merSETA
MANUFACTURING, ENGINEERING AND RELATED SERVICES SETA

Baseline survey of sustainable green-related activities, trends and innovations in the merSETA levy-paying companies

Final Report

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Acronyms

APPA	Atmospheric Pollution Prevention Act
AQA	Air Quality Act
BEE	Black Economic Empowerment
CC	Climate Change
COP	Congress of the Parties
DEA	Department of Environmental Affairs
DHET	Department of Higher Education and Training
DoE	Department of Energy
DTI	Department of Trade and Industry
EE	Energy Efficiency
EMS	Environmental Management Systems

GHG	Greenhouse Gas Emissions
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRI	Global Reporting Initiative
IPAP	Industrial Policy Action Plan
ISO	International Standards Organization
merSETA	Manufacturing, Engineering and Related Services SETA
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act
NSDS III	National Skills Development Strategy III
NWMS	National Waste Management Strategy
OEM	Original Equipment Manufacturers
R&D	Research and Development
SAAQIS	South African Air Quality Information System
SABS	South African Bureau of Standards
SANS	South African National Standard
SDL	Skill Development Levies
SETA	Sector Education and Training Authority
SMME or SME	Small Medium and Micro Enterprises

Executive Summary

The concept of sustainability and sustainable development has been broadly documented, discussed and accepted by all stakeholders in the South African economy. Government has, and continues to, demonstrate its commitment to sustainability by making it a primary tenet in key policy papers and strategy documents. More importantly, this commitment is evidenced by sustainability being incorporated consistently across all Government departments' and ministries. Examples include:

- Department of Higher Education (DHET): National Skills Development Strategy III which targets '*sustainable employment';*
- Department of Trade and Industry (DTI): Industrial Policy Action Plan which develops a framework to improve manufacturing competitiveness;
- National Planning Commission (NPC): National Development Plan which calls for a *low carbon future and environmental sustainability*;
- Economic Development Department: Green Economy Accord which highlights the *opportunity that climate change related actions offer new economic activity*; and
- merSETA position paper on sustainability proposes a value based definition for sustainability.

The business sector has also developed, and in certain instances, made sustainability reporting mandatory. These include King Report on Corporate Governance (III), and the Code for Responsible Investing and Integrated Reporting.

With these policies and commitments in place, the question arises whether the 'green' economy is indeed materialising in South Africa's private sector. Is sustainability being

considered at a senior management level? Are funds being allocated to support 'green' activities? And are 'green' skills being developed?

The merSETA represents five chambers – metal, automotive manufacturing, motor retail, tyre and plastics industries. Supported by the GIZ, under the Skills Green Jobs (SGJ) programme, a study was commissioned to conduct a '***Baseline survey of sustainable green-related activities, trends and innovations in the merSETA companies***'. The purpose of the project was to scope and deliver a baseline survey of the merSETA levy paying companies to gain a better understanding of their green activities in order to inform and determine the sustainable green activity-related status, trends and innovations in the various sub-sectors. The information would be gathered by using an online survey and the results would be verified and validated by a limited number of face to face interviews.

Before a questionnaire could be developed it was necessary to define indicators and define a 'green maturity model'. This was used to:

- Create common understanding of key concepts;
- Using the merSETA position paper on sustainability as a key input;
- Identify key issues South Africa is facing with regards to three key inputs: materials water, and energy, and two outputs: waste and emissions;
- Develop an 'environmental maturity matrix' which identifies five levels of activity, with level 1 indicating no action being taken and Level 5 for sustainability 'best practise' leaders. The matrix provides general descriptions for each level, which allows users to categorise their company according to the most appropriate description.
- The model recognises that there is more to sustainability than the above mentioned resources / inputs and outputs and caters for this by providing for an assessment of 'overall company approach to sustainability'.
- By separating the resources / input and outputs it allows companies to evaluate the performance separately;
- Finally, the model allows companies to embark on a journey rather than stake a position. A further ideal is that the model allows merSETA, or any other SETA, to use the model in future to measure sustainability progress.

The questionnaire design was informed by the above and an electronic email inviting merSETA levy paying members to participate was sent to 6,157 companies from all five chambers. 664 replies were received, equating to a 10.8% return rate, which is within the norm of what can be expected for quantitative research of this nature. Some limitations encountered include: 1) Not all 13,568 merSETA members were contacted due to deficiencies with the database; 2) The small number of tyre manufacturers meant that the results from this chamber are not statistically reliable and can only be viewed as indicative; and 3) The small number of qualitative interviews conducted means that they can only 'support' and 'enrich' the findings of the quantitative research.

Key issues which the survey measured were:

- The degree to which companies are engaging with sustainability issues in accordance with the above mentioned environmental maturity matrix;
- The sustainability and environmental performance drivers;
- Training needs - where are companies positioned on this currently?
- The degree to which budget is made available / in place for development and training;

- Who the sustainability decision maker within an organisation is;
- What the impact and influence sustainability has on company culture;
- The approach of South African-specific companies compared to international players on sustainability;
- The approach of larger companies compared to smaller companies on sustainability;
- Current green activities and future intentions;
- Trending areas across companies of varying sizes and across sub-sectors; and
- Investment and attitude towards innovation.

Personal interviews were then conducted with either the sustainability, environmental or senior manager of companies from the five chambers following the quantitative research. This additional component was used to validate the findings of the online survey and expand understanding of environmental policy, practice and trends.

The findings of the research reveal both expected and unexpected approaches and attitudes towards sustainability. As expected:

- The large, often international, companies have a higher level of activities that support sustainability through best practice processes which are embedded in their operations. Key amongst these is ISO and South African National Standards certification. It should also be noted that improved sustainability practices are often an indirect consequence of such certification and not the primary objective of the management decision to adopt them. For many companies, certification is often a requirement to participate in the supply chain of an Original Equipment Manufacturer in the auto manufacturing industry;
- Companies which have adopted sustainability and / or environmental performance as a core value are easily identified as the theme is engrained at all levels of the organization and procedures are designed to implement, enforce and measure compliance thereof;
- The notion and concept of sustainability and environmental performance means different things to different people and 'do good' activities are often misinformed, resulting in little, or in extreme cases even negative impact, while the company believes it is on the right track and taking 'real' action; and
- Smaller companies under current economic conditions are in a 'survival' mode with little time or budget to address non-mandatory policy objectives, such as environmental performance.

Findings which were not expected to come through as vocally as they did were:

- A strong call for Government to incorporate awareness programmes in the school curriculum as school leavers joining the work force tend to have little understanding of environmental awareness. Further, if behaviour is to change, beliefs and attitudes around protecting the environment must first be instilled. Instilling this with children is believed the most effective approach; and
- A real willingness of small and medium sized companies to implement ISO and National Standards, with an inability to do so due to the high upfront and on-going costs. Almost all companies shared the view that these certification programmes would make their operations more sustainable and competitive and would also 'up-skill' their workers. This suggests that if Government were to find a way to make certification accessible to small and medium sized companies it would have a significant impact on sustainability practices of small companies.

In conclusion, the research has found that few companies have a holistic understanding and approach towards sustainability and environmental management. The companies which do have this understanding tend to be large companies, which are often foreign based, and have implemented programmes to either comply with best practise or have adopted sustainability as a core value. Small and medium sized companies tend only to comply with legal requirements or implement stand-alone projects which in many instances have little environmental value. This is possibly due to a combination of factors, one being the way in which Government is implementing its policies which may not always be clear or effective - especially when it comes to voluntary measures. This is demonstrated by a higher awareness, compliance and budget allocations respondents have towards waste management, which is highly regulated, compared to water and energy efficiency, for example, which are not.

There is a clear disconnect between the understanding that the majority of the companies who participated in the survey have of sustainable development and what Government policies and strategies are trying to achieve. A key starting point would therefore be to implement a programme which aims to close this gap. Especially in light of 83% of companies who participated in the survey believe that 'the pressure for change *(green related activities covered in the survey)* will increase in the next three years'.

Introduction to and Structure of this Report

As part of its ongoing work programme, the merSETA has recognised the importance of addressing environmental pressures on its member companies, as well as the opportunities associated with the 'Green Economy' and is therefore prioritising skills for sustainable development. This is being done through the development of a 'Sustainable Green Skills Development' programme.

To ensure that this programme and its associated interventions is targeted correctly, and has an impact, the merSETA along with its development partner, GIZ, has commissioned Unlimited Energy to undertake a study to understand the current status of 'green-related' activities of levy paying companies in the SETA's sub-sectors.

Examples of 'green-related'[1] activities in a company could be included in processes where the company is focusing on, such as:

- Developing and adopting renewable sources of energy;
- Reducing consumption of energy, fossil fuels and raw materials;
- Enhancing energy and resource efficiency;
- Decreasing waste and pollution, and
- Recycling materials.

On this basis the merSETA and GIZ commissioned this ***'Baseline Survey of Sustainable Green-Related Activities, Trends and Innovation in the merSETA companies'***.

The purpose of this report is to detail the approach to, and findings of, this baseline study. In order to do this effectively the report has been structured as follows:

[1] As identified and listed in the Terms of Reference

Section 1 – provides an analysis of the context to the survey and clearly indicates what 'Green' elements are being focussed on;

Section 2 – describes the 'Green Maturity Model' for companies. This model has been developed for analysing where merSETA members are with regard to 'Green' related issues;

Section 3 – details the results of the baseline survey; and

Section 4 - integrates all the study's analyses in the form of conclusions and recommendations.

1 Contextual Background

1.1 Key Concepts – 'Green' and 'Green Skills'

To ensure that the baseline survey is correctly focused, a common understanding of the notion of 'Green' is vital to support the merSETA companies and the stakeholder community as a whole in a developmental approach towards an enhanced approach to sustainable green skills development.

1.1.1 'Green' – Developing a Common Understanding

The South African National Environmental Management Act of 1998 (NEMA) defines Sustainable Development in the following way:

> '***Sustainable Development*** means the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations'

This approach is in line with international approaches which consider sustainable development to require an understanding of the world as a system which connects past and future and all areas of the world.

The International Institute for Sustainable Development's website[2] defines sustainable development thus:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- The concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

What this definition and the one used in NEMA have in common is the balancing of the needs of the present and future generations. These definitions put people at the centre of sustainable development while recognising the role of technology and its impact on the environment as crucial aspects along with economic development. The search for sustainability is thus a search for technologies and human organisation that use the environment in a way that both meets the need of people now, and that ensures that it will meet the needs of people in the future. As such the resources which these companies

2 http://www.iisd.org/sd/ accessed 5 October 2013

use, the technologies employed and the outputs – both products and waste – are all implicated in the sector's contribution to or detraction from sustainable development.

Legal framework:

- The new Companies Act[3]- places emphasis on transparency and good corporate governance;
- Regulation 28[4] to the Pension Fund Act[5] requires the consideration of environmental, social and governance (ESG) factors by institutional investors in their investment decisions – thereby requiring consideration of long-term performance (and risk factors) of investments in the effective discharge of fiduciary duties.

Non-mandatory mechanisms:

- The King Code of Governance for South Africa (King III)[6] – emphasises sustainability and corporate citizenship as key elements of good corporate governance. It mandates an inclusive approach to governance, recognises that sustainability is one of the most important opportunities and risks for businesses and that 'people, planet and profit are inextricably linked' in an organisation's approach to governance, and requires the adoption of integrated reporting. Compliance with King III is a mandatory requirement for companies listed on the Johannesburg Stock Exchange;
- The Code for Responsible Investing in South Africa (CRISA)[7] - intended to give guidance on how the institutional investor can give effect to the principles of King III and the principles for responsible investing; and execute investment analysis, activities and rights so as to promote sound governance, responsible investment and sustainable development[8];
- Integrated reporting - requires companies to report on the company's performance in terms of both its finance and its sustainability in an integrated and holistic manner[9]. This is also a mandatory requirement for companies listed on the Johannesburg Stock Exchange.

King III recommends that all entities, whether public, private or non-profit, adopt and produce sustainability reports following the reporting guidelines of the Global Reporting Initiative (GRI). This Initiative uses substantially the same definition as that quoted above and requires that organisations do not just report on their performance but also on "how an organization contributes, or aims to contribute in the future, to the improvement or deterioration of economic, environmental and social conditions, developments, and trends at the local, regional or global level." [10]

In the environment category the aspects to be reported on include the following[11]:

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[3] No 71 of 2008, as amended

[4] Promulgated under Government Gazette No. 34070, dated 4 March 2011. Regulation 28 covers prudential investment guidelines and governs permitted levels of exposure to different asset classes

[5] Act No 24 of 1956, as amended

[6] The King Code of Governance for South Africa 2009, Institute of Directors in Southern Africa

[7] The Code for Responsible Investing in South Africa, July 2011; Institute of Directors in Southern Africa

[8] The Code for Responsible Investing in South Africa, July 2011; Institute of Directors in Southern Africa

[9] The Framework for Integrated Reporting and the Integrated Report Discussion Paper, January 2011

[10] https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf accessed 5 October 2013

Environmental Category: aspects	
Materials	Products and service
Energy	Compliance
Water	Transport
Biodiversity	Overall
Emissions	Supplier Environmental Assessment
Effluents and Waste	Environmental Grievance Mechanisms

The National Development Plan (NDP) also emphasises the need to place sustainability at the centre of the development agenda, and it also understands sustainability in terms of the environment's ability to meet future needs. The NDP highlights the aim of moving to a low-carbon future and the ability to meet the challenges of climate.

The NDP points to the need for investment in technologies, skills and institutional capacities that will make this possible.

Key points that emerged from the National Development Plan (NDP) are:

- There needs to transition to a low-carbon future and a more diverse and inclusive economy;
- Developmental challenges must be addressed in a manner that ensures environmental sustainability and builds resilience to the effects of climate change, particularly in poorer communities;
- Investment in skills, technology and institutional capacity is critical to support the development of a more sustainable society and the transition to a low-carbon economy;
- Consumer awareness initiatives and sufficient recycling infrastructure should result in South Africa becoming a zero-waste society; and
- The development of environmentally sustainable green products and services, including renewable energy technologies, will contribute to the creation of jobs in niche markets where South Africa has or can develop a competitive advantage.

It indicates the need to be opportunity-focused, in terms of looking for synergies between sustainability, growth, competitiveness and employment creation. This aims to address South Africa's historical inequality and poverty, and specifically the priority focus of Government – job creation.

These opportunities are taken forward further in policy through the biennial 'Green Economy Accord', and operationally in the Department of Trade and Industry's 'Industrial Policy Action Plan (IPAP)'. The Green Economy Accord highlights the opportunity that climate change related actions offer for new economic activity, as well as the possibility for innovation in areas such as renewable energy, waste recycling and the local manufacturing of electric vehicles. Other opportunities identified include: the local manufacturing, assembly, construction and installation of renewable energy and energy efficiency related products; recycling and the diversion of useful resources in industrial waste streams; building retrofits; and, bio-fuels. The Green Economy Accord highlights the potential to leverage benefits like job creation by ensuring that there is strong support for localisation.

Finally, in a position paper published in 2013 by the merSETA[12] an approach where a set of internationally developed values for sustainable development programmes is proposed. These include:

- Freedom;
- Equality;
- Solidarity;
- Tolerance;
- Respect for nature; and
- Shared responsibility

This study is focused on the merSETA companies, which are companies involved in metal, automotive manufacturing, motor retail and component manufacturing, tyre manufacturing and plastics sub sectors. To facilitate a manageable analysis of the position of merSETA companies in relation to addressing sustainable development, the study focuses on the following aspects of environmental activities in merSETA companies:

- Resource Efficiency – specifically in terms of the key inputs of;
- Water;
- Energy;
- Materials;
- Waste Management – applying the waste hierarchy framework discussed above; and
- Emissions – which include emissions from operation and transport and from secondary sources, such as electricity.

The rationale behind this focus is that these aspects relate directly to the ability of an enterprise to remain competitive, as well as focusing on the environmental impacts of such companies, and their contribution to sustainable development more broadly.

For example, more efficient water use enables companies to address the increased pressure on the countries limited water resources as a result of a growing population, universal access to water, contamination of freshwater, a growing economy and climate change. Companies implementing energy efficiency initiatives or developing own energy generating options (e.g. solar PV) to reduce costs and enhance their energy security, are also likely to have lower carbon footprints.

1.1.2 'Green Skills'

Taking the above environmental aspects as a focus, provides a basis to define an approach to 'Green Skills'.

At a recent business breakfast hosted by the Steel and Engineering Industries Federation of SA, in August 2013, Karsten Feuerriegel of GIZ highlighted the importance of recognising that green skills should be integrated into all jobs and not just 'green jobs'.

Feuerriegel said that:

> "The boundaries between green and brown jobs are becoming increasingly blurred and generic skills need to be improved across the entire workforce. An overall greening of jobs seems to be an appropriate strategy. Close cooperation

[12] A Liebenberg, Sustainable Green Skills in merSETA, January 2013

> between industry and training providers is required and integrating skills into existing green qualifications and the green up-skilling of existing skills in the workforce are much more effective than creating new training standards."[13]

A recent study[14] conducted by the merSETA referenced an international study conducted by Per Capita (2010) that found that none of the countries which were reviewed have embraced a formal definition of green skills, but it is clear that green skills begin with sector-specific skills, some of which become generic skills, over time. It was also found that the development of green skills content has largely been organic, driven by immediate commercial needs and opportunities, rather than by overarching policy frameworks.

The same merSETA report notes that '*In the merSETA, green skills development has also started to evolve organically and developmentally. The term organic implies a continuous cycle of planning, reflecting and sustainable growth*' but it is highlighted that the notion of sustainability has not fully been interrogated.

The report cites a definition proposed by Bartlett[15]: "***Sustainable development is development that does not compromise the ability of future generations to meet their own needs***". The definition is developed further by the merSETA by aligning its six values[16], namely: freedom, equality, solidarity, tolerance, respect for nature and shared responsibility.

The merSETA report introduces a value-based position, for the notion of sustainable green skills development in merSETA. The above definition (Bartlett) is proposed which is supported by internationally conceptualised values.

When considering what skills are required it should be noted that the focus of the merSETA is on technical and artisanal skills, which includes values and attitudes, and therefore the survey focuses on identifying these demands within merSETA companies. These needs could involve the development of new qualifications, the incorporation of new skills, knowledge and values into existing qualifications and / or working with training centres to support this new area.

When the potential for job creation in these areas is considered, as for example in the 2011 Green jobs report**[17]**, the importance of this area in skills development is clearly combined with its potential ability to promote enterprise competitiveness.

In conclusion, the objective of this study is to scope and deliver a baseline survey of the merSETA levy paying companies to gain a better understanding of their green activities in order to inform and determine the sustainable green activity-related status, trends and innovations in the various sub-sectors. In the interests of clarification it is stated

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13 http://www.engineeringnews.co.za/print-version/green-industry-could-create-more-than-400-000-jobs-in-sa-2013-08-21

14 Liebenberg, A. Sustainable Green Skills Development in merSETA, 2013

15 Bartlett, A. The meaning of sustainability, in the Teacher Clearhouse of Science and Society Education Newsletter, Volume 31, No 1: Winter 2012 (p.1), published online www.populationmedia.org/2012/04/04/the-meaning-of-sustainability-by-professor-emeritus-albert-a-bartlett/

16 Leiserowitz, A., Kates, R. & Parris, M. Sustainable Values, Attitudes and Behaviours: A Review of Multinationals and Global Trends, in the Annual Review of Environment and Resources, Volume 31 (pp.413-444) 2006. Harvard University: Centre for International Development

17 IDC / DBSA / TIPS, *Green Jobs – An estimate of the direct employment potential of a greening South African economy,* 2011. Accessed 3 July, 2013 www.idc.co.za/projects/**Greenjobs**.pdf

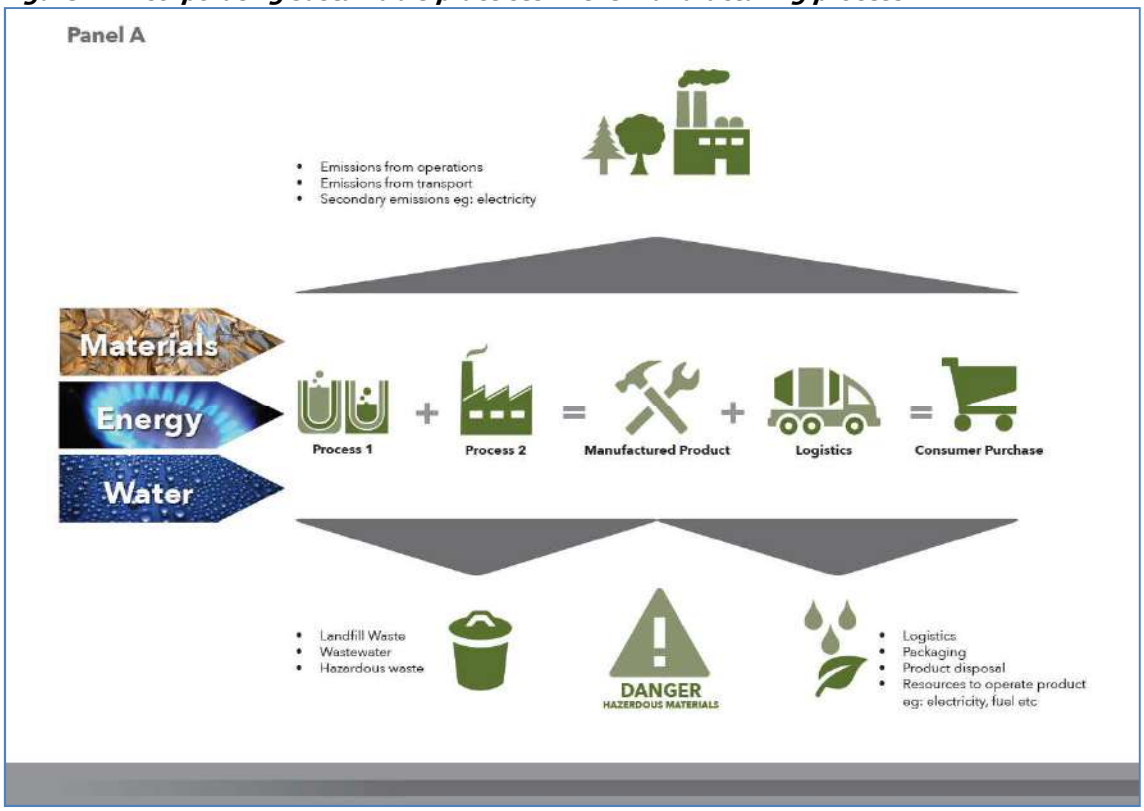
that this is not an environmental study, which aims to determine the level of performance, or non-performance, of companies with regards to the disposal of waste materials and consumption of input materials and resources. Ultimately, the merSETA's role is to provide a supporting role to companies who are starting, or have already started, to implement a more sustainable operating model and it intends to use the findings of the baseline study to inform skills development to support this.

