Ecological Footprint Analysis of SMEs Within the Mid-West Region of Ireland

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This project aims to identify the scale of SMEs environmental impact and to demonstrate how this information can be used to calculate the ecological footprint of an individual SME. The ecological footprint will then be used as an indicator of sustainability. The concept and methodology of the ecological footprint is a mechanism for SMEs to develop an environmental management information system that will aid in the measurement and assessment of their environmental performance. An ecological footprint can represent simply and communicate effectively issues of environmental impact and sustainability. It will highlight how SMEs can contribute to the objectives of sustainable development. There are twenty SMEs from a variety of sectors involved in this research; one of the SMEs ecological footprint will be presented here. The diversity of companies involved in the overall project allows comparative studies between sectors to be carried out as well as identification of possible synergies. Through the application of the ecological footprint on an annual basis an SME can develop, identify and illustrate its progress towards sustainability over time. Upon the successful completion of this project it is expected that the ecological footprint will be accepted as a valid and worthwhile sustainability indicator for SMEs.

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1. Introduction

Small-Medium Sized Enterprises (SMEs) are important engines of economic growth, employment and development and are a rapidly growing section of the business community. Collectively they contribute significantly to a country's economy and are responsible for considerable resource consumption. They are substantial contributors to environmental pollution. It has been documented that 70% of all industrial pollution can be attributed to SMEs (Hillary, R. 2000). SMEs are essential in delivering sustainable development as they provide many of the goods and services that contribute to improved quality of life (Chambers and Lewis, 2001). Data from twenty SMEs of a variety of industry types will be gathered for the purpose of this research project. The study boundary for the purpose of this research is the Mid-West Region, which comprises Counties Limerick, Clare and Tipperary North. This region covers an area of 7,939 square kilometres with an estimated population of 325,800 persons. An ecological footprint has been calculated for Company "X" Ltd. The ecological footprint is designed to quantify the environmental impact of the company. Developing the footprint gauges the extent of the environmental impact from the company's activities. The footprint identifies the contributors to the overall environmental impact of Company "X" Ltd and helps prioritize action.

1.1 Aims and Objectives

The aim of this project is to carry out an assessment of current sustainability indicators for business. It will then identify the scale of SMEs environmental impact and demonstrate how this information can be used to calculate the ecological footprint of an individual SME. An ecological footprint can represent simply and communicate effectively issues of environmental impact and sustainability. It will highlight how SMEs can contribute to the objectives of sustainable development. The diversity of industry types being sampled will allow comparative studies across sectors to be carried out as well as the identification of possible synergies between sectors. Through the application of the ecological footprint on a regular basis, (monthly, quarterly, yearly, etc.) an SME can develop, identify and illustrate its progress towards sustainability over time. Upon the successful completion of this project it is expected that the ecological footprint will be accepted as a valid and worthwhile sustainability indicator for SMEs in the Mid-West region. This paper will outline the methodology used and the results obtained in the ecological footprint analysis of one of the SMEs. It aims to illustrate how the ecological footprint can be used as a tool to communicate effectively both internally and externally the environmental effects of the company's activities, to identify the 'hard hitters' highlighting areas needing immediate attention.

1.2 Sustainable Development

One of the greatest challenges facing modern society is the need to combat present unsustainable trends, both in the consumption of resources and the equally unsustainable production of waste. At a fundamental level humanity has always been aware of its effect on the environment that supports it. Sustainable development is at its heart the simple idea of ensuring a better quality of life for everyone, now and for generations to come. The publication of the Brundtland Commission's report entitled 'Our Common Future' in 1987 provided the most commonly used definition of sustainable development, as development which:

> "…meets the needs of the present without compromising the ability of future generations to meet their own needs", (WCED 1987).

Sustainable development pursues a threefold goal of improving economic efficiency, protecting and restoring ecological systems, and enhancing the wellbeing of all people.

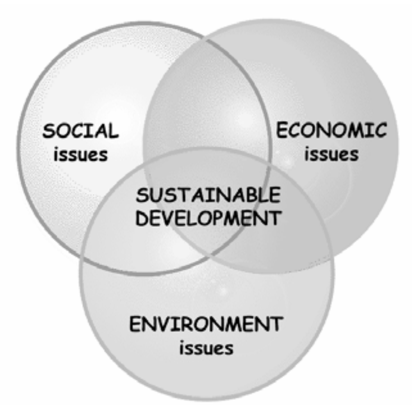

Figure 1: Social, economic and environmental components of sustainable development.

