Reduction of Unintentionally Produced Persistent Organic Pollutants (UPOPs) emissions by improving waste management practices at landfills

Source Separation and Collection Pilot Concept – Waste oil filters

2022

BCRC CARIBBEAN
Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean

UN environment
United Nations Environment Programme

Resources & Waste Advisory Group

gef

STOCKHOLM CONVENTION

UNIDO

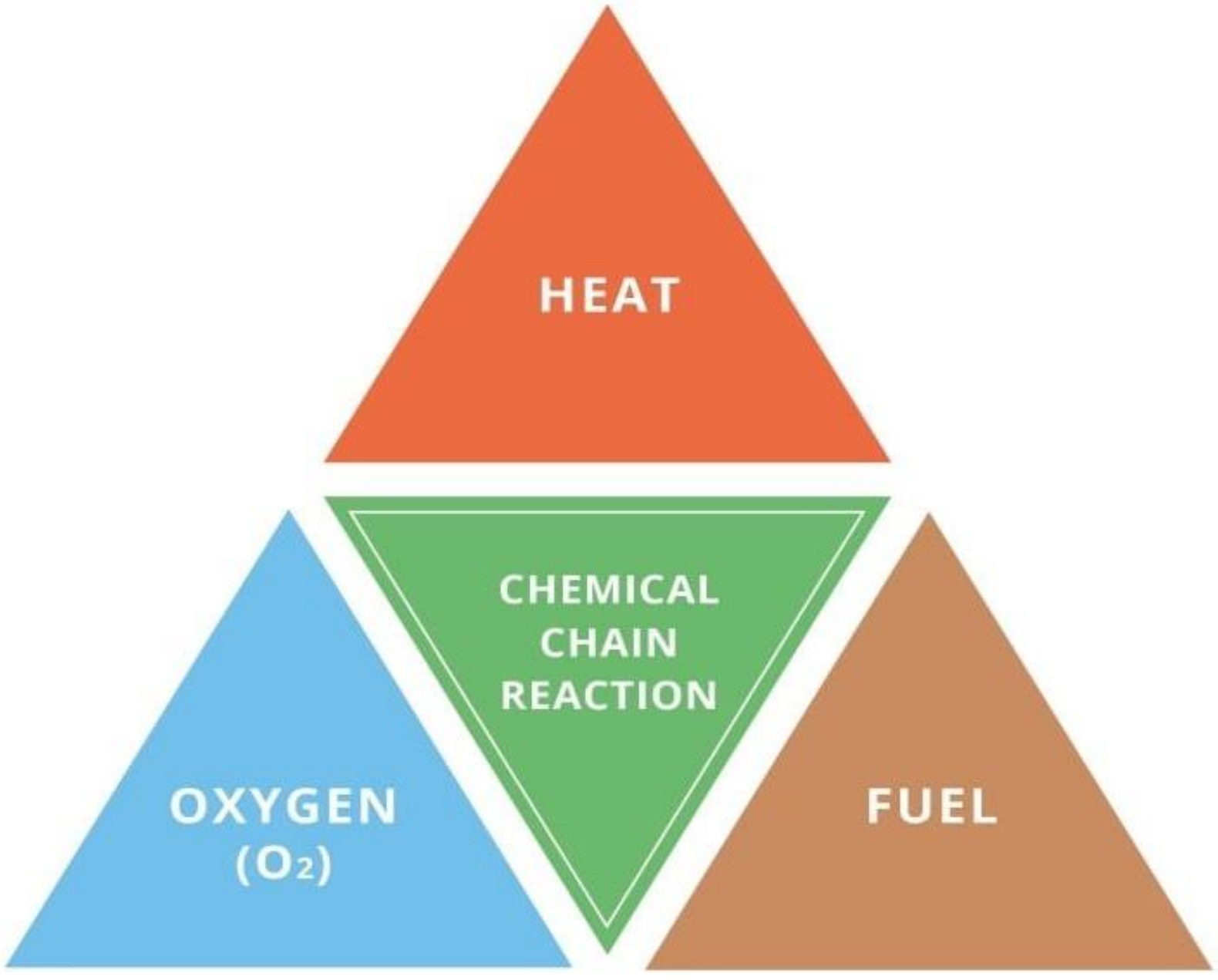
Pilot study concept

Diversion of oil filters from landfill

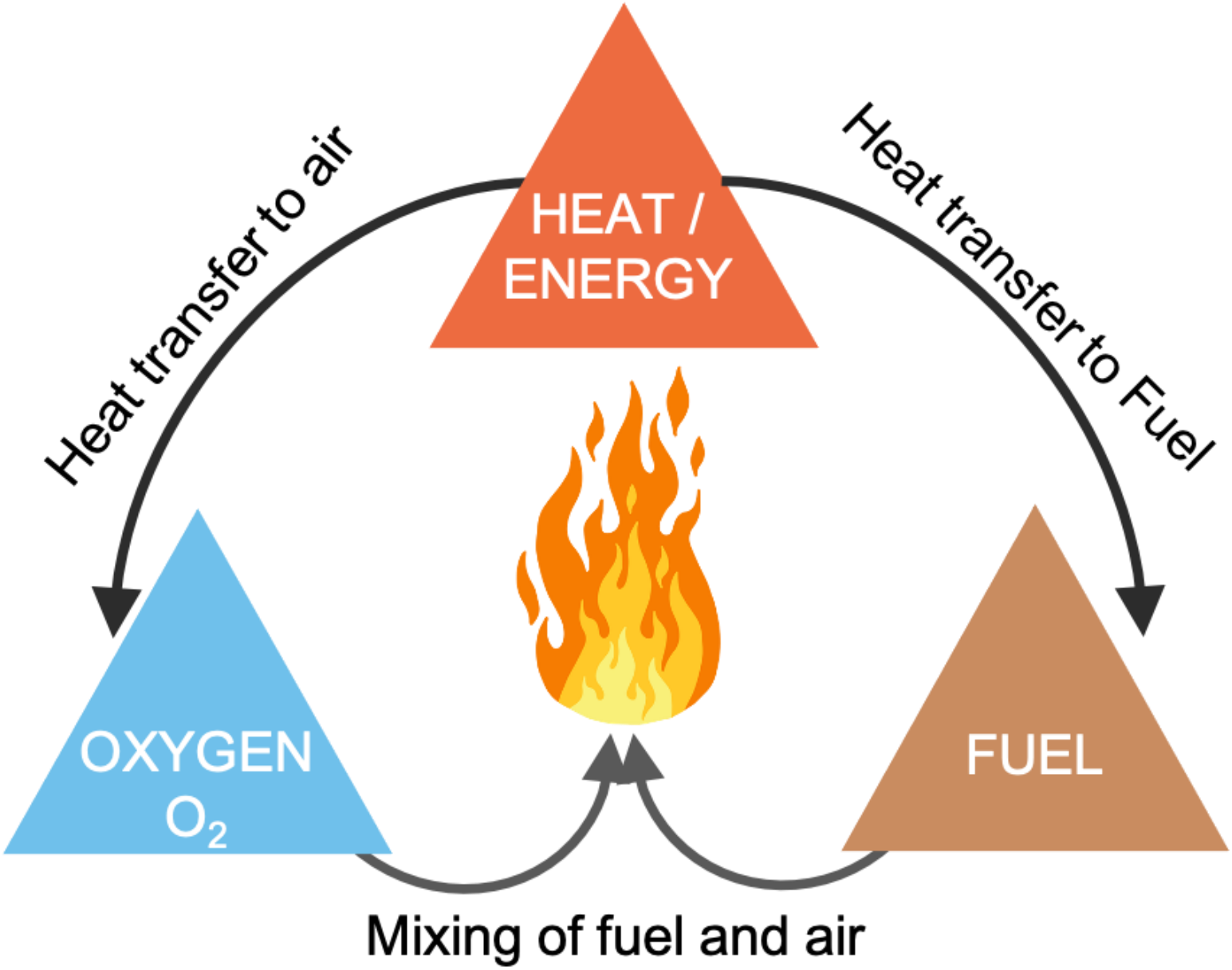
Purpose

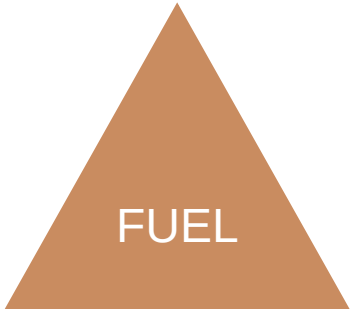
Pilot project aim: Introduce the source segregation of oil filters with oil recovery to identify if they can be diverted from landfill and thus reduce the UPOPs emissions from landfill through reducing the occurrence and sustainment of landfill fires.