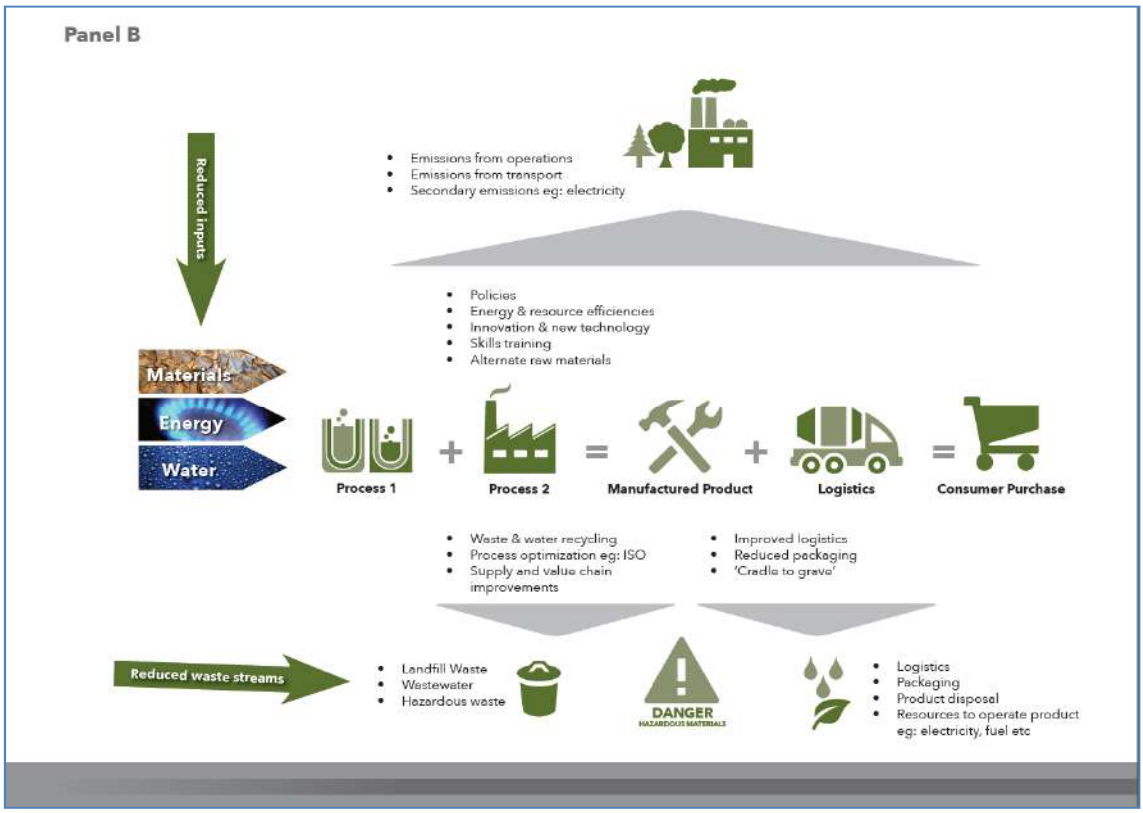
1.2 Company Operations and Processes

All manufacturing processes require inputs, in the form of energy, water and raw materials. During the manufacturing process waste streams are created, which must be disposed of. Policies, regulations and standards have been promulgated, which companies must comply with or use as a guide in the disposal of these streams. One of the objectives and outputs of improving environmental performance is to reduce these streams through a combination of internal company-specific policies, technology, processes and skills. If implemented correctly, these interventions can create new opportunities and a competitive advantage as opposed to being viewed as onerous compliance requirements in an already tough trading environment.

Figure 1 illustrates this approach, as envisaged by the merSETA. Panel A represents a simplistic 'as is' process with inputs and waste outputs. Panel B suggests interventions which could be implemented in order to gain energy and resource efficiencies. The inputs (arrows) and outputs (brackets) in Panel B are reduced to indicate that these have reduced in size, (representing reduced waste streams and inputs) and thus improved environmental performance.

Figure 1: Incorporating sustainable practices in the manufacturing process.





The remainder of this section provides high-level detail of government policies and regulations with regards to waste, air pollution and energy. It is intended to illustrate the current status, the issues and challenges faced by government and how it is responding to them. The section concludes with the role that skills development must play in this context and Appendix 1 gives a list of the key actions, in chronological order, of the policy landscape.

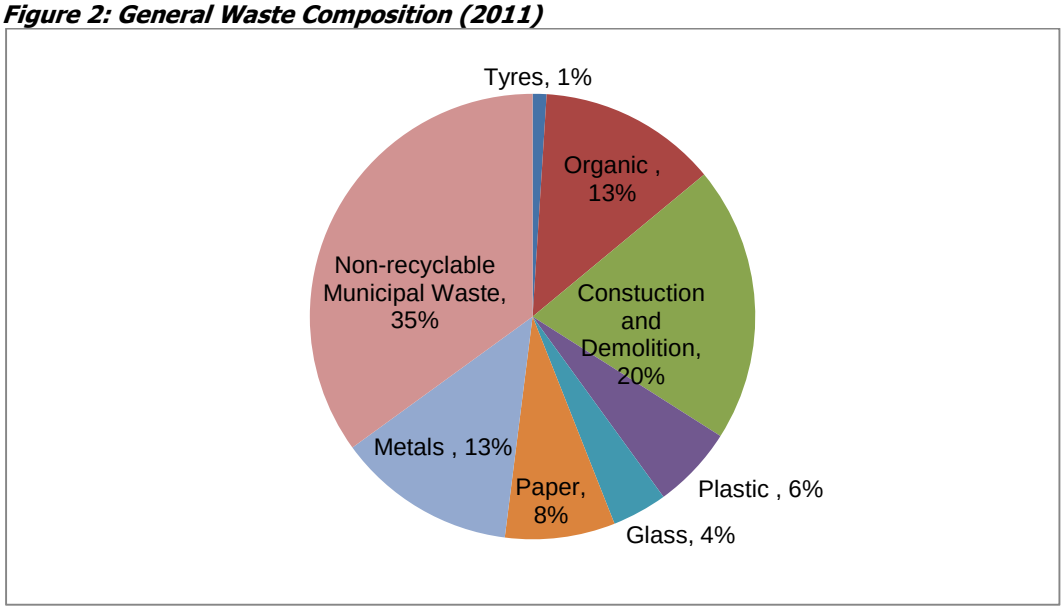
1.3 Waste

1.3.1 General Waste

The Third National Waste Baseline[18] (2012) shows that South Africa generated approximately 108 million tonnes of waste in 2011, of which 98 million tonnes was disposed of at landfill. Of the total amount of waste, 59 million tonnes is general waste, 48 million tonnes is currently unclassified waste and the remaining 1 million tonnes is hazardous waste. According to the baseline report, 10% of all waste generated in South Africa was recycled in 2011, thus South Africa is still heavily reliant on landfills as a waste management option. The percentage contribution of each waste stream to the composition of general waste is shown in Figure 2.

[18] Department of Environmental Affairs, National Waste Information Baseline Report (Draft), 2012 www.sawic.org.za/documents/1880.pdf#page=1&zoom=161,0,775

Figure 2: General Waste Composition (2011)



Source: National Waste Baseline Report (2012)

1.3.2 Wastewater

A Government study[19] on the utilization and disposal of wastewater stated that the traditional practices related to wastewater sludge management include dedicated land disposal, waste piling, landfill disposal and to a lesser degree use in agriculture. However due to varying reasons on-site land disposal and waste piling have become the standard management options for many wastewater treatment plants in South Africa today. With sludge production increasing current practices are unsustainable with sludge management becoming a problem for many municipalities in South Africa.

The potential benefits of the nutrients (nitrogen, potassium and phosphorus) and the high carbon content of sludge have been well demonstrated and have led to the beneficial utilization of sludge in many countries. Beneficial use of sludge is seen as an appropriate and cost effective management option for South Africa both for the sludge user and wastewater industry.

1.3.3 Waste Management

The Waste Act (2008)[20] requires government to develop and review on a 5 yearly basis a National Waste Management Strategy (NWMS) to achieve the objectives of the Act. In its 2011 National Waste Management Strategy[21] (NWMS), the Department of Environmental Affairs (DEA) recognised the pressures being faced by waste management facilities, which include:

- Increasing volumes as the population increases and the economy grows;
- Increased complexity of waste streams due to urbanization and new industrial processes;

[19] Guidelines for the utilization and disposal of wastewater sludge, Water Research Commission, 2008 www.dwa.gov.za/Dir_WQM/docs/wastewatersludgevol5Mar08.pdf

[20] National Environment Management: Waste Act, Department of Environmental Affairs, 2008 www.info.gov.za/view/DownloadFileAction?id=97351

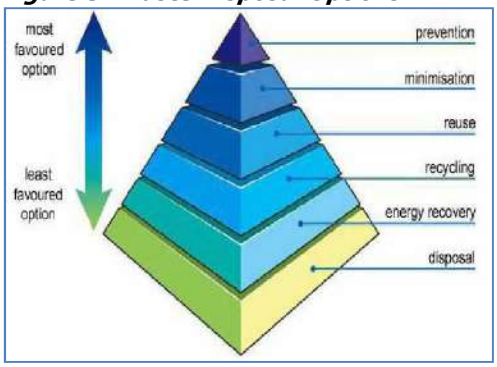
[21] National Waste Management Strategy, Department of Environmental Affairs, 2011 www.poa.gov.za/Outcome10/Supporting%20Documentation/National%20Waste_Management_Strategy.pdf

- Limited understanding of waste flows as the submission of waste data is not mandatory;
- A policy and regulatory environment which does not actively promote the waste management hierarchy, and
- Growing pressure on out-dated waste management infrastructure, with declining levels of capital investment and maintenance

The NMWS provides an action plan which sets out how the three spheres of government and industry will give effect to Act.

The NWMS grades the available options for the disposal of waste and the hierarchy of priority, which are shown in Figure 3. The Hierarchy shows the preferred options, with disposal, for example in landfills, being the least preferred option.

Figure 3: Waste Disposal Options



Waste Management Hierarchy

Source: Department of Environmental Affairs

The current NWMS identifies the need for energy recovery, for waste types that cannot be re-used or recycled, and in Goal 2 of the Action Plan[22] an action item is to undertake a feasibility study for municipalities to implement options for waste to energy.

1.4 Air Pollution

Up to, and including, the early 1990s there was no urgency regarding air pollution and controlling emissions was not a priority.

Developments since then have gone some way to correcting the situation, with the introduction of new air quality legislative guidelines introduced since 2000, which are in line with the World Health Organisation and US Environmental Protection Agency standards. In many cases, the country's air quality legislation is more stringent than that of other countries, whether, developing or undeveloped. In addition, some companies have become more environmentally aware and are including environmental aspects in their understanding of corporate responsibility and have developed environmental policies.

The replacement of the Atmospheric Pollution Prevention Act (APPA), Act 45 of 1965 by the National Environmental Management: Air Quality Act (AQA), Act No. 39 of 2004 is in process. The Air Quality Act requires a shift from source-based air pollution control to a receiving environment, air quality management approach. The AQA aims to deliver

[22] NWMS - Appendix 1 Goal 2: Ensure the effective and efficient delivery of waste services (page 70), Department of Environmental Affairs, 2011

cleaner air whilst not harming the environment or economy and its objectives[2] are, to protect the environment by providing reasonable measures for:

- The protection and enhancement of the quality of air in the country;
- The prevention of air pollution and ecological degradation; and
- Securing ecologically sustainable development while promoting justifiable economic and social development

The new national air quality standards come into effect on January 1, 2015 and the priority air pollutants identified are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), lead, benzene, carbon monoxide, ozone and particulate matter (PM_{10}).

Since the adoption of the AQA, the SA Weather Service and the DEA have developed the South African Air Quality Information System (SAAQIS). This web-based system provides a central repository of up to date air quality data. The system can be accessed at www.saaqis.org.za

1.5 Energy

South Africa is facing multiple challenges in its energy sector. Key amongst these is:

- An acute electricity supply shortage against ever-increasing demand from existing and new users as the country's electrification programme continues to be rolled-out;
- Local and international pressure to reduce greenhouse gas (GHG) emissions from its almost exclusive use of coal for generation;
- Electricity tariff increases, which have averaged 23% per year for the period 2007 to 2012 and a further 8% per year from 2013 until 2017, and
- A user base which is resisting this new paradigm as it has become accustomed, until recently, to a prolonged period of surplus capacity and reliable supply while enjoying the lowest electricity tariffs in the world – resulting in the wasteful and inefficient use of electricity.

Energy efficiency has been a cornerstone of South Africa's energy policy since the adoption of the Department of Energy's (DoE) (previously known as the Department of Minerals and Energy (DME)), National Energy Efficiency Strategy (NEES) of 2005. Yet, the implementation and uptake of energy efficient technologies, measures and behaviour remains muted.

The mission[23] of the DoE's EE Directorate is to:

- Develop measures to promote energy saving;
- Reduce the negative impact of energy use on the environment;
- Reduce energy costs to the economy;
- Contribute towards sustainable development, and
- Achieve the objectives of a national energy policy.

The NEES[24] notes in its second review (2011 – released for public comment and submitted to Parliament adoption) that the global phenomenon of rising incomes and population growth places increasing pressure on supply and consequently the price of

[2] www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf

[23] For more information please see URL: http://www.energy.gov.za/files/eee_frame.html.

[24] Energy Efficiency Strategy for the Republic of South Africa, Department of Minerals and Energy, 2005 http://www.info.gov.za/view/DownloadFileAction?id=88503

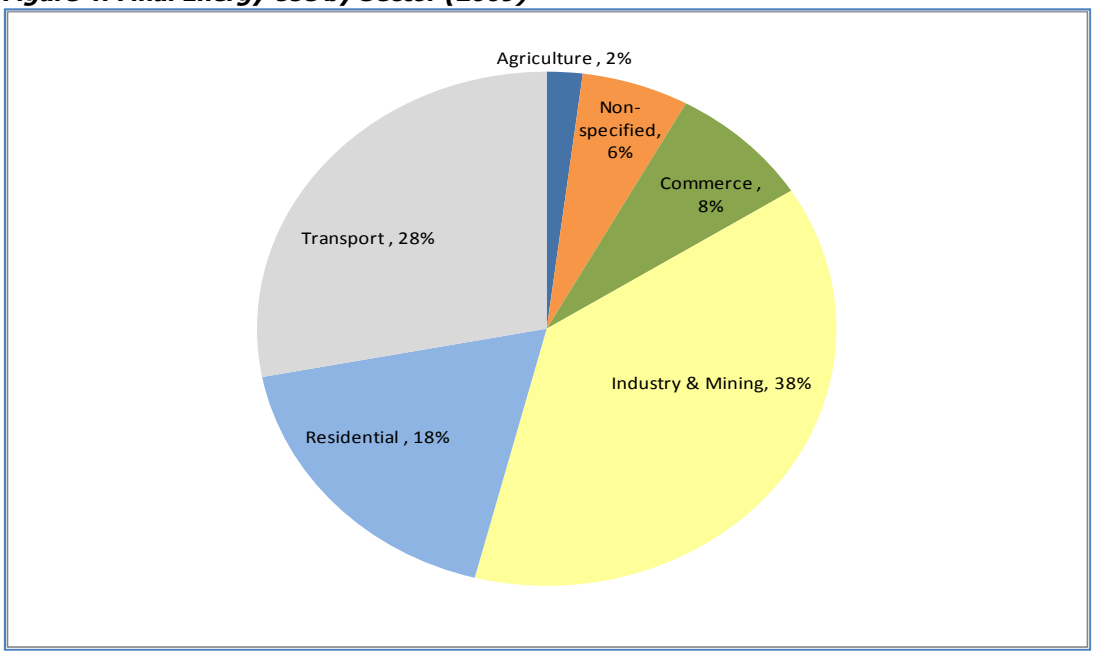
energy. It goes on to say that although awareness and understanding of the importance of EE in South Africa has improved, more still needs to be done. However, the strategy states that the biggest barrier is:

> 'Resistance to change, attitudes to the value of improved EE and the cost associated with the disruption of energy projects'.

Conflict of interest, such as the building owner and tenant scenario, is also identified as a key barrier.

The NEES categorises the usage of energy by sector. Figure 5 lists the sectors and their final energy use.

Figure 4: Final Energy Use by Sector (2009)



Source: Department of Energy

The merSETA, which encompasses manufacturing, engineering and related services, is made up of five chambers: metal and engineering, auto manufacturing, motor retail and components, tyre manufacturing and the plastics industries. These chambers consist of entities which all fall under industry and mining in the figure above, which as can be seen is the biggest end use consumer of energy. The merSETA chambers represent approximately 50,000 companies and employ over 600,000 people.

1.6 Skills Development, Manufacturing Competitiveness and Sustainability

The merSETA's mandate is to '*...play a central role in making sure that the National Skills Development Strategy (NSDS) III is fulfilled*'.

The goals of the strategy are:

- Establishing a credible institutional mechanism for skills planning;
- Increasing access to occupationally directed programmes;
- Promoting the growth of the public FET college system that is responsive to sector, local, regional, and national skills needs and priorities;
- Making better use of workplace-based skills development;
- Encouraging and supporting cooperatives, small enterprises, worker initiated, NGO and community training initiatives;

- Increasing public sector capacity for improved service delivery and supporting the building of a developmental state, and
- Building career and vocational guidance.

The NSDS III (2011) in relation to the New Growth Path and the Industrial Policy Action Plan (IPAP), recognises that success will require the public and private sectors to develop priority skills, using the National Skills Fund. Priorities include the development of research capacity related to the application of new knowledge in the workplace.

Subsequent policy documents, such as the Green Economy Accord, which were launched at the Congress of the Parties (COP 17) builds on and reinforces the Government's commitment to sustainable economic development. Appendix 1 provides a timeline of the development of South Africa's energy, waste and climate change policy landscape since 1994.

2 Environmental Maturity Model

2.1 Introduction and Objectives

The global trend for companies to develop and implement environmental management systems has led to the emergence of industry norms and generally accepted methodologies. In terms of certification this takes the form of the ISO 14001: 2006 EMS (Environmental Management Systems). As the standard evolves a key objective is to identify how the standard itself can become a more effective change agent rather than a scorekeeper. In other words, the standard must attempt to avoid being relevant only to 'environmental market leaders', which will discourage entry-level organizations from adopting the standard. The ISO technical standards committee in its review stated '...*The use of 'maturity matrices' should be considered to show how requirements can be applied in an increasingly comprehensive manner'.*

Underpinning the concept of a maturity matrix is the recognition that attaining good environmental performance is '*best considered as a journey and not a destination.*'[25] For many companies achieving a certification or standard is an end goal which contributes to marketing or compliance requirements. The intention of the 'journey' approach is to encourage a continuous process of moving towards improved environmental performance.

By making ISO 14001 a tool to improve environmental management, rather than to rate it, the tool must target all participants – especially 'entry level' companies who have recognised the necessity and indeed the opportunities created by improved environmental performance. The impact and progress of environmental management would be limited if the tool only catered for market leaders who in all likelihood would be undertaking these activities anyway. However, this 'inclusive' approach must at the same time ensure that it does not compromise '*absolute environmental performance'* by lower or devaluing the standard which could have unintended consequences such as polluters being more readily able to achieve the standard.

