



Analyzing the Ambitions to Develop Sustainable Stadiums in Brazil and the Netherlands

Bram Entrop, Leon olde Scholtenhuis, Jeroen van der Meer, Arno Bouwhuis, Peter Schoonderbeek and Bart Wolbers

Department of Construction Management and Engineering, University of Twente, Enschede, the Netherlands

Corresponding author: Bram Entrop (a.g.entrop@utwente.nl)

Abstract: For the World Championships of 2014 and 2018, the International Football Association “Fédération Internationale de Football Association” (FIFA) had issued hosting countries the request to organize the sports event in a sustainable way. One way to enhance sustainability of these large scale events is by reducing the life cycle energy use of its sport venues both directly and indirectly. Scientific literature offers many aspects that need to be taken into account to enhance sustainable design of buildings. Well known is, for example, the trinity People, Planet, Profit. In this research we focus on two of these categories of measures to analyze sustainable project ambitions. In specific, we measure values related to (1) water use, (2) material use, both as part of the aspect Planet, and (3) stakeholder participation, as part of the category People. Our case study focuses on assessing the ambitions during the early stage planning and conceptual design of sports buildings. It encompasses two projects; one football stadium in Manaus (Brazil, host of World Cup 2014) and one football stadium in Enschede (the Netherlands, candidate host 2018). Conclusions are drawn based on the main differences and similarities between theory and practice and the preliminary designs of the two stadiums.

Key words: Assessment, sustainability, stadium, Trias Hydrica, Trias Hylica, participation.

1. Introduction

Mega sport events have a large impact on their environment. A significant amount of materials, energy and water are used during the construction, and operation of stadiums and accommodating facilities. The embodied energy of these buildings -i.e. “the energy sequestered in building materials during all processes of production, on-site construction, and final demolition and disposal” [1]- is expected to be high. Since large sports venues are often a landmark, their design and construction processes serve as role-model for enhancing sustainability in smaller projects. Although its overall success in enhancing sustainability can be disputed [2], sports associations’ (such as FIFA, Federation Internationale de Football Association) requirements setting offer a way to catalyze sustainability awareness on a larger scale [3].

A mega sports event held in Brazil was the 2014 FIFA World Cup™. The country (re)constructed multiple sports venues and tried to minimize the venues’ negative impact on their environment, whereas at the same time maximizing financial and social benefits. By winning the FIFA 2014 bid, Brazil convinced the International Football Association that they were able to meet prescribed sustainability requirements. In Europe, the Netherlands and Belgium competed with other countries to become host of the FIFA 2018 World Cup™. Although Brazil and the Netherlands are very different countries, they both had to comply with the sustainability demands from the International Football Association.

Various ways exist to measure “sustainability”. From an energy viewpoint, for example, Life Cycle Energy Analysis (LCEA) evaluates energy use during manufacturing, operation and demolition [4].