

Short Communication

Critical Assessment of The Carbon Emissions Impact of a Professional Men's Football League

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Abstract

Objectives: This paper aims to estimate the travel-related emissions of a typical professional men's football season. We will outline the first attempt at quantifying carbon emissions amidst the climate crisis.

Methods: We used a group of traveling participants and a validated carbon emissions calculator. The fixture draw was published on the competition website, and we utilized travel distances from the major cities closest to those with available flights.

Results: The total carbon emissions related to travel was 1249 metric tonnes (mT), with an average of 5mT per participant. We found the range of emissions per week from 32mT to 62 mT, which was inversely related to the number of games played between teams from the same city.

Conclusions: Travel-related carbon emissions from a typical professional men's football season are significant. Better understanding through more accurate monitoring will help to drive policy to limit sport's contribution to climate change.

SYNOPSIS

Travel related an emission from a professional football league is significant. Mitigation of these emissions will reduce a large burden of carbon emissions and the leagues contribution to climate change.

Practical Implications

- Carbon emissions related to travel for a professional sporting league are significant.
- Consideration of the burden of emissions should be taken into consideration when designing the fixture schedule.
- Fixture rounds with more derby games had less travel related emissions.

INTRODUCTION

In 2019, a novel coronavirus caused a cluster of viral pneumonia cases in Wuhan, China. In the ensuing months, the situation became a global pandemic and has subsequently affected almost every aspect of our daily lives. In early 2020, travel by commercial airlines plummeted as stay-at-home orders were instituted. This resulted in carbon emissions reductions across the world [1-6]. For many, life ground to a halt with canceled regular entertainment activities, including sporting and music events. Expressly, sporting competitions were canceled or postponed, often utilizing so-called "hubs" In dealing with a 100-year pandemic, we also face a climate crisis [7,8]. Throughout the 20th-century human activity has resulted in the significant release of carbon dioxide (CO₂) into the atmosphere with a

consensus that we need to keep the concentration of CO₂ to less than 350 parts per million (PPM). In 2021, the concentration of CO₂ in the atmosphere is over 400PPM, and we have increased the global surface temperature by 1°C. We need to hold warming to below 2°C to avoid catastrophic destabilization of our climate [9]. The threat of climate change will increasingly affect the daily lives of all people, and we should look for ways to minimize our impact by reducing carbon emissions.

Australia is a large country characterized by a dense population in coastal regions and major cities spread across the landmass. The professional men's football league – A-League Men (ALM) is played in Australia from September through May. The competition comprises 12 teams spanning eight major cities across Australia and New Zealand. The competition requires teams to travel significant distances every year to compete. With this extensive travel come significant travel-related emissions. There has been no study quantifying the travel-related emissions of professional sport.

This paper will estimate the carbon emissions of a typical professional football season and present a novel argument for considering the emissions burden of travel associated with a professional football competition.

METHODS

We estimated the lowest possible emissions for each traveling team for this study. We estimated the minimum number of traveling players and staff, including 16 players, two coaches, one medical, and one logistic staff member. We used the International

Civilian Aviation Organization (ICAO) emissions calculator with return flights for 20 traveling participants to estimate flight-related travel emissions. The most direct routes were selected, and when origin and destination were not available in the calculator, the closest cities were selected [10]. Ground transport and low or zero-emissions travel are possible alternatives to air travel and were not accounted for in this assessment.

When teams from the same city played each other, we assumed zero emissions. This affected teams from Sydney, Melbourne, and Northern New South Wales.

RESULTS

Using the ICAO emissions calculator, total emissions were 1249 metric tonnes (mT). Twelve teams, each with 20 participants, were included in our calculations. Each participant was responsible for 5mT CO₂ emissions (CO₂e). For each round of games, emissions ranged from 32mT to 62mT and were inversely correlated with the number of games between teams from the same city (derby games), with mean emissions of 48mT per week (Table 1,2). On weeks with no derby games, the average emissions per game were 55mT, and weeks with three derby games averaged 32mT per week. This represents significant savings due to reductions in travel-related emissions on weeks where teams from the same city play each other.

Table 1: Demographics.

Travellers / team	20
No teams	12
Total travellers	240

Table 2: Emissions Data.

Total (kg CO2)	1,249,169
Total (mT CO2)	1,249
Weekly Low (kg CO2)	32,934
Weekly High (kg CO2)	62,934
Emissions / person (mT CO2)	5

DISCUSSION

Climate change is the greatest threat to our current way of life. The Organisation for Economic Cooperation and Development (OECD) found the average yearly emissions in Australia to be 22.4mT per individual. According to the Intergovernmental Panel for Climate Change (IPCC) 6th Assessment report, average emissions in developing countries are close to 4mT per year [9]. This means that the emissions footprint per traveling participant is greater than the yearly emissions of a person living in a developing country.

The National Transport Commission (NTC) estimates 180.5g of CO₂e per kilometer for average passenger vehicles in Australia. Electric vehicles also make up less than 5% of total vehicles currently in use [11]. We did not assess for vehicle emissions because we could not account for the travel patterns of teams and their ground transport utilization. However, with the increased utilization of electric vehicles, there may be an opportunity to reduce travel-related emissions in the future significantly.

We found an inverse relationship between the number of games played by teams in the same cities and weekly travel emissions. This may represent a strategy for restructuring the game schedule to reduce the travel burden. An additional strategy may be to group games together to minimize travel emissions.

IMPLICATIONS

Travel by air is necessary to facilitate the running of a national competition, thus making emissions unavoidable. Given the substantial emission burden amidst a global climate crisis, there may be cause for assessing scheduling to reduce these emissions. The COVID19 pandemic forced the league into playing in “hubs” in 2020 [12]. These reduced emissions significantly; however, it may have taken away from part of the tradition of teams playing in home stadia in front of supporters. Professional sporting leagues should balance their travel needs with the burden of their carbon emissions. In doing so, clubs and sporting bodies will spread the message of climate change and hopefully spurn action in this area among the public.

LIMITATIONS

This study is limited in that this is a novel methodology for assessing travel-related emissions. There is, however, precedent for this method in the literature, namely regarding emissions impacts in medical residency interviews in Canada and the United States of America [13-16]. We did not survey the teams directly about their travel, so our estimates may not represent their actual patterns. This may represent an avenue for future research that could inform decisions for travel. Carbon emissions are not a metric associated with professional sporting teams; however, there is precedent for assessing this topic. Formula One has committed to being carbon zero by 2030, highlighting the growing support for reducing carbon emissions within their fan base [17].

CONCLUSION

Air travel-related emissions associated with the Australian Men's professional football league were significant and were equivalent to the total yearly emissions for a person from a developing nation. Awareness of the emissions burden of flight-related travel should be seen as an opportunity to organize seasons to limit emissions while also achieving commercial outcomes of the league.

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