Individual Assignment

Sustainability: An Interpretation of the Recycling Industry

“I hereby confirm that the assignment is the product of my own work and research and has been written by me and further that all sources used therein have been acknowledged.”

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PART A : Literature Review

Human societies have co-evolved with their host ecosystems over the past ten millennia during which civilisations have formed, thrived and disappeared. Unlike the collapsed societies examined by the author Jared Diamond that typically degraded together with their regional ecosystems, the modern global civilisation cannot be allowed to degrade global ecosystems to the point of collapse. It would be a sad epitaph for humanity that its single greatest and last accomplishment was to cause a mass extinction and undo 65 million years of recently evolved biodiversity.

The first inkling of this possibility emerged in the middle of last century when the scale of human impacts on the natural landscape dramatically increased in magnitude affecting entire ecosystems through dumping of toxic effluent, conversion of hundreds of thousands of hectares of land into continuous monoculture crops and the application of non-discriminating pesticides and herbicides.

Concerns for the ongoing degradation of the natural environment merged with increasing demands for improved human development in the third world. The Brundtland Commission released the report *Our Common Future* in 1987 (World Commission on Environment and Development 1987) that formally established the concept of sustainable development. This concept has been interpreted, revised and reinvented countless times in the 25 years since then (Mebratu 1998; Hattingh 2001; Sneddon, Howarth & Norgaard 2006; Blewitt 2008; Swilling & Annecke 2012).

This paper argues that sustainable development must be constrained by ecological limits and that a universal concept for sustainable development is improbable and undesirable. It is submitted that the consumption based economy is a key obstacle to a long term sustainable future. This paper reviews the concept of sustainability from the perspective of prominent worldviews with the expectation of identifying key principles to inform a pragmatic 'pluralistic' (Sneddon, Howarth & Norgaard 2006) approach to sustainable development. In conclusion a set of normative principles is offered that might be used as parameters to formulate a sustainable development strategy.

1 Ecological limits

Any worldview on sustainability must acknowledge that with 7 billion people sharing one planet and 9.3 billion anticipated by 2050 there are limits to consider. A simple calculation
shows how crowded the Earth is, 1/7 billionth of the Earth’s surface equates to 7.3 hectares. Subtract the 70% covered by ocean and each person alive today has just 2.2 hectares of land. Adjust that to make room for the additional 2 billion people expected by 2050 and this leaves 1.65 hectares. The world population is expected to grow to 10.1 billion by 2100 (United Nations News Service 2011) further reducing the area available to each person. The unproductive land such as deserts and frozen tundra must also be deducted from the current 2.2 hectares leaving little room for human needs and ecological systems to cohabit the space.

The productivity of land is measured by the net surplus of ecological goods and services provided through new growth every year. This expressly excludes the stock of natural capital required to produce it. A forest would represent the natural capital while the fruits nuts and new timber growth would represent the annual product. Harvesting more than the annual product would reduce the stock of natural capital thereby reducing the future productivity of the land (Hawken, Lovins & Lovins 2010:3–5).

The amount of productive land available can be estimated by the Ecological Footprint, This tool developed by Wackernagel and Rees (1996) to aid in sustainability planning expresses the Earth’s finite ecological resources as a unit of productive land. At the time the book was published the world population was approximately 6 billion and the individual share, termed a ‘fair Earthshare’, of the Earth’s ecological productive land was approximately 1.5 hectares. This ‘Earthshare’ assumes all of the productive capacity is available for humans and leaves nothing for other species (Wackernagel & Rees 1996:54).

Clearly directing all or even a large part of the product for exclusive human use cannot be sustained over the long term as it would deplete the living component of the ecosystems that form our natural capital. The 27th September is the estimated day of Earth Overshoot for 2011, the point when the demand of human activities for ecosystem goods and services exceeded the annual supply. After this date human activities started drawing down the stock of natural capital (Wackernagel & Rees 1996:55). As a species we have reached and exceeded the sustainable ecological limits.

The findings of the Millennium Ecosystem Assessment (MA) (2005) provide stark evidence of ecosystem degradation resulting from human activities over the last 50 years. By assessing ecosystems in terms of the relationship to human requirements for goods and services the report highlights both ecological and social imbalance and injustice. The MA reports that 60% of the ecosystems assessed have been degraded or are used
unsustainably and reports “... a substantial and largely irreversible loss in the diversity of life on Earth” (MA 2005:1).

Strategies for sustainable development must take into consideration the finding, though inconclusive, of potential non-linear and abrupt changes in ecosystem functions that may affect food security and economic performance (MA 2005:1).

2 Inequality and Social Injustice

Not only are ecosystems being over exploited the cost of the degradation is being shifted to the poorer developing countries and to future generations through reduced productive capacity. The degradation may increase over the next 40 years, the cost of which will burden mainly developing countries and will hinder the achievement of the Millennium Development Goals (MA 2005:1).

