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Sustainability in Mega Sport Events: between Tokyo 2020 and Paris 2024

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INTRODUCTION

Nowadays the theme of "sustainability" is very popular. This is due to the fact that people have become more aware of the damages caused by the human being to the environment through the catastrophic events that intensified in the last years.

The final objective of this work is to make the readers understand how much the topic of sustainability is treated when a Mega Sport Event (MSE) is implemented and to make them more aware of the efforts and strategies adopted by the International Olympic Committee and by the last two Organising Committee of the Games, Tokyo 2020 and Paris 2024.

It is an interesting aspect to analyse, because of the big amount of people that these events are able to move among fans, athletes, staff and media, as well as involving an obliged host cities' transformation. Therefore, it is important that the MSEs start adopting measures for reducing their economic, social and environmental impact in a way that allows to contribute to fight against climate change.

The work is structured as follows.

In the first chapter, we are going to look at the origins of the sustainability term and the treaties, agendas and standards that have been adopted by the countries around the world for trying to limit the damages. The sustainability standards that we are going to look at, are the mainly used in European Union and in Asia-Pacific region because of the scope of the entire work. Another thing that we are going to focus on in this section is the reason why it is important to pay attention to sustainability and what the IPCC panel is telling us about climate change situation. This panel has, in fact, the role of assessing impacts and risks related to climate change and the role of looking for solutions for adaptation and mitigation.

Then, in the second and third sections we are going to deal with MSEs and their sustainability and with the origins of Olympics and Paralympics. It is going to be interesting investigating how the most famous MSEs like Olympic and Paralympic Games and FIFA World Cups have adapted to this new global model in which the environmental and social aspects are fundamental for the successful development of the event. We are going to study the impact assessments in MSEs and how these two types of events made an effort to include sustainability in their organisation over the years.

Finally, in the last chapter we are going to study the sustainability strategies used by Tokyo 2020 and by Paris 2024. As we are going to see, many were the doubts and criticisms towards them. An investigation into what public opinion thinks about these two events is also going to be realized.

CHAPTER I. SUSTAINABILITY

1.1 What is sustainability?

The term "sustainability" is generally defined by many authors as the capacity to maintain and to support a process over time. While sustainability is the final state to reach, sustainable development is the process through which realizing it (Laine et al., 2022).

Sustainable development was firstly defined by the World Commission on Environment and Development (WCED) in 1987 in a report called "Our common future" or "Brundtland Report" (because of the Commission's chairwoman name that was Gro Harlem Brundtland) as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The Brundtland Report highlighted that the major global environmental challenges were caused by the poverty of the South of the world and the unsustainable practices of consumption and production of the North of the world. So, this report aims to introduce a strategy that integrate development and environment, commonly known as sustainable development (are.admin.ch, 2024).

Already in the 60's and in the 70's we had a lot of key publications and key events that marked the transition to a more conscious way of living. In fact, the purpose of the Brundtland Report was to examine and to address the issues raised in the previous decades by for example Rachel Carson's Silent Spring (1962), Garret Hardin's Tragedy of the Commons (1968), the Blueprint for Survival by the Ecologist magazine (1972) and the Club of Rome's Limits to Growth report (1972) (sd-commission.org.uk, 2024).

Prior to the Brundtland Report in 1972 there was the UN Conference on the Human Environment in Stockholm, the first conference in which the environment was identified as the major issue. The results of this conference were the publications of the UN Environment Programme and the Stockholm Declaration and Action Plan for the Human Environment. The latter contained 26 principles prioritizing environmental issues at global level and marking the beginning of a dialogue between developed and developing countries on the link between economic growth, air pollution, water, oceans and well-being of people (un.org, 2024).

1992 was another important year: there was the UN Conference on Environment and Development (UNCED) also known as "Earth Summit" in Rio de Janeiro. It was held for the 20th anniversary of the first environmental conference in Stockholm. Its focus

was on the impacts of human socio-economic activities on the environment, and it recognized that for sustaining human life on planet is crucial to integrate and to balance environmental, social and economic concerns in fulfilling our needs. The results of the Earth Summit were numerous:

- Agenda 21
- Rio Declaration and its 27 universal principles
- UN Framework Convention on Climate Change (UNFCCC)
- Convention on Biology Diversity
- Declaration on the principles of forest management
- Commission on Sustainable Development

In 1997 the adhering members of UNFCCC defined the Kyoto Protocol, an international treaty on global warming, that entered into force in 2005. Today the parties under this protocol are 192 (191 and the UE). It set the targets to meet for the period from 2008-2012 for cutting GHG emissions, but then in December 2012 with the Doha Agreement there was the extension from 2012 to 2020 with further objectives to reach. It basically asks to the industrialized countries to limit and reduce GHG emissions adopting specific policies and measures on mitigation and having also to report them periodically. It is inspired by the principle of "common but differentiated responsibilities and capabilities", because the developed countries are the main responsible for the high levels of emissions currently present in the atmosphere, so that their contribution has to be much more relevant with respect to the underdeveloped ones (unfccc.int, 2024).

Some years after, in 2015, during the UN Climate Change Conference (COP 21) in Paris, was signed the historic Paris Agreement. It entered into force in 2016 and 195 (194 and the UE) parties taken part to it. It aims to reduce global GHG emissions to hold global temperature increase well below 2 degrees above pre-industrial levels and to limit it to 1.5 degrees above pre-industrial levels. The Paris Agreement has marked the start of the transition towards a net-zero emissions world and its implementation is fundamental for the achievement of the Sustainable Development Goals (SDGs) (un.org, 2024).

In the same year the United Nations have adopted the 17 SDGs – related to social, environmental and economic issues – with 169 targets to reach at least by 2030 (for this reason is also called UN Agenda 2030). They are applicable to all the countries around the world, not just the developing ones. These goals were established to end poverty, to

protect the planet and to reach peace and prosperity. Every year the UN General Secretary presents the annual SDG progress report developed in cooperation with UN System, based on data produced by national statistical systems and information collected at regional level (sdgs.un.org, 2024). Each goal represents a key global challenge, and they are all interlinked, because activities to address one aspect can have positive or negative impacts on the others. We cannot address one problem without considering its connections with the other challenges (Laine M. et al, 2022).

With the introduction of the UN Agenda 2030, an important accounting framework was developed: the triple bottom line (TBL). The term was used for the first time in 1994 by John Elkington, with the purpose of improving conditions of people and environment and so, going beyond profits. This framework, in fact, revolves around the three Ps: people, planet, profit (IBM.com, 2024).

Figure 1.1: SDGs (sdgs.un.org, 2024)

The concept of sustainability has grown in importance since nowadays we are using a lot of natural resources, more than what Earth is able to produce, and that the population and economy are growing faster than in the past. The overshoot day is the date of the year at which humanity's demand for natural resources and services exceeds the regenerative capacity of the Earth (overshoot.footprintwork.org, 2024), and it is coming earlier year by year as we can see from the figure 1.1 below.

In 2023 the overshoot day, calculated every year from the Global Footprint Network, was on 2nd August and for the rest of the year we were in debt with the planet's resources. In this historical period, we are consuming resources as if we had 1.7 Earths. Based on the actual trends this is going to increase until 2 Earths by 2030 (wwf.it,

2024). Knowing that population is going to increase in the future, we have to take some kind of actions, because, as the Secretary-General of UN Ban Ki-Moon said in COP22, "there's no planet B". There are a lot of actions that we can take to start making the difference, such as: food waste prevention, recycling, financing decarbonization, land stewardship for low impact beef production, improve emissions standards for trucks, use of renewable energy etc.
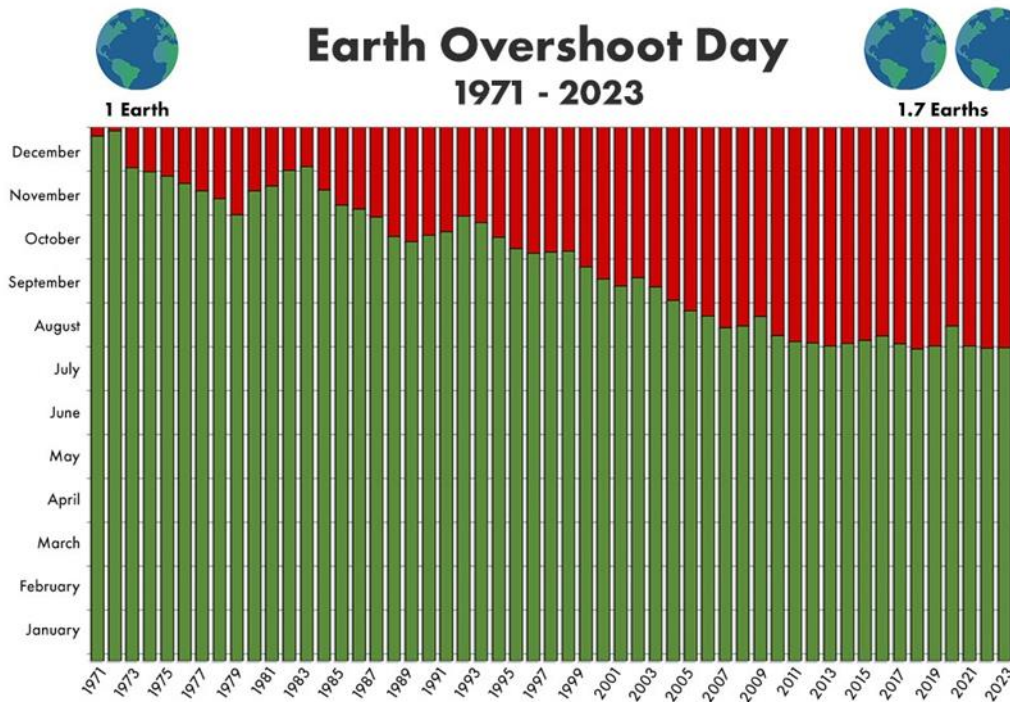
Figure 1.2: Overshoot day from 1971 to 2023 (National Footprint and Biocapacity Accounts 2023)

Sustainability can be analysed from two different perspectives (Jérôme Pelenc et al., 2015): strong sustainability and weak sustainability.

Strong sustainability (figure 1.2 a) assumes that the three dimensions of environment, social and economy are not to be considered on the same level, because natural capital and manufactured capital are not interchangeable but rather complementary.

They are complementary because they are different: manufactured capital is reproducible and its destruction is usually not irreversible, while on the opposite the consumption of natural capital is irreversible (Jérôme Pelenc et al., 2015). The destruction of the natural capital implies the disappearance of ecosystem goods and services that are vital to human welfare (tapio.eco, 2024). So, there is a problem of intergenerational justice because future generations have the right to breath non-polluted

air and to find still intact natural resources. Some elements are considered to be critical because of their unique contribution to the human well-being.

Weak sustainability (figure 1.2 b) assumes that all the three dimensions of environment, social and economy have the same weight, and for this reason natural capital could be replaced by manufactured capital without generating any kind of difference in the common well-being. What really matters in this perspective is the overall worth of the combined capital assets, which should be sustained or enhanced for the prosperity of future generations (Jérôme Pelenc et al., 2015). This kind of approach was very popular during the Enlightenment, but more recently we have understood that natural resources are not infinite and that using this model we are contributing to maximising monetary compensation for environmental degradations, so we have tried to develop new approaches (tapio.eco, 2024).
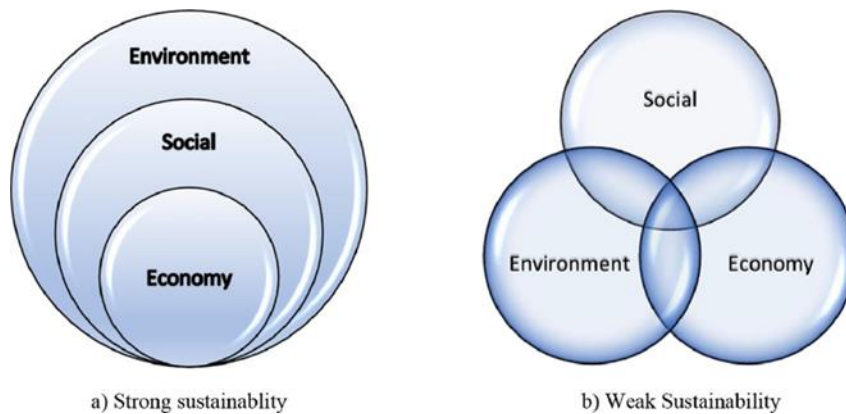
Figure 1.3: Sustainability perspectives (Jérôme Pelenc et al., 2015)

In order to control, to verify and to measure the organizations' commitment towards sustainability, we have to take into account all the three dimensions: Environmental, Social and Governance (Bellini M., 2021). The term "ESG" is the acronym of them and was firstly used in 2004 in a publication called "Who Cares Wins – Connecting Financial Markets to a Changing World", research conducted by several financial institutions under the guide of the general secretary of United Nations Kofi Annan (Adonopoulos G. and Napoletano E., 2023). All the three dimensions are interrelated, and I will try to explain them here below.

1.1.1 Environmental sustainability

The environmental sustainability is the first pillar. It focuses on the well-being of the environment. Within this factor can be included: the use of natural resources such as

land, water or air, waste management, climate change adaptation and mitigation, pollution prevention, biodiversity protection.

At least six of the United Nations SDGs are focus on environmental sustainability:

1. Clean water and sanitation
2. Affordable and clean energy
3. Sustainable cities and communities
4. Responsible consumption and production
5. Life below water
6. Life on land

This pillar has become more and more relevant over time due to the increasing likelihood and severity of negative climate events over the last decades in all parts of the world, such as for example floods, hurricanes, fires (McCarthy N., 2022).

One of the main problems about this pillar is greenwashing. It involves the use of marketing techniques to mislead the public into believing that company's products, aims and policies are environmentally friendly. It is usually used to divert the attention from unsustainable business practices. The term "greenwashing" was coined in 1986 by the environmentalist Jay Westerveld. One way through which companies can try to prevent it is by adopting recognized standards released by valid organizations (McCarthy N., 2022), such as the Global reporting initiative (GRI) standards and the Sustainability Accounting Standards Board (SASB), to name a few of them.

1.1.2 Social sustainability

Social sustainability focuses on the well-being of people and communities. Within this factor can be included: human rights, fair labour practices, living conditions, health, safety, wellness, diversity, equity, work-life balance, empowerment, community engagement. Nine of the 17 United Nations SDGs are related to this dimension:

1. No poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Decent work and economic growth
7. Reduced inequalities

8. Sustainable cities and communities
9. Peace, justice and strong institutions

The social pillar impacts are the least easy to quantify and to measure among the three dimensions, but also the easiest to identify (adecesg.com, 2024). For this reason, guidelines are provided by international frameworks, such as GRI and SASB as we have just told for the environmental pillar.

Companies have to consider also the human cost in doing business, because social sustainability mitigates risk and so ignoring it can lead to liabilities for both their brand and products quality (Rice P., 2024). This means that if a company decide to not take social sustainability into account – not investing in safety, not guaranteeing adequate wages etc. – it could then be subject to even higher costs in order to remedy to damages and incidents it has caused to people or communities. So, ignoring social sustainability leads to undermine public health and to cause disasters ruining companies own investments, and at the same time leads also to have to pay a lot for all of this.

By investing in social sustainability, companies can transform these liabilities into valuable assets. When you provide safer working conditions, living wages, and job security, you create a more secure supply chain ensuring the integrity of your product.

In the last few years there has been an increase in conscious consumers, so in people caring about the impact of the products they buy (Rice P., 2024). The consumer knows that choosing one product rather than another one leads to some kind of consequences.

1.1.3 Economic sustainability

Four of the 17 United Nations SDGs are related to the economic pillar:
1. No poverty
2. Decent work and economic growth
3. Industry, innovation and infrastructure
4. Responsible consumption and production

To achieve sustainability, profitability is crucial, without never forgetting the others two pillars. Pursuing profit without taking into account the consequences is not what the economic pillar concerns: it is about compliance, proper governance, and risk management. Sometimes, this pillar can be also called "governance pillar", referring to

boards of directors and management aligning with shareholders', employees', value chains actors' and customers' interests. The economic or governance pillar of sustainability involves practices which help to maintain company's values aligned with those of society, such as honest accounting, transparency, and regulatory compliance (investopedia.com, 2024).

1.2 Why is it important to be more sustainable?

There are many reasons why it is important to be more sustainable. To improve firms' reputation, to increase firms' profitability, but certainly the most important one is to preserve the planet health from climate-related disasters.

Focusing on the latter, it is fundamental to try to limit the likelihood and the severity of occurrence of climate-related risks, that can be both physical (acute or chronic) or about transition. Year by year we are noticing an increasing in severe weather events caused by climate change. Regardless of where we live – along the coast or in the inside land – we are all exposed to some kind of climate risk. To make an example, in 2020 in the USA there were climate disasters for an amount of $95 billion in damages and $2 trillion since 1980. As a result, people living in regions susceptible to floods or to other extreme events, are seeing the costs of their properties insurance rise. Also the governments have to find solutions to the great amount of damages incurred by their infrastructures. So, to identify and to mitigate these climate risks, we need to use risk analysis approaches in order to incorporate the levels of exposure in the decision making processes. Understanding possible risks and trying to be prepared for them is the best possible way to mitigate their impacts (Patnaik S., 2022).

To better understand climate-related risks we have to make a distinction between transition risks (see figure 1.4) and physical risks (see figure 1.5). As reported by the Task Force on Climate-related Financial Disclosures (TCFD) launched in 2015, transition risks are those that arise from the transition to a low-carbon and climate-resilient economy. Transitioning to a low-carbon economy requires policy, legal, technology, market and reputation changes. In regulations we do not have clear classification of them, because each firm can consider different types of transition risks as they all have different transition plans.

Then there are the physical risks. As reported by the Draft European Reporting Standards in 2023 "physical risks are risks that arise from the physical effects of climate change". They include acute and chronic risks, that can be in both cases temperature-related, wind-related, water-related and solid mass-related. The acute ones are the risks arising from particular hazards such as for example hurricanes, floods, avalanches. The chronic risks are those arising from long-term changes in the climate such as for example sea level rise, heat stress, coastal erosion.

Examples of climate-related transition events (examples based on TCFD classification)			
Policy and legal	**Technology**	**Market**	**Reputation**
Increased pricing of GHG emissions	Substitution of existing products and services with lower emissions options	Changing customer behaviour	Shifts in consumer preferences
Enhanced emissions- reporting obligations	successful investment in new technologies	Uncertainty in market signals	Stigmatization of sector
Mandates on and regulation of existing products and services	Costs of transition to lower emissions technology	Increased cost of raw materials	Increased stakeholder concern
Mandates on and regulation of existing production processes			Negative stakeholder feedback
Exposure to litigation			

Figure 1.4: Examples of transition risks (TCFD)

Classification of climate-related hazards (Source: Commission delegated regulation (EU) 2021/2139)				
	Temperature-related	**Wind-related**	**Water-related**	**Solid mass-related**
Chronic	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
	Heat stress		Precipitation or hydrological variability	Soil degradation
	Temperature variability		Ocean acidification	Soil erosion
	Permafrost thawing		Saline intrusion	Solifluction
			Sea level rise	
			Water stress	
Acute	Heat wave	Cyclones, hurricanes, typhoons	Drought	Avalanche
	Cold wave/frost	Storms (including blizzards, dust, and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

Figure 1.5: Classification of physical risks (Commission delegated regulation EU 2021/2139)

In order to monitor the climate change situation over the years, in 1988 the Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP).

The IPCC is defined by them as "the United Nations body for assessing the science related to climate change". Its objective is to provide a holistic scientific vision of the actual state of climate change and its future impacts and risks on environment, society and economy, and to develop options for adaptation and mitigation (ipcc.ch, 2024).

The IPCC has 195 members that are part of the UN or WMO. IPCC is not engaged in direct research activities, but there are volunteer experts and governments around the world that analyse and evaluate thousands of scientific papers published during each year and every six years they summarize in reports the actual knowledge about climate change.

The IPCC assessments are not binding for governments but can be used as a basis for the development of climate related policies. The reports just inform policymakers on what scientists know about climate change (ipcc.ch, 2024).

The Panel arranges meetings of government representatives (Plenary Sessions) to take the major decisions. Then there is the IPCC Bureau (elected by governments' members) that meets regularly to provide guidance on scientific and technical aspects of the work. Then there are three Working Groups, a Task Force and a Task Group which work on the IPCC. Their activities are supported by a Technical Support Unit (ipcc.ch, 2024). As the Panel explains:

- Working Group I deals with the physical science basis of climate change. The main topics discussed in this group are: extreme weather, glaciers and ice sheets, oceans and sea level, GHG and aerosols in the atmosphere, hydrological cycle and changing precipitation patterns, biogeochemistry and the carbon cycle, climate sensitivity, temperature changes in the air, land and ocean. Its task is to provide relevant information on how the climate system is changing and the related causes.
- Working Group II deals with climate change impacts, adaptation and vulnerability. It assesses vulnerabilities of natural and human systems and adaptation and mitigation options to reduce the climate-related risks.

- Working Group III deals with the mitigation of climate change. It assesses methods for reducing greenhouse gas emissions and removing it from the atmosphere taking both short-term and long-term perspectives.
- Task Force on National Greenhouse Gas Inventories objective is to develop and improve the methodology for the computation and reporting of GHG emissions and removals and to promote its use among the participating countries.

There are three types of report: Assessment Reports, Special Reports and Methodology Reports. Since 1988, the IPCC has produced five Assessment Reports and it is currently concluding the sixth assessment cycle (2015-2023), the most ambitious one so far.

