The waste industry, including recycling

At present less than 1% of VCB's are recycled after consumption. The very low recycling rate is due to a combination of constraining factors on both the supply and demand side.

The demand for recycled HD-LD is restricted to refuse bags (primarily), certain types of pipes, and to a very limited extent to the manufacture of "plain" VCB's. On the supply side the key constraints relate to collection of VCB's not being economically viable due to a host of factors, including:

- The high levels of contamination, including printing, reduces the value of the bags.
- The low mass to volume ratio of bags contribute greatly to the VCB's being low in the pecking order of collection, where the relative value items (weight per item) determine the feasibility of collection
- The absence, other to dumpsites, of extensive central collection points of post consumer waste.

It was fount that in order for large scale recycling of VCB's to take place it is essential to remove not only the constraints on the supply side , but also to create additional demand.

THE IMPACT OF THE PROPOSED REGULATIONS

The approach to the impact assessment

The socio economic impact assessment reflects the impact of the proposed regulations on the current industries relevant to vest type carrier bags, as well as industries that could possibly be affected in future. There are two main factors that drive all the impacts with regard to the proposed plastic bag regulations.

The first factor is that **products** will change based on the 30 micron or 80 micron criteria and that these product changes create a number of impacts. This product change will then create significant shifts in the market that will fundamentally affect **demand** for VCB type bags and subsequently create a number of upstream and downstream impacts. The demand change is however not only a function of product change since there are demand boundary constraints such as maximum affordable cost. Therefore, product change will also depend on demand changes. How these two factors combine determines what the nature of the impacts will be.

A number of scenario's, based on different products and varying levels of demand, is therefore created to illustrate the potential impact of the regulations. For each scenario the impact variables such as impact on investment, the changes in labour requirements, the price of the product, etc. were calculated, based on the product and demand assumptions.

The four scenario's created were as follows:

- Scenario A, the **current demand scenario** is the upper-boundary limit, and although an unlikely scenario, provided insight a maximum impact situation based on current consumption levels. It assumes there are no limits to retailer spend, that products stay the same, and substitute products are ignored This scenario is unrealistic because it assumes no change in current bag demand, and no role for substitute products.
- Scenario B, the **adjusted demand scenario,** is more realistic in that it considers that the regulations will achieve a reduction in demand for bags and that market forces will introduce a substitute product in the form of paper bags, which is estimated to capture 5% market share under a 30ì regulation and 35% under a 80ì regulation. The change in demand is realistically estimated considering factors such as reduction in demand due to bag optimisation (larger bags with increased carrying capacity), efficiency gains through improved packaging practices, as well as increased re-use. The reduction of demand is assumed to be 30% under a 30ì regulation, and 15% under a 80ì regulation. The reduction under a 80ì regulation is lower due a number of factors, the most important being the fact that the proposed 80ì plastic bag and paper bag alternative are much smaller bags than the "optimised" plastic bag.
- Scenario C reflects what the situation will be if no additional cost to the retailer (and therefore consumer) is to be incurred. This is the **current retailer spend scenario**. Retailers spend as a

percentage of revenue stay the same, with adjustments for increased usage of paper bags as a substitute product. This can be seen as the other demand boundary. The need for adjustment for substitute products is driven by the change in the difference between the cost of plastic and paper bags due to the regulations. It assumes the bag characteristics remain unchanged.

- The scenario's conclude with a brief description of what could be a **worst-case scenario,** Scenario D. The worst-case scenario, which is where the total VCB manufacturing industry ceases to exist, could happen for two reasons. The first would be if converters were unable or unwilling to recapitalise their equipment to manufacture at the proposed minimum thickness, and exit the industry. The domestic supply would become zero. The second would be if the cost of bags increases to a point where retailers and consumers are unable to, or unwilling to buy bags. The demand for bags therefore ceases to exist. The impact is the same, and assessed in this scenario.

The calculation of the optimum scenario is beyond the scope of this research, as this would include thorough research into the consumer market to determine price elasticity of demand, potential changes in consumer behaviour, consumer spending patterns, and a host of other factors.

Key findings

The key finding per scenario is extensively described in the report. The following are the primary findings regarding the impact of the regulations in general, and specifically on the industry value chain.