The imbalance in resource allocation between human activities and ecosystems is repeated by the gross misallocation of resources between developed and developing countries resulting in large inequalities in wealth, human development and quality of life (McLaren 2003; Norberg-Hodge 2000).

The premise for promoting trade based national and international economies was to rebuild Europe and ensure the future stability of the world economies after World War II. At a convention at Bretton Woods John Maynard Keynes proposed that governments actively stimulate aggregate demand through monetary policies. The International Monetary Fund (IMF) has aggressively pushed governments to grow their economies and since the 1980s has practically forced free trade policies onto developing countries in need of loans. The IMF and the World Bank have ensured developing countries accept market liberalisation despite the negative impact it has on their internal economies resulting in the vast majority of the world’s poorest people now living in developing countries (Stiglitz 2002).

The programme has succeeded in the first objective and failed dismally in the second. A new programme is required that must not only stabilise world economies it must redirect the flow of wealth towards equitable human development in developing countries and redress the social injustices of the first programme.

3 The Dilemma of the Consumption Economy

It has been argued that there has been a deliberate structuring of the world economy to
prioritise international trade powered by the creation of a consumer society with success being measured by ever increasing rates of material consumption. This increasing rate of consumption is made possible by relatively cheap energy, free trade policies and the concentrated wealth and power of transnational corporations (Norberg-Hodge 2000; Stiglitz 2002).

The malaise of the consumption based economy as the driver of unsustainable human activities is a regular theme in sustainability literature (Norberg-Hodge 2000; Jackson 2009; Hawken, Lovins & Lovins 2010). The modern capitalist economy both promotes and is dependent on constant growth in consumption rates. This consumption based economy requires the flow of billions of tons of material every year of which most is disposed of as waste (Hawken, Lovins & Lovins 2010:8).

The easy access to cheap funding through debt finance in the last decade has added a further growth impetus. The concentration of wealth and power in developed countries has been directed towards controlling resources in developing countries. Local communities experience poverty and cultural disintegration as they lose access to natural resources and move to cities to join the consumer society where they must compete in the modern economy (McLaren 2003; Mies & Shiva 1993; Norberg-Hodge 2000; Väyrynen 2005).

The western materialistic version of capitalism resembles a positive feedback system locked-in by decades of indoctrination and entrenched belief in economic growth through increasing consumption; by the aspirations of billions of consumers that measure individual success by material acquisition; by massive investments in physical and social infrastructures aligned with this mindset; and by the need to pay interest on and settle the excessive international debt used to finance the system (Roubini 2011; Heinberg 2007; Mauldin & Tepper 2011).

There is growing discontent with a lifestyle dominated by a materialistic value system (Wilkinson & Pickett 2010). Awareness of the ecological damage, ecological limits and unsustainability of this system is spreading through all spheres of society including the field of economics (Daly & Townsend 1993; Stiglitz 2002; Jackson 2009; Roubini 2011; Gilding 2011). Transforming this mindset will take more than the realisation that it is unsustainable. The underlying forces that drive it have to be systematically transformed, eventually removed and replaced with drivers of sustainable development (Jackson 2009; Heinberg 2011; Martenson 2011).
The role of consumption is so fundamental to the functioning of the western capitalist economy that it is understandable that most economists are loathe to tinker with it, least the truth of its vulnerability and reliance on the false logic of infinite growth is exposed. Unravelling the consumption based economy and building an economy founded on sustainable principles, while avoiding a collapse in confidence, will require finesse.

4 Review of Worldviews on Sustainability

The definition of sustainable development in the Brundtland Commission report *Our Common Future* (WCED 1987) links the ideals of sustainability and human development. Implicit in the definition is the need for economic growth to achieve the human development goals especially to meet the needs the poor. While the Brundtland definition acknowledges ecological limits these are not considered to be inherently finite rather these limits reflect the limitations in productive capacity due to current technology and social organisation (Hattingh 2001:5–6; Swilling & Annecke 2012:51).

Over the last quarter century the concept of sustainable development has seen numerous interpretations and attempts to refine or redefine it see overviews by Mebratu (1998), Sachs (2000) and Sneddon (2006).

4.1 Pluralistic approach

A search for understanding of the concepts of sustainability and sustainable development exposes an endless array of interpretations along ethical (Hattingh 2001), ideological, semantic and logical lines (Mebratu 1998). Detailed literature research provides a greater depth of understanding of the parameters that collectively encompass the idea of sustainable development however a single concise and comprehensive definition remains elusive. It is necessary to move beyond the quest for one universally acceptable interpretation, as it may be neither possible nor desirable, and acknowledge a plurality of perspectives (Sneddon, Howarth & Norgaard 2006).

