

Roadmap to zero waste athletic facilities: The case of Athens Olympic Sports Center

M. Tsakona¹, E. Karapidakis², T. Manios³, N. Vidakis⁴

¹Qgreen, Agia Paraskevi, Attica, 15343, Greece

²Department of Electrical & Computer Engineering, School of Engineering, Hellenic Mediterranean University, Heraklion, Crete, 71410, Greece

³Department of Agriculture, School of Agricultural Science, Hellenic Mediterranean University, Heraklion, Crete, 71410, Greece

⁴Department of Mechanical Engineering, School of Engineering, Hellenic Mediterranean University, Heraklion, Crete, 71410, Greece

Keywords: zero waste, sports, athletic facilities
Presenting author email: maria.tsakona@qgreen.gr

Serving hundreds of thousands of people each year, stadiums may generate anywhere from 50 tonnes to up to 100 tonnes per game/event, which release 188 to 376 metric tons of carbon dioxide into the atmosphere. (McSherry, 2009). These large amounts of waste, which are usually composed of 60-80% recyclables (Henly, 2013; Johnston, 2017), show that athletic venues have ample opportunities to create sustainable recovery programs and to mitigate their environmental footprint.

Under this framework, the paper aims to bring athletics into the circular economy by introducing the zero-waste approach. More specifically, the paper presents the roadmap to zero waste developed for the Athens Olympic Sports Center (O.A.K.A.) in Greece, which may serve as an example for other facilities.

O.A.K.A. includes four stadiums and two training centres within an area of 1,000 acres. It hosts 14 major sporting events annually and several concerts, exhibitions, and conferences. During regular operation O.A.K.A. receives approximately 9,690 visitors and athletes on weekdays and 11,720 on weekends.

The work builds upon the analysis of collected data during site visits, stakeholder consultations, and data from the literature. Initially, the baseline situation is analysed and a techno-economic assessment of different waste management scenarios to approach zero waste is performed.

The study reveals that OAKA generates as much as 600 tons of waste annually out of which 77% are recyclables (mainly plastics) while 13,4% are food waste. Most of the waste is generated during the daily operation of the facility by visitors and athletes (80%) (Table 1).

Table 1. Waste generation by source at O.A.K.A

Source of waste generation	Waste generation (tn/yr)	Organic Waste (tn/yr)	Recyclables (tn/yr)	Rest (tn/yr)
Cultural events	43	11,5	27	4,5
Athletic events	60	16	39	5
Staff	20	5	13	2
Athletes/visitors	472	47	377	47
Total	594	79.5	456	58.5

Due to the high recovery potential waste segregation at source, ban of single-use plastics, prevention and/or composting of food waste, and staff engagement, have been defined as key elements to establishing zero-waste. A six-year program has been designed including prevention and recovery goals to gradually reduce the residue while increasing recycling and implementing prevention actions at the source (Table 2).

Table 2: Prevention and recovery goals

Targets	1 st year	2 nd year	3 rd year	4 th year	5 th year	6 th year
Prevention (%)	0	5	7	10	13	15
Recovery for recycling/composting (%)	60	70	75	80	85	90

Challenges lie mainly in the difficulty to engage the visitors, athletes, and the staff, and the high costs of eco-friendly alternative products to single-use plastics. On the other hand, opportunities refer to the reduction of costs of handling waste and improving the ecological footprint of O.A.K.A.

References

- Johnston, M.W., 2017. Los Angeles Coliseum “Modernizes” With Zero Waste. BioCycle. Retrieved from: [Los Angeles Coliseum “Modernizes” With Zero Waste | BioCycle](#) <Accessed September 2021>
- Henly A., 2013. Collegiate game changers. How campus sport is going green. NRDC Report. Retrieved from: [NRDC: Collegiate Game Changers - How Campus Sport is Going Green \(PDF\) \(greensportsalliance.org\)](#), <Accessed September 2021>
- McSherry, M., 2009. 2009 Collegiate Athletic Department Sustainability Survey Report. Retrieved from: <https://eric.ed.gov/?q=lighting&pg=102&id=ED538348> <Accessed September 2021>