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# ENVIRONMENTAL LEGACY OF THE OLYMPIADS

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**Резюме.** Проаналізовано особливості Олімпійських ігор та їх вплив на навколишнє середовище, наведено екологічну періодизацію сучасного олімпійського спорту з метою подальшого поглибленого аналізу екологічної спадщини олімпійського руху. Розглянуто п'ять основних етапів екологічної політики організаційних структур Олімпійських ігор: 1) екологічно нейтральні; 2) екологічно несприятливі; 3) екологічно негативні; 4) екологічно орієнтовані; 5) екологічно позитивні.

**Ключові слова:** екологічна спадщина, Олімпійські ігри, сучасний олімпійський рух.

**Резюме.** Проанализированы особенности проведения Олимпийских игр и их влияние на окружающую среду, приведена экологическая периодизация современного олимпийского спорта с целью дальнейшего углубленного анализа экологического наследия субъектов олимпийского движения. Выделены пять основных этапов экологической политики организационных структур Олимпийских игр: 1) экологически нейтральные; 2) экологически неблагоприятные; 3) экологически отрицательные; 4) экологически ориентированные; 5) экологически положительные.

**Ключевые слова:** экологическое наследие, олимпийские игры, современное олимпийское движение.

**Problem.** Sport has evolved in a certain way, just as the relationship with the natural environment has followed its own course. One characteristic common to virtually all early forms of sport (i.e. from ancient civilizations until the Industrial Revolution) is their connection with the natural environment. But this relationship is very different from age to age. **The purpose of the work** is to illustrate the environmental legacy of the Olympic Games since Ancient Greece and through to the Sochy-2014 Winter Games.

**The literature analysis** fully reflects the characteristics and specifics of the IOC, the IFs, NOCs, NSF, the OCOG, but there is a lack of information on environmental policy of the above mentioned organizations. A large amount of information in both official and periodicals published by the governing bodies of Olympic sports on the issue of ecology and sport was collected and analyzed. Historical analysis of the organizing committees of the Olympic Games of modern times, as well as content-analysis of the literature data has revealed certain stages in development of environmental policy of governing bodies of the Olympic sports.

**Results of the study.** Olympic history begins in Ancient Greece. Here for the first time the celebration of large sports events devoted to the Greek gods – Olympic Games – is mentioned. The most widely accepted historical date of the first Olympic Games is 776 BC. Olympia was the host city of the ancient Olympic festivals. The guesthouse, palaestra, gymnasium, stadium, race track and other facilities, which allowed the hosting of grandiose events without significant harm to an environment, were built there. The Olympic stadium constructed

by the architect Leonidas (middle of the IV century BC), had 213 × 29 m arena and about 50,000 places for spectators on the hills of the Cronos Mountain, which were a natural tribune [6]. All sports facilities in Olympia were entered in a natural landscape, thus not artificially impacting the environment.

The Olympic Games of Ancient Greece were the largest sports festivals, where athletes competed in running, long jump, swimming, discus, javelin, fencing, wrestling, boxing and equestrian sports. Games of the first 24 Olympiads (684–116 years BC) included 6 disciplines only and were competed on one day. Gradually the Olympic program extended up to 20 events, youth were allowed to take part in the Games, and all celebrations and competitions were arranged over a five day period.

So those sports caused the least impact on the natural environment. The Ancient Olympic Games had little anthropogenic effect, i.e.:

✓did not result in negative changes in the environmental landscape, flora and fauna;

✓did not cause the erosion and pollution of the ground;

✓did not result in water and air pollution.

The Ancient Games had only one environmentally negative effect. There was a high background noise influencing athletes «and spectators» health. However, it is possible to consider the Olympic Games of Ancient Greece as «ecologically clean».

The Olympic Games were terminated by the decree of Emperor Theodosius I, as a pagan gaudy, in 395. Some 1500 years passed until the Olympic Games were revived by Baron Pierre de Coubertin. In this paper I'll consider the influence of the modern Olympic Games on the natural environment.

The modern Olympic Games have over a hundred year's history. However Olympiads differ from each other both by organization and realization, and by the ecological impacts. These distinctions are most precisely visible in a historical retrospective review. Five periods describing the environmental legacy of the Olympic Games are conditionally possible to identify in modern Olympic history.

1. 1896–1936 (I–XI Olympiads): environmental-sound Olympic Games.