1.2.1 Business and Sustainable Development

"Our Common Future," emphasised the importance of environmental protection in the pursuit of sustainable development. The relationship between sustainability and business has emerged as one of crucial concern in recent times. This emergence of environmental concerns in business has been driven by the following:

1. There's an increased awareness of the seriousness of the environmental consequences that have resulted from previous economic growth. The attitude that the environment is a provider of free goods to business and not a set of precious resources is no longer tenable.

2. Industrial accidents and crises such a Bhopal have accentuated the awareness of the environmental implications of business.

3. The varying degrees of emphasis which have been placed on environmental issues, reflected in legislation blurs the terms of trade and "places an uneven burden on public and private sectors". For instance in some countries businesses are required to incorporate the costs of good environmental practice within their economic structure (Roberts, 1995, pg 2).

1.3 Indicators

In order for a business to be sustainable it must not extract more than its fair share of the Earth's resources.

> "Gaining acceptance for strong sustainability hinges on finding a meaningful unit to measure the natural capital requirements of the economy" (Wackernagel & Rees, 1996, pg.63).

Indicators are used in a variety of areas giving simplified and precise information. In general an indicator is of wider significance than its immediate implication. For instance in ecology the presence of a certain indicator species is used to umpire the condition of an ecosystem as the ecosystem itself is complicated to judge. A number of indicators specifically designed to measure sustainability have been developed. A prominent example is the genuine progress indicator (GPI), which removes the cost of crime, family breakdown and pollution from the GDP figure. When applied in a time series, genuine progress is decreasing. Whereas another indicator, material intensity per unit of service (MIPS) combines lifecycle analysis and material accounting to provide an inclusive picture of resource use associated with industrial production, as demonstrated in Schmidt-Bleek (1994).

Authors	Definition
Holling et al. 1978	‘A measure of system behaviour in terms of meaningful and perceptible attributes’
McQueen & Noak, 1988	‘A measure that summarizes information relevant to a particular phenomenon, or a reasonable proxy for such measure’
Chevalier et al. 1992	A variable ‘hypothetically linked to the variable studied which itself cannot be directly observed’
OECD, 1993	‘A parameter or a value derived from parameters, which points to/provides information about/describes that state of a phenomenon/environment/area with significance beyond that directly associated with a parameter value’ ‘ Indicators possess a synthetic meaning and are developed for a specific purpose’
ISO 14000, 1999	‘A specific expression that provides information about an organisation’s environmental performance, efforts to influence that performance, or the condition of the environment.’

Table 1: Specific definitions of Indicators, as cited in SEI, 2001.

1.3.1 The Ecological Footprint

The footprint, developed by Mathis Wackernagel and William Rees in the early 1990’s, is a resource accounting index that translates human resource demand to the land area required to produce the resources needed and sequester the wastes. While originally used to gauge impacts at a national level the model can be applied to regions, cities, organisations and industries. Any entity that has an impact and traceable resource flows can have its footprint calculated.

The EF has emerged as an innovative technique to measure the ecological dimension of sustainability. Sustainable development pursues the threefold goal of improving economic efficiency, protecting and restoring ecological systems and enhancing the wellbeing of all peoples. The concept of the EF is a way of assessing the availability of natural resources and the extent to which production and consumption have an impact on them. The EF documents humanity’s demand on nature. It has its roots in the concept of the carrying capacity. An environment’s carrying capacity is its maximum persistently supportable load (Catton, 1986). Carrying capacity is usually defined as the maximum population of a given species that can be supported indefinitely in a defined habitat without permanently impairing the productivity of that habitat (Rees & Wackernagel, 1996). Khanna et al. (1999) argue that, for human society, carrying capacity may be defined as the maximum rate of resource consumption and waste discharge that can be sustained indefinitely in a defined planning region without progressively impairing bioproductivity and ecological integrity.

