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SUSTAINABILITY IN THE SPORTS SECTOR

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Sustainability in the Sports Sector

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Sustainability in the Sports Sector

Introduction

On September 29th 2010, UCL Environment Institute and Marylebone Cricket Club held a one-day workshop at Lord's Cricket Ground to discuss the issue of sustainability in relation to the sports sector. The discussion on that day has been followed up in a number of other meetings and this briefing brings together some of the key points that have been made along with some additional information.

Sport is defined in the European Sports Charter 1992 as "all forms of activity which, through casual or organised participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competition at all levels." (Sports Council of Great Britain 1993).

The sport sector is central to economic, social and cultural life throughout the UK. In 2003, the direct economic activity attributed to sport was around £13,531 million and 421,000 jobs; approximately 1.8% of all employment in England (Coalter 2009). Sport imparts many more indirect social benefits on the participants and spectators including improved physical health and psychological well-being and greater social connections and community cohesiveness (Social Issues Research Centre 2006). Arguably, the economic and social dimensions of the sport sector have received more attention than its environmental impacts, however, these three elements should be combined to create a sustainable development approach to managing the sports sector at all levels.

Sustainable development is "an enduring, balanced approach to economic activity, environmental responsibility and social progress." (British Standards Institution 2006).

A more sustainable sports sector would sit centrally within activities to deliver on the government's sustainability policy as set out in *Securing the Future* (Defra 2005) and the draft *Carbon Plan* (Department for Energy and Climate Change 2011) and would be a major stepping stone on the path to demonstrating and enhancing the positive impact of the sector in economic, social and environmental terms. This paper outlines the social, environmental and economic dimensions of sustainable sports activities.

"Sport is sustainable when it meets the needs of today's sporting community while contributing to the improvement of future sport opportunities for all and the improvement of the integrity of the natural and social environment on which it depends." (Green and Gold 2007).

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Sport and the social dimensions of sustainability

The sports sector already recognises that it can make a major contribution to social well-being through both personal development and the development of local communities. However, care needs to be taken to ensure that such benefits are spread in an equitable and long-lasting fashion. There are several strands of social sustainability. Recent literature on major sporting events identifies the ability of sports to create a range of positive social effects including: reinforcing collective identities; uniting people; improving self esteem; increasing civic pride; raising awareness of disability; inspiring children; providing experience of work; encouraging volunteering, increasing participation in sport; and promoting wellbeing and healthy living (Smith 2009). Two strands of social sustainability that are highlighted below are public health and community cohesion.

It is widely acknowledged that greater involvement in sporting activities has a public health benefit (Department of Health 2009); greater physical activity can tackle obesity, avoid the incidence of a wide range of diseases and contribute to mental health. Seeking to extend some of these benefits to sporting events and stadia in the form of 'health promoting settings', the European Healthy Stadia Network actively promotes health policies and practices to sporting venues of all sizes, advocating smoke free environments, provision of healthier food options and active travel interventions for both spectators and workforces at stadia and venues of all sizes across Europe (European Healthy Stadia Programme 2009).

Active involvement in sports may also have an impact on academic achievement, through enhancing concentration, future employability and building skills and confidence; an effect that may last for several decades (McIntosh 1966; Smart 1967; Williams 1988; Shephard and Trudeau 2008) that is particularly notable in young women (Pearson, Crissey *et al.* 2009). It should be noted though that this work is based on observational studies, and not intervention studies (Keeley and Fox 2009). Research has further suggested an active contribution to the rehabilitation of offenders through sport (Council of Europe 1989; National Audit Office 2006). At the level of local communities and society more broadly, sport can play a role in building relationships in local communities, especially amongst young people (Department for Culture Media and Sport 2004; Sport England 2008), although care must always be taken to avoid creating competitive cleavages between sport supporters. With the appropriate planning and management, sporting activity can contribute to social inclusion and ensure the widespread access to sporting facilities across communities, including the most deprived communities.

