



KwaZulu-Natal Recycling Forum Seminar



16th September 2016

Zero Waste???

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History & Background

- Established in July 2009 as a Section 21 company incorporated Not for Gain
- Aim: to identify **waste beneficiation** opportunities that will increase waste diversion from landfill whilst creating opportunities for Green Economic Growth in eThekweni and maximising job-creation opportunities.
- eThekweni funding to establish cluster of R4.5M over 3 years at R1.5M per year for 2010-2012 financial years and R2.0M per year for 2013-2015

2014-2015 Highlights

Diverting Waste

- The many projects and initiatives USE-IT have created or supported to end June 2015 resulted in the recycling of **10,256 tons** of plastic, paper, glass, cans and metal, green waste, e-waste and rubber.
- This has created a **diversion of 30,619m³ of airspace diverted from landfill*** equivalent to a **savings to landfill of R9,185,700** this year at a cost estimate of R300/m³ (DSW).
- For **every Rand of funding** received we **saved R4.59 in landfill diversion** illustrating that this is a cost-negative project for the city regardless of the job-creation, environmental, economic and social benefits created by USE-IT's initiatives.



2014-2015 Highlights

Creating Jobs

- USE-IT has created **51 direct jobs and 43 indirect jobs** in the 2014-2015 financial year
- Adding to the previous track record, this brings the total tally of jobs facilitated by USE-IT to **2329 jobs** to June 2015 since our July 2009 inception.
- This equates to just less than **R25,000 per direct job facilitated with 4.5 additional indirect jobs created for every direct job** from eThekweni funds - or considering total leveraged funds over 6 years , R295,000 per direct job plus 4.5 indirect jobs overall R53,500 per job.



2014-2015 Highlights

Leveraging Funds

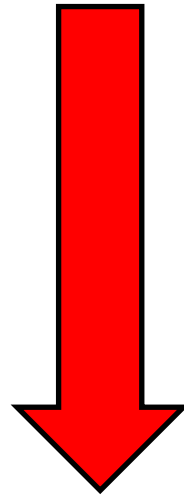
- In addition, to date for every Rand of funding from eThekweni Municipality we have **leveraged R3.92** in additional **public** sector funding internally and **R6.95 in private** sector funding externally for project development giving USE-IT a **gearing ratio of almost 11 to one** on funding. Added to the landfill diversion this gives a **1546% return** on investment proving that recycling and waste beneficiation are the best investment a municipality can make.



Growing Green Economies....

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Is it Possible???



No!

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From Landfill

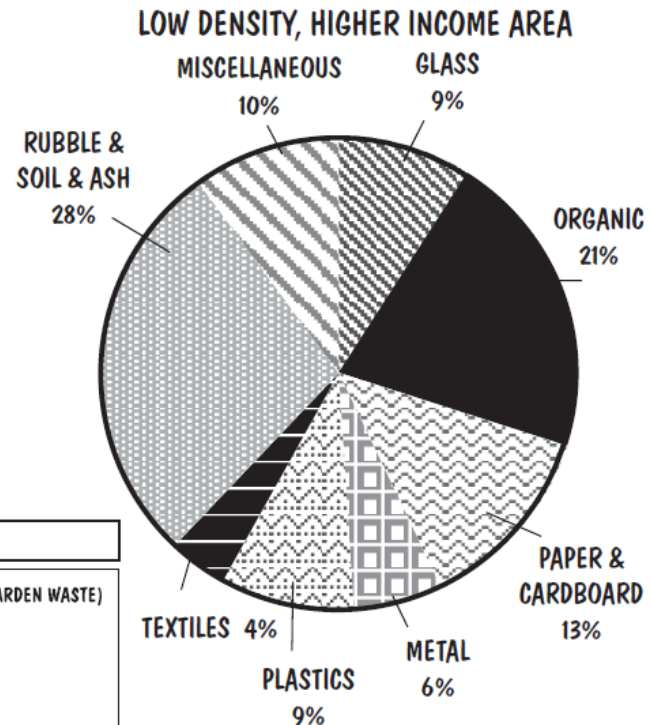
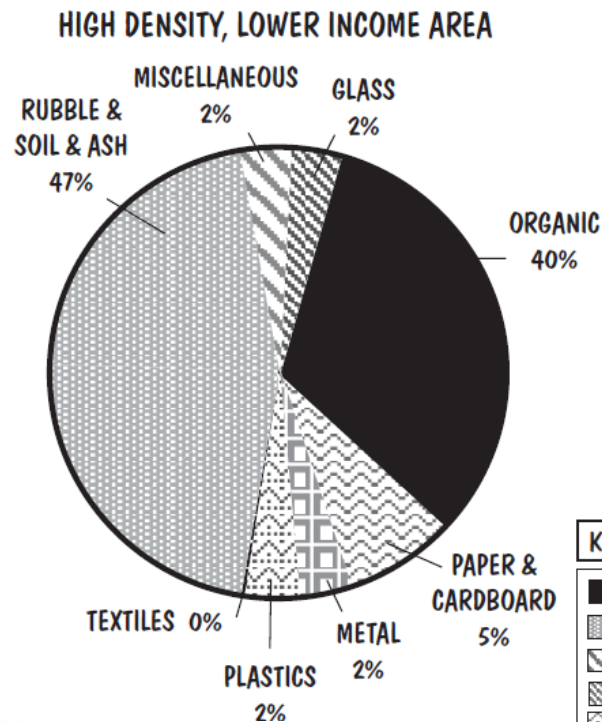
Is it Possible???