To overcome these issues the most suitable and workable solution is to implement continuous improvement as a core tenet of the approach. This can be achieved by the use of a maturity model, which facilitates self-assessment. The intention is that once companies have an understanding of where they are on the matrix, they will be better

[25] Niall Enright, *The Environmentalist,* September 2012 www.sustainsuccess.co.uk/maturity-matrices-in-action Accessed 10 July, 2013

able to detail the skills they need to take their initiatives further. Several maturity models have been developed for different applications. The Energy Management Matrix[26] shown in Table 1 below allows the user to rate themselves using a scale system, across six different themes. The rating is based on selecting the description that most closely matches the organization's current approach. Although simplistic, the tool forces the company to deal with themes rather than specific technologies, which often side-tracks discussions as they become technical and hypothetical. At a broader level management teams can quickly identify issues. For example, a company's energy costs have increased but no action has been taken by operations. Identifying the company's current level on the investment may quickly explain why new and more efficient technologies have not been implemented. A further advantage is that the matrix allows different business areas to do a self-assessment and any marked differences between them could identify conflicting approaches or attitudes which can then be resolved.

Table 1: Energy Management Matrix

	Policy	Organising	Training	Performance Measurement	Communicating	Investment
4	Energy policy action plan and regular review have active commitment of top management	Fully integrated into management structure with clear accountability for energy consumption	Appropriate and comprehensive staff training tailored to identified needs, with evaluation	Comprehensive performance measurement against targets with effective management reporting	Extensive communication of energy issues within and outside organisation	Resources routinely committed to energy efficiency in support of business objectives
3	Formal policy but not active commitment from top	Clear line management accountability for consumption and responsibility for improvements	Energy training targeted at major users following training needs analysis	Weekly performance measurement for each process, unit or building	Regular staff briefings, performance reporting and energy promotion	Same appraisal criteria used as for other cost reduction projects
2	Unadopted policy	Some delegation of responsibility but line management and authority unclear	Ad-hoc internal training for selected people as required	Monthly monitoring by fuel type	Some use of company communication mechanisms to promote energy efficiency	Low or medium cost measures considered if short payback period
1	Unwritten set of guidelines	Informal mainly focused on energy supply	Technical staff occasionally attend specialist courses	Invoice checking only	used to promote energy efficiency	Only low or no-cost measures taken
0	No explicit energy policy	No delegation or responsibility for managing energy	No energy related staff training provided	No measurement of energy costs of consumption	No communication or promotion of energy issues	No investment in improving energy efficiency

Source: The Carbon Trust

2.2 Maturity Matrix

A key aspect of the development of the matrix has been the understanding of the terms 'sustainable development' and 'Green', as outlined in the analysis done in Section 1 of this report. The project uses an understanding of 'Green' that not only refers to addressing key national environmental issues (e.g. water resource management, pollution control and waste management) that companies need to comply with in terms of South Africa's regulatory environment, but also opportunities that the 'Green Economy' offers for enhanced economic activity and job creation.

[26] The Energy Management Matrix was developed by the Carbon Trust

Based on this approach a maturity matrix based on this understanding of 'Green' would include, but not be limited to, the following developmental objectives:

- Improved environmental quality within South Africa;
- Improved use of key environmental resources in South Africa;
- South Africa's economy becomes less carbon intensive;
- Enhancing the country's resilience to the impacts of climate change;
- Increased economic activity associated with 'Green Economy' focus areas in the country;
- Increases company competitiveness by reducing input costs; and
- Competitive advantage – SA products could gain global recognition for having a lower carbon footprint making them more desirable and / or not being excluded from proposed future embargoes on imported goods and services which do not meet a minimum requirement. For example, the growing trend for wine to be exported in plastic and screw tops to reduce their environmental impact.

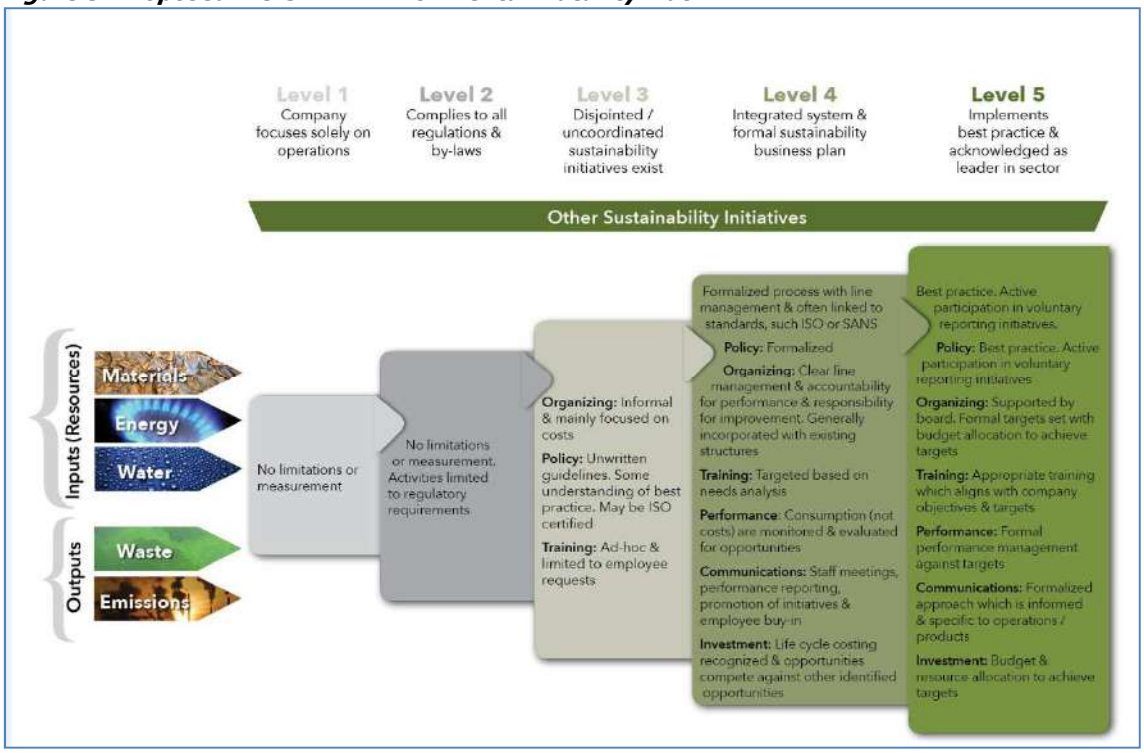
Table 2 below takes this one step further by providing examples of what meeting these objectives would mean for merSETA companies in terms of initiatives they could take.

Table 2: Potential developmental objectives related to 'green' activities

Developmental Objectives	**Examples**
Improved environmental quality within South Africa.	Use of alternatives and/or reductions in use of hazardous chemicals. Compliance with air quality management legislation. Remediation of contaminated soil to regulatory standards. Effective storm water management to prevent contamination of surface and groundwater resources.
Improved use of key environmental resources in South Africa.	Implementation of programmes to support the more efficient use of water and energy. Waste minimisation initiatives.
South Africa's economy becomes less carbon intensive and more competitive	Reductions in emissions of greenhouse gases through the use of renewable energy. Energy input costs increase by less than the annual electricity tariff increases as EE and RE programmes come into effect
Enhancing the country's resilience to the impacts of climate change.	Ensuring that operations have effectively analysed and addressed the risks associated with changing weather patterns. Implementing rainwater-harvesting activities to address anticipated water shortages and anticipated increases in water prices.
Increased economic activity associated with 'Green Economy' focus areas in the country.	merSETA companies take advantage of the increased opportunities offered by localisation requirements in the REIPPPP programme. Companies develop new products to take advantage of new technical infrastructure requirements.
Private Public Partnerships (PPP) to achieve voluntary policy and best practise objectives which would benefit all citizens	Increased recycling activities which are labour intensive;

Using input sourced from semi-structured meetings held with merSETA members, the energy management matrix in Table 1 as well as other recognised matrices[27] the following environmental maturity matrix was developed for the merSETA companies and is shown in Figure 5.

Figure 5: Proposed merSETA Environmental Maturity Matrix



The matrix has the following characteristics:

- It identifies five levels and purposefully avoids associating titles to each level. Rather it provides a general description, which would allow the user to categorise their company according to the most appropriate description. Given that the merSETA has five chambers made up of multi-national corporations down to family run businesses the description must be relevant to all;
- The matrix acknowledges that there is more to sustainability than energy, water and raw materials. It caters for this by providing for an assessment of 'overall company approach to sustainability';
- The same six themes used in the Energy Management Matrix (Table 1) have been incorporated into the merSETA matrix for each of the resources, however they are only included in the matrix as they become relevant. For example, level 1 has no themes while level 6 includes all six themes with a short description to allow for the self-assessment;

[27] www.sustainsuccess.co.uk/wp-content/uploads/2012/09/CarbonManagementMatrix.png

www.cse.org.uk/projects/view/1082

www.cipd.co.uk/NR/rdonlyres/387C691D-62E3-44A1-8BB7-430B20F49BA9/0/SYDHRMaturityMatrix16Mar2012.pdf

www.lean-green.nl/uploads/2012/05/5-maturity-matrix-en.pdf

- By separating the resources and outputs it allows the companies to evaluate their performance on their management of resources and outputs separately. This may highlight that they may score highly in one area but be underperforming in the other two. Illustrating that their overall environmental performance may not be as mature or evolved as initially thought, as all their focus was just on one topic; and
- Finally, the matrix is designed to allow companies to embark on a journey rather than stake a position. This is done through suggestions and the introduction of additional themes across the levels.

3 Survey Process and Methodology

3.1 Introduction

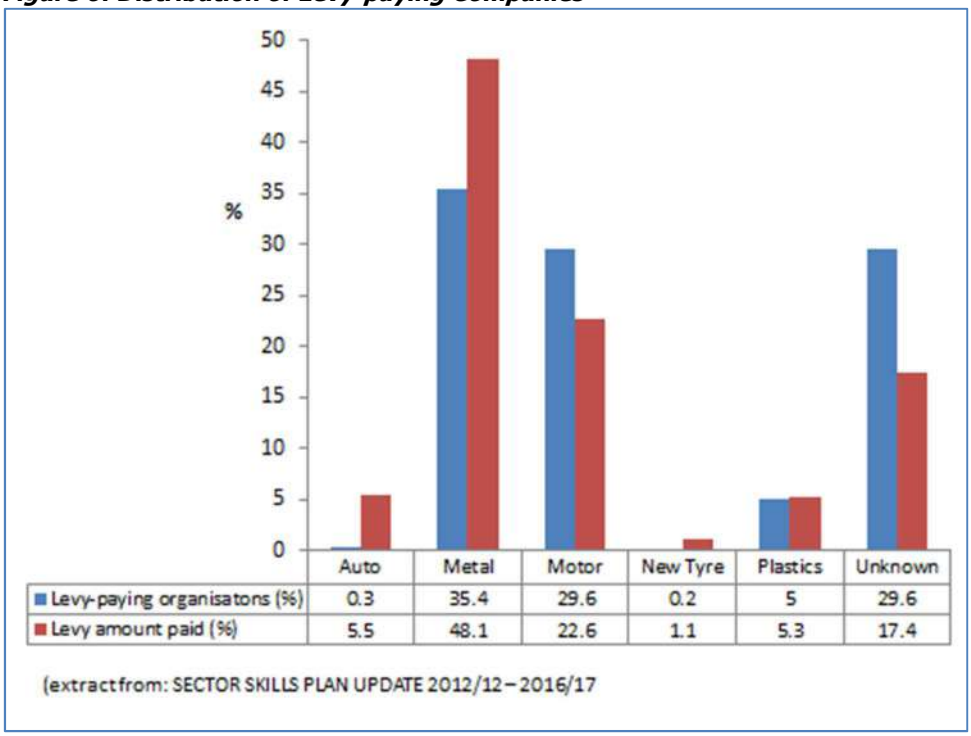
One of the elements of merSETA's strategic vision is the development and implementation of a 'Sustainable Green Skills Development' initiative. As part of ensuring any associated interventions are targeted effectively, and ultimately having an impact, merSETA commissioned a '***Baseline Survey of Sustainable Green-Related Activities, Trends and Innovations in the merSETA companies***'.

The survey has been designed in such a way that it allows for the impact of interventions to be evaluated in future.

The merSETA has almost 50,000 organisations on its database, ranging from conglomerates to medium and small in size. However, in the 2010/2011 financial year, only 13,568 businesses paid skills development levies (SDLs) to the SETA. The other organisations are either small companies that are exempt from the SDL or they are not currently operational.

The following graph represents the distribution of the levy paying companies.

Figure 6: Distribution of Levy-paying Companies



3.2 Purpose

The purpose of the project was to deliver a baseline survey of the merSETA levy-paying companies in order to gain a better understanding of their green activities. This would inform and determine the sustainable green activity-related status, trends and innovations in the various sub-sectors.

The survey results and output will be used to:

- Establish existing benchmarks of the prevailing situation;
- Support the ongoing skills development research processes integral to the Sector Skills Plan (SSP), and
- Identify the priority areas to include in the Sustainable Green Skills Development Programme.

The baseline survey sets out to determine:

- Current green activities in the range of merSETA levy-paying companies that affect current skills supply and demand;
- General environmental sustainability trends in companies of varying sizes and across sub-sectors; and
- Any related innovations to inform skills planning and requirements, inclusive of possible green-related priority skills that could be included in the merSETA's SSP.

The results will be used to understand what is happening in terms of where merSETA companies are in respect of their maturity in addressing 'green' issues and the activities that reflect this maturity.

3.3 Scope

The following aspects have been measured:

- Where merSETA companies are on the Environmental Maturity Matrix;
- The drivers;
- Training needs - where are companies positioned on this currently?
- The degree to which budget is made available / in place for development and training;
- Who the environmental sustainability decision maker within an organisation is;
- The impact and influence of the sustainability approach on company culture;
- The approach of South African companies Compared to international companies on sustainability;
- The approach of larger companies compared to smaller companies on sustainability;
- Current green activities and future intentions;
- Trending areas across companies of varying sizes and across sub-sectors; and
- Investment and attitude towards innovation.

3.4 Research Approach

3.4.1 Quantitative methodology

In selecting the appropriate data collection methodology, a number of factors were taken into account, including but not limited to the ease of reaching a wide range of respondents, participation rates, budget and timing constraints. Based on these considerations it was decided that the most appropriate data collection methodology would be that of an online survey. By making use of the online methodology, costs would be contained, while at the same time, all levy-paying businesses registered with the merSETA would be given a chance to participate in the study. In addition, online

interviews are generally used when the target population is difficult to reach or has limited time available. It is particularly appropriate for business people who have email addresses.

Coverage

Coverage was extended nationally to all levy-paying organisations on the merSETA database.

Data Collection Methodology

The questionnaire was designed using the Environmental Maturity Matrix (Figure 5) as a basis. Every effort was made to ensure that the terminology used in questions was practical and understandable for all levels of respondent.

A draft questionnaire was designed and sent to GIZ and merSETA for approval. Once approval had been received, the questionnaire was thoroughly pilot-tested, by making use of an off-line test whereby the questionnaire was distributed to 6 -10 individuals who were willing to assist. A cross-section of people was used ranging from colleagues, GIZ and merSETA volunteers. A skills development practitioner, Benita Pavlicevic, and a Communications Professor of UNISA also reviewed the questionnaire.

The final questionnaire covered the following aspects:

- Basic demographics of the responding company, e.g., province, merSETA chamber, location of head office, number of employees;
- Certification/s held, e.g., ISO series and other;
- Current and future intended approach to the management of resources, i.e., materials, water, energy, emissions and waste;
- Measurement of the impact that the company's operations and products have on the environment;
- Conservation activities currently undertaken and commitment to future conservation activities;
- Allocation of budget to green-related interventions with regard to materials, water, energy, emissions and waste;
- Decision-making level with regard to spending money on sustainable development
- Drivers affecting company's approach to the management of materials, water, energy, emissions and waste; and
- Training on environmental sustainability

The number of open-ended responses was kept to a minimum and further exploration around areas where more information was required was followed up in the qualitative in-depth interviews. A copy of the quantitative questionnaire is attached as Appendix 3 to this report.

To encourage companies to respond, the following was done:

- A detailed explanation was given of why participation in the project by the respondent is very important;
- Regular follow-up emails were sent to those who had not yet participated;
- A guarantee of anonymity was given;
- The length of the questionnaire was controlled, and
- An offer to share the results was made.

To ensure that the above was managed and to increase the chances of success, the consultants worked closely, with the merSETA special project unit to monitor responses.

A deadline date was set for responses. Once this date had been reached, the survey was closed.

Sample

The merSETA provided their database of levy-paying members. However, issues were encountered with the completeness and quality of the database. The Terms of Reference stated that merSETA had 13,568 levy-paying members in 2010/11. The data was supplied via three separate spreadsheets, due to an ongoing systems migration exercise within merSETA, which only contained 6,885 entries or just over 50% of the expected sample size. In addition, 3,940 of these entries were incomplete and were missing one or more of the following: company name, contact email address, chamber and number of employees. To address this, the list was cleaned, de-duplicated and updated by members of the research project team, who corrected incomplete email addresses and followed up on contact details. Over 1,000 email addresses were added through this effort.

A final list of 6,157 levy-paying members of merSETA, with all the necessary contact details, was obtained and invitations to participate in the survey were sent out.

A total of 664 interviews were completed and returned, a 10.8% return rate. The response rate of 10-15% is generally the average response rate (surveys completed, out of surveys offered) that most survey companies manage to obtain.

It is reasonable to expect that any survey that samples a population (or that achieves only a sample by way of respondents) will incur some sampling error and possibly also some sampling bias. The former is the extent to which any statistical measure applied to the sample gives a result that deviates from the mean of the population as a result of random variation in the membership of the sample. The latter is where a statistical measure applied to the sample deviates from the population measure because of systematic bias in the membership of the sample (Dillman, 2000).

Table 3 below shows that a significant number of companies could not be categorised in terms of their specific chamber membership (shown in the first two columns as "Levy-paying companies' and "Usable list of levy-paying companies"). In the final sample, ("number of respondents"), all those answering the questionnaire assigned their companies to one of the chambers, in response to the question asking into which chamber their company fell. It was not possible to validate whether these respondents classified their businesses according to the way they have been classified in the merSETA database or whether those who had fallen into the 'unknown' category had assigned their businesses to the correct SETA chamber.

It is clear that, given the limited size of the Auto and Tyre chambers in reality, many respondents have mis-classified their organisations into one or other of these categories. The Auto and Tyre chambers comprise primarily of large international conglomerates. Other companies on the fringes of these industries (e.g., auto mechanics, panel beaters, wheel balancing companies, etc.) have also classified themselves as belonging to either the Auto or Tyre chambers, hence the inflated figures for these chambers in the survey.

Table 3: Distribution of Levy-Paying Companies

	Levy-paying companies[28]	Usable list of levy-paying companies[29]	Number of respondents[30]
Number of companies/ businesses	13 568 %	6 157 %	664 %
Auto	0.3	0.9	6.2
Metal	35.4	26.3	61.9
Motor	29.6	15.3	24.5
New tyre	0.1	0.3	1.5
Plastics	5.0	5.4	5.9
Unknown	29.6	51.8	N/A

The objective of using a proper probability sample is to give each person in the target field an **equal chance** of being included in the sample[31].

In order to achieve this, it was ensured that the **likelihood of each person in the universe (representing a levy-paying merSETA business in the cleaned database) responding is based on statistical chance** with each member of the universe having the same [or at least a measurable] statistical chance of responding. This means that a good cross-section of the merSETA levy-paying population should appear in the sample.

The main advantages of using a probability sample include: no interviewer bias (not applicable in this instance); incidence can be measured; no pre-knowledge of universe necessary; profiles can be established; statistical accuracy can be assessed.

Sample size[32] depends on**:**

- The most important item to be measured by the proposed survey
- The required accuracy
- Breakdowns required
- Client's budget

Accuracy increases with sample size, but not in proportion:

SAMPLE	RESPONSE RATE	MARGIN OF ERROR
500	50 %	± 4.5
1,000	50 %	± 3.2 [=71 % OF 4.5]

The sample size increases by 100 %, [and thus costs increase accordingly] but sampling error only decreases by 29 %.

NB: Margin of error depends on sample size, not on the size of the universe.

Thus, the final sample of 664 responses has a margin of error of 3.7% and, had 1,000 responses been received, the margin of error would only have increased slightly to 3.2.

SAMPLE	RESPONSE RATE	MARGIN OF ERROR

[28] As per Sector Skills Plan Update 2012/13 – 2016/17
[29] Source: merSETA database - post-cleaning, de-duplicating and updating
[30] Final sample of responses to online questionnaire
[31] **Researching the South African Market** – P.A. Nel, F.E. Rädel, M. Loubser
[32] **Marketing Research** – Harper W. Boyd, Ralph Westfall, Stanley F. Stasch

664 (read on the line showing 700 responses) 1,000	50 % 50 %	± 3.7 ± 3.2

Margin of Error

All random sample surveys are subject to a probable margin of error. The statistical reliability of a survey, where probability was used, can be determined and is dependent upon the size of the samples used and the unanimity of response.