- A first and most important finding is that the proposed "two step" introduction of the regulations, i.e. firstly a minimum thickness of 30ì and then after six months, a minimum thickness of 80ì, is not feasiblel. An 80ì bag is a very deferent bag to a 30ì bag. It requires totally different manufacturing technology (equipment) to that currently used, is primarily made from LD-PE compared to the current HD-PE bag, and will require extensive capital investments. No manufacturer will be prepared to make a capital investment to manufacture a 30ì bag, and then scrap the equipment 6 months later in order to invest in the manufacture of 80ì bags. A significant capital investment will be required in order to convert current manufacturing capacity to be able to produce 30ì bags .

- A second important finding is that there is a real chance that, under an 80ì regulation, the local VCB manufacturing industry could shut down altogether, and be replaced by imported product. It was found that there are a number of forces that come into effect under a 80ì situation, which will result in manufacturers exiting the industry. The first factor is the extent of capital investment required, as extensively dealt with later on. The second is the current structure of the industry, namely it being a relatively mature commodity industry with low margins and therefore relatively unattractive to new investment. The third factor relates to the prevalence of imports and the difficulties (especially for SME's) in accessing alternative, and specifically, export markets.

  The research found that the small and medium enterprises will not have access to the capital required, and be forced to either shut down or find alternative markets under the 80ì scenario.

Export markets are not accessible to such SME's, and the potential to enter alternative domestic markets is limited due to the specific application of current equipment.

Large companies who have access to finance indicated that their shareholders would be reluctant to approve large capital investments in a low margin industry. The large company that is currently exporting indicated that the margins on exports are so low that business can probably not be sustained solely on exports.

The implications of the domestic VCB industry ceasing to exist are severe and include massive job losses, negative impact on international investor confidence especially in the upstream sector, unrealised capital investments, negative impact on South Africa's balance of payments, negative impact on socio-economic development in rural areas such as KwaZulu-Natal and the Eastern Cape, etc.

- A third key finding is that although an increase the thickness of bags will stimulate recycling, the increase in recycling will be limited (maximum 10-15% of production, due to fundamental economics of recovery) unless other factors that constrain recycling are addressed. The most important factor is the need to create additional demand for recycled polymer. A frequently mentioned example of how additional demand can be created relates to the merits of specifying a minimum recycle content of refuse (and possibly other) bags. Alternatively, a levy could be placed on the industry to subsidise sub-economic recovery of VCBs. Further investigation of the merits of such interventions was beyond the scope of the study.
- The findings of this study relate only to the impact on the VCB manufacturing sector of the plastic industry. Other sectors, such as the manufacturing on non-VCB's will also be affected by the regulations. The impact on other sectors of the plastic industry could not be established since Government were not is a position to clarify the scope of the regulations in the detail required for successful extrapolation, when this research was conducted.

Impact on the upstream sector

The table below depicts the impact on the upstream sector as identified by the scenarios developed. It is important to understand that the scenarios are for illustrative purposes only and that the maximum numbers are highly unlikely in the extreme. In fact the most likely scenarios from a realistic point of view is the minimum scenario.

	Current Situation **Actual demand**	**30 micron scenario** **Changes in demand**		**80 micron scenario** **Changes in demand**	
		Max	**Min**	**Max**	**Min**
HDPE Demand	37,000	+37,382	-7,036	-37,000	-37,000
LLDPE Demand	4,760	+15,075	+3,230	+50,445	+544
LDPE Demand	0	0	0	+207,019	+19,890
Masterbatch	1,740	3,218	+258	+12,061	-414

The polymer manufacturing sector is currently ethylene constrained and polymer capacity constrained, with available ethylene being the major constraint. Polymer capacity cannot be expanded without ethylene capacity first being increased.

The 30 micron scenario shows HDPE demand changing from an increase in demand for 37,382 tons per annum to a decline in demand of 7,036 tons per annum. In the case of an increase, the first 10,000 tons will be able to be supplied from the current HDPE capacity surplus of 10,000 tons. This will have a positive impact on the profitability of DOW Chemicals since the production will be sold into the domestic market as opposed to exported.