YES ☐
NO ☐
MAYBE ☒



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From specific waste streams?
Is Possible!!!



KEY

- ORGANIC (KITCHEN AND GARDEN WASTE)
- RUBBLE & SOIL & ASH
- MISCELLANEOUS
- GLASS
- PAPER & CARDBOARD
- METAL
- PLASTICS
- TEXTILES

Recycling Builder's Rubble and Soil Waste

Durban builder's rubble
+/- 30,000 tons/month



Crush and sieve



Road crusher run



Block manufacture



Sustainable housing



Organics Recycling

Biomass to Energy



Bio-Organic Fertilizers



Vermiculture



Green Waste



Ethanol



Anaerobic Digestion

Durban organic waste
+- 21,000 tons/month



Composting

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From specific waste streams? Is Possible!!!

- So – 40% on average is soil, ash and builder's rubble – solutions in new building materials, aggregate replacement and crusher-run
- Another 25% on average is organic waste – garden and market waste that can be composted or digested to extract energy and then by-products used as fertilizer
- So 65% already accounted for ??!! Good Start...

Tyre Recycling

Durban 2000-3000 tons/month



Roof Tile Systems



Oil



Interlocking Paving



Shredding



Agricultural Piping



Play Blocks/
Safety Matting

NEW
PRODUCTS

Remove steel & Fibre



Granulating



Upcycling



Fuel Alternative

Durban +- 10,000 tons/month

Glass Recycling



Blend & re-melt

Ceramics
& Tiles



Tumbled
Landscaping



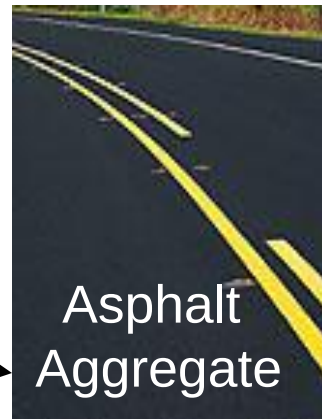
New
Glassware



Kitchen
Counters



Crush & sort



Asphalt
Aggregate



Water
Filtration

E-Waste Recycling

Cartridge Recycling



Hydrometallurgy

Refurbishment & Reuse



Plastics



Metals recycling



Dismantling



Lead extraction

Paper Recycling

**I am
not a
virgin.**

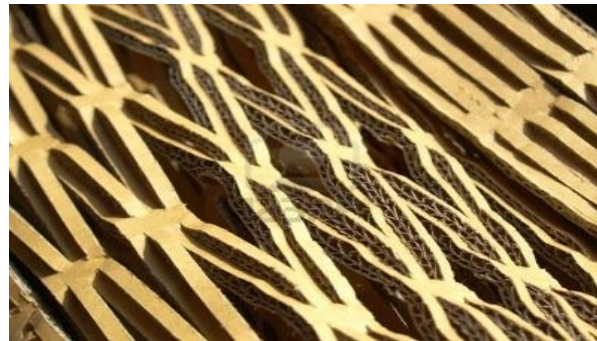
I am 100% post-consumer waste.
I am not processed with any chlorine.
I saved 1 tree, 27 gallons of water, 55,000
BTUs of energy, 6 pounds of solid waste and 10
pounds of greenhouse gases just by a designer
choosing me.



