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**Green Game and Societal Sustenance: A Case of  
London Olympic 2012**

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## **Green Game and Societal Sustenance: A Case of London Olympic 2012**

### **Abstract**

Sustainability through environmental protection and fostering social development is essential ingredient for survival of mankind across the nation, as human society is facing extraordinary growth on all facades of life. The development that have been made life of human being very smooth but it poses threat to environment in terms of biodiversity destruction, atmospheric and other ecosystem impurity. For having continuity of survival of humane species, it is indispensable to protect our environment through any activity and even through sport and London Olympic 2012 is one such trend setter event. Thus this research paper study how London Olympic 2012 plan for sustainability throughout game and to create legacy for its society, through tackling climate change and managing waste efficiently, encouraging biodiversity, setting new standards for the sustainable development of infrastructure and creating facilities, transport used for the games and construction of the venues.

**Key Word:** Sustainability, Environmental Protection, Olympic Game, Biodiversity, Healthy Leaving

**JEL Classification:** L83, Q56, Q57

### **1. Introduction**

World Commission on Environment and Development in their 1987 report, our common future, defined sustainable development which is very relevant today itself. It state that, sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs (Development, 1987 p. 43). The minute dismemberment of this definition categorically emphasized on the development of economically, socially environmentally sustainable system that could lead to economic excellence, biodiversity protection, atmospheric and other ecosystem limpidness and societal equality in terms of health other social services (Harris, June 2000).

In existing status quo, human society is facing unprecedented growth on all fronts of life including industrial development, computational convergence, growth in agriculture production, trade & services and so and so forth. But somehow this growth poses threat to atmosphere, the lithosphere and the hydrosphere which is indispensable for ultimate survival of living species on the earth. This is because modern society with hubris profit motive

produces toxicated emissions without taking into consideration the environment degradation of the physical, chemical and biological processes (Kyriacopoulos, 1987). Thus, if we don't do something to protect our bios, we cannot safeguard this planet for future generation.

Keeping this depiction of futuristic approach of protecting the bios for incoming generation and to contribute to very objective of protecting the planet earth, Olympic Development Authority (ODA) & London Organizing Committee of the Olympic Games (LOCOG), promise to make the Olympic 2012 games the greenest game ever happened in the history of global sport event.

## **2. London Olympic 2012**

For organization of Olympic game nine cities were applied such as , Paris, New York, London, Moscow, Madrid, Havana, Leipzig, Rio de Janeiro, Istanbul only the first five were shortlisted. The international Olympic committee basically judge the viability to be selected as host depends upon various criteria such as, government support and public opinion, city infrastructure (transport), sports venues and experience, Olympic village and accommodation, safety, security and finance and most importantly on Environmental impact and legacy (Committee I. O.).

The main factor responsible for London owning the right to host the 2012 Olympic Games and Paralympic Games was its long-term vision to encourage the young people to participate in sport and to organize this event in a sustainable manner so that it could generate an enduring social, economic and environmental legacy. For this the Olympic Delivery Authority's sets out Sustainable Development Strategy.

The strategy ODA set through London 2012 Sustainability Plan includes, tackling climate change and managing waste efficiently, encouraging biodiversity, setting new standards for the sustainable development of infrastructure and creating facilities, transport used for the games and construction of the venues, so that, to provide healthy living throughout construction phase. For strengthening and providing impetus to construction phase the ODA's Sustainable Development Strategy put great emphasize on the involvement of industries that can think and act innovatively to deliver an improvement in sustainability aim of the London Olympic authority. The significant strategic perceptions that enable the Olympic authority a strong lead is that, the opportunity to adopt a socially and environmentally responsible approach of sustainability with the notion of challenging issues

like Climatic variation, exhausting natural resources, insufficient skill levels and inequalities in employment on which future of United Kingdom can be cultivate.

The focal objective of the London 2012 Olympic Games and Paralympic Games is to regenerate world class amenities most of through existing resources so that the gigantic construction, huge flock of people who will visit the game will not damage the climate, natural resources will not deplete and at same time it will generate the employment opportunity and boost up the economy as well. Thus London bid to host the 2012 Games and set out a vision and plan in a sustainable way with the theme 'Towards a One Planet Olympics' developed in partnership with WWF and BioRegional (Authority O. D., January 2007).