A population's EF is the biologically productive area required to produce the resources used and absorb the waste generated by that population. Representing human demand the EF can be compared to the biological capacity representing ecological supply in a specific region or for the entire planet (Redefining Progress, 2001). It serves to sharpen the focus about the ecological requirements for sustaining human settlements (Rapport, 2000). In measuring the ecological (biophysical) requirements to sustain a given company in terms of land area required to sustain consumption patterns as well as assimilate wastes, it can be shown that most companies are far from self-sustaining. The EF is measured in global hectares. A global hectare is 1 hectare of biologically productive space with world average productivity of the 11.2 billion bioproductive hectares on earth (Wackernagel *et al*., 2005). Alan Fricker (1998) gives a similar definition of the EF as "a measure of the resources we consume expressed in terms of the equivalent productive land area needed to produce them and absorb the consequent wastes".

> "The EF has the ability to transform sustainability from a vague concept into a measurable goal. It is a global budgeting approach dividing the planet into available ecological space per capita." (Deutsch, 2000).

To standardise, average global yield figures are used which allows ready comparison between worldwide cities, town and regions as well as countries themselves (Maged, 2003). By comparison with the average world footprint, a per capita footprint illustrates the extent to which individuals are living unsustainably. The EF is a function of population and per capita material consumption. The footprint assumes that all types of energy and material consumption and waste discharge require the productive or absorptive capacity of a finite area of land and water, and a calculation of the model requires incorporation of relevant income, prevailing values, socio-cultural factors and technology for the area under study, (Occasional paper, 1997). Excluding deserts, degraded land and pavement, there are 11.2 billion hectares of biologically productive land, slightly less than a quarter of the earth's surface (WWF, 2003). In other words, there are 1.4 hectares (3.5 acres) per person for each of the 6 billion human beings who presently inhabit this earth (Wackernagel, 2000). It is questionable whether people should use all of the 1.4 hectares per capita since the human species is not alone on this planet. Human beings share this planet with over 10 million other species – most of which are excluded from the spaces occupied for human purposes (Wackernagel *et al.*, 2001).

The EF has the ability to transform sustainability from a vague concept into a measurable goal. It is a global budgeting approach dividing the planet into available ecological space per capita (Deutsch, 2000). It offers a robust ecological economist's tool for demonstrating the actual occurrence of overshoot. Overshoot is when human demand exceeds nature's supply at the local, national, or global scale. The level of overshoot is the amount by which nature's biological capacity is being used beyond its regeneration state (Ede, 2001).

In order for any sustainable system to be possible its progress must be measured. Various approaches have been followed in the last few years to evaluate efforts to move to sustainable development. The first EFs were calculated using a component based approach. This has evolved into a more comprehensive and robust approach: compound footprinting, now used for national footprint accounting.

1.3.2 Critique of the Ecological Footprint

No tool for measuring sustainability is complete and none will satisfy everyone. The fact that ecological footprinting has been widely adopted as an indicator of sustainable development can be attributed to a number of inherent advantages (Wackernagel and Rees, 1996; Barrett and Scott, 2001; Leigh, 2003; Rees, 2000) and disadvantages (Van den Bherg and Verbruggen, 1999; Leigh, 2003; Ayres, 2000) as shown in Table 2.

Advantages	Disadvantages
The EF is readily and easily understood by all that have a vested interest in company's environmental performance (Barrett and Scott, 2001, pg316).	It has been argued that without clearly developed management information systems, features of the EF will have little power (Leigh, 2003, pg. 229).
The EF as an environmental metric will not only measure all environmental ecological impacts but also shows these impacts in relation to corporate sustainability (Barrett and Scott, 2001, pg317).	Conversion factors are derived from physical and biological considerations but do not correspond to long-term technological potential or current social weights for input, for instance market prices, (Ayres, 2000, pg. 347).
It provides linkages between consumption patterns and ecological limits.	Where data availability is inadequate, proxies and assumptions are made.
It provides a single number and is conceptually and methodologically simple allowing for comprehensive and comparative analyses.	Trade-offs with simplicity may result in losses of transparency.
It can be applied for the purpose of developing sustainable scenarios and to evaluate future policies (Barrett and Scott, 2001, pg320)	It assumes a linear relationship of impact with effect however in reality ecological pathways are complex and rarely show linearity over the whole scale (Leigh, 2003, pg230).
It has the power to both help assess current reality and to test alternative 'what if' scenarios on the road to sustainability (Rees, 2000, pg 373).	Some commentators argue that the EFing concept over-simplifies nature and society and that the method has little predictive value (Rees, 2000, pg 371).
The EF technique is important in a planning context as it allows an assessment of the current condition of the entity and provides a framework in which ecological impacts can begin to be addressed (Leigh, 2003, pg227)	Leigh also argues that footprints can't incorporate views of future generations and can't capture eco-justice elements of sustainability, i.e. how it may contribute to human fulfilment (Leigh, 2003, pg231)