The Sixth Assessment Report (AR6) includes the three Working Groups contribution and a Synthesis Report. The latter combines the Working Group I, II and III findings with others three Special Reports: Special Report on Global Warming of 1.5°C (SR15, October 2018), Special Report on Climate Change and Land (SRCCL, August 2019) and Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC, September 2019). Within this new assessment cycle were also updated the methodologies in the 2019 Refinement to the 2006 Guidelines on National Greenhouse Gas Inventories (ipcc.ch, 2024).

Key findings from this sixth assessment report are (earth.org, 2024):
- *"Climate change is the result of more than a century of GHG emissions due to human activities"*. These gases trap heat and cause global temperatures rise. Global fossil fuel consumption and agricultural practices have constantly increased from 1900 to nowadays.
- *"Global temperatures are rising"* a lot compared to pre-industrial levels (have increased by 1.1 degrees in 2011-2019 compared to 1850-1900), "*glaciers are melting*" (2/3 of Earth's glaciers may disappear by 2100 under current warming trends) and "*sea levels are rising*" with the risks of displacement of 1/10 of people with also economic and cultural consequences.
- *"The frequency and intensity of extreme weather events are increasing"*. This causes huge damages to people and economy. There is evidence that these events are mostly due to global temperatures rise.
- *"Oceans acidification is accelerating"* (it has increased by 30% from pre-industrial levels and it has negative impacts on ecosystems and biodiversity), *"biodiversity is decreasing"* (due to climate change, habitat destruction and

overfishing) and *"water is becoming increasingly scarce"* (4 billion people are going to experience water scarcity if global warming reaches 4 degrees).

- *"Climate change is exacerbating existing inequalities"*. This happens because developing countries with respect to the developed ones are facing in a disproportionate way the effects of climate change even if they insignificantly contribute to GHG emissions.

- *"The global economy is vulnerable to the impacts of climate change"*. Climate disasters can cause huge economic losses disrupting supply chains and eroding consequently global GDP.

- *"We have options in all sectors to at least halve emissions by 2030"*. We could reduce GHG emissions by 40/70% by 2050 if we could change our behaviours and lifestyles through the new right technologies and policies. Many countries have implemented carbon pricing systems such as carbon taxes and emissions trading schemes.

- *"International cooperation is required to tackle climate change"*. It means that international agreements, initiatives and policies are needed to reduce GHG emissions.

An important update made by the AR6 is the substitution of the Representative Concentration Pathways (RCPs) of the AR5 with the Shared Socioeconomic Pathways (SSPs), to simulate future scenarios related to climate change. Depending on what we will do in the next decades in terms of emissions, different scenarios could take place.

Five key SSPs have been developed with complex Integrated Assessment Models and each of them differs in terms of assumptions about socioeconomic – such as population, education, energy use - and technological evolution (Riahi K. et al., 2017):

1. *SSP 1: Sustainability – Taking the Green Road (low challenges to mitigation and adaptation)*

   "The world shifts gradually, but pervasively, toward a more sustainable path, emphasizing more inclusive development that respects perceived environmental boundaries. Management of the global commons slowly improves, educational and health investments accelerate the demographic transition, and the emphasis on economic growth shifts toward a broader emphasis on human well-being. Driven by an increasing commitment to achieving development goals, inequality is reduced both across and within countries. Consumption is oriented toward low material growth and lower resource and energy intensity."

2. *SSP 2: Middle of the Road (medium challenges to mitigation and adaptation)*

   "The world follows a path in which social, economic, and technological trends do not shift markedly from historical patterns. Development and income growth proceeds unevenly, with some countries making relatively good progress while others fall short of expectations. Global and national institutions work toward but make slow progress in achieving sustainable development goals. Environmental systems experience degradation, although there are some improvements and overall the intensity of resource and energy use declines. Global population growth is moderate and levels off in the second half of the century. Income inequality persists or improves only slowly and challenges to reducing vulnerability to societal and environmental changes remain."

3. *SSP 3: Regional Rivalry – A Rocky Road (high challenges to mitigation and adaptation)*

   "A resurgent nationalism, concerns about competitiveness and security, and regional conflicts push countries to increasingly focus on domestic or, at most, regional issues. Policies shift over time to become increasingly oriented toward national and regional security issues. Countries focus on achieving energy and food security goals within their own regions at the expense of broader-based development. Investments in education and technological development decline. Economic development is slow, consumption is material-intensive, and inequalities persist or worsen over time. Population growth is low in industrialized and high in developing countries. A low international priority for addressing environmental concerns leads to strong environmental degradation in some regions."

4. *SSP 4: Inequality – A Road Divided (low challenges to mitigation and high challenges to adaptation)*

   "Highly unequal investments in human capital, combined with increasing disparities in economic opportunity and political power, lead to increasing inequalities and stratification both across and within countries. Over time, a gap widens between an internationally connected society that contributes to knowledge- and capital-intensive sectors of the global economy, and a fragmented collection of lower-income, poorly educated societies that work in a labour-intensive, low-tech economy. Social cohesion degrades and conflict and unrest become increasingly common. Technology development is high in the

high-tech economy and sectors. The globally connected energy sector diversifies, with investments in both carbon-intensive fuels like coal and unconventional oil, but also low-carbon energy sources. Environmental policies focus on local issues around middle and high-income areas."

5. *SSP 5: Fossil-fuelled Development – Taking the Highway (high challenges to mitigation and low challenges to adaptation*

"This world places increasing faith in competitive markets, innovation and participatory societies to produce rapid technological progress and development of human capital as the path to sustainable development. Global markets are increasingly integrated. There are also strong investments in health, education, and institutions to enhance human and social capital. At the same time, the push for economic and social development is coupled with the exploitation of abundant fossil fuel resources and the adoption of resource and energy-intensive lifestyles around the world. All these factors lead to rapid growth of the global economy, while global population peaks and declines in the 21st century. Local environmental problems like air pollution are successfully managed. There is faith in the ability to effectively manage social and ecological systems, including by geo-engineering if necessary."

As we can see from the figure 1.6 below, SSP 1 leads to low mitigation challenges due to the development of low-carbon technologies, the facilitation of international cooperation and the use of renewable energy. It also implies low challenges for adaptation thanks to improvements in human well-being and institutions. SSP 2 faces moderate challenges for mitigation and adaptation. We have moderate development trends from all points of view with some differences among countries. SSP 3 implies high mitigation challenges because of the dependency on fossil-fuels, the lack of international cooperation and the difficulty in changing and improving technologies. It also leads to high adaptation challenges due to slow income growth, to low investments in human capital and to ineffective institutions. SSP 4 is a mixed scenario in which is difficult to adapt to climate change and is easier to mitigate it. In fact, it faces low mitigation challenges thanks to a strong international cooperation and to the development of low-carbon technologies, and high adaptation challenges caused by a big proportion of population at low levels of development with limited access to institutions. Lastly, we have SSP 5 that is another mixed scenario, in which this time is difficult to mitigate climate change and is easier to adapt to it. It leads to high mitigation

challenges because of the strong dependence from fossil-fuels and to low adaptation challenges due to human development achievements, economic growth and highly engineered infrastructure (O'Neill et al., 2017).

Figure 1.6: Five Shared Socioeconomic Pathways (O'Neill et al., 2017)

1.3 International sustainability reporting standards and frameworks

Sustainability reporting is a term generally used to describe the practices and tools through which a company can communicate to its stakeholders what are its own strategies, performance and impacts on environment, society and economy. This practice nowadays is mostly a voluntary practice, even though is widely used by many large firms (Laine et al., 2022).

There are several reporting standards and frameworks that can help organizations to prepare their reports in a clear and reliable way discouraging green-, blue- or whitewashing (Laine et al., 2022). In fact, firms that decide to disclose non-financial information can reach a better degree of transparency and reputation.

In the last decades has become increasingly important to report how social and environmental resources are being used. As a matter of fact, have been elaborated a multiplicity of approaches through which companies can be guided in the disclosure of non-financial information. There are some globally widespread frameworks and standards, while others that are exclusively or more related to some specific areas. Beginning from the most used ones we have GRI (Global Reporting Initiative)

Standards, <IR> (Integrated Reporting) framework, SASB (Sustainability Accounting Standards Board), ISSB (International Sustainability Standards Board), TCFD (Taskforce on Climate-related Financial Disclosure) and CDP (Carbon Disclosure Project).

In 2000 was launched the first edition of the GRI guidelines. During the years they have been subject to a series of updates and improvements leading to the actual GRI Standards. Their objective is to enable firms and organizations of any dimension to understand and to report in a transparent way their impacts on economy, environment and society. They include three series of standards which are known as universal standards, sector standards and topic standards (globalreporting.org, 2024).

Another framework, even if it is more difficult to apply with respect to GRI, is the <IR> framework. It was elaborated by the International Integrated Reporting Council (IIRC) in 2013 and then it was updated in 2021. Its audience is represented by investors and the key idea that stands below it, is to develop a report in which companies have to disclose how they create value in the short, medium and long-term using six types of capital: financial, manufactured, intellectual, human, social and relationship, natural (Laine et al., 2022). It is adopted by approximately 15% of the number of companies using GRI Standards (Bose S., 2020).

Companies can also use SASB standards. SASB is a non-profit organization founded in 2011 in the United States by Jean Rogers. It enables companies to disclose industry-based information about sustainability-related risks and opportunities that can have a relevant impact on the financial performance. SASB identified the most important standards in 11 sectors for 77 industries. It also plays an important role in the application of ISSB standards, due to the fact that the latter requires industry-specific disclosures to be implemented (sasb.ifrs.org, 2024).

In 2021 at COP26 in Glasgow there was the announcement of the realization of the ISSB by the International Financial Reporting Standards (IFRS) Foundation (ifrs.org, 2024). In June 2023 were issued the first two IFRS Sustainability Disclosure Standards: IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosure (Laine et al., 2022). They are projected to provide indications for companies on what type of information on sustainability issues they should disclose in order to help investors to take the right

decisions. This framework is based not only on SASB but also on TCFD as well as collaborating with GRI Standards (kpmg.com, 2024).

There are also a certain number of frameworks more related to climate indicators, and the most important ones are CDP and TCFD. CDP was established in 2000. It is a non-for-profit charity that helps companies, cities, regions and states to disclose their environmental impacts. CDP hosts the largest database of corporates and cities information about their actions to climate, deforestation and water security (cdp.net, 2024). In 2015 was then created the TCFD by the Financial Stability Board (FSB). It establishes recommendations to companies on how to disclose information about climate-related risks and opportunities, increasing transparency in order to support lenders, investors and insurance underwriters. Now the number of TCFD supporters is around 4900 organizations from more than 100 different countries (fsb-tcfd.org, 2024). These were the globally accepted and most used frameworks around the world but is interesting to have a look on how things are going in different parts of the world. For the purposes of this work, we will focus on the European Union and on Asia Pacific region.

1.3.1 EU sustainability reporting standards and frameworks

European Union is currently the world leader in ESG regulations. It is the biggest supporter of the transition to a low-carbon, resource-efficient and sustainable economy. EU law requires the disclosure of information related to social and environmental risks and opportunities by certain categories of firms. In addition to the frameworks already mentioned above, in EU in 2023 was established the Corporate Sustainability Reporting Directive (CSRD) and according to the Directive (EU) 2022/2464 of the European Parliament and of the Council, it applies to:

- Listed companies on EU regulated market (including listed SMEs, no micro-enterprises)
- Large companies exceeding 2 of the 3 criteria:
  - 250 employees during the financial year
  - Balance sheet total EUR 20 million
  - Net turnover EUR 40 million
- Small and non-complex financial institutions and captive insurance and reinsurance undertakings
- Non-EU companies generating a net turnover of more than EUR 150 million and having a subsidiary in the EU that follow the criteria applicable to EU

companies or a branch in the EU generating more than EUR 40 million net turnover

This Directive is applicable from different accounting years for different types of companies. The first companies to apply have to do it in 2024 financial year for reports that will be published in 2025.

These reports have to be elaborated in accordance with European Sustainability Reporting Standards (ESRS), that were produced in a draft form by the European Financial Reporting Advisory Group (EFRAG). The first set of 12 standards was published in 2023 in the Official Journal as a delegated regulation and it comprises two types of cross-cutting standards and ten types of topical standards:

- ESRS 1 General Requirements
- ESRS 2 Disclosure Requirements
- ESRS E1 Climate change
- ESRS E2 Pollution
- ESRS E3 Water and marine resources
- ESRS E4 Biodiversity and ecosystems
- ESRS E5 Resource use and circular economy
- ESRS S1 Own workforce
- ESRS S2 Workers in the value chain
- ESRS S3 Affected communities
- ESRS S4 Consumers and end-users
- ESRS G1 Business conduct

It has to say that ESRS standards and GRI standards are closely aligned thanks to the publishment of the joint statement of interoperability that has highlighted the strict cooperation among them during the development of the ESRS draft in order to prevent the need of double reporting by companies (efrag.org, 2023).

Another important transparency tool adopted by the European Union in 2020 is the EU Taxonomy. It is a classification system in which are defined the criteria through which determining whether an economic activity can qualify as environmentally sustainable for the purposes of establishing the degree to which an investment is environmentally sustainable (finance.ec.europa.eu, 2024). According to this regulation, there are four

conditions that an economic activity has to meet in order to be considered environmentally sustainable:

1. Contributes substantially to one or more of the environmental objectives: climate change mitigation, climate change adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control and the protection and restoration of biodiversity and ecosystems

2. Does not significantly harm any of the environmental objectives

3. Is carried out in compliance with the minimum safeguards

4. Complies with technical screening criteria that have been established by the Commission

This regulation refers to single economic activities as every organization performs many.

1.3.2 Asia Pacific sustainability reporting situation

In 2023 KPMG, one of the largest financial statement auditing firms in the world with PWC, E&Y and Deloitte, has published a report in which was analysed the evolution of sustainability reporting in Asia Pacific.

What this report suggests is that ESG regulatory environment in this region has evolved in the last decades. Governments and organizations have begun to give growing importance to sustainable practices and responsible behaviours. The models and systems used to include sustainability issues are actually highly different across the various jurisdictions, even though ISSB's release of the S1 and S2 standards has provided an international basis. Beyond ISSB, also the others global reporting frameworks are being used as a reference point for the Asia Pacific disclosure regulations.

It is useful to take some examples of countries included in this area to see how they are behaving in practice.

In Australia businesses that decide to disclose, usually referred to GRI and to TCFD. Moreover, the Australian Accounting Standards Board (AASB) has published an exposure draft including two standards equivalent to the IFRS S1 and S2 but specific for the Australian context. The major mandatory requirements or guidance available in Australia are the National Greenhouse and Energy Reporting Act of 2007, ASX

Corporate Governance Principles and Recommendations (with some reference to TCFD), Commonwealth Modern Slavery Act of 2018 and the Workplace Gender Equality act of 2012.

In China sustainability reporting is actually in its early stages and for this reason the regulatory landscape is very fragmented. The major mandatory requirements or guidance available in China right now are the Measures for the Administration of Legal Disclosure of Enterprise Environmental Information issued by the Ministry of Ecology and Environment, Guidelines on the format of annual and semi-annual reports for listed companies that include now information about environmental and social responsibility, obligation for listed companies on Shanghai Stock Exchange and Shenzhen Stock Exchange to disclose CSR performance, Guidelines on Environmental Information Disclosure for Financial Institutions and Green Finance Guidelines for Banks and Insurers.

In Japan, before the introduction of the GRI Standards, companies were encouraged to disclose environmental reports, but after that the focus has shifted to the disclosure of sustainability reports. Then there was also the introduction of IIRC and METI Guidance that have favoured a growing diffusion of non-financial information disclosure. In addition, the Sustainability Standards Board of Japan (SSBJ) established in 2022, is ready to adopt by March 2025 its first standards in line with IFRS S1 and S2 but related to the Japanese context. The major mandatory requirements or guidance available in Japan are the Cabinet Office Order on Disclosure of Corporate Affairs, Japan's Corporate Governance Code, Act on Promotion of Global Warming Countermeasures and the Act on Rationalizing Energy Use, Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement.

CHAPTER II. OLYMPIC GAMES

2.1 Mega Sport Events

To define what a Mega Sport Event (MSE) is, we have to rely, first of all, on what a Non-Sporting Mega Event is, because most of the research in literature is related to general events.

Mega events have come up during the 19th century, related to industrial revolution and modernity. In that period there were the first World Exposition in London (1851) and the first Olympic Games in Athens (1896). They were seen as something symbolizing important values all around the world such as innovation, excellence and growth, but also as something advantaging the host cities and/or countries from an economic and political perspective (futurelearn.com, 2024).

What distinguishes mega events by regular events is something that has to do with the size, with respect to some characteristics that can be internal (duration, scale) or external (media and TV coverage, tourism attractiveness) to them. As we will see in the following pages, the authors' main attention has been focused on the external characteristics and on impacts, in particular on the media and TV coverage, that at this point in time represent something that cannot be ignored as we are all in front of the screen most of the time.

The concept of "mega event" during the years has been defined by many scholars in different manners focusing on the various characteristics of the phenomenon. Here there are some examples illustrated in Müller M. (2015):

J.R.B. Ritchie, in 1984, defined mega events as: "Major one-time or recurring events of limited duration, developed primarily to enhance the awareness, appeal and the profitability of a tourism destination in the short and/or long time. Such events rely for their success on uniqueness, status, or timely significance to create interest and attract attention".

Roche, in 2000, defined mega events as: "Large-scale, cultural (including commercial and sporting) events, which have a dramatic character, mass popular appeal and international significance".

Mills and Rosentraub, in 2013, defined them as: "Significant national or global competitions that produce extensive levels of participation and media coverage and that

often require large public investments into both event infrastructure, for example stadiums to hold the events, and general infrastructure, such as roadways, housing, or mass transit systems".

They are only some of the wide numbers of definitions that a person can find in the literature, but all of them tends to focus more on some criteria while excluding some others. For this reason, in his work Müller M. (2015) tried to give a definition containing all the most significant dimensions touched by the previous authors: "Mega events are ambulatory occasions of a fixed duration that attract a large number of visitors, have a large mediated reach, come with large costs and have large impacts on the built environment and the population". From his point of view there are four dimensions on which we should focus to classify an event as a "mega event", and these are:

- Visitor attractiveness: measured through the number of tickets sold, as it is the best proxy available for compute the number of visitors attending the events (at least 1 million tickets for being classified as mega)
- Mediated reach: measured through the broadcasting rights sold used as proxy, because global viewership figures could be manipulated (usually billions of USD)
- Costs: measured through the costs of the infrastructures for hosting the event (transport, venues) and costs of organising the event itself (salaries, technology, security)
- Urban transformation: measured through the share of capital investments over the total costs (transport, energy, ICT, accommodation, media centres)

So, from his point of view, an event to be "mega" has to have a large number of visitors, a large mediated reach, large costs and large impacts on the environment and population.

Another point on which is important to raise attention is that of the distinction between a general great event and a mega event. In fact, not all the great events are identified as "mega", even if sometimes people use them as synonyms. In the past years there were some scholars that have tried to classify great events by relying on the characteristics that we have mentioned previously.

The most important classification, recognised also by the International Olympic Committee, is that proposed by Maurice Roche (2000), for whom there are four types of

great events: mega events, special events, hallmark events and community events (see Table 2.1). He divides events focusing on the public to reach and on the media interest, primarily considering the symbolic, cultural and political nature of each of them.

Another type of classification is that proposed by Chito Guala (2002) (see Table 2.2), trying to distinguish events also by considering their contents as well as the users or the media/TV coverage and interest. For example, the Special Events are here divided by different sectors, such as sport, political, economic, cultural and religious. He considered also the great public works as a great event because of the big impacts they can have on the territory.

Table 2.1: Big events (Roche M., 2000)

Type of event	Example	Target	Media interest
Mega Event	Expo, Olympic Games or World Cup (soccer)	Global	Global TV
Special Event	Grand Prix (F1) and World Regional Sport	World, regional or national	International TV or national TV
Hallmark Event	National Sport Event or Big City Sport/Festival	National or regional	National TV
Community Event	Rural Town Event or Local Community Event	Regional or local	Local TV or local press

Table 2.2: Big events (Guala C., 2002)

Type of event	Example	Target	TV coverage
Event "mega & media"	Olympic Games (summer/winter) and Soccer World Cup Final	Global	Live
Mega Event	Expo	Global	TV services
Special Sport Event	Grand Prix (F1), Ski World Championship, America's Cup (sailing)	Global and/or macro-regional	Live
Special Political Event	International Summits (G7)	Global or macro-regional	TV services
Special Economic Event	International trade fairs	International or national	TV services
Special Cultural Event	Venice Film Festival, European City of Culture	International or national	TV services
Special Religious Event	Jubilee	Global	TV services
Great Public Works	Alexanderplatz (Berlin), Millennium Dome (London), Guggenheim (Bilbao)	National or regional	TV services

All Mega Sport Events could have several positive or negative impacts on the countries and/or the cities in which they take place. With respect to regular events, in fact, they tend to be more impactful. In recent years also legacies connected to these events have

raise in relevance (Knott and Tinaz, 2022). There is substantial difference between the two terms (eventscase.com, 2024): "an impact refers to the immediate outcomes and effects of an event", while "legacy focuses on the long-term consequences and benefits that stem from an event".

The main reason behind the decision to host MSEs is that of improving local economy and the social status of the local community. Economic advantages are not to be achieved directly from the income of the event, but from the increased awareness around the designated locality as a tourism destination and from the consequently job creation. Having a look also to the problems that can be potentially caused by MSEs there is that of housing relocation, that can happen because of the necessity of building sport facilities for the event.