### **3. London sustainability plan: towards a one planet 2012**

Sustainability expresses social, economic and environmental benefits to all contemporaneous and future generation. To provide these benefits to generations through the game, Olympic delivery authority of London Olympic 2012 set forth London sustainability plan. This plan is benchmark for pre and post efficient functioning of infrastructure generated for 2012 Olympic game and divided into three phases that is preparation, staging and legacy of the Games. Preparation phase includes design and construction of the Olympic Park and other permanent venues and infrastructure, staging phase involved all Games-time activities and legacy phase comprises of the post-Games economic, social, health and environmental benefits to the society. In order to set out the key policy priorities and to realise the sustainability vision, Olympic Development Authority set out certain objectives.

### **4. Measures for sustainable development by Olympic Development Authority (ODA)**

For realising sustainable development throughout the game ODA lay down following major measures:

#### *4.1 Curtailing carbon emissions concomitant with the Olympic park and venues*

Carbon emission is the main constituent of greenhouse gases lead to climate change, the ODA have taken active steps to reduce the carbon emission associated with development activity of the Games. The ODA came up with three-pronged strategy of 'mean, lean and green'. Thus the concentration is to minimise the energy demand of the Park, venues and village using more efficient energy supply with low carbon technologies from new, zero carbon renewable sources.

ODA aims for minimising the energy demand of Olympic village 25% during the game and 15% after the games through innovative design, by maximising the benefits of natural light and ventilation, and by balancing the requirements for heating and cooling at venues. For this purpose energy control and monitoring equipment like smart metering, automatic controls of motion, daylight or temperature sensors and manual overrides has been established and linked to Building Management Systems. Further for efficient energy supply Combined Cooling, Heating and Power Plant (CCHP), biomass boilers and biomass storage has been set up within the Olympic park for assisting reduction of carbon emissions. In addition to this 120 metre wind turbine erected which provides energy equivalent to supply 1,200 homes and will continue to provide power for an expected 20 years.

During construction activities it is planned to reduce the carbon intensity for this ODA adopted Building Research Establishment Environmental Assessment Methodology (BREEAM). The approach called for third-party assessment and certification of the sustainability related impacts of each new permanent Games venue after the Games (Authority T. O., 23 January 2007).

#### *4.2 Enhancing the efficiency for use, reuse and recycling of water*

To achieve this objective, ODA set the goal to reduce water consumption of all permanent venues and non-residential buildings by 40% and 20% for residential buildings in operational modes as based on current industry standards and London consumption. For effective use and to reduce the demands of water self-contained wheel and vehicle washing systems re-circulating and reusing water via integral settlement tanks has been established. Wastage of water further reduced by using sanitary devices like sensor taps, dual-flush toilets/ low flush toilets, aerating flow restrictor taps with automatic shut off, leak detection systems, low flow showers and proximity shut off valves and metering and use of groundwater from excavations on the site for dust suppression (Authority T. O., 23 January 2007).

Facilities erected at venue to discharge the contaminated groundwater through foul sewer and other suitable disposal after treatment. Emphasis given on utilising alternative sources of non-potable water such as rainwater and grey water harvesting such as the recovering of water from sinks, showers and baths which is very cost effective.

#### *4.3 Augmentation of sustainable biodiversity and ecology*

Unsustainable resource use has long-term consequences on human health, forest, water resources and land leads to ecological imbalances and biodiversity degradation. So in order to maximise the potential for ecological benefits, ODA incorporated green and brown roofs at appropriate places in the venue.

To provide cost-effective habitats for native species, the swift bricks and other nesting cavities created within buildings on the game site. In addition to this to provide environment beneficial to reptiles, amphibians, specialist deadwood invertebrates and lower plants log walls erected around park rather than chain link fence. To study conservation status and factors affecting the species or habitat, biodiversity action plan for the Olympic Park has been design which includes habitat action plans and species action plans. In consideration with these plans, new freshwater habitats like river corridors were created within the Park to protect mudflats, reed beds, inter-tidal invertebrates, fish and birds and marginal vegetation (Authority T. O., 23 January 2007).

#### *4.4 Line up walking, cycling and the use of public transport to and within the Olympic Park and venues*

For healthier and environmentally friendly travel to and within the Park a total of 50 kilometres of new cycle routes and 30 kilometres of walking route has been constructed. For this approximately 4,000 temporary cycle parking spaces were erected. Further for reducing the environmental impact of transportation of materials during the construction phase 50 per cent of materials transported to the Park by rail and water during construction (Authority T. O., 23 January 2007).

#### *4.5 Waste reduction through strategic design and reuse and recycling of material*

To avoid production of waste, arising during demolition, remediation and construction at least 90 per cent, by weight, of the demolition material has been reused or recycled. In the Olympic Park site recovery and recycling of materials achieved through on site processing and utilisation of Construction Material Recycling Facilities (CMRFs). The soil arises out of the ground dug up, used as fill material for the development of park which includes ground surface treatment, land bridges and for landscaping (Authority T. O., 23 January 2007).