This paper takes the approach that while no single definition of sustainability may be universally accepted each worldview represents, besides its inherent dogma, fundamental principles that must inform sustainable development. Navigating the array of worldviews is aided by a map of sorts provided in the book *Understanding Sustainable Development* (Blewitt 2008).

In chapter 2 of the book Blewitt exposes the reader to a range of world views (2008:27–50).
It becomes apparent that rather than presenting tangible direction towards sustainable development most worldviews attempt to define the concept to conform to and expand on their existing ideological, institutional or academic outlook (Mebratu 1998; Sneddon, Howarth & Norgaard 2006). While none of the worldviews offers a complete picture they do serve as beacons to navigate and weave a path towards sustainability.

4.2 Deep Ecology

The deep ecology approach reminds us that we do not have an exclusive right to exist and flourish, that all life has this right. (Blewitt 2008:30–31). The human and natural realm is indivisible, they are the same. Human impacts on nature impact equally on the human realm. The richness and diversity of both nature and culture are values in themselves. Rather than focussing on a standard of living, defined by material acquisition, human development should focus on meeting vital needs and on life quality through experiences of value. Ecosystems must be appreciated for their intrinsic value that transcends mere commercial value (Blewitt 2008:31).

Naess prescribes a fundamental change in economic, technological and ideological structures to achieve a sustainable future where humans live in harmony with nature (Naess in Blewitt 2008:31). While it may not be realistic to expect everyone to adopt an ideological lifestyle that is true to deep ecology these principles can serve as a benchmark to assess the ecological integrity of policies and practices claiming to promote sustainability.

4.3 Relationships within Societies and with Nature

The social ecologists and similarly the eco-feminists remind us that the unsustainable exploitation of natural resources is a reflection of societal behaviour and power relationships. That the reckless degradation of ecosystems cannot be stopped without reshaping the social and economic structures that perpetuate the inequality within and between countries due to the concentration of power, wealth and control over access to resources (Blewitt 2008:32–34).

Eco-feminism identifies modernisation, progress and development, promoted by a male dominated capitalist patriarchal world system, as being the cause of oppression of women, children, humanity and the natural world. The hierarchical dichotomy inherent in this world system is typically expressed through antagonistic, superior versus inferior, relationships with oppression and exploitation being the norm. In principle eco-feminism promotes connectedness, a holistic approach to theory and practice, inclusiveness, respect for diversity and a fundamental realisation that liberation for women cannot be achieved without
the preservation of all life (Mies & Shiva 1993:1–20).

Social ecologists see social restructuring as essential for achieving social harmony without which harmony with nature is not possible. The exploitation and degradation of the natural world is an extension of the centralist power hierarchies of the capitalist system. Urban settlements must be decentralised and designed to a scale that matches the capacities of the local ecosystems (Blewitt 2008:34).

### 4.4 Importance of Local Context

Human societies have lived for centuries even millennia in harmony with the ecosystems that sustain them. Those that were successful evolved traditions and beliefs that restrained unsustainable population growth and excessive exploitation of natural resources. Those communities that did not eventually collapsed (Diamond 2006).

The resurgence of interest in traditional ecological knowledge offers a further insight towards developing a viable approach to sustainable development. Human activities that aim for sustainability must take into account the characteristics and limitations of the local ecosystem they rely on. For this a deep understanding of the ecosystems and their limitations is required. This understanding of the local ecological context often resides within the traditions, beliefs and lore of the communities that have lived there for generations (Norberg-Hodge 2000; Blewitt 2008:36–39). It can be argued that there can be no universal concept of sustainability, as a unique solution is required for each local ecological and social context.

The idea of scaling human activities to match the extent of a host ecosystem is encapsulated in bioregionalism. The argument is that decentralised communities living in harmony with and within the resource limits of ecosystems will almost by default result in sustainable development. It is interesting to note many of the societies examined by Diamond that failed were bound to a particular bioregion. This fact alone was not sufficient to ensure a sustainable harmony between them and their host ecosystems. In these cases it appears that inflexible and unsustainable social practices lead to over-exploitation and degradation of the ecosystems they depended on and ultimately the collapse of their societies (Diamond 2006).

The principle of attaining and maintaining equilibrium in the natural environment, in industry and agricultural and in population growth is crucial to attaining a sustainable bioregional community. To achieve this equilibrium requires greater attention to connecting and
identifying with the local ecology and reinforcing the sense of being native to a place. Recognising that degraded ecosystems undermine the potential for sustainability bioregionalists prescribe ecological restoration (Blewitt 2008:35–36).

To maintain equilibrium in industry and agriculture, trade is limited to dealing with surpluses not required by the community and should be limited to the essential items not locally available (Blewitt 2008:35).