Another type of impact is named socio-cultural impact. MSEs can contribute to increase sport participation and consequently to enhance the well-being of the people living in that locality increasing their local pride and solidarity.

There can be also physical impacts related to the construction of sporting facilities and new roads and to the development of public transportation. Many times, new constructions are just temporary, implying environmental problems related to their demolition.

Finally, we have also to mention political impacts connected to the possibility for people involved to increase their visibility offered by the involvement in the event to improve their career prospects (Malfas et al., 2004). Other positive benefits are the increased national identity and international cooperation, while drawbacks can be corruption and the incorrect use of public funds.

Legacies can be deliberate or unexpected, positive or negative, soft or hard. In literature we can find different categories of legacies related to sport events (Knott and Tinaz, 2022):

- Sporting: increase in sport participation or the upgrade of sport facilities
- Urban: changes on urban structure of cities
- Infrastructural: development of public transportation and of other services
- Economic: permanent job creation or investment attractions or tourists increase
- Social: national pride or inclusiveness
- Environmental: environmental awareness
- Political: public interventions or democracy and human rights promotion

- Image/branding: host locality exposure

Considering everything that has been said so far, Mega Sport Events can be differentiated by typical sport events based on some indicators of the case. Maennig and Zimbalist (2012) suggested some criteria: the number of participating athletes, the attendance at the event, the TV viewership of the event and the related revenue the event produces. The thing that they took care to underline many times in their work is that each indicator cannot be taken independently by the others. To explain this concept they made some examples, such as: Monday night games during the regular seasons in the National Football League (NFL) in 2009 were between 10,2 million and 21,8 million US viewers per telecast, while the 2009 National Hockey League (NHL) Stanley Cup Championships series had between 2,9 million and 8 million US viewers. Taking into account only the TV viewership we could conclude that regular season games of NFL can be considered as MSE, while the championship finals in the NHL not. The reason for this difference can be found in the level of interest that a sport attracts or in the team or individual players that are competing.

Olympic Games and FIFA World Cups are the only sport events to be recognized as Mega Sport Events (MSEs) due to the significant audience of people all over the world following them. They are events for which countries and/or cities compete in order to have the opportunity to host them and for which also every athlete in the world aims to participate at least once in lifetime. Hosting these events create a lot of new jobs and sport facilities, bring a lot of visitors, promote international publicity, improve the image of the relative city or country and create many more benefits. For this reason, is understandable the big competition in the last years among emerging countries for hosting MSEs, in fact we had: in 2008 in Beijing the Summer Olympic Games, in 2010 in South Africa the FIFA World Cup, in 2014 in Sochi the Winter Olympic Games and in the same year in Brazil the FIFA World Cup, in 2016 in Rio the Summer Olympic Games, in 2018 in Russia the FIFA World Cup and in the same year in Pyeong Chang the Winter Olympic Games (Ladhari R. and Souiden N., 2020). The current trend is that of mega events taking place in the BRICS (Brazil, Russia, India, China and South Africa) countries (futurelearn.com, 2024).

2.2 Olympic and Paralympic Games: history and evolution

One of the most common examples of Mega Sport Event are the Olympic and Paralympic Games. For this reason, we will briefly analyse their main characteristics and their evolution over time.

2.2.1 Ancient Olympic Games: a brief introduction

To begin, it is important to have a quick look to the roots of these Games, in order to better understand the common traits with their modern version.

The first Olympic Games of history took place in the sacred area of Olympia in 776 B.C. The Games were held every four years in Zeus honour, because at that time they were seen as something religious in which a lot of sacrifices have to be made (history.com, 2024). During the entire course of the Games a fire was kept burning on the Hestia's altar in Olympia. Also the fire had a divine connotation at that time (wikipedia.org, 2024).

The entire event continued for five days, and the typical sports used to be: boxing, chariot racing, long jump, javelin, discus, running, pankration and wrestling. All athletes had to compete completely naked.

Only the free Greek males were allowed to compete regardless of if they were royals or farmers. No woman could participate, and the married ones could not even attend to the competitions (history.com, 2024).

The Olympic Games were an important event in the Greeks calendar and thousands of spectators came from all over the empire to watch them. During that days was established the traditional Olympic Truce through a treaty between the kings Iphitos of Elis, Cleosthenes of Pisa and Lycurgus of Sparta in order to allow athletes and spectators to reach in a safe way the place where the competitions will take place and also to stop conflicts (olympics.com, 2024).

When in the mid-second century B.C. the Roman Empire conquered Greece, the Olympic Games quality began to decline until 393 A.C. when Emperor Theodosius I decided to definitely ban them (history.com, 2024).

This was the end of the ancient Olympic Games and for the rise of the Modern ones the world had waited at least 1500 years.

2.2.2 Olympic Games

The French baron Pierre de Coubertin was the one who managed to bring back the Olympic Games in a modern and revised version. He founded the International Olympic Committee (IOC) in 1894 and this Committee organised the first modern Olympic Games in 1896 in Athens (Greece), the country of the ancient Games. Pierre de Coubertin was a French leader in education reform with the dream of establishing Olympic Games with the aim of fostering peace and respect among nations through sport.

There are few things still observed today, such as the Olympic Truce and the Olympic Flame. The Olympic Truce was reintroduced at the Winter Olympic Games of Lillehammer in 1994 by a United Nations' resolution called "Building a peaceful and better world through sport and the Olympic ideal", that will be applied one year before each Olympic Games starting from that edition (olympics.com, 2024). In the 1928 Olympic Games, the Olympic flame was reintroduced. This flame is lit some months before the beginning of the Games in Olympia, and through a relay it is brought to the Country hosting Olympic Games (wikipedia.org, 2024).

The modern Games are for sure inspired by the ancient ones but have also involved some innovations over the years. Firstly, they are no more dedicated to the gods of Ancient Greece, and they take place every time in a different city and country, while once upon a time they were always celebrated in Olympia. Another difference is that nowadays the Games include athletes from all the five continents becoming a universal event, and also their length is quite different because in the antiquity they lasted 5 full days while now the last races take place at the 16th day.

As time passed were also added, modified and excluded the kinds of sport that could take part in the modern Games. In 1896 in Athens were included only nine sports: athletics, cycling, fencing, gymnastics, weightlifting, wrestling, swimming, tennis and shooting. Actually, there are 32 sports for the Summer Games and 8 sports for the Winter Games, and each sport can include a wide number of different events (olympics.com, 2024).

Two of the biggest innovations of the modern era were the inclusion of women in 1900 and the introduction of the Winter Olympic Games in 1924.
The 1900 Olympic Games in Paris included 22 women out of a total of 997 athletes and the British Charlotte Cooper was the first woman to win a gold medal (ehne.fr, 2024).

Women presence was limited to just few sports that were considered appropriate for them, such as tennis and golf. As time passed, they began to gain access to other sports, until London Olympic Games in 2012 when women finally were allowed to take part to all the competitions. In Paris Olympic Games in 2024 for the first time in history there will be full gender parity, because IOC has equally distributed (50:50) places to male and female athletes (olympics.com, 2024).

As the winter sports began to gain popularity in the 20s, IOC decided to introduce officially the Winter Olympic Games dedicated to snow and ice competitions. The first one was held in Chamonix (France) in 1924, with 250 athletes coming from 16 different countries and participating to 16 events (britannica.com, 2024).

Another point interesting to highlight talking about Olympic Games is their famous logo (figure 2.1) created by Pierre de Coubertin. It is represented by five intertwined rings on a white background and each ring has a different colour. From left to right we have at the top blue, black and red, while at the bottom we have yellow and green. The aim was to underline the union among populations and the spirit upon which he wanted to reintroduce the Olympic Games. About this symbol Pierre de Coubertin said: "These five rings represent the five parts of the world now won over to the cause of Olympism and ready to accept its fecund rivalries. What is more, the six colours thus combined reproduce those of all nations without exception" (olympics.com, 2024). The colours in fact are those used in the flags of all the countries of the world.

Another symbol representing the Games is the motto: Faster, higher, stronger – together. The motto was updated in 2021 to underline the relevance of solidarity adding the word "together". Solidarity is something that has always been part of the Olympic philosophy, it is something rooted in its values and mission. Olympic Games aim to unite people and nations around the world in the name of sport (olympics.com, 2024).

Figure 2.1: Olympic Games logo (Google Images, 2024)

2.2.3 Paralympic Games

Right after the World War II, Sir Ludwig Guttmann, a German doctor, had the idea to organise a competition involving injured war veterans giving to the event the name of Stoke Mandeville Games, because of the name of the British hospital in which doctor Guttmann opened a spinal injuries centre.

As time passed these Games evolved in order to become Paralympic Games, and the first summer edition was held in Rome (Italy) in 1960 with 400 athletes from 23 countries. The first winter edition was held instead in Örnsköldsvik (Sweden) in 1976 (paralympic.com, 2024).

The Paralympic movement involves athletes with physical, vision and intellectual impairments that have at least 1 out of the following 10 eligible impairments: impaired muscle power, impaired passive range of movement, limb deficiency, leg length difference, short stature, hypertonia, ataxia, athetosis, vision impairment, intellectual impairment (gtimg.tokyo2020.org, 2020).

In each edition, just like it happens for the Olympics, some sports are modified, other are excluded and other are introduced.

The logo of the Paralympic Games is quite different from that of the Olympics. There are no rings, it is composed by three "agitos" blue, red and green that are the most used colours in the flags around the globe and the signs represent the body, the mind and the spirit of the athletes (comitatoparalimpico.it, 2024). The symbol represented in the figure 2.2 is the fourth update of the Paralympic logo, that has been in use from 2019. Before the introduction of the "agitos", the logo was composed by Tae-Geuks, a traditional decorative Korean motif (paralympic.org, 2024).

Figure 2.2: Paralympic Games logo (Google Images, 2024)

22 September 1989 was founded the International Paralympic Committee (IPC), an international institution representing athletes with disabilities based in Dusseldorf (Germany). Its aim is to give the chance to these athletes to compete and to inspire people around the world promoting inclusiveness (olympics.com, 2024).

The IPC is composed by a General Assembly, a Governing Board, Management and different Committees. The General Assembly is the governing body of IPC and has various functions, such as the election of the president, the approvement of the budget and the approvement or admission of members in IPC. It is composed by IFs, National Paralympic Committees (NPCs), International Organisations of Sport for the Disabled (IOSDs) and Regional Organisations (ROs). The Governing Board main function is to set policies and to ensure that all is going in the direction taken by the General Assembly (paralympic.org, 2024).

Paralympic Games are the most famous events because are organized in a similar way of Olympic Games (in parallel), but IOC has also held other types of games to include more people possible, such as Deaflympics[1] and Special Olympics World Games[2].

2.3 IOC: organization and governance

IOC is the acronymous for the International Olympic Committee, which is an independent non-for-profit organisation privately funded and based in Lausanne

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[1] Deaflympics are organised by the International Committee of Sports for the Deaf (ICSD) and they were previously recognised as "International Silent Games". They are a multi-sporting event for deaf athletes.

[2] Special Olympics World Games are an international multi-sporting event for people with intellectual disabilities.

(Switzerland). It is known as "the supreme authority of the Olympic Movement[3]" because of its fundamental role in fitting together all the members of the Olympic Movement, from the athletes to the partners and stakeholders, as well as playing a relevant role in the Olympic Games supervision (olympics.com, 2024).

2.3.1 IOC organisation

IOC was founded during the first Olympic Congress at the Sorbonne University in Paris in 1894. IOC was, in fact, originally established in France, but then moved to Switzerland in 1915. The Olympic Congress is a meeting of the Olympic Movement constituents that takes place whenever the IOC president decides for it.

At the head of the International Olympic Committee there is the president. Since 10 September 2013 there is the German Thomas Bach, who is the ninth president since the creation of the IOC in 1894. The president is elected by the Session for a term of eight years that can be renewed just for four years.

The Session is the IOC most important organ. The members of the IOC meet once a year and the last Session, the 141st, was hosted in Mumbai (India) in October 2023. In these Sessions are elected new members and selected host cities for the next Games.

Then there is the Executive Board, which is composed by the IOC president, four vice-presidents and ten regular members. The members of the Board (except for the president) are elected by the Session for a term of four years and can be elected just for two times consequently. It meets when the president decides or when most of the members request it. The Executive Board is responsible for the IOC administration and for the compliance with the Olympic Charter[4] (olympics.com, 2024).

The IOC members, as said in the Olympic Charter, "represent and promote the interests of the IOC and of the Olympic Movement in their countries and in the organisations of the Olympic Movement in which they serve". There are 106 members and 40 honorary members (olympics.com, 2024). In each country who participates to the Olympic Games (206 actually) there is a National Olympic

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[3] The three main constituents of the Olympic Movement are the IOC, the International Sports Federations (IFs) and the National Olympic Committees (NOCs).

[4] The Olympic Charter is the codification of Olympic fundamental principles and rules adopted by the IOC.

Committee (NOC) that selects the athletes that will participate and nominates the host cities. They are part of five regional associations, one for each continent, which are: Associations of National Olympic Committees of Africa, Pan American Sports Organization, Olympic Council of Asia, European Olympic Committees, Oceania National Olympic Committees (guides.II.georgetown.edu, 2024).

The president can also establish permanent, standing or ad hoc Commissions whenever he wants, with the role of advisors of the Session, the IOC Executive Board or the President itself, as clarified by the Olympic Charter. Actually, there are numerous Commissions. To give some examples we can name the IOC Athletes' Commission, the IOC Ethics Commission, the Future Host Commission, the Olympic Solidarity Commission etc.

IOC administration is left under the control of the General Director with the supervision of the IOC president and the assistance of some directors who coordinate different units of competence, such as for example Technology and Information Department, Human Resources Department, Finance Department, Legal Affairs Department, Corporate Events and Services Department etc. (olympics.com, 2024).
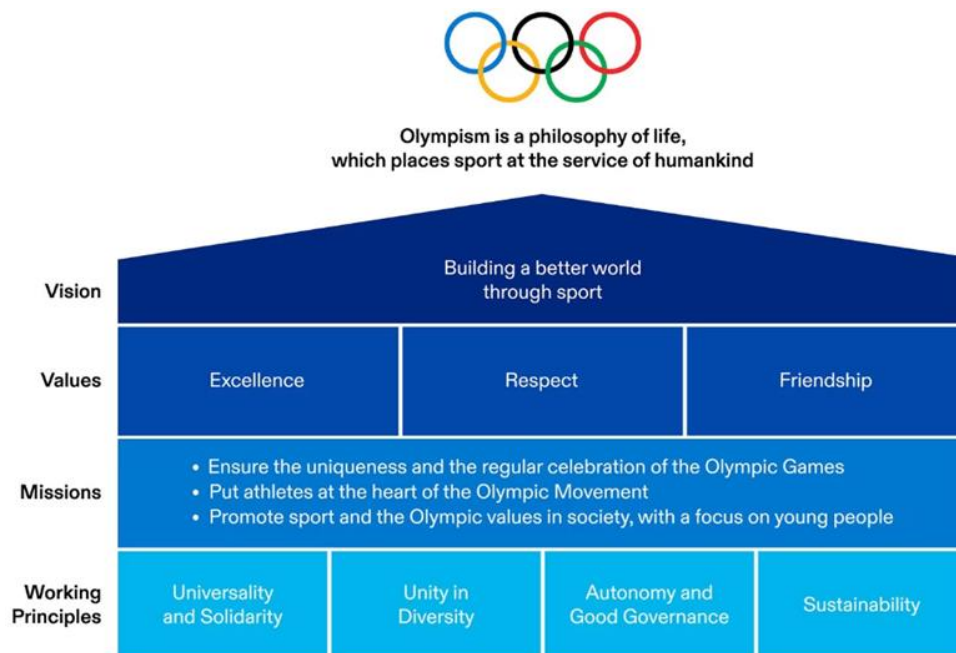
2.3.2 IOC principles and values

Figure 2.3: IOC principles (olympics.com, 2024)

In the Olympic Charter "Olympism" is defined as a way of life, in which sport plays a fundamental role in making the world a better place to live in through mind, body and spirit. This philosophy has led to the generation of a series of values, and the most important ones highlighted by the IOC are (The Olympic Museum, 2013):

- Excellence, which means that athletes have to do their best to try to achieve personal objectives and goals. It has not to do with winning but with participating with determination.
- Friendship, which means that athletes have to form relationships regardless of political, economic, gender, racial or religious differences. In the Olympic movement is encouraged the building of a better world through the connections offered by sport.
- Respect, which means that athletes have to respect one another, the environment, and the rules. In sport with "respect" we mean, especially, fair play.

Olympism and his values are communicated through a lot of Olympic symbols, such as the Olympic logo, the Olympic motto and the Olympic anthem.

IOC mission is to promote Olympism leading the Olympic Movement, and some of its purposes are (Olympic Charter 2023):

1. to encourage and support the promotion of ethics and good governance in sport as well as education of youth through sport and to dedicate its efforts to ensuring that, in sport, the spirit of fair play prevails and violence is banned
2. to encourage and support the organisation, development and coordination of sport and sports competitions
3. to ensure the regular celebration of the Olympic Games
4. to cooperate with the competent public or private organisations and authorities in the endeavour to place sport at the service of humanity and thereby to promote peace
5. to take action to strengthen the unity of the Olympic Movement, to protect its independence, to maintain and promote its political neutrality and to preserve the autonomy of sport
6. to act against any form of discrimination affecting the Olympic Movement
7. to encourage and support elected representatives of athletes within the Olympic Movement, with the IOC Athletes' Commission acting as their supreme representative on all Olympic Games and related matters

8. to encourage and support the promotion of women in sport at all levels and in all structures with a view to implementing the principle of equality of men and women

9. to protect clean athletes and the integrity of sport, by leading the fight against doping, and by taking action against all forms of manipulation of competitions and related corruption

10. to encourage and support measures relating to the medical care and health of athletes

11. Etc.

The fundamental principles of Olympism are codified into the Olympic Charter together with rules and by-laws of IOC. This charter was adopted in 1908, when was named as "Annuaire du Comité International Olympique".

2.3.3 IOC sustainability program

The International Olympic Committee has released the last Sustainability Strategy in 2017. "Sustainability" is one of the three pillars of the Olympic Agenda 2020[5] together with "credibility" and "youth".

Sustainability Strategy outlined three IOC's spheres of responsibility that are:
- IOC as an organisation, which regards the level of sustainability included in its own daily operation and activity
- IOC as owner of the Olympic Games, which regards the sustainability criteria that the host city and the local Organising Committee of the Olympic Games (OCOG) have to meet
- IOC as leader of the Olympic Movement, which regards the IOC's work in engaging with and in assisting National Olympic Committees and International Federations on sustainability matters

Sustainability Strategy has also identified five main areas in which to focus on:
- Infrastructure and natural sites
- Sourcing and resource management
- Mobility
- Workforce
- Climate

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[5] Currently it has been updated by the Agenda 2020+5, that is going to be effective until 2025.

For each sphere of responsibility and for each of the five-focus area were found strategic intents for 2030. These strategic intents represent the contribution of the Committee to the SDGs (UN Agenda 2030).

For IOC as an organisation: "the IOC organisation has to be a role model in sustainability". There are some examples of how IOC is acting in this way. In 2019 was opened the Olympic House, the new IOC headquarters in Lausanne (Switzerland), that is recognised as one of the most sustainable buildings in the world. In fact, it received three of the most important sustainable building certifications in the world: Leadership in Energy and Environment Design (LEED), Swiss Sustainable Construction Standard (SNBS) and Swiss energy efficiency standard (Minergie P). The Olympic House is a true example of:

- circular economy: 95% of former administrative building materials reused or recycled, 95% of construction waste recycled, 80% of construction costs spent with local contractors
- resource efficiency: reduction in municipal water consumption of 60% (compared to standard new office building), reduction in energy consumption of 35% (compared to standard new office building), presence of solar panels and heat pumps
- respectful integration: half of the site vegetated, 50 additional trees on site and over 100 trees added in surrounding areas, 2,500 m2 of vegetated roof, promotion of active and ecological mobility (135 bicycle spaces, employee subsidies for sustainable mobility, chargers for e-cars, hydrogen station)
- user comfort: flexible space, 90% of regularly occupied spaces with quality views, no static element with 8m of the façade, high indoor air quality thanks to selection of low emission materials and highly efficient ventilation system

For IOC as owner of the Olympic Games: "the IOC has to ensure the Olympic Games are at the forefront in the field of sustainability and the host cities can leverage the Games as a catalyst for their sustainable development".
Attention to sustainability topics is something that is required to the host cities for the planification of Olympic Games. There are certain guidelines that have to be followed, such as:

- Olympic Games Guide on Sustainable Sourcing
- IOC Host City Contract (HCC) – Operational Requirements
- Olympic Games Guide on Sustainability
- Olympic Games Guide on Sourcing and Resource Management

To make an example, the Olympic Games Guide on Sustainable Sourcing is used to assist the OCOGs in the achievement of IOC sustainable requirements on uniforms, furniture, food and beverage services, broadcasting rights, sponsorship deals etc.

For IOC as leader of the Olympic Movement: "the IOC has to inspire and assist Olympic Movement stakeholders in developing sustainable sport worldwide and to leverage the inspirational power of athletes and the Olympic symbol for promoting sustainability through sport".

