

# A legacy of design

Most environmental impact is determined at the design stage, so it's vital that we get that right

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**B**eing a designer is a really great job. To be able to use one's creative energy in your day-to-day endeavours is a true privilege. However, being a designer that puts environmentalism and purpose at the same level of importance as form and function can be tough – a career path full of guilt and confliction.

I love creating, but I'm acutely aware that the things I create have environmental impact. My job is to create beautiful things and lure into a world of consumerism, but I know that, all too quickly, these things will end up in the ocean, atmosphere or soil.

My creations are made from materials from mines, embodied energy in their processing and manufacturing. And they become waste as soon as marketing persuades us we need a newer, shinier version.

For every tonne of household waste we create, tonnes more are created in the manufacture of the products we consume. From 1.5kg of waste to make a single toothbrush to two tonnes of raw material to make a 5g gold ring, and 8,000 litres of water in the making of a pair of shoes<sup>1</sup>. So much hidden impact.

My design studio calculates the environmental footprint of its designs and uses this as a tool to consider the whole-life process. Unfortunately, this is not common practice for the 1.97 million people who work in the UK's design economy.<sup>2</sup>

In the recent *Green Design Skills Gap Report*,<sup>3</sup> issued by the Design Council, 66 per cent of the designers who responded had designed for environmental impact in the past 12 months, but only eight per cent of this was in material recovery and resource scarcity.

Only 46 per cent rated themselves proficient or expert in environmental design.

It seems we have a skills-and-knowledge gap in our sector, which is a problem when you consider that global future growth will be in the green sector, and that this growth cannot put further stress on the planet. *The Circularity Gap* report says up to 70 per cent of global GHG emissions are linked to material extraction, processing and use.

It's crazy: behind every product is massive wastage from the production that we don't seem to acknowledge, and it's estimated 90 per cent of all products become waste within six months of purchase.

So, how can we break this wasteful cycle? Who can change the complex, global supply chains and systems? What role does the designer have, and can we eliminate waste from the design process? How would the design process change?

An obvious place to start working this out would be for the design and waste sectors to collaborate. These two industries don't normally come together to talk, but when they have, good solutions have emerged.

Take, for example, the exemplary work done by the London Olympics 2012. Not only did it lower the carbon footprint of the games, but its legacy lives in design practices today.

Hosting an Olympic games is a mammoth event. It can (and has) regenerated a whole area. It is also temporary and full of structures that need to come down quickly – an obvious remit for reuse. As soon as the bid was won, the Olympic Delivery Authority set out design briefs aimed at reducing waste at all stages. This led to solutions for the design teams, contractors, and

sub-contractors,<sup>4</sup> with five principles of designing out waste (DoW), following WRAP's guidelines:

- **Design for reuse and recovery** The use of reused (from the site) or recycled materials in designs was encouraged. The proportion of secondary materials in buildings had to be at least 20 per cent
- **Design for off-site construction** This reduced waste and construction time and increased efficiency for the main stadiums and structures
- **Design for material optimisation** Designers should draw on a number of 'good practice' principles that designers should consider (eg, lean design)
- **Design for waste efficient procurement** Designers were required to identify how design specifications could lead to the generation of waste and agree how to reduce this
- **Design for deconstruction and flexibility** Designers considered how materials were to be recovered when maintenance and refurbishment was undertaken, or when items came to the end of their life. Design proposals had to ensure that 90 per cent of demolition waste could be reused.<sup>5</sup>

These principles required the project team (the clients) to systematically evaluate waste and resource use as part of the design and review processes – from concept to completion. They also recognised that the most effective opportunities occurred during the early stages of the design process so made sure these were given the time and space to happen and were supported and protected through subsequent stages.

The outcome was seen across the site: 95 per cent of the Olympic Park demolition materials were reused onsite (more than 417,000 tonnes) alongside cost savings through innovative recovery and reuse solutions developed by the project teams ranging from £3,000 to £3m. For example:

- The chairs in the basketball arena were specified as black plastic, allowing their recycled content to be up to 98 per cent
- The concrete used on-site contained up to 30 per cent recycled aggregate and 25-40 per cent pulverised fuel ash as a cement substitute
- The International Broadcasting Centre was designed with a flexible internal layout with bolted – rather than welded – steelwork connections to allow for deconstruction and adaptation
- On-site soil washing was used – a UK first on this scale – meaning 80 per cent of onsite materials could be re-used, eliminating the need to import over a

million cubic metres of virgin material

- The velodrome design included a cable net roof – a lightweight solution that saved time, cost and materials

The embodied CO<sub>2</sub> of the 80,000-seat London Olympic stadium totalled 48kt (in contrast to the 2008, 91,000-seat National Stadium in Beijing at 370kt).<sup>7</sup>

All this foundational thinking carried through the London 2012 Olympic design processes and can be seen today in its legacy; land that housed the largest fridge dump in Europe was transformed into the beautiful Queen Elizabeth Park and the whole regenerated area of London with new housing and businesses and institutions.

Even the process has legacy. The delivery body wanted to make good on all the sustainability promises made in its bid, and help suppliers and contractors deliver to these requirements. They asked BSI to create a sustainable events standard quickly that could be used while the build was happening. *Specification for a sustainable event management system with guidance for use* was the result, now in the form of the *BS ISO 20121:2024: Event sustainability management systems* standard.

Designing-out waste is often done on an informal and piecemeal way, not stipulated in the brief, or held up by the client teams. But look at how impactful it can be if it is written with planet in mind from the outset. Closer working partnerships between design and resource management will be crucial to find the solutions to build a green future. And it needs to be done faster, building on what has already been done. In the words of the International Resource Panel, our relationship with nature 'will be resolved either with collective wisdom and effort or in a hard and very painful way [with] conflicts, pandemics, migration. The future will be green or there will be no future'.<sup>8</sup> ●

<sup>1</sup> The Great Recovery, 2012.

<sup>2</sup> <https://www.designcouncil.org.uk/our-work/design-economy/#c8020>

<sup>3</sup> <https://www.designcouncil.org.uk/our-work/design-economy/#c8020>

<sup>4</sup> Olympic Delivery Authority: Procurement policy

<sup>5</sup> *Learning Legacy: Lessons learned from the London 2012 Olympic Games construction project: Collaboration with environmental regulators and statutory stakeholders.* Richard Jackson ODA, Christian Bonard, CLM, Susan Steensma, CIRIA

<sup>6</sup> *Learning Legacy: lessons learned from the London 2012 Olympic Games construction project. Designing out waste on the Olympic Park.* Dr David Moon, WRAP, Dr Ian Holton, WRAP.

<sup>7</sup> *Learning Legacy: lessons learned from the London 2012 Olympic Games construction project. Reducing embodied carbon through efficient design.* Jonathan M Cullen, Mark A Carruth, Muiris Moynihan, and Julian M Alwood University of Cambridge, Dan Epstein ODA.

<sup>8</sup> [https://www.theguardian.com/environment/2024/jan/31/raw-materials-extraction-2060-un-report?CMP=Share\\_AndroidApp\\_Other](https://www.theguardian.com/environment/2024/jan/31/raw-materials-extraction-2060-un-report?CMP=Share_AndroidApp_Other)