### 4.5 Resource Efficiency

Proponents of ecological modernisation put their faith in increasing resource efficiency to reduce humanity's reliance on primary natural capital and to take the pressure off ecosystems. It is even suggested that we can optimise ecosystems for greater productivity. This is not a new idea and was first practised with the advent of agriculture around ten thousand years ago. The biodiverse landscape was replaced by a limited number of domesticated plants and livestock purely for human consumption. The fallacy of this approach is ecosystems have evolved over millennia and any attempt to optimise them merely means directing energy and material flows from one part of the system towards the products humans want. In effect the ecosystem becomes less optimal in that the sub systems that lose energy and material flows then degrade reducing the resilience of the whole system (Walker & Salt 2006:7–10).

Decoupling aims to maintain economic growth while staying within natural limits through ever increasing efficiency in the provision of goods and services by reducing the throughput of materials and energy per unit of GDP (Jackson 2009:67–86). Jackson refers to strong evidence of relative decoupling over the past few decades where especially in advanced countries the material and energy throughput per unit of GDP has reduced. He is less convinced that absolute decoupling has been achieved where despite the efficiencies achieved the total material and energy consumption has increased over the same period due to higher rates in GDP growth. A successful strategy of decoupling must maintain a continuous and absolute decrease in material and energy throughput that exceeds the percentage of growth in GDP. Substantial increases in absolute decoupling are required where ecological limits have already been exceeded such as CO₂ emissions (Jackson 2009).

As the author Herman Daly (Daly & Townsend 1993) argues the second law of thermodynamics establishes certain absolute limits to increased efficiency. At some point further efficiency is not possible and the underlying drivers of unsustainable processes need
to be addressed. Decoupling as a strategy towards sustainability is essential, however the underlying cause of the ever increasing material and energy consumption must be addressed.

### 4.6 Systems Thinking and Networks

Latour advocates focussing on matters of concern and to overcome the inherent bias and assumption associated with labels such as 'nature' where 'nature' is therefore separate from 'society'. Actor Network Theory (ANT) attempts to neutralise the tendency to view issues in terms of opposing positions. Rather than defining issues by the attributes of the subject and object ANT promotes defining issues by the characteristics of the relationships between them. While this approach removes the fixation with truths, its focus on what 'matters' introduces the complexity of the political decision-making process (Blewitt 2008:40–41).

Systems thinking takes the focus on relationships and introduces the concepts of ecological systems with positive and negative feedback loops, adaptation, dynamic equilibrium, communication and hierarchy. The systems approach enables modelling of complex systems by defining the attributes of the multi-dimensional relationships between the elements. Systems thinking enables analysis and interpretation in a manner that reveals unexpected emergent patterns, system adaptation and resilience, essential when assessing sustainable development strategies (Blewitt 2008:42; Gallopín 2003:11–18).

The criticism of solutions provided through systems thinking is that results are expressed in probabilities rather than the direct answers that decision-makers are used to. Analysis using systems theory is only as good as the understanding of the relationships within the system being modelled. To their credit systems analysts are better at identifying thresholds or tipping points where the system flips to an alternate state of equilibrium that could not have been predicted using only reductionist analysis. Forewarning of tipping points is crucial when working close to ecological and social limits (Blewitt 2008:41–44). Systems thinking should be considered a tool for assessing the sustainability of a strategy or scenario rather than a worldview on sustainability.

### 4.7 Gaia Hypothesis

In terms of the Gaia hypothesis the Earth behaves like a large self regulating organism constantly adapting to maintain a dynamic equilibrium that is conducive to the forms of life inhabiting it at the time. This assertion remained controversial since it was first presented in the 1960's (Blewitt 2008:45). In Amsterdam 2001 a declaration was signed by over 1,000 global-change delegates acknowledging that the Earth behaves like a self regulating system
(Lovelock 2007:32). The acknowledgement that the Earth is a self regulating system and the unavoidable conclusion that it is the super system within of which all ecosystems and human systems are subsystems affirms the Cosmic Interdependence model (Mebratu 1998:514).

Of concern is the conclusion by the author James Lovelock in the book *The Revenge of Gaia* that it is too late for sustainable development as the damage has gone to far and more development will simply do more damage. The focus must turn to adaptation (Lovelock 2007:3–4).

### 5 Conclusion

This paper set out to demonstrate that sustainable development must be constrained by ecological limits and further that a universal concept for sustainable development is improbable and undesirable.

The spatial extent of land surface currently available per person is limited to 2.2 hectares. The productive land that is available is only 1.5 hectares and these values will reduce to accommodate a population of 9 billion by 2050. The annual ecosystem product for 2011 was consumed by human activities by the 27th September. For the remainder of the year the natural capital was drawn down to supply the needs of human activities. The authoritative Millennium Ecosystem Assessment report confirms human activities have degraded over the past 50 years 60% of the ecosystems assessed. Further degradation resulting from human development is expected over the next 40 years. The developed countries avoided their ecological constraints by taking ecosystem products and natural capital from developing countries. This leaves local communities and future generations with reduced production capacity to meet their needs and reduces their chances of developing out of poverty.