There is a close connection between the scale of the Games and their influence on the environment. As a result of the small number of participants and rather limited interest in the new Games, the Olympics did not bring serious harm to any environment. Representatives from 13 countries competing in 9 disciplines took part in the first Olympic Games in 1896. By 1936, the number of participating countries had increased to 49, and the number of disciplines to 130. However, some Games, in particular II Olympiad in Paris (France) and III Olympiad in Saint Louis (USA) drew sharp criticism from the international sports public in connection with numerous defects in the organization and realization of the Games [3]. The number of spectators who watched these Olympiads did not exceed 100,000. So the Olympic Games in the first period of the Olympic history rendered neither negative nor positive ecological influence.

However, the spirit of Olympism revived by Coubertin gradually covered the whole planet. The modern Olympic movement began gaining strength. International sports federations and national associations were created, international rules of competitions were developed, record checking was carried out, and the specifications for sports facilities were defined. With this came the realization that the Olympic Games stimulated the worldwide development of sports facilities – stadiums, gymnastic halls, pools, shooting galleries, etc. Hence, the impact of the Games on the environment increased. From this point of time ecological history of the Olympics enters into a second period.

2. 1948–1972 (XIV–XX Olympiads): environmentally adverse Olympic Games.

During this period, there was an expansion in the popularity of the Olympic Games. The number of participants and spectators of the Olympiads increased; the Olympic program was extended. Sports training systems were intensively developed. Technology, medical and biological innovations were actively used in pursuit of the Olympic gold. There was a growth in the sports industry: organizations, facilities, equipment, food, etc. The impact of sports on the environment amplified sharply. It covered not only the host city, but also all world aspiring to laurels. There was not only a local influence on the landscape and ecosystems, but enormous ecological

impacts on soil, water and air pollution which were caused by sports industry waste products. There was also disappearance of some species of animals and plants, and a change in the natural landscape. However, this impact was ignored, and Olympic history moved toward the third stage ecological involution.

3. 1976–1992 (XXI–XXV Olympiads): environmentally negative Olympic Games.

The realization of such grandiose events as both the Summer and Winter Olympic Games forced the organizers to seriously recognize the ecological impacts. The construction and reconstruction of many sports facilities, the accommodation of several thousand participants, officials, visitors, representatives of mass media, and also the presence of hundreds of thousands of spectators, required the supply of electric power, water, transport, the recycling waste etc. This represented potential danger to the environment.

The history of sport can provide no more blatant example of waste and inefficiency than the 1976 Montreal Olympic Games. The original budget of \$124 million grew to over \$1 billion by the end of the Games [3]. Montreal's mega-debt represented more than just fiscal irresponsibility. It is illustrative of a way of thinking which came to dominate the planning of the 1976 Games: grandiose, wasteful and without any thought for the post-Games legacy. The result:

- a state-of-the-art velodrome which never again hosted a world-calibre event, lost millions of dollars in the following decade, and whose acres of hardwood cycling track were scrapped in the late 1980s to build a «Biodome» museum;
- the «Big 0» Olympic stadium (also known as the «Big Owe») whose millions of tons of concrete are already in a state of advanced deterioration. The roof of the stadium was not finished until 1989 and has been shredded by winds and replaced on several occasions and;
- the Olympic Village, built at a cost of over \$95 million, whose apartments were designed for a Mediterranean climate, and have proven very difficult to fill.

The legacy of 1976 for Montreal is one of wasted money, materials, energy, land and opportunity. The environmental tragedy is that with better planning, management and foresight, these same resources could have been used not only to stage a respectable Olympics, but to provide long-term facilities on a human scale for the residents of Montreal and future events. Instead, much of that concrete and steel is destined for landfill decades ahead of schedule.

The 1992 Winter Games in Albertville, France, though far better managed than Montreal, were the source of several particularly shocking tales. The problems were again one of vision on the part of organizers. The bad planning has appeared expensive in several aspects:

- the poisoning of the population living near the bob and luge track by a highly toxic substance – ammonia used for refrigerating tracks;

- the construction of transport highways leading to the Olympic city and biathlon and ski races tracks has resulted in exhaust pollution, deforestation and erosion of the Alpine mountains.

The Albertville Games were the first ever to have their opening ceremonies preceded by a protest march to complain about the Games «legacy of pollution and environmental injury» [3]. Some communities actually voted to refuse the Games, placing the preservation of their environment and their quality of life above any promised economic gains.

