Global Co-operation of Philips and Lighting Industries

• The objective is to implement and optimize environmentally and financially sustainable collection & recycling service organisation’s (“CRSO”) for end of life (“EoL”) lamps, tailored to the specific country requirements.
• Philips experience of implementing CRSO’s together with the country lighting industry:
Overview Flow of EoL Lamps to be Managed by the CRSO

End Users → Collection → Storage → Logistics → Recycling → Reuse

Logistics

End Users

Collection

Storage

Logistics

Recycling

Reuse

Disposal → Landfill

End Users

Collection

Storage

Logistics

Recycling

Reuse

Disposal → Landfill
What Lamps to Collect at EoL?

• Compact fluorescent lamps (CFL):

• Other fluorescent lamps including straight tubes and round tubes:

• High intensity discharge (HID) lamps:

• Light emitting diode (LED):
Where to Collect EoL Lamps?

• Public Collection Points - hospitals, schools, post office, restaurants, shopping malls, commercial office buildings and retail outlets.
• Professional End Users - Large installers and maintenance, re-lamping, electrical distribution.
• Mobile & Curbside Collection Vehicle Service.
• Online Mail Order.
• Waste Merchant.
Large Container Collection

- Foldable, efficient for logistics.
- Adaptable to different types of EoL lamps.
- Possible to track and trace containers.
- Suitable for large installers and maintenance, relamping, electrical distribution, professional end users.
Smaller Container Collection

- Increases coverage of public collection points as space efficient to install.
- Soft-drop internal ramp system to minimise breakage.
- Provides convenient access to public and the household.
Incentivised Collection – Waste Bank Network Indonesia

One of the challenges is to improve the collection of compact fluorescent lamps from households, which typically is below the waste flow from professional end-users.
Incentivised Collection – Waste Bank Network Indonesia

Based on the price list and volume of waste received by the Waste Bank, the member receives cash equivalent deposits into the Waste Bank Book.

Once a certain amount has been accumulated the member can withdraw physical cash. All amounts are manually recorded.
Incentivised Collection – Reverse Vending

- Built-in technology recycles CFL and LED lamps containing hazardous substances.
- An automated soft-drop system designed to safely collect and lower light bulbs into a special collection container, minimizing breakage.
- An internal mercury fume extractor and mercury fume filter.
- The user automatically receives a reward incentive voucher that can be used for product discounts and sales incentives.
Joint Waste Collection

• Multi product container for small e-waste such as lamps and batteries, are space efficient and provides synergies for collection at retail sites.
Informal Salvagers

• Waste pickers collect and sometimes buy recyclables, packing them on their mode of transport including lamps.
• Selling them for profit to sorters who then ship it all off for processing.
• This form of recycling network, is a low-tech solution, but one that works.
• Engagement of the informal sector is necessary to formalise waste volumes collected and can help create employment.
Storage Guidelines

• Warehousing will need to have license to store hazardous waste.
• Contingency planning at the warehouse is necessary including training workers in the event of breakage of EoL lamps such as the use of a mercury spill control kit.
Logistic Guidelines

• As collected volumes increase specialized logistic providers will be required with dedicated fleets to handle the above special purpose containers.
• They usually require licenses to deal with hazardous waste.
• Logistically the waste collected is consolidated at take-back storage sites and transported to recycling.
• Online logistic system will be required to track and trace containers and trucks.
Why Recycle Lamps?

• It is the safest way to deal with the hazardous materials found in many lamps.
• This prevents them from entering landfill from where they leak into the environment.
• It reduces the demand for raw materials as primary processing is more energy intensive than recycling.
How to Recycle Lamps?

- One example is the MRT Compact Crush and Separation Plant from Sweden, it is self contained processing equipment for recycling most types of fluorescent lamps.
- The plant which is incorporated in a 20" container in which the air is brought to a sub-pressure, preventing mercury from being released into the environment.
- The container can be fixed or relocated or used as a mobile unit. Internal plant illustration:
What are the lamps recycled into?

• Recycling allows direct reuse in the manufacture of lighting equipment.

• The material recovery rate from recycling typically exceeds 95% an effective ‘cradle to cradle’ solution.
• There are also alternative industrial use of the recycled materials such as glass for building insulation.
Disposal – As Last Resort
Landfill – Hazardous Waste Site Only
Government Needs to Communicate Benefits of Converting to Energy Saving Lamps

A standard bulb costs $25 to run every year* (100W INCANDESCENT)

And you’ll only pay $5 a year to run this one* (20W EFFICIENT CFL)
CRSO Communicate to Build Awareness for End Users
CRSO Communicate Convenience to C&R Lamps
Financing the CRSO via Visible Fee

Greenlight CRSO

Producer → Funding the CRSO → End Users

Payment of visible fee

End Users → Collection → Storage → Logistics → Recycling → Reuse

Payment for C&R

Disposal → Landfill
Government Oversight

Regulation and monitoring → Reporting and compliance

Greenlight CRSO

Producer → Funding the CRSO

Payment of visible fee

End Users → Collection → Storage → Logistics → Recycling → Reuse → Disposal → Landfill

Payment for C&R
Differentiating Lamps to other Waste

- The collection and recycling of lamps is different to other EoL e-waste products due to their specific characteristics, which should be considered for government regulation:

  - Fragile and hazardous
  - Low weight of individual lamps with different shapes and dimension
  - High volume of lamps put on the market every year
  - No residual value at end-of-life
  - New LED technology
  - Specific collection and treatment plants
  - No distinction can be made between household and professional EoL lamps.
Conclusion – Lamps are Different

- One financially and environmentally sustainable CRSO specifically for lamps.
- Involving the whole country market lamp industry.
- Based on strongly enforced lamp specific regulation.