Sustainability initiatives and guidelines provided by the IOC will help IFs and NOCs to better understand how to correctly move in a more sustainable direction. For example, Sustainability Essentials are guidelines used to develop sustainability programmes. There are different series of them, such as:
- Introduction to sustainability
- Sports for climate action
- Sustainable sourcing in sport
- Plastic game plan for sport
- Sustainability management in sports
- How to be a sustainable champion

Furthermore, in the Sustainability Report released in 2021 are being identified 17 objectives to try to reach in the four-year period from 2021-2024 for each of the three spheres of responsibility (see Tables 2.3-2.4-2.5 below). All of them have to be aligned with IOC's 2030 intents and with UN SDGs, allowing the Games to take place in a climate positive way. In the development of this objectives were involved different stakeholders, both internal and external, such as Olympic Movement partners, NGOs, institutions and sport bodies.

Table 2.3: IOC as an organisation (IOC Sustainability Report 2021)

OBJECTIVES	MEASUREMENT CRITERIA
Co2 emissions reduction	- % reduction of overall CO2 emissions - % reduction of CO2 emissions related to travel
Olympic Forest creation	- Scale of forest - Quantity of carbon saved by trees - Long-term social and biodiversity benefits
IOC Sustainable Sourcing Guidelines implemented across the entire supply chain	- Evidence of a formal process in place to assess commercial deals according to environmental and social risks and opportunities
Staff competency in implementing IOC sustainability strategy	- Uptake of training programme by staff - Feedback from staff surveys

Table 2.4: IOC as owner of the Olympic Games (IOC Sustainability Report 2021)

OBJECTIVES	MEASUREMENT CRITERIA
Assist and accelerate transition to climate positive Olympic Games	- Production of climate positive Games methodology and guidance - Initial carbon inventory preferred hosts submitted for 2030 and 2032 - Paris 2024 carbon footprint results
No permanent construction in protected areas and try to protect and enhance biodiversity	- Incidents of non-compliance - Collaborative actions to conserve biodiversity - Area of publicly accessible urban green space
Identify functional areas and phases of Olympic Games in which sustainability needs to be reinforced or implemented	- Completion of gap analysis and detailed recommendations - Adoption of policies and processes to fulfil recommendations
Construction of workers' rights	- IOC's 2022 Human Rights Strategy
Promote sustainable tourism, responsible consumption, create awareness	- IOC communications channels - IOC campaigns in partnership with OCOGs and host authorities

Table 2.5: IOC as leader of the Olympic Movement (IOC Sustainability Report 2021)

OBJECTIVES	MEASUREMENT CRITERIA
Work with Ifs with sports that are on Olympic programme to develop sustainability strategies and publicly disclose progresses	- Number of IFs with a sustainability strategy - Number of IFs that monitor and publicly disclose progresses

Develop a sustainability strategy template valid for all NOCs	- Production of a global template - Number of NOCs establishing sustainability strategies - Creation of a sustainability monitoring and evaluation system for NOCs, in collaboration with Olympic Solidarity
Pull IFs with sports on Olympic programme and NOCs to sign up to UN Sports for Climate Action Framework	- Number of IFs and NOCs signing up to UN Sports for Climate Action Framework - Number of IFs and NOCs actively participating in UN Sports for Climate Action Framework
Develop a framework to allow Olympic Movement to contribute to Olympic Forest	- Production of Olympic Forest participation criteria - Uptake of opportunity to contribute to the Olympic Forest project
Pull IFs with sports on Olympic programme and NOCs to apply the IOC basic level Sustainable Sourcing in Sport guidelines	- Creation of basic level criteria for IFs and NOCs - Number of IFs and NOCs applying basic level sustainable sourcing criteria - Number of IFs and NOCs going beyond basic level
Develop expert network and regular forum to showcase best practice in sustainable innovation in sport infrastructure	- Establishment of expert network - Establishment of forum/communication platform
Pull the Olympic Movement to increase best practices and to implement sustainable actions	- Number of views and downloads from the IOC sustainability webpage - Number of IFs and NOCs publishing information on sustainability - Number of projects/actions undertaken by the Olympic Movement organisations
Work with athletes and sport personalities as Sustainability Ambassadors	- Number of athletes and young leaders supported by IOC in sustainability projects - Number of Olympians, role models and influencers supported by IOC in sustainability projects and education

In the 2021 Sustainability Report is also disclosed the fact that the IOC is making an effort to reduce its impacts on climate change. IOC's commitment towards climate is going to be realized through:

- Reducing direct and indirect CO_2 emissions by 50% by 2030 in line with what the Paris Agreement suggests: by reducing air travels, improving energy efficiency of the buildings, stopping the use of fossil fuels, increasing the use of zero or low carbon products/services, minimise/reuse/recycle waste in daily

activities and events, incentivising visitors to use public transports or other low carbon options

- Compensating remaining emissions through the Olympic Forest: it is a contribution to the Africa's Great Green Wall initiative involving the plantation of 590000 native trees (14000 for agroforestry farmland and 576000 for enrichment and restoration) in Mali and Senegal covering an area of approximately 2000 hectares. This forest is expected to sequester more or less 200000 tonnes of CO_2e. It is not only something beneficial for emissions reduction but also for food security, economic security and for increasing biodiversity.

- Influencing stakeholders and Olympic fans to take actions against climate change: IOC can make it by amplifying the voices of athletes, supporting zero/low-carbon solutions in the organisation of sporting events, providing guidance to OCOGs on carbon management, supporting the CO_2 emissions reduction by Ifs and NOCs through the implementation of UN Sports for Climate Action Framework.

CHAPTER III. SUSTAINABILITY IN MEGA SPORT EVENTS

3.1 Literature review: sustainability in Mega Sport Events

Mega Sport Events (MSEs) such as Olympic Games and Football World Cups have always generated short- and long-term impacts on the relative host country or city. As we have yet analysed, they can be both positive or negative. The positive ones are those connected mainly to economic benefits for the host city or country due to the increase in tourist arrivals, urban renewal and development, the improvement of a city's or country's image, social cohesion among residents and increase in intellectual property (Hugaerts et al., 2023). On the negative side there are a lot of environmental and social issues. From the environmental point of view MSEs generate significant quantities of GHG emissions and waste and they are also characterized by the high consumption of water and energy. A list of the most common environmental externalities is made public by the United Nations Environment programme (UNEP) (Pourpakdelfekr T. and Oboudi B., 2022):

- Degradation of sensitive ecosystems or scarcity of land for sport
- Noise and light pollution caused by sport
- The exploitation of non-renewable resources
- The exploitation of natural resources
- Greenhouse gas emissions caused by the consumption of electricity and fuel
- Depletion of the ozone layer due to refrigerants
- Soil and water contamination from pesticide usage
- Soil degradation while construction and from attendees
- Waste accumulation from facility buildings and visitors

In order to fight against all of them, in 1992 at the Rio Earth Summit, UNEP developed "Agenda 21" that is a framework supporting sustainable development. In 1999 was also adopted by IOC. IOC's own Agenda, in fact, rely on that framework and focuses on improving socio-economic conditions, conservating and managing resources for sustainable development and strengthening the role of major groups (Warren G. S., 2020).

As Warren G. S. (2020) says, the set of damages varies depending on the type of event (Olympic Game, Football World Cup, etc.) and on a couple of factors which are fake

emergencies and event seizure, that can be avoided only by implementing legal frameworks for hosting MSEs in a conscious way.

We have fake emergencies when the event organisers perceive the necessity of accelerating the construction or preparation of something related to the event bypassing rules and cutting public debate that can be seen as obstacles to the execution. This can lead to energy and environmental exceptionalism that would not be normally allowed.

With event seizure, instead, we mean the imposition of MSE organisations and local elites' priorities over the host cities and societies' needs. A famous example is that of the 2018 Russia World Cup in which low-income families were forced to leave their homes due to new infrastructures construction. In addition to that, these infrastructures were funded through public funding, such as taxes, even if host cities residents cannot attend the events.

Pourpakdelfekr T. and Oboudi B. (2022) have summarized in a table (Table 3.1) sustainable solutions, collected from interviews and investigations, for each of the factors that negatively influence the environment in MSEs organization. As we can notice "infrastructure and construction" and "energy and water conservation" are the main factors on which the events' organisers should intervene through strategies able to reduce their impacts on the environment.

Reducing these damages is not enough in order to achieve long-term benefits, but the important is to stimulate right behaviours and attitudes. To encourage awareness around environmental topics, the organisers should implement eco-friendly measures, regulations and practices, should use environmentally friendly products and policies and should promote public transportation and recycling habits. It is also important that the spectators, visitors and fans are conscious and understand the messages that the event organisers are being transmitting to them through practical actions, such as engagements in partnerships with climate organisations or athletes with the role of ambassadors talking about climate change, environmental issues and environmentally friendly technologies.

As Pourpakdelfekr T. and Oboudi B. (2022) have underlined, in the past years sport has had a fundamental role in trying to solve and in raising awareness about social matters like for example justice and racism through campaigns such as the one made by UEFA in 2016 called "No to Racism". So, the sport can also have the power to help people understand what is going on around the planet and to create positive climate legacies.

Table 3.1: Ecologically beneficial alternatives (Pourpakdelfekr T. and Oboudi B., 2022)

	Domain		
1	Infrastructure and construction	Keeping games out of protected areas, wilderness and agricultural land	(Chernushenko et al. 2001b, Kou and Shen 2014)
		Shifting Winter Games away from mountain resorts towards cross-country ski venue	(Chappelet 2008, TUNZA 2012)
		Installing physical barriers to protect vulnerable ecosystems, plants and water bodies	(Chernushenko et al. 2001b, Yang and Xu 2014)
		Construction of multiple-use facilities	(Chernushenko et al. 2001b, Kou and Shen 2014, Stadhouders 2010, TUNZA 2012)
		Depending on the climate, design structures to optimize solar gain or to protect against it	(Chernushenko et al. 2001b, Kou and Shen 2014, Schmied et al. 2007)
		Implementation of green roofs	(Porteshawver 2009, Warren 2020, TUNZA 2012, Zhang et al. 2022)
		Rotating the Olympics among the same cities	(Müller et al. 2021)
		Construction of ecological shelter forest belt and green belt	(Yang and Xu 2014, Karlsson 2009, TUNZA 2012)
		Enhancing the quality of the sidewalks surrounding stadium by using recycled rubber asphalt	(Porteshawver 2009)
		Carbon neutrality by reforestation	(Rowberg and Rincker 2019)
		Providing temporary accommodation by using cruise ships in the harbors	(Stadhouders 2010)
		Implementation of movable pool floor	(Stadhouders 2010)
		Avoid events during breeding season	(Schmied et al. 2007)
2	Transportation	Encouraging carpooling, and human-powered commuting	(Chernushenko et al. 2001b, Stadhouders 2010, Schmied et al. 2007)
		Free or special prices offer for public transport	(Chernushenko et al. 2001b, Porteshawver 2009, Yang and Xu 2014, Karlsson 2009, Schmied et al. 2007, TUNZA 2012)
3	Waste management	Composting organic waste	(Chernushenko et al. 2001b, TUNZA 2012)
		Construction waste and materials removed during renovation can be reused, sold or donate	(Chernushenko et al. 2001b, Schmied et al. 2007, TUNZA 2012)
4	Materials management	Reduce the use of materials that deplete natural resources or pollute the environment	(Chernushenko et al. 2001b, Collins et al. 2009, Kou and Shen 2014, Schmied et al. 2007)
		Avoid ozone-depleting chemicals	(Chernushenko et al. 2001b)
		Use of plasticized signboards with removable printed mark that van be reused	(Chernushenko et al. 2001a, TUNZA 2012)
5	Energy and water conservation	Installing or updating to energy-efficient equipment such as heat pumps or geothermal technology or utilizing wind and biomass energy	(Chernushenko et al. 2001b, Collins et al. 2009, Kou and Shen 2014, Porteshawver 2009, Stadhouders 2010, Warren 2020, Yang and Xu 2014, Schmied et al. 2007, TUNZA 2012)
		Shifting from electricity or oil to natural gas	(Chernushenko et al. 2001b, Yang and Xu 2014, Karlsson 2009, Schmied et al. 2007)
		Minimizing air leakage by closing off any unnecessary openings (doors, windows)	(Chernushenko et al. 2001b, Porteshawver 2009, Schmied et al. 2007)
		maximizing natural light and installing energy-efficient lighting and/or solar panels	(Chernushenko et al. 2001b, Porteshawver 2009, Warren 2020, Yang and Xu 2014, Schmied et al. 2007, TUNZA 2012)
		Installing low-flow showerheads and faucet aerators	(Chernushenko et al. 2001b, Porteshawver 2009, Yang and Xu 2014, Schmied et al. 2007, TUNZA 2012)
		Storing rainwater and gray water for irrigation purposes	(Chernushenko et al. 2001b, Porteshawver 2009, Stadhouders 2010, Karlsson 2009, Schmied et al. 2007, TUNZA 2012)
		Establish vegetation buffers surrounding bodies of water to effectively absorb runoff and decrease erosion.	(Chernushenko et al. 2001b, Stadhouders 2010, TUNZA 2012)

6	Merchandising and procurement	Paperless games	(Chernushenko et al. 2001b, Stadhouders 2010)
		Use recycled paper and vegetable-based inks in case of printing	(Chernushenko et al. 2001b, Schmied et al. 2007, TUNZA 2012)
		Providing ecologically friendly packaging or returnable packaging	(Chernushenko et al. 2001b, Schmied et al. 2007)
		Designing giveaways to be reusable at future events	(Chernushenko et al. 2001b, Schmied et al. 2007)
		Alternative gifts such as a service or a gesture instead of material objects	(Chernushenko et al. 2001b)
		Creating Olympic medals out of recycled metals from donated gadgets	(Rowberg and Rincker 2019)
		Using recyclable materials to create team uniforms	(Warren 2020, TUNZA 2012)
7	Catering and food services	Use reusable coffee filters	(Chernushenko et al. 2001b)
		Donating acceptable food to food banks or local kitchens	(Chernushenko et al. 2001b, Schmied et al. 2007, TUNZA 2012)
		Use of a durable mug for all participants (athletes, spectators and employees)	(Chernushenko et al. 2001b, Schmied et al. 2007, TUNZA 2012)
		Using waxed paper instead of plates for fast food	(Chernushenko et al. 2001b, TUNZA 2012)
		Preparation of biological and healthy food	(Stadhouders 2010, Schmied et al. 2007, TUNZA 2012)

Nevertheless, MSEs are also catalysts for urban development for the cities that host them. As explained by Mirzayeva G. et al. (2020), urban development is seen as "a process of economic, spatial and social progress and a means whereby local governments formulate and execute public policies for economic growth".

In their work, Chen Y. et al. (2013) have pointed up the fact that hosting these type of events leads to investments in infrastructure development and to the plan and use of sophisticated revitalisation strategies for urban reimaging. Since Barcelona 1992 Olympic Games, the Games have been seen as a way through which trying to improve cities' infrastructures and urban areas. MSEs are seen as a strategy for cities' development and great importance is given to economic and spatial implications, social benefits and environmental awareness.

From an economic point of view these events can make profits by attracting important investments (infrastructures, telecommunications, etc.), huge number of tourists and global media with related television rights. In most of the cases also temporary or permanent employment is something resulting from the hosting of the sport event.

From a social point of view the consequences that the events can bring are an increased community pride and self-esteem, increased levels of cultural interaction, enhanced city profile and more liveable places. These are just the most evident ones, but there are others impacts, also negative in some cases, that can come along with the staging of Olympic Games or Football World Cups or something else.

From an environmental point of view MSEs can entail a greener image of the city by eliminating polluted resources, improving public transport, enforcing stricter environmental control, using environmentally friendly energy and investing in parks and open spaces.

From a spatial point of view can be notice improvements in infrastructures, in tourist and sport facilities, in public transport and the creation of high-quality public spaces.

It can be interesting to have a look on the example offered by Chen Y. et al. (2013) on Barcelona 1992 Olympic Games, from which we can understand how the strategy of hosting a Mega Sport Event to achieve the above listed objectives has been put in place by this Spanish city.

Between the 70's and 80's, due to the economic globalization and the increased competition among European cities, the city of Barcelona started to feel the need for improving its urban image in order to being able to attract more tourists, capital and others type of sources. The winning bid of the 1992 Olympic Games was fundamental to get out from the ongoing economic crisis. Among the reasons of the bid there was the intention to push for economic growth and to enhance the international prestige of the city improving its competitiveness. Some development strategies were adopted, such as the supply of high-quality sport facilities, the progress in infrastructures and the creation of multifunctional urban areas. There were plans and projects for urban revitalization that were put in place before the Games receiving support from both the public and private sectors, were used public subsidies and were improved public spaces in order to push for private investments.

The outcome of all of these strategies was a general improvement in infrastructures and in public spaces that have contributed to the enhancement of the Barcelona public image. Thanks to the hosting of the Games, all the projects could be implemented in less time than usual contributing to an increased in city pride. Despite the economic benefits that the event brought, from the social side there were some negative effects such as the affordability of housing and gentrification and brandification of urban spaces. From an environmental point of view, the results were mainly positive thanks to the transformation of industrial sites into something greener. We have to say that there was a minority saying that all the process of urban development was made too rapidly and not in the best manner.

Another example that can help to make this topic clearer is the Rio 2016 Golf project in the Rio de Janeiro 2016 Olympic Games. Here the focus was much more on the environmental sustainability of an event project such that of the construction of a Golf Course in this region.

About this case has written Gaffney C. (2013) in his work. The urban development projects in Rio mostly occurred in Barra de Tijuca and Jacarepaguá, located in an environmentally fragile region. Barra de Tijuca absorbed the largest share of city's residential construction due to urban permissions for the real-estate sector for maximization of profits with no regard of the environment. In 2016 Rio de Janeiro needed a public golf course, so the government opted for the construction in the area of the "Reserva da Marapendi". It was 1180000 square meter area of environmental protection, one of the last wetlands of the region serving as an important lakeside biosphere reserve. This project raised legal battles due to conflicts of interests between Rio 2016 stakeholders and landowners that ended up with an executive decree changing local laws with justifications like "the environmental reserve had already been significantly altered by human activities, opening up areas would allow the city government to reduce costs in the hosting of Olympic Games and that an Olympic golf course would bring more enduring legacy for the city than the preservation of the natural environment". There were also others type of conflicts raised by social movements such as "Golfe para Quem?" that tried to raise the public awareness through protests and media campaigns without success in stopping the adoption of the project. This kind of project contributed to increase environmental pressures in this area of Brazil.

As underlined by Gaffney C. (2013), a good urban planning requires preservation of natural environment for the needs of the future generations and social justice. A sustainable urban planning is one that allows to increase social equity.

Today, differently from how it was in the past, the public opinion is a fundamental aspect when a city/country wants to participate in the bid for an MSE. As Hugaerts I. et al. (2023) says, there are some possible determining factors for the host cities' residents, such as age, gender, income, education, brand image or environmental sustainability (ES). We have to say that according to the research they conducted, the ES and brand image are the most relevant ones among the above listed factors. The data for the research were collected in 2021 among 1357 people representative of the German

population in terms of age, gender, location etc., from which were considered just 917 respondents.

The research found out that the perception about the ES of a MSE influences the support for staging those events in Germany, and so to collect positive votes from the public the events' organisers have to implement and then correctly communicate each environmentally sustainable aspect, and the same goes for the image of the event. The analysis showed that 53,2% of the respondents are in favour of hosting Olympic Games and 60,5% are in favour of hosting Football World Cup. For both events 1/2 of the respondents thinks the image of the events is positive and 1/3 of the respondents thinks the same for the ES. The better the image and the perceived ES, the higher the support for staging MSEs. This increased interest on these topics is due to the recent increased public attention on climate change and others environmental issues that are reflected also into impactfully events like the hosting of Olympic Games or Football World Cups.

3.1.1 Sustainability impacts assessment

Dodouras S. and James P. (2004) in their work explained that it is possible to assess environmental, social and economic impacts associated with sporting events through methods using integrated processes. A problem common to all evaluation methods is that there is a great number of factors that need to be considered that makes difficult to being able to make comparisons among different events.

So, the evaluation of sustainability impacts of MSEs is complex and difficult and it does not consist in just estimating potential revenues and expenditures, but also other parameters such as the number of jobs created etc.

Literature said that environmental, social and economic impacts should be integrated into the planning and decision-making process by practitioners and decision makers influencing the projects from the very beginning.

In the study conducted by Collins A. et al. (2009) were investigated two different but both effective kind of approaches: Ecological Footprint and Environmental Input-Output modelling.

The Ecological Footprint is an indicator of the global environmental impact of resource consumption, and it is commonly expressed in global hectares per capita (gha/capita). This approach can estimate the demand on global bio-capacity and the relative supply. One of its limits is that this process tells you how much you impact but not what to do to limit those negative effects, even though you know there are some things that you can

do and others that are better to avoid. As it is explained by the scholars "this method is used to show the area of bio-productive land[6] to provide the resources for a reference population and assimilate their waste". The national Ecological Footprint can be also disaggregated in order to provide information about industry-sector, final consumption categories, sub-national areas and socio-economic group.

The Environmental Input-Output approach allows to estimate indirect economic or environmental consequences of new economic activities using the Leontief-inverse matrix. There are few limitations and restrictive assumptions connected to this method, nevertheless it is one of the most utilized. It also has a number of benefits, like for example the fact it is one of the most transparent and cheap and that it can be adopted also in areas without developed economic account or macro-economic model.

Satellite accounts are used to explore details of the national accounts. In the context of Input-Output analysis related to environmental information, this type of account can lead to better understand selected externalities associated to the consumption demands of sporting events.