A sample survey deals with a microcosm of the total population and it is, therefore, impossible to discover the exact proportion of the population who act in a certain way or buy a particular product. However, by determining the standard error of the sample, it is possible to say, within a predetermined degree of accuracy, that the true proportions fall within certain limits. In our survey, a sample of 664 representatives of merSETA levy paying companies agreed to participate and 35% of them claimed certain environmental behaviours and opinions, then the probable margin of error would, in 95 cases out of 100, be within plus or minus 3.5% of this figure. In other words, the true figure would lie somewhere between 31.5% (35% - 3.5%) and 38.5% (35% + 3.5%).

In Table 4 below the percentages are shown, which have to be added to and subtracted from any survey finding to establish the range within which the true proportion of the population will fall in 95 cases out of 100 (at the 2-sigma level).

Table 4: Margin of Error

SAMPLE SIZE (N)	PERCENTAGE RESPONSE RATE									
	5% or 95%	10% or 90%	15% or 85%	20% or 80%	25% or 75%	30% or 70%	35% or 65%	40% or 60%	45% or 55%	50%
100	4.3	5.9	7.0	7.9	8.5	9.0	9.4	9.7	9.8	9.8
200	3.0	4.2	5.0	5.6	6.0	6.4	6.6	6.8	6.9	6.9
300	2.5	3.4	4.0	4.5	4.9	5.2	5.4	5.6	5.6	5.7
400	2.1	2.9	3.5	3.9	4.2	4.5	4.7	4.8	4.9	4.9
500	1.9	2.6	3.1	3.5	3.8	4.0	4.2	4.3	4.4	4.4
600	1.7	2.4	2.9	3.2	3.5	3.7	3.8	3.9	4.0	4.0
700	1.6	2.2	2.6	3.0	3.2	3.4	3.5	3.6	3.7	3.7
800	1.5	2.1	2.5	2.8	3.0	3.2	3.3	3.4	3.4	3.5
900	1.4	2.0	2.3	2.6	2.8	3.0	3.1	3.2	3.3	3.3
1 000	1.4	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1

Analysis and Processing of Quantitative Results

The online survey tool aggregated the data as the responses came in. Once 417 completed questionnaires had been received, the analysis of the data was discussed with GIZ and merSETA and the following parameters were agreed.

A survey that looks at aggregated information requires a minimum number of respondents in order to be of real value in terms of analysis. Statistically, at least thirty respondents are required in any sub-group being analysed. With fewer than thirty respondents, one or two particularly biased individuals can distort the results. In these cases, results should be treated as indicative rather than having any statistical

significance. **For the Tyre Chamber, where this is the case (10 responding companies), this category is indicated by **.**

In addition, this survey was "self-completed" and it was, therefore, not possible to control the number of respondents answering each question. The results for each question have been based on those who answered the question and the base size is indicated on each graph/table.

3.4.2 Qualitative methodology

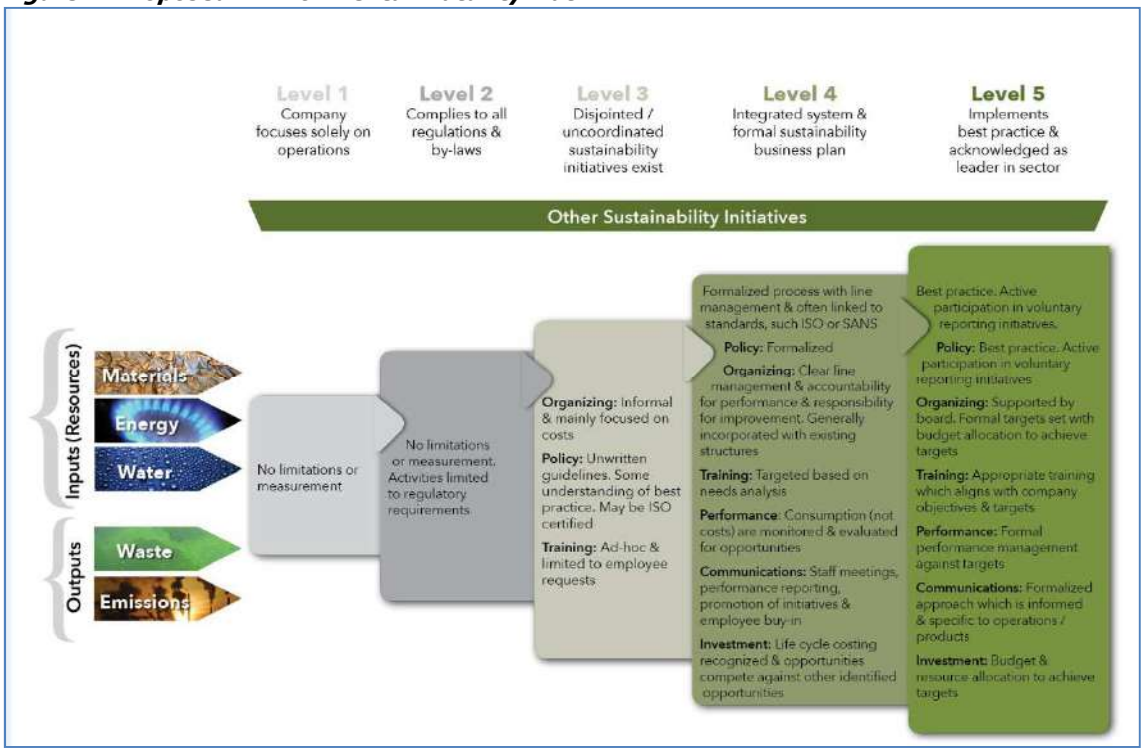
Objective

A second stage of primary research was conducted, with the dual objectives to test the validity of the quantitative survey results and to enrich the understanding of those findings through further in-depth exploration and discussion.

Methodology and instruments

The methodology selected to validate the survey results consisted of **face-to-face in-depth interviews (x 12),** supplemented by some **telephonic interviews (x 4)**, with a selection of companies across all five chambers. This entailed a qualitative specialist research team member conducting the interviews. The same interviewer undertook all interviews for consistency and to probe into new and emerging topics that could provide a depth of understanding. A discussion guide was developed as a framework to ensure consistency of questions and discussion exploration areas. The framework was designed in alignment to the quantitative questionnaire and to the proposed Environmental Maturity Matrix. A front copy of the Maturity Matrix (Figure 7 below) was used in each interview to establish where the respondent believed their organisation was positioned on sustainability. This also assisted the structure of the discussion. The discussion guide is attached as an appendix to this report.

Figure 7: Proposed Environmental Maturity Matrix



In order to ensure that all chambers were represented in the qualitative phase, the team used telephonic interviews when face-to-face interviews were not possible due to time availability and/or location.

Face-to-face interviews were approximately one-hour in duration, in comparison with telephonic interviews which averaged 25 minutes. Face-to-face interviews were conducted at the place of employment of all respondents, at a time that was convenient to each. All interviews were audio recorded and transcribed by a professional transcriber.

Sampling

Table 5 provides a breakdown of the interviews across the chambers. We designed a sample grid that was representative of the merSETA levy-paying membership and sought to secure interviews to match this design as closely as possible.

Table 5: Breakdown of Qualitative Interviews by Chamber and Company Size
Note: **Brown text denotes phone interview, green text denotes face to face interviews.**

	Metal & Engineering	*Motor retail & component manufacturing*	*Auto manufacturing*	*Tyre manufacturing*	*Plastics industries*	*Total*
Large Multi-national (multi-location)	1 X Isando	1 X Rosslyn	1 X Rosslyn 1 x Pretoria 1 x Isando	1 X Durban 1 X East London 1 X Alberton*	1 X Johannes-burg	9
Large national (multi-location)	1 X Rosslyn	1 X Pretoria			1 X Pretoria	2
Medium		1 x Heidelberg				1
Small	1 X Durban	1 X Pretoria			1 X Midrand	4
Total	3	4	3	3	3	16

*This particular company did not fall directly into the merSETA scope of original tyre manufacturing, but was included in the study and analysis for providing insightful information about the tyre manufacturing industry.

The easiest interviews to secure were in the Metal and Motor chambers, followed by Auto. Comparatively, interviews in the Plastics and Tyre chambers were difficult to secure. This corresponds to the proportion of membership per chamber in the overall merSETA member base, with Metal being biggest and Tyre, smallest. All companies interviewed, except two, were levy-paying members of merSETA. (It is not clear why the two do not pay levies as they were not asked this question.)

The lack of interviewees in the small, medium and large sectors of Auto manufacturing and Tyre manufacturing accurately represents the current status quo of these two sectors which are dominated by Large Multi-National organisations.

Once a few of the interviews had been conducted, we observed that the findings were similar to that of the quantitative research. As such, it was evident that amongst small and medium companies, which comprise 58% and 26% respectively of the merSETA data base sampled (as demonstrated Figure 10, page 41), we could anticipate that very few formal environmental initiatives were underway. Therefore, to focus the sample of interviews on SMMEs in order to be representative of the quantitative sample meant we would be learning a lot of the same. This was not considered an optimal approach to meeting the objectives of the research and the financial investment thereof. Consequently, the decision was taken to focus more interviews on the large companies, which comprise 16% of the quantitative sample. As will become apparent in the main findings of this report, it is the large companies, particularly Multi-National companies

with international head offices, that lead the way in environmental trends in this sector. It stood to reason that to provide the merSETA with direction around trends, and the skills support set that would be required into the future, would provide more value for strategic planning purposes. This explains why the qualitative sample skews towards larger companies, whereas the quantitative sample more closely mirrors the balance of the merSETA membership across different company sizes.

Analysis

All discussions were audio recorded and transcribed by professional transcribers. The transcripts, along with observations gathered during interviews, formed the data upon which the qualitative analysis was conducted. Individual interview responses were captured in a large excel spreadsheet, organised by sector, company size, and flow of discussion according to the discussion guide.

Once the data had been captured as described, a content analysis was conducted: this is a method of analysis "for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns"[33].

3.4.3 Merging the Quantitative and Qualitative Results

As explained above, the data from the interviews was captured in a formal, standardised way allowing the emerging themes from the qualitative findings to be compared to the themes emerging from the quantitative survey.

These themes were identified and named during meetings of the research team members throughout the research process. Having two data pools allowed the team to expand their understanding of the themes, and, as anticipated, the qualitative data allowed for in-depth exploration of the reasons and motivations for particular attitudes, behaviours and activities.

As the body of data expanded in both the quantitative and qualitative findings, the team was able to identify similar trends in both data pools. However, once each phase of data collection was completed, separate team members analysed each set of results independently. The results were then compared. It was evident that the findings from both the qualitative and quantitative samples were aligned and the decision was taken to merge these results into one report. The qualitative research has played an important role in further explaining emerging trends and company motivations behind decisions to follow certain environmental initiatives over others. However, where differences in results between the two sets of findings exist, the separate views are accounted for in the report.

This iterative process enriched the team's understanding of the data collected. Whilst the quantitative results show us the levels of engagement across the five areas of the Environmental Maturity Matrix, the qualitative results explain the reasons for engagement within the different merSETA chambers and company sizes.

Through this process, a framework was developed based on the most meaningful and prevalent themes, which can be used as benchmarks or points of measure. These benchmarks provide information about the current baseline situation, and can be used in the future to evaluate the progress of 'greening' amongst merSETA organisations. These will also provide useful guidelines to inform the direction of training and progress.

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[33] Hsieh, H.-F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis. Qualitative Health Research, 15(9), 1277-1288.

A Note on the Interpretation

In general terms, research has proved that there is a tendency for respondents to overstate their performance on measures and ratings.[34]

In this study, it is apparent that at least half of the interviewed representatives of companies rated themselves more positively than the interviewer would have done based on the information they provided on their companies' attitudes and behaviours on the input and output aspects of the Environmental Maturity Matrix. The interviewers estimated that interviewees selected a position at least one level above where the interviewer would have placed them based on their description of their companies.

The tendency to overstate performance appears more prevalent in organisations without ISO certifications and smaller companies among the sample interviewed. For example, such a company may rate themselves a 3 to 4 or a 4 to 5 on the Matrix, whereas a company which is a leader in sustainability practices would be rated a 5.

It is possible that some companies may be overstating because they do not as yet understand what 'world class' sustainability looks and feels like.

With education and exposure over time, it is expected that companies will be more able to self assess and rate themselves more accurately.

3.5 Limitations

The following factors should be taken into account when considering the research findings:

- An inaccurate and incomplete database meant that only 50% of merSETA companies were invited to participate. In addition, in many instances, the consultants were not certain that the invitation to participate was sent to the appropriate person in the company;
- As stated in Section 3.4.1 (Margin of Error), the tyre manufacturing industry is represented by a small number of companies, who have large operations, i.e.: employ > 500 people. This resulted in too few responses being received for any findings from this chamber to be statistically reliable and should be viewed as indicative;
- As per the Terms of Reference, the survey focused on green related activities related to water, energy, materials, emissions and waste – defined in the Environmental Maturity Matrix which was developed. The research does not consider other sustainability activities or criteria; and due to the low number of interviews undertaken as a percentage of total respondents, the qualitative findings are there to 'enrich' and 'support' quantitative findings and cannot be relied upon as representing the views of any of the merSETA chambers;
- Responses to questions in both the quantitative and qualitative stages of research are driven through respondent knowledge, experience and perception. With regards perception, the adage "perception is king" must be remembered in reading this report. Respondents' perceptions of environmental sustainability, initiatives undertaken and training that exists to support activity, may differ to reality. The majority of people who took part in this research are not experts in the field of environmental sustainability. However what they know, or what they **perceive to know**, is very important to identify. This will highlight the gap that exists between

[34] Controlling Response Bias in the Measurement of Consumer Knowledge; Craig Nathanson, Bryce Westlake, & Delroy L. Paulhus; The University of British Columbia

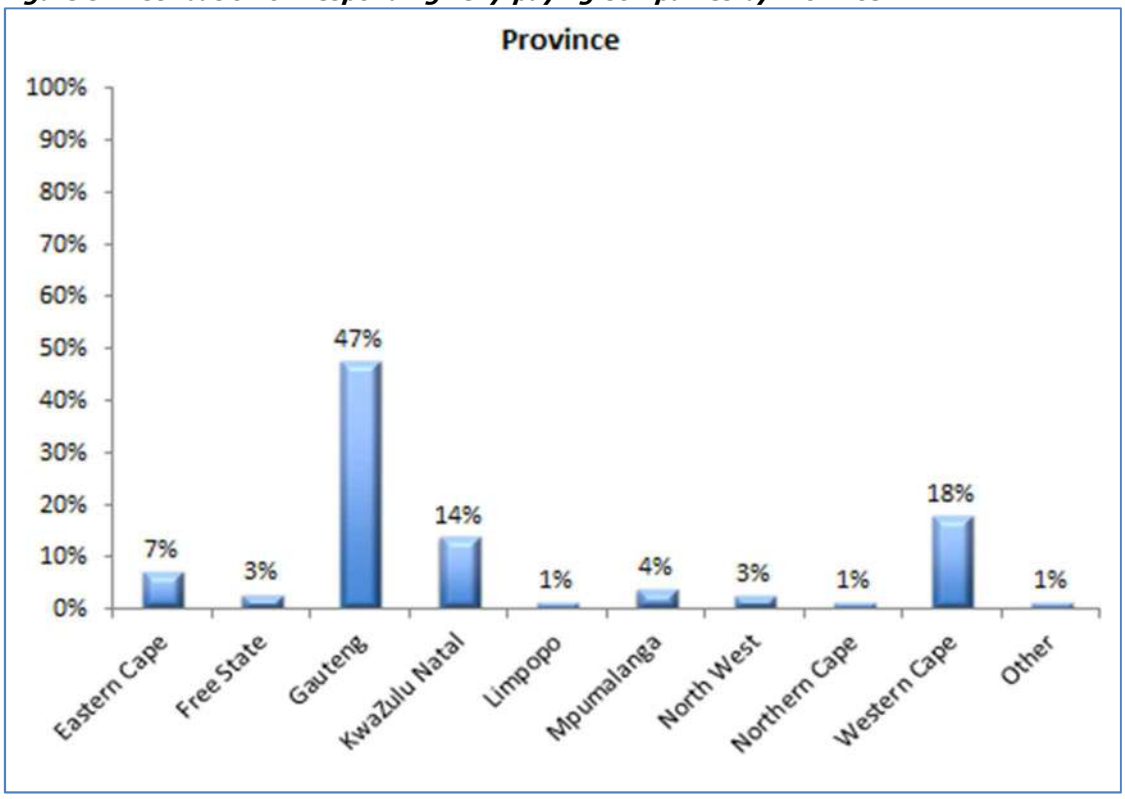
perception and reality, which can be narrowed through the provision of green training and skills development to drive a green economy.

3.6 Main Findings

3.6.1 Company Demographics, Structure and Footprint

While Gauteng has the lion's share of merSETA levy-paying respondents (47%), the distribution of companies in the merSETA chambers across the four main provinces varies somewhat.

Figure 8: Distribution of Responding Levy-paying Companies by Province



The table below shows that more Auto and Tyre Manufacturing businesses are located in the Eastern Cape, while Metal and Engineering companies are more likely to be found in Gauteng. Motor Retail and Component and Tyre Manufacturing companies are less likely to be found in Gauteng, while Auto and Tyre Manufacturing companies are less likely to be found in the Western Cape.

Table 6: Representation of Chambers by Provinces (based on those who responded)

Province	All respond-ents %	Metal and ngineer-ing %	Auto manu-facturing %	Motor retail and compo-nents manu-facturing %	Tyre manu-facturing ** %	Plastics industry %
All respondents	100	62	6	24	2	6
Eastern Cape	7	4	**22**	10	**30**	5
Free State	3	3	2	3	0	5
Gauteng	47	**57**	44	**26**	**30**	46
KwaZulu-Natal	14	12	15	16	**30**	15

Limpopo	1	1	0	4	0	0
Mpumalanga	4	2	0	**9**	**10**	3
North West	3	2	0	6	0	3
Northern Cape	1	1	2	4	0	0
Western Cape	18	18	**12**	20	**0**	20
Other	1[x]	1	2	2	0	5

[x] Denotes those who mentioned more than one province.

Numbers highlighted in blue indicate where representation is significantly above the norm.

Numbers highlighted in red indicate where representation is significantly below the norm.

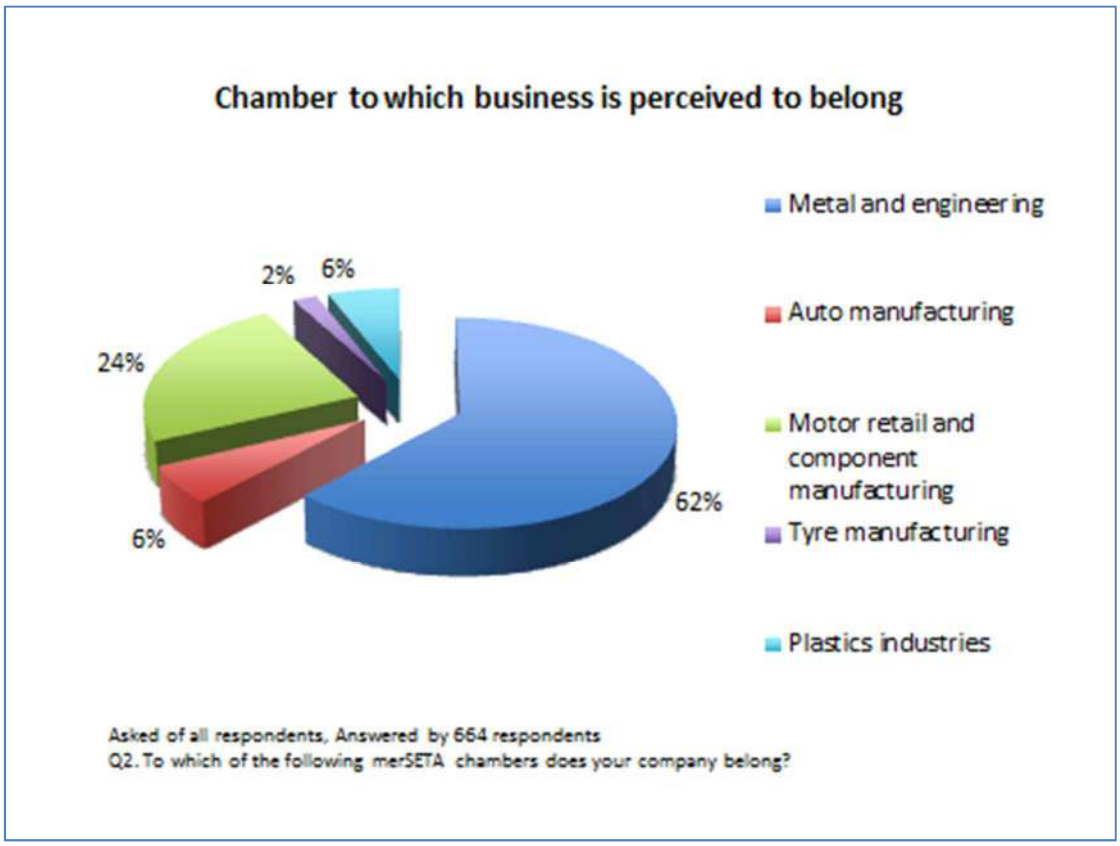
The merSETA companies are distributed according to GDP per province, as indicated in Table 7 below.