#### *4.6 Use of environmentally and socially responsible materials*

For erecting the massive construction in environmentally and socially sustainable manner ODA laid down four principal i.e. responsible sourcing, use of secondary materials where possible, minimising embodied impacts and healthy materials. For this ODA reclaimed and

reused the material aroused from the demolition of existing structure. Thus at least 20 per cent of materials, from existed venues including number of bricks from buildings on site of Olympic village were recycled and used. Around 1,000 tonnes of York stone and 300 tonnes of granite block regained from the site, used for pavement in the Olympic park. The timber required for construction and other uses had been sources from identified suppliers with evidently proof from UK Central Point of Expertise on Timber (CPET). To minimise high levels of toxicity (minimising embodied impacts) in soil from the site which was sometime the industrial belt of UK, three soil washing machines had been installed to wash, filter and shake out pollutants like arsenic and lead, oil and petrol, tar. Thus 1.5million cubic metres of soil dug, washed and used to form a new landscape (Authority O. D., Demolish, Dig, Design, December 2007).

#### *4.7 Reducing adverse impacts on land, water, noise and air quality*

The ODA will took into consideration stout management systems to reduce the impact on the environment, in terms of providing improved quality of land, water, noise and air so that reduced trouble to local communities. To have strict check on standard ODA implemented Civil Engineering Environmental Quality Assessment and Award Scheme (CEEQUAL) for their contractor, which propounds measure and compare standards and performance, respect people and the society in which it operates, seeks to undertake its work in an ethical and sustainable manner, acts in a socially and environmentally responsible way and protects and enhances the environment. Further Considerate Constructors Scheme (CCS) made compulsory for the contractors under which they expected to achieve a score of at least four in each section of the CEEQUAL scheme.

In addition to this, to provide better quality of air, water and to reduce the noise pollution measures like natural ventilation through such designs that ease the proficient air flow, avoidance of materials that contains Volatile Organic Compounds (VOCs) have been taken. Park infrastructure designed in anticipation of flood risk, in such a modus that, it can sustain 20 per cent increase in river flow and a six millimetre per year sea level rise consequently of the changing climate and these design is based on the principles of Sustainable Drainage Systems (SuDS) that expounds minimising surfaces which do not allow absorption.

### **1. Major Target and achievement of London Olympic 2012**

<b>Target</b>	<b>Measures</b>	<b>Achieved</b>
<b>Climate change</b>		
	The concrete combine used for the	



<p>To achieve a fifty per cent reduction in carbon emissions from permanent buildings on the Olympic Park (Committee, Towards on Planet, Sustainability plan summary, February 2010)</p>	<p>Olympic Park and Village.</p> <p>Building excellence Building research Environmental Assessment Methodology (BREEAM) used to assess the environmental performance of new and existing buildings.</p> <p>Adaptation of greenhouse gas Protocol and ISO 14064-1: Relevance, Completeness, Consistency, Accuracy and Transparency (Committee L. O., Carbon footprint study – Methodology and reference footprint, March 15, 2010) (Limited, December 22, 2009)</p>	<p>Carbon savings of over fifty eight per cent compared with customary specifications achieved.</p> <p>Over 85,000 tonnes of embodied carbon are saved</p>
<p>To supply twenty per cent of the energy from on-the-spot renewable sources and to supply zero carbon energy through the burning of solid wood or wood pellets, for heating and hot water within the venues</p>	<p>Seven tiny vertical wind turbines put in next to the Aquatics Center.</p> <p>Biomass boilers (3 MW) beside the CCHP (Combined Cooling, Heating and Power Plant), and biomass storage established at Kings Yard (Committee, Delevering Change, April 2012)</p> <p>Non hydro-fluorocarbon (HFC) chillers used (Ammonia-based system used) for Cooling within the Energy Centre and Aquatics Center (London, February 2012)</p>	<p>0.8 per cent renewable energy has been confirmed</p> <p>More than ninety per cent of cooling equipped to permanent venues will be HFC-free after the Games</p>
<p>Providing low carbon fuel for the Olympic and Paralympic flames</p>	<p>London 2012 sustainability Partner EDF provided low-carbon fuel solutions for the flames of the Olympic torch and also the cauldron average carbon dioxide emission standards set</p>	<p>Save up to 1.6ktCO<sub>2</sub>e</p>
<p>Use a low emission vehicle fleet</p>	<p>On vehicles Drive green system giving the observation of driving standards and additionally the determinants of inflated fuel consumption has place in</p>	<p>The target set for reduction in carbon is more than three-quarters, down to 7,000 tonnes of carbon dioxide (Target emission just about 30,000 tonnes). (Committee, Delevering Change, April 2012)</p>

