

Resilient Places

The Lighting Circular Economy



Contents



The Lighting Circular Economy

Our collective
responsibility

BDP Ideas



Why we must act now

The concept of the circular economy (CE) is not new. In 2019 some notable manufacturers raised awareness, with lighting conferences promoting the thinking of long-time advocates like John Bullen who, up until now, had been screaming alone in the desert like a latter day John the Baptist.

I decided to make 2020 the year of the circular economy for BDP. It was simply the right thing to do. This meant a strong focus on research, engaging with stakeholders and developing a design process and specification to make a real and meaningful contribution. We explored the big issues with our clients and design partners and built a strong consensus on the approach and deliverables.

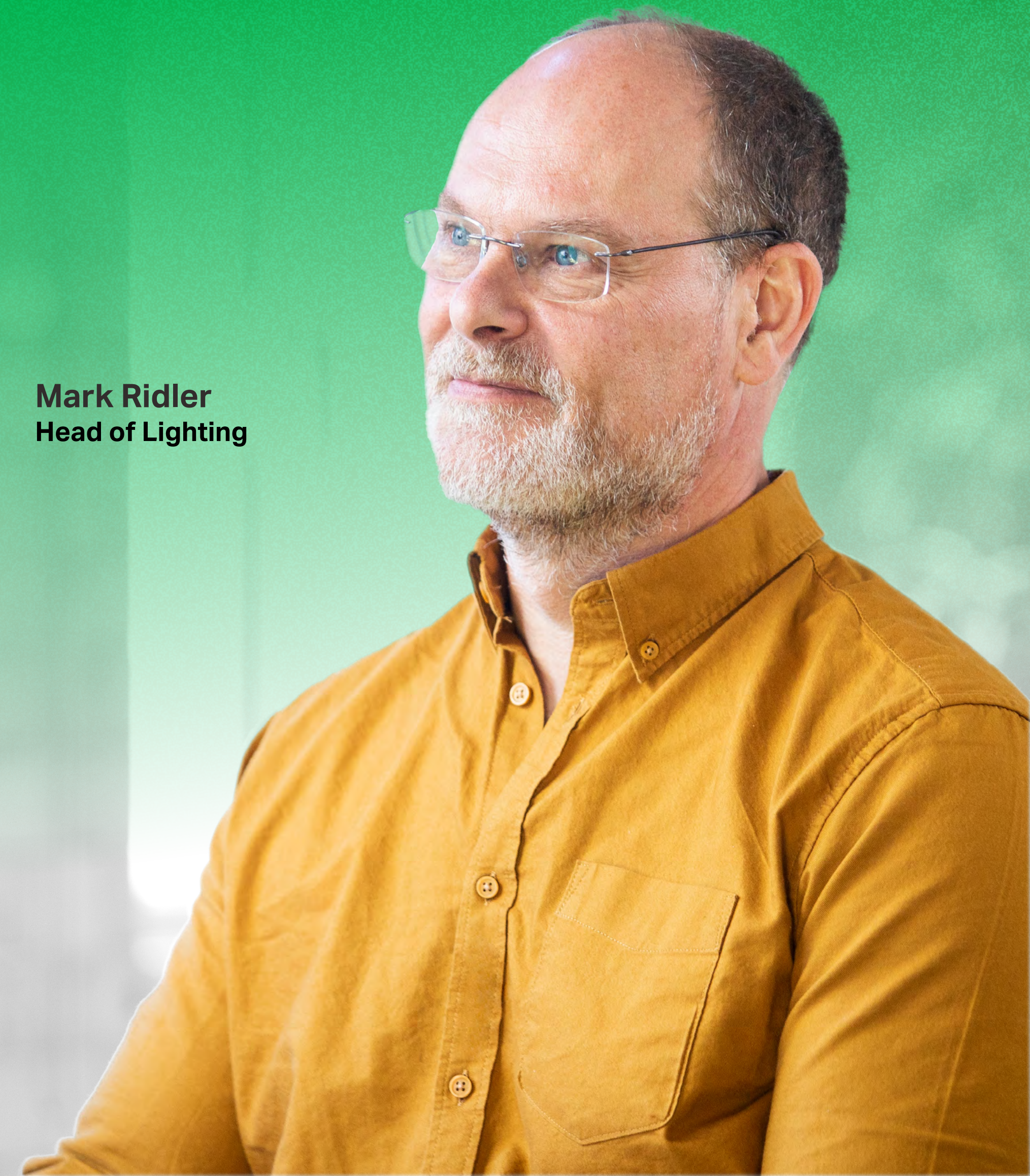
Partly prompted by net zero targets and Corporate Social Responsibility (CSR) imperatives and stimulated by Covid-generated strategic estate reviews, organisations across the world are having a parallel debate about the circular economy. The supply chain has been an early adopter, with some companies radically modifying their business models, partly out

of moral conviction, but also with hopes of commercial benefit. The quantity surveyor and project management community are quickly up to speed (being close to the clients as they are) and even some contractors are willing to engage as long as there is an acknowledgement that the system has to adapt for them to play their part.

The circular economy debate in the lighting profession is not just being driven by the depletion of the environment and biodiversity, it is being driven by resource poverty (the world is forecast to run out of copper in 2050¹). We need to rethink how we implement the principles and reduce short term and long term costs to make them more appealing.

