

PHILIPS

Best Practice Guide Collection & Recycling Lamps

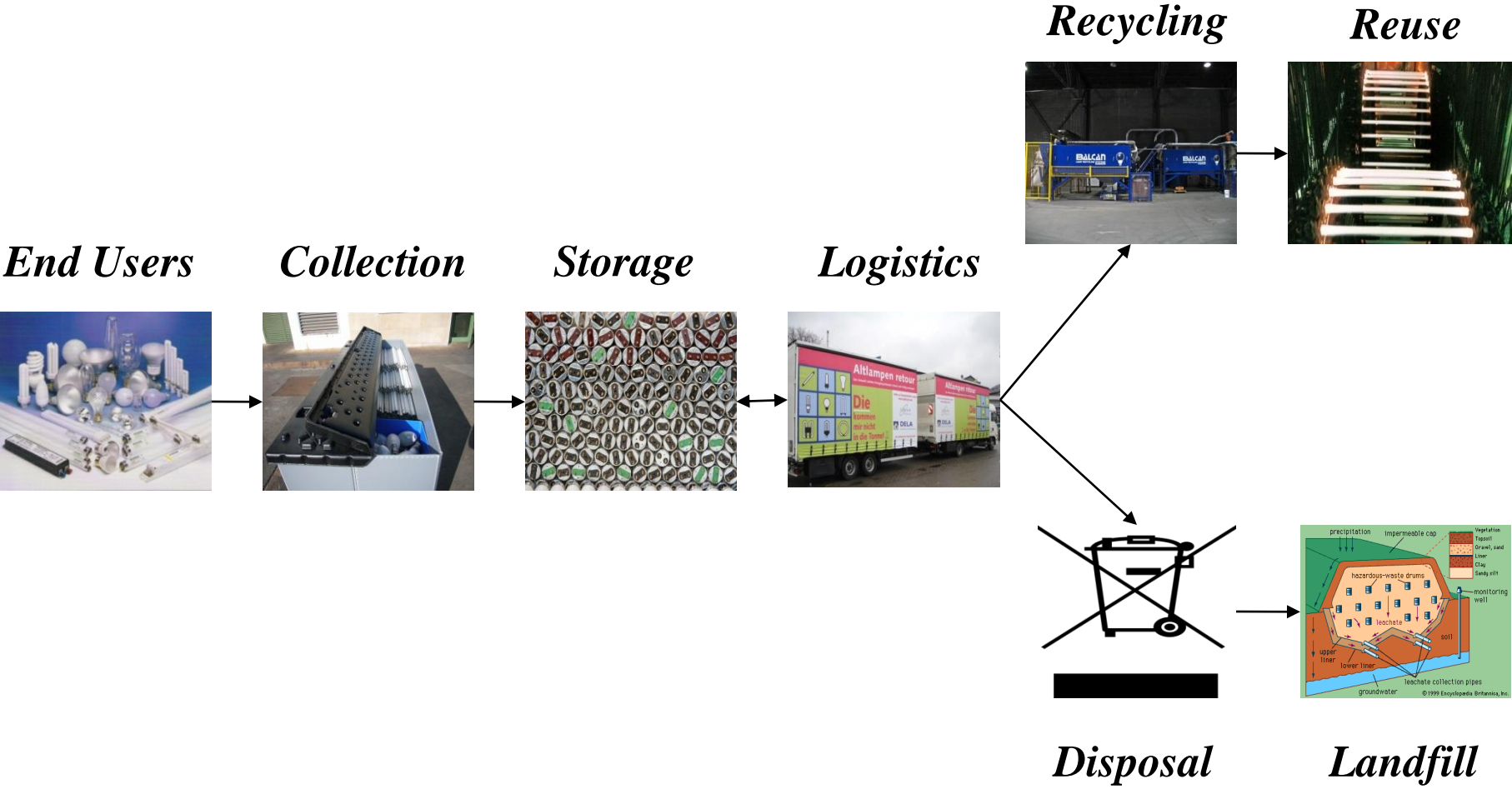
13 December 2012

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



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):