Community Cohesion and the example of Solihull: Positive Futures, Fusion, and Neighbourhood Sports Programme (Sport England 2008; Solihull Active 2011)

The Solihull Neighbourhood Sports Programme is a new combination of the Positive Futures programme sponsored by the Home Office and the North Solihull Fusion project sponsored by Sport England. Positive Futures was a locally-based social inclusion programme aimed at young people using areas such as arts, media, and sport. North Solihull Fusion was designed to engage the community, and especially young people, of North Solihull, West Midlands through sport and recreation. The combined programme had a new focus on community sport due to the success of the local sport and recreation aspects of the social inclusion programmes.

The project includes targeted interventions to meet local goals to reduce nuisance behaviour and

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anti-social behaviour as part of the borough's crime and disorder strategy. The programme was originally delivered as the Fusion programme at pre-identified crime hotspots with training and education with evening activity sessions using a mobile venue. There also were sporting and learning opportunities provided at permanent locations such as schools and leisure centres, and a full school holiday activity programme. There was a specialist sports sector training programme for unemployed people aged 18 to 24.

The Fusion programme in its early years was a success – 18,000 participants, ten community sports clubs involved, young people gained jobs and apprenticeships, and neighbourhood wardens were trained as coaches as part of their role as community activists.

The neighbourhood programme continues to provide both open activity sessions, now throughout the borough instead of just in the original communities, and targeted interventions for the young and unemployed. The programme adheres to the principles of what it calls "Doorstep Sport" – delivering sports activity to young people in the right place at the right time.

Prince's Trust Sport - xl Clubs (Prince's Trust 2011)

The Prince's Trust uses sport as an important vehicle to engage disadvantaged young people with their programmes. One example of this is the Prince's Trust xl Club programme. xl Clubs operate within educational settings, both in and outside of the mainstream, to target young people that are at risk of exclusion. Young people aged 14-16, receive at least three hours a week of contact with trained advisors throughout the school year. The programme helps young people to re-engage with learning, improve their chances of completing their education, increase their confidence and self-esteem, improve motivation and social skills, and investigate their own potential.

Using sports activity within the programme helps young people become better in their interactions with their peers, develop these key soft skills and offers some sports-related progression opportunities into coaching and volunteering.

One example of a sports partnership within xl clubs is the xl cricket programme, run in partnership with four county cricket boards in England. Using expert cricket coaches, xl clubs benefit from a 6-8 week dedicated programme of support using cricket themed activities to engage and motivate young people. In addition to coaching support, young people receive equipment and progression opportunities to enable continued participation beyond the life cycle of the initiative

Some of the benefits of sports activities can be secondary effects. The provision of green spaces is often an integral part of sports facilities. Such spaces can also be seen as key elements in urban design for a socially balanced and healthy community. These spaces not only serve a specific sporting function, but they also encourage healthy lifestyles and social contact outside of the home, school, and workplace. Neighbourhood-level provision of green spaces that can accommodate sport of some

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kind would normally be in excess of 0.2 hectares, would be accessible (defined by Barton, Grant *et al.* [2010] as within 4-600 metres from home or workplace) and would avoid local authority by-laws prohibiting ball games. Groups that may benefit from access to open spaces on this scale include parents with young children, young children playing on their own, people with limited mobility or in wheelchairs and workers or students in a lunch break.

Sports clubs can encourage physical activity and social interaction in and between these hard-to-reach groups by locating themselves within residential communities, and local planning authorities can facilitate this by ensuring that flexible provision for sport is available in every community.

Sport and the environmental dimensions of sustainability

The sports sector manages a vast range of venues ranging from professional that attract large numbers of spectators to participant-led venues such as village sports halls, local playing fields, neighbourhood swimming pools, and everything in between. In addition, many sports arrange events which use non-specific local facilities, green spaces, roads, and the urban environment on an occasional basis (e.g. triathlon, cycling road races). These venues and events can have a significant environmental impact and increasingly are being managed to reduce this impact.