Paper resin countertops



Paper Bricks



Recycled cardboard packaging

Recycled paper products



Upcycled paper

Paper wood



Plastics Recycling



Pelletizing



Furniture

pallets



Compression molding



Upcycling



Building products



Extrusion

Injection molding



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**From specific waste streams?
Is Possible!!!**

- So we have solutions for Plastics at 7%
- Paper and cardboard at 8%
- Metals at 5% - standard industry recycling systems
- Tyres at 3%
- E-Waste at 1%
- On top of our 65% that brings us to 89% we have solutions for – we are doing well??

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**From specific waste streams?
Is Possible!!!**

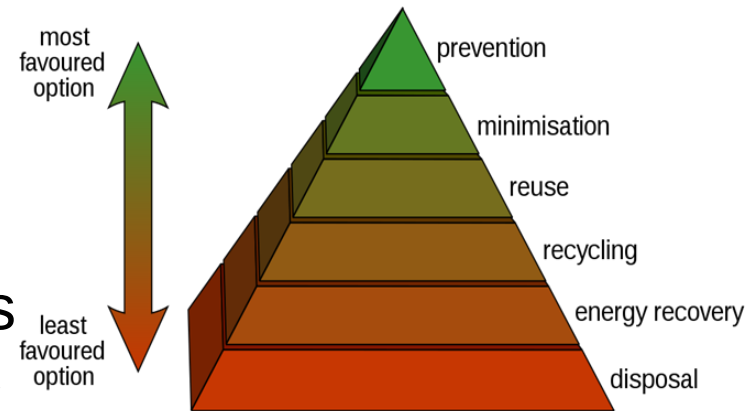
- So we have 89% solutions available right now – the remainder can go to Waste to Energy
- But wouldn't we already be better off with the remaining 11% just going to landfill?
- Is it that simple?? Have we solved the problem?
- Unfortunately not...

Let's just unpack one waste?



Plastic Recycling

- To understand plastic recycling, we need to acknowledge the waste hierarchy: First prevent then minimise (reduce), then reuse, recycle, recover and if all else fails – dispose.
- The first 2 options are not going to eliminate plastics as the volume still grows as the population of the planet grows
- To reuse or upcycle gives us an interim option on the application of the product, but does not eliminate waste
- Recycling offers huge potential for economic development, but what happens to it after that?
- Recovery offers us new opportunities
- Disposal can be diverted to recovery



Prevent...



Not going to happen....



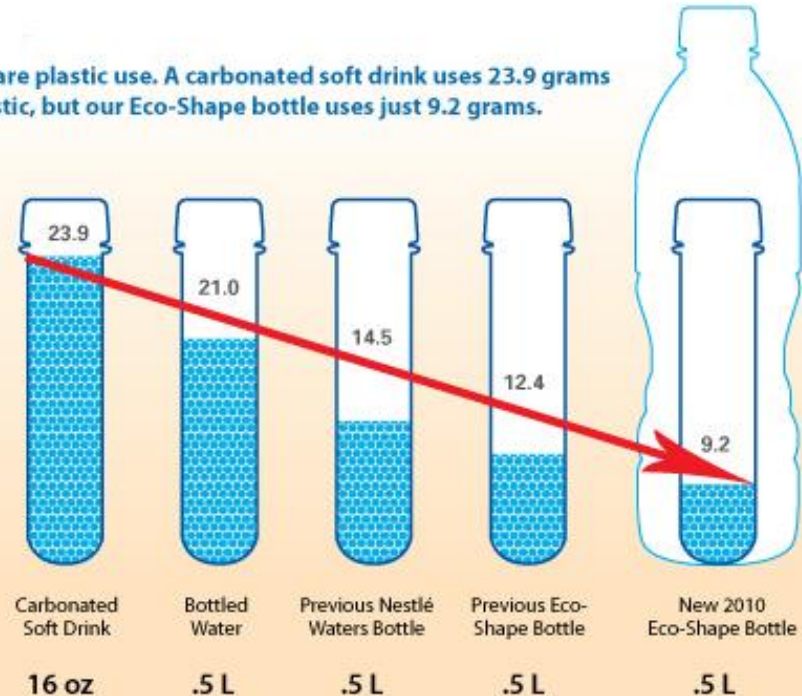
Reduce...