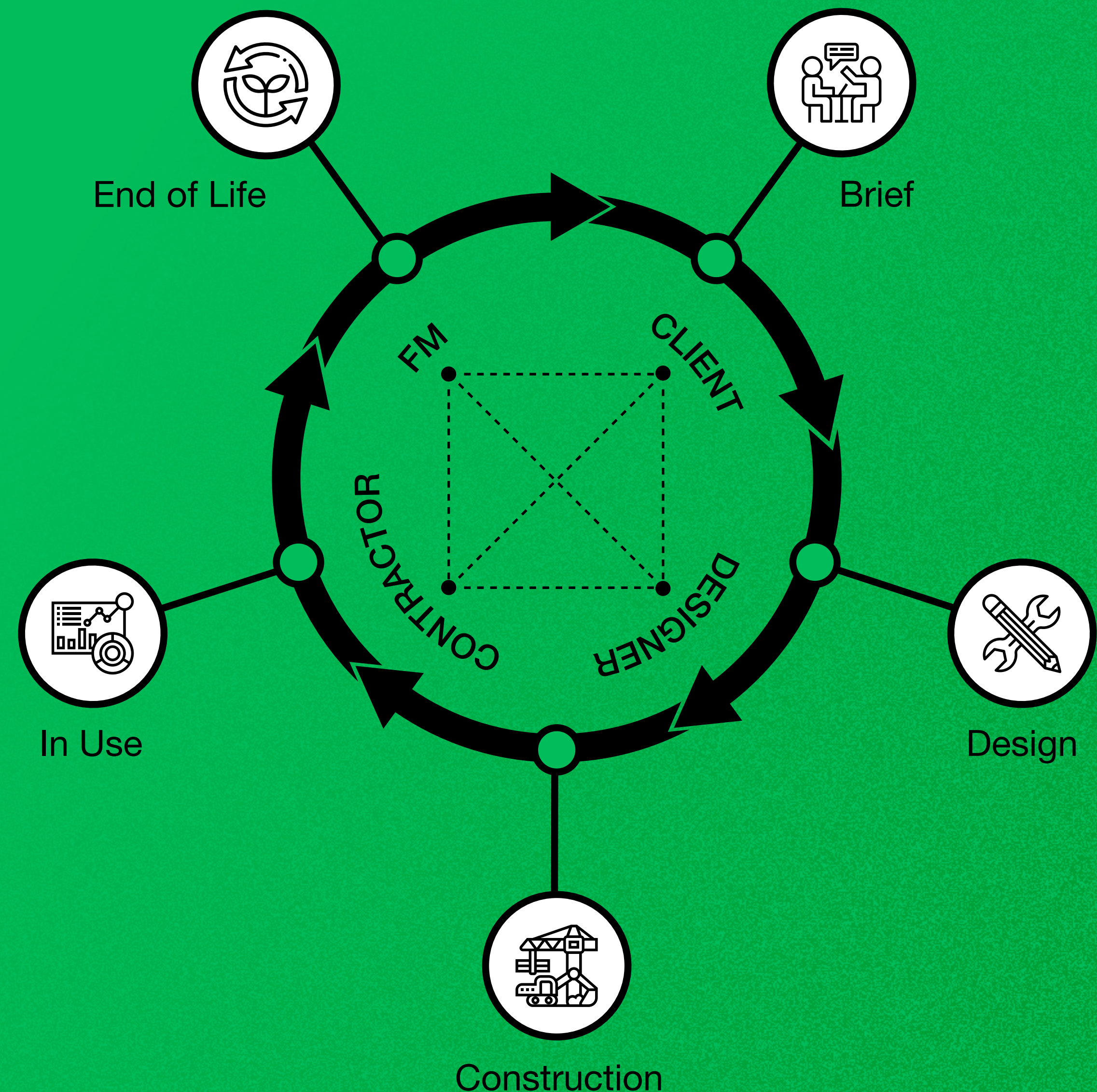
¹ <https://www.visualcapitalist.com/forecast-when-well-run-out-of-each-metal/>

Mark Ridler
Head of Lighting



There is no circular economy product without a circular economy project

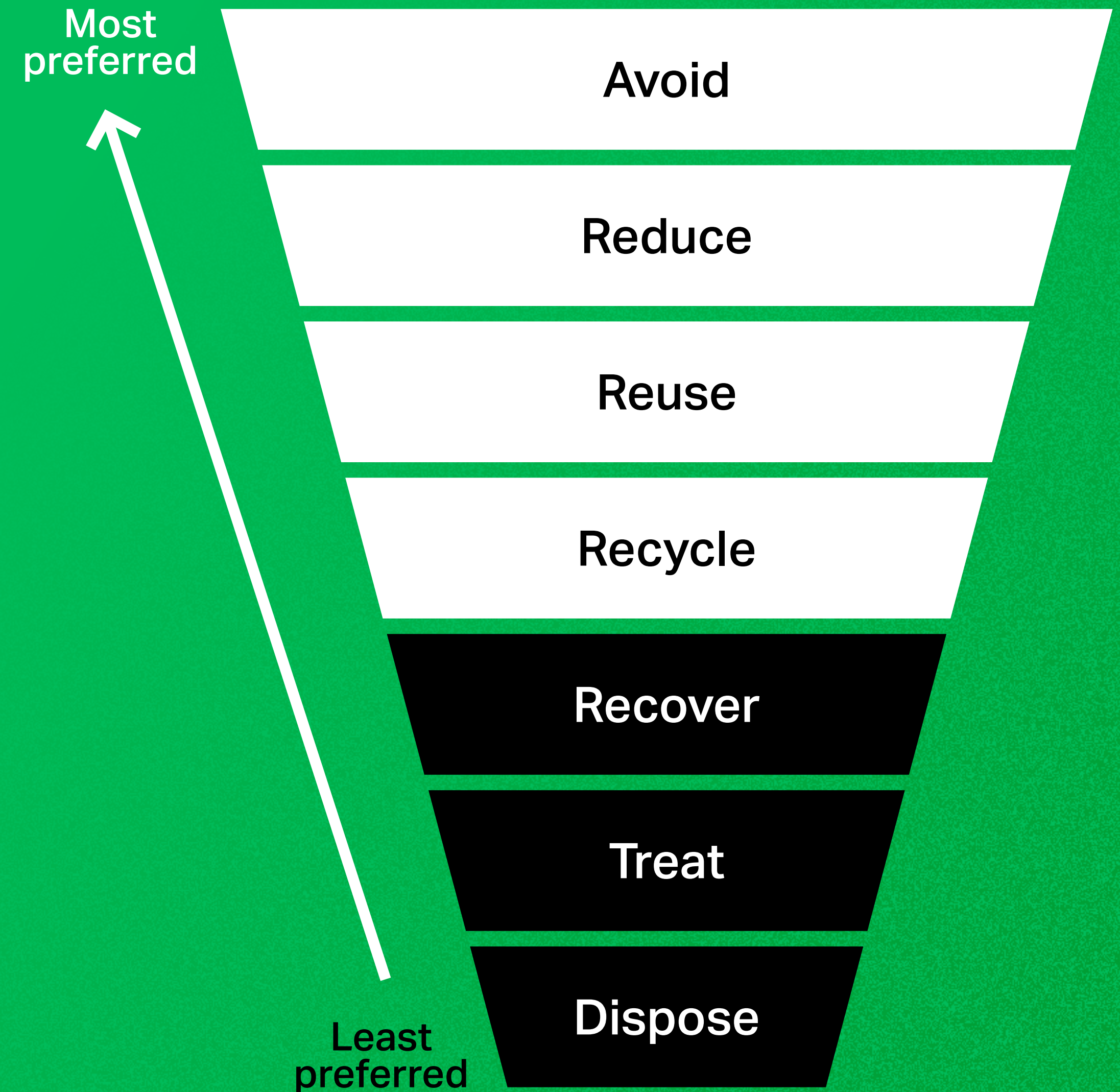
Much of the debate about CE is centred around product and the supply chain. While this is necessary, it is not sufficient. Design needs to reduce the requirement for product and ensure what is specified comes from renewable sources. The contractor needs to ensure that the design is delivered and sourced sustainably. The operator needs to understand the installation and control use, maintenance and discharge back into the supply chain. Disposal is no longer an option. These are all links in the chain, any one of which can be broken. Ultimately the client will drive the intent and secure each link. Collaboration between all parties is essential.