There has been some evaluation of the environmental impact of major sporting events, but this has rarely been done for community buildings and events. Such studies have been performed using both ecological footprint and carbon footprint analysis. An ecological footprint is an aggregated indicator of global ecological impact that estimates the area of bio-productive land and sea required to support the resource consumption of the event using prevailing technology. A carbon footprint is the measurement of carbon dioxide equivalent from the range of greenhouse gasses emitted. One example in Britain is the evaluation of the ecological footprint of the 2004 FA Cup Final at the Millennium Stadium in Cardiff (Collins, Flynn *et al.* 2007). Carbon footprint studies have been conducted on the last two football world cups in Germany and South Africa (Econ Pöyry AB 2009; Dolles and Soderman 2010). Events such as the Wimbledon Championships and the London 2012 Olympic Games are also assessing their environmental impact through ecological and carbon footprinting exercises (Centre for Sustainable Energy 2010; LOCOG 2010). Such assessment can then act as guides to the review of sporting operations with a view to reducing the measured impact.

Integration of environmental performance into the management of sports events includes, among other things, consideration of energy use and carbon emissions, the local natural environment and promotion of biodiversity, efficient use of water and other resources and management of waste to maximise recycling and re-use. The venue's performance may be affected by both internal and external factors; for example, various activities stimulate energy use, and resulting greenhouse gas emissions, including heating indoor spaces and running televisions, floodlighting and other electronic equipment. Meanwhile, significant transport emissions come from the travel of spectators, teams, officials, and food and drink to the venue. Management of environmental performance extends into issues of the supply chain and sustainable procurement for building and operating sport venues.

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Natural environment

Sport is played in a variety of venues from natural environments to purpose-built buildings; different venues will affect the natural environment in a different way. Some events visit a particular natural or urban environment infrequently; perhaps only once a year or sometimes as a unique one-off event. Other sports require facilities that permanently alter the landscape to permit them to be played for substantial parts of the year. Most sport is played within urban areas, either in planned green spaces or inside buildings and stadia.

When taking place in a temporary setting, either in a rural or urban environment, a sound sustainability policy will require that the area is returned to, at least, its previous condition; a sustainable event should leave the countryside, park, or city streets in the same or better state than it was found. Care should be taken not to affect the biodiversity of the area, create litter or other forms of pollution. The event also may generate unusual patterns of transport unrelated to normal public transport services, and organisers may need to become direct providers of transport to avoid excessive transport emissions.

A great variety of sports are played in permanent venues, often turf based: golf, football, rugby, cricket and horse-racing for example. This produces specific sustainability concerns. Managing local biodiversity and even habitat creation can be part of the contribution of the sport venue to its local natural environment. Sustainable urban drainage can be important and management of sites, including the grassed areas, can seek to reduce the use of chemicals protecting local water supplies and minimising the need for treatment.

Green spaces can also be part of a positive contribution to urban environments through management of the Urban Heat Island effect. There is growing evidence that the provision of multiple areas of green space throughout an urban area has a disproportionate benefit limiting the extent to which cities are warmer than the surrounding countryside. This has a more beneficial effect than the provision of the same amount of green space in larger parks (Wilby and Perry 2006; Chang 2007; Smith, Lindley *et al.* 2009).

There are increasing numbers of examples of environmentally sustainable activity relating to facilities management at sporting venues. For tennis courts, water can be managed to top irrigate the grass courts and drip-irrigate the clay courts to minimise water use. At Wimbledon, sustainable forms of drainage on the site ensure local drainage systems are not overloaded (LOCOG 2010). The English Golf Union is developing non-intensive management of courses, involving: natural turf grasses, cultural techniques, minimal water use, and reduced requirements for fertilizers and pesticides (English Golf Union 2011). In Suffolk, the Jockey Club support an initiative whereby stable waste from the local area is used for biomass based energy generation (The Jockey Club 2010).

Major venues such as the Millennium Stadium in Cardiff and Aviva Stadium in Dublin have achieved certification for sustainable management systems (British Standards Institution 2007). At Manchester United FC, they have developed a nature reserve at their Trafford Training Centre, Carrington co-managed with Cheshire Wildlife Trust, with a lagoon with reed bed technology and a bore hole to help with water self-sufficiency (Cheshire Wildlife Trust 2006).

The importance of being ready to adapt to climate change, when it does happen, also has to be recognised. This will increasingly affect venues and events with issues of water scarcity, soil moisture changes and heat waves creating new demands on management.