A review of worldviews on sustainability found that each operates at different scales from global, to regional to local. Each worldview has a core conviction that may make it incompatible with one or more alternate worldviews. One universal concept could not be applied to countless local socio-ecological contexts and provide a flawless solution that works for each locality. A universal application would include unsuitable prescriptions for all but a few situations.

This paper reviewed prominent worldviews on sustainability from which key principles were synthesised that reflect shared values. A sustainable development strategy might respond to the following normative principles:
1. The human and natural realm is interconnected, human well-being is achieved only through the well-being of all life and impacts on nature impact equally on humanity.

2. There is a reciprocal relationship between the sense of being native to a place, and the commitment to connect with and understand the local ecology and culture.

3. Ecological and cultural memories co-evolve and grow richer with time.

4. Respect the richness and diversity of both nature and culture, as values in their own right that transcend mere commercial value.

5. Surpass vital needs, with life quality through valued experiences, above material acquisition.

6. Restore degraded ecosystems, communities and their cultural identities so that both can be enriched.

7. Without a commitment to deeper understanding, even the simplest system will produce unexpected, possibly unwanted changes. More complex systems will require the same understanding with more knowledge.

8. Export only surpluses that are not required by the local community or ecosystems.

9. Use less of the annual natural product than that which is required to restore and maintain the natural capital.

10. Aim for resource efficiency in the manufacturing of required products with no waste and a minimum increase above room temperature.

11. Balance the population and its consumption with that of the ecosystems’ capacity to maintain it.

12. Maintain an equilibrium between the natural environment, agriculture and industry.

13. Restore the imbalances in human well-being, ecological integrity and control over resources, between regions and within regions.

14. Match the level of social structure and decision-making to the extent of affected communities and ecosystems.

15. Be ready to adapt to outside influences.

This paper reviews the consumption based economy and finds that this was a deliberate act reinforced constantly over the last half century, it generates significantly more waste than useful product, is subsidised through cheap energy and debt, is required to grow exponentially and cannot easily be transformed or replaced without destabilising the world economy. Since it is a key contributor to the unsustainable exploitation of natural capital and is unlikely to be replaced in the short term it should be considered a key obstacle to a long term sustainable future.
PART B: Recycling a Perspective on Sustainability

Recycling is an established industry in South Africa and is simply assumed to be sustainable in the broadest socio-ecological sense. This assumption will be interpreted from a range of worldviews and it will be argued that while recycling is not incompatible with any, some perspectives would consider it superfluous, it is most compatible with the ecological modernisation worldview. The underlying assumption that recycling in its current form is sustainable will also be explored.

1 Outline of the Recycling Industry

While the concept of recycling is generally understood a brief outline is necessary to contextualise this study. In its most concise form recycling can be defined as the process of reusing the material from an unwanted product to manufacture a new product instead of disposing of it (Clean Energy Ideas n.d.). For expanded definitions of recycling refer to the South African Waste Information Centre (2006) and the United States Environmental Protection Agency (Pillsbury 1997).

1.1 Conventional Industrial Process

To understand the benefits of recycling it is necessary to first reflect on the conventional industrial process where raw materials are either extracted through mining, harvested from natural habitats or from agricultural land transformed from natural landscapes. In the process ecosystems are destroyed or degraded. The raw materials are often pre-processed on site then transported to a series of plants for further processing and refining before they enter the manufacturing phase. At each stage large volumes of waste materials; solids, effluent and emissions, are produced and disposed of placing further pressure on ecosystems. Materials are transported great distances, often across the world and back again, between each stage of processing, manufacturing, and final distribution to the end user. Once the end user has consumed the product the packaging and often the product itself is sent to landfill. The whole process is driven by a consumption based growth economy powered by relatively cheap fossil fuels. For an insightful and easily digested overview of the conventional process see the video documentary titled “The Story of Stuff” (Fox 2007).
1.2 A Visit to the Land of 'Away'

The following section is written in the first person as it best reflects the author's personal experience.

I recently had the opportunity to visit the place generally referred to as 'away', I visited four such places in the City of Johannesburg while overseeing an environmental legal compliance audit in June 2011. My first observation is that they were not that far away, rather their presence is very immediate and imposing. Since they are landfill sites it may seem ironic that my next impression was how wasteful the process is. While inspecting the work face we were confronted with the activities of the reclaimers, a group of what initially appears to be a disorganised mob of human scavengers scrambling around the garbage trucks. Like the ever present flock of squawking seagulls people would dive in and out, seemingly indiscriminately, to grab something of value.