The hierarchy of waste model

Our approach can be mapped against the established European hierarchy which identifies waste prevention, i.e. avoid and reduce as the preferred options, followed by reuse, recycle, then energy recovery. Treatment and disposal should be the very last resort.

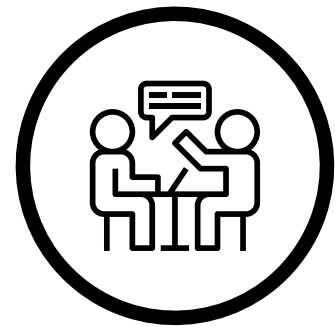
We apply these tests to drive our designs.



The Lighting Circular Economy

Brief





Establish the brief

For any project there are multiple competing objectives and constraints that the client must navigate. CE is only one, but the intent and will needs to come from the central driving intelligence of the project. The client must clearly articulate intent, drive a collaborative culture, instigate design and construction governance and align operational policy. An informed designer can help define these requirements and capture them in a brief.

Value engineering

We are driving hard to create and evolve industry standards but until they are established and recognised we need to address sustainability lost to value engineering. If clients are going to commit to a project specification then they will need cost certainty at the schematic and detail design stages. Designers may need to run mini tenders to provide diligent project estimates and potentially a bill of materials. This level of detail will enable the client to commit to a specification with confidence and incorporate into contracts as a deliverable.

Contract governance

CE lighting design defines process as well as product. For example, it might be how to treat the existing stock in a refurbishment or the methodology of packaging and delivery. The client and their project managers will need to ensure not only the end, but also the means. How the contract is monitored and enforced is crucial, as is the articulation of the project aims at tender.

