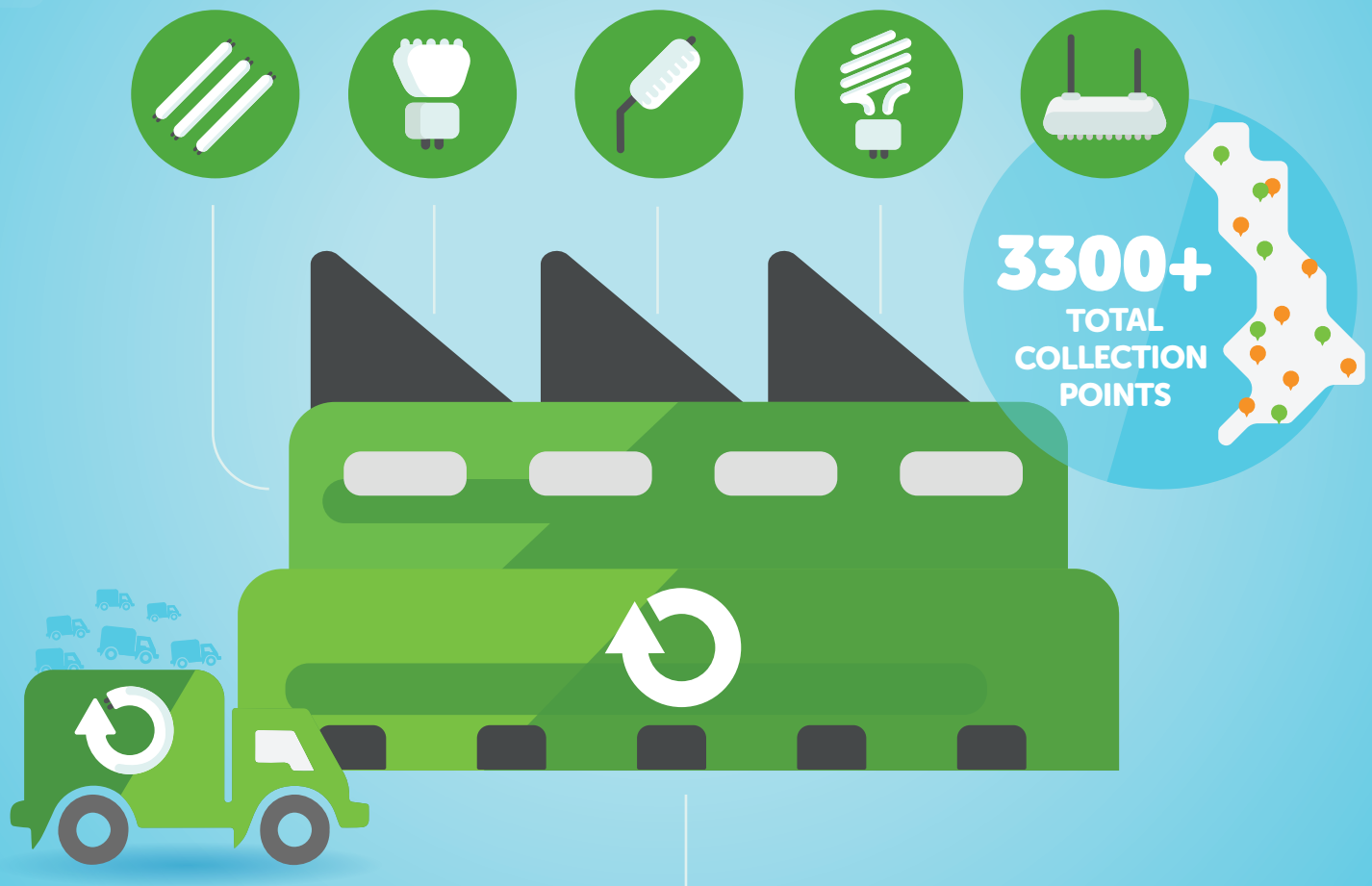
Recolight
WEEE? GOT IT.

How we recycle

The Recolight recycling process

& challenges faced with recycling LEDs



GLASS — METAL — PLASTIC — PHOSPHOR — MERCURY

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The recycling process

Working with recycling and logistic operators

- Our recycling and logistics operators are required to comply with the relevant requirements of the Regulations and Standards.
- Our purchasing and tendering process specifies the criteria with which potential Operators will have to comply. We seek Operators with the highest quality standards
- Regular, comprehensive audits are undertaken with appointed operators. We also check compliance with the requirements of the UK WEEE Regulations and any other regulations set out by relevant parties such as DEFRA or the Environment Agency.
- We finance the costs of collection and recycling both from many Local Authority Designated Collection Facilities (Household Waste Recycling Centres) and also Commercial Collection Points (organisations that have applied to join our collection network and have agreed to operate according to our standard terms which include health and safety).

Lamp recycling process

Although different lamp recyclers use different recycling technologies, the principles are all broadly similar. Waste lamps are fed into the recycling plant under negative air pressure.

The lamps are then crushed using a mechanical process, and the negative air pressure ensures that the mercury vapour released is captured in activated carbon filters and not vented to the environment.