It turns out they are neither disorganised nor indiscriminate. By far the most sought after items are soda drink bottles made from a type of plastic called Polyethylene Terephthalate (PET). I was informed that despite the unpleasant conditions that reclaimers can generate a reasonable income collecting and selling PET by the ton.

This is a form of recycling however it represents the most inefficient and unpleasant form. Reclaimers sort through mounds of general waste to get at PET bottles which attract the greatest financial return for their effort while ignoring most other recyclable materials with lesser monetary worth.

The work of the reclaimers contradicts every basic principle of the idea of decent work. From direct observations and casual discussions with the operations managers of the landfill sites the reclaimers work in dangerous conditions unprotected from the elements, amongst material that is contaminated by rotten food and occasionally by medical and hazardous waste. They have no formal employment, are essentially trespassers and enjoy no legal claim to the recyclable materials.

1.3 Sorting Recyclables at Home

The following section is written in the first person as it best reflects the author's personal experience.

Unlike the municipalities in the Western Cape our Municipality the City of Tshwane has no
programme to support separating of materials at source. Without the necessary infrastructure 'recycling' does not progress further than the kitchen. The research campus where our office is based introduced collection bins for sorted materials a few years ago. I was able to move our sorted material on to the recycling process. It was inconvenient but I persevered, all the while on the lookout for a Pretoria based 'recycling' company.

I was curious how my family would respond to sorting recyclables and was quite surprised that they took to it without any complaint. After a while I noticed my wife thinking twice about purchasing a particular brand if the packaging could not be recycled. The conscious act of sorting recyclables was making our family more aware of the impact our purchasers would have on the environment.

Our in-laws visited and were quite gracious about following our lead. Later their municipality introduced voluntary sorting by providing clear plastic bags and collecting the sorted material. Our in-laws volunteered without a second thought. It appears that where the right infrastructure is in place to make it as convenient to sort at source as it is to discard waste, people once introduced to the idea would rather 'recycle'.

A 'recycling' company eventually extended its area of collection to include our suburb and we subscribed in March 2012.

1.4 Interview with a Recycling Company Representative

An interview was arranged to gain an insight into the operations and practical experiences of a 'recycling' company conducting what may be generally referred to as an environmentally friendly or 'green' business. An interview was held with Mr Lido Graham a business partner in the company Open Sky based in the City of Tshwane. The following section is compiled from notes of the discussions during the interview process.

The recycling industry is fairly well established in South Africa with a reliable network of converters, companies that purchase and process sorted material to produce either plastic flakes or beads. In some instances converters use the material to manufacture items directly. Usually the flakes or beads are sold on to manufacturers in South Africa or to commodity buyers that export to China and India (Graham 2012).

Open Sky has a pay-for-collection business model at approximately the same cost as the municipal fee. Clients pay for the convenience of their recyclable material being collected. Open Sky is entirely self funded and receives no government subsidies or financial
incentives. To date local government’s involvement has been limited however there are areas they could assist private collectors. The key cost collectors have to manage, is the weight and density per kilometre travelled. A fifteen kilometre radius around the transfer site represents the break even point beyond which it is no longer viable to collect material. The cost of buying or leasing land for transfer sites affects the areas private companies can support. Local government can assist by setting up a series of transfer sites on government owned land that private companies can use. The City of Tshwane outsources waste collection and could as easily outsource the collection of recyclable material (Graham 2012).

The demand for recyclable material varies depending on the material and time of year however there is a stable demand for certain materials. The demand exists for more recyclable material. There are no entry restrictions, anyone can start, many start with a borrowed shopping trolley and slowly work their way towards purchasing a vehicle. The only limiting factor is the distance from the collection site of a buyer. Here local government could assist by providing a denser grid of collection or transfer sites and create new work opportunities for self employed collectors (Graham 2012).

With data gathered over three years Mr Graham estimates that between 80% and 90% of the typical suburban domestic waste in the City of Tshwane could be redirected to the recycling industry for reuse. The financial cost of energy consumption for transport and processing the collected material is internalised in the price paid to collectors. The distance that local recyclable materials are transported cannot compare to the much greater distance that the virgin material would travel from extraction to manufacturer (Graham 2012).

Open Sky has a vision to complete the material cycle with a cradle-to-cradle solution producing golf tees for a golf club using plastic material collected from the same estate. The tees would be branded to raise awareness of the cradle-to-cradle process (Graham 2012).