Table 2: Advantages and Disadvantages of Ecological Footprint Analysis

1.3.3 Application of Ecological Footprint Analysis to Business

For the purpose of business, data collection and the definition of boundaries are essential prerequisites to an accurate EF analysis (Chambers, pg 21). The EF monitors the progress of a business towards strong or weak sustainability allowing these findings be tracked and communicated. Decision-makers within a company and indeed auditors can use EF analysis to estimate more comprehensively the ecological implications as well as the potential economic and social strains of potential courses of action (Internet Reference 1). The EF provides a business with a tool for communicating clearly about the topic of sustainability, both at an internal awareness level and externally with the public. For example, EF measures offer a much-needed complement to conventional indicators on the state of nations, such as the Gross Domestic Product (GDP). A business can set specific observable goals using EF analysis as a framework. This will highlight issues of accountability and guide the business to design products with a view to sustainability. The EF can assess resource inputs and waste discharges making it a valuable tool for business to investigate business operations and technologies. By knowing what enters and exits a business and its production processes unnecessary costs and unexploited opportunities can be detected. It highlights wastes that could become a resource and resources that are wasted. More ecologically sound production and business operations are the benefits of applying this tool. According to Chambers (2001) the EF can be applied to good effect at the corporate level as an aggregated eco-efficiency indicator that links in with global carrying capacity and hence global sustainability.

2. Methodology

2.1 Collection Methodology

An audit of each company was carried out using an audit questionnaire. Companies were contacted and the information required was communicated to them in advance of the visit. Initially the audit questioning was followed by a tour of company, this was then reversed as it was found to be more beneficial to view premises first taking note of various aspects for discussion during the questioning period. Follow up emails and phone calls were required to complete the audits. It was found that information gathered to this point was unsatisfactory for the purpose of ecological footprint analysis and as a result the data collection method was reassessed. A detailed spreadsheet of required information was compiled. It included waste, energy, transportation, materials, services, water use, land use and an employee survey. The initial draft of this document was forwarded to some of the relevant parties for review. Suggestions made were taken on board and alterations were made. This was then emailed to all the involved companies for completion. An Access database is being designed to organise and arrange data as it is returned.

2.2 Ecological Footprint Methodology

Ecological footprint analysis can be applied to any entity that produces an environmental impact. Naturally the quality and quantity of data available will differ according to what level the footprint is applied at. Data availability is the ultimate factor in determining which method can be used. Due to data unavailability the methodology being applied in this study was an aggregate model, incorporating elements from varying methodologies. Both methodologies incorporated elements of compound and component foot printing to suit the amount and nature of data obtained for each category.

2.2.1 Compound Approach

Developed by Mathis Wackernagel the top-down compound approach, which is robust and easily repeated, has been widely applied. EF analysis has been applied at a variety of different scales - nation, region, sector, company and product. The World Wide Fund for nature's (WWF) Living Planet Report (LPR), presents the EF as one of two main indices to quantify changes in the state of the Earth's ecosystems. The EF is calculated for 152 countries for 1996 and the global EF from 1961-97. The footprint is aggregated from individual footprints presented dealing with: grazing land, cropland, forest, fishing ground, carbon dioxide and built-up land. Simmons *et al.*, 2000 have investigated the EF calculation method which has matured into what has been termed 'component-based' footprinting as opposed to 'compound' footprinting as pioneered by Mathis Wackernagel, (Wackernagel *et al.*, 1996a). This method adopts a bottom up analytical approach and compared to a compound approach where material flows are measured primarily at a National level, component-based footprinting is more sensitive to underlying data variations. Simmons *et al.*, (2000), emphasise that the 'component-based' approach is not intended to be in any way a replacement for 'compound' footprinting. Each method has its benefits and uses and can be considered as different kinds of ecological tape measures.