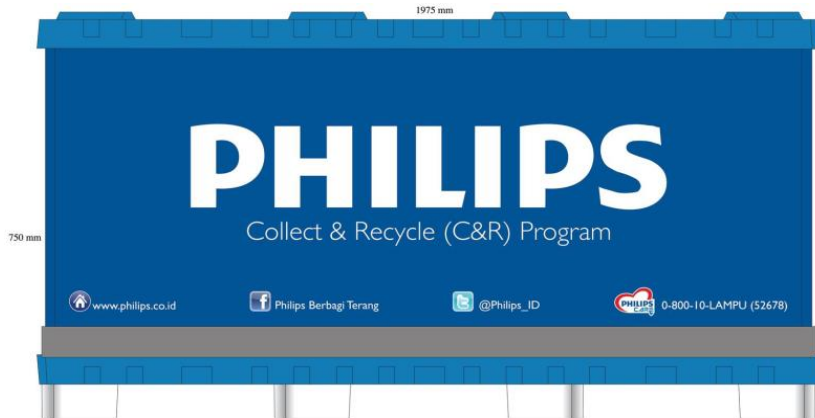
Where to Collect EoL Lamps?

- 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.

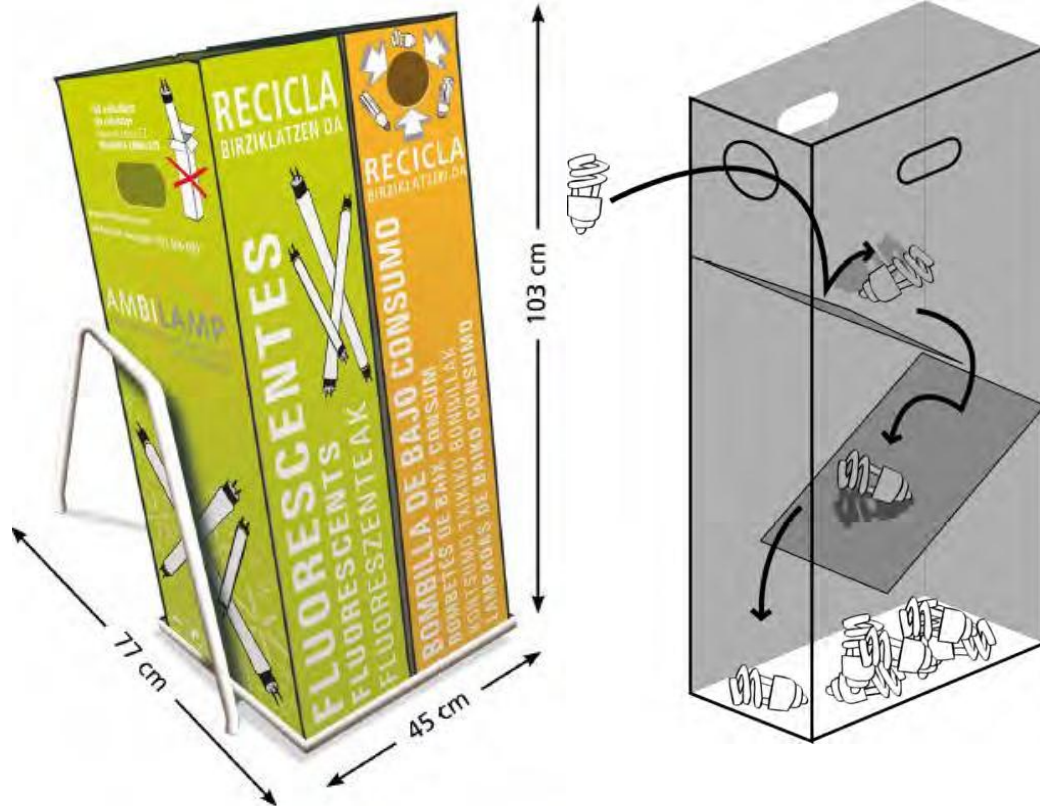
Large Container Collection



- 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.