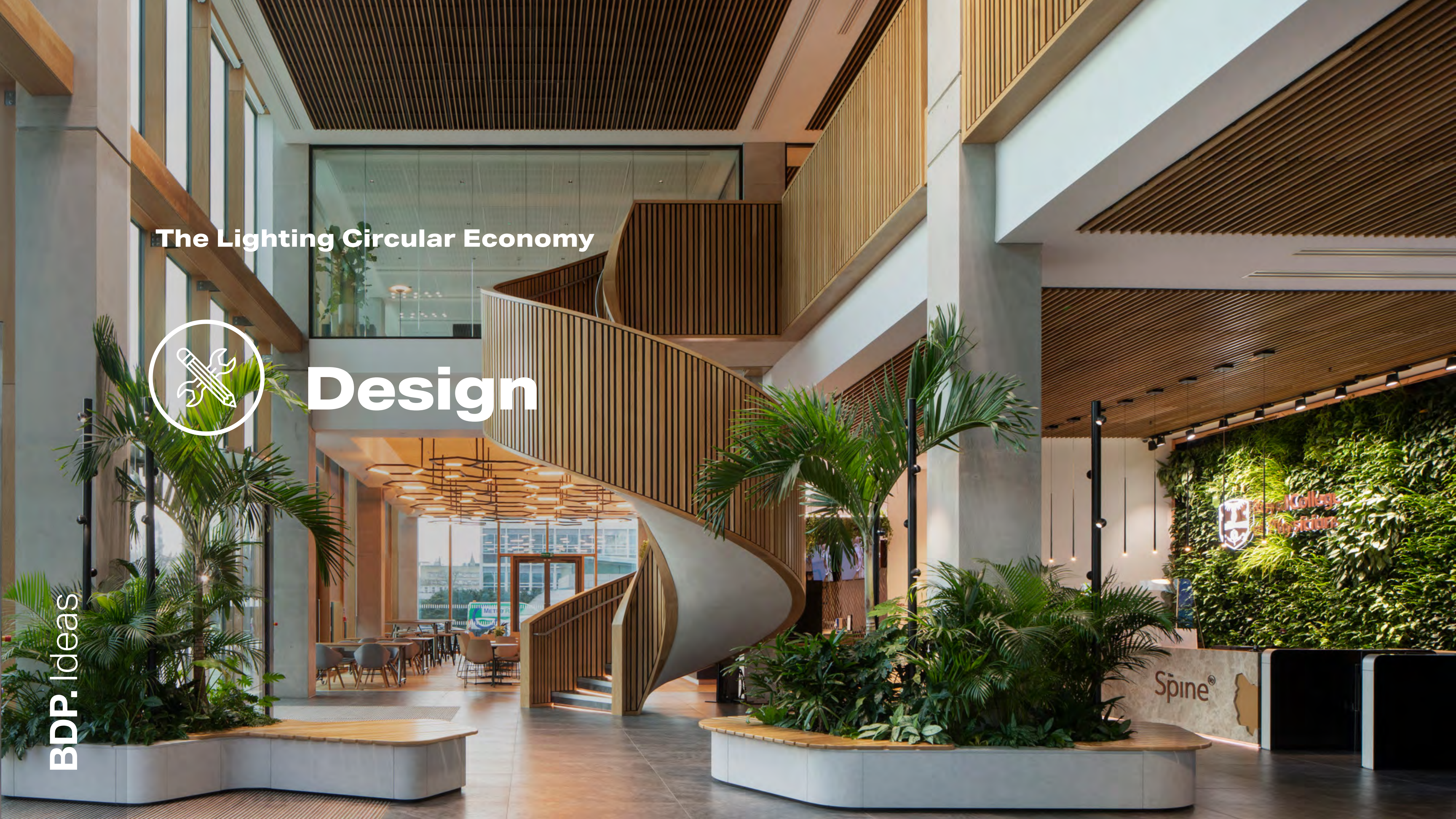


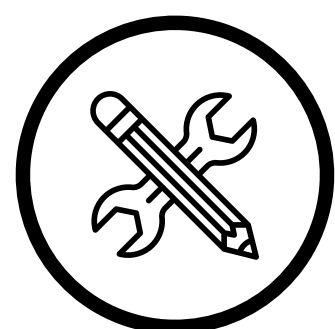
The Lighting Circular Economy



Design

BDP Ideas

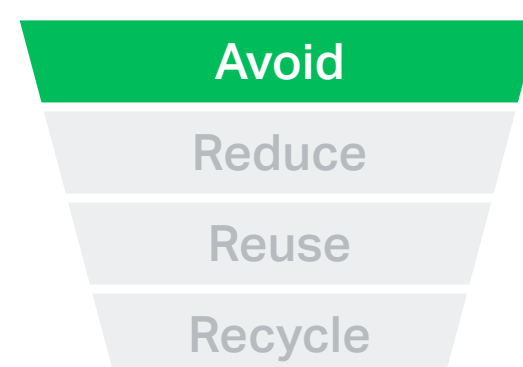


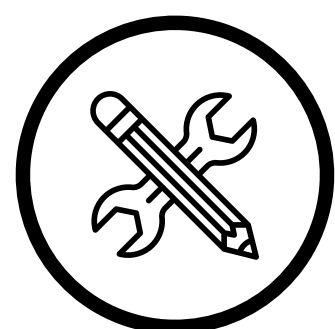


Daylight

Daylight is the ultimate prevention strategy. It is free, carbon neutral and life enhancing. Research proves that human physiology requires regular daily access to natural light so that our internal circadian timeclocks can regulate all hormonal processes.

As lighting designers we can help our clients craft the architectural brief in terms of density, massing, fenestration and internal planning. Our artificial lighting designs always respond to the daylight condition.

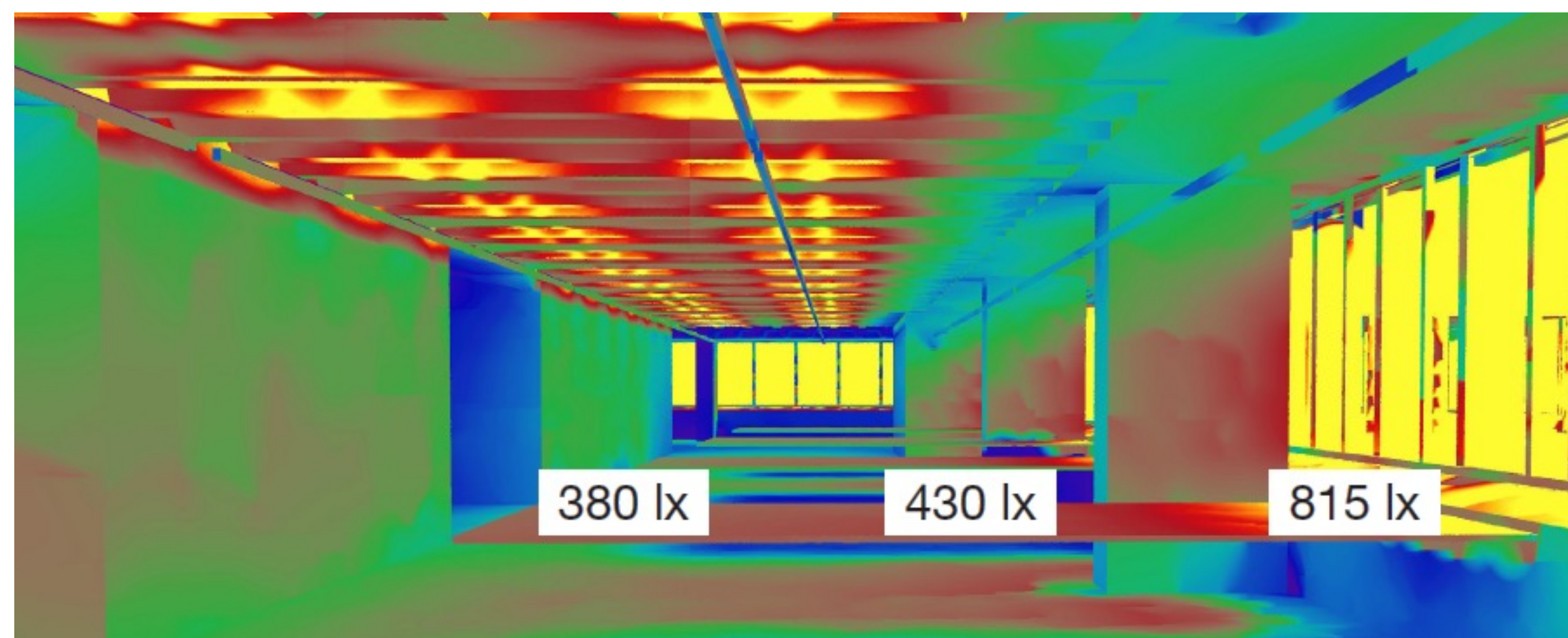
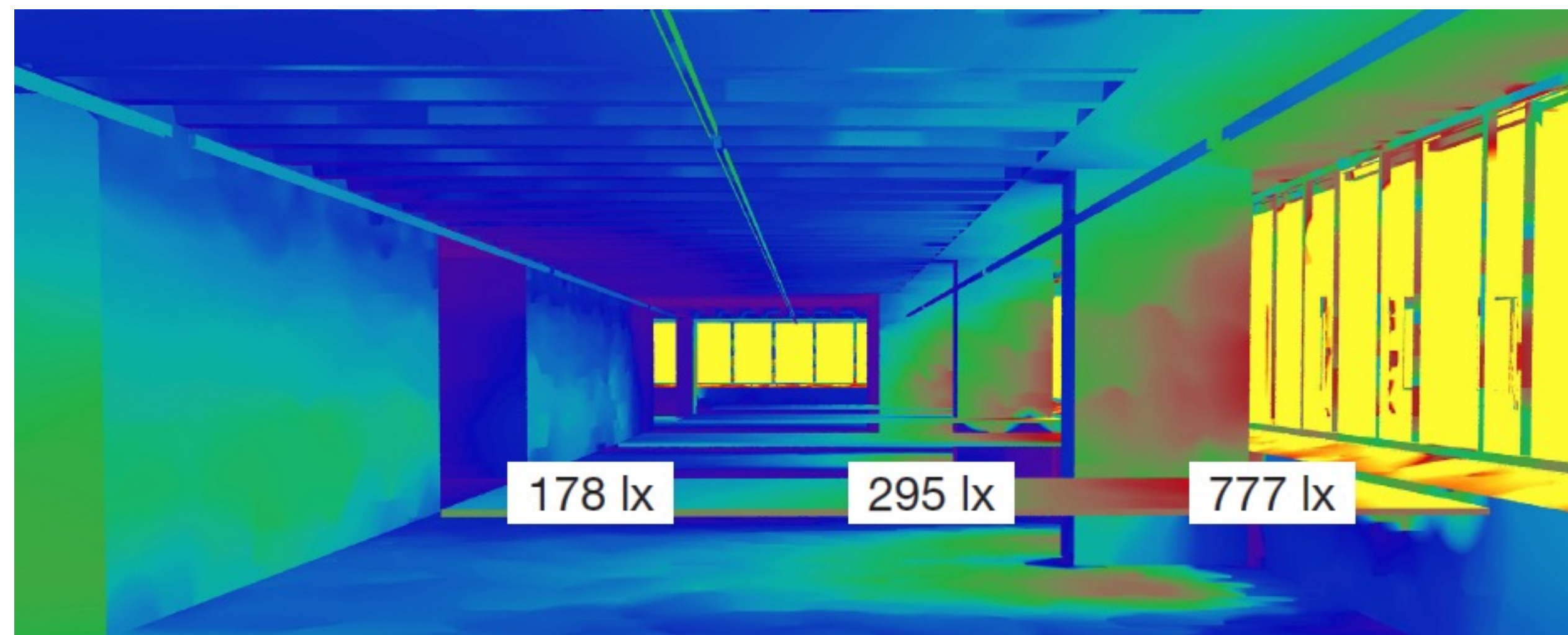
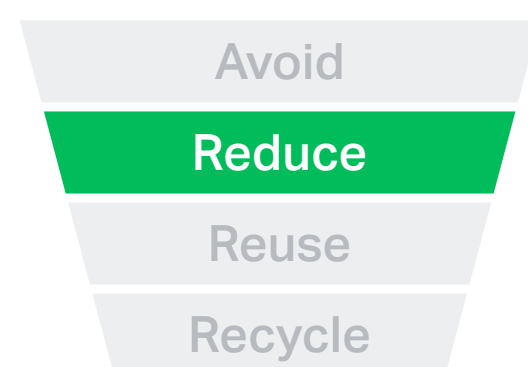