This approach goal is to understand the transactions between economy and environment and the matrix could look as follows:

$$A1 \quad A4$$
$$A2 \quad A3$$

A1 stands for economy-economy interactions

A2 stands for economy-environment interactions

A3 stands for environment-environment interactions

A4 stands for environment-economy interactions

The most studied ones are the A1 and A2 matrix. The meaning of these two could be:

- for A1 "how changes in final demands for one product creates demands for other goods and services up the supply chain"

- for A2 "how production of a good or service is connected to environmental externalities"

These two approaches can be seen as complementary, because the Environmental Input-Output approach allows to estimate the within-nation environmental impact, while the Ecological Footprint allows an estimation of the global environmental impact.

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[6] It is defined as the land and water (both marine and inland waters) area that supports significant photosynthetic activity and the accumulation of biomass used by humans.

Using them for mega events like Olympic Games and Football World Cups needs to be done paying attention, because of the difficulties on considering all the environmental ramifications of event-related consumption and because of the costs on collecting all these data.

Both approaches have some limitations and to make them workable we need to make firstly some assumptions. The Ecological Footprint does not consider all human impacts on the environment and whether consumption patterns impact the bio-capacity of the planet. Furthermore, this measure does not take into account the fact that local communities consumption habits that are not sustainable, exceed what is the earth carrying capacity without incurring in any negative effect. The approach also aggregates different types of land to estimate the footprint. The Environmental Input-Output approach uses a coherent and transparent method in order to assess the impacts of event activities. This approach also makes rigid assumptions about price changes and technical coefficients of industry production.

They both are backward looking approaches using established coefficients and algorithms that can lead to some errors because the principal activities of mega events can vary being not always the same.

In the table 3.2 are summarized the main strengths and weaknesses of both methodologies.

Table 3.2: Strengths and weaknesses of Ecological Footprint and Environmental Input-Output approaches

	Strengths	Weaknesses
Ecological Footprint analysis	- Strong 'consumer' responsibility element. - Provides a measure of global environmental impact. - Good communication and educational tool. - Highlights those consumer activities that have the largest environmental impacts. - Can be used to assess the impact of future policy options.	- Difficulties in accounting for all event-related consumption. - Difficulties in accounting for displacement effects. - Non-transparent & inflexible causal link from economy to environment. - Single aggregative indicator limits analysis in some cases. - Issues relating to availability of data.
Environmental Input–Output analysis	- Detailed results by industry. - No of environmental indicators. - Transparent.	- Industry structure may be inappropriate. - Generally restricted to national analysis.
Both	- Widely accepted methodologies. - Quantitative results aid strategy formulation & policy prioritisation. - Comparability across events & with other forms of economic activity.	- Extant coefficients may not represent event activity. - Limitations of Input–Output analysis in event evaluations.[a]

The use of methodologies such that we have described can be useful to compare across time and space sporting events that aimed to achieve social and environmental goals.

The two most important MSEs, Olympic Games and Football World Cups, during the years have tried to implement the theme of sustainability into their events' organisation. Sometimes with success, while sometimes with difficulties.

In 2018 was launched the UN Sports for Climate Action by the UNFCCC, in which IOC and FIFA joined. This initiative aims to raise awareness on the theme of climate change among people, through sport organisations. The main reason is the fact that sport activities could be affected by the consequences of climate change through, for example, the raise in temperatures that leads to the melting of glaciers and snow and to the rising in the level of the sea, compromising the normal running of sports competitions and damaging the various structures located near the sea and in the mountains (Aruffo C., 2021).

In the following paragraphs the aim is to offer an overview of what IOC and FIFA are doing to try to limit possible climate repercussions.

3.1.2 Sustainability impacts in Olympic Games

In the 90's the IOC starts to think about greening the Olympic Games right after the edition of the Games held in Albertville (France) in 1992. In fact, it was during the Centennial Olympic Congress in 1994 that the topic of environmental sustainability started to gain importance. In the same year took place the first ever Winter Games supporting an environmental commitment, in Lillehammer (Norway) (Jin L. et al., 2011). In those years the environmental pillar became the third pillar of Olympism together with "sport" and "culture" (Hugaerts I. et al., 2023)

In 1996 the IOC added a paragraph in the Olympic Charter with the aim of making environmental protection mandatory for all the future editions of Olympic Games. The Olympic Charter said (Karamichas J., 2015): "The IOC sees the Olympic Games are held in conditions which demonstrate a responsible concern for environmental issues and encourages the Olympic Movement to demonstrate a responsible concern for environmental issues, takes measures to reflect such concern in its activities and educates all those connected with the Olympic Movement as to the importance of sustainable development".

As it was written in the Olympic Review (2006), in 2003 the IOC introduced the Olympic Games Impact (OGI) study in order to measure the impacts of each Olympic Games edition on the host city, on the environment and on the residents. Each study began two years before the host city was selected and it ended two years after the conclusion of the Games, covering a 11-year period.
The main objectives of OGI study were:

- to measure the overall impact of the Games
- to assist bidding cities and future Olympic Games organisers through the transfer of strategic direction obtained from past and present Games to identify potential legacies and maximise benefits
- to create a comparable benchmark across all future Olympic Games

The OGI study was mandatory and had to be conducted by each Organizing Committee for the Olympic Games (OCOGs) with the role of collecting data at specified intervals and of producing four reports.

There were 150 indicators divided into three categories of impacts: economic, social and environmental.

In 2018, during the 9th International Sport Business Symposium in South Korea, the IOC presented the new Legacy Reporting Framework that should have replaced the Olympic Games Impact (OGI) study. The reason of the replacement was the release of new reporting standards such as the GRI Standards, which make the OGI study obsolete with the need of a revised model to follow (olympics.com, 2018). Tokyo 2020 was the first Olympic Games edition to report on legacies based on this new framework.

Since the 1990s, the Olympic Movement (OM) began to recognize the importance of considering environmental issues. But, as time goes by, as underlined by the study conducted by Ross W.J. and Leopkey B. (2017), the focus passed from the environment to the idea of sustainability in the Games and finally to the concept of zero impact Games.

In Olympic bids the environment has always been present, but not in the sense we mean nowadays. There were disclosed information about average temperatures and precipitation in order to understand if the Games will be held in the conditions suited to the event.

In the 1880s there was the bidding process for the 1994 Winter Olympic Games assigned to Lillehammer. In the bid there was no mention to environmental protection, but as the protests for the 1992 Winter Olympic Games of Albertville took place, the Lillehammer Olympic Organizing Committee (LOOC) started to make adjustments and in the Post-Games Report we were able to see the Games' goals towards environment, such as the use of environmentally friendly materials. From that point in time initiatives from the Olympic Committees of the host cities were increasingly more frequent.

For the edition of Atlanta Games were developed some environmental plans after the city selection and was created also an Olympic Environmental Support Group in 1991. In 1995 was presented to IOC the Atlanta Committee environmental plan that comprised, among the others, the initiative of planting thousands of trees in the city.

From 1998 environmental protection became a fundamental element among the bids for the Olympic Games. The Beijing's 2008 Olympic Games is known as Green Olympics, and the goal of the Beijing Committee was to achieve environmental protection in a cost-effective manner. The objective was to leave the greatest environmental legacy ever.

After this point there was a shift to the inclusion of sustainability into the host cities' plans. This inclusion began from the preparation of the 2004 Olympic Games' bids and it was also due to the IOC commitment towards sustainable development. For the bids of 2006 Winter Olympic Games, both the cities of Torino (Italy) and Sion (Switzerland) referred to sustainability and sustainable development. Within the bidding round for the 2010 Winter Olympic Games, Vancouver wanted to be remembered as "Sustainable Games", creating open and socio-economically equal Games benefitting all citizens. Then for the 2012 Olympic Games, London's bid underlined some goals such as zero waste, promotion of environmental awareness, improvement of the quality of life and opportunities for local communities through different projects etc. The Sochi 2014 Winter Olympic Games objectives were inclusiveness, economic viability and environmental consciousness. Sochi sustainability plan, not only embrace environmental protection but also some social issues like health.

From this time on, sustainability began to raise in importance passing through economic goals to health, safety and quality of life.

Since 2012 Olympics bids, the zero-impact theme began to take hold. IOC in bid manuals began to request air and water quality information in the documents. In the bid manual for the 2014 Winter Olympic Games were required measurements for carbon monoxide, PM 10, sulfur dioxide and nitrogen dioxide. For the 2016 Olympic Games edition Tokyo proposed an "Olympic carbon minus programme", but the Games were not assigned to it. Chicago for the same edition proposed a plan for decrease emissions and reach carbon neutrality. Rio de Janeiro won the bid in 2016 with four environmental focus area in its plans: water conservation, renewable energy, carbon neutrality and waste management and social responsibility.

Then the winner for the 2018 Winter Olympics bid was PyeongChang known as "Low carbon Olympics" or "Green Olympics and Paralympics for the Next Generation", as they embodied the next generation of environmental standards. The PyeongChang zero impact objectives were: zero waste, net zero energy use or creation of a surplus, zero emissions and zero wasteful water use.

For the bid of 2020 Games, Tokyo proposed a model based on reduce, reuse, recycle, recover energy and restore urban nature. While, for the last edition of 2024 Tomas Bach (IOC president) proposed the implementation of a carbon management and reduction plan for the Olympics.

The zero-impact goal is something that each OCOG can consider in a voluntary manner, differently from environmental and sustainability stuff. For sure it could help in increasing the benefits intended for the host communities.

To assess the nation or city capacity for environmental modernization (EM), results quite important to analyse each phase of the hosting process, from the pre-event to the post-event (Karamichas J., 2015).

In the pre-event phase, the candidates for hosting the Olympic Games have to fill in the application that is guided by the Manual for Candidate Cities (MCC) published by IOC eight years before each edition. These candidates have to present plans, among which there must be plans for increasing environmental awareness. Their implementation can lead to the transformation of the institutional and policy framework on environmental modernization of host cities.

In the post-event phase, the capacity for environmental modernization can be captured, as we can learn from key works in this topic and from green legacies aspirations of the IOC, through the use of six interdependent indicators: average annual level of CO2 emissions, level of environmental consciousness, ratification of international agreements, designation of sites for protection, implementation of Environmental Impact Assessment procedures, Environmental Non-governmental Organizations participation in public decision-making processes.

Hosting Mega Sport Events, as we have said various times until now, can lead to negative socio-economic and environmental impacts. They can increase crime rate, living costs, traffic congestion, air pollution, noise and construction waste. We can list numerous sporting events in which there were a lot of these issues, beyond the positive effects that they could also bring. An interesting example deepened by De La Cruz

A.R.H. et al. (2019), explored the association between air pollution and mega-events taking as case study the 2016 Rio de Janeiro Olympic Games edition.

They learned that the air pollution concentration varies depending on the phase in which we are, before, during or after the Games. The work was conducted in the metropolitan area of Rio de Janeiro, in which the main source of pollution was the vehicular emissions, followed by stationary sources such as refineries, naval, metallurgical petrochemical construction and power plants.

The three periods analysed were divided as follow:

- Before Olympic Games from July 1st to August 4th (A)
- During Olympic and Paralympic Games from August 5th to September 18th (B)
- After Olympic Games from September 19th to October 31st (C)

The daily concentration of PM10, O3, SO2, NOX and CO were taken by the Municipal Secretary of Conservation and Environment of Rio de Janeiro and were related to different monitoring stations around the city (Bangu, Irajà, Sao Cristovao, Tijuca, Copacabana and Centro), while the meteorological data such as wind speed, wind direction, temperature, solar radiation, relative humidity and precipitation were given by an automated weather system.

The reported results highlight the fact that the level of pollutants concentration (not for O3) decreased in the period B compared to period A, and the same goes comparing period C to period B. O3 was the only one that increased between period A and B and C, due to an increase in temperature and in NO levels. So, it is a pollutant that behaves differently from the others.

In the period during the Games the concentration of air pollution may be reduce due to the implementation of some policies by the Rio de Janeiro government during Olympics, such as the limitation of the number of vehicles allowed in the streets surrounding the Games sites and the development of an efficient public transport. The reduction after the Games period can be associated with the adoption of a new type of traffic management.

Rainfall and relative humidity are factors influencing the levels of concentration of pollutants. High relative humidity is correlated to high pollution levels and low relative humidity is correlated to low pollution levels. Precipitation is caused by high levels of humidity when the temperatures decrease causing condensation of water vapor. Through precipitation, pollutants can be deposited everywhere and the pollutant concentration drops.

Between period A and B there were an increase in rainfalls and the same occurred between period B and C. Also thanks to that, there was a reduction of air pollutants. Relative humidity decreases between period A and B, while it increases between period B and C.

We can see in the table below extracted by the work of De La Cruz A.R.H. et al. (2019), all the percentage variations among Olympic periods for each air pollutant and for each Rio station.

Table 3.3: Percentage variations (De La Cruz A.R.H. et al., 2019)

Table 3

Variation (%, air pollutants and meteorological variables) among Olympic periods (A, B, and C) for each pollutant and air pollution monitoring station.

Pollutant	Tijuca		Centro		Copacabana		São Cristovão		Bangu		Irajá		Study area		Reference, RJ		
	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-B (%)	B–C (%)	A-R (%)	B-R (%)	C-R (%)
PM$_{10}$	−9.4	−13.4			8.3	−5.9	−25.5	−31.7	−30.0	−23.0	−29.4	−29.9	−16.9	−18.9	48.0	23.0	−0.3
O$_3$	**48.5**	−0.3	24.9	0.2	19.2	10.4	5.2	28	23.0	6.0	35.9	5.9	26.5	7.1			
SO$_2$	8.9	−37.2	−8.5		−29.0	−25.0	−29.0	−32	**−70.0**	**80.0**	6.5	−1.7	−26.4	−16.9			
CO	−10.4	−13.9		−23.3	−27.0	−38.0	−20.0	**−68**	−14.0	−31.0	−8.5	−25.6	−12.9	−30.9			
NO	−39.8	−14.9							−42.0	**−48.0**	**−57.0**	**−52**	**−49**	−35.5			
NO$_2$	−10.6	−20.1							7.1	−41.0	−27.0	−21.0	−12.5	−25.3			
Meteor																	
T	7.7	0.9			5.6	1.5	6.3	−0.1	−1.5	29.9	6.1	−0.2	6.4	0.53			
RH	−0.8	8.8			1.4	3.7	−2.7	11.3			−0.9	8.5	−1.0	12.2			
Rainfall	138	359	565	129	410	17	1019	214	2668	12	1647	65	629	96			

Note: A-B: Difference % (before-during), B–C: Difference % (during-after), white space: not measured, R: reference value (average of eight years) reported by Pacheco et al., (2017), which the authors evaluated only PM$_{10}$ in Rio de Janeiro. T: temperature, RH: relative humidity. Differences greater than 45 is in bold.

For mega sporting events it is also valuable to try to study the residents' perception of environmental impacts. With this regard we can have a look at two research: the first is about the 2008 Beijing Green Olympic Games carried out by Jin L. et al. (2011) and the other one is about the 2012 London Olympic Games carried out by konstantaki M. and Wickens E. (2010).

For the research on Beijing Olympics (in China) was taken a sample of 298 people from Beijing residents of various age groups, 56,4% male and 43,6% female, with different levels of education and income. To those people was administered a questionnaire including six sections: awareness, perception, attitude, behavioural intention, actual behaviour and demographic background. The data were collected via emails, through online surveys or through face-to-face surveys from June to August 2009 in Beijing. The study revealed that the residents in general perceive in a positive way the fact of hosting the Olympic Games. When in 2001 the city of Beijing was selected as host city for the 2008 Games, the environmental situation was different from that faced in 2009, so people agreed on the fact that this event had helped to improve the air and water quality, to better use energy, to improve public transportation, to enhance pollution and waste management etc.

These positive results achieved by Beijing were possible thanks to the city government who invested a lot on environmental projects and thanks to the constant encouragement from IOC and UNEP to integrate environmental protection into sport activities.

The environment has become an important part in the organization of Olympic Games, so it became necessary to investigate on the awareness, perception, attitude, intention and behaviour related to those environmental initiatives connected to the Games among the host cities' residents (in this case Beijing).

The findings of the study indicate that environmental perceptions influenced the attitude towards the Beijing Olympic Games and this attitude influenced the intention to support Beijing green Olympic initiatives and others future MSEs.

The perceived air and water quality, energy use, public transportation, ecological construction, industrial pollution, solid waste management and environmental education affected the attitude, behavioural intentions and support behaviours toward the Olympic Games. Environmental management performance before, during and after the event can stimulate positive attitude, behavioural intention and support behaviour.

With this research marketers, planners and organizers of events like these, can take advantage of this information trying to implement strategies taking into account the environmental and social side of the events and emphasizing environmental aspects of the events through campaigns aiming to make people aware of the organization's efforts.

For the research on London Olympics, was taken a sample of 100 respondents from the residents of High Wycombe that is located in the county of Buckinghamshire near the hosting city of London. Buckinghamshire was selected because of the large number of Olympic-related activities that took place there since London won the bid for the Games of 2012, such as conferences, courses, coach education seminars, sport ambassador schemes and community projects. The data of the survey were collected in March and April 2008. The 50% of the respondents were young people (18-34 years) while the other 50% were older people (35-55 years). This survey wanted to highlight the differences and similarities among the two groups of respondents about perceptions.

There were differences among residents' perceptions of environmental issues at 2012 London Olympic Games between the age groups.

Firstly, we have to say that the study has shown, in general, strong support from all the residents interviewed. The older group was composed by people with higher levels of education and socio-economic status and also higher levels of apprehension and scepticism about the environmental topic. The young respondents were on average more supportive of the London Olympic Games. They support the event for the new opportunities of employment offered and for the improvements in sporting and transportation facilities guaranteed.

The reasons why the older people supported the event were the improvement of UK economy and the pride and excitement of the nation.

The percentage of non-supporters were larger in the case of older respondents.

Young people that do not support the Games stated that was for the increased in prices of goods and travels and because the event did not lead to an immediate possibility of employment.

Old people that do not support the Games stated that was for the increased in taxation, the problems of security and for the negative impacts on the environment.

Several studies have reported that the environmental conscious citizens are those that are less supportive of Olympic Games.

There were differences among young and old residents about the perceptions of environmental issues. The older ones demonstrated a much negative attitudes towards the topic, although for both groups the problem of transportation is real and they thought that to plan a safe and an effective transport system for 2012 Olympic Games would have been quite difficult.

Finally, for the older residents LOCOG wouldn't ensure an efficient level of security to the Games, while the younger ones appeared to be neutral.

The fact that the residents of all the ages negatively perceived the transport system is something that can lead to a reflection. The British government were doing a lot in order to develop and to renovate London transportation to be ready for the Olympics. So, there was a problem of awareness and of communication, because such projects and plans needed to be communicated to residents through the media in order to educate people and make them aware of environmental and security initiatives.

3.1.3 Sustainability impacts in Football World Cups

The first time that the Fédération Internationale de Football Association (FIFA) addressed environmental sustainability concerns was during the organisation of the 2006 Football World Cup in Germany. Until 2018 the efforts of FIFA were mainly concentrated on the reduction of direct emissions and on the energy use by the event organisation. Then, it began to focus also on the reduction of indirect emissions (Hugaerts I. et al. 2023).

In the Germany edition of the World Cup was implemented a sustainable long-term greening agenda containing five green goals related to energy, water, waste management, climate change neutrality and efficient transport. The 2006 Germany Football World Cup is known as a success in terms of sustainability (Talavera A. M. et al., 2019).

Death C. (2011) work focuses on the 2010 Football World Cup, that was hosted by South Africa, and on the Green Goal 2010 programme. South Africa is a developing country that tried to emulate the Germany's attitude towards environment through the implementation of the already mentioned programme. It was carried out with the purpose of putting in place a carbon-neutral event securing an environmental, social and economic legacy for the tournament and for the nation itself.

The Department of Environmental Affairs and Tourism (DEAT) elaborated a National Greening 2010 Framework, which focused on waste, energy, transport, water,

biodiversity and responsible tourism, and on four cross-cutting themes of carbon off-setting and emissions reduction, sustainable procurement, job creation and communication and outreach.

Differently from what happened for the German World Cup in 2006, in South Africa the priority was the economic and social development rather than the environmental mitigation. Another difference that arises from a comparison between these two is that the 2010 tournament produced 896,661 t CO2e, so eight times the tonnes of the German edition, plus others 1,856,589 t CO2e for international air travel. Moreover, while in 2006 FIFA helped in offsetting the carbon footprint, in 2010 this didn't happen.

Most of the initiatives related to the Green Goal 2010 were developed by the host cities themselves because the National Greening Framework was not adopted from an early stage, so the success of the programme varied among host cities since they had different technical and financial capacities, and many cities didn't have the appropriate resources. Some cities like for example the City of Cape Town, implemented creative greening programmes. Cape Town Green Goal programme included 43 projects from waste minimization and recycling initiatives to biodiversity protection and education campaigns, to city beautification and public transport improvements.

One of the most important sustainability legacies of the 2010 World Cup in South Africa was the public transport upgrade. By the way, we have to distinguish between service upgrades that will disappear after the event and infrastructural improvements that will last beyond the event. These improvements aimed to reduce road traffic and to be useful for tourists and commuters. They also had the goal of changing citizens' behaviours impacting positively on the environment and society.

Furthermore, new stadiums were constructed for the realisation of the tournament. Five were built and five were renovated with impacts on environment, society and on the economy. In Cape Town was built the Green Point stadium, by local workers and with local materials (a % of components of old stadiums were recycled and reused), performing well also in terms of energy and waste. Many didn't look at this project as a good thing for the nation because of the poverty conditions that many people in South Africa face, and so it seemed like a waste of money for something that should be less important than human lives. Another point against the project was the fact that in past editions like in Japan or South Korea the new stadiums then became expensive white elephants and the same could happen in this case.

