

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

## Waste tyre management

GEF Project ID: 5558 – Component 2 - Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean



# Management of Waste Tyres

# The problem of tyres

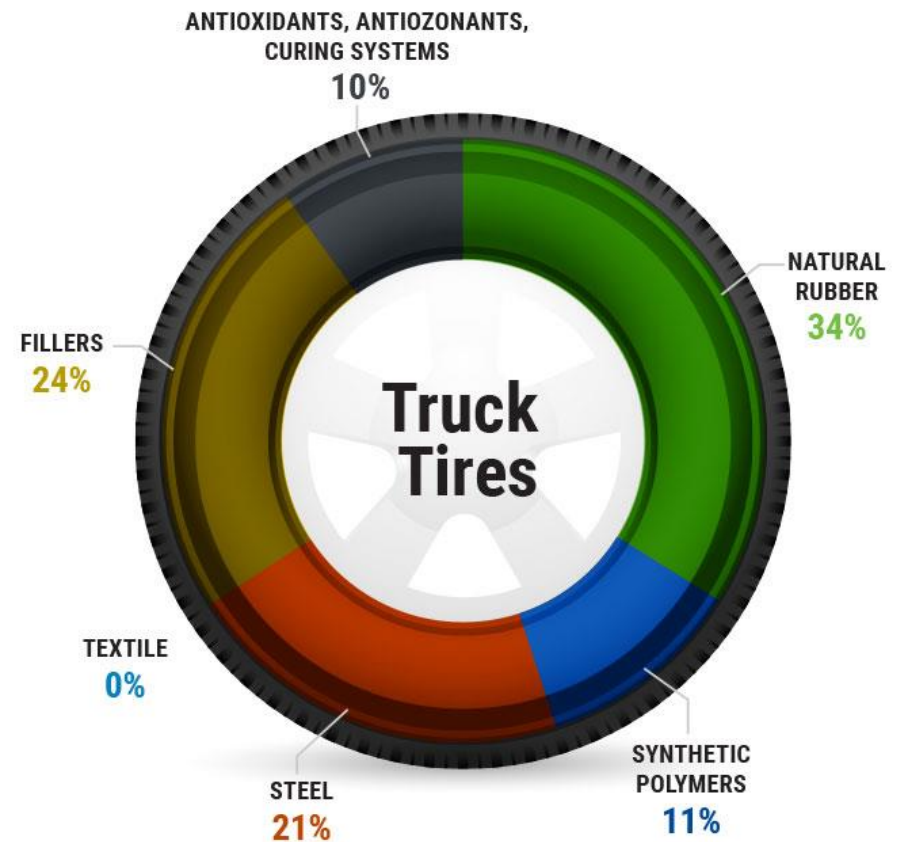
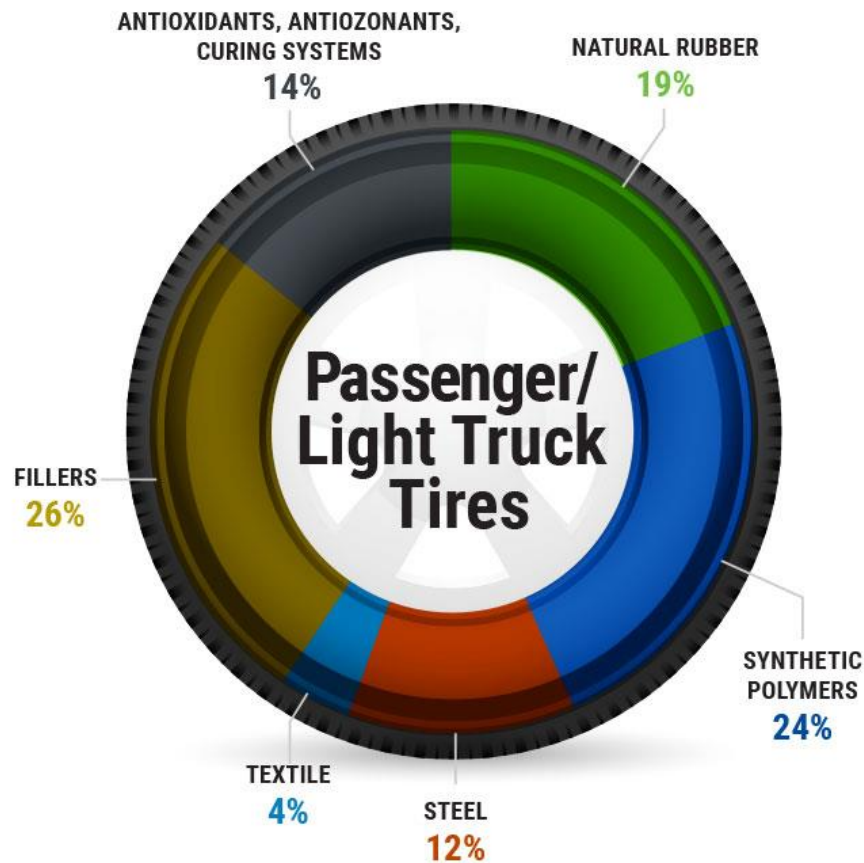
! No or very limited treatment capacity in Caribbean countries  
stockpiling