The crushed materials then pass through a range of different systems designed to separate them from each other. The output fractions are collected in separate containers, and then sent for further recovery.

Recovery rate

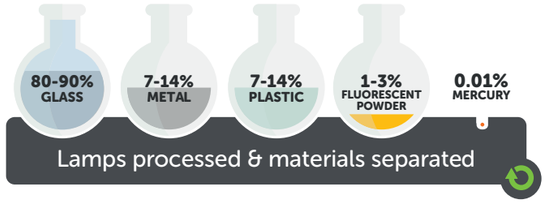
The WEEE Regulations set a target of 80% for reuse of materials recovered during lamp recycling. The recycling recovery rate achieved by Recolight appointed subcontractors exceeds 90%.

The recycling process

Recovery of fluorescent lamp material

Materials from current collections of waste fluorescent lamps are typically composed of up to:

- 85% Glass parts
- 15% Plastic and metal parts
- 3% Phosphor powder
- And less than 0.01% mercury



The materials recovered from the various processes used by recyclers and are used in many ways.

- Aggregate in road construction is the most common use of lamp waste.
- The metal and plastics are collected together and sent to specialist recyclers who separate the various plastic and metal types from each other.
- Each is then melted down and re-used as raw materials for manufacture of new plastic and metal products of almost any kind.
- There is currently however, a global concern regarding the processing of recycled plastics, following a decision by China not to accept waste plastics. Given that a large proportion of plastic products are made in China, this creates problems for the subsequent use of this fraction.
- It is technically feasible to recover the rare earths from the lamp phosphor powders, and we are undertaking further research into this through our European trade association, EucoLight.
- The mercury arises in the lamp vapour released when the lamp is broken and in the phosphor powders.

Depending on the concentration in the powders, high temperature distillation of the powder may be necessary to separate it out. When purified to the right level, it may be used as a raw material to make new lamps or in other industrial processes.

LED lamp collection

LEDs represent less than 1-2% of the lamp waste stream. They are collected with other gas discharge lamps, in part because research has shown that most users cannot distinguish waste mercury containing lamps from LED lamps, so separation for treatmeant can only be done practically by the experts at the recycling facility.

LED lamp recycling

LED lamps can be recycled with other WEEE as they do not contain mercury and are therefore more similar in nature to other WEEE than to fluorescent lamps. They should be treated as mercury bearing lamps where they are co-collected; as there is a risk they may have some mercury contamination. This is because unavoidable breakages in general containers will cause some fugitive emissions.

When a batch of waste lamps arrive at a lamp recycling plant, the LED lamps will be separated out manually, although in some cases, smaller LED lamps are fed into the plants treatment machinery along with fluorescent lamps.

Those that are separated out are usually sent to a general WEEE processing plant, where they are shredded into their smaller component parts, and then separated as far as is feasible.

Recycling luminaires with both traditional and LED sources

Most luminaires, regardless of the technology inside, are treated in the same way as most other non-hazardous small mixed WEEE. This includes luminaires based around traditional lamp technologies such as fluorescent and High Intensity Discharge (HID) lamps.

Assuming the luminaire is not suitable for refurbishment and re-use, the objective of treatment is to separate the device into its' constituent materials (plastics, metals, etc.).

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Challenges of recycling LEDs

The diversity of LEDs

The diversity and rapidly evolving nature of design and construction of LEDs presents additional challenges to their recycling. LEDs contain rare earths, but there is no value in attempting to recover these as they exist in each lamp in such minute quantities.

Retrofit LED tubes can cause a problem for some lamp recycling equipment because they often contain lots of very strong rigid materials, they don't break up in the same way as a normal glass lamp in the treatment machinery.

They can be separated and manually dismantled like many luminaires, or they can be sent to a general WEEE processing plant.

Due to of the vast range of designs of LED lamps, and the wide range of materials used in their construction, the recovery of material for LED lamps can be materially less than those for fluorescent.

Working with EucoLight to address the LED recycling challenge

Recycling LEDs presents a significant challenge. Fortunately, with LED lamps still only representing 1-2% of the lamp waste stream, this is not yet a material issue.

The long lifetime of LED lamps means it will still be many years before the proportion of LED is significant.

There is therefore still some time for the work that is already underway to bear fruit.

Recolight is a founder member of EucoLight, the European Association for lighting WEEE compliance schemes. EucoLight are currently running several projects to seek solutions for this challenge.

EucoLight brings together Europe's leading WEEE schemes specialised in the lighting sector, and so is ideally placed to tackle this.

About Recolight

Recolight takes on the producers WEEE obligations by providing a free recycling service for all WEEE lighting.

Recolight's comprehensive offering makes it the preferred WEEE scheme for the lighting industry, setting the standard for the sector. It is the only WEEE compliance scheme in the UK to provide integrated Lamp and Luminaire collection and recycling. It has the biggest UK-wide network of over 3000 collection points. As a result, since its founding in 2007, Recolight has funded the recycling of over 325 million lamps, LEDs and luminaires, more than all other UK WEEE schemes put together.

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