In particular, that of the construction of the stadium at Green Point right in front of the iconic Table Mountain was a FIFA idea. This raised numerous concerns, in particular from the Green Point Common Association (GPCA) who opposed to the construction because it would destroy the city's last remaining green lungs.

There were social movements inspired by the World Conference Against Racism (WCAR) and by the World Summit on Sustainable Development (WSSD), that saw greenwashing practices in the Green Goal 2010 programme. According to them the organization of the event was more careful in ensuring the success of this mega event than in taking into consideration sustainability aspects.

Social movements' resistance against the South African World Cup raised from the fact that the total emissions would not be offset totally as it had happened during the 2006 World Cup in Germany. In South Africa, on contrary, there seemed to be a lack of interest in mitigating carbon footprint due to the low regard that politics and media have about the argument. The nation, in fact, relies on sectors like the mining and coal-fired power ones, that are generally known as environmentally damaging. South Africa in 2010 was ranked 115 out of 163 countries in the 2010 Environmental Performance Index.

South Africa's sustainability policy is characterized by weak ecological modernization and a weak sustainable development perspective. In many cities the organizers were not able to execute all the green projects due to lack of funding directed to this programme. Only a limited number of urban renewals and green jobs had been created.

For this reason, in 2010, the Cape Town organizers complained with the fact that FIFA, the Local Organizing Committee for the event and the government itself were not so focused on this Green Goal, so that the National Greening 2010 Framework emerged lately, after several concerns came out from the host cities and the social movements.

To sum up, we can say that there were a lot of good ideas and intentions about the Green Goal, but the tree-planting and the recycling bins cannot be enough to mitigate the carbon footprint of an event like the 2010 South Africa World Cup. The lack of financial resources, the waste of money for the creation of white elephant ruining the natural environment of this country, the forced removals of communities and the FIFA control and their multinational partners had contributed to be a disaster for environmental politics and for sustainable development.

Another case that has attracted the attention of several scholars is that of the recent 2022 Qatar World Cup. Talavera A. M. et al. (2019) focused on the sustainability issues of the Qatar World Cup organization.

Qatar is a country located on the Persian Gulf with an arid climate and a deserted territory. In this area there are little precipitation, and the summer temperatures are generally very high, so for these reasons agricultural resources and water resources are very scarce and the population needs to rely on the importation from others regions or continents. Qatar's economic growth mainly relies on natural gas exports. The capital is Doha and in the last years has become attractive for tourism and business.

In 2010 Qatar won the bid for hosting the 2022 Football World Cup, the first ever World Cup organised in the Middle East and Arab World, and in 2011 was created the Supreme Committee for Delivery and Legacy with the purpose to show updates and news about the event and sustainability initiatives. In fact, Qatar aimed to organise the first carbon neutral World Cup using renewables energies, environmental construction practices and new cooling technologies in the stadiums' construction.

Motivations that pushed Qatar to make a bid for this mega event are those of all the other countries, such as prestige, branding, global exposure, universal recognition as world destination. Being Qatar a developing country hosting those events can be seen as a sign of stability and a promise of an emerging future role. Hosting SMEs pushes local economies, financial prospects and urban developments. All these things are linked by an aspiration to sustainable development.

Despite all the things mentioned above, Qatar was accused many times of worker abuse, forced labour, human rights abuse and bribery for winning the hosting bid. The construction of urban and sport facilities (such as stadiums) was also seen as a waste leading to white elephant infrastructures[7].

The framework of the sustainability aspects for the Qatar 2022 World Cup was based on the three main pillars of sustainability and more in particular on the QNV 2030[8] in which was added the human component. For each of the fields that make up the framework are explained the related legacies that will remain after the execution of the Qatar World Cup.

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[7] The term refers to an extremely expensive building project that fails to deliver on its function or becomes very costly to maintain.

[8] The Qatar National Vision 2030 is a development plan launched in 2008 by the General Secretariat for Development Planning in the State of Qatar. Its aim is to transform Qatar into an advanced society capable of achieving sustainable development by 2030.

We are going to briefly examine some of them as reported by the work of Talavera A. M. et al. (2019):

- Organization: FIFA and the hosts have different interests toward the event. On one hand for FIFA is more important the profitability and the attractiveness of the World Cup, while on the other hand for the hosts is more important the prestige and the long-term contributions and legacies for the nation. The main challenge is to see how these two can go together in order to meet the commitment of a carbon neutral World Cup. It was created the Supreme Committee for Delivery and Legacy with the aim to create a legacy for future generations proposing and supervising initiatives, projects and sustainability activities. This institution created collaborations with NGOs and third local parties to meet sustainability legacies challenges.

- Social: Qatar lies in a region that is very conservative and traditional, and many aspects of its culture clashes with the Western modernity approach embodied by immigrants and visitors. The World Cup event can highlight this cultural gap due to the thousands of fans coming to Qatar with their own habits. Qatar to get closer to the whole world allowed room for celebrations for the event. Another problem faced by Qatar is that of social inclusion and human and labour rights. There are abuses, forced labour, human trafficking and human rights issues all along the migrant workers' life cycle because of the lack of supervision of the system and of legal enforcement encouraging bad practices. This is affecting Qatar reputation and its power to attract business, so the World Cup is seen as something that could help in cleaning its international image. Finally, this event could also assist in spreading out sustainability awareness and green habits among children, students and adults through campaigns, ad hoc programs and initiatives.

- Economic: The challenge for the Qatar World Cup is to be like an economic support for many sectors for future growth. Until this moment oil and gas sector has dominated in this region, but there's hope that the situation in the future can change with the entering of new sectors such that of sport.

- Infrastructural: For the Qatar World Cup were constructed several stadiums that needed high amount of electricity mainly for lightning and air conditioning, so the challenge that the event had to face was to use energy in the best efficient way possible using cleaner sources of energy. Another thing that was important

to fix was the transportation system. So here the challenge was to build an efficient urban transportation system composed of metro, buses etc. with the aim of remaining also after the event. Finally, talking about urban planning, the aim of the event was to enhance the urban services and infrastructures in order to meet the future generations needs without elaborating projects that just lead to white elephants.

- Environmental: Environmental sustainability of the World Cup implies different challenges. Due to the region's arid conditions and to the high temperatures, the energy consumption is very high, and it increases a lot during mega events for the stadiums lightning and air conditioning and for the domestic services for the visitors. The challenge is to try to reduce carbon footprint using cleaner technologies for energy consumption. Qatar is also water-stressed and during these kinds of events the situation is much more complicated than usual, so there is the need to find a way to not deplete underground water. The waste management is an important topic to face, and the World Cup organizers have to ensure the reuse and the recycle of most of the materials and resources.

To conclude this explanation about Qatar World Cup, we have just to know that there are a lot of challenges, and their solutions are not quick to undertake. This region is growing a lot urbanistically and economically in the last decades and the execution of a World Cup contributes to this process. On the environmental side there are some good ideas for making the event carbon neutral, as we have seen above, and the constructed stadiums can also be used after the event as hotels, malls and sport centres besides of being constructed in a modular way in order to be dismounted and donated to developing countries. With reference to human rights and forced labour issues, Qatar is trying to introduce new practices and mechanisms of control although this process requires time.

In this chapter, we said that there are environmental issues connected to MSEs that can be limited through sustainable solutions like the ones illustrated in table 3.1. MSEs are not only carriers of negative impacts over the country, the region or the city, but also catalysers of urban development, leading to infrastructures development and urban transportation improvement for example. As we have underlined, this can automatically carry benefits from an economic, social and environmental point of view, due to a better efficiency of the location in which these events take place. We have then analysed the

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case of the 1992 Barcelona Games, where the event played a very important role in the city development. Another case discussed in this chapter was that of 2016 Rio de Janeiro Games, where the big amount of projects connected to the Games had great repercussions on the environment (such as the Golf Curse in the Reserva da Marapendi) raising protests by social movements. Public opinion is very important for the bid of an MSE. Here was taken as an example the work of Hugaerts I. et al. (2023) analysing the German population perception about ES and brand image connected to MSEs and how these can affect the support towards the event itself. The result was that, if the ES and the brand image are perceived in a positive way, people tend to be more supportive about the organization of the relative sporting event.

Another point that was analysed in this chapter was the method used for the assessment of MSEs' sustainability impacts. From the literature, results that there is not a single method valid, but there are many, such as the Ecological Footprint and the Environmental Input-Output approach. These two methods, in particular, can be used in a complementary manner, the former allows you to estimate the global environmental impact, while the latter allows you to estimate the within-nation environmental impact.

Focusing on the sustainability impacts of the Olympic and Paralympic Games, we had a look at the origins of the theme among the various editions starting from the 90s. Then, we explored the relationship between pollution and mega-events taking as an example case the 2016 Rio de Janeiro Games. From this study conducted by De La Cruz A.R.H. et al. (2019) emerged that the pollution concentration levels during and after the Games were lower due to the city's efforts in implementing solutions to improve air conditions (for example new types of traffic management).

In order to understand the residents' perception of the environmental impacts related to Olympic Games were examined two studies: 2008 Beijing Olympic Games and 2012 London Olympic Games. What resulted from them was that if people perceive improvement from an environmental point of view after the event, like improvement of air and water quality, efficient public transportation etc., they will be more supportive for future mega events. Another thing that came out was that the government and the organization of the event have to communicate the projects they intend to implement to make people aware of the efforts made for protecting the environment and make them more supportive. Younger people resulted to be a little more supportive for these kinds of the events.

Finally, we focused on sustainability impacts of Football World Cups from the environmentally success of the 2006 Germany World Cup to the 2010 Green Goal Programme and the 2022 Qatar World Cup issues.

The 2006 Germany World Cup success was taken by the South Africa organisers as a role model for the implementation of the Green Goal Programme, whose focus was on waste, energy, water, transportation, biodiversity emissions etc. It didn't work as hoped by the organisers, even though it helped to improve the public transport system. For the 2010 edition of the World Cup were constructed various stadiums, such as the Green Point stadium, with the risk to become white elephants. The construction of the cited stadium destroyed a vast green area of the region and for this reason it raised numerous protests from social movements and citizens. These movements, in fact, saw in the programme some greenwashing practices, because the economic success of the event seemed to be a lot more important than the social and environmental problems it could cause. The discussion on the 2022 Qatar World Cup was mainly based on the particular arid conditions of the region in which the event took place and on the social issues characterising it. It was examined the sustainability framework of the event and the legacies hoped to be achieved after the realization and conclusion of the World Cup.

CHAPTER IV. SUSTAINABILITY STRATEGIES COMPARISON BETWEEN TOKYO 2020 AND PARIS 2024

The sustainability strategy of an event like the Olympic Games can be found into their Sustainability Plan, that is released few years before the Games start. This instrument, in fact, sets out the policies, objectives and measures in order to improve the sustainability of the event. In this chapter we will look at the Sustainability Plans of the 2020 Tokyo Olympic and Paralympic Games and of the 2024 Paris Olympic and Paralympic Games, making a comparison among the strategies adopted. We will also investigate the public reactions from media, citizens and experts.

4.1 Tokyo 2020 sustainability strategy

The last version of the Tokyo 2020 Olympic and Paralympic Games Sustainability Plan was released in June 2018. In this plan was specified how Tokyo 2020 aimed to contribute to the United Nations SDGs through the Games.

Were selected five main themes of sustainability: "Climate Change (Carbon Management)", "Resource Management", "Natural Environment and Biodiversity", "Consideration of Human Rights, Labour and Fair Business Practices" and "Involvement, Cooperation and Communications (Engagement)". For each of them were set out goals, targets and measures. These themes could be summarized by the sustainability concept of Tokyo 2020 "Be better, together for the planet and the people".

For the organization of sustainable Games, it was vital the cooperation of Tokyo 2020 with Tokyo Metropolitan Government, the Government of Japan, local municipalities, sponsors and delivery partners, IOC, IPC, JPC[9], civil society etc.

The scope of the Plan was to adopt the strategy that better fitted with the event that was going to be executed, aiming at increasing the positive impacts that the Games could cause to the environment, society and economy, and decreasing the negative ones. It was based on four principles: stewardship, inclusivity, integrity and transparency.

The management system adopted by Tokyo 2020 adhered to ISO 20121, an international standard for Event Sustainability Management Systems. Tokyo 2020 also created the Tokyo 2020 Sustainable Sourcing Code, pushing for attention towards sustainability along the entire supply chain.

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[9] Japanese Paralympic Committee

The first theme is "Climate Change". One of the Tokyo 2020 goals was to deliver zero carbon Games using as guidelines the Paris Agreement and the SDGs. The Paris Agreement about climate change sets the objective of "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels", while in the SDGs we can find two goals about climate change that are the 13th "Urgent action to combat climate change and its impacts" and the 7th "Ensure access to affordable, reliable, sustainable and modern energy for all".

The first thing to do to deliver a zero-carbon edition is to compute the carbon footprint of the Games analysing all the CO2 emitting activities from the constructions to the operations and spectators' activities. Then, must be set the targets and measures for the avoidance of emissions, reduction of emissions and for the offset of CO2 and of the other GHGs in order to achieve the primary goal of the Games. In the table 4.1 are identified all the targets and measures in the field of climate change.

Table 4.1: Climate change targets and measures (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

Emissions avoidance	Reduction of emissions	Offset of emissions
- Strategic venue planning for the maximum use of existing venues and public transport networks. - Ensuring high environmental performances in the construction of venues. - Maximum procurement of materials and goods with high environmental performances.	- Construction of venues by effectively using energy saving technologies. - Maximum use of facilities and equipment with high energy efficiency. - The implementation of energy management in venue operations, and the installation and use of BEMS in new permanent venues. - Reduction of CO2 emissions through recycled use of materials and goods as much as possible. - Promotion of transport with lower environmental load. - Maximum reduction of GHGs besides CO2. - Installation of facilities which use renewable energies in permanent venues. - Maximum use of renewable energy.	- Implementation of offset for CO2 and other GHGs which are inevitably emitted even with the implementation of avoidance/reduction measures of emissions.

The second theme of Tokyo 2020 Sustainability Plan is "Resource Management". The Games' goal was to deliver a zero-waste edition, trying to avoid wasting resources on each phase of the event preparation, to ensure cyclical use of resources and to share this attitude with athletes, spectators and all the people around the world.

Initiatives related to Resource Management are required both for the resource input phase (procurement of materials and goods before and during the Games) and for the resource output phase (after the Games). For Tokyo 2020 resource management, is necessary to responsible use resources and to minimize wastes during the input phase, while trying to decrease the GHGs emitted during the output phase. All of this can be done by, for example:

- Selecting reused materials and goods and recycled goods
- Selecting advantageous materials and goods in terms of total costs (from purchase to post-consumption)
- Using rentals, leases and purchases with buy-back systems

The most important information for the resource management system is the amount of materials and goods necessary for the Games execution and the amount of materials and goods for disposal after the event. In Tokyo 2020 Games the main resources were represented by consumables, supplies, equipment and construction materials, while talking about venues, were fully utilized the existing ones so that there was just a small part newly built. These new venues were long-lasting and ensured an efficient use of energy and resources.

In the table 4.2 below are identified the main targets in the field of resource management.

Table 4.2: Resource management targets (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

Resource Management targets
- Reduction of the edible part of food waste - Reduction of packaging materials - Reduction of the production of new items by using rentals and leases to procure items - Reuse or recycle of procured items and goods - Use of recycled materials - Use of recycled metal in medals of the Games - Reuse or recycle of wastes generated from operations of the Games - Recycle of food waste - Reuse or recycle of construction wastes - Sustainable use of renewable resources (for example timbers) - Reduction of emissions into the environment

To promote the reuse and the recycle of resources, it is necessary to encourage the segregation of wastes. To do it in the best manner possible, for Tokyo 2020 Games were used bins with standardized designs (through colours and pictograms) to help people from all over the world to recognize and utilize them in the correct manner. During this edition of the Games was also used energy from waste incineration, important to realize both a recycle-oriented society and a low-carbon society.

About this, Tokyo 2020 had trained its workforce in order to make them more aware of sustainability and resource management activities. The reduction of waste involves the cooperation of as many people as possible from staff to visitors. "Mottainai" is the Japanese word to summarize the concept of avoiding waste.

The third sustainability theme that we have to discuss is "Natural Environment and Biodiversity". The Tokyo 2020 goal in this case was summarized in "City within nature/Nature within the city", saying that the Games' objective was to create a comfortable and resilient urban environment that had to coexist in harmony with the nature. Activities to recover and develop the ecological networks have been conducted by the Organising Committee, national Government and the Tokyo Metropolitan Government, the effects of which aim to remain for a long time after the Games as a legacy. Some examples are:

- The Ariake Shinsui Marine Park and Ariake Arena (competition venue for volleyball and wheelchair basketball) are going to be turned into a park used for environmental education
- The Sea Forest (competition venue for sailing, canoe, equestrian) is going to be used for tree planting events
- At the Kasai Kaihin Park the sea bathing experiences are going to continue, but at the same time are also going to be cultivated seaweed, clams and it is going to be practiced fishing

In the table 4.3 below are identified the main targets in the field of Natural Environment and Biodiversity.

Table 4.3: Natural Environment and Biodiversity targets (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

Natural Environment and Biodiversity targets
- To minimise the environmental load of the Games, enhance the functions of water circulation in the city and while improve the comfort that urban environment can offer - To develop the urban environment, and forming an attractive landscape - To minimise the environmental load associated with production, distribution, and other operations of the procurement phase of the Games by paying attention to prevent environmental contamination and protect biodiversity

The fourth sustainability theme to be mentioned is "Consideration of Human Rights, Labour and Fair Business Practices". The Games' goal with respect of this theme was "Celebrating Diversity – Inspiring Inclusive Games for Everyone".

In the Olympic Charter we can find the fundamental principles of Olympism, and there are a couple of ones about this topic. The principle 4 states "The practice of sport is a human right. Every individual must have the possibility of practising sport, without discrimination of any kind and in the Olympic spirit, which requires mutual understanding with a spirit of friendship, solidarity and fair play", while the principle 6 states "The enjoyment of the rights and freedoms set forth in this Olympic Charter shall be secured without discrimination of any kind, such as race, colour, sex, sexual orientation, language, religion, political or other opinion, national or social origin, property, birth or other status".

The Olympic Agenda 2020 on this point said that Host City contracts should consider the above cited principles and should comply with UN Guiding Principles on Business and Human Rights.

The introduction and promotion of Paralympic sports has contributed to the creation of a more inclusive and respectful society towards diversity.

Moreover, by looking at SDGs there are some specific goals dedicated to education and gender. The goal 4 states "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" and the goal 5 states "Achieve gender equality and empower all women and girls".

Tokyo 2020 aims to prevent and mitigate adverse human rights impacts caused by the Games related activities, and to avoid causing or contributing to any discrimination and child labour or forced labour issued through the Games related activities. In fact, this event operates in accordance with the UN Guiding Principles on Business and Human

Rights. These types of problems are present in Japan and could be increased through the spread out of mega sport events if the organization does nothing.

In the table 4.4 below are identified the main targets in the field of Consideration of Human Rights, Labour and Fair Business Practices.

Table 4.4: Consideration of Human Rights, Labour and Fair Business Practices targets (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

Consideration of Human Rights, Labour and Fair Business Practices targets
- Raise awareness of D&I and provide training opportunities for staff - Cooperate with stakeholders (partners) - Secure accessibility (develop and implement guidelines) - Promote actions at Games facilities and operations - Secure diverse human resources - Implement and secure flexible working - Provide appropriate working environment - Implement necessary training - Ensure procurement considering fair business practices - Develop the Sustainable Sourcing Code and property implement it - Prepare a communication system and property understand the situation of human rights consideration issues - For management control areas of Tokyo 2020, proactively request correction to abusers and protect victims - Establish and properly implement the Grievance Mechanism for the Sustainable Sourcing Code - For areas not under Tokyo 2020's direct management control, promptly communicate with responsible organisations/parties and request for their actions

The last sustainability theme of the Plan is "Involvement, Cooperation and Communications (Engagement)". The goal set by Tokyo 2020 was "United in Partnership & Equality – Inspiring Inclusive Games for Everyone".

For the Games to be sustainable it is necessary the involvement and cooperation of the public, volunteers, spectators and stakeholders promoting interaction and training for everyone. This is also what the goal 17 of SDGs tells us, "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development".

In the table 4.5 below are identified the main targets in the field of Involvement, Cooperation and Communications (Engagement).

Table 4.5: Involvement, Cooperation and Communications targets (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

Involvement, Cooperation and Communications targets
- Promote preparation and operation of the Games through collaboration and engagement of various parties - Inclusion of a wide range of people through talent development - Create broad inclusion through projects with the public - Provide communication to encourage understanding and actions for consideration of sustainability

The Sustainability Plan is then composed of other two sections, one related to Action Plans and Progress Status and the other one related to the Management and Tools for the realisation of the Plan.