Target	Measures	Achieved
<b>Waste</b>		
To achieve zero percentage of waste	<p>Waste and Resource Action Programme's (WRAP's) enforced and waste directly send to landfill</p> <p>Across the location around 1.5 million cubic meters of soil is being excavated and clean</p>	More than eighty per cent of soil has been clean and reused on the Olympic Park
To reuse or recycle 90 per cent of demolition waste by weight	<p>Waste Consolidation Centre (WCC) has been set up by the ODA</p> <p>On site process and utilisation of Construction Material recycling Facilities (CMRFs) adopted (Authority O. D., Sustainable Development Strategy, 2007)</p> <p>Coca-Cola has committed to recycle every bit of clear PET plastic waste from the London 2012 Olympic and Paralympic Games</p>	98.5 per cent of demolition waste and over ninety nine per cent of construction waste from the Park has been recycled and in some cases reused (Authority L. O., April 2012) ( <b>Table -1</b> )
20 per cent use of construction materials from a reused or recycled source	All waste thought-about as a possible resource and a minimum of seventy per cent of Games-time waste are reused, recycled or composted	A total of eight off-site buildings reused and foundations for the Aquatics Centre, Handball Arena and Olympic stadium have used concrete with quite thirty per cent of recycled materials (Engineers, 2008)
To carry out Freight fifty per cent (by weight) of construction materials for the Park by rail or watercourse (More than a million tonnes of material)	Direct rail root created & connected to Olympic park for supply of material	More than sixty seven per cent of materials are delivered to the Olympic Park by rail or water
Reduce the amount of drinking water utilized in new permanent venues by forty per cent	<p>Use of water saving devices and appliances.</p> <p>Well-organized water use and re-use and recycling adopted (Committee, Delivering the Change, April 2012)</p> <p>Strategic Park designs followed</p>	<p>Water consumption per person per day reduced to one hundred and five liters against a customary of one hundred sixty liters.</p> <p>60% more than of slandered achieved</p>

Target	Measures	Achieved
<b>Biodiversity</b>		
<p>Converting the Olympic Park from poor setting into a prime quality biodiversity park, so to develop new natural surroundings in an urban setting (2012, November 2010)</p>	<p>Executed Olympic Biodiversity Action Plan</p> <p>Creating, ‘Future proof’ against climate changes by planting more than 2,000 semi-mature trees of poplar, birch and hazel (Committee, Towards on Planet, Sustainability plan summary, February 2010)</p> <p>Creating green zone and new surroundings in forty five hectares (<b>Table - 2</b>) and 102 hectares of open area, in a vicinity presently deprived of accessible green area</p>	<p>A UK company has been contracted to supply 300,000 wetland plants for the Park</p> <p>Invasive Japanese Knot-weed Space equivalent to ten soccer fields has been cleared of</p>
<p>Providing natural links along the river valley corridor to connect wildlife habitats</p> <p>Providing a Biodiversity section in Temporary Venues and Overlay as per the Sustainable Design Requirements section of LOCOG’s Design Strategy</p>	<p>Providing amenity to the wildlife and habitats improvement works invigorated</p>	<p>More than 15,000 m<sup>2</sup> of living roof enclosed within the designs of Olympic Village, Aquatics Centre, Eton Manor and Main Press Center (Diplomat, 2012)</p> <p>Five kilometre of waterway improvement works are completed among the Olympic Park site, together with taking garbage out of streams, dredging and fixing river walls</p>
<p>Forming undisturbed areas for wildlife</p> <p>Incorporate surroundings options into the design of buildings, like the supply of nesting sites and therefore the creation of green and brown roofs and walls</p>	<p>Habitat creation on the Olympic Park site (Paralympic, April 2012)</p> <p>Creating new ecologically managed wildlife habitat with the intention that it develop into a Site of Importance for Nature Conservation (SINC)</p>	<p>Two thousand semi-mature trees for the Park, provided by a UK nursery that has been hand-picked to ‘future proof’ against climate changes.(Committee, Towards on Planet, Sustainability plan summary, February 2010)</p>