The Waste Bank Book details official prices offered by categories of waste

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



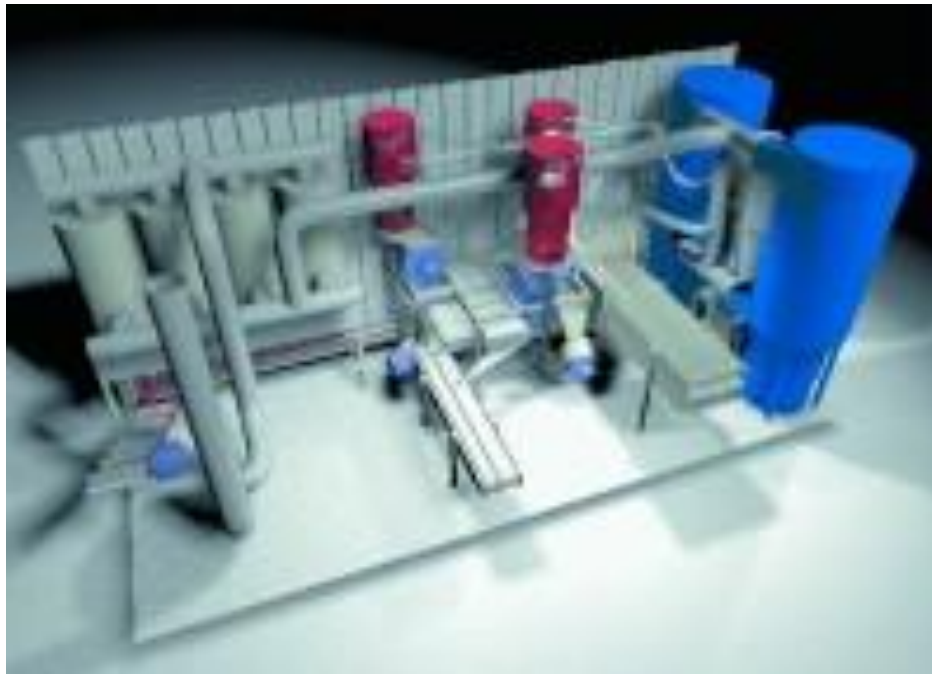
- As collected volumes increase specialized logistic providers will be required with dedicated fleets to handle the above special purpose containers.
- They usually require licenses to deal with hazardous waste.
- Logistically the waste collected is consolidated at take-back storage sites and transported 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:

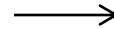


What are the lamps recycled into?