# I. Construction of a typical tyre



## II. Materials of car and truck tyres



# 2. Hazards of poor waste management

### III. Landfilling / burying tyres

Catch fire,  
pollute the  
environment and  
harm the local  
community's  
health.

Do not  
decompose.  
Their toxic  
components can  
leak into soil and  
water table.

If they are  
exposed to rain  
and wind, they  
develop as  
breeding  
ground for  
mosquitoes and  
other pests  
(infestation).

“Float” up  
through the  
waste site and  
cause explosive  
gas pockets,  
site instability,  
and presents  
additional fire  
hazards.

## I. Stockpiling / storing



waste tyres collect moisture on their surfaces

breeding ground for mosquitoes

infestation, disease



## II. Burning tyres

Waste used tyres



Tyre fire at landfill, NSWMC Saint Kitts 2019



RWA, 2020

## II. Burning tyres

Tyre fires are hard to control and stop.

The emitted UPOPs stick to other compounds like fatty acids in plants and animals, and travel thousands of miles.



*Smoke and resultant soil pollution from uncontrolled open tyre fires (RWA, 2019)*

Tyre burial is not a suitable solution, a tyres will 'float' to the surface and create instability in the waste deposit



RWA, 2020

# 3. Challenges and options for better tyre waste management

# Tyre shredding

① - Primary/Chipping Shredder



Short/  
Long  
rubber  
strips

② - Steel Liberator



Mulch, TDF,  
pyrolysis  
feedstock

Coarse wire-  
free rubber



Coarsely-  
sized rubber



Nylon fiber

④ - Screening and milling

Rubber powder of variable sizes

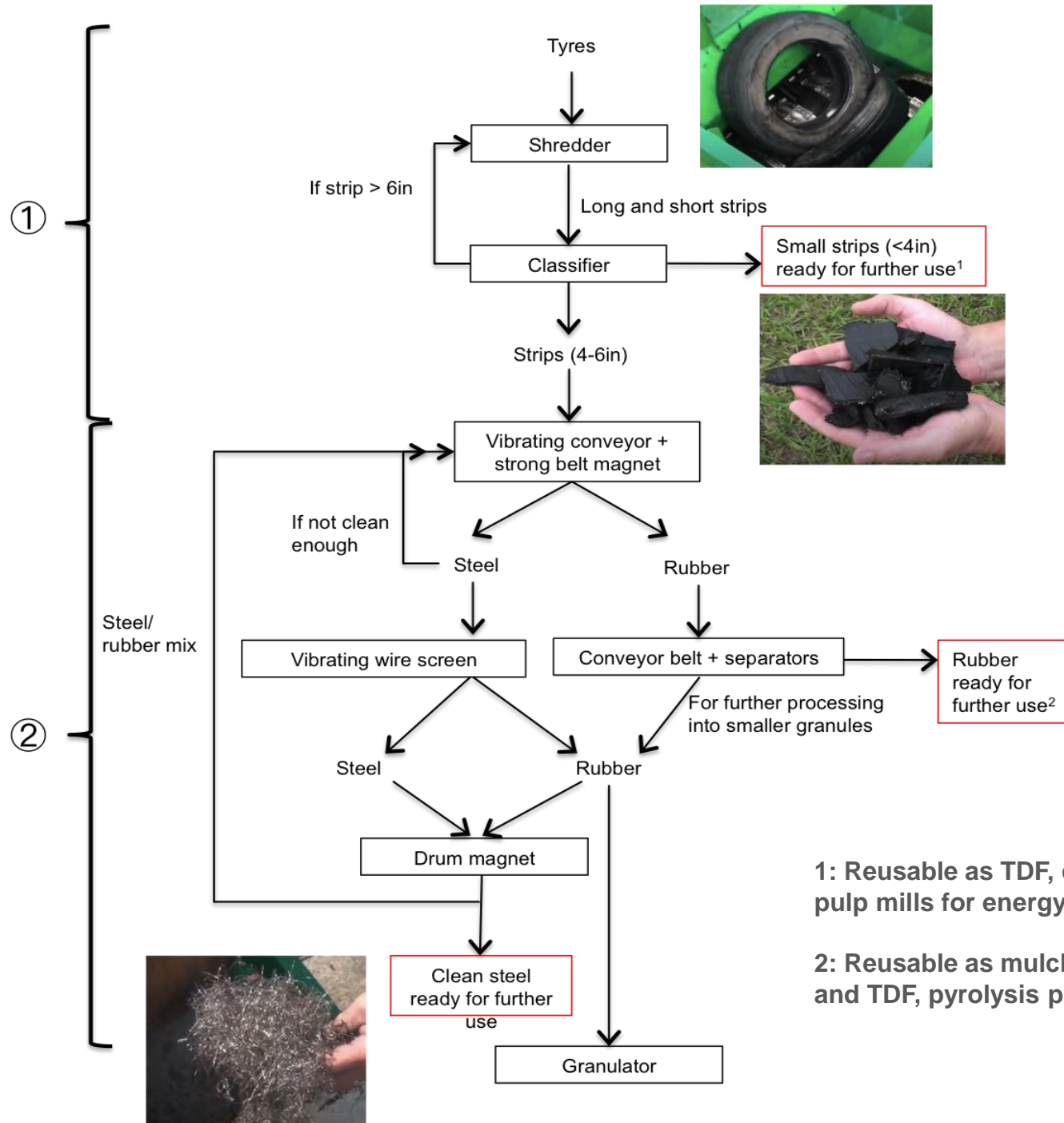
③ - Granulator and Fiber  
removal

Output

Material  
flow

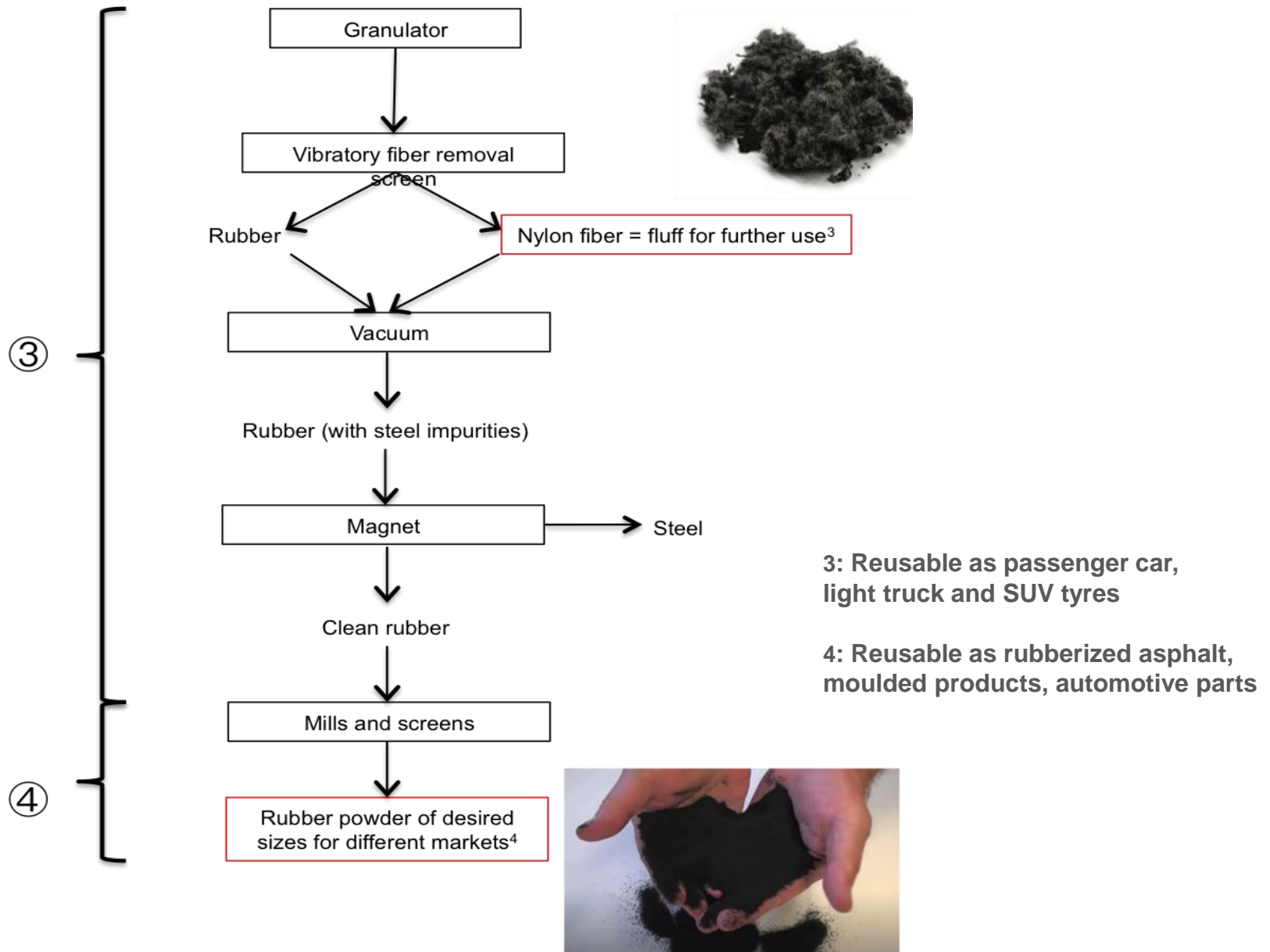
*The four stage of a Tyre Recycling System and some outputs*

*(images by CM Shredders USA, explanations by RWA, 2021)*



1: Reusable as TDF, cement kilns, paper pulp mills for energy generating facilities

2: Reusable as mulch, playground cover, and TDF, pyrolysis processes





**CM Shredder** + initial parts +  
Instructions on operations +  
Shipment  
cost min. 490,000 USD  
(x2 if add plus aparators)

**Local artisan** building  
construction + shredder  
platform + its installation  
cost 150,000 to 400,000  
USD

**TANA Shark 440 Mobile  
industrial shredder**  
cost > 800,000 USD +  
shipment



1 <https://weibold.com>  
2 <https://tana.fi/stories/tana-shredding-variety-of-materials/>



# 5. Alternative use

## Alternative re-use for car tyres: road construction

**“Mechanical Concrete™”** is built with cylindrical tension bands created from used auto tyres from which both sidewalls have been removed.

These tyre-derived cylinders are placed side-by-side on the ground covering the footprint of a road’s foundation and nailed/stapled together into a grid. When appropriately sized stone aggregate is poured into the cylinders, the stones tightly lock together and behave as a solid, immovable mass.

This construction method uses less stone, requires no compaction or curing, and is instantly ready to support construction loads.

1 <http://www.mechanicalconcrete.com/green-road-construction-invention-deployed-in-five-states/>

# Cutting out side walls (reciprocating saw)

Note – Health and Safety factors are absent in this video – safety gear must be used.



# Side wall free tyres



# Development of road

Level surface, lay geotextile, layout tyres, connect tyres with nail or screw, fill with gravel



## Alternative re-use for car tyres: road construction



See video in separate resource provided, or at link:  
<https://www.youtube.com/watch?v=nboVqwDTF4U>