Collection of material sorted at source rather than at the disposal site provides opportunities for more dignified work. Open Sky appoints 15 staff for every 1,000 houses and approaches people that previously operated as reclaimers on landfill sites. Moving from a landfill site to employment at Open Sky means an immediate improvement in working conditions. The sorting is carried our at a transfer site rather than at the working face of a landfill site. Staff are formally employed and received monthly salaries greater in value than they could earn at the landfill site. The material they work with is clean and the work area is far more hygienic. Staff benefit from discarded electronic equipment, very often in good working order (Graham 2012).
With the exception of individual self employed collectors the business ownership is male dominated. In a convenient but unfortunate reinforcement of a cultural stereotype women form a sorting circle while men drive out to collect the recyclable material from residential clients (Graham 2012).

2 Interpreting Sustainability

The wide array of interpretations of sustainability has frustrated those seeking a universal definition with which to assess the sustainability of decisions and processes (Mebratu 1998; Hattingh 2001; Blewitt 2008). Taking a truly pluralistic approach (Sneddon, Howarth & Norgaard 2006) this assessment imagines the responses from a diverse range of worldviews thereby establishing the boundary principles within which the recycling industry could be considered sustainable.

2.1 Deep Ecology

Recycling is a step in the right direction as it offsets to a degree the imbalance between what ecosystems are able to provide and what is currently being demanded of them. However recycling remains an industrial process that impacts on ecosystems. It merely addresses the symptom not the underlying problem of excessively high consumption rates. A simpler solution would be to take from nature only what is necessary, focussing on the quality and not the quantity of goods. Remove excessive consumption and a recycling industry is not required. Recycling should remain a natural process to be incorporated by default into all human activities.

2.2 Traditional Ecological Knowledge (TEK)

Reusing and recycling waste replicates the cyclical processes of nature. The recycling industry is an unnecessarily complicated and resource intensive way of getting the things you need. Consideration should be given to using the food, medicine and materials that are readily available in the surrounding natural landscape. Nature will recycle what can no longer be used. The need to produce and consume so much and then discard it almost immediately is very wasteful. It seems recycling is necessary to minimise the damage of the industrial process on ecosystems and cultures however it remains part of the industrial process which is not sustainable in its current form.

2.3 Social ecologists

This could be considered a good example of how power relationships influence the impact
on ecosystems. It is encouraging to see the very consumers, so essential to the consumption based economy, exert their power over corporations to demand the inclusion of recycled materials in products and thereby giving rise to the recycling industry. It is however essential to keep it simple, use manufacturing processes and materials that are appropriate to the local socio-ecological context. Matching the scale of the recycling industry to that of the local beneficiary communities is recommended (Blewitt 2008:34).

The complex international economic and corporate structures that control the flow of capital, resources and products allow the accumulation of wealth and power in the hands of a few at the expense of local communities (Blewitt 2008:34; Norberg-Hodge 2000:3; McLaren 2003:33). The recycling industry in its current form is tied to the same global system and though it may mitigate the effect, it cannot be considered conducive to sustainability in the long term nor to the development of impoverished people.

2.4 Eco-feminism

The recycling industry is male dominated and is framed by the same mindset that permeates the capitalist patriarchal world system. Being part of the global system it should be seen in the same light as the exploitative capitalist patriarchal system that controls international trade and resource allocation (Mies & Shiva 1993:2). Recycling merely justifies the continuation of the current global system. The promise of new work opportunities must be viewed in the same context as that of large transnational corporations (TNCs) that promote economic freedom through emancipation (Mies & Shiva 1993:6–8). The TNCs in the name of free trade and working through local agents, barely support minimum wages for local people to harvest material that the TNCs then take away to process and profit from (Mies & Shiva 1993:9). In this context the recycling industry cannot be considered an agent of sustainable development.

2.5 Actor Network Theory

The modern global economy is founded on countless political decisions to promote and facilitate free trade and consumer based economic growth (Stiglitz 2002). The degradation of ecosystems as they reach or exceed capacity runs parallel to this (Norberg-Hodge 2000). Awareness of this threat to ecosystems and disruptions of cultures has lead to international political agreements such as the Kyoto Protocol in 1998 and the Brundtland Commission (World Commission on Environment and Development 1987) to minimise and reverse the damage.

The recycling industry is a natural evolution of these political processes. To demonstrate
their environmental responsibility corporations have established a demand for recycled materials. This has lead to new technological innovations and products. Individuals, small business and corporations have responded by establishing collection, distribution and processing networks for recyclable material. Although the drive to recycle is largely a reaction to ecosystem degradation, participants in the recycling industry need not be motivated or even be aware that their activities reduce pressures on ecosystems.

The recycling industry is exemplary of the 'Actor-Network-Theory' and the political nature of the interactions between ecosystems (natural), consumer reaction and entrepreneurial response (social) and technological innovation (science-based). The complex reciprocal interactions blur the distinction between subject and object (Blewitt 2008:40–41). The recycling industry is therefore sustainable, while the current dynamic between ecosystems, consumers and entrepreneurs, and global economic conditions remains unchanged.