2.2.2 The Component Approach

The Eco-Index™ Methodology developed by Best Foot Forward, (Chambers *et al.*, 2000) utilises a 'component' or bottom-up approach to perform EF analysis. Despite differences, it is wholly compatible with the 'compound' top-down approach (Footprint of Nations, 1997, 1999, 2000) which uses international trade statistics as a starting point. In the ecoindex methodology full life cycle impact data is used to derive EF conversion factors wherever possible for key component. In the component-based model the EF values for certain activities are pre-calculated using data appropriate to the entity under consideration. The component approach is thus more suited to calculating footprints for regions and cities. It is also thought to have a more simplistic and educative structure as it is built around activities with which people can identify and in which they participate, such as the production of waste and the consumption of electricity (SEI, Birch *et al.*, 2004).

Any footprinting project must be preceded by careful planning in order to determine the best methodology to adopt. There are several factors affecting the methodological choice. The data used for this project are based on 2004 figures otherwise stated.

2.2.3 Ecological Footprint Methodological Issues

Study Boundary

As with all studies of consumption ecological footprint analysis faces boundary issues, to identify what to include and exclude. A fundamental decision was whether the aim of the study was to calculate the ecological footprint of the companies based on the geographical or responsibility principle. The geographical approach is based on the company's boundaries and the responsibility approach is based on the consumption of the company within and beyond geographical boundaries. These two approaches can give very different answers. For the purpose of this project the ecological footprint will account only for the consumption attributed to each individual company's activities.

Data Availability and Proxy Data

The use of proxy data tends to mask differences in consumption and this should be taken into account when considering the figures presented by this study. Proxy factors are a necessary tool in obtaining data for these types of studies. The applied proxies have as closely as possible, reflected the likely activity of the subject companies. Data sets produced in this way are not as reliable as primary data and use of proxies were limited.

Equivalence factors

The ecological footprint (as measured using global average yields) is normalised by the application of equivalence factors. These are in essence multipliers, which adjust different area and sea types according to their relative bio-productivity (Lewan & Simmons, 2001). The equivalence factor represents the productivity of a category of land globally as compared to 'average' land globally.

Yield Factors

When calculating the bio-capacity of an area, the land types and sea available are normalised to world average equivalents using locally derived yield factors. These are multipliers, which express the extent to which local bio-productivity is more or less that of the world average for that land or sea type (Lewan & Simmons, 2001).

2.3 Conversion Factor Methodology

Due to time constraints it was decided to use existing UK conversion factors for the purpose of this paper. It is hoped that they will be replace by Ireland specific conversion factors in the coming months. Table 3 shows the conversion factors being used and their sources.

Component	**Conversion**	**Unit**	**Source**
Land Use			
Built-on Land	2.83	ha-yrs	Simmons et al., 2001, pg.73.
Direct Energy			
Grid elecricity	95	ha-yrs / gWh	Chambers and Lewis, 2001, pg.65.
Gas for heating	45		Simmons et al., 2001, pg.83.
Transportation			
Freight in			
Air	0.32	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87.
Road	0.07	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87.
Freight out			
Air	0.32	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87.

Road	0.07	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87.
Freight waste out			
Road (Matrix trays)	0.07	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87.
Road (mr binman)	0.07	ha-yrs / 1,000 t-km	Simmons et al., 2001, pg.87 HGV embodied energy per t-km with proportioned area of road network (EU data).
Road (WEEE)	0.07	ha-yrs / 1,000 t-km	Chambers and Lewis, 2001, pg.65 (Disel freight EU data).
Travelling to work			
Bus	0.0000397	ha / pass km	Barrett et al., 2002, pg.48.
Car	0.000059	ha / pass km	Barrett et al., 2002, pg.49.
Water Consumption			
Mains	0.8	sq m –yrs / 100 litres	Simmons et al., 2001, pg 98.
Waste			
Hazardous			
Waste solder	0.81	ha-yrs / tonne	Environmental Quality Management, 2002, pg.47.
Landfill			
Canteen, of which:			
Paper	3	ha-yrs / tonne	Simmons et al., 2001, pg. 95.
Glass bottles	2.87	ha-yrs / tonne	Simmons et al., 2001, pg. 96.
Plastic drink bottles	2.31	ha-yrs / tonne	Barrett et al., 2002, pg 68.
Aluminium Cans	6.72	ha-yrs / tonne	Barrett et al., 2002, pg 68.
Food	0.149	ha-yrs / tonne	Barrett et al., 2002, pg 70.
Recycled			
Cardboard	2	ha-yrs / tonne	Simmons et al., 2001, pg. 95.
Plastic	1.5	ha-yrs / tonne	Simmons et al., 2001, pg. 95.
Matrix trays	2	ha-yrs / tonne	Simmons et al., 2001, pg. 95.