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Energy and greenhouse gas emissions associated with travel

Travel by participants and supporters is a major element of sports' environmental impact. A measurement of the ecological footprint of the 2004 FA Cup Final in Cardiff, Wales, found that the impact of visitor travel was the largest environmental impact in staging the match, with the environmental impact of a travelling fan an order of magnitude greater than the average British person's daily impact (Collins, Flynn *et al.* 2007). The 73,000 fans who went to the Millennium Stadium travelled an estimated 43 million kilometres, with 47% of that distance covered by car. Hence, the largest share of carbon emissions attributable to an event is from actions over which a sports club or venue may have some influence but can not have total control. The study recommended that events investigate the direct provision of transport as well as extensive information about accessing the venue or ground by public transport.

Promoting environmental sustainability at venues and events can be one way that the sports sector uses its profile and networks to raise environmental awareness more generally within local communities and their supporters. The development of travel plans, minimising the need to travel where possible, and enhancing accessibility to public transport, also have a role to play. Spectator sport typically involves travel during off-peak hours on evenings and weekends. This can be a benefit, using spare capacity in the public transport network outside of normal commuting patterns. However, it can also be a challenge. Following sport can involve intercity travel, which demands a large number of aggregate miles travelled by spectators and where public transport options at these hours are more limited than during the working day. This is especially true of well-attended sporting events.

There are some programmes that are set up as direct providers of transport to their supporters. Manchester United FC uses green vehicles for its Disabled Supporters Association. Wembley Stadium partners with National Express coaches for sporting events with a calculation of carbon emissions for spectators to compare their coach with car use – part of "we're in this together" campaign as a sport and music venue.

Energy and greenhouse gas emissions associated with venue operations

Major sports stadia attract large crowds in a similar fashion to other entertainment venues. There is relevant research in the entertainment industry that quantifies the relative amount of energy consumed by venues, visitors, and performers at events. An overview of the carbon emissions of live music touring of venues of varying sizes in the UK found that 45 percent of all greenhouse gas emissions were from audience travel, 24 percent from the operation of a venue including energy and concessions, and 15 percent from merchandise supply and sales (Julie's Bicycle 2009). Although a similar survey has not been done for sporting venues in the UK, individual studies reflect a similar pattern of carbon intensive behaviour around the staging of sporting events.

Sports centres occur in many different sizes and configurations and offer different activities with differing intensity and durations of use. In particular indoor sport centres with swimming pools have a very high expected energy demand. A major study of the Display Energy Certificates of indoor leisure centres show that, while there is still great uncertainty about the energy performance, most leisure centres in a recent study did better than the certificates' benchmark for heating demand. Work is still ongoing to help operators and energy assessors understand these types of buildings better, but the

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expectation is that the current benchmarks are too generous and that operators will have to adapt to more stringent benchmarks in the near future (Bruhns, Jones *et al.* 2011).

The 2007-08 FA Cup Carbon Footprint campaign (Cred 2008)

As part of their response to the 2004 FA Cup Final study, the Football Association and their sponsors E.ON created the Carbon Footprint campaign for the entire 2007-08 FA Cup tournament. The entire tournament has characteristics of both community and spectator sport comprised of matches between community teams in early rounds and professional clubs with thousands of travelling supporters in later rounds. The FA estimated that 42,000 tonnes of carbon dioxide were created per season by the staging of all the matches in the Cup.

The campaign also had a website where fans could find out about car-sharing schemes in their area and fans made over 160,000 pledges such as fitting energy-efficient light bulbs, taking a coach or walking to a game, or by watching the match together at a pub with friends instead of in their individual home. From the second round (last 96 teams) onwards the campaign also offered free coach travel with National Express for fans heading to FA Cup matches right the way through to the final.

Portsmouth and Cardiff supporters collectively travelled 2,781 miles by following their teams from the third round all the way to the final at Wembley. By taking free coaches, supporters saved 18.39 tonnes of carbon dioxide equivalent. Through the carbon-saving pledges done on Carbon Footprint's website, 22,000 tonnes of carbon dioxide equivalent were saved by all supporters through the entire FA Cup tournament.

Sport and the economic dimensions of sustainability

Sporting activities have to be viable to continue and their economic viability is significant for broader economic growth. Sports clubs and venues can reduce their costs, improve their profit margins and become more efficient while improving performance by implementing a sustainable procurement policy. However, rather than just pursuing profit for the organisation, the sustainability agenda argues for the importance of driving up the economic value of the sporting activities and the communities that support them; this can have a number of dimensions.