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

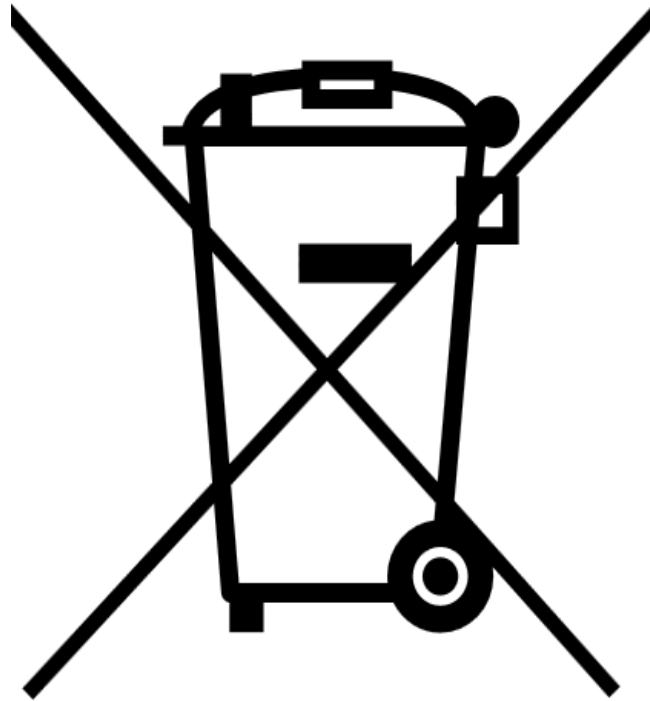


Distillation
recovers
mercury

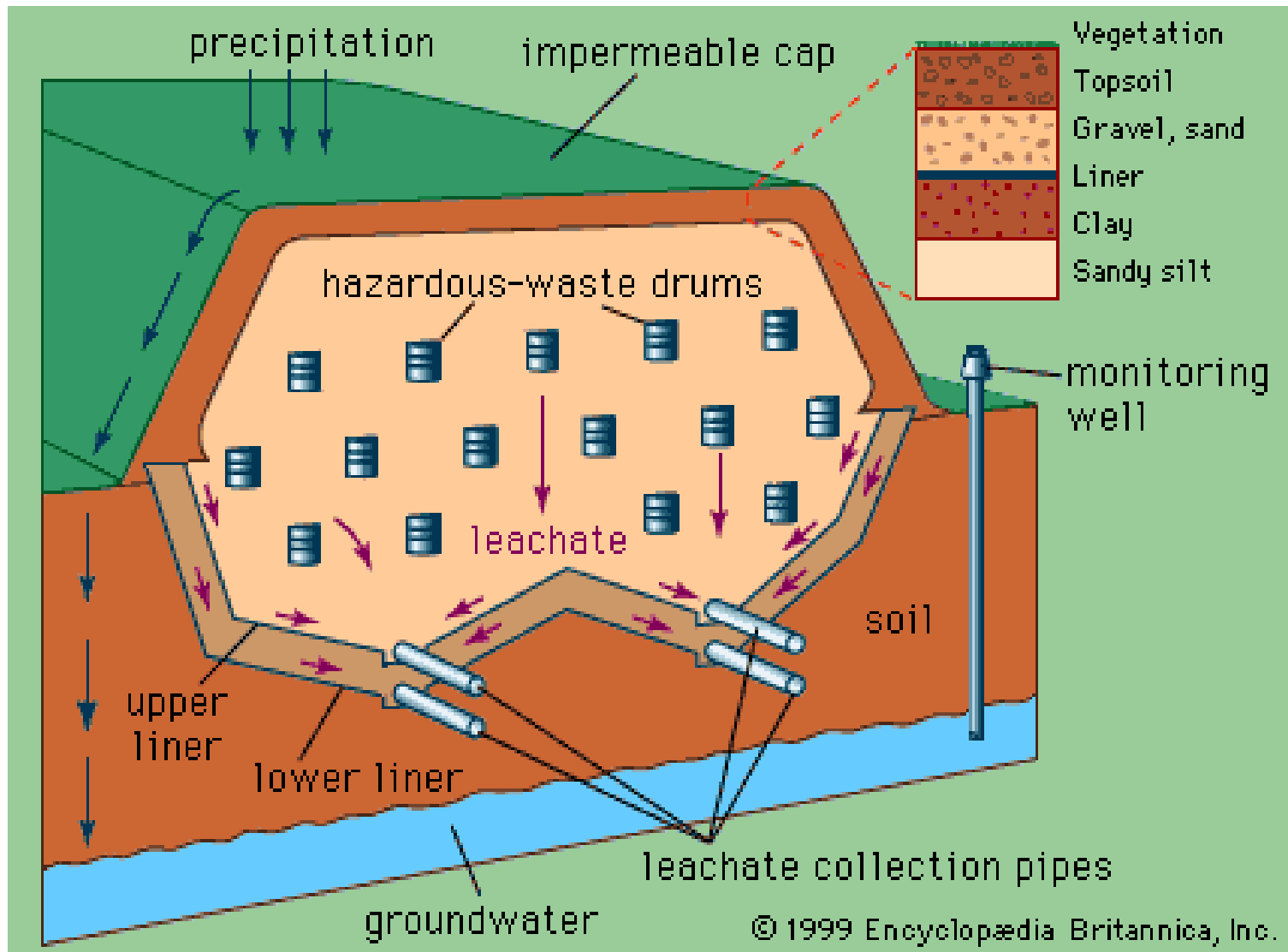


- The material recovery rate from recycling typically exceeds 95% an effective 'cradle to cradle' solution.
- There are also alternative industrial use of the recycled materials such as glass for building insulation.