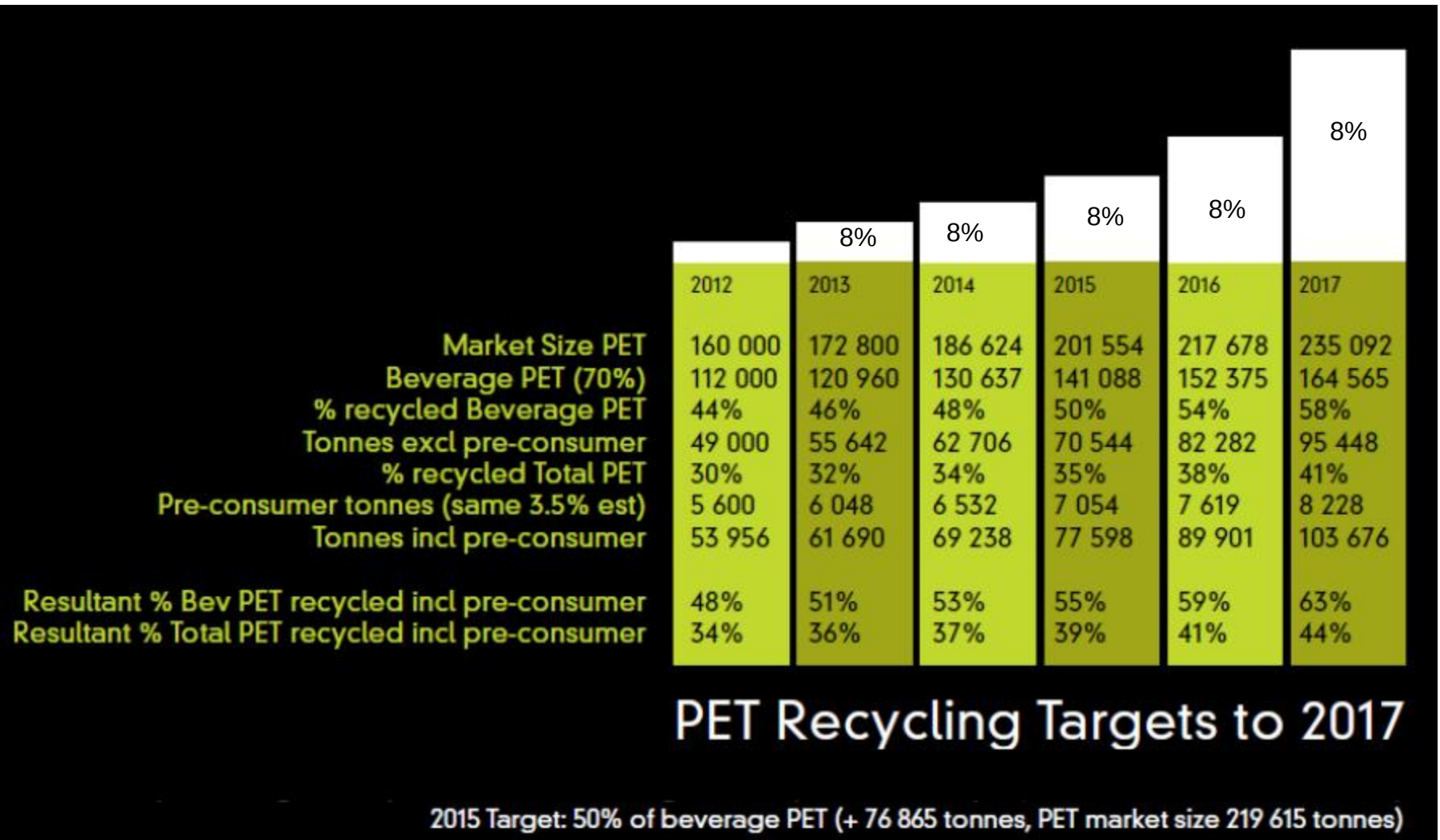
- We can ban some plastics
- We can design better