Sustainable procurement

Sustainable procurement means that the purchase of goods and services is done in such a way that minimises the environmental impact and promotes equity and social justice right through the supply chain. This includes the employment of the building workforce and the procurements of materials in the construction of new venues, and ongoing contracting of services such as catering during a venue's operation.

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One direct way to ensure sustainability in supply chains is to require contracting with accredited sustainable suppliers. This may range from using Forestry Stewardship Council wood in construction and refurbishment to committing to Free Trade products within catering and sports merchandise.

Using local workforces reduces overall transport-based energy use and emissions. Sourcing local building materials and catering sources also reduces the amount of travel by people and materials. This also will have positive implications for the social and economic sustainability of the sporting venue in relation to its location. Local suppliers embedded in the community will be able to promote and increase the skill base for these jobs amongst people living nearby, as well as maximise the contribution to the local economy (see links to economic sustainability below).

One example of good practice is Manchester City Football Club, who reported a reduction in their annual carbon footprint by roughly 30 percent in 2009, partly by concentrating on sustainable procurement and construction. In mid-2009, the club wrote a sustainable procurement policy to encourage local suppliers by obligating the club to use such services whenever a locally based company offers a comparable and viable service. The club built corporate offices as part of the continuing development of the City of Manchester Stadium area in 2009; 95% of the building labour and materials used were sourced from local suppliers (Manchester City Football Club 2010).

Community value

The British Urban Regeneration Alliance (BURA) has written a guide to best practice in Sport and Regeneration. They stated that "sports stadia and facilities are not a panacea that will address all the regeneration issues within a town or area; they can, however, play a significant role in facilitating financial and social improvements if they are implemented within a strongly defined strategy" (Ladd and Davis 2003). The expectations of the economic impact of a particular sports-led development may or may not be realistic, but the indirect economic benefits can be considerable. The United States have seen a number of major sport-led developments in the recent past, and evidence from these show that economic benefits are inverse to the proportion of supporters that drive to the venue. Thus, a key environmental sustainability concern – increasing the use of public transport, walking and cycling to venues and events – can also bring economic sustainability benefits.

BURA identified a number of factors that contribute to successful stadia development:

- Agreement that the stadium managers will provide community leisure and health facilities within the stadium complex.
- Significant private sector funded improvements in transport infrastructures in and around stadia to allow new development corridors to be opened.
- Significant private sector funding of land remediation costs in and around stadia.
- Innovative funding agreements whereby a direct local benefit is derived from in-stadia sales.
- Private sector funding of stadia-sited community training facilities and on-site incubation centres.

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The types of regeneration through sport range from those led by the sector to those where the sector is a more passive participant (Figure 1).