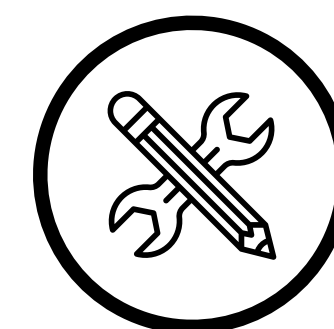
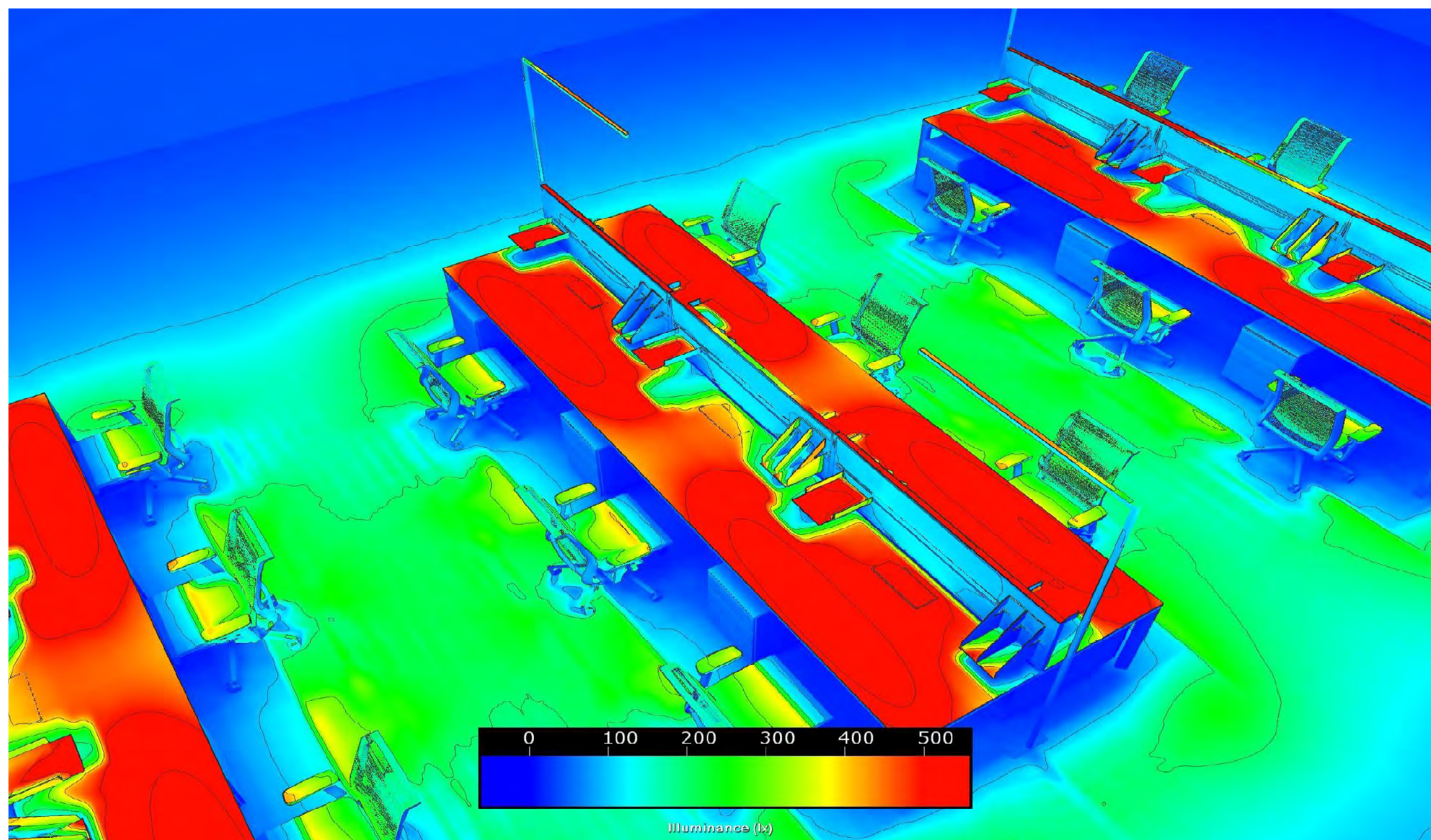