Table 7: Incidence of Provinces against Provincial GDP

	% of incidence of responses	**% GDP**
Eastern Cape	7	8
Free State	3	5
Gauteng	47	36
KwaZulu-Natal	14	16
Limpopo	1	6
Mpumalanga	4	6
North West	3	5
Northern Cape	1	<2
Western Cape	18	15

According to merSETA statistics, the largest number of companies that are registered levy-paying companies are to be found in the Metal and Engineering chamber. Tyre Manufacturing is the smallest chamber. The number of respondents corresponds to this distribution.

Figure 9: Chamber to Which Responding Business is Perceived to Belong

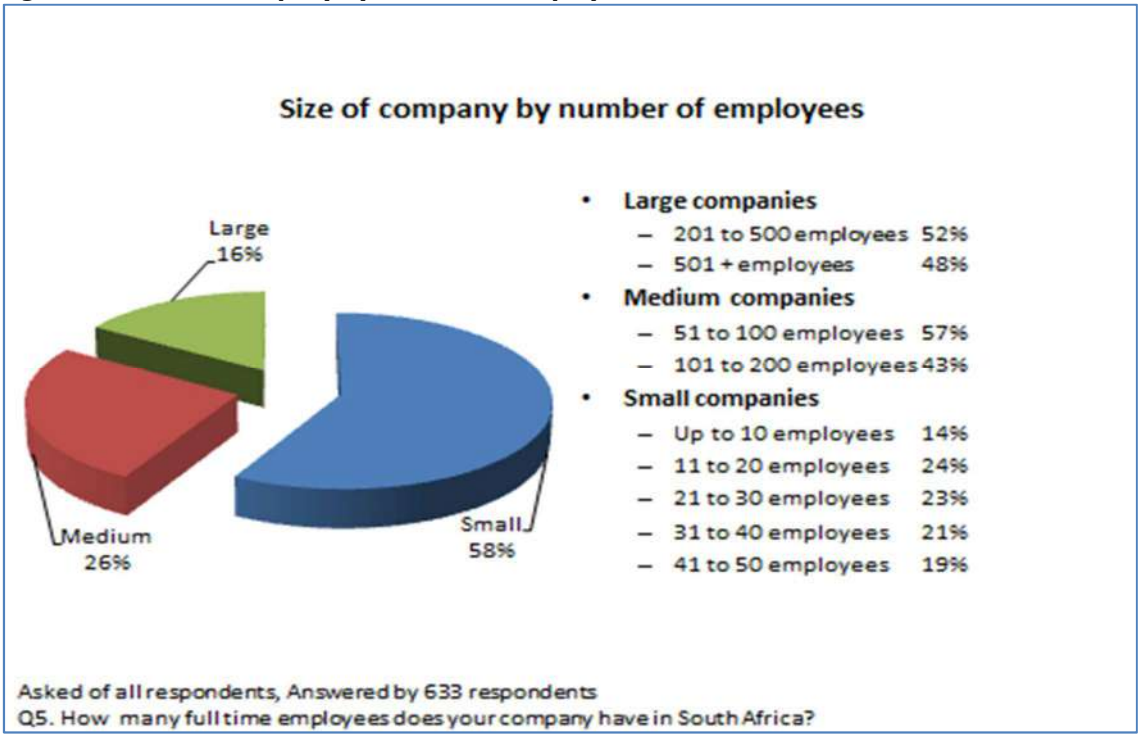


Most of these companies have their head offices in South Africa (93%). Eighteen percent (18%) of the Auto Manufacturing companies have their head offices outside of South Africa, which is a higher proportion than in other chambers.

Seven in ten businesses are situated in one province of South Africa only, while 27% are to be found in two or more provinces. Only three percent are to be found in all nine provinces.

The number of full-time employees was used to define the size of companies. On this basis, 58% of the sample comprises small companies, 26% medium and 16% large.

Figure 10: Size of Company by Number of Employees



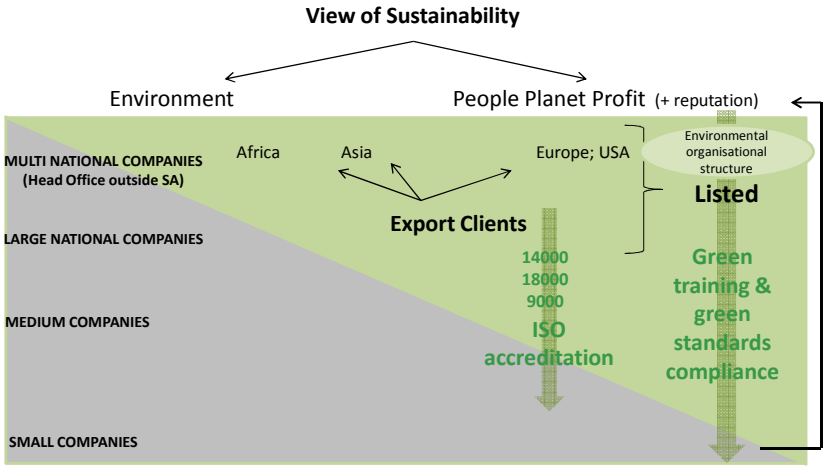
The Auto and Tyre Manufacturing chambers have more large companies than the other chambers: 34% and 60% respectively.

In the qualitative sample, the nine multi-national companies all have their head offices outside of South Africa (for example in Germany, United States and India) and all but one (excl. Plastic company) are listed companies. As figure 11 below shows, listed companies, are required by law to report on their sustainability which may explain why they appear to have a deeper, more ingrained sense of responsibility towards sustainability. The responsibility cascades down into every division and area of business around the globe, and is visible in the training offered to employees and suppliers which aims to ensure that global quality and sustainability standards are met. Of interest, the one non-listed multi-national cited sustainability standards as an influencing reason for not listing.

Figure 11: Influence of international stakeholders on environmental activity

Company Demographics → impact on attitude towards Environmental Sustainability

- The presence of international stakeholders has a significant influence on behaviour around environmental sustainability.



Similarly, small and medium companies are not listed and therefore the focus on sustainability practices is not in any way mandatory, nor a driving focus of business. Another emerging driver of sustainability policy relates to customer footprint. Of the companies surveyed in the qualitative phase nine, including one of the smallest companies in the Metal sector, export their products and services outside of South Africa's borders. This means that they have to meet the standards of the companies in countries to which they export. However, Europe and Northern America have stringent SHEQ standards than do some Asian and African countries, which suggests that exporting to the former probably drives a higher level of meeting of the SHEQ standards and requirements. As such, ISO accreditation rises to the priority list of all size companies if opening up to export markets, particularly those in the northern areas of the globe. Companies servicing a customer base within SA borders, i.e. keeping a tight and narrow footprint, are more likely to operate without ISO accreditation.

Thus we can deduce that the presence of international stakeholders has a significant influence on driving environmental sustainability practice and policy in South African organisations.

3.6.2 Definition of Environmental Sustainability

While the research team arrived at a common understanding of sustainability, it is important to understand that organisations responding to the survey and interviews may have very different and diverse understandings of environmental sustainability.

Respondents in the qualitative interviews were asked how their company views or defines environmental sustainability. What emerged is that definitions employed by the companies largely depend on the historical and strategic adoption of sustainability, as a value and practice in business strategy.

The definitions used by companies vary:

- From a direct understanding that "It's about looking after the environment" (Large Plastics Industry Company)

- to "... preserving the environment and natural resources for future use" (Small Metal and Engineering Company);
- From a business focused approach of "... gearing the full business lifecycle to reduce negative impact on the environment" (Multi-national Auto Manufacturing Company)
- To a fully integrated sustainability approach where the environment forms just one aspect of integrated sustainability "These were the 4 pillars - compliance pillar, social impact, environmental impact which equals economic impact" (National Motor Retail Company).

As Figure 11 demonstrates, environmental sustainability is considered to be part of overall sustainability more by the multi-nationals than by companies on the small and medium spectrums who have a narrow focus on environment alone. As mentioned, the multi-nationals are generally also listed companies, with strong commitment to world class governance and exposure to public scrutiny and the legislative contexts in the various countries they operate in.

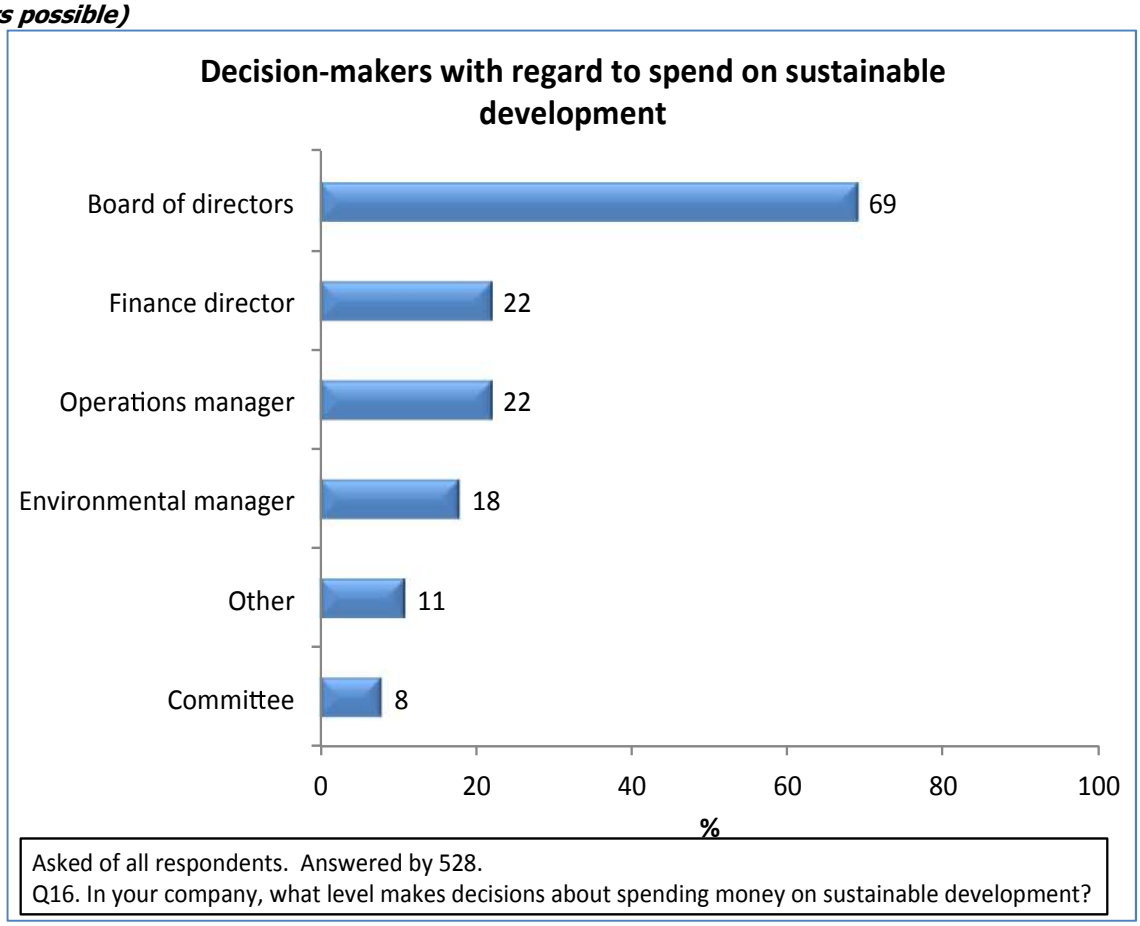
- "We see sustainability as a strong strategic pillar – this is a business investment as well as environmental" (Multi-national Auto Manufacturing Company)
- "Sustainability is part of great business practice and corporate values .... contributing to a better world" (Multi-national Auto Manufacturing Company)

To assess how seriously companies actually take environment management, we asked where the responsibility for environment management lay. Only one of the companies in the qualitative sample – a multi-national Auto Manufacturer – has an Environmental Sustainability department in South Africa, headed by the Environmental Protection Manager. This particular company is an industry leader where the impact on the environment is considered in every major business decision, product launch, etc.

Whilst actions reflecting environmental concerns are being taken to varying degrees by all other companies, decisions driving these actions are largely made at Board / MD / Management level, implemented by SHEQ or in some cases, by HR or Operations.

Having environmental decisions made by one of these structures is an indication that Environmental Sustainability is not considered as a separate 'portfolio' but rather a function that someone 'picks up' to manage over and above their designated, primary role and responsibility.

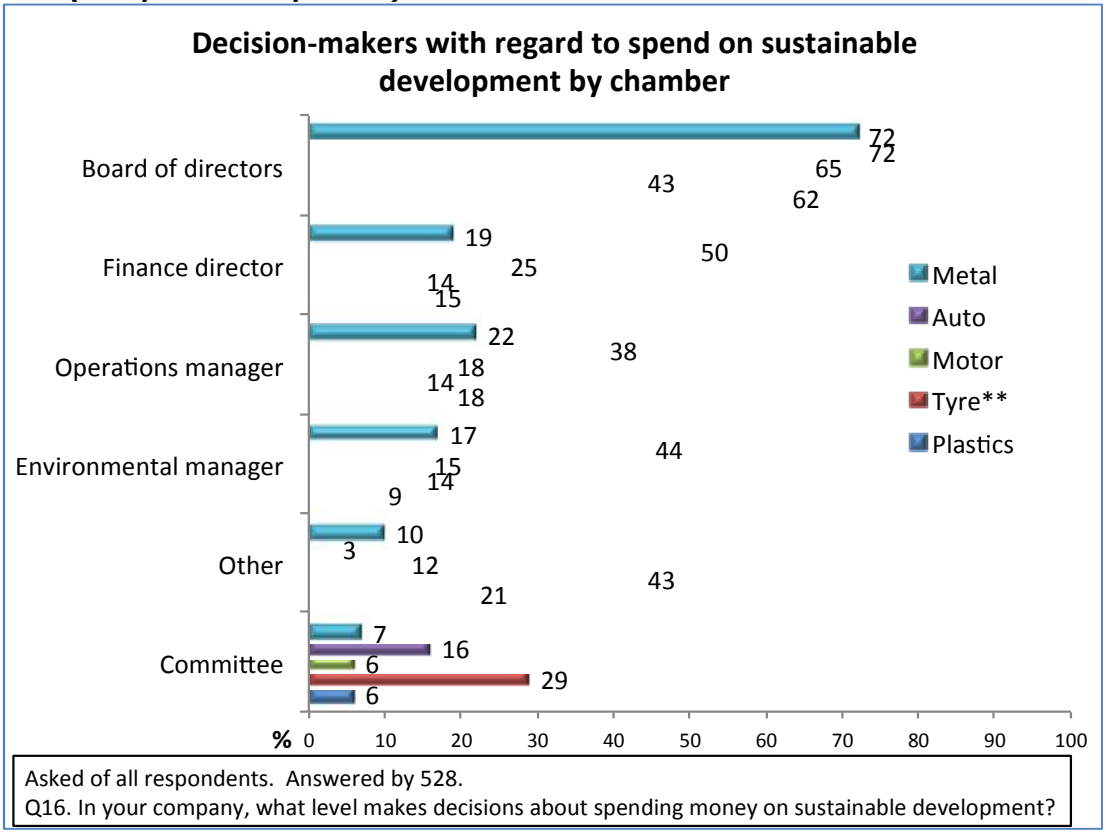
Figure 12 Decision-makers with regard to Expenditure on Sustainable Development (multiple answers possible)



What we are seeing in the quantitative findings is that few companies have an organisational structure that supports independent and autonomous environmental decision making. Most decision–making regarding expenditure on sustainable development takes place at board level (69%).

These findings are indicative of the skewed composition of the sample of responding companies, i.e., the skew towards smaller companies where the owner generally performs many of the functions mentioned above.

Figure 13:Decision-makers with Regard to Expenditure on Sustainable Development by Chamber (multiple answers possible)



It is interesting to note, that in the Auto Manufacturing companies, these decisions are more likely to be taken by financial directors, operations and/or environmental managers, given that Auto Manufacturers lead the way in this sector on environmental management.

Through exploration in the qualitative interviews, it emerged that in multi-national companies, environmental sustainability policies are set by the global Head Office, and implemented locally in alignment with South African legislation. Local relevance also plays a role, with some restriction on implementation if the skills, technology or infrastructure cannot support global policy. Some functions, specifically research and development into sustainable alternative material inputs, remain centralised at global Head Office.

As such, we could assume (and later go on to demonstrate) that some of the multi-national Auto and Tyre manufacturers are leading the way in Environmental Sustainability policies and practices and are the more likely chambers to have a mature environmental organisation structure. They also ensure that their suppliers (Metal and Engineering; Plastics and Motor manufacturing) in allied disciplines comply with standards that are set.

The qualitative interviews also suggest that for the most part, the awareness of and attitude towards environmental sustainability depends on the culture and commitment of leadership; ranging from:

- The 'tick box' compliance mind-set "I'm obeying all the rules ..." (Medium Motor Component Manufacturer); "Whatever they (clients) say we must do to do business with them" (Multi-national Plastics Industry Company);

- To "We are big on integrity. We regularly do integrity training. If I say regularly, I mean like 3 or 4 times a year and the environment for us plays a big role." (Multi-national Auto Manufacturing Company).

However, at the core, what 'big business' is able to see, and lead the way on, is that sustainability is critical for business survival and longevity; which also includes sustaining a good reputation in the media and public eye. Attracting and maintaining both loyal customers and investors depends on a company's ability to engage trust:

- "Sustainability values are being driven by larger companies who have a higher profile and therefore more pressure to perform in a socially and environmentally responsible way, so they've had to integrate this into the fabric of their existence to make it real. And then with the escalating costs of manufacturing and doing business, and their responsibility to corporate governance and shareholders, are driven heavily to be more cost efficient. As the cost of energy increases, the impact on their bottom line must be a significant lowering of margins. So I guess they have to invest for long term savings." (Small Metal and Engineering Company).

It is important to highlight however, that given the strong representation in the quantitative sample of small and medium companies, that most of the merSETA membership surveyed does not view sustainability in a holistic sense of "People. Planet. Profit"[35] and that sustainability mostly refers in some way to the protection of the environment.

3.6.3 Attitudes and Behaviour towards Environmental Sustainability

Attitudes towards environmental sustainability differ widely across the sample as demonstrated through associated behaviours - from the bare minimum driven by compliance, to deeply embedded values, performance and reward systems. The series of charts presented below illustrates the attitudes and behaviours of companies in each chamber. Each axis represents a different approach to the management of environmental sustainability, with ratings along the axes representing the frequency of responses choosing that approach.

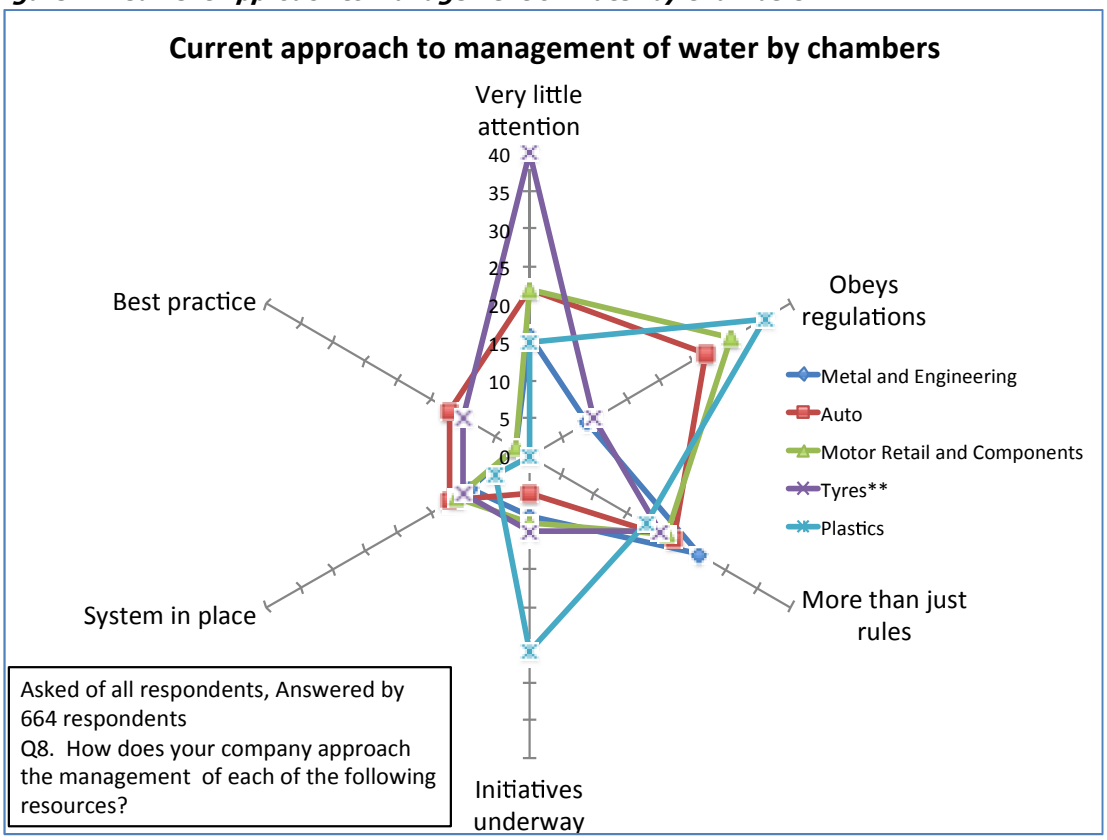
Each chart focuses on an input or output, showing the distribution of companies that range between zero and the top end of the range, e.g. 'no attention' and 'a great deal of attention' or 'does not obey regulation' and 'obeys all regulations. This allows us to draw a shape for each such input/output that can be compared with the other inputs/outputs – to determine if they are the same or different – and in what way.