The remaining 27,382 tons will have to be imported will all the associated negative impacts of importing polymer such as:

- Negative impact on trade balances
- Negative impact on exchange rate due to increased dollar demand
- Negative impact on trade balance
- Negative impact on balance of payments
- Increase in converter costs since they will have to hold greater stocks of polymer to guarantee supply with increasing uncertainty of on –time delivery and increased lead-times due to having to import the required polymer
- Increasing port delays due to increased volumes on a port infrastructure that is already under strain

In the case of the 80 micron scenario, all the HDPE which is currently sold into the domestic VCB market will be lost and will have to be exported. This will have a significant impact on the profitability of DOW Chemicals as well as on the investor confidence of an international firm which has made significant investments in South Africa.The worst case impact for the 80 micron scenario is a reduction in profit to DOW Plastics of R70m per annum and a loss of taxes to the government of R21m per annum (assuming an average tax rate of 30%)

In the 30 micron scenario depending on the market size, the likely impact on DOW Plastics ranges from increased profits of R18.95m to a profit reduction of R13.3m.

In all the scenarios there is an increase in demand for LLDPE. The increase in demand ranges from +50,445 tons to +544 tons per annum, depending on the scenario. There is currently a shortage of locally produced LLDPE in South Africa and all of the increased demand will have to be imported. The impacts fall into the same categories as above for imported product. Clearly if the converters do not make the required investments then demand for LLDPE will decline. The impact will not be high since there is currently a shortage of LLDPE and polymer is being imported to meet domestic demand.

In the case of LDPE demand, this changes only under the 80 micro scenario where demand increases between +19,890 tons per annum to +207,019 tons per annum. Clearly the upper scenario is totally unrealistic for the 80 micron product (increased cost alone shows it to be unrealistic) and besides a world scale plant would have to be established to supply this demand – highly unlikely for an uncertain market and for a single product line. In the short-medium all polymer requirements will have to be imported due to the negative supply/demand balance for LDPE and to bring volumes of the order of 200,000 tons per annum through the current port infrastructure is probably unrealistic.

Impact on the plastic VCB manufacturing industry

The implications for production and production technology at 30ì are similar for all scenario's, namely that the production process remains essentially the same, the raw material mix will change as specified, and that that conversion of existing technologies is possible, but there will be a cost implication.

The implications for production at 80ì is also the same for all scenarios, namely that a vest type carrier bag cannot be manufactured at 80ì and that the type of bag will change. The raw material mix will change as identified, and conversion of current equipment is technically impossible.

There are capital investment required to manufacture at 30 and 80ì's, regardless of the demand and product assumptions. The capital investments relates to three factors, as indicated in the table below and as shown in the table range from R34m to R526m.

Capital investment requirement 30ì regulation	**Scenario A Maximum impact (R million)**	**Scenario B Adjusted demand (R million)**	**Scenario C Minimum impact (R million)**	**Comments**
To compensate for a reduction in throughput due to increased thickness	35	35	19	The maximum scenario makes no provision for paper bags as substitute Scenario B and C makes provision for paper capturing 5% of the market. No capital investment is required in paper industry
Modifications to existing equipment to be able to produce at increased thickness	15	15	15	
New equipment to meet increased demand in tonnages due to changes in bag demand and thickness	100	34	0	
Total	150	84	34	
Capital investment requirement 80ì regulation	**Scenario A Maximum impact (R million)**	**Scenario B Adjusted demand (R million)**	**Scenario C Minimum impact (R million)**	**Comments**
To compensate for a reduction in throughput due to increased thickness	61	61	N/A	The maximum scenario makes no provision for paper bags as substitute Scenario makes provision for paper capturing 35% of the market. Capital investment is required in paper industry is R 120 million for scenario B and R 10 million for scenario C
Modifications to existing equipment to be able to produce at increased thickness	Not possible	Not possible	Not possible	
New equipment to meet increased demand in tonnages due to changes in bag demand and thickness	465	180	54	
Total	526	241	54	

It is worthwhile pointing out that no capital investments would be required if a minimum thickness of 22 - 24ì is specified. There is agreement within industry that 24 microns is the maximum thickness at which manufacturing can take place, without any throughput capacity being lost, or any modifications to equipment is required.

