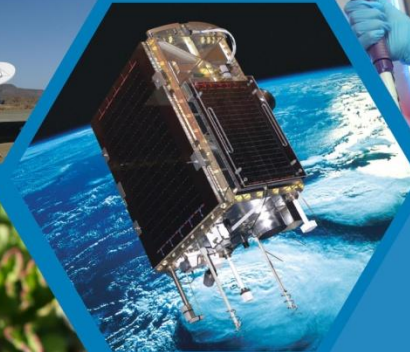


A Waste Research, Development and Innovation (RDI) Roadmap for South Africa

Economic value of South Africa's Waste (*Preliminary*)



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**science
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Motivation to change

- South Africa landfills **~90%** of all waste generated
- Legislation requires a move away from landfilling
 - Principles of the waste hierarchy
 - Regulations that ban certain waste to landfill in time
- BUT, when it comes to cost, **landfill often still the cheapest**
 - Landfilling general waste ~ R100-R150/T
 - WtE ~ 3-4 times more expensive
 - Composting more expensive
 - New 'Norms & Standards for Disposal of Waste to Landfill' may correct 'low' disposal costs
- SO... **why should we move waste up the hierarchy?**



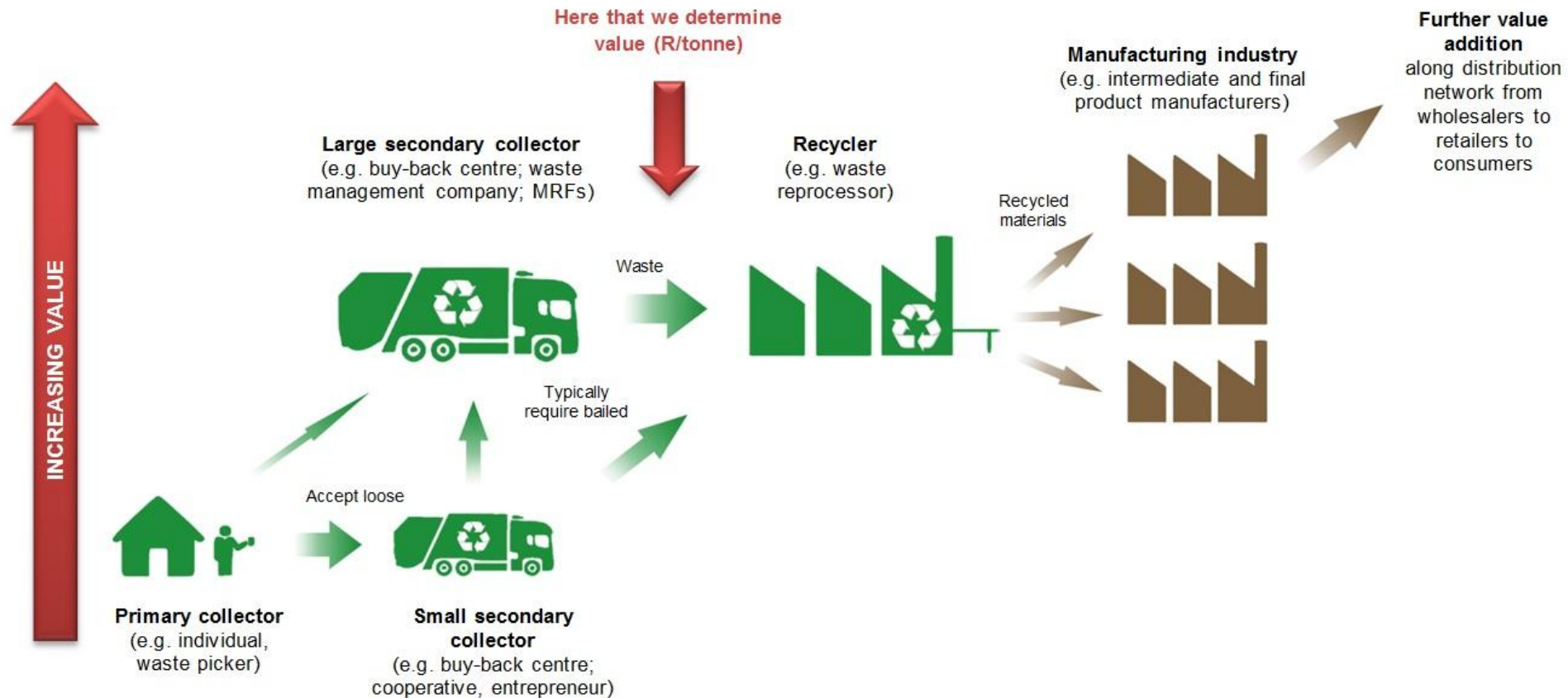
Valuing South Africa's waste

- Methodology –

$$\text{Resource value}_n = (Q_1 \times UV_1) + (Q_2 \times UV_2) + \dots (Q_n \times UV_n)$$

- Quantity (Q) of waste stream
 - **Selected 13 waste streams** to value, based on –
 - Perceived mod-high potential for recycling/recovery (global trends)
 - Magnitude of waste generated (high tonnage waste streams)
 - Availability and accuracy of data
 - Tonnages of waste generated from DEA **baseline study** (2011)
- Unit value (UV) of stream
 - Various methods of determining unit value
 - Adopted the **price paid by the recycler** for the waste