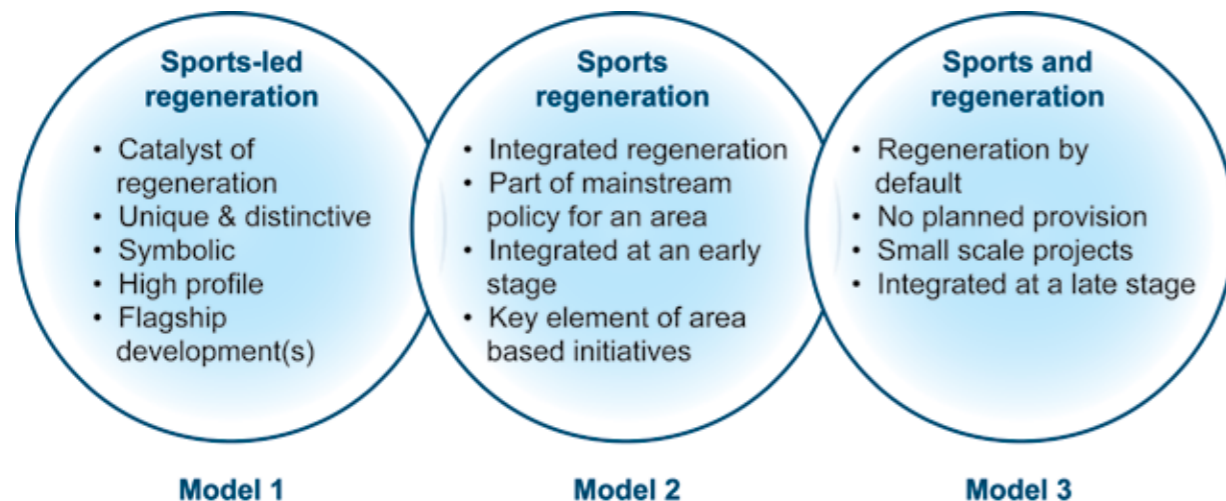


Figure 1 Davies' definition of three models of regeneration through sport (Davies 2010)

Examples of the role that sports facilities can play in urban regeneration efforts include the regeneration of the area around the new Arsenal stadium in partnership with Newlon Housing Trust and Islington Council, and the Somerset County Cricket Ground's role in the creation of a cultural quarter in Taunton (Newlon Housing Trust 2011; Project Taunton 2011).

Liverpool Sport Action Zone (SAZ) (Sport England 2005)

Twelve Sport Action Zones were designated in 2000 for the purpose of engaging with local communities, partnership working and demonstrating the role that sport can play in regeneration and neighbourhood renewal. In the Liverpool SAZ, for instance, physical regeneration activity has centred on building new facilities such as community sports centres and sports pitches, refurbishment of existing community facilities and improvement of school facilities. The local planning and leisure services authorities were sought in the early stages of these new development proposals. This enabled the smooth delivery of new facilities that met the goals they had for the built environment and community leisure programmes. Of the £11 million invested in the SAZ, £8 million were raised from external sources and not by direct public sector grants. Increased participation in sport has occurred as a response to building of new facilities. This increase has been a central tenet of the success of the SAZ programme in Liverpool, and the local authority judged that it was unlikely that this scale of development would have taken place in the absence of the SAZ programme.

With careful planning, the viability of urban environments can also be enhanced through the joint use of facilities over the day and week. There are complementary weekday, evening, and weekend uses of the venues themselves by using their meeting rooms, halls, and sports pitches for other sport,

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conference, educational and community functions. Under the new Localism Agenda, there may be a growing role for community buyouts of sport facilities tying in to community viability. And increasingly, the sponsors of sporting organisations, venues and events often demand sustainability more broadly as a pre-condition for investing in the sport. This may involve demonstrating the contribution of the sporting activity to the local economy as well as environmental and social benefits.

Community Stadium, Colchester (Royal Institution of Chartered Surveyors 2011)

The Colchester Community Stadium, a new 10,000 seater football ground, opened in 2008 providing community facilities for the residents of Colchester and the wider area of Essex. It was the Royal Institution of Chartered Surveyors' Community Benefit commendation in 2009.

The stadium was created as a partnership formed between the public, private, and voluntary sectors. Colchester Borough Council, Colchester United Football Club and the Colchester United Community Sports Trust, developed an economically sustainable plan that balanced community and commercial interests. Both competitive and recreational sport are catered for as well as non-sporting community uses in the new stadium, which includes a study support centre, a wedding venue, community facilities, a conference hall, and recreational football pitches for the local community.

The ownership of the Community Stadium is structured in a way that ensures that the football club, which has the greatest income of the three ownership groups related to the facility, has a day-to-day operational requirement to deliver community services. This has ensured that costs are limited and specialist sport, facility, and entertainment venue management expertise is available for all the uses of the stadium.

Conclusion

Sustainability, in its broadest sense, is a philosophy; it is a way of way of thinking and acting that considers economic, environmental and social impacts in all decision-making processes. It should never be a 'bolt-on' at the end of the decision making process but should be part of a cohesive strategy that considers, as far as practicable, the impacts and consequences of decisions made.

The preceding paper illustrates how the sport sector can itself act more sustainably, but can also be part of a broader solution for society. The sport sector is well placed to play a dual role by managing their internal operations to improve economic, environmental and social performance and by encouraging similar sustainable behaviours in participants and spectators before, during, and after sporting events of all sizes from individual participation, through community-based events to large international events.