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

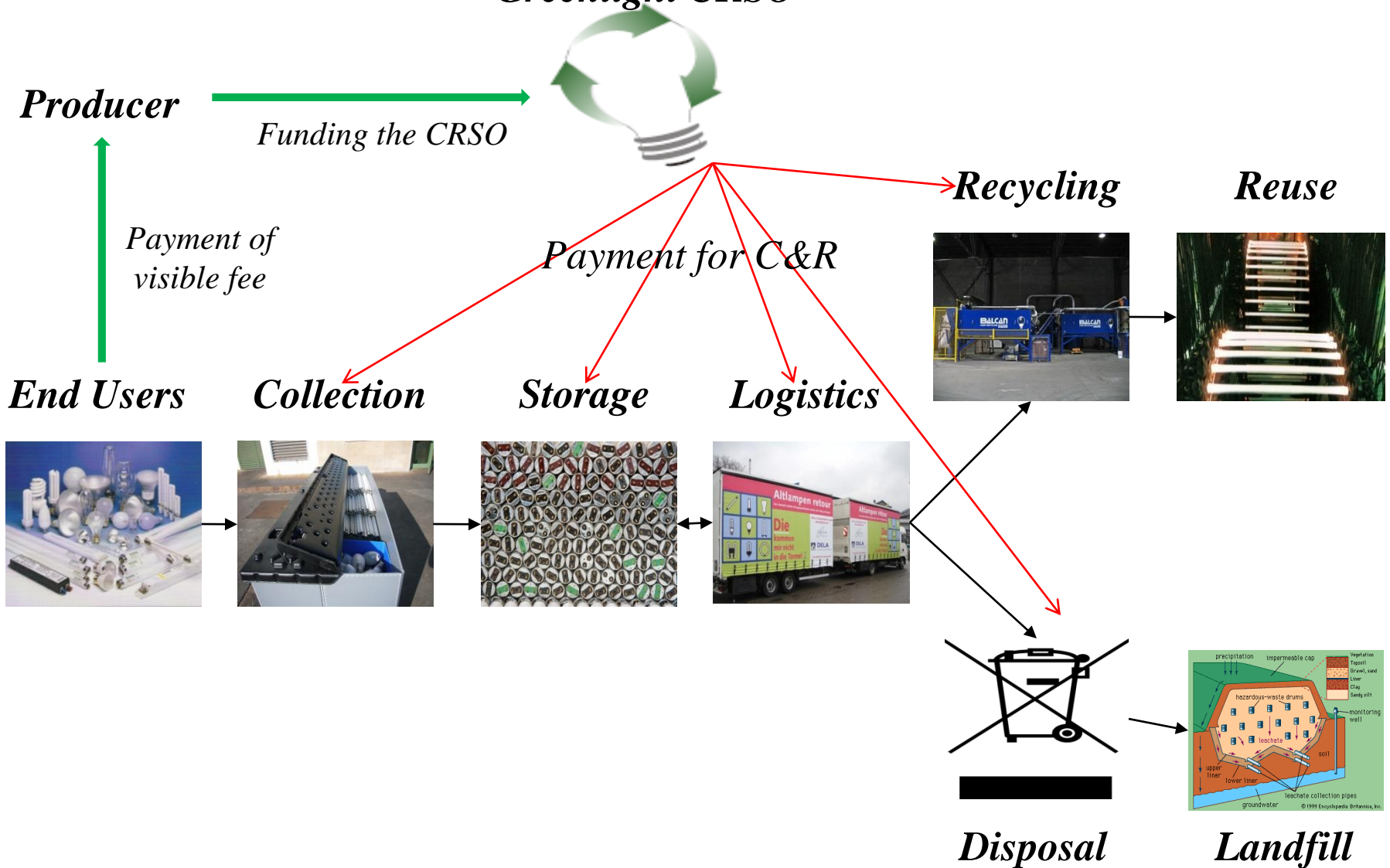


CRSO Communicate Convenience to C&R Lamps

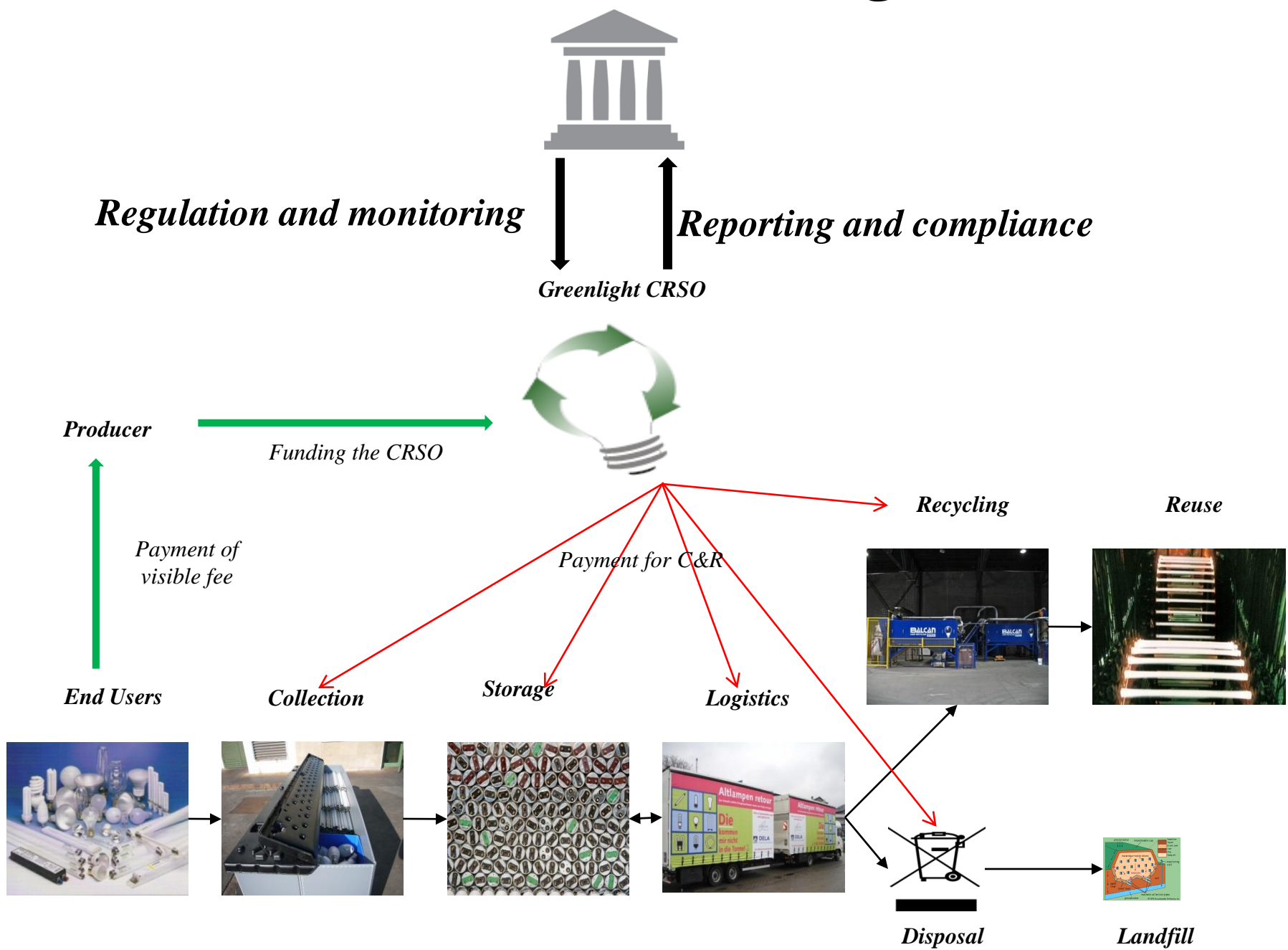
The image shows a screenshot of the AMBILAMP website. At the top left is the logo for AMBILAMP, which stands for the Asociación para la Seguridad de Lámparas. To the right of the logo are two dropdown menus: 'Seleccione provincia' and 'Seleccione localidad'. Below these is a search bar with a magnifying glass icon. The main part of the page is a map of Spain, densely populated with green circular icons that each contain a white lamp symbol, representing the locations of C&R lamps. The map includes various geographical labels such as 'España', 'Barcelona', 'Madrid', and 'Valencia'. In the top right corner of the map area, there are three tabs: 'Mapa', 'Satélite', and 'Híbrido'. On the left side of the map, there are navigation controls including a compass, a zoom-in (+) and zoom-out (-) button, and a vertical zoom slider. At the bottom left, the Google logo is visible. At the bottom right, there is a copyright notice: 'Datos de mapa ©2011 Earth Technologies, Google, Tele Atlas'. The status bar at the very bottom of the browser window shows 'Listo' on the left and 'Internet | Modo prote...' on the right.

Financing the CRSO via Visible Fee

Greenlight CRSO



Government Oversight



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.