The general deterioration in the earth ecology has resulted in the sports community facing environmental problems as well. Organizers of the 1994 Winter Games in Lillehammer, Norway for the first time tried to prevent an ecologically negative legacy of the Games and give them a «green profile» [8]. In spite of the fact that attempt has not managed, the effort was made and the wheel of evolution turned towards ecology instead of from it, as was before. The Olympic movement went into the 4th period of ecological development.

4. 1996–2004 (XXVI–XXVIII Olympiads): environmentally friendly Olympic Games.

The Olympic Games considered their influence on ecology at this stage. The 1996 Atlanta Olympic Games achieved a number of environmental successes and showcased several new approaches and technologies in the environmental problem decision-making, even though the Organizing Committee (ACOG) did not embrace environmental leadership as a central objective [4]. Significant positive results include:

- efforts to protect air quality included the use of electric trams within the Olympic Village and prohibition of the buses and cargo vehicle traffic through its territory;

- a photovoltaic energy system consisting of 2,856 solar panels, generating 340 kilowatts, covered the roof of the Atlanta Aquatic Center. The world's largest solar energy installation of its type, it generated up to 40 percent of electricity demand at this facility;

- at the Lake Lanier rowing and canoeing site, tree cutting and shoreline erosion were prevented by erecting 14,000 temporary seats on floating barges.

In spite of the fact that not all objectives were realized (for example, a very strong overload of the transport system in the city, and high level of heavy metal concentration in the air), the undertaken measures have not resulted in serious ecological problems at least. The organizers of the Atlanta Olympiad were guided by a principle: if not to improve then to not worsen nature. And whenever possible carried this principle through.

The Sydney Organizing Committee (OGOCS) offered the most comprehensive environmental plan. It consisted of 100 commitments in activities including design, construction and fit-out of venues, transport, merchandising, catering, ticketing and waste management. The nature protection activity covered 5 key areas:

- energy conservation;
- water conservation;
- waste avoidance and minimisation;
- pollution management;
- protection of significant natural and cultural environments.

OGOCS achieved a high standard of environmental performance. It developed management systems called “Environmental Focus” [1] and implemented the Environmental Guidelines based on the concepts of the sustainable development. Many organisations were involved in planning and staging the Olympic Games, such as:

- government agencies;
- environment groups – such as Greenpeace, Green Games Watch 2000 and World Wide Fund for Nature;
- sponsors and licensees;
- industry associations;
- community groups.

Partnerships have been established to maximise understanding and opportunities for co-operation. Examples of this partnership are the main environmental techniques:

- innovative non-mechanical ventilation / cooling systems for sports facilities;
- solar-powered homes and services for the Olympic Village;
- roof-top water-siphoning system for collecting and storing rainwater;
- a comprehensive waste reduction and management program, complemented by an official waste management sponsor.

Due to their unique environmental project, Sydney was chosen as the host of the XXVII Olympic Games and showed new opportunities for the prevention of ecological problems connected to the Games. As a consequence, the 2000 Olympic Games have earned a «green games» image [2].

However Salt Lake City was the first host city to have had its bid evaluated according to IOC environmental criteria. The organizing committee (SLOC) elaborated a 12-point Environmental Platform which has served as the basis for subsequent initiatives [7].

Thus, there is the beginning of the new age of the Olympic movement history. The organizers consider not only ecological problems, but also develop politics of prevention of negative consequences of the Games.

Evolving, the Olympic history has fluently passed into the 5th period – the 2008–2014 (XXIX–XXX Olympiads): environmentally positive Olympic Games. The main orientation of the Games will consist not in prevention of negative consequences, but in the improvement of the existing environment. It will be the basis of harmonious coexistence of man and nature.

To preserve the unique nature of the region during the construction of Olympic facilities in Sochi in Russia for XXII Olympic Winter Games 2014 for the first time the system was used «green» standards. «Green» construction involves the use of environmentally friendly building materials and renewable energy sources, waste minimization and recycling, reduce greenhouse gas emissions, as well as the rational use of water and energy [10].

Environmental issues have become paramount in the design and construction of Olympic infrastructure. LEED and BREEAM «green» standards have been applied during the construction, innovative technologies for the collection, recycling and reuse of waste (the principle of «zero waste») also have been implemented.

Principle of the «green» standards is a contractual obligation for investors and contractors of the «Olympstroy» building company. Construction is underway of environmentally friendly materials. Previously approved imposed environmental requirements of energy consumption equipment were used for the procured goods. Satellite surveillance system was installed on objects to ensure continuous environmental monitoring.