The first chart, Figure 15 below, shows the responses on the management of water as an input, and a series of other shapes (not shown here) do the same for each of the inputs or outputs being measured.

In looking at these shapes it is evident from the similarity of the shapes that, overall, there are no significant differences in the current approach to the management of inputs / resources, (water, energy, materials), or to the management of outputs (emissions and waste).

[35] Pan African Green Industrial Skills Conference – Leipzig 2013: Green Jobs – Future Jobs; Ansa Liebenberg

Figure 14: Current Approach to Management of Water by Chambers



The majority of the companies that responded to the quantitative survey (75% - 80%) fall into the first three categories of the matrix:

- Pay relatively little attention to green issues;
- Obey all regulations and bylaws with regard to green issues; and
- Generally accept that sustainability is more than just following rules (mid-range response).

For the purposes of this study, these categories have been grouped together as representing a LOW approach.

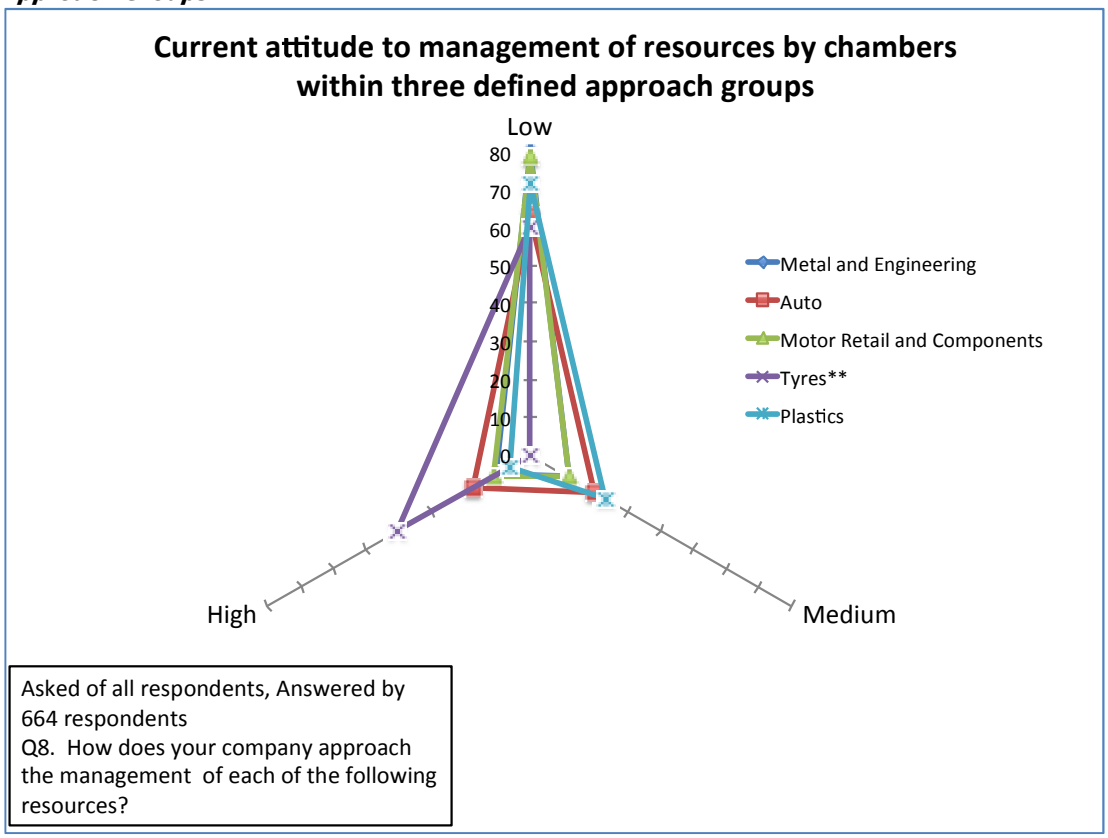
A second group comprises those companies which have a number of green initiatives underway (approximately 10% of the sample) – these have been classified as having a MEDIUM approach to sustainability.

The third group, the HIGH approach group (about 12% of the sample), is made up of those companies falling into:

- Our green initiatives fit together as part of an overall system; and
- Our green initiatives are best practice and we are known to be a green leader in our sector.

The chart below shows these chambers plotted against the Low, Medium and High approach to sustainability. From the shape of the graph, it is clear that the majority of companies fall into the group categorised as LOW.

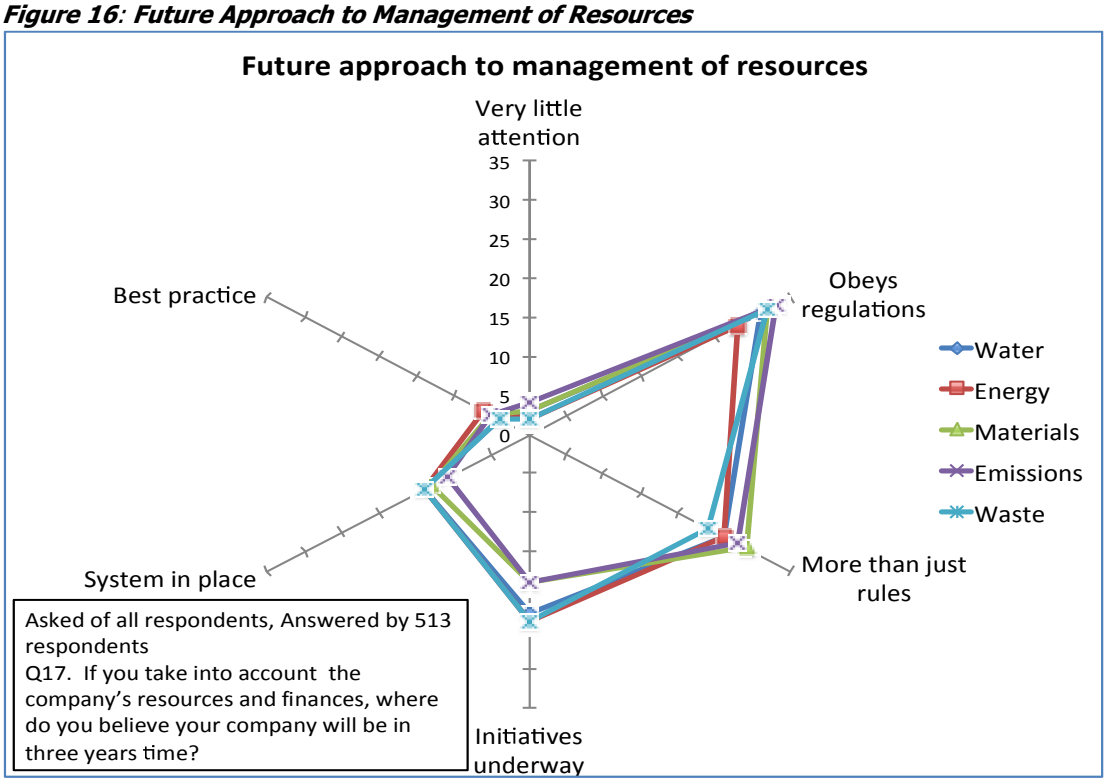
Figure 15: Current Attitude to Management of Resources by Chambers within Three Defined Approach Groups



3.6.4 Future intentions for input and output management

Companies were asked where they saw their companies in the future in terms of environmental management. The figure below shows the distribution of responses. The change in shape from the current reality to the intended future reality shows a shift from a LOW to MEDIUM approach for most companies.

Figure 16: Future Approach to Management of Resources



Considering intentions for the future approach to the management of resources, it is clear that there is a significant positive shift along the axis from LOW to MEDIUM approach as they express their intention to embark on more initiatives and their understanding of the need for activities 'beyond just obeying the rules' increases.

However, when the question focused on the attitudes the same shift was not evident.

Figure 17: Current attitude to management of resources

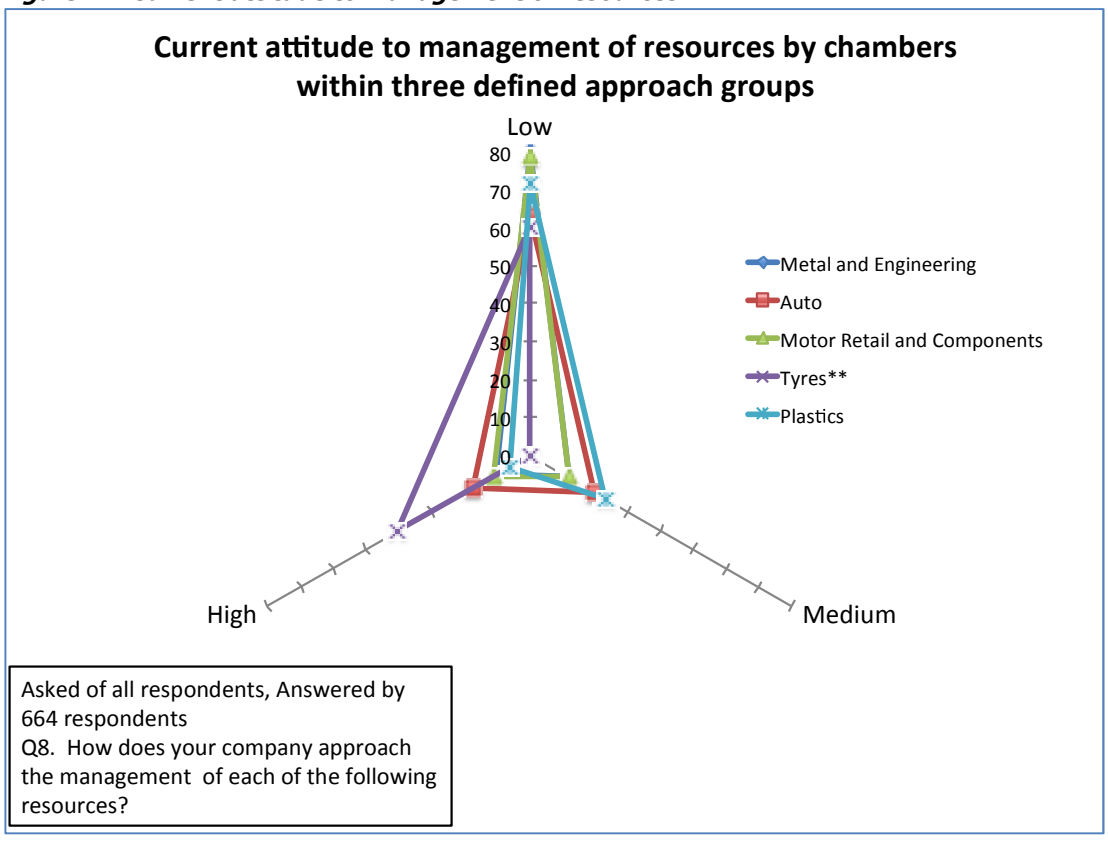
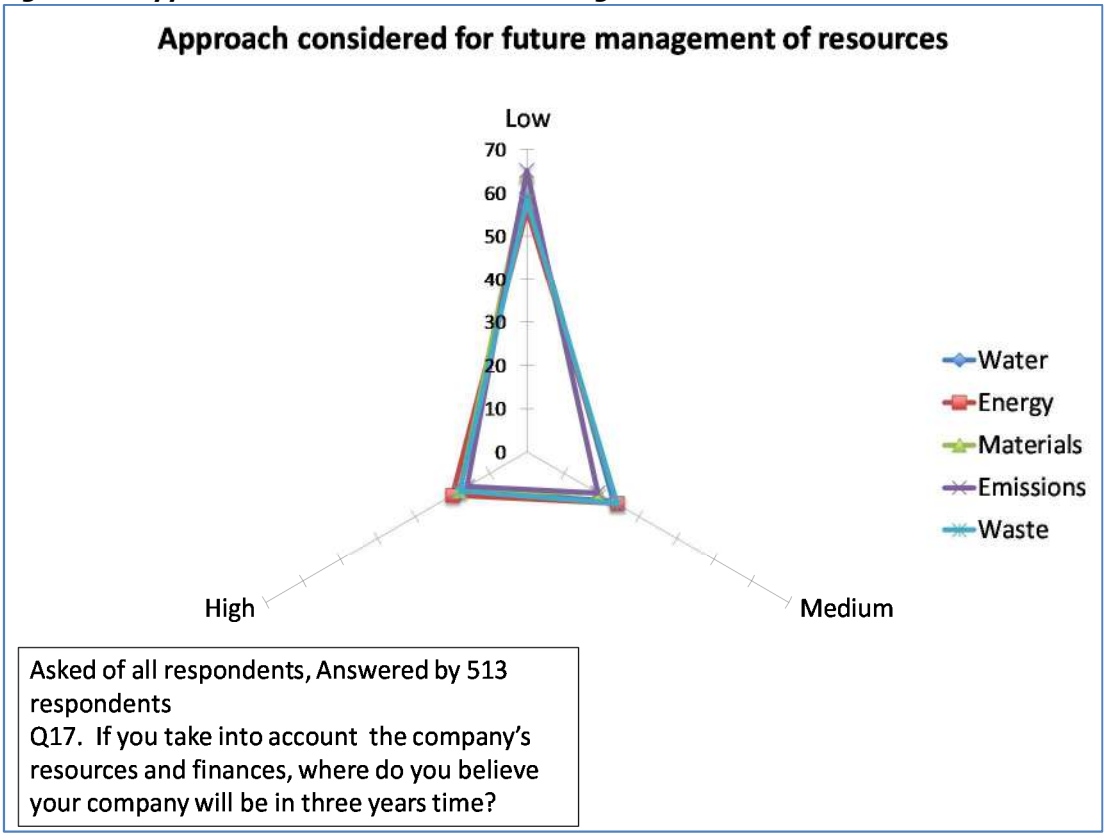


Figure 18: Approach Considered for Future Management of Resources



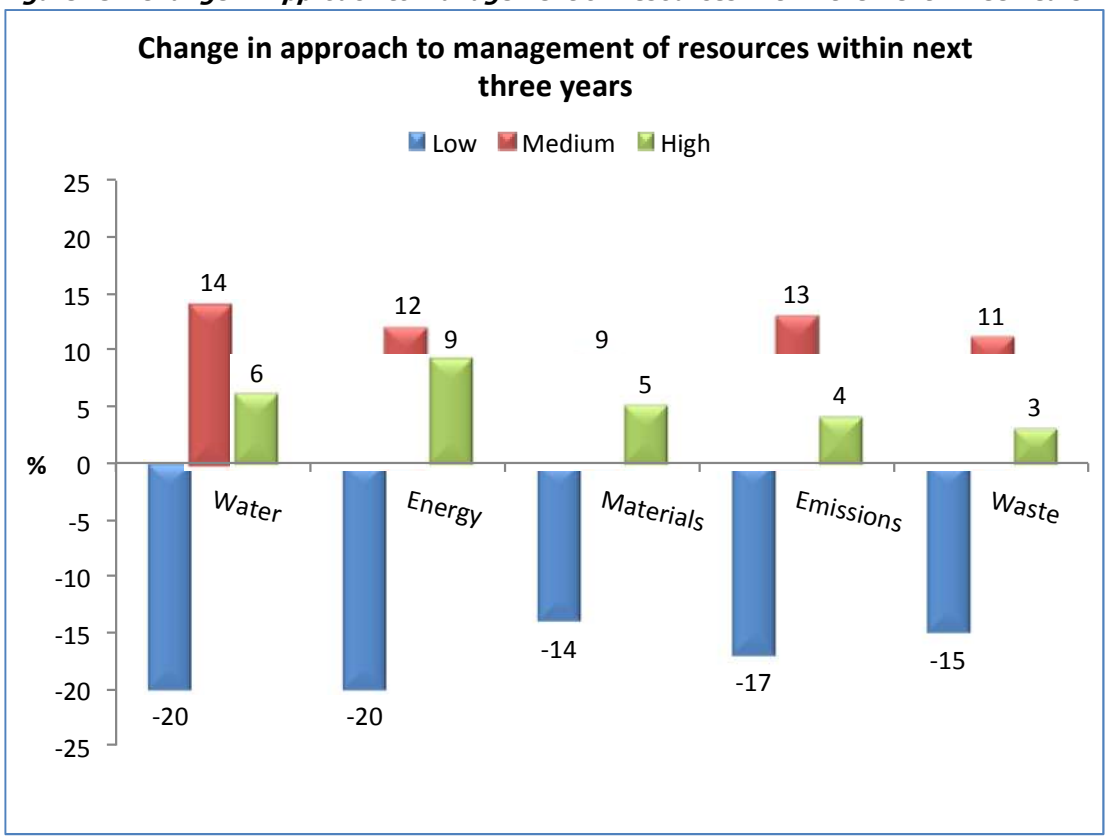
The table and graph were derived from measuring the differences between the current approaches and future intentions of the LOW, MEDIUM and HIGH groups. For example, if we look at the two graphs above, the first shows the current approach and the second one future intention. A calculation was performed subtracting the figures for Current Approach from the figures for Future Intention. An example is given in the table below.

Table 8: Calculation of Current Approach vs. Future Intentions

	LOW	MEDIUM	HIGH
Current approach	80	9	11
Future intention	60	23	18
DIFFERENCE	-20	+14	+6

The figures showing the differences between the two approaches have been plotted in the graph below which illustrates the picture in the total market clearly. The most significant changes from current approach to future approach are for the improvement in the management of water and energy, followed by emissions, waste and then, materials.

Figure 19: Change in Approach to Management of Resources within the Next Three Years



There are considerable differences in approach by the various chambers using the same methodology of calculating the difference between current and future approach. These are shown in the table below:

- The Metal and Engineering chamber companies intend to improve their approach to the management of water and energy;
- The Motor Retail and Components Manufacturing companies intend to concentrate their green initiatives in the energy sector;
- Water and emissions appear to be important areas for the Auto Manufacturing industry to implement a number of green initiatives, while energy is the area where they intend strengthening their overall systems as well as best practices;
- Although off a small base, it is clear that Tyre Manufacturers are intent on moving forward with regard to their management of water, energy, materials, emissions and waste; and
- The Plastics Industry, similar to the Metal and Engineering industry also intend improving their approach to the management of water and energy.

Table 9: Change in Behaviour regarding Approach to Management of Resources by Chamber

		Water	Energy	Materials	Emissions	Waste
Metal and Engineering	Low	-20↓	-21↓	-14	-18	-16
	Medium	+13	+12	+10	+13	+13
	High	+6	+9	+5	+5	+5
	Low	-17	-18	-16	-13	-10

Motor Retail and Component Manufacturing	Medium	+11	+20↑	+11	+8	+7
	High	+6	+8	+5	+6	+2
Auto Manufacturing	Low	-24↓	-10	-7	-22↓	-18
	Medium	+22↑	-3	+5	+25↑	+9
	High	+2	+13↑	+1	-2	+9
Tyre ** Manufacturing	Low	-53↓	-43↓	-37↓	-43↓	-33↓
	Medium	+23↑	+50↑	+7	+40↑	+13
	High	+30↑	+7	+30↑	+3	+20↑
Plastics Industries	Low	-24↓	-26↓	-1	-16	-12
	Medium	+14	+17	+2	+13	+16
	High	+9	+9	-1	+3	-4

↓- indicates a decline of >20% in the size of the LOW group

↑ - indicates an increase of >20% in the size of the MEDIUM group

↑ - indicates an increase of > 10% in the size of the HIGH group

So:

- While small companies do intend bettering their approach to the management of key resources, probably due to the lack of resources and finance, they do not intend doing this to a significant extent;
- Medium-sized companies will focus on water; and
- Large companies intend to improve their management of water and energy resources. Emissions are also important to them.
- In most instances, input of materials is the resource that is not focused on to the same extent as the other four resources.

