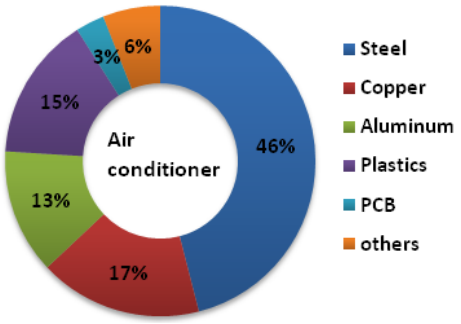
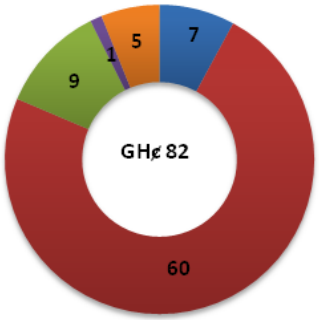
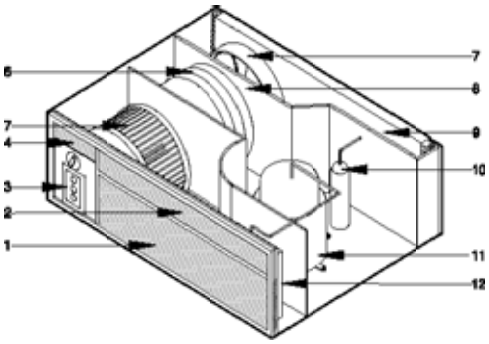
Material Composition



Scrap Value In Agbogbloshie



Air Conditioner



1 Front Grille
2 Blower
3 Control Panel
4 Adjustable Louvres
5 Blower
6 Control Panel
7 Fan
8 Partition
9 Condenser Coil
10 Expansion Valve
11 Compressor
12 Filter

Air Conditioner Overview

Common Brands:
Bryant, Carrier, Danby, Hitachi, Kenmore, LG, Samsung, Voltas

Hazardous Materials:
Chlorofluorocarbon (CFC), Polychlorinated biphenyls (PCB), polyvinyl chloride (PVC)

Key components/parts:
Capillary tube, compressor, compressor coil, evaporator coil, expansion device, fans, indoor and outdoor

Primary materials:
Aluminium (Al), copper (Cu), plastics, steel

Types:
Central air conditioning, portable air conditioner, window air conditioner,

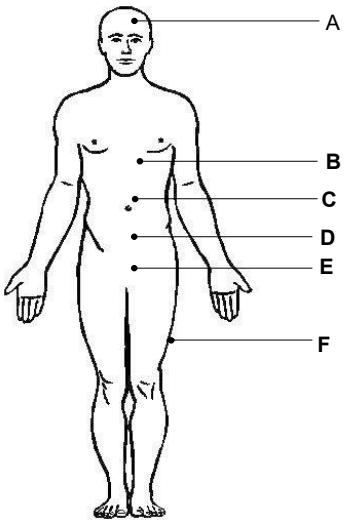
Weight composition (%):
13%Al, 17%Cu, 15% plastics, 3% PCB, 46% steel [1].

Air conditioners contain PVC, which is highly toxic, especially when combusted. The combusted particles are carcinogenic and hence cause cancer.

Urban Mining

The copper & aluminium coils of the radiator and other components are the most valuable parts of in an air conditioner. The compressor can also be sold or copper can be extracted and sold separately from the steel black box at a moderate price. There is also the casing which is made out of stainless steel. In all these cases, the extracted metals can be reused as they are or they can be sold to industries, smelted and used as raw material for other objects or equipment.

Health



A. Nervous System
B. Respiratory system
C. Immune system
D. Urinary system
E. Reproductive system
F.Skin

Hazardous Material

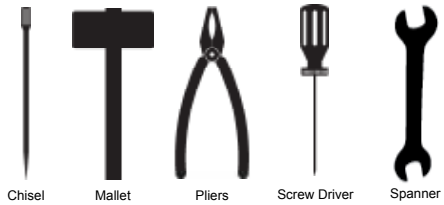
Polychlorinated biphenyl (PCB) - Liver & immune system damage, cancer, damage to the nervous system, and infertility.
Polyvinylchloride (PVC) - Headaches, dizziness, eye and throat irritation, lung and kidney irritation, liver damage and increased cancer risk.
Cadmium (Cd) - Lung, kidney, immune system damage, Diarrhoea, Infertility, DNA damage.