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References

- Barton, H., M. Grant, *et al.* (2010). Shaping neighbourhoods : for local health and global sustainability. London, Routledge.
- British Standards Institution (2006). BS 8900:2006 Guidance for managing sustainable development. London, British Standards Institution.
- British Standards Institution (2007). BS 8901:2007 Sustainability Management Systems for Events. London, British Standards Institution.
- Bruhns, H., P. Jones, *et al.* (2011). CIBSE review of energy benchmarks for Display Energy Certificates - Analysis of DEC results to date. London, CIBSE Benchmarks Steering Committee.
- A. A. Lew and C. M. Hall. Harlow, Addison Wesley Longman: 25-34.
- Centre for Sustainable Energy (2010). "Energy and Carbon Reduction for Wimbledon." Retrieved 21 May 2011, from <http://www.cse.org.uk/projects/view/1158>.
- Chang, C. R. (2007). "A preliminary study on the local cool-island intensity of Taipei city parks." Landscape and Urban Planning **80**(4): 386-395.
- Cheshire Wildlife Trust (2006). "Example of our corporate members." Retrieved 21 May 2011, from http://www.cheshirewildlifetrust.co.uk/membership_examples.htm.
- Coalter, F. (2009). "The value of sport: economic impact and regeneration of local communities." Retrieved 10 May 2011, from http://www.culture.gov.uk/case/documents/Economic_impact_and_regeneration_of_local_communities.pdf.
- Collins, A., A. Flynn, *et al.* (2007). "Assessing the environmental consequences of major sporting events : the 2003/04 FA Cup Final." Urban Studies **44**(3): 457.
- Council of Europe (1989). "Recommendation No. R (89) 12 of the Committee of Ministers to member states on education in prison." Retrieved 11 May 2011, from <https://wcd.coe.int/wcd/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=593350&SecMode=1&DocId=656296&Usage=2>.
- Cred (2008, 5 September 2008). "Carbonfootprint.com: 2007/08 FA Cup season." Retrieved 22 May 2011, from http://www.uea.ac.uk/polopoly_fs/1.138105!Footyprint%20Case%20Study.pdf.
- Davies, L. E. (2010). "Sport and economic regeneration: A winning combination?" Sport in society **13**(10): 1438-1457.
- Defra (2005). "Securing the future : delivering UK sustainable development strategy : executive summary." Retrieved 10 May 2011, from <http://www.defra.gov.uk/publications/files/pb10589-securing-the-future-050307.pdf>.
- Department for Culture Media and Sport (2004). Bringing Communities Together Through Sport and Culture. Engaging Communities through Sport and Culture, Oldham, UK.
- Department for Energy and Climate Change (2011). "The Carbon Plan." Retrieved 10 May 2011, from <http://www.decc.gov.uk/Media/viewfile.ashx?FilePath=What%20we%20do/A%20low%20carbon%20UK/1358-the-carbon-plan.pdf&filetype=4&minwidth=true>.
- Department of Health (2009). "Be active be healthy : a plan for getting the nation moving" from http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_094359.pdf.
- Dolles, H. and S. Soderman (2010). "Addressing ecology and sustainability in mega-sporting events: The 2006 football World Cup in Germany." Journal of Management and Organization **16**(4): 587-600.