Lighting design metrics

In 2020 we worked on the refurbishment of a central London 1970s tower, with the circular economy at the heart of the brief. The site benefitted from excellent daylight, so we were able to remove 1/3 of the daytime lighting equipment which in turn reduced capital investment.

The application of new daylight metrics enabled us to combine and fully optimise artificial and natural lighting design, reducing the amount of lighting that needed to be installed.





Code intelligence

Code intelligence uses the Euro norms or British Standards – intelligently; not automatically blanket illuminating with 400 lux. It is about deciding where light is needed and where it can fall away. A task orientated lighting design philosophy will limit the amount and type of illumination required and reduce energy consumption.

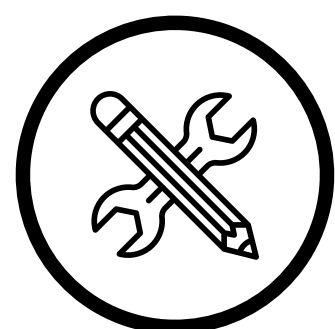
This technique reduces installed equipment, whilst delivering a high performing and flexible lighting environment. It is widely applied in Europe, and increasingly finding favour amongst our local and national government clients.

Avoid

Reduce

Reuse

Recycle

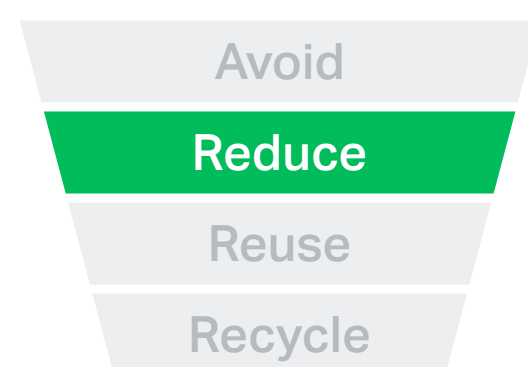


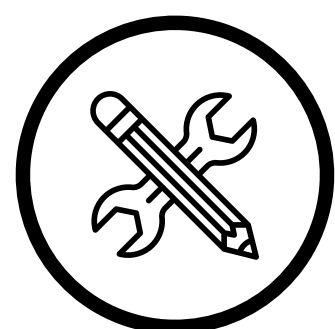
Control

The right amount of light, in the right place and at the right time.

Control is the third element of this mantra. Historically it has been harder to deliver than it should be, particularly in commissioning and operation. But the industry is changing with LED technology seeing the advent of wireless mesh solutions that deliver a more responsive, individually tailored control that consumes less and enhances user wellbeing.

Additional benefits are beginning to be realised in delivering big data to smart building platforms, helping operators optimise their buildings, providing automated geolocated inventories and occupancy information that, for example, facilitates estate efficiency.

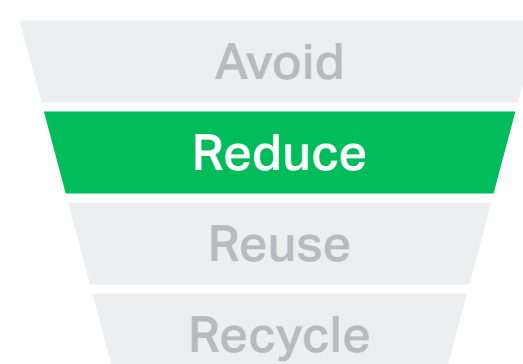


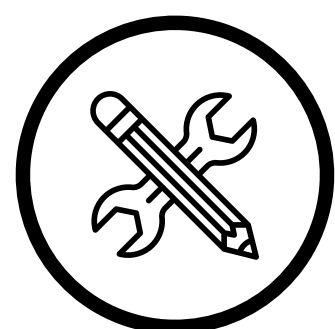


Supplier innovation

Suppliers have an important role to play in the design of sustainable light fittings. Increasingly they are using recyclable materials, providing intelligent cardboard packaging and shorter supply chains to reduce transport carbon and introducing end of life take back schemes.

Some manufacturers are taking the lead and we, as designers, need to recognise these efforts in our specifications whilst communicating the sustainable performance to our clients and design partners. In addition to aesthetics, performance and cost, we need to add sustainable performance to our product evaluations.

