GrowthBeam
Unlocking Success with Servitization

# Transition to a Circular economy in the Lighting industry

## Article
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# Introduction

To transition to a circular economy, the lighting industry needs fresh thinking on design, materials and business models.

As lighting professionals, we have an inherent appreciation of the value of light. The light that surrounds us influences the beauty and liveability of our homes, the productivity of our workplaces, the yield of our crops, and even our ability to transmit data or eradicate disease. As we demand more of our lights, so our industry grows. In 2030, there will be 35% more light points in the world than there were in 2006.

With this growth comes a duty of care. As the lighting industry has transformed, Signify has adapted our products, our processes, and our business models to the reality of the changing world around us. With the great shift to LED, we have slashed electricity consumption and its associated emissions. And through the accelerating uptake of connected systems and services, we help customers manage their use of energy resources that come with both a financial and an environmental price tag.

But all of these light points come with another associated cost: their reliance on resources and the generation of material waste. In 2021, humanity was using 1.7 times the resources our planet can sustain. Unless things change, we will require three earths to supply our needs by 2050.

At Signify, we aim to address this point through a strategic commitment to the growth of lighting for circularity – or lighting that works within the principles of the circular economy. A circular economy aims to decouple value creation from the use of resources by using those resources more effectively. Lighting for circularity changes the way we consume light to focus on the true end product – the light itself. Products are designed to be serviced, upgraded, reused, and refurbished so that the previous materials, energy, and labour inputs will last. For customers, the benefits are readily apparent: there is no need to invest in equipment, take

care of management and maintenance, or commit to long term innovation paths. In many cases, we are able to offer products, systems and services that save energy, too.

Signify defines products and services as circular when they are designed to preserve value and avoid waste. This includes the following categories:

1. Serviceable luminaires (incl. 3D-printing), which are upgradable, serviceable, connectable, energy efficient, reusable and recyclable.
2. Circular components, which are exchangeable and recyclable parts, such as drivers, controls, and LED boards.
3. Intelligent systems, which monitor serviceable luminaires and enable preventive maintenance.
4. Circular services, which aims to prolong lifetime and provide customers with end-of-contract options.

In 2019, those segments comprised 16% of our global business. In 2025, we aim to double it to 32%.

## How to make circular economy work?

How do we make our products, systems and services work for the circular economy, and how can others do the same? Harvard Business Review identified three strategies businesses can use to create a circular business model: retaining product ownership, product life extension, and design for recycling. The best combination of these strategies is dependent on considerations like the complexity involved in recovering materials, and the ease of recovering the product from customers. All three of these strategies are very much at play in Signify, with different weightings across our businesses, sectors and products.

### Retaining Product Ownership

Through shifting from product to service-based goods, products can live multiples lives. In our Light as a Service (LaaS) offering, Signify makes our products available through service contracts with a typical five to ten year term. This flips our commercial offering from the nuts and bolts of the products, to the end

solution. We can provide a competitive offer to customers with a zero or low upfront capital investment, take on the maintenance of the customers' lighting, manage their lighting operations, and at the same time, ensure we continue to extract value from the products – or their components – at the end of the contract or at the end of the product's life. In this way, we give products a useful life when customers' lighting needs change. And by ensuring we offer our customers an integral service including both products and services through their entire life cycle and recovering them at the end, we remove uncertainty about the future of their components.

This model is particularly appealing in industries that make intensive use of light, like manufacturing, warehouses, retail or entertainment spaces. In a recent project at ArcelorMittal's factory in Sagunto, Spain, workers had struggled with poor-quality, yellow lights that needed frequent maintenance. By switching to LED on a LaaS model, ArcelorMittal has been able to bring down energy consumption while guaranteeing a fixed lux output for the duration of the contract and ensuring that maintenance is continually carried out.

The private sector has been faster to shift to a service model, as procurement is often set up with more flexibility. However, a LaaS model is also ideal for outdoor street and road lighting, where fast maintenance and easy availability of spare parts is essential for public safety.

The growth of this service-based model gives businesses like ours extra incentive to maximise the durability and lifespan of our products, keep them well maintained, offer operations managed services, and create a cost-effective and streamlined pathway at the end of their useful life.

## Product Life Extension

To contribute to a circular economy, Signify aims to create products with a long life. LEDs are a great example of a vast improvement in longevity through a technological change. In our fast-moving field, we must ensure that all of our products are durable and serviceable, but also future-proof, offering potential to be upgraded and system connected as technology moves on.

When considering lifespan, we need to also consider serviceability, and we tackle that in part through modularity in product design. By standardising and simplifying, we allow for the easy replacement of components to give products a longer functional life.

Signify's Luma gen2 road lighting is an example of a product that is intrinsically designed for serviceability and to make use of natural resources in a much more effective and regenerative way. Every element of this multi-purpose road and urban outdoor light is designed to be easily installed, maintained and recycled to extend its useful life. First, it is made of durable materials that are easily recycled. Under the hood, all electrical components are contained within a plug and play GearFlex module to optimise and simplify maintenance and repair. Technicians can easily remove the entire module and take it to the ground for adjustments in a safe workshop environment. Maintenance instructions come built in via a Service tag QR code on every product, further enhancing the product's serviceability. And to equip it for the future, the Luma gen2 is System ready, meaning that customers who are not quite ready to switch to smart city controls and sensors can do so at a later stage via integrated universal connectors, without wasteful and expensive replacement of equipment.

## Design For Recycling

Our third strategy focuses on products and manufacturing processes that optimise recoverability of materials. In a global company operating across many product families and geographical areas, this process is complex. We therefore work with dedicated recycling partners that share our vision and goals. For example, within the EU, we participate in collective schemes for lamps and luminaires through Collection and Recycling Service Organisations (CRSOs). These CRSOs ensure sustainable financing and guarantee effective and environmentally-sound collection and recycling. In collaboration with the EU lighting industry, we've established a dedicated infrastructure for the collection and recycling of lamps. At the end of their life, lamps are either crushed or cut to extract components like mercury, fluorescent powder, metals and glass. The

processed materials can return to the lighting industry or can be repurposed for other uses — for example, glass from processed lamps can be used for glazing, industrial or cleaning use. Through this process, we are able to re-use more than 80% of the waste collected from lamps.

A second component of design for recycling is creating products, processes and techniques that facilitate use of recycled and recyclable materials. Through our use of 3D printing as a manufacturing technique, we can locally create product components to our customers' precise specifications. These products can be accurately designed to fit existing fittings, minimising further material replacement. They are lighter to ship, make use of fewer components, and eliminate the need for glue. At the end of their life, the polycarbonate can be shredded and made into a new design.

3D printing can be used in the smallest to the largest scale projects. At Colombia's El Dorado airport, 3D printing allowed us to customise to the specifications of the existing lights for seamless installation, covering close to 9,000 light points within Terminals 1 and 2. This meant we could upgrade the lighting experience for airport workers and visitors while minimising disruptive and resource-heavy installation in a busy 24/7 transit hub.

3D printing also lends itself to recycled materials; for example, the Philips LED table lamp made from 24 recycled CDs, or our MS Series Projector with at least 65% recycled polycarbonate, recovered from illuminated advertising, protective hoods from machines, carports or swimming pool covers.

A transition to a circular economy will be instrumental in managing our scarce natural resources as the world's population grows. When the lighting industry transitioned to LEDs, we showed that a shift in technology could yield a lighting solution that was not just lower in energy consumption, but superior in every way. By shifting our mindset in the way we design, consume and re-use our lights, we can address this second fundamental issue, for brighter lives and a better world.


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