In the first section we have a carbon management table in which Tokyo 2020 analyses the CO2 emissions tonnes for each of the sub-areas included in the three main sectors of construction, operations and spectators. In this manner Tokyo 2020 can understand what its environmental impact is and can also identify the sub-areas in which it is better to intervene through ad-hoc measures. Each carbon footprint item in the table is under the responsibility of some kind of organisation. The total emissions computed in the business-as-usual (BAU) scenario amount to 3,011 million tonnes of CO2, among which 1,660 are from construction, 0,530 are from operations and 0,831 are from spectators. The total emissions computed implementing emission containment measures amount to, instead, 2,93 million tonnes (see Figure 4.1).
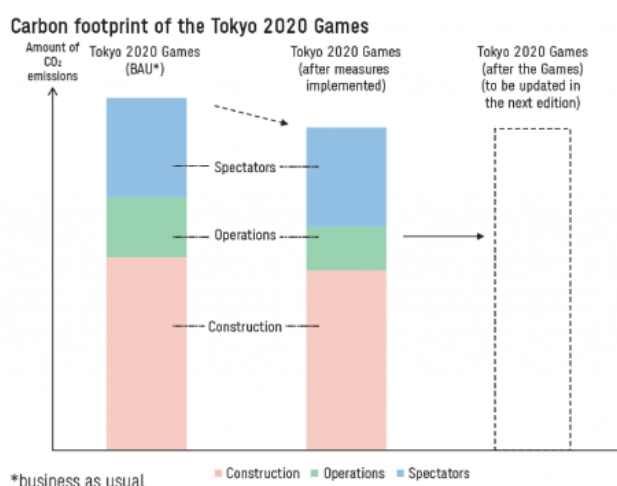

Figure 4.1: Carbon Footprint estimation (Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2, 2018)

For each functional area and organisation are defined the roles (which can change on regular basis) they have on climate change and resource management application of measures. Among the functional areas and organisations involved we have PGI

(Paralympic Games Integration), LGL (Legal), PEM (People Management), Transport, Administration, Sustainability (SUS) and many other that we can see from page 92 to page 100 of the Plan.

Due to COVID-19, the emissions computed at the end of the Games were lower than previsions, so approximately 1,9 million tonnes of CO_2 rather than 2,93. The reason can be imputed to the absence of spectators.

Moreover, also the Venue Plan for Tokyo 2020 is discussed in this section. It is composed by two main areas: the Heritage Zone (full of the legacies of Tokyo 1964 Games) and the Tokyo Bay Zone (embodying the future).

The venues used for the competitions can be disposed into three groups: we have the existing venues, newly constructed venues and temporary venues built just for the event. Their development has a huge impact on the sustainability of the Olympic and Paralympic Games. For this reason, there are few construction policies to take into account when building venues. The following ones can give us an idea:

- CASBEE (Large Comprehensive Assessment System for Built Environment Efficiency), a Japanese green building rating system for temporary venues
- The Green Building Program of the Tokyo Metropolitan Government for permanent buildings to take into account environmental measures
- The Tokyo Specifications of Energy Saving and Recycled Energy for venues constructed by the Tokyo Metropolitan Government
- The Policy for Promotion of Procurement of Eco-Friendly Goods and Services and the Resource Circulation and Disposal Plan of the Tokyo Metropolitan Government
- The Sustainable Sourcing Code for Timber set by Tokyo 2020 Organising Committee
- The Promotion of the Recycling of Construction Waste Plan 2014 set by Ministry of Land, Infrastructure and Transport and the Promotion of the Recycling of Construction Waste Plan 2016 of Tokyo Metropolitan Government
- The Guidelines for Promotion of Efficient Use of Water Resources of the Tokyo Metropolitan Government
- The Guidelines for Selecting Native Plant Species for Greening, to develop greenery areas that match locations

- The Landscape Plans of the Tokyo Metropolitan Government, for designing buildings that match the area
- Tokyo 2020 Accessibility Guidelines set by Tokyo 2020 Organising Committee
- The Basic Policy for Safety and Health of Construction of Tokyo Olympics and Paralympics Competition venues

In particular, in the Sustainability Plan were analysed the newly constructed Olympic Stadium, the new permanent venues constructed by the Tokyo Metropolitan Government (such as Ariake Arena, Seaside Park Hockey Stadium, Sea Forest Waterway, Olympic Aquatics Centre, etc.), temporary venues and overlay (such as the Olympic Gymnastic Centre, Olympic BMX Course, Odaiba Marine Park, etc.) and the Olympic/Paralympic Village. For each of them were examined the construction processes with the illustration of the phases year by year, and the specific activities undertaken in the past and those that are going to be implemented in the future with respect to climate change, resource management, natural environment and biodiversity and the consideration of human rights, labour and fair business practices (details are provided by the Plan from page 103 to page 133).

The last section of the Tokyo 2020 Sustainability Plan explains that for the right implementation of the plan it is necessary to establish a management system, and the Tokyo Organising Committee has applied it in accordance with ISO 20121, an international standard for Event Sustainability Management System. It allows to manage environmental, social and economic impacts related to the event.
The plans' activities the organisers put in place need to be monitored over time for seeing if the targets set are going to be achieved or not, and if not, they have to be modified together with the types of efforts.

Tokyo Organising Committee has also the task of preparing and publishing three Sustainability Reports with the updates of the goals defined in the Plan: the Progress report, the Pre-Games Report and the Post-Games Report. They are all prepared referring to United Nations Global Compact and to GRI Standards. Furthermore, to gather the legacy of the Games, Tokyo Organising Committee has to apply the Legacy Reporting Framework.
The Tokyo Organising Committee in order to study sustainability issues and monitor their progress, has established the Urban Planning and Sustainability Commission

composed of two groups: the Sustainability Discussion Group and the Working Group (the latter with more technical tasks).

After the conclusion of the Games in September 2021, the Tokyo 2020 Post-Games Sustainability Report was published, and the main achievements of the event were communicated:

Figure 4.3: Achievements (Tokyo 2020 Sustainability Post-Games Report)

The Sustainability Reports have to disclose to their stakeholders (Tokyo Metropolitan Government, Government of Japan, local governments, sponsors, etc.) the material information about the efforts on sustainability made by the event.

A few months before the starting of the Games, COVID-19 broke out and it was decided to postpone the event to the following year in order to safeguard the health of athletes, staff, spectators and citizens. This never happened before, and it caused changes in the preparation and delivery of the Games taking measures to prevent the

spread out of the infection. This had, without any doubt, impacted the sustainability efforts requiring to replan and to organise new initiatives.

To be consistent with the Sustainability Plan, the Report's chapters represent the sustainability themes of the Tokyo 2020 Olympic and Paralympic Games with all the relative targets' performances. All the impacts and changes connected to the advent of COVID-19 are present at the beginning of the Report and within each chapter when related to the themes.

4.1.1 Tokyo 2020 public reactions

Tokyo hosted the Games for the first time in 1964, but with different purposes with respect to 2020. If in 1964 the objective was mainly the development of the city and the country driven by population and economic growth, in 2020 Tokyo aimed to be recognised as a mature city with a careful eye on sustainability. The Tokyo Metropolitan Government implemented strategies to develop the city in harmony with the global environment and various efforts have been made to fight against global warming and social inequalities such as refugee crisis and discrimination. During the years following the Second World War were adopted some human right treaties like for example the Universal Declaration of Human Rights, and some environmental treaties like the Paris Climate Agreement and the Sustainable Development Goals, all of them ratified by Japan. With the delivery of the Games, Tokyo 2020 showed to the world how it would intend to solve the SDGs challenges embracing sustainable development through the five themes we have discussed before, and the specific initiatives that were activated in order to achieve the targets and goals set by the Sustainability Plan.

Tokyo 2020 promised to be the most sustainable edition of the Games ever, but as we can read from the study conducted by Müller M. et al. (2021) from the University of Lausanne this was not the case in the end. Tokyo 2020 was the third least sustainable edition ever, only better than Rio de Janeiro 2016 and Sochi 2014 (see figure 4.4). In this study were measured all the Games editions since 1992 considering economic, environmental and social factors.
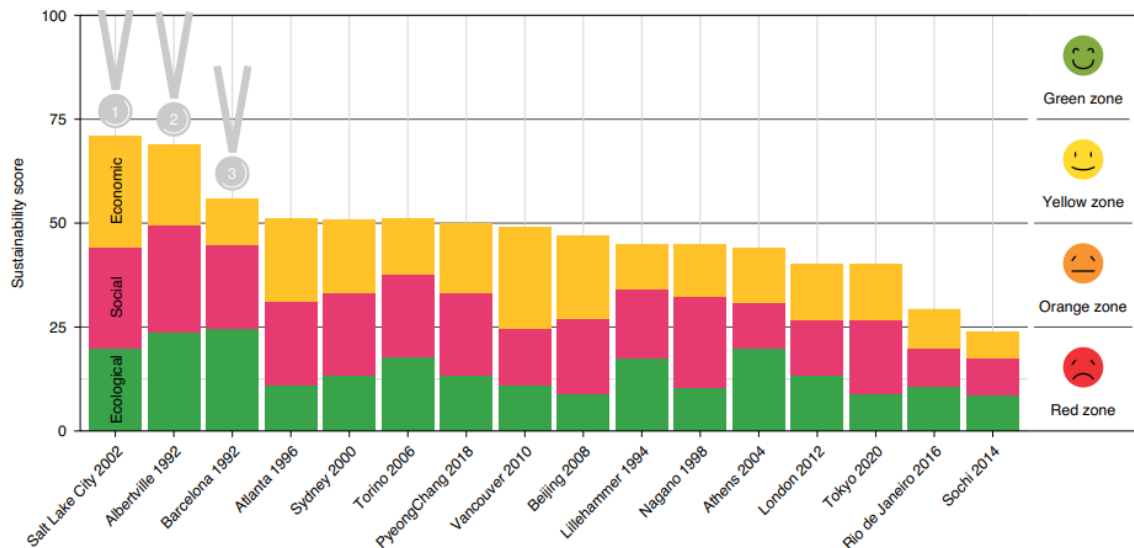
Figure 4.4: Sustainability of Games' editions since 1992 (Müller M. et al., 2021)

Were taken into account nine factors: new construction, visitor footprint, event size, public approval, social safety, rule of law, budget balance, financial exposure and long-term viability. These were assessed for each Games edition, on a scale from 0 to 100, so from less to more sustainable. Then was computed the mean value among all the factors for each edition in order to have the overall level of sustainability of the host city taken into consideration.

The study shows us that the overall sustainability of the Games is decreasing year by year, despite the increased concern on climate change and the development of new efficient technologies. So, why is it happening? The answer seems to be related to the increasing in the size of the event, to the presence of more athletes/staff/visitors/media to the event, to the increasing in venues and accommodations used etc.

The only solutions that can be adopted to make the Olympics and Paralympics more sustainable would be to downsize the event and to rotate its presence among the same chosen host cities so that there will be no need to build new infrastructures for example.

The Japan Olympic Committee to try to be more sustainable as possible worked on a lot of projects. First of all, to compensate carbon emissions produced during the event, it decided to purchase 4,38 million tonnes of carbon credits generated through local energy-saving and efficiency projects, worthing 150% of the total carbon emissions of Games' operations, making Tokyo 2020 carbon negative. But the activity of carbon offsetting has been criticised by many climate scientists and environmental activists because through this mechanism we continue to emit doing nothing to reduce our

polluted practices, and simply cleaning up our activities by spending money. This was the first edition in which carbon credits were used.

Other projects on which Tokyo 2020 was based are: the BATON Project (Building Athletes' village with Timber Of the Nation), the Medal Project (medals made of used electronic devices), the reutilization of existing venues, the wastes recycle, the athletes' uniforms made by recycle materials, the Olympic torch working through hydrogen, the recycled cardboard beds for the athletes, the podiums 3D printed with household plastic waste and many more. It was also developed an efficient decarbonisation strategy using renewable energy, electrified transport for athletes, a cutting down of new constructions and the making of old and new buildings more energy efficient (Smithson A., 2021).

The above-mentioned efforts were overall commendable, but most of them didn't leave any legacy to the country (for example plastic wasn't ban) and some of the wood used for the construction of the Athletes' village and the Kengo Kuma's Japan National Stadium has been linked to deforestation activities. So, what has been done is not enough and this can be clearly seen by the University of Lausanne study.

It can be interesting to know also what the perceptions of people around the world and of Japanese citizens were before the start of the Games. Ipsos Global Advisor issued a survey to discover what the opinion of people was on the delivering of the Games during COVID-19 pandemic. It reached 19.510 people from 28 countries. It was delivered from May to June 2021 before the Tokyo 2020 Games. On average, 57% of respondents didn't want the Games to take place, and the 78% of Japanese were against the Games (see figure 4.5). The reasons were related to the concerns on the public health in a moment in which a country was facing COVID-19 emergency. In fact, in Japan at that time only 20% of population was vaccinated.

Figure 4.5: Percentages of agree and disagree to the delivery of Tokyo 2020 Games (Ipsos Global Advisor, 2021)

The opposition of citizens toward Tokyo 2020 was also investigated through the study of Kato T. (2021) based on an online survey provided by Insight Tech Ltd. via the IDR Dataset Service of the National Institute of Informatics, reaching 800 people living in Japan from the age of 20s to 50s. Were examined both factors with negative effects such as perception of high cost, high risk of infectious diseases and concern about the burden on medical institutions, and factors with positive effects such as perception of COVID-19 countermeasures, economic effects and athletes' opportunity.

The factor with the greatest influence on the citizens' opposition to the event was the burden on medical institutions, meaning that the possible collapse of the healthcare system through the spread out of the COVID-19 infection due to Olympics was the major concern for Japanese. The costs for hosting the Games, from this survey, seem to be something not significant enough for opposing to the event such the risk of infections and medical system collapse. On the other side, positive and significant factors for the Games to be delivered with public support were the economic benefits generated for the city and for the country, and the presence of COVID-19 countermeasures such as vaccination and PCR tests. The last positive factor to be mentioned was that related to the athletes' opportunity to participate to this important historical event delivered once every 4 years.

The final result was an opposition of approximately 80% of Japanese citizens to the Tokyo 2020 delivery of the Games. This was very close to the percentage of the Ipsos survey, confirming the trend.

4.2 Paris 2024 sustainability strategy

The Legacy and Sustainability Plan for the Paris 2024 Olympic and Paralympic Games was released in 2021 by the Paris Organising Committee. The Games' strategy is strengthened by the numerous initiatives implemented, such as the Paris 2024 Social Charter, the Olympic and Paralympic Week (OPW), the alignment with the Paris Agreement and many others. The strategy is based on six pillars with the aim of achieving two main ambitions, and these are the following:

Figure 4.6: Paris 2024 sustainability strategy's pillars (The legacy and Sustainability Plan for the Paris 2024 Olympic and Paralympic Games, 2021)

In order to reach all of them, Paris 2024 applies a methodology including a carbon neutral approach to mitigate the impact of the Games, an assessment and impact measurement, the achievement of ISO 20121 certification, a responsible purchasing strategy, the Olympic Values pilot programme for the French children and the foundation of three platforms (Entreprises 2024, SSE 2024 and Emplois 2024).

For each pillar, Paris 2024 set some objectives that have to be monitored through the use of certain indicators accepted in France and in the entire world.

The first pillar is "Eco-responsible Games that harness sustainable solutions". The related objectives Paris 2024 intends to achieve are mainly four: to guarantee a positive impact on the climate, to recognize, protect and regenerate biodiversity, to set up a circular economy and, finally, to strengthen resilience.

To achieve the carbon neutrality, the first objective, Paris 2024 implements a target carbon footprint instead of the usual carbon footprint forecast. The difference is that the

latter allows to offset emissions only after the conclusion of the event. The Games have to remain within the target set of 1.5 million tonnes of CO2, while during the previous editions were emitted about 3.6 million tonnes of CO2 (Tokyo 2020 is not taken into account because there was no public, so no international travels). To keep the impacts to the minimum, Paris 2024 implements an approach based on the following steps:

- Anticipate, estimating the carbon impact of the Games
- Avoid, using existing or temporary structures (95%) and developing a sustainable transport system
- Mitigate, detecting emissions' sources and finding the related possible solutions
- Offset, developing environmentally and socially beneficial projects
- Catalyse action, taking advantage of the power of sport to make people aware of climate change

To comply with the second objective (to recognize, protect and regenerate biodiversity), Paris 2024 developed a systematic method to assess environmental impacts of the Games in line with what IOC and the International Union for Conservation of Nature (IUCN) in France said about methodologies and goals. The tool developed includes five sections that are: (1) biodiversity and ecosystem (2) circular economy (3) scenery and heritage (4) carbon footprint (5) environmental health. This tool is necessary to compute the impacts of the Games and to identify the opportunities to counteract to them. The ambitions set by Paris 2024 about protection of biodiversity and environment are mainly three and can be summarized talking about protection of endangered species of animal or plant, protection of habitats through various initiatives and the regeneration of ecosystems.

The third objective is about circular economy. In this case great importance is given to the adoption of an efficient resource management through which trying to use as many existing resources as possible, designing in an environmentally friendly way, giving things a second life and producing less wastes as possible. The same principles have to be part also of the philosophy of contractors and suppliers. In 2021 Paris 2024 issued its resource management plan in order to clarify the resources' use for reducing wastes. It has, in fact, implemented a Zero Waste Policy through which pushing for a more circular and inclusive economy.

The last objective has to do with resilience, so the ability to prepare for, prevent and then manage risks getting back to normality after some kind of disruption due to natural disasters, air pollution or water pollution for example. Paris 2024 has to take into

account these risks to set the targets on athletes/spectators/organisers health and on the facilities' functionality.

The second pillar identified by the Plan is "Games that boost regional growth and appeal and improve the quality of life for local people". The related objectives Paris 2024 intends to achieve are mainly two: increasing the range of sport offered in the regions and improving the quality of life of people living in host regions. The Games are being hosted in the north-east department of Paris, called Seine Saint Denis. The projection and the construction of facilities to benefit and improve the quality of life of the people living in this area has been accelerated due to the organisation of the Games. The Athletes' Village and the Media Village at the conclusion of the event will become an important urban legacy for the city. Moreover, the renovation of sport facilities has been made possible thanks to the delivery of the Games, and for this reason the participation and promotion of sport is feasible.

To comply with the first objective of the pillar (increasing the presence of sport in the region), the construction of numerous facilities has been accelerated, among which there are:

- La Chapelle Arena, a venue that will host national and international sport competitions, cultural and artistic events
- The Aquatics Centre, a venue used for water polo, diving and artistic swimming events that after the Games will be transformed into a facility for various sport, from climbing to skating and swimming
- Around 20 pools, venues used for competition, training and warm up before and during the Games and then reused by the residents after the event
- The Guy Moquet sports hall, a multisport facility renovated and upgraded for the Games that will be then used by the residents
- The Auguste Delaune sports complex, a facility redeveloped for the Games where will be used as a training facility for athletics

Then, another important initiative for the objective's achievement is Terre de Jeux 2024 label that is given to all the authorities, associations, regions, areas etc. that make some efforts to increase sport participation. Paris 2024 together with the French National Sport Agency has signed an agreement to ensure new collaborations with this label, funding every year 150 development, renovation and accessibility projects for local sport facilities.

Also hosting Pre-Games Training Camps is something that makes the region more attractive. The sport clubs can benefit from the renovation and construction of sport facilities, the residents can learn something about sport, other cultures and countries and is also very useful for athletes' preparation to the event. They are sport centres in France that allow Olympic and Paralympic delegations to train in the period between Tokyo 2020 and Paris 2024.

The last initiative to be mentioned is the Seine Saint Denis 2024 swimming plan developed by Paris 2024 that will help to optimise the use of swimming pools and to instal new venues pushing people learning how to swim. In fact, the proportion of children who know how to swim in this area of Paris is very low, 1 in 2 children aged 11 years old cannot swim.

The second objective is about enhancing the residents' quality of life, which can be achieved through Solideo commitments and through public investments for the construction of new facilities, such as the Athletes' Village, the Media Cluster and many others.

Solideo is a French industrial and commercial public authority with the tasks of collecting funds to finance Games' structures construction, of guaranteeing that all the Games' related projects are delivered in line with programmes, budgets and deadlines, and it is also the contracting party for the Games' related development projects. Solideo aims to adopt an Environmental Excellence Strategy trying to ensure carbon neutrality by 2050, to guarantee urban comfort in the climate of 2050 and to make a positive contribution to urban biodiversity.

The Athletes' Village is an urban project accelerated by the winning bid of Paris 2024. While it will host competitors during the Games, after the Games it will be transformed into a neighbourhood with homes for students and families, economic activities and public facilities. All of this will be framed by energy efficiency, carbon neutrality, protection of biodiversity and inclusivity. The Media Cluster, instead, will be the venue dedicated to journalists, shooting, sport climbing events and training sessions. After the Games it will be transformed into a neighbourhood, a green park and an education centre.

The third pillar is "Responsible Games that open up opportunities for everyone". The related objectives Paris 2024 intends to achieve are mainly three: creating opportunities

in society and economy, boosting job creation and skills development, ensuring inclusivity and accessibility for everyone.

To comply with the first objective, there are three documents issued by Paris 2024 together with Solideo and its stakeholders, which are the Paris 2024 Social Charter, the charter to promote local employment and community development and the agreement between Paris 2024, Yunus Centre, Solideo and Les Canaux.

The Social Charter sets 16 social commitments Paris 2024 and Solideo have to follow in the delivering of the Games and they mainly have to do with decent working conditions and with the occupational integration of vulnerable groups.

The charter to promote local employment and community development has been issued for Games' construction projects, while the above mentioned agreement's goals include: (1) supporting local economic development and pushing for organisations with social and environmental attention (2) encouraging the creation of companies and job opportunities (3) promoting principles like inclusivity and circular economy (4) involving companies, professional integration bodies and disability sector in Games' economic opportunities (5) guaranteeing that Social and Solidarity Economy and all types of business can develop infrastructures and can provide services related to the Games.

There are also few initiatives that have been launched as a result of the Games to achieve this objective, such as the Entreprises 2024 Platform with which companies can find information about business opportunities related to the Games, the ESS 2024 Programme, the Entreprendre 2024 Programme and La Fabrique des Jeux.