Table 3: Conversion Factors and Sources

3. Results and Discussion

3.1 Results

Table 4 shows the ecological footprinting component breakdown table for Company "X" Ltd.

Component	Footprint (gha)
Land Use	
Built-on Land	**0.53**
Direct Energy	**33.63**
Grid elecricity	26.66

Gas for heating	6.98
Transportation	
Freight in	**395.52**
Air	395.45
Road	0.07
Freight out	**68.08**
Air	37.97
Road	30.11
Freight waste out	**0.09**
Road (plastic)	0.03
Road (general)	0.04
Road (electronic)	0.02
Travelling to work	**23.07**
Bus	3.32
Car	19.75
Water Consumption	
Mains	**<0.01**
Waste	**96.81**
Hazardous	
Waste solder	**0.32**
Landfill	**36.29**
Canteen, of which:	
Paper	8.13
Glass bottles	18.10
Plastic drink bottles	8.16
Aluminium Cans	1.34
Food	0.56
Recycled	**60.20**
Cardboard	43.68
Plastic	9.36
matrix trays	7.16
Total Footprint	**594.75**
Footprint per Employee	**11.90**

Table 4: Footprint Components of Company "X"

The most significant contributor to Company "X" Ltd.'s ecological footprint is that of transportation, which can be primarily attributed to freight transport inbound. The majority of the company's raw material is air freighted from Japan giving rise to this. By increasing its use of locally produced and distributed materials and services the company could decrease a major source of the transport footprint. Outbound freight and transportation of wastes account for a much smaller portion of the overall transportation footprint. Company employees commute approximately 32 kilometres round trip to and from work with 80% using cars and 20% use buses with a footprint of 19.75 gha and 3.32 gha respectfully. By promoting and facilitating a car pooling system, this could be significantly reduced. As there are no company vehicles and travelling while at work is rare this was omitted from the calculation. Energy and waste were identified as the next 'hard hitters' whereas the impact of built on land and water consumption are negligible. A large part of reducing the impact of waste at the company would involve its generation in the first place. Material conservation is key to reducing waste streams. Direct energy consumed by the company is in the form of grid electricity and natural gas. Water is not used in process so the footprint is negligible for this component. The calculation only accounted for water consumption being from the cold tap and not from flushing or hot water use, which would lend to a higher footprint.

Component	Footprint gha	% Breakdown
Land Use	0.53	< 1%
Direct Energy	33.63	6%
Transportation	463.78	77%
Waste	96.81	16%
Total	594.75	100.00%

Table 5: Company X's Ecological Footprint

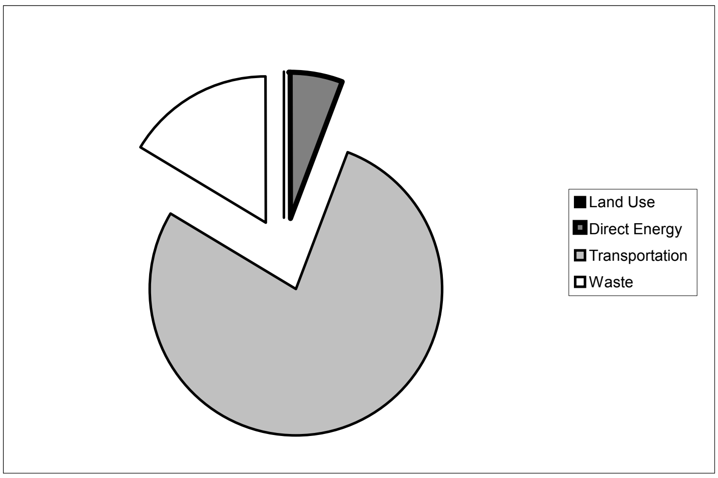

Figure 2: Component Breakdown of Company "X" Ltd.'s Ecological Footprint

While many factors affecting the size of the company's footprint are beyond the control of the company itself there are a number of actions that can be taken to reduce their impact without impeding the company's goals or increasing costs. The prediction of scenarios plays an important role in illustrating the effect of a company making such changes.