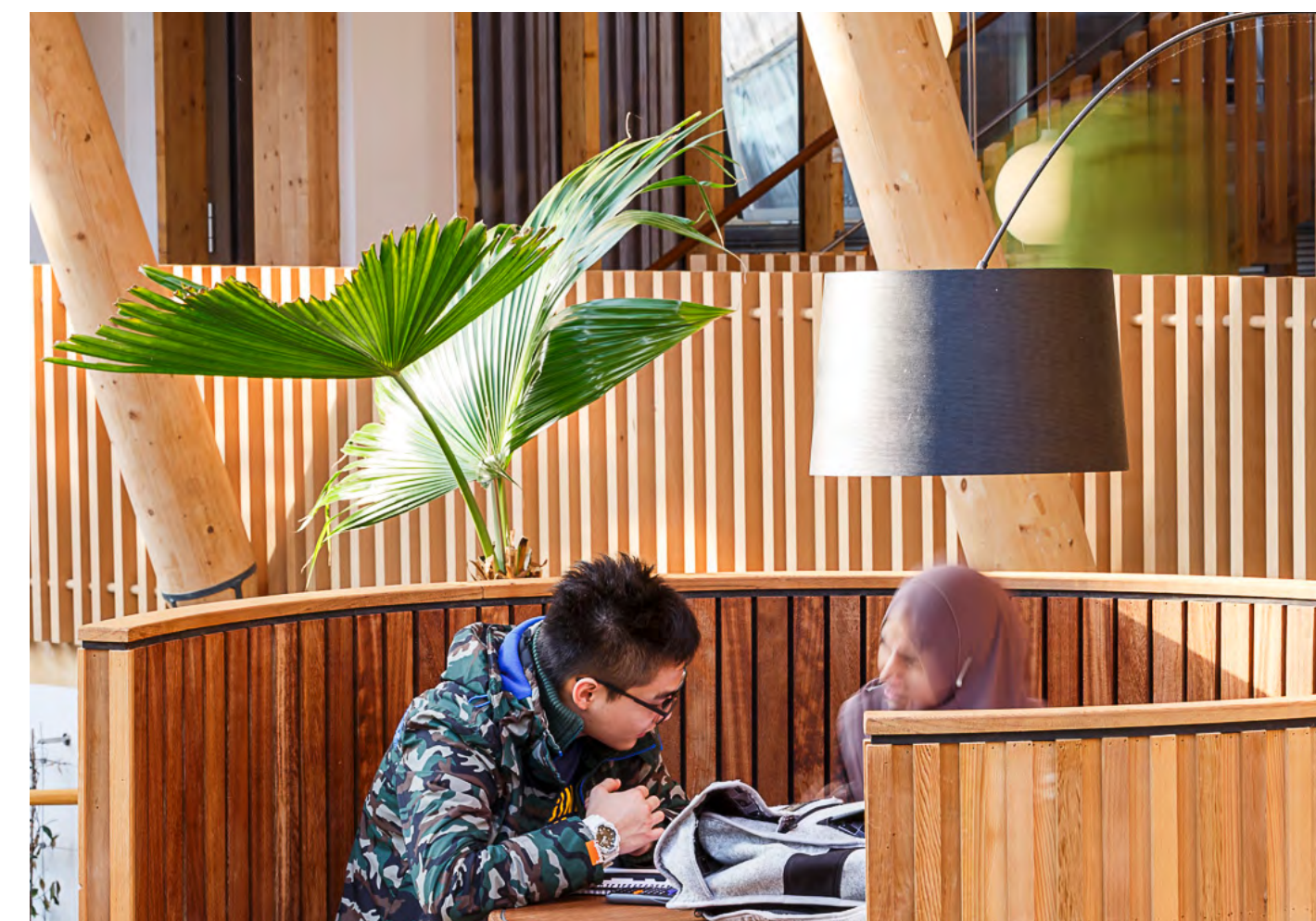
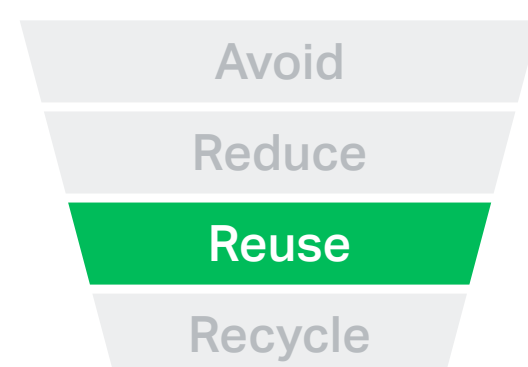


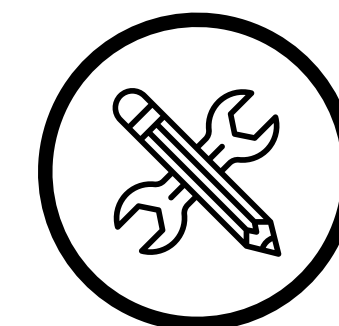


Task options

Floor and table mounted task orientated lighting systems are a great way to light a space and when the time comes, they can be packed up and taken away to another location. It is also an ultra flexible solution to space reconfiguration, avoiding the need for new equipment when operational models change.

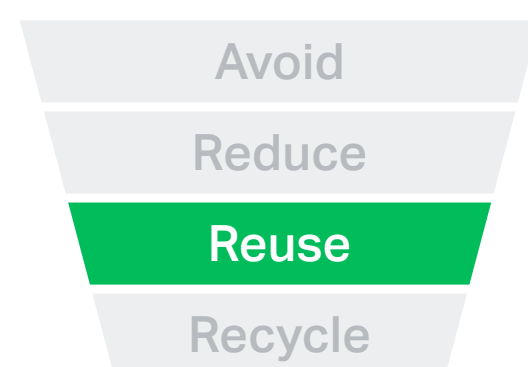
It is not the right solution for every project and needs buy in from the client, operators and our design partners, but it is gaining greater support and popularity and CE is likely to drive this trend further.

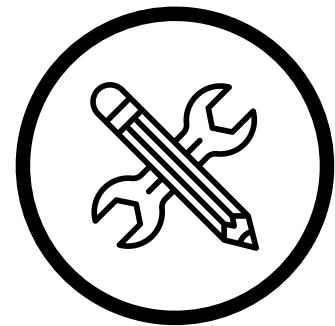




Prefabrication

Prefabricated rooms and pods which incorporate lighting are increasing in popularity. This provides clients with the flexibility to reuse those rooms and the lighting in another building in the future. This must form part of the client brief with facilities management teams contributing to the specification, in terms of maintainability and flexibility.

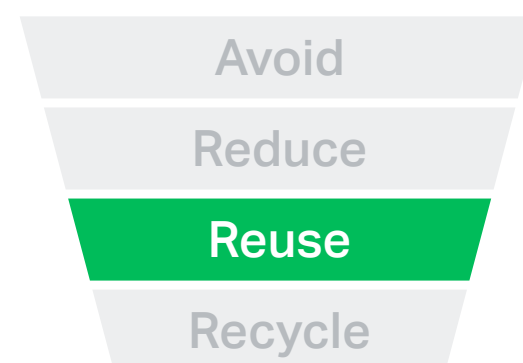




Demountable design

Demountable design desegregates lighting equipment and infrastructure from the building. When combined with wireless control systems the luminaire can be easily unplugged, boxed up and reinstalled into another project. Making the control luminaire specific and not building specific is key. Standardising this type of lighting infrastructure means the wiring and mechanical support is demountable too, making it very adaptable for use in other buildings and easily installed by facilities management teams.