To achieve the second objective, so in order to create more job opportunities, Paris 2024 together with Solideo launched a study in 2018 with the aim of identifying jobs and training required to prepare and organise the event. It is a three-step process: (1) identifying the number of jobs created and developing training pathways (2) identifying the qualifications required (3) helping professional integration bodies and public employment services finding the right people.

Then there have been some initiatives for structuring and expanding sectors and professions for MSEs, accelerated because of the Games, such as "2024, all champions". This is a programme with the aim of training and supporting 1000 long-term unemployed people identified by the study mentioned above.

It is also important to find the right tools in order to be able to match the offer with the demand, so have been launched initiatives like the "Emplois 2024 Platform", which lists

the jobs generated by the Games and the training pathways. Another initiative is "From the stadium to employment", that embodies a new form of recruitment in which, through sport and the moments created by it, jobseekers can demonstrate their interpersonal skills and attitudes to job recruiters.

The third objective talks about inclusivity and accessibility of the Games. Paris 2024 Organising Committee and its stakeholders decide to pursue common goals, such as the delivery of a Games edition that can be seen as an inspiration in terms of gender equality, increasing female sport participation and ensuring professional equality, and in terms of accessibility and inclusivity of people with disabilities. In this sense the Paris City Council has adopted an action plan called "Making Paris more inclusive with the Games" for hosting the Paralympics and leaving a legacy to the city for people with disabilities.

Initiatives that have been accelerated due to the organisation of the Games are:
- Accessibility by public transport for all the Games venues
- Adaptation of sport venues to create high-quality experience for everyone
- Connections between train stations and Games venues

The fourth Plan's pillar is "Sport to improve health, education and civic engagement". Nowadays people tend to have sedentary habits and to do not practice physical activity, with the result that for example the 17% of French people are obese and the 31% are overweight. Being active and moving a bit every day can prevent from death, depression and cancer. Organising Olympics and Paralympics helps to make people aware of these facts and to move more. Paris 2024 tries to comply with the first half of the pillar "Sport to improve health" by establishing two kinds of objectives:

1) Increasing sport participation and physical activity at school, at work and in urban areas. Several initiatives have been launched thanks to the Games' organisation. Paris 2024, for example, aims to promote the integration of daily physical activity for children at school lessons and daily warm-up exercises before starting to work for the workers on Games construction sites. In addition, Paris 2024 aims also to promote cycling to work (actually 70% of workers drive to work with cars) and to encourage young children to cycle. By cycling we can maintain ourselves active and at the same time we can help reducing transport impacts on the environment.

2) Encouraging people not involved in sport to start doing it. Paris 2024 helps creating parasports departments and training leaders and instructors in regular clubs to accommodate people with disabilities. Paris 2024 also launched the Sporty Parisians call for proposals to support sport participation among girls. In fact, after the age of 11 the girls start to become more sedentary.

Paris 2024 tries also to comply with the second half of the pillar "Sport to improve education and civic engagement" by establishing three kinds of objectives:

1) Encouraging children to become more physical active and involved in sport. For achieving this goal have been launched different initiatives, such as the trial of daily 30-minute period of exercise at primary school in addition to physical education lessons, the introduction of the Carte Passerelle to allow children between 9 and 11 years old members of USEP (Union sportive de l'enseignement du premier degré) or UGSEL (Union générale sportive de l'enseignement libre) to try new sports for free within the participating sport clubs, the introduction of the Olympic and Paralympic Week (OPW) that is a one week event to promote sport participation among young people and the meaning of values of citizenship and sport. Finally, it is also important to name the Génération 2024 label for schools and higher education establishments. To obtain this label the schools have to develop projects together with local clubs, to take part in the Games, to work with or accept elite athletes and to make school sport facilities available to local sport clubs.

2) Supporting sport to channel love of learning and foster community spirit. Here the principal activities that have been launched are the "I'mPossible" programme useful for raising awareness on disability among children in primary schools, the "Education in Movement" programme for educating children from 6 to 12 years old on the Olympic values of respect, friendship and excellence through the practice of sport in school playground, and the "Génération2024 platform" which provide a list of resources related to sport, Olympism, Paralympism etc. through which the teachers can prepare their lessons and projects.

3) Using sport to drive engagement and citizenship. France has a great volunteering culture having 16 million people involved, and one third of them are engaged in the sport sector. Paris 2024 aims to promote civic engagement through various initiatives like the Generation 2024 Civic Service programme for the

mobilisation of 10000 young people in making voluntary commitments in the France's priority areas (for example sport), the Leaders of Tomorrow programme which promote accessibility to responsible positions in sport sector particularly for young women and the Universal National Service which aims to raise awareness on civic engagement and volunteering in the sport sector among young people.

The fifth pillar is "Sport to improve inclusion and solidarity". The related objectives Paris 2024 intends to achieve are mainly three: promoting equality and fighting against discrimination through sport, promoting social inclusion through sport and supporting professional integration through sport.

Sport is seen as an important tool for social inclusion, and in the Legacy and Sustainability Strategy are highlighted three types of community sport activities: (1) sport activities that make people's talents shine and through (2) sport activities that champion values (3) sport activities that act as regional projects.

For achieving the above objectives have been launched or have been accelerated various initiatives as a result of the Games. First of all, in order to fight against discrimination and to change the way people look at disability, the role of Paralympics is fundamental to show the skills and employability of people with disabilities. Then, with respect to this theme, has been promoted "30 minutes of exercise every day" at school for children with disabilities to involve them in sport and physical activity. Furthermore, the Generation 2024 label, from 2021, can be obtained also by a certain number of special needs school that have tried to promote sport participation among people with disabilities. To comply with the third objective of professional integration, Paris 2024 launched an incubation programme to support 24 athletes (8 from France and 16 from Africa) in putting in place their entrepreneurial projects.

One of Paris 2024 objectives has to do with helping the sporting movement to achieve equality and of increasing the female sport participation. To do that has been launched the "Equality Label" with the aim to leave a social legacy after the conclusion of the Games. "Female Leaders" is another initiative launched by the French National Olympic and Sports Committee to increase the female presence in sport management bodies.

The final pillar is "Sport to drive the environmental transformation". The related objectives Paris 2024 intends to achieve are six: accelerating the transformation of

sporting events, promoting sustainable sporting structures, eliminating single-use plastics, raising awareness of the importance of a balanced diet for health and the planet, combating climate change and protecting biodiversity through sport.

Sport plays an important role in combating climate change and protecting the environment, and as a result of the delivery of Paris 2024 Games many initiatives have been accelerated meeting the set objectives. To push for an environmental transformation of sporting events, Paris 2024 forms a partnership with WWF France. The WWF programme is based on three key areas: (1) supporting environmental transition of sporting events in France (2) raising awareness among spectators (3) developing active mobility during the Games. To promote sustainable sporting structures, Paris 2024 supports the PEXE's project bringing together the world of sport and cleantech companies for promoting sustainable innovative solutions in sport and for responding to energy and environmental issues of the world of sport.

About the use of plastics, IOC issued the Plastic Game Plan for Sport which is used by the sport sector for reducing plastic pollution. In particular, Paris 2024 aims to engage in contributing to the reduction of the single use of plastics through the delivering of projects and through trying to change spectators, athletes, companies' behaviours and habits during sporting events. This could be followed by supporting the previous mentioned WWF project.

In order to raise awareness on balanced diets for the health and planet, Paris 2024 in 2021 published the FoodVision, which promotes commitments and methods for changing catering practices at sporting events and for promoting low-carbon and locally produced seasonal food.

The Games aggregate billion of viewers, spectators and athletes from all over the world, having the opportunity to encourage people to take environmental action. At the COP24, Paris 2024 announced to take part to UNFCCC "Sports for Climate Action" initiative for reducing GHGs emissions related to the organisation of sporting events. Since both sport and biodiversity contribute to the wellbeing of people, Paris 2024 promotes the respect of biodiversity in sport, especially in outdoor sports where athletes are daily in contact with nature.

The last part of the Plan is about the methodology used. For implementing sustainability and legacy related projects and for creating an endowment fund, the Paris 2024 Board of Directors had to allocate a budget, whose resources came from the budget of the

organising committee (€50 million), funding from stakeholders and from partner marketing companies. In particular, the endowment fund is a platform that, through sport, supports projects with a social positive impact. In fact, the areas covered by it are mainly four: (1) sport to improve health (2) sport to improve education and citizenship (3) sport to improve inclusion, integration, solidarity and equality (4) sport to protect the environment. The endowment fund financially supports the selected projects and allows them to take part to Impact 2024 call for proposals. This call help to reinforce the circulation of tools and best practices across regions, to promote local synergies and to develop new solutions.

Paris 2024 Organising Committee had allocated also a budget of €52 million for the Environmental Excellence Strategy: €15 million for ensuring carbon neutrality, €13 million for the implementation of innovative environmental excellence policies and €24 million for the achievement of the objectives set.

The Legacy and Sustainability strategy is carried out by two departments, the Impact and Legacy department and the Environmental Excellence department, through the implementation of the responsible purchasing strategy and the sustainable management system. The main principles of the Paris 2024's responsible purchasing strategy are: (1) taking into consideration the post-Games period (2) an archive accessible to everyone (3) the strategy's multiplier effect. To efficiently set up the responsible purchasing strategy, Paris 2024 had to implement indicators related to circular economy, carbon neutrality, environmental protection, social innovation, social inclusion and value creation. The Paris 2024's sustainable management system includes a policy plan and the various action plans from the departments, processes, procedures and operational tools to integrate environmental and social challenges into activities. The sustainable management system has to comply with ISO 20121 standards.

The strategy has been developed engaging with different stakeholders. The legacy that will be left by Paris 2024 depends on the stakeholders' involvement in projects. The main stakeholders involved in the organisation of the Games and so in strategy development are Solideo, the French State, the Paris City Council, regional authorities, Paris Metropolitan Area, etc. In order to implement rightly the strategy, Paris 2024 regularly consults also members of civil society such as experts and associations. For this reason, were for example established the Legacy and Sustainability Steering

Committee, the Environment and Climate Council, the Equality and Diversity Committee and many others.

The French Ministry of Sport together with WWF France launched a charter of 15 eco-responsible commitments used to organize environmentally friendly events. Paris 2024 took part to the related working group having the opportunity to interact with other organisations and share information and best practices. Furthermore, Paris 2024 signed the UNFCCC "Sports for Climate Action" initiative, in order to work with other parties in trying to reduce the climate impacts of these kind of events, to educate people on climate change and to promote sustainable consumption habits.

To assess and measure the results obtained in terms of social relations and environment in sport, has been developed an approach aligned in particular with the IOC Agenda 2020+5, the OECD's Recommendation on Global Events and Local Development, the Kazan Action Plan and the United Nations' 17 Sustainable Development Goals (SDGs). Furthermore, Paris 2024 is working together with IOC and OECD to develop tools that permit to assess the contributions of future international sporting events like Olympics and Paralympics to local development and people's well-being. There is a committee in Paris 2024 with the aim of supervising impact measurement and assessment.

At the time of writing this work, the Paris 2024 Olympic and Paralympic Games have just ended and therefore the results and achievements are not available through the Sustainability Report, that will be published in the next months.

4.2.1 Paris 2024 public reactions

The Paris 2024 organisation promised to deliver a carbon positive edition of the Games, but when criticism from activists and scientists arises due to the very low probability of this to happen, it decided to change the main objective in halving the carbon emissions compared to the previous Games in London and Rio de Janeiro. According to the pre-event carbon emissions balance, Paris 2024 will emit approximately 1.58 million tonnes of CO_2e against the 3.5 million tonnes of CO_2e on average emitted by Rio de Janeiro and London (Gennari V., 2024). In Tokyo 2020 the level of emissions was around 1.9 million tonnes, but it is not taken into account because were delivered without public and so without international travels due to COVID-19 emergency.

For the ONG Carbon Market Watch, the most polluted sectors in the organisation of the Paris Games were the transports (40%) and constructions (32%) (geagency.it, 2024). To

deal with the problem of construction sector, in Paris have been newly constructed only two buildings that are the Athletes' Village and the Aquatics Centre, while all the other infrastructures used were existing or temporary. For the improvement of the transport sector were developed an efficient public transport network and a cycle network that connects the various Games' structures around Paris, as well as an efficient bike sharing system (Di Stefano D., 2024). The issue of air transportation is something out of the control of the organisation at the moment, but the hope is that in the future there may be a complete rethink of the Olympics and Paralympics organisation. One of the possible solutions suggested by the scholars is for example the delivery of the Games in the same cities in rotation or the delivery of each discipline in a different country whose public has to be embodied just by the home country people.

Some of the projects perceived by Paris 2024 as reported, among the others, by Di Stefano D. (2024) were the installation of solar panels above of the historical palaces around the city to use 100% sustainable energy, the doubling of the share of plant-based food options, the half of the disposable plastic, the rent instead of the purchase of sport and electronic equipment, and many more initiatives.

To contribute to the reduction of the emissions, the organisation decided also to offset a part of the emissions that were considered to be inevitable. But the purchasing of carbon credits as well as the choice of the sponsors of the event were elements of debate.

The ONG Carbon Market Watch said that the Paris 2024 objective to halve the emissions of the previous Games is something difficult to verify and ambitious to achieve. For the ONG there is few transparencies about the methodology and the calculation method for the carbon emissions and the use of carbon credits mechanism is something problematic because high-quality carbon credits are in short supply (geagency.it, 2024). It highlights also the inconsistency about the choice of the sponsors for the event, leaders in carbon-intensive industries, and the absence of climate criteria imposed to them raised doubts about the clearness of its sustainable initiatives making us to think about greenwashing actions (Pagliaro I.R., 2024).

Another important issue to address is the case of the pollution of the Seine, which has been under the scrutiny of the world press for the entire duration of the Games. The river has hosted a couple of Olympic events, triathlon and the open water swimming. As we could read in any newspaper, the Paris municipality has spent approximately 1.5

billion euros to clean the Seine, but the situation seemed not to be fully resolved. If the project would end up being a success, the river in the future could become a bathing area for Parisians people. Athletes who were supposed to take part to these competitions complained with the fact that because of an experiment and because of the billions spent, their health was being put in danger. To confirm the athletes' concerns, after the women triathlon race a Belgian athlete contracted an Escherichia Coli infection. It was not clear, but it was thought to be due to the Seine water ingestion.

Athletes during the competition period complained also with the fact that in the Olympic Village there was no air conditioning for sustainability reasons, contrasting with the necessary level of concentration and rest before their performances. The controversies raised by the athletes have highlighted the difficulty in reconciling sustainability and comfort. For this reason, a critical evaluation is necessary as well as a continuous commitment toward this direction for the future being better (Paolini M., 2024).

We can end up saying that Paris 2024 could be less polluted than the previous editions of the Games, but it is still not sustainable due to the size of the event being a Mega Sporting Event.

4.3 A brief comparison between Tokyo 2020 and Paris 2024

After a long description of the Sustainability Plans of the two events, it is useful to make a brief comparison between them in order to highlight differences and similarities.

Both have identified a certain number of themes through which detecting goals and targets to try to reach a sufficient level of sustainability. In the case of Tokyo 2020 we had: "Climate Change (Carbon Management)", "Resource Management", "Natural Environment and Biodiversity", "Consideration of Human Rights, Labour and Fair Business Practices" and "Involvement, Cooperation and Communications (Engagement)". While, in the case of Paris 2024 we had: "Eco-responsible Games that harness sustainable solutions", "Games that boost regional growth and appeal", "Games that open up opportunities for everyone", "Sport to improve health, education and civic engagement", "Sport to improve inclusion, equality and solidarity" and "Sport to drive the environmental transformation". In the first part of the Plans these themes were analysed, and different projects were described. These projects had the role to improve

the background in which the Games had to be developed with the objective to make Tokyo and Paris as more socially and environmentally friendly as possible. Sometimes there have been also criticisms. For example, someone argued that there were no explicit legacies connected to most of the announced projects and activities.

In Tokyo 2020 the emissions released were projected to be 2,93 million tonnes of CO_2. As we could notice at the end of the Games, this estimation was so far from reality (emissions were approximately 1,9 million tonnes of CO_2) because of the spread out of COVID 19 emergency that have limited spectators' movements from any country to Japan. On the other hand, in Paris 2024 the emissions released were projected to be 1,58 million tonnes of CO_2, about a half of that released in the previous editions, thanks to a low level of new constructions (they were just 2, precisely) and to an efficient network of public transport and bike sharing service. In both editions there were a lot of projects that aimed to reduce the emissions, but probably, the difference was in the number of new constructions realised.

In Tokyo were constructed more newly venues, compared to Paris. In the Tokyo Venue Plan (visible on the Sustainability Plan) was specified that each of the newly constructed structures after the end of the event would be reutilized for other purposes, so that there would be no waste. Many construction policies were also activated in order to follow the most sustainable way of working. However, there is difference among no constructions at all and a lot of new constructions with a purpose, in the former case no CO_2 is emitted.

Another point to highlight is the purchasing of carbon credits, that was initiated in Tokyo 2020 for the first time in the history of the Games, then it was used also in Paris 2024. When there are emissions that cannot be avoided or absorbed in other manners, this instrument should be very useful to make a contribution, even if small. This has raised criticisms by public opinion, because sometimes the quality of the credits is not so high and because is a system that organisations seem to use to avoid stopping to emit, so someone could see greenwashing in this practice.

A common problem to all the Games' editions is that of air transportation, and it will remain as the first source of pollution of the Games until a more sustainable solution would be found in the future.

In the last part of both the Plans we have an explanation of how the management process has been realised and what tools were used. The management system adopted by both Tokyo and Paris organisations was in line with the ISO20121, the international standard for Event Sustainability Management System.

In particular, the last section of the Tokyo Plan, includes the explanation of what the adhesion to ISO20121 standard means, including the practice of monitoring, measurement, analysis and evaluation that is required by it. Here, is also described the role of the Urban Planning and Sustainability Commission, consisting in experts and academics with the aim of studying issues and monitoring progress of efforts made towards a sustainable direction. Finally, we can find an illustration of the Sustainable Sourcing Code developed by Tokyo Organising Committee, whose function is, in a nutshell, to push suppliers and partners to take sustainability into account when working with the organisation.

In Paris 2024 last section, is described the methodology used to develop all the points made clear in the first part of the Plan. A budget has to be allocated in order for the projects to be launched (Endowment Fund) and for environmental objectives to be reached (Environmental Excellence Strategy). It is also explained that the sustainability strategy is mainly carried out by two organisation's departments: "Impact and Legacy Department" and "Environmental Excellence Department". In this section we are also informed of the fact that Paris 2024 Organising Committee took part to the working group for the development of the charter of 15 eco-responsible commitments for organising sustainable events in France and that it signed in the UNFCCC "Sports for Climate Action".

CONCLUSION

With this work we have attempted to clarify what the term sustainability means, and how a Mega Sport Event like the Olympic and Paralympic Games is trying to become as more environmentally and social aware as possible.

In the first chapter the objective was to give a general overview of what sustainability is, delving into what were the main events and publications that have signed the start of a new way of thinking and living. In this section was also explained the importance of being sustainable, preserving the Earth from climate-related disasters limiting the occurrence and severity of physical and transition risks. Furthermore, we have studied that, to monitor the global climate change situation, was established an Intergovernmental Panel, that through the scientists tries to understand what possible solutions for adapting and mitigating climate change could be. In the last part of the first chapter, we have explained what the main sustainability standards are used around the world, particularly in Europe and in Asia.

The second chapter was dedicated to the explanation of what a Mega Sport Event is and of what the origins of Olympic and Paralympic Games are. What we have noticed is that the topic of MSEs is a tricky one, because there are so many different definitions of the term from so many different scholars with different opinions.

The third chapter was about the sustainability in Mega Sport Events. We took as examples the Olympic and Paralympic Games and the FIFA World Cup because they are the most known MSEs in the world. We analysed through the literature the steps that have brought these two events to consider sustainability as part of their organisation, driven by a global situation that requires to do it. Both IOC and FIFA also signed in the UN Sports for Climate Action Initiative with the commitment to reduce emissions in their activities that are highly affected by climate change.

To conclude, in the last chapter was examined the sustainability strategies used in the two editions of Olympic and Paralympic Games, in Tokyo 2020 and Paris 2024, looking at their Sustainability Plans. As we have seen, the Tokyo edition in terms of emissions was highly influenced by the COVID-19 emergency situation, permitting to the organisers to hold emissions at a very low level with respect to the previous editions. That of Paris 2024, even without emergency situations, was projected to carry out an edition with half of the emissions of Rio de Janeiro and London.

Nowadays, reducing emissions to zero is quite impossible in this context, and the main problem is related to the movements of people among countries to reach the event's host cities. This is something inevitable and one of the major challenges for the future, to find out a sustainable solution. Until that moment, the efforts have to be related to things under the direct control of the organization, such as the use of renewable energy sources, to the reduction of the use of plastics and all the other polluted materials, to the use of pre-existing venues, to the development of sustainable movement solutions for people in the host cities, and many more. All of this has to be done without interfering with athletes' performances.

This work, as well as being useful for people interested in known more about this topic, has some limits due to the timing and length of the thesis. It lacks a comparison among the effective results achieved at the end of the two editions of Tokyo 2020 and Paris 2024, because it has been written during the last Games, so that the final report of Paris 2024 was not available, and this comparison was not possible to be done. I think it would have been interesting.

It also would have been interesting to analyse the sustainability strategies adopted by the past winter Games, because different problems and different solutions would have come up compared to the summer editions, but further investigations should have been done and the work would have been too long and detailed, out of the scope of this master thesis.

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