3.2 Scenarios

A scenario was constructed to predict Company "X" Ltd.'s footprint if certain actions were taken. For instance if land filled /canteen waste was segregated and recycled the footprint of this component could be significantly reduced. By recycling aluminium cans the footprint of this particular component is greatly reduced from 1.34 to 0.12 gha. If office paper was to be recycled its' footprint would fall from 8.13 to 5.42 gha. Glass and plastic drink bottles would fall from 18.10 to 11.97 gha and 8.16 to 4.94 gha respectively. If organic waste was composted the impact would be negligible. Figure 3 illustrates these results where the dark column represents the footprint if no action was to be taken and the lighter column represents the impact if the above was implemented.

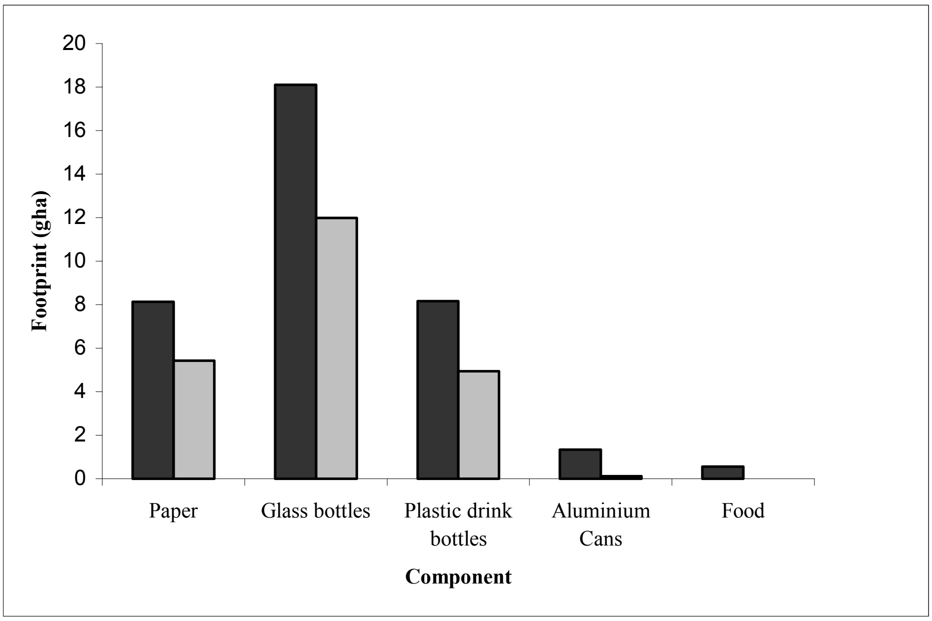

Figure 3: Current Waste Management Activities of Canteen Waste Vs Scenario Implementation

It’s possible to carry out similar scenarios for other aspects of the company’s activities for instance the freight inbound footprint is attributed primarily to the sourcing of raw materials in Japan. It could be suggested that Company “X” Ltd. would begin to source more of its’ material within Ireland or better again within the region.

4. Conclusion

It can be concluded that ecological footprint analysis can be applied to good effect at company level as an aggregated eco-efficiency indicator. It is a useful tool to monitor progress and communicate a company’s movement towards sustainable development. Clearly some of the footprinting methodology is based on estimates and assumptions. Despite drawbacks the footprint offers best available estimates of integrated environmental performance. Its strength lies in its consistent use over time and inaccuracies will tend to cancel themselves out. From the calculation its evident that company “X” Ltd.’s is having a disproportionate effect on its environment. Some environmental effects are out of control of the company, however the footprint illustrates where changes can be made. The concept of the ecological footprint is an approximation of impact and valuable for understanding environmental impact patterns especially over time.

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