Safety Gear

The disassembly process exposes the worker to various levels of potential harm. There is a need for protective gear to reduce impact of these practises. Safety gear include gas masks to protect e-waste workers from dust and toxic gases and hazmat suits, which are full garments with footwear and masks, worn to protect e-waste workers from exposure to dangerous chemicals.

Tools For Disassembly

The tools required for processing are: screwdriver, hammer, pliers, wire cutter and spanner



Tools are essential to the process of disassembly and are the primary means by which industrial activities are carried out. Tools have always represented societal advancement. In Agbogbloshie, during the disassembly of air-conditioners, the most commonly used tools are the chisel, mallet and screw drivers. Spanners and pliers are used occasionally.

Tools are a potential source of injury. The risk can drastically be minimised by using the right tool for the right job. The major risk in the disassembly of air-conditioners, especially in Agbogbloshie is the handling of mallet and chisel.

Step by Step Disassembly

1. The outer shell is removed by unscrewing and removing all the fasteners.
2. Once it's done, the copper wires and condenser lines are cut off and the condenser is taken apart.
3. Then, the motor and other parts such as the blower are removed by using screwdriver, mallet and wire cutter. Separate copper and aluminium from the other scraps
4. All the copper and other contents of the compressor can be safely removed, by taking the lid off the compressor first.
5. Extract the evaporator coils, using a mallet and chisel.
4. Document all disassembled parts and components before remake.


Fan


Blower


Stainless steel air-conditioner case


Evaporator Coils


Compressor

Re-make

One can sell the undamaged parts for good value. The fan and compressor can be particularly useful and can be used for several other equipment or can be used as a replacement part for malfunctioning air conditioners. In the spirit of ecofriendly living, the fan from an old air-conditioner for example, can be used to make a standing fan, for indoor and outdoor use.

What are some of the things we can reuse old electric motors for?

An indoor standing fan, such as this can be made from old air-conditioner fans [2].

Made in Agbogbloshie

Part of an old air conditioner unit, used as seat during work by e-waste workers in Agbogbloshie.

References/Notes

1. http://eco3e.eu/products/air-conditioner/
2. http://www.instructables.com/id/Hollis-homemade-AC/
3. http://www.lenntech.com/periodic/periodic-chart.htm
4. http://www.epa.gov/ttn/atw/hlthef/vinylchl.html

***Calculation on estimated value:**

Prices of materials vary in Agbogbloshie depending on the local market. Also the state of the materials also influences the price, that's the price of burnt copper differs from that of the unburned by 1 Ghana cedis per pound. In Agbogbloshie, copper and aluminium are weighed in pounds (lbs) and iron/steel is weighed in kilograms (kg). The prices we used in this calculation are that charged as at July, 2014.

Calculation inputs:
Total weight of equipment (W): kg
Weight percent of material (W%): %
Weight of material (Wm): W% * W
Price per material = Wm * amount in GHC per kg
(1 kg = 2.204 pounds)

** These types of EEE are mostly found and dismantled in Agbogbloshie.

For more information, visit:
http://qamp.net/air-conditioners

What is an Air Conditioner

It is an electronic system which helps to control the temperature and humidity in a room. In warmer regions or seasons, the objective is cooling, whilst in colder regions or periods, the objective is warming.

How it works

An air conditioner (AC) works in a similar way as a refrigerator, releasing cooled air directly into a room. When the air conditioner is switched on, the thermostat control sends an electrical current to the compressor (see diagram). The evaporator is the cooled part of an air conditioner which receives the liquid refrigerant and evaporates it into gas. A fan blows air over the cold coils and disperses it into the room, keeping it cool.

Air Conditioners

AMP

Agbogbloshie Makerspace Platform