Impact on the retail industry

The impact on the retailer (and therefore the consumer) is concluded from two perspectives:

The first is to assume that retailers (and consumers) can, but will not pay more for bags. Under the proposed regulations this will translate to a maximum number of bags that will be available as follows:

Retailer spending (R million)		Current consumption (bag units, billions)	Maximum bag consumption 30 ì - billions			Maximum bag consumption - 80 ì		
			Plastic bags	Paper bags	% reduction	Plastic bags reduction	Paper bags	%
Large retail	203.44	2.552	1.14	0.06	53	0.27	0.14	84
Small printed	184.86	2.314	1.06	0.056	51	0.25	0.13	83
Small unprinted	188.45	3.158	1.02	0.053	64	0.24	0.13	88
Total	571.54	8.024	3.23	0.17	58	0.77	0.41	85

Under the 30ì regulation it will require substantial increases (58%) in packing efficiencies for retailers to still provide bags free of charge (scenario B reflects the impact of realistic efficiency gains)

Under the 80 ì regulation it will become impossible for retailers to provide customers with bags, free of charge. The increased cost of the bags will mean that retailers simply will not be able to buy enough bags to satisfy demand. The implication is that retailers will either have to make consumers pay for bags (a scenario which the large retailer groups view as unacceptable since it reduces customer service as well as customers' disposable income), or consumers will have to bring their own bags. The cost of consumers providing their own bag will always be higher than the current cost to the consumer, which is zero. Regardless of the strategy the retailers follow, it will have a negative effect on consumer spending power.

The other perspective is to consider that retailers will pay more for the bags (in reality any increases in cost will be passed to the consumer), but tries to minimise demand through optimisation, thereby minimising cost.

For this scenario where demand is reduced due to efficiency gains, the bag size is optimised, and paper bags as an substitute product becomes economically viable, the analysis indicates that under the 30ì the efficiency improvements of a larger bag and improved packaging practices are largely offset by the increase in the cost of the bag due to its increase in dimensions. The implications are that much higher efficiency gains will have to be achieved if the cost to the retailer, who will inevitably pass it on to the consumer, is to be minimised. Whether efficiency increases additional to those assumed in this scenario can be achieved is debatable.

The impact of cheaper paper bags as a substitute product to a 80ì plastic bag still produces increased costs to the retailer in the region of 400% and more. The conclusion is therefore regardless of

efficiency gains, or the utilisation of paper bags as an alternative, there are substantial cost implications to the retailer, who will pas it on to the consumer. (R 500 million for the 30ì scenario and in excess of R 2 billion for the 80ì scenario).

Impact on the waste management, including recycling industry

The key factors that need to be considered regarding recycling have been mentioned. The other factor that needs to be considered would be that for all scenario's the amount of material that will enter the waste stream will either be the same as current levels, or increase. A worst case scenario, from a waste management perspective, would be the 80 ì scenario where demand for bags remain at current levels (who carries the additional cost associated with thicker bags is not ignored), since it will mean an additional 236 000 tonnes of material enters the waste stream. The cost of additional landfill disposal would be in excess of R 40 million per annum

Impact on labour and their dependants

For the purposes of this report, research was focused on the VCB manufacturing industry. Other industries, notably upstream polymer production, paper bag manufacturing, plastic recycling, and retail are relevant to any complete analysis of changes in the industry. Detailed research was not carried out on these industries. However, an attempt was made to estimate any implication on labour as a result of the proposed legislation.

The employment implications for the upstream industry and, to a lesser extent, the paper bag industry is relatively small to that of the VCB industry. By contrast, the potential employment implications to the plastic recycling industry and the retail industry dwarf possible employment losses or gains in the VCB industry. The data for these other industries is less reliable than for the VCB industry given the focus of the research. However, employment implications in these sectors deserve serious consideration.

The major impact, in terms of labour, of the proposed regulations is:

- the impact on jobs and, cascading from this,
- the impact on wage earners' dependants.

The impact of these two factors is modified by the quality and remuneration of the jobs lost or gained. In brief, the loss of jobs is likely to push workers and their dependants into poverty. The creation of jobs will have the reverse effect. The impact on individuals can, to an extent, be quantified other implications, such as the affect on crime, cannot.

The impact of the regulations on employment and dependants, as modelled in the scenarios, range between:

- Substantial (though unlikely) job creation as a result of huge increases in polymer conversion and the potential for recycling (Scenarios A and B)
- Minor, negative, changes in employment (Scenario C,30 microns),

- Significant job losses as a result of decreased polymer conversion (Scenario C, 80 microns, D.1, and D.2),
- potentially massive job losses should the VCB industry close down and consumers use their own bags (Scenario D.3).

The following table summarises the estimated employment change and the affect on dependants under the different scenarios. It should be noted that the extremes of employment change are heavily influenced by the possible (but very uncertain) creation of informal jobs in the collection of plastic post-consumer waste for recycling, and by the assumed loss of jobs of retail packers should consumers use their own bags. In addition to these caveats, caution should be used in assessing all these estimates and readers are urged to read the full list of assumptions made in their calculating.