Determining unit value



Waste types & Scenarios

Stream	SCENARIO 1 Baseline (2011)			SCENARIO 2		SCENARIO 3 (DST Goal)		SCENARIO 4 (100% recovered)	
	Generated (t/yr)	Recycled (t/yr)	Recycled (%)	Recycled / recovered (t/yr)	Recycled / recovered (%)	Recycled / recovered (t/yr)	Recycled / recovered (%)	Recycled / recovered (t/yr)	Recycled / recovered (%)
Municipal waste (non-recyclable portion)	8 062 934	0	0	2 015 734	25	4 031 467	50	8 062 934	100
Organic component of municipal waste	3 023 600	1 058 260	35	1 587 390	53	2 116 520	70	3 023 600	100
Biomass waste from industry	36 171 127	0	0	10 851 338	30	21 702 676	60	36 171 127	100
Construction and demolition waste	4 725 542	756 087	16	1 559 429	33	2 362 771	50	4 725 542	100
Paper	1 734 411	988 614	57	1 087 476	63	1 387 529	80	1 734 411	100
Plastic	1 308 637	235 555	18	537 850	41	785 182	60	1 308 637	100
Glass	959 816	307 141	32	417 520	44	575 890	60	959 816	100
Metals	3 121 203	2 496 962	80	2 653 022	85	2 809 083	90	3 121 203	100
Tyres	246 631	9 865	4	103 585	42	197 305	80	246 631	100
WEEE	64 045	6 884	11	19 453	30	32 023	50	64 045	100
Slag (from mineral processing)	5 370 968	2 685 484	50	3 356 855	63	4 028 226	75	5 370 968	100
Ash (from power generation)	36 220 000	2 289 104	6	4 766 552	13	7 244 000	20	36 220 000	100
Waste oils	120 000	52 800	44	69 600	58	86 400	72	120 000	100
TOTAL	101 128 914	10 886 756	11	29 025 804	29	47 359 071	47	101 128 914	100

Unit value of selected wastes

Stream	Range in values (R/t)	Unit value (R/t)
Municipal waste (non-recyclable portion)	N/A (own calculations)	367.38
Organic component of municipal waste	N/A (own calculations)	188.63
Biomass waste from industry	N/A (own calculations)	188.63
Construction and demolition waste	85 - 90	87.50
Paper	200 - 1800	744.47
Plastic	1900 - 3960	3119.54
Glass	450 - 500	490.00
Metals	1000 - 7000	2270.00
Tyres	N/A (own calculations)	367.00
WEEE	1000	1000.00
Slag	170 - 180	175.00
Ash	0 - 5	3.00
Waste oils	2777.78	2777.78

Disclaimer:

All prices quoted in the report are average prices based on data from multiple sources, multiple geographic regions, and for a period of time (2013), and as such should not be seen as the current (January 2014) market price that could be obtained for a waste.

Value of selected wastes

	Value (Rand/year)			
Stream	Scenario 1 (Baseline)	Scenario 2	Scenario 3 (DST Goal)	Scenario 4 (100%)
Municipal waste (non-recyclable portion)	0	740 547 527	1 481 095 054	2 962 190 108
Organic component of municipal waste	199 624 053	299 436 079	399 248 106	570 354 437
Biomass waste from industry	0	2 046 933 732	4 093 867 465	6 823 112 441
Construction and demolition waste	66 157 613	136 450 038	206 742 463	413 484 925
Paper	735 995 662	809 595 449	1 032 976 649	1 291 220 811
Plastic	734 824 361	1 677 846 536	2 449 411 002	4 082 351 670
Glass	150 499 090	204 584 780	282 185 904	470 309 840
Metals	5 668 103 740	6 022 360 735	6 376 617 729	7 085 130 810
Tyres	3 620 455	38 015 658	72 410 862	90 513 577
WEEE	6 884 000	19 453 250	32 022 500	64 045 000
Slag	469 959 700	587 449 625	704 939 550	939 919 400
Ash	6 867 312	14 299 656	21 732 000	108 660 000
Waste oils	146 666 667	193 333 333	240 000 000	333 333 333
Total	8 189 202 652	12 790 306 399	17 393 249 283	25 234 626 353



How can we use these results?

- Focus in on municipal (general) waste (2011)
 - R17.0b / annum worth of resources generated
 - R7.6b recycled and **R9.4b resources landfilled**
 - Municipal operating revenue for the solid waste function for 2011/12 was **R8.3b / annum**
 - Municipalities spent R8.3b in 2011 to send R9.4b worth of resources to landfill

Value of selected wastes

Stream	Unit value (R/t)	Current recycling rate (%)
Plastic	3119.54	18
Waste oils	2777.78	44
Metals	2270.00	80
WEEE	1000.00	11
Paper	744.47	57
Glass	490.00	32
Tyres	367.00	4
Municipal waste (non-recyclable portion)	367.38	0
Organic component of municipal waste	188.63	35
Biomass waste from industry	188.63	0
Slag	175.00	50
Construction and demolition waste	87.50	16
Ash	3.00	6



Conclusions

- So if there is so much ‘value’ **R25b** (minimum) locked up in South Africa’s waste...
- If the unit value (R/t) for most streams is greater than the cost of landfilling (R100-R150/T)
- Why are we only recycling **~10%** of all waste generated?
- For MSW, could we be spending that **R8.3b/annum** operating budget on rather diverting the **R9.4b/annum** of resources to recycling and recovery, rather than diverting to landfill?