Fire Triangle – The needs of a fire

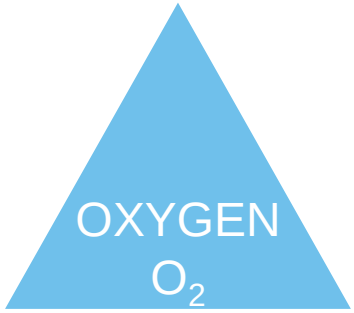


Fire Triangle – The needs of a fire

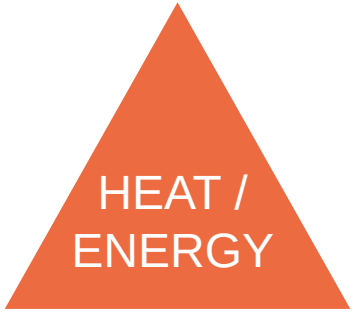




Waste oil and fuel filters contain volatile petrochemical residues which can have a low flash point, liable to fast ignition, potentially spontaneously combust or act as a propellant in waste fires. This can result in large waste fires releasing substantial UPOPs emission.

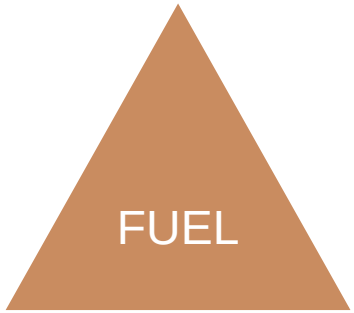


Oil filters are mixed in municipal waste prior to being processed/landfilled. The uncompacted temporary storage allows for oxygen presence, thus allowing favourable conditions for fire. Such conditions may also occur in the landfill.

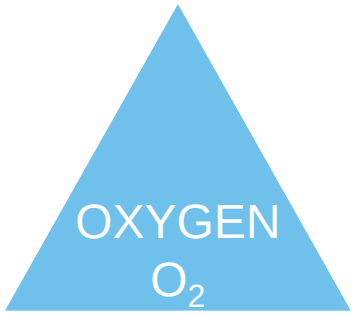


Heat generated by waste decomposition can reach 90^{o}C. Batteries, oxidising chemicals, boating flares, vehicles delivering and compacting waste, informal waste pickers, smoking are all potential sources of heat / energy (sparks) on the landfill or in waste management facilities.

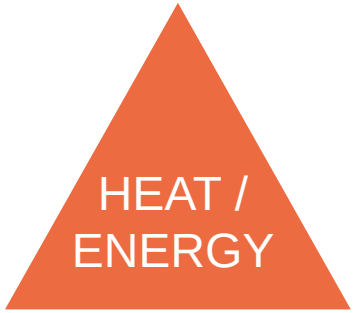
Fire Triangle – Breaking the fire cycle



Remove fuel source – Minimise waste production and divert volatile / combustible materials to alternative waste management options. Minimise organic material that degrades in landfill to produce flammable landfill gas and minimise the quantity of flammable material in the landfill.