There are about ten «green» innovations for one Olympic construction. Projects include the Olympic venues with innovative technologies in the field of energy and resources (heat recovery systems, water recycling and rainwater utilization technology of dual functioning heating / cooling systems, energy efficient lighting, etc.). 10 objects of Olympic construction passed the mandatory certification for compliance with international «green» standards and LEED BREEAM, including the Great Ice Palace «Large», indoor skating center, main media center.

In total of about 200 objects were designed and built by «Olympstroy» company with regard to «green» building standards.

Organizing Committee «Sochi-2014» held an active dialogue with the world's leading experts in the field of environmental protection and «green» building, international environmental experts. Among them – UNEP (United Nations Programme on environmental protection, cooperation with which was initiated by the organizers of the construction), UNDP (United Nations Development Programme) and UNESCO (United Nations Educational, Scientific and Cultural Organization). Environmental pro-

grams «Sochi-2014» aimed at preserving rare species of flora and fauna of the region, improvement of water and forest sites as well as to increase the level of environmental responsibility in the country.

Ministry of Natural Resources and Ecology of the Russian Federation tasked with developing a national «green» building standards. Developing and putting into practice the construction activities of the Russian national standard «green» building is conducted with the participation of «Olympstroy» company, NP «Green Building Council» and NP «Center for Environmental Certification – Green standards».

In the environmental management system of the Organizing Committee XXII Olympic Winter Games includes 19 corporate environmental standards governing the work at all stages of engineering research and design to operation built Olympic venues and infrastructure.

«One of the most important was the Olympic corporate «green» standard for compliance to be certified most objects. This is a significant step in the transition to the international regulatory system, because this standard translates into a significant portion of the discharge requirements of Good Practice contained in the Russian legislation, similar international «green» requirements», – said Mr. Bolloev, adding that the international «green» standards more stringent than the requirements of the Russian legislation [10].

Standard was developed in May 2010 based on the provisions of international «green» standards BREEAM International and LEED. It establishes requirements for environmental and energy efficiency, resource conservation, environmental management in the design, construction and operation of the Olympic venues.

As part of developing a core corporate standard the Environmental support program for the preparation and holding of the XXII Olympic Winter Games and XI Paralympic Winter Games of 2014 in Sochi (hereinafter – Environmental Program ) was created by the Institute of Regional policy under contract with the Autonomous Nonprofit Organization» Organizing Committee of the XXII Olympic Winter Games and XI Paralympic Winter Games of 2014 in Sochi» (hereinafter – ANO «Organizing Committee Sochi-2014» or Customer) № ENV/10/01/29-2 29 January 2010. The basis of the environmental program includes a list of environmental activities, systematized in four strategic areas, as well as measures and activities planned for implementation on agreed projects, the necessary resources to ensure the Environmental Strategy and commitments of the Bid Book.

In 2009, the Environmental Department Sochi -2014 Organizing Committee has released an Environment Strategy «Sochi 2014», a concept which is

based on 4 main areas of integrating environmental issues in preparing and carrying out of games, as well as post-Olympic legacy:

- Games in harmony with nature;
- climate Neutral Games;
- zero Waste Games;
- education Games.

As part of the environmental program has identified the following areas:

– the need to manage large volumes of construction waste and other industrial and consumer waste generated in the process of preparation and holding of the Winter Games in 2014;

– the need for a modern integrated approach to environmental management and protection of the environment in connection with the construction of the Olympic facilities in borders and / or adjacent areas with protected areas (PAs ) federal – Sochi National Park and territories bordering the Caucasus Biosphere Reserve (a World Heritage Site by UNESCO «Western Caucasus»);

– the need to ensure a high level of air quality and drinking water and proper sanitary and

epidemiological situation of the territory for the period of the Games and after their completion;

– the need for active efforts to protect biodiversity in the placement of Olympic facilities in foothill and mountain areas.

**Conclusions and perspectives for future research.** Environmental policy of the Organizing Committees of the Olympics is to develop various projects in order to ensure the safety of the environment, as well as demonstration of ecological economics. The main directions of environmental activities of the OCOG are environmental management, design and construction of sports facilities, taking into account environmental safety, energy conservation, environmental management and resource consumption, work with official suppliers and sponsors, cultural program and ceremonies, environmental education, environmental monitoring.

The study of environmental legacy of the modern Olympic movement could allow to consider the possibility of introducing environmental technologies in the Olympic sport in Ukraine.

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