Sustainability in the Sports Sector

- Econ Pöyry AB (2009). Feasibility Study for a Carbon Neutral 2010 FIFA World Cup in South Africa. Stockholm. Department of Environmental Affairs and Tourism, South Africa and Norwegian Embassy, Pretoria.
- English Golf Union (2011). "The Sustainable Golf Course." Retrieved 21 May 2011, from http://www.englishgolfunion.org/core/core_picker/download.asp?id=6281&documenttable=libraryfiles.
- European Healthy Stadia Programme (2009). European healthy stadia: Evaluation report. Liverpool, UK, Heart of Mersey.
- Green and Gold (2007, 11 November). "Defining the Principles of Sustainable Sport." Retrieved 11 May 2011, from <http://www.greengold.on.ca/issues/6defining.html>.
- Julie's Bicycle (2009). Green Music Guide: Taking action on Climate Change. London, Greater London Authority.
- Keeley, T. and K. Fox (2009). "The impact of physical activity and fitness on academic achievement and cognitive performance in children." International review of sport and exercise psychology **2**(2): 198-214.
- Ladd, J. E. and L. E. Davis (2003). BURA guide to best practice in sport and regeneration. London, British Urban Regeneration Association.
- LOCOG (2010, 30 March 2011). "Carbon footprint study – Methodology and reference footprint." Retrieved 21 May 2011, from <http://www.london2012.com/documents/locog-publications/carbon-footprint-study.pdf>.
- LOCOG (2010, October 2010). "Sustainability Statement for the London 2012 Tennis event at Wimbledon." Retrieved 21 May 2011, from <http://www.london2012.com/making-it-happen/planning-consultations/documents/wimbledon-sustainability-statement.pdf>.
- Manchester City Football Club (2010). "Corporate and Social Responsibility Report 2009-10." Retrieved 21 May 2011, from <http://csr.mcfc.co.uk/>.
- McIntosh, P. C. (1966). "Mental Ability and success in school sport." Research in Physical Education **1**: 20-27.
- National Audit Office (2006). "Serving Time: Prisoner Diet and Exercise." Retrieved 11 May 2011, from http://www.nao.org.uk/publications/0506/prisoner_diet_and_exercise.aspx.
- Newlon Housing Trust (2011). "Newlon at Arsenal." Retrieved 22 May 2011, from <http://www.newlon.org.uk/about-us/newlon-at-arsenal/>.
- Pearson, J., S. R. Crissey, *et al.* (2009). "Gendered Fields: Sports and Advanced Course Taking in High School." Sex Roles **61**(7-8): 519-535.
- Prince's Trust (2011). "Prince's Trust xl club." Retrieved 22 June 2011, from http://www.princes-trust.org.uk/about_the_trust/what_we_do/programmes/xl_clubs.aspx.
- Project Taunton. (2011). "Regeneration Areas: Cultural Quarter: Somerset County Cricket Club." Retrieved 22 May 2011, from <http://www.projecttaunton.co.uk/regeneration-areas/cultural-quarter/342-somerset-county-cricket-club.html>.
- Royal Institution of Chartered Surveyors (2011). "Community Benefit Award - Commended: Weston Homes Community Stadium, Colchester." from http://www.rics.org/site/scripts/documents_info.aspx?documentID=688&pageNumber=7.
- Shephard, R. J. and F. Trudeau (2008). "Physical education, school physical activity, school sports and academic performance." The international journal of behavioral nutrition and physical activity **5**: 10-10.
- Smart, K. B. (1967). "Sporting and intellectual success among English secondary school children." International Review of Sports Sociology **2**: 47-54.

Sustainability in the Sports Sector

- Smith, A. (2009). "Theorising the Relationship between Major Sport Events and Social Sustainability." Journal of Sport Tourism **14**(2-3): 109-120.
- Smith, C., S. Lindley, *et al.* (2009). "Estimating spatial and temporal patterns of urban anthropogenic heat fluxes for UK cities: the case of Manchester." Theoretical and Applied Climatology **98**(1): 19-35.
- Social Issues Research Centre (2006). "The impact of sport on the UK workplace." Retrieved 10 May 2011, from http://www.sirc.org/publik/sport_and_the_workplace.shtml.
- Solihull Active (2011). "Neighbourhood Sports Programme." Retrieved 16 May 2011, from <http://www.solihullactive.co.uk/neighbourhoodsports>.
- Sport England (2005). Spatial Planning for Sport and Active Recreation. London, Department for Culture, Media, and Sport.
- Sport England (2008). Creating safer communities: Reducing anti-social behaviour and the fear of crime through sport. S. England. London.
- Sports Council of Great Britain (1993). Council of Europe : European Sports Charter. Sports Council.
- The Jockey Club (2010). "Annual Review 2010." Retrieved 21 May 2011, from <http://www.thejockeyclub.co.uk/documents/review2010.pdf>.
- Wilby, R. L. and G. L. W. Perry (2006). "Climate change, biodiversity and the urban environment : a critical review based on London, UK." Progress in physical geography **30**(1): 73.
- Williams, A. (1988). "Physical activity patterns among adolescents – some curriculum implications." Physical Education Review **11**: 28-39.

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