Summary of Changes in Employment and Number of Dependants Affected Scenarios A – D					
Scenario	**Quality of Jobs Affected**[2]	**Employment Change**		**Dependants Affected**	
		Lower Limit	**Upper Limit**	**Lower Limit**	**Upper Limit**
Scenario A, 30 microns No change in the number of VCBs demanded	Higher Quality Formal	+1,181	+960	8,739	7,104
	Lower Quality Formal	0	+1,446	0	7,664
	Informal	0	+2,857	0	8,571
	Total	**+1,181**	**+5,263**	**8,739**	**23,339**
Scenario A, 80 microns No change in number of VCBs demanded	Higher Quality Formal	+5,053	+5,133	37,392	37,984
	Lower Quality Formal	-2,000	-1,105	(10,600)	(5,857)
	Informal	0	+7,143	0	21,429
	Total	**+3,053**	**+11,171**	**26,792**	**53,556**
Scenario B, 30 Microns: 35% reduction in volume demand, paper takes 5% of market	Higher Quality Formal	+466	+384	3,448	2,842
	Lower Quality Formal	0	+805	0	4,267
	Informal	0	+4,286	0	12,858
	Total	**+466**	**+5,475**	**3,448**	**19,967**
Scenario B, 80 Microns: 50% reduction in volume demand, paper takes 35% of market	Higher Quality Formal	+2,388	+2,388	17,671	17,671
	Lower Quality Formal	-2,000	-1,105	(10,600)	(5,857)
	Informal	0	+7,143	0	21,429
	Total	**+388**	**+8,426**	**7,071**	**33,243**
Scenario C, 30 Microns: VCB spend remains constant, paper takes 5% of market	Higher Quality Formal	-26	-26	(192)	(192)
	Lower Quality Formal	-75	-75	(398)	(398)
	Informal	0	0	0	0
	Total	**-101**	**-101**	**(590)**	**(590)**
Scenario C, 80 Microns: VCB spend remains the same, paper takes 35% of market	Higher Quality Formal	+92	+92	681	681
	Lower Quality Formal	-6,042	-6,201	(32,023)	(32,865)
	Informal	0	0	0	0
	Total	**-5,950**	**-6,109**	**(31,342)**	**(32,184)**
Scenario D.1: Closure of domestic industry – VCBs are imported	Higher Quality Formal	-587	-587	(4,344)	(4,344)
	Lower Quality Formal	-814	-973	(4,314)	(5,157)
	Informal	0	0	0	0
	Total	**-1,401**	**-1,560**	**(8,658)**	**(9,501)**
Scenario D.2: Closure of domestic industry – VCBs replaced by paper bags	Higher Quality Formal	-18	-18	(133)	(133)
	Lower Quality Formal	-814	-973	(4,314)	(5,157)
	Informal	0	0	0	0
	Total	**-832**	**-991**	**(4,447)**	**(5,290)**
Scenario D.3: Closure of domestic industry – consumers shift to own bags	Higher Quality Formal	-587	-587	(4,344)	(4,344)
	Lower Quality Formal	-70,814	-70,973	(375,314)	(376,157)
	Informal	0	0	0	0
	Total	**-71,401**	**-71,560**	**(379,658)**	**(380,501)**

[2] See Note 13 in Chapter 8 for a full explanation of the quality of jobs involved.

The role of Government

There are a number of factors relevant to the role of Government in the context of the regulations:

- The first relates to the cost and requirements to the enforcement of the proposed regulations. Although the Government had not established the costs associated with the enforcement of the regulations at the time of this research, it is recognised that the cost of enforcement is an additional cost to the economy. In this respect Government has informed the Study Team that enforcement will not be done at point of manufacture. It must be recognised that the cost of enforcement will probably be higher if done at point of distribution. Enforcement of the regulations on imported bags will also contribute to the cost.
- A second issue of relevance is that Government support to the plastic industry in lieu of the regulations would be limited. Government has indicated that the only relevant support programme is the SME – Development Programme. This programme will assist SME's with recapitalisation of equipment due to the regulations. Whether is will be substantial enough (limited to a R 1.7 million grant for an investment of R 30million) to ensure that recapitalisation does take place, is debatable.
- A third issue that came to the attention of the Study Team is that the manufacturing process of VCB's is such that the thickness of the material varies by up to 10%. This factor is important in the enforcement of the regulations