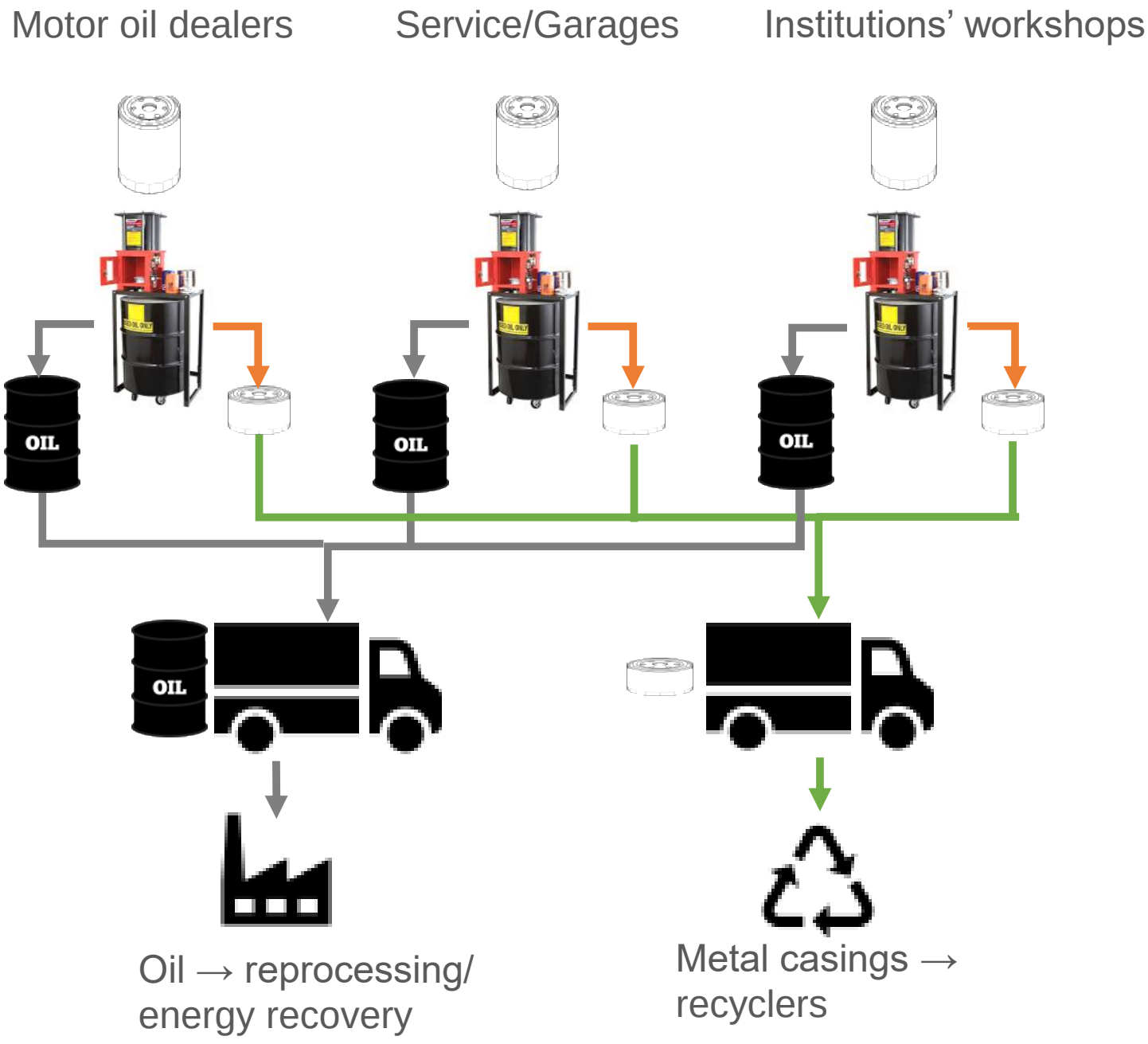


Smother air (O_2) supply – Heavily compact waste to maximise material density and minimise space for air. Remove bulky waste that prevents good compaction.
Cover waste with soil or similar inert material to prevent air getting into waste mass.



Protect waste from heat / energy – Remove oxidising materials and items that may spark (batteries, motors, etc.) from waste. Prohibit smoking and any other forms of fire (e.g. informal burning of wires). Cover waste with inert material to prevent heat from sun and sparks from machinery igniting waste.

Desired end state



Desired end state

Specific aim of pilot project

To assess the **potential and effectiveness of source separating waste oil filters** and the oil therein from the general waste stream, **assessing the practicality of recovering the metal and used oil**, and **the capabilities to utilise / market the recovered oil and metal** materials through environmentally sound management.

Desired end state

Objectives of the pilot project

1. **Assess the effectiveness of source segregated collection in diverting used oil in oil filters from landfill**, capturing used oil and metal from used oil filters, and waste generator acceptance of introducing source segregation at their workshops (including effectiveness of communications strategy and impact of service on open dumping and enforcement resourcing). This shall also assess the quantities of oil and metals accessible to potential future private / EPR filter recovery service providers.
2. **Evaluate the capacity and appropriateness of the proposed operator models** for processing used oil filters and further processing of used oil and recovered metal markets.
3. **Monitor the impact used oil filter diversion has on landfill** management **and potential fire / UPOPs mitigation**.

Equipment

Item
Oil Drum (Open and Closed head) or similar sealable containers
Oil filter drainage rack with cone
Mechanical Oil filter crusher and oil capture
Oil drum trolley
Scrap Metal baler
Collection vehicle with hydraulic lifting gate

+ Civic amenity site (drop-off center) filter collection containers, once system proves working