Target	Measures	Achieved
<b>Healthy living</b>		
<p>To maximize the health advantages that the Games programme can bring to spectators, staff on site, and therefore the whole of the united kingdom.</p>	<p>Six key areas such health and safety; redress of contaminated land and improvement impure waterways; air quality; sustainable food; sports participation and physical activity; and legacy facilities for community and elite sport and culture have been identified.</p>	<p>More than ninety million litres of polluted groundwater that existed on the Olympic Park are treated using novel systems</p>
<p>Target of zero fatalities throughout this construction phase</p> <p>Scheming for health and safety risks measure related to the construction, maintenance and use of the Olympic Park and different venues, and also the Olympic Village (London Sustainability Report: A Blueprint of Change , April 2011) .</p>	<p>During the construction programme, the Olympic Board introduced policies requiring restrictions on the use of polyvinyl chloride (PVC) and hydro fluorocarbons (HFCs).</p> <p>Coatings assessment policy was additionally developed to assess the projected coatings, together with paints, Water proofing and anti-graffiti coatings.</p>	<p>There have been no fatalities on the programme.</p> <p>The accident rate at year finish was zero. Sixteen per cent for the entire programme (0.13 per cent for the year 2011 – representing 770,000 hours worked for each re-portable accident). This is roughly one-third of the construction industry average reported within the best year for accident statistics on record (2010/11), and below the all-UK employment record.</p> <p>The ODA has had twenty seven periods of 1,000,000 man-hours while not a re-portable accident.</p> <p>There are over 40,000 health checks undertaken, and solely 3 staffs are excluded from acting on the location owing to a pre-existing health condition.</p>

<p>To clean up the 245-hectare Olympic Park site, that was erstwhile spoilt by fly-tipping, poor water quality and tiny public access</p> <p>Providing most effective attainable air quality for athletes to vie in the clean-up operation (Games, 2007)</p>	<p>In the clean-up operation, sustainable techniques used to recycle and reuse.</p>	<p>More than ninety per cent of the demolition material and eighty per cent of soil on site reused.</p> <p>Lorry journeys reduced within the native area and lowest quantity of contaminated material was taken to lowland sites (Committee, Towards on Planet, Sustainability plan summary, February 2010)</p>
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Apart from above targets and measure to realize sustainability through game Olympic authority through inclusive design created an extremely accessible Olympic Park and venues, safe public space and housing facilities pliable to future climates, generated new employment and business opportunities domestically, regionally and across the country

### **Conclusion**

Keeping in mind the previous Olympic Games to nurture the masses of united kingdom even in future for next few decades, London 2012 is that the first Olympic and Paralympic Games to try to deliver a holistic sustainability programme from construction and creating legacy for future generation and it is first Olympic game to open itself up to scrutiny by an independent commission. Being a green game London Olympic is nice success because it provided sustainable venues and heritage for future generation that bring profound changes on entire masses, habitat and whole setting of United Kingdom. This sustainability, throughout the sport, is that the outcome of meticulous plans of London Organizing Committee of the Olympic Games and Paralympic Games (LOGOS) through pioneering ingenuity like food vision and zero waste plans, the sustainable sourcing code, diversity and inclusion objectives. the sport not solely attempt laborious for environmental sustainability however conjointly for social sustainability further, because it consistently plan for development of local community and communities across the united kingdom by generating jobs, skills and employment opportunities through native procurance programme. therefore London Olympic 2012 one it's kind of sport event within the history of humankind that endeavour for making Social, Economical & Environmental sustainable system for safeguarding our bios, that is want of hour for very survival of humane species across the world.

**Table -1**

Waste generated in connection with the installation and  
Decommissioning of venues

Measures	Tones of waste	% of Total (Target Achieved)
Re-use	27,220	45
Recycling	32,963	54
Energy recovery	461	0.8
Treatment (Hazardous)	25	0.04
Landfill	0	0
Total	60,669	
% of total waste re-used, recycled		<b>99%</b>
% of total waste diverted from landfill		<b>100%</b>

**Source:** London 2012 Post-Games Sustainability Report- A legacy of change  
(December 2012)

- Note:** 1. The data in this table is subject to rounding.  
2. Does not include discrete data associated with London 2012 Ceremonies which also achieved zero waste to landfill

**Table – 2**

Ecologically designed and managed habitat  
(45 Hectare)

Habitat	Area in hectares
Built Environment	0.40
Parks, squares and amenity spaces	1.67
Allotments	1.04
Brownfield Habitats	5.05
Species-rich grasslands	23.69
Trees and scrub	10.00
Wet woodland	0.90
Rivers	0.27
Reed bed	1.80
Ponds	0.18
<b>Total</b>	<b>45.00</b>

**Source:** A review of biodiversity across the London 2012 programme  
(Sustainable Naturally)

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