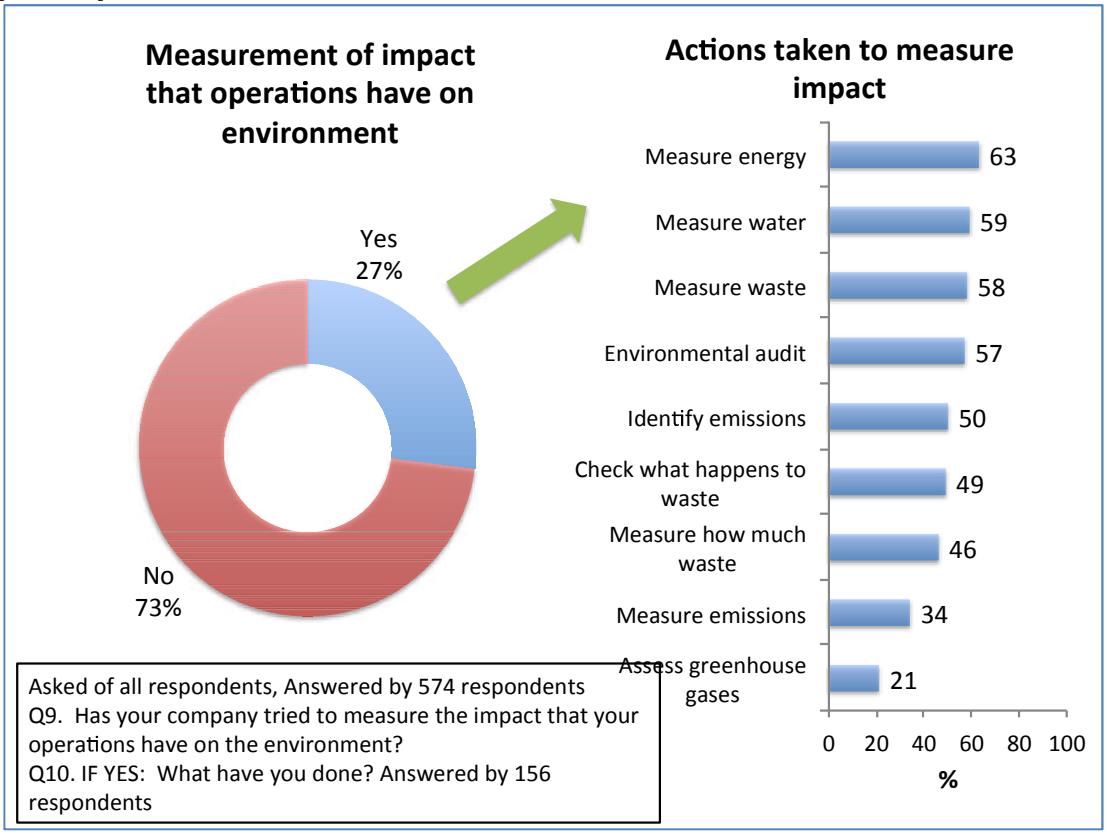
Table 10: Change in Behaviour regarding Approach to Management of Resources by Size of Company

		Water	**Energy**	**Materials**	**Emissions**	**Waste**
Small companies	Low	-15	-7	-11	-16	-10
	Medium	+12	+11	+9	+11	+10
	High	+4	-3	+4	+7	+1
Medium companies	Low	-21↓	-13	-11	-9	-11
	Medium	+16	+12	+8	+10	+8
	High	+6	+8	+3	-1	+2
Large Companies	Low	-27↓	-23 ↓	-18	-26↓	-24↓
	Medium	+13	+8	+10	+24↑	+17
	High	+14↑	+15↑	+8	+2	+7

Measurement of Impact of Operations on Environment

- One in four companies measure the impact that their operations have on the environment. They have done this using the actions listed in the chart below.
- The companies that are more likely than average to institute these measurements are those in the Auto Manufacturing and Plastics Industries. They are also more likely to be medium and large rather than small companies.

Figure 20: Measurement of Impact that Operations Have on Environment (multiple answers possible)

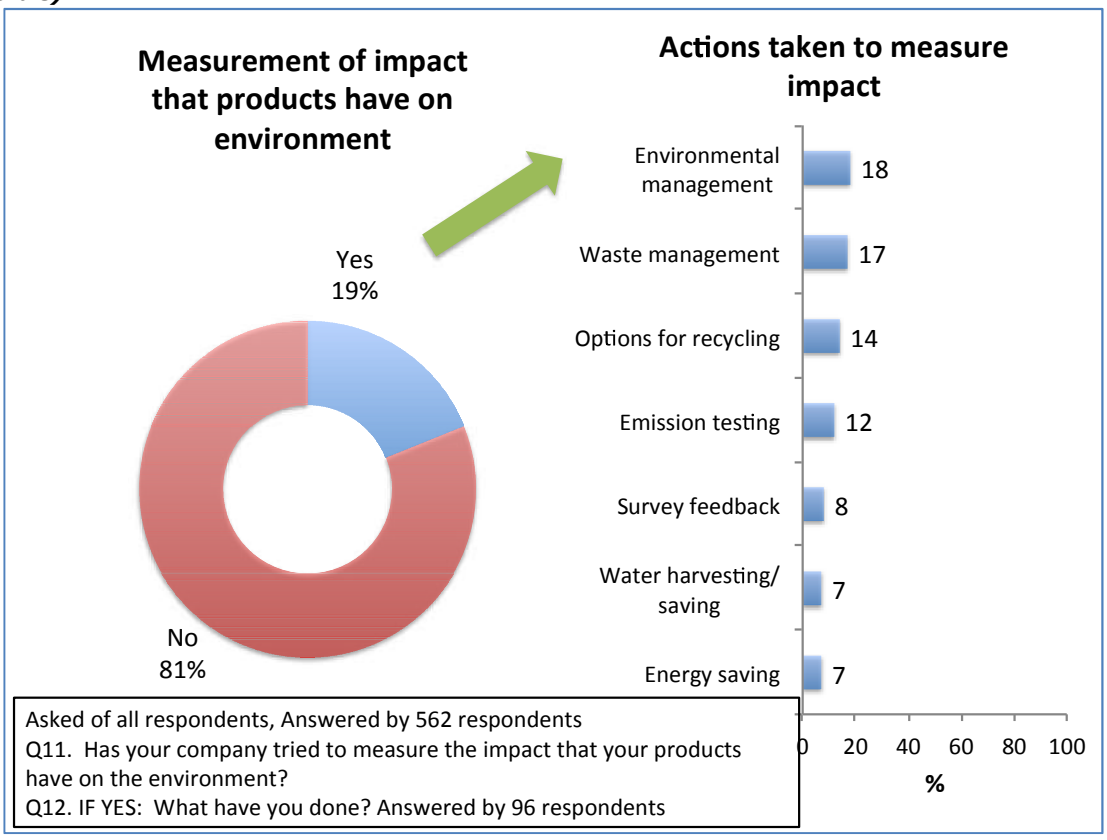


Measurement of Impact of Products on Environment

When it comes to measuring the impact that products have on the environment, only 19% of companies actually do this. Again, it is companies in the Auto Manufacturing and Plastics Industries that are more likely than average to do this. They are also more likely to be large rather than medium or small companies.

The actions taken are shown below.

Figure 21: Measurement of Impact that Products Have on Environment (multiple answers possible)

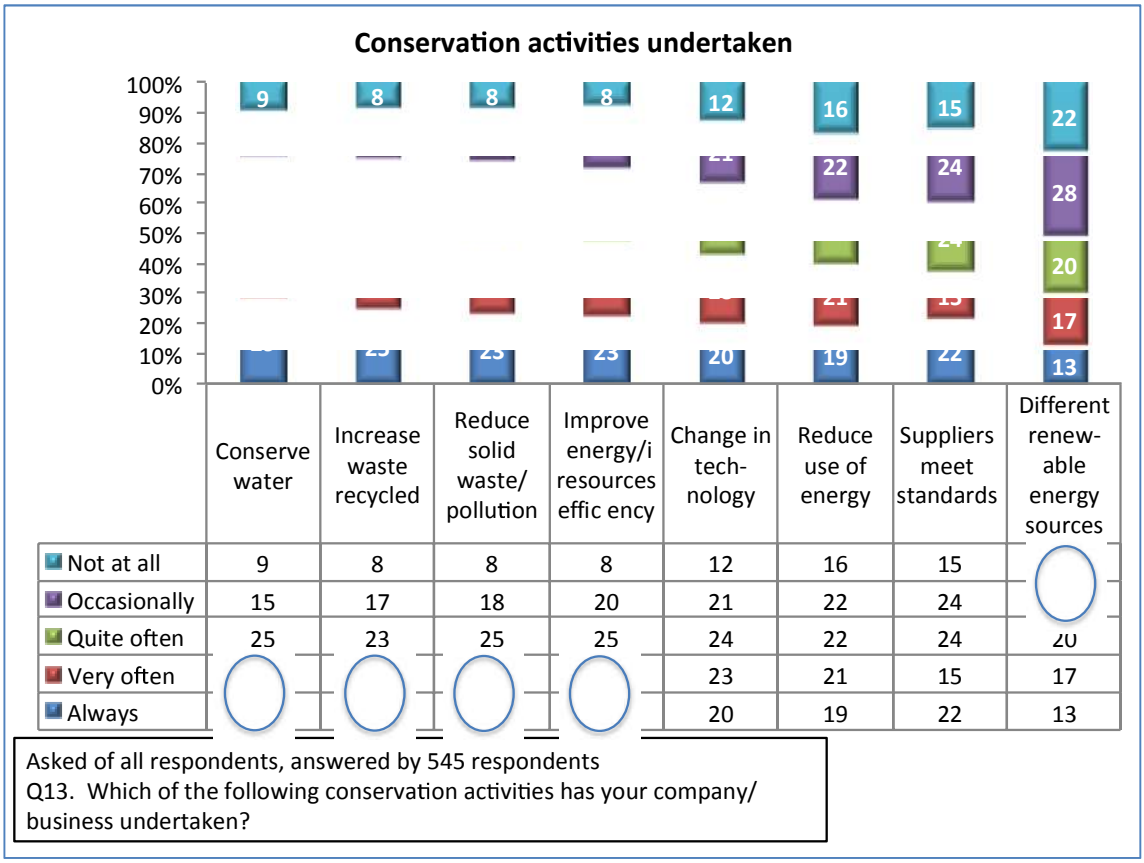


3.6.5 Conservation action taken

Currently, the conservation activities most frequently undertaken by roughly one in two companies are water conservation, increasing the amount of waste recycled, reducing solid waste and pollution and improving energy and resources efficiency.

The activity that is least often carried out is looking for different kinds of renewable energy sources to implement.

Figure 22: Conservation Activities Undertaken



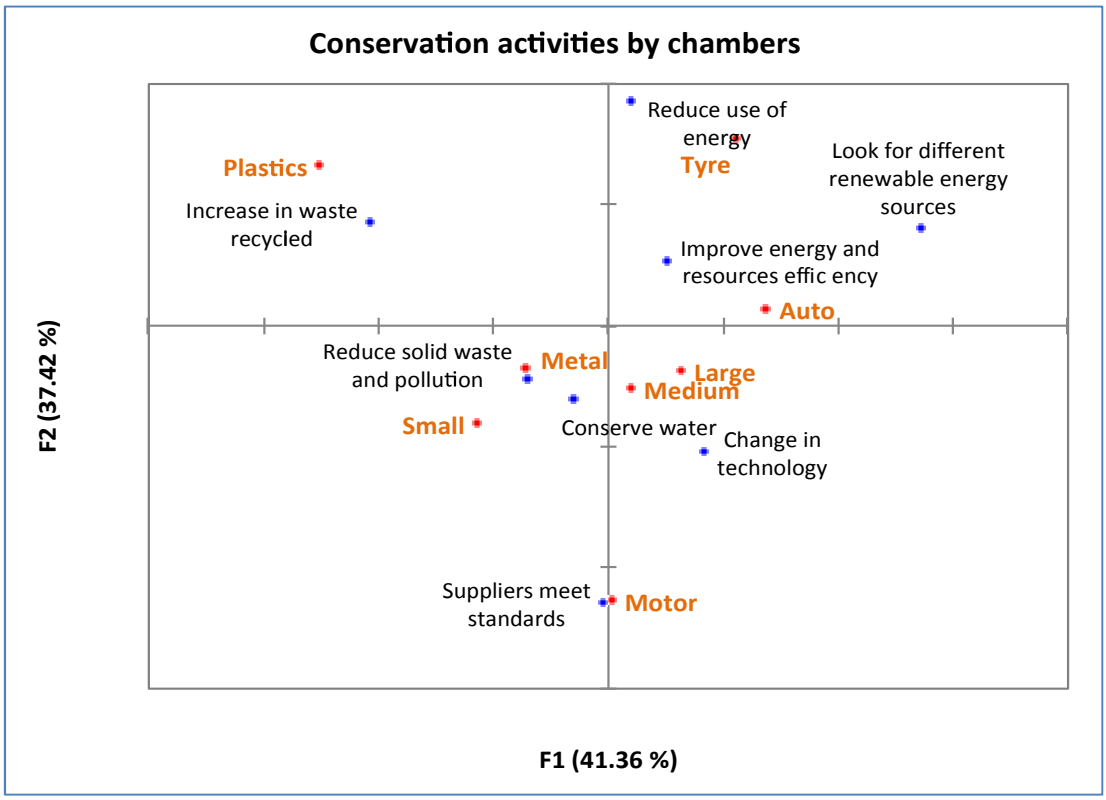
The chart below maps those activities frequently (always plus very often) carried out by size of company and by those in five chambers. Note that the percentages shown at the bottom and on the left hand side of the map, i.e., F1 41.36% and F2 37.42%, indicate the amount of data that is explained by each axis and, in total, that 78.78% of that data is explained.

From the positioning of each chamber and the various activities, a picture is shown of 'who does what'. The closer to the centre of the map, the more 'average' the chamber is in terms of its activities.

- Metal and Engineering – is positioned close to the centre of the map, indicating that it is not particularly strong or weak on any of activities;
- Motor Retail and Components Manufacturing – this chamber is mostly concerned with only buying from suppliers that meet their sustainability standards;
- Auto and Tyre Manufacturing – these two chambers are mainly invested in improving/conserving and finding innovative ways of using energy;
- Plastics industry – in this industry, the focus is on increasing the amount of waste that is recycled;
- Small companies – given that small companies are in the majority as are companies in the Metal and Engineering chambers, it is not surprising to find them close to the centre of map; and
- Medium and large companies – change their technology on a continuous basis in order to improve production, to make it cleaner.

Note: Bear in mind that respondents have self-classified the chambers to which they belong.

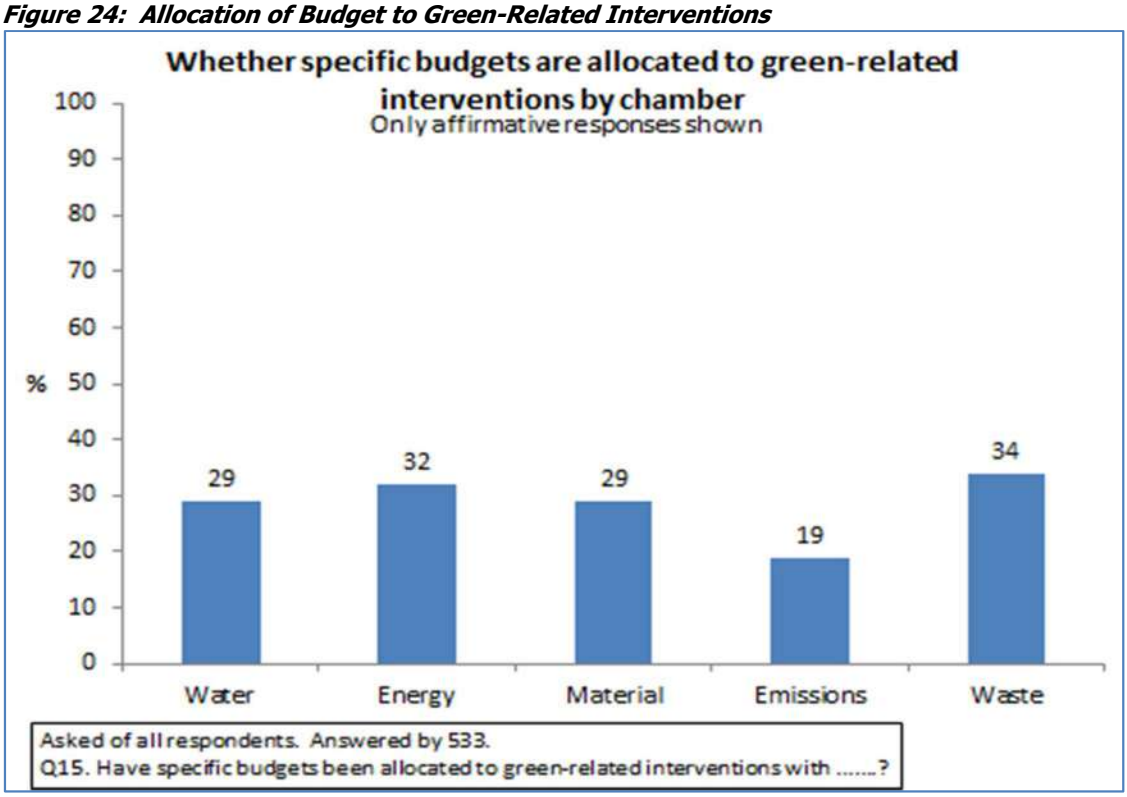
Figure 23: Map of Environmental Management Activities Undertaken by Chamber and Size of Business



3.6.6 Budget Allocation to Environmental Management

Respondents were asked whether their company had set budget allocations for a variety of environment management measures or not. Note the findings do not measure the size of the budget but only whether a specific budget is allocated or not.

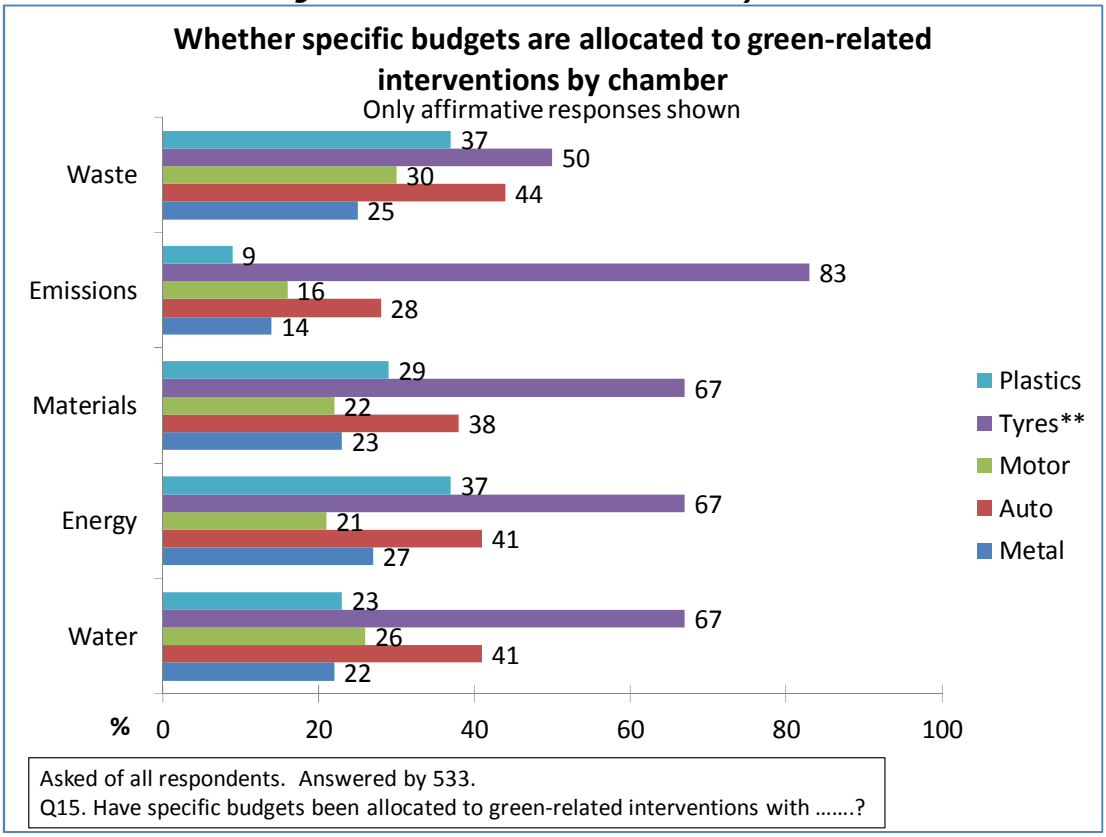
Figure 24: Allocation of Budget to Green-Related Interventions



Budget allocation to green-related interventions is highest for waste and energy, followed closely by water and materials. Fewer companies assign budget to dealing with emissions.

Again, there are marked differences between chambers who allocate budget for environmental sustainability activities, with more Tyre Manufacturing companies allocating budget to this end. Companies in the Auto Manufacturing chamber are also above average in their allocation of budgets for green-related interventions.

Figure 25: Allocation of Budget to Green-Related Interventions by Chamber



3.7 Key Reasons for the Approach to the Management of Resources

Among the companies who responded to the survey questionnaire, the reduction of costs is the most frequently mentioned reason determining the company's approach to the management of all resources, by far. This aspect is absolutely imperative when it comes to energy and materials.

The next most important driver is the company's policies and values, particularly when it comes to waste.

Industry and government regulations have had a greater effect on a company's approach to managing emissions and waste.

Procurement process requirements are a factor to be considered when it comes to materials management to a much greater extent than for any other resource.