Our Eco-Shape half liter bottles use less plastic than other beverage containers (comparable sized carbonated and non-carbonated)

Compare plastic use. A carbonated soft drink uses 23.9 grams of plastic, but our Eco-Shape bottle uses just 9.2 grams.



Moving Goalposts...



Reuse...

- We can upcycle...
- We can repurpose...



Recycle...

- We can convert to new...



RPET

Reduce, Reuse, Recycle...

But even once we have done all this great stuff...

...it still has to go somewhere???

Duzi River



Umgeni River

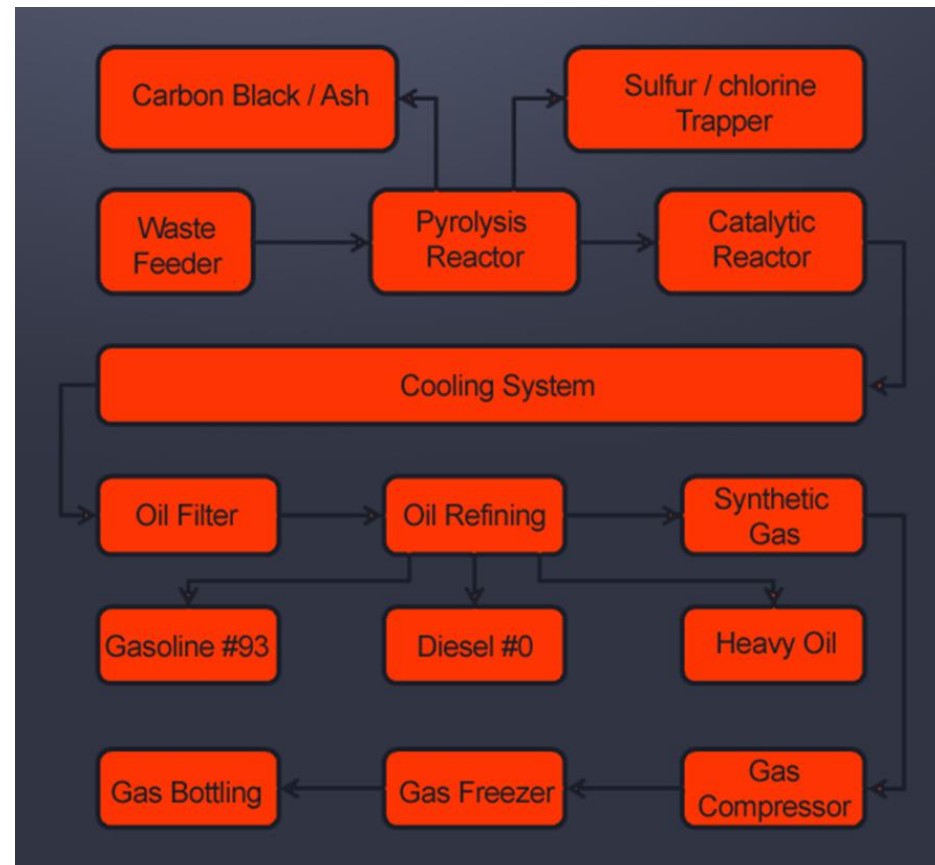


A Global Issue...



Recover...

- Energy recover through mass incineration – no thanks!!
- Energy recovery through waste-specific technologies – pyrolysis, syngas generation, plasma arc systems, depolymerisation, homogenisation, etc.
- Plastics to oil conversion



Recover...