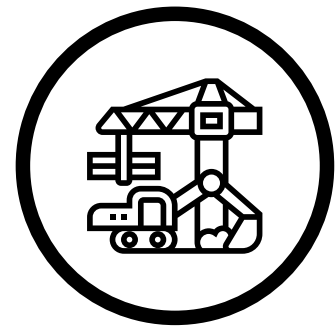
For years, we have designed light without light fittings; integrating lighting invisibly with architectural and interior designs. The drive towards sustainability is creating an exciting dialogue about lighting aesthetics.



The Lighting Circular Economy



Construction



The circular chain

Creating a sustainable design and specification has no benefit if it is not installed. Construction is a critical link in the circular chain.

Much of specification is about process rather than product. Until such time as CE benchmarking transpires, we need to recognise that many of these features are not transparent to a traditional equal or approved value engineering process; examples include packaging, length of supply chains, and manufacturer renewable energy use.

Clients need help to specify by establishing cost certainty earlier in the design process. BDP often holds mini tenders during the schematic design stage. If CE forms part of the client brief, then governance must ensure the desired processes are upheld.



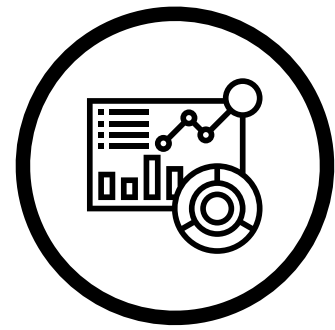


The Lighting Circular Economy



In use





Operation

Operations teams must be trained to understand the CE project and be rewarded for managing, dismantling and reusing to deliver a sustainable end. As a new building has a minimum 20 year lifecycle, this knowledge will be held by a series of employees over time, requiring a shift in institutional thinking around the use of technology.

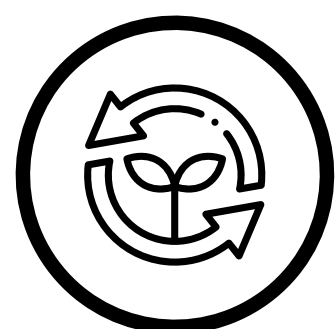
Accurate inventories of material and equipment will become increasingly necessary. The good news is that lighting systems can help. As well as identifying themselves to integrated FM platforms, they are now capable of providing realtime data to assist predictive maintenance, and provide historic trend information to inform the wider estate and new project briefs.



The Lighting Circular Economy



End of life

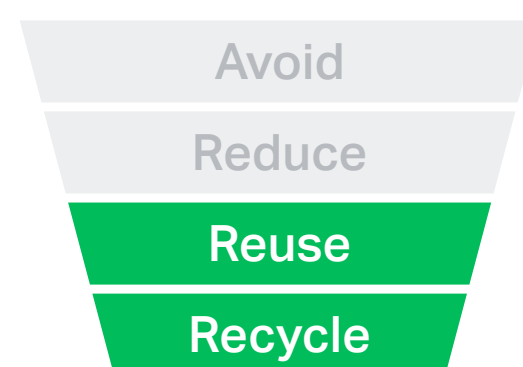


Adding value

Wireless controls mean that lighting installations can generate automatic inventories so that operators know what they have in their building. Additionally, using LEDs makes it possible for each light source to report its condition history. Together, this creates value. A user knows what they have, where it is and how much life it has left; so allowing them to reuse with confidence and/or sell it on.

A simpler, lower tech approach is to label equipment to alert users to return the luminaire to point of origin at end of life and allow the manufacture to reassemble/reuse/repurpose.

Essentially, we are talking about brokering; the creation of a second hand market. Just as with cars – if you can identify the provenance and estimate future life there is value in an object that disincentivises disposal.



A modern office kitchen area with a white brick wall. A copper countertop runs along the wall, with a black faucet. Above the counter, several wooden shelves hold various potted plants. Three large, copper-colored pendant lights hang from the ceiling. A man in a white t-shirt and blue jeans stands at the counter, looking at a screen. A blurred figure of a person in a dark shirt and pants is walking across the foreground. In the foreground, there is a white table with several circular cutouts and a blue marker. To the right, a glass partition with a black frame is visible, and a hanging terrarium is attached to it.

The Lighting Circular Economy

Our next steps

We must start now

The good news is that Lighting Europe and the Society of Light and Lighting, amongst others, are already on the case and ad hoc collaborations between designers and manufacturers are springing up. The GreenLight Alliance, which BDP co-founded, is a forum for collaboration with a short-term aim of achieving a design checklist to share widely.

Let's be curious and work together. It's not going to be easy but it's entirely possible. If the whole lighting community agrees consensus and says "Yes, this is what we should be doing" that will have a massive impact. When the materials run out, we'll have no choice!



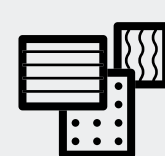
BDP Circular Economy Principles

The lighting circular economy model forms part of our wider approach to the circular economy.



Resource reuse

- Retain in high value cycles



Material selection

- Bio-based materials
- Recycled content
- Non toxic



Designing out waste

- DfMA
- Optimised design



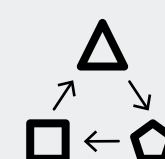
Building in layers

- Interdependent
- Whole life cycle



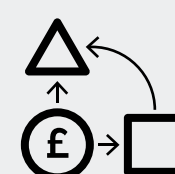
Design for disassembly

- Facilitate removal of materials without compromising future value



Design for adaptability

- Building services
- Internal space use
- Future occupancy



CE business models

- Leasing and taking back
- Sharing economy



CE enablers

- Technology
- Material passports
- Certifications

Our global practice

18

Studios

10

Countries

6

Regions

North America

Toronto

South America

Lima

UK

Birmingham

Bristol

Cardiff

Edinburgh

Glasgow

Leeds

Liverpool

London

Manchester

Sheffield

Europe

Dublin

Rotterdam

MENA

Abu Dhabi

Asia Pacific

New Delhi

Shanghai

Singapore

BDP is different. Our unique position as a collective with experts spanning the spectrum of the built environment gives us a special status and capability in the design world.

Mark Ridler
Head of Lighting
London
+44 [0]7919 167 567
mark.ridler@bdp.com

Colin Ball
Director
London
+44 [0]7595 863 510
colin.ball@bdp.com

Chris Lowe
Associate
Manchester
+44 [0]161 828 2200
chris.lowe@bdp.com

Tom Niven
Associate
London
+44 [0]20 7812 8000
tom.niven@bdp.com

BDP/lighting.com