2.6 Bioregionalism

Recycling can be seen as a necessary processes to ensure the sustainable development and long term sustainability of region based communities. These communities can reuse locally sourced materials to ensure human activities remain within the carrying capacity of the host ecosystems (Blewitt 2008:35).

Recycling as an industry is no longer sustainable where the recycled material is traded primarily as a commodity for export, especially when material has to be imported to make up for local manufacturing and consumption. See the article “Shifting Direction: from global dependence to local interdependence” for a detailed argument in favour of reduced globalisation and stronger local economies (Norberg-Hodge 2000).

2.7 Gaia Hypothesis

The question of whether or not recycling is sustainable is moot, according to James Lovelock it is too late for ideals such as sustainable development and renewable energy (Lovelock 2007:4).

The damage to Gaia as a self regulating entity especially through the emission of greenhouse gases has gone too far. Reducing the impact on ecosystems through recycling is admirable however the reduction is insignificant and cannot offset past and current impacts. What is required is a 'sustainable retreat' as humanity adapts to the feedbacks resulting from human induced destabilisation of the Gaia system (Lovelock 2007:8; Harding in Blewitt 2008:46).
2.8 Systems Thinking

The recycling process can be described as a system with the main elements being the collection, separation, baling, converting and re-manufacturing stages while the flow of materials serves to link these elements (Gallopín 2003:9).

For the recycling process to be considered sustainable the net worth of the outputs, the relative value of the recovered materials against virgin materials, must not decrease over time. The relative output value could be a combination of the price, profit, energy balance and recovery benchmarks established by consumer demand or legislation. As a subsystem to the larger consumption driven production system, recycling is dependent on a continuous supply of recyclable materials and demand for recovered materials. A drop in profits, reduction or removal of benchmarks for recoverable material, or a negative energy balance would reduce the output value function. A lower output value may result in the decreasing net worth of the outputs at which point the recycling system would no longer be sustainable (Gallopín 2003).

2.9 Ecological Modernisation

The reuse of materials and savings on embodied energy of recovered materials over virgin materials would, together with the positive impact on corporate brands, be considered sustainable by proponents of the weaker ecological modernisation (EM) perspective. While the environmental benefits are promoted critics may argue that the recycling industry is actually an economic response to a new market demand without which it would not and could not exist (Blewitt 2008:46). In the eyes of EM proponents with a stronger ecological leaning the recycling and manufacturing industries should merge into a fully integrated 'cradle-to-cradle' system as proposed by Braungart (2009) for it to become truly sustainable.

3 Conclusion

This paper provides a brief outline of the conventional industrial process where material follows a linear path from extraction to disposal at a landfill site. Collection and sorting takes place at landfill sites and the author shares his experiences and observations of the working conditions of reclaimers, having visited four sites in the City of Johannesburg.

The author shares his personal experiences with separating at source and identifies opportunities for local government to actively promote and support recycling.

The summarised notes of an interview with a business partner in a local recycling company
based in the City of Tshwane highlight key issues where the recycling industry might be critiqued in terms of its contribution to sustainability. Key findings include the steady and growing demand for recyclable materials, the minimal entry barriers, the current lack of local government support in the City of Tshwane, the gender imbalances with a male dominated industry, and the improved working conditions of employed sorters versus landfill based reclaimers.

This paper considers possible responses from an array of prominent worldviews on the sustainability of the recycling industry. At the outset it was anticipated that the recycling industry would not be incompatible within any worldview, that it may be superfluous to some and only compatible with the ecological modernisation worldview. The method of assessment relied on a qualitative comparison of the characteristics of the recycling industry against a rationalised version of each of the prominent worldviews.

It was found that the recycling industry is not compatible with the eco-feminism worldview. The industry is male dominated, perpetuates African gender stereotypes and is no more than an extension of the existing capitalist patriarchal world system. The social ecologists share a similar perspective to the eco-feminists, that the recycling industry is entirely reliant on the global system and therefore cannot be said to be sustainable over the longer term.

The deep ecology and TEK worldviews would agree with the idea of recycling however consider it to be redundant since the preferred solution would be to avoid the generation of waste altogether by terminating the conspicuous consumption process.

The worldviews of bioregionalism, political ecology and systems thinking would consider recycling to be sustainable only where certain conditions are met. Proponents of bioregionalism require a regional scale operation. Proponents of political theory and systems thinking point out that recycling is only sustainable while consumption waste is generated. The Gaia Hypothesis worldview considers the idea of sustainable recycling as irrelevant. The world crisis is too advanced for sustainable development to rectify it.

The assessment confirms that proponents of ecological modernisation (EM) would consider the recycling industry to be sustainable. The stronger ecological proponents of EM would recommend a closer integration of the recycling and production phases in line with the ideal of cradle-to-cradle materials cycling, for it to be considered sustainable.
References