Table 11: Drivers Influencing Approach to Management of Resources (multiple answers possible)

	Average percentage across resources
Reducing costs	68

Company policies and values	48
Industry regulations	33
Government regulations	28
ISO accreditation	20
Government policy	16
Procurement process requirements	15
International pressures/ Global mandates	9

Using the picture emerging from the quantitative table above, the qualitative interviews sought to expand upon the understanding of what drives the management of resources.

3.7.1 Saving and efficiency

What was confirmed is that improving efficiency and performance, is critical in the attempt to reduce costs and is a major driver across the board for all companies surveyed. With the rise in costs of electricity, fuel and raw materials, all companies are looking for ways to protect margins and sustain profits.

> "Our industry runs on heat in terms of our process so one has to constantly look to reduce those sorts of costs" (Small Plastics Industry Company)

In the case of smaller companies, they are looking for ways to survive from month to month. The benefit of improved efficiencies - in the obvious environmental input (energy and water) and output (waste) areas – have a direct positive impact on environmental protection at the same time as cutting costs. Saving money thus paves the way for education around resource management, which will ultimately serve to shift attitudes and behaviours positively.

3.7.2 . Social responsibility

Commitment to company policy and values is also confirmed by the qualitative research. Most of the respondents who were interviewed expressed a willingness to 'do the right thing'. This demonstrated both personal buy-in and a reflection of the company they worked for, to care both for the environment, and more so for the people living in the environment – whether that be for grandchildren's children in the future, or for today's communities. To some extent, regardless of size of company or industry represented, there appears to be a sense of altruism and working 'for the common good' of our community and planet, although this is more likely to be embedded if it is core to a company's values and social policies. However, the extent to which companies translate 'doing the right thing' into activities with real and measurable impact is where a visible difference in awareness and knowledge is evident between small and large business. Given that the qualitative sample was skewed towards large and multi-national business enables us to see a significant divide in the attitude towards activities that will yield a sustainable difference. Smaller companies may express their desire to 'do the right thing' but as yet, their actual activities, in comparison to large business, are fairly minimal and not yet guided by strategic decision making and company values.

> "It's more us wanting to do it than legally required to do so" (Multi-national Tyre Manufacturing Company)"As the second biggest employer in this town, we have a social responsibility to protect our workforce and community." (Medium Motor Component Manufacturer)

> "We recycle our steel shavings and dispose of our dirty oil safely ... but our rubber goes to the dump which is very wrong, we're supposed to split it from our general refuse" (Small Metal and Engineering Company)

3.7.3 Compliance

As indicated in the quantitative findings, the qualitative results also demonstrate the importance of compliance, or intention to comply with industry and government regulations, which is like a passport to doing business. This appears particularly relevant with Auto Manufacturers, Tyre Manufacturers to some extent, and with the mines. The recommendation by the King III report for across the board sustainability reporting and the demands of local environmental legislation, such as NEMA, the Waste Act, the Water Management Act, The Air Quality Act, as well as the Biodiversity and Protected Areas Acts have created a situation where non-compliance poses serious business risk and reputational damage as well as the potential for fines and criminal prosecution. Even small companies are aware of areas in which they could incur fines.

In addition, ISO accreditation of suppliers called for by bigger companies, and, in particular, by global companies with head offices outside of South Africa, acts as a major driver in addressing environmental management practices.

> "It's just a matter of bringing the environmental legal stuff in and make sure that's in place" (Multi-national Auto Manufacturer)
>
> "If I let something go through our quality gates it will be picked up and we can stand to lose the business. It's really not worth the risk" (Medium Motor Component Manufacturer)

3.7.4. Attitude to and uptake of ISO

What differs from the quantitative results, and potentially skewed to some extent due to the focus on large business in the qualitative sample, is the importance and influence given to ISO accreditation. Initially, ISO compliance can be a 'grudge purchase' but over time, it appears to play a vital role in raising the profile of environmental sustainability. The process starts with planning for ISO 9000 accreditation, through which budgets become set aside for the implementation of quality management and regular audits. Once companies have this in place, they typically start building towards ISO 18000, then ISO 14000. Emotional acceptance and engagement with ISO develops over time, when ROI becomes evident, when the board of Directors experience the benefits of sustainable practices and start to allocate bigger and bigger budgets for environmental management.

> "When I first started 2 years ago the budget available was negligible compared to what it is. In the last year to 18 months the budget increase has been significant. I am seriously talking about significant" (Multi-national Metal and Engineering Company)

Companies who have not gone through accreditation – typically small companies in this industry - do not dismiss the benefit of improved quality, delivery and overall awareness of 'best business practice' – in fact, there is high awareness of SHEQ and its impact on employee and customer engagement and satisfaction.

> "It's very good! But it's too expensive. By rights it should be made a lot more reasonable to companies because of the safety and quality that it brings in, the quality of staff you employ, and it brings a lot of honesty to an organization" (Small Metal and Engineering Company)

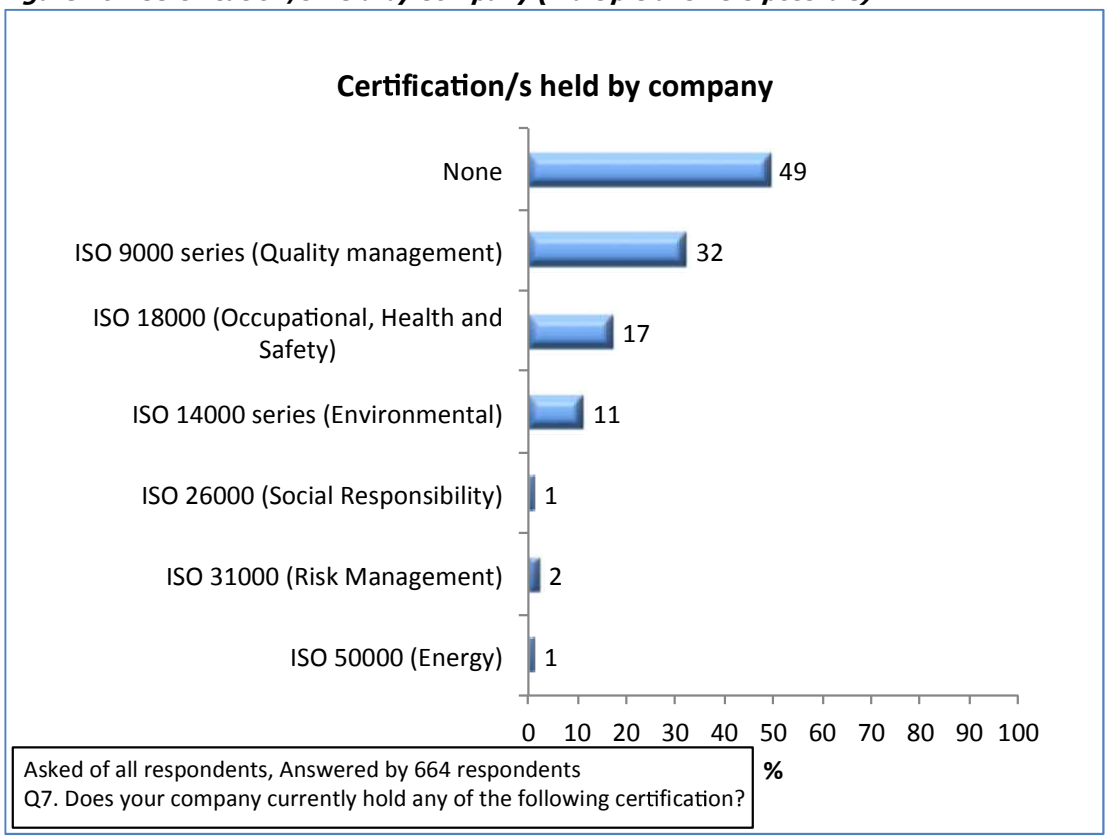
But for the most part, compliance in other regulatory areas takes precedence in cash flow planning, particularly BEE and taxation compliance. Small companies can get away without ISO accreditation but cannot remain in business without addressing BEE and financial auditing.

> "BEE accreditation is definitely a priority. You'll get work because of that over the ISO accreditations" (Small Metal and Engineering Company)

Therefore, the lack of ISO accreditation amongst 49% of the sample is not necessarily a sign of disinterest, but more likely a result of financial trade-offs that SMMEs make given the financial demands of compliance on various levels in South Africa. This, coupled with a lack of critical trade skill is at the forefront of the challenges this sector of the market faces.

> "Costs for accreditation are too high; in fact costs for compliance are compromising companies' abilities to be economically sustainable. There is no balance between incentive and compliance" (Small Plastics Industry Company)

Figure 26: Certification/s Held by Company (multiple answers possible)



The quantitative results indicated that companies without any certification at all are more likely to be found in the Motor Retail and Components Manufacturing chamber (55%) as well as in the Plastics Industry chamber (69%). The number of those without any certification rises to 67% among small companies.

ISO 9000 series (Quality Management Systems) certification is held by 32% of companies interviewed, followed by the ISO 18000 series (Occupational, Health and Safety) at 17% and ISO 14000 series (Environmental Management) at 11%.

Companies in the Auto and Tyre Manufacturing chambers, as well as large companies are more likely to have these certifications than average. For medium companies, there is an above average incidence of ISO 9000 series certification.

3.7.5. Competitive advantage and reputation

Respondents interviewed in the qualitative research also identified reputation and competitiveness as a reason to consider good environmental practices. Particularly companies with more mature approaches to environmental management regard sustainability practices and policies as providing them with a competitive edge. This approach is found more often in companies located in global markets that are advanced on sustainability strategy and implementation. In these markets, environmental budget would need to be a considerable percentage of the total company budget to allow for research and development of technologies that can improve negative environmental impacts of processes, operations and materials in production and manufacturing. The impact of not complying, on company reputation and stakeholder engagement is significant in these markets – people want to be associated with companies who are 'doing good' beyond just providing products and excellent services.

> "Sustainability practice is about being No 1 and remaining no 1, pushing the bar and finding or building technology to make improvements" (Multi-national Auto Manufacturing Company)
>
> "To be the best, to be the market leader, to be recognised as a financially successful company, a corporate company that cares" (Multi-national Metal and Engineering Company)
>
> "It's about competitive business, being the best, but still understanding the balance between human need and harmful product production" (Multi-national Auto Manufacturing Company)

Importantly, whilst competitive advantage is more frequently the domain of 'big business'; the intention to drive best practice is not limited to those with the financial means to invest heavily in research and development.

> "We compete with all the big shops in Joburg, but we are trying to stand out a little, be a tiny bit ahead of the rest ... we care about our reputation and the quality we put out there." (Small Motor Retail and Component Manufacturing Company)

All the above mentioned factors – cost and efficiencies; social responsibility and company values; compliance and accreditations; as well as competition and reputation; impact on an organisations' environmental attitudes and approaches, which in turn influence the awareness of the need to bring 'green skills' into employment practices.

3.8 Impact of Broad Attitudes towards Environmental Sustainability Skills Development

The degree to which environmental management practices differ between large and small business; as well as the impact that compliance has on a long term shift in adoption and advocacy; indicates how necessary it is to formally address environmental skills in the workplace. Discussions amongst the different levels of business, indicate that the Auto and Tyre chambers appear to be way ahead of other chambers in terms of environmental skills development. These chambers and associated member companies lead the way on environmental sustainability with tangible measures such as targets, action points, environmental units, budgets, innovation, etc. The very nature of these industries' products has the potential to cause substantial environmental damage and therefore they have had to look for responsible operating models. For the Tyre Chamber specifically, the Department of Environmental Affairs has developed a Tyre strategy which could account for heightened awareness and demands on the sector to act responsibility. Given the global footprint of these companies and origin in mature

environmental markets, the impact on South African operations and affiliated stakeholder groups is very positive.

According to one representative of such a multinational, the company "... anchored environmental management deeply in the process owner's responsibilities, with environmental performance incentives and rewards" (Multi-national Auto Manufacturer). Companies who similarly value environmental sustainability will not make a business decision without considering and measuring the impact of a decision on the environment.

The spin off from Auto and Tyre manufacturing is the demand for manufacture of associated components from the metals, plastics and motor chambers. As such these two chambers play a pivotal role in 'pulling' the other chambers up regarding environmental awareness and action. However, there is a glaring gap between the latter's attitude of compliance and the former's commitment to integrated sustainability. This gap also poses a big challenge for the ultimate outcome of this research, which is to guide the development of 'green skills'.

The South African operations of multi-national companies are provided with the budget and skills required to implement environmentally sustainable practices. Skills are either 'trained in' by Head Office programmes or brought in by consultants and training providers. In turn, suppliers to this chain (large as well as SSMEs) are also exposed to training and induction developed and run by the training departments of OEMs or OEM affiliated training providers. As such, training courses and environmental education is made available to a range of companies, which assists them to meet environmental sustainability demands.

In comparison, companies in the SMME sector not dealing with Auto and Tyre Manufacturers, do not have environmental skills capacity development anywhere on their radar. These companies are focused on keeping their head above water financially, some just surviving year to year. Whilst they may undertake some elementary and accessible environmentally friendly practices, there is no consideration at this point in time to expanding investment or commitment to environmental care, and even less so to spending money on 'green skills' training. The contrast between apparent attitudes amongst merSETA membership base can best be summarised by the following comment "... Leaders are asking what your sustainability case for the business is whereas survivors are asking what the business case for sustainability is."(National Motor Retail Company)

In order to start addressing the very broad gap in both policy and awareness between large and small business, it is likely that a multi-tiered strategy to skills development will be necessary.

3.9 Specific Identified Green Activities

To this end, the influence that ISO accreditation and working towards it has on growing awareness and structuring operations should remain in focus as most companies recognise the improvements in quality that result. Companies that start to walk the ISO journey from 9000 upwards, start to experience a '*maturation*' in their systems and processes; putting a solid foundation in place for the advent of sustainable environmental practices.

ISO 14000 accreditation has a direct impact on the degree to which companies address environmental activities; as well as how they structure and manage these functions.

> "Of course we have a full environmental management structure, because we have ISO 14000" (Medium Plastics Industry Company)

ISO 14000 becomes a yardstick that guides companies in what they need to do and how they need to do it; building on from the organising framework of ISO 9000 and 18000.

Over time, the regular audits across the key inputs and outputs helps companies track and improve their environmental behaviours.

However, that does not mean that small companies without accreditation sit back and do nothing. As mentioned in previous sections, perhaps such companies pay very little attention to 'green' issues; however most companies, no matter size or chamber, undertake some form of green activity. Even though this may happen for other reasons, such as a cost cutting programme to reduce electricity consumption as a result of high tariffs; the secondary benefit is environmental management practices start to take root.

While there are clear differences between large and small companies, and between those that are subject to international pressures and those that are not, there are also common trends. The most consistent levels of activity across all companies are in the areas of energy, water and waste; with waste offering companies the most opportunity for 'accessible innovation'. Materials and emissions lag behind, being the two most difficult areas in which to effect change.

Figure 27: Current attitude to management of resources by chambers.

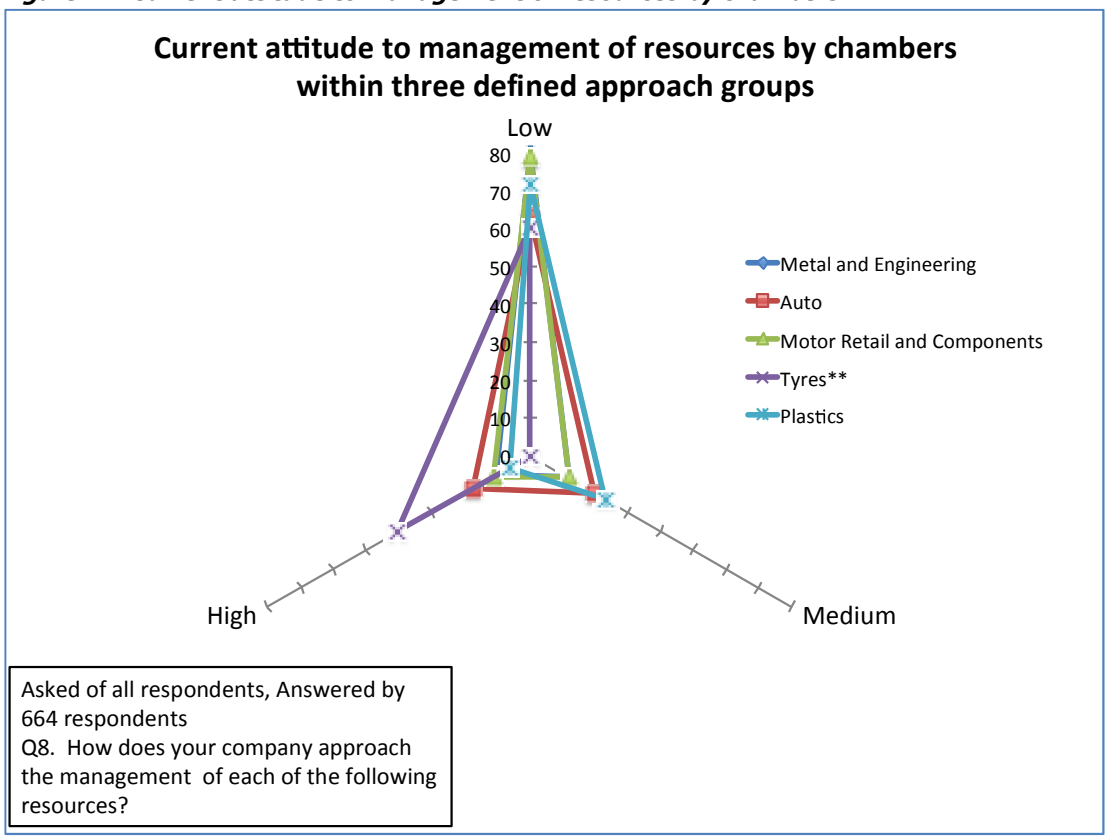
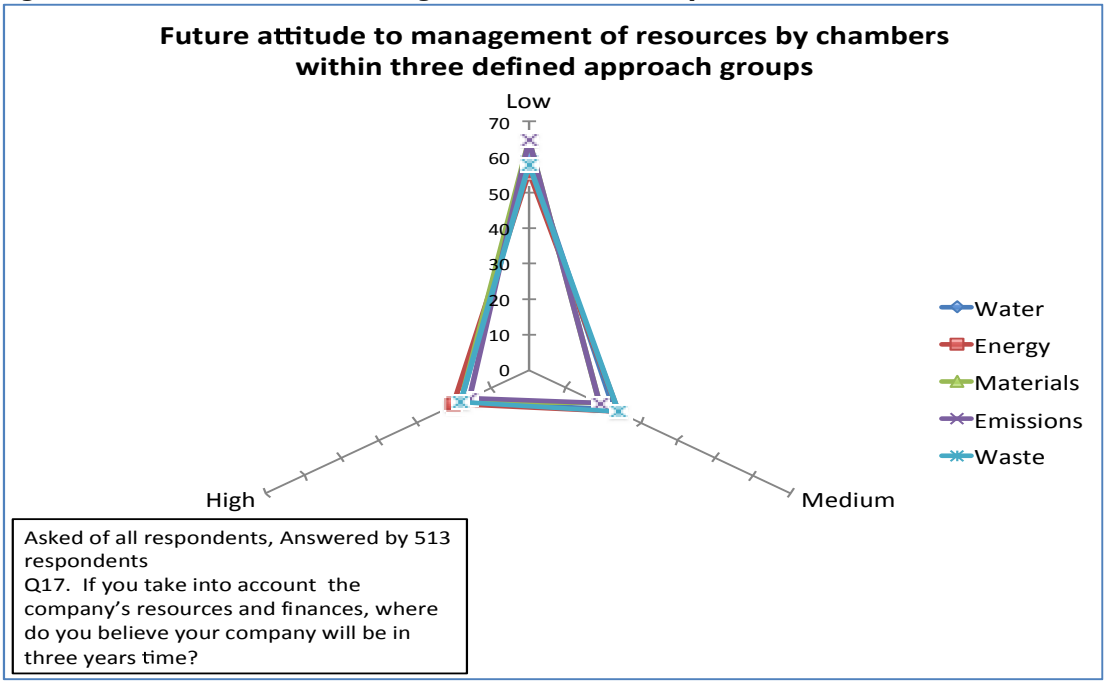


Figure 28: Future attitude to management of resources by chambers.



3.9.1 Energy

From the qualitative discussions it appears that the merSETA chambers are high users of natural resources – all use electricity in daily operations as well as manufacturing processes; and many also use coal, gas and oil in the production of their services and products. Although electricity is the preferred form of energy as it is the cleanest, and powers more modern, electronic processes; the rising costs has seen the return of coal and gas as cheaper alternatives, e.g. gas powered forklifts and coal boilers.

> "We spend R70K per month on electricity which is becoming an issue." (Medium Metal and Engineering Company)
>
> "... but have reverted back to coal 9 months ago because of electricity cost hikes." (Multi-national Tyre Manufacturing Company)

The key drive across chambers is to reduce the use of natural energy resources for the same or better output in terms of efficiency and performance. Examples given include manufacturing a car engine with improved performance but which uses less fuