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IMPROVING BY SUSTAINABILITY IN SPORT FACILITIES

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Abstract *Sporting structures particularly in Portugal, which were built for Euro 2004, in addition to belonging to clubs, the rest, have a very low utilization rate. But all in general have high operating costs and little control in the use of resources available.*

From the cases of stadiums Letzigrund, Zurich, Switzerland and Amsterdam Arena, the Netherlands, there may be a new vision for the improvement of Portuguese stadiums.

In the case of the stadium was the Letzigrund stadium in its construction was dubbed the Green Stadium, built for Euro 2008. Among the recommended measures were implemented immediately: Green roof: with a photovoltaic system with an area of 2500 m² and Solar Thermal Collectors 90 m², heating by pellets; Promoting green transport: public transport; Waste management by implementing reusable cup; Lighting System: Minergie.

The Amsterdam Arena, even having been built in 1998, has now the objective for 2015, be the first zero carbon stadium. The Amsterdam ArenaA strives: to be a platform for sustainable innovations; to reduce our own environmental impact, and that of our events; to be a good neighbor and a positive boost for the economy; to increase our sustainable impact together with others.

It presents an analysis of the measures advocated by these two football stadiums for sustainability, and measures can be defined and advocated an example and be applicable in Euro 2004 stadiums.

It is considered that the implementation of measures for sustainability in sports facilities can be made throughout his life in order to have lower cost and operating efficiency.

1. INTRODUCTION

After execution of the stadiums for Euro 2004 have been news appears the difficulty of maintaining spaces and difficult to monetize enclosures taking into account the initial investment. The greatest difficulties are manifested particularly by local authorities that manage these structures, however football clubs also feature a heavy maintenance bill.

In view of the need for modernization of the stadium, as well as the profitability of resource utilization and minimizing maintenance costs, technical analysis / economic sustainable measures is possible to implement all urgent and necessary in order to make the best framework.

However, there are stadiums in Europe that have been developing various efforts to increase their efficiency, reducing costs. The measures advocated pass these become greener, as measures for the sustainability of their operation.

Sustainability in sports facilities are usually associated with the design and construction. Thus in 2007 the FIFA and UEFA in 2011 and set out measures to take into account sustainability.

2. BACKGROUND

FIFA released in 2007 [1] an initiative to promote environmental sustainability through the Green Goal™ program - an initiative that FIFA fully expected that partners embrace. The main objectives of the program are to reduce the consumption of drinking water, the prevention and / or reduction of waste, creating systems with more efficient energy and increased use of public transport for FIFA events.

After the UEFA Euro 2008 starts also take into account the sustainability of its recommendations. The stadiums for Euro 2008 which stands out, being analysed is then Letzigrund stadium.

In 2011 UEFA in its Guide to Quality Stadiums [2] presents the concepts of Sustainability at the Stadium. The first aspect is addressed in Sustainable Design, Green architecture as defined. It is considered that this approach should be made either from conception to use during your lifetime. The project should thus be taken into account the following aspects: General reduction in energy consumption, reduction of waste and carbon emissions, introduction of measures for local energy production, promote the rational use and reuse of natural resources is priority water. The second one is referred Sustainable Architecture, ie for people, which are recommended several aspects to take into consideration so that users of the stadiums have comfort, safety, and sensory stimuli in order to increase their connection to the stadium and promote greater satisfaction in using.

Currently all efforts for large installations that have high resource consumption and emissions of Carbon considerable change their operating, there is the case of the stadium of Amsterdam in 2015 set the goal to be the first zero carbon stadium.

3. EXAMPLE OF SPORTS FACILITIES

The stadium Letzigrund, Zurich, Switzerland, was in the stadium that its construction was dubbed the Green Stadium, built for Euro 2008. Among the recommended measures were

implemented immediately:

- Coverage Green: with a photovoltaic system with an area of 2500 m² producing about 500kW of electricity and Solar Thermal Collectors 90 m²;
- Heating with pellets;
- Promoting green transport: public transport;
- Waste management by implementing reusable glass;
- Lighting System: Minergie with low power consumption.



Figure 1. Letzigrund Stadium.

The Amsterdam ArenA in 2015, will be the first stadium in the Netherlands CO₂ neutral. With the heating and cooling claim that CO₂ emissions per year are reduced by 815 000.



Figure 2. Arena Amesterdan.

The stadium since its opening in 1996, makes use of heating systems in combination with its own gas boilers. Now, the stadium has a new heating system with which results in a reduction of about 50% of CO₂ emissions.

In the future, the current compression *chillers* that high consumption of electricity are replaced by a new installation of cold, which is expected a reduction of 75% of CO₂ emissions.

In addition to new energy sources is also provided for a new management system, where energy flows division are monitored and adjusted if necessary.

The Amsterdam ArenA is weighted in the use of renewable energy. Panels on the roof can

be an option as well as build a windmill. This is a stadium that is intended to be a producer of power during peak periods of consumption.

There is also the concern to reduce packaging materials used extensively to separate and recycle. They are also working on methods to reduce it. It is also being considered to study the mileage of the visitors to the ArenA, in order to ascertain the best solution in terms of transportation.

4. DISCUSSION OF DATA

It appears that the two cases presented are various measures advocated or to be advocated at this time there are no account in Euro 2004 stadiums. The only exception is in Stadium of Light, a more comprehensive sports complex, the use of solar panels to heat the pool water.

In general it appears that the measures related to the use of the resources are too focused energy higher costs at the expense of the use of the water component.

It also highlights the issue of waste management, which is a matter timely, in days of sporting events is presented as relevant. However, it must be taken into account that for example the separation of waste still appears by users usually difficult to occur.

Finally the issue of movement of the stage falls to users as an aspect taken into account, even under study, so as to improve its contribution to a more sustainable stage.

5. CONCLUSIONS AND OUTLOOK

These two stadiums are an important reference for the implementation of measures for sustainability in existing stadiums. It is considered however that there are other components that must also be taken into account, particularly in relation to the users, which may contribute to a change in behaviour and attitudes towards sports facilities.

Sports facilities are hosts events that bring thousands of users, where these can be involved and encouraged taking into account the emotions and interactions that occur there, with a view to improve the performance of the installation itself. The steps to be developed in these sports facilities can be an example to be taken into account in other facilities in the cities as well as influence the mode of operation of urban space within its boundaries.

REFERENCES

- [1] FIFA. *Football Stadiums, Technical recommendations and requirements*. Zurich, Switzerland: FIFA Fédération Internationale de Football Association. (2007).
- [2] UEFA. *Guide to Quality Stadiums*. UEFA. (2011).