- Traditional pyrolysis and catalytic depolymerisation systems could take PS, PP, PE – same materials everyone wants...
- New systems more versatile – PS, PP, PE, PVC, PET, ABS, PU, PC, Nylon, Polyester, Multilaminate plastics and a range of composite and industrial plastics
- New systems have de-chlorination and de-sulphurisation systems and use catalysts that shorten the hydrocarbon chains creating a light sweet fuel



Recover...



Recover...

- PET Plastic to oil report

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
Density at 20°C	GB/T 1884-00(2004)	0.8977 g/cm³	--	--
Sulfur Content	GB/T 11140-2008	0.0230 % (m/m)	--	--
Distillation of petroleum products at Atmospheric Pressure	GB/T 6536-2010			
Initial boiling point (IBP)		77.9 °C	--	--
10% Recovered at		87.1 °C	--	--
50% Recovered at		100.5 °C	--	--
90% Recovered at		239.7 °C	--	--
Final boiling point (FBP)		288.5 °C	--	--
% Recovery		98.7 % (V/V)	--	--
% Residue		1.2 % (V/V)	--	--
% Loss		0.1 % (V/V)	--	--
Flash Point (Close Cup)	GB/T 261-2008(Procedure A)	<40 °C	--	--
Acidity	GB/T 258-77(2004)	5.12 mg KOH/100mL	--	--
Existent Gum	GB/T 8019-2008	44 mg/100mL	--	--
Oxidation Stability(Induction Period Method)	GB/T 8018-87(2004)	>480 min	--	--
Cleveland Fire Point (Open cup)	ASTM D92-12b	<79 °C	--	--
Gross Heat of Combustion	GB/T 384-81(2004)	41.155 MJ/kg	--	--
Ash Content	ASTM D482-13	0.003 % (m/m)	--	--
Kinematic Viscosity at 20°C	ASTM D445-12	0.9096 mm²/s	--	--
** End of Analytical Results **				

Recover...

- Refuse Derived Fuel (RDF) – Pyrolysis to electricity...



- Needs specific flue gas scrubbing systems to scrub harmful dioxides, so more expensive
- Systems available for straight heat generation, electricity conversion and LPG conversion
- More efficient and economically viable than large-scale Waste-2-Energy plants

Dispose...

- Should be the last option and phased out to convert all non-useable paper and plastic waste to energy...
- First Avoid, then Reduce, then Reuse, then Recycle, then Recover. Nothing should be going to landfill...
- Extract maximum value – maximise jobs and green economic development around recycling – Then Recover...
- No more of this:



LET'S RECAP

- Is there a problem?
- Is there a solution?
- If there's a solution – then what's the problem?

So:

- **ALL** Plastics can be Reduced, Reused, Recycled or Recovered
- There are economically viable technologies available for all plastic wastes
- No possibility of banning plastic from landfill unless alternative options are put in place
- Needs regulatory and legislative mechanisms to ensure this happens – government facilitation (not intervention) and corporate responsibility...

The Problem is YOU!!!



The Industry spends Billions every year trying to make fancier packaging than their competition, and the recyclability of the final product does not feature in this design

The N# 7 dilemma



Plastic N#7: This category basically means “everything else” and is composed of plastics that were invented after 1987 as well as mixtures of different plastics.



Plastic N#7: Gives literally thousands of ways to disguise non-recyclable plastics.

Anyone remember BPA ??
(Bisphenol-a)

Oh well – we can't do anything with label waste...

Siliconised glassine paper release liner

(“backing paper”) – this can't be recycled with normal paper as you need a sophisticated deinking plant to remove the silicone. Consequently the options are limited to landfill, waste to energy or recycling (which is often uneconomic at current rates)



Since 2009 C4G has been a pioneer setting up a novel recycling solution for silicone-coated release liners in Europe. They offer a complete system with collection and recycling services for the label industry and label end-users throughout Europe.



SO IT CAN BE DONE !!.....

Oh but we don't have the volumes to justify the costs...

No, but nor do any companies in Europe, and they used to collectively landfill 180,000 tons of labels per year (UK numbers alone!)

- There are always excuses
- There are available technologies
- There are duties and responsibilities
- Work together for common solutions

YES IT CAN BE DONE !!.....

No more excuses please:



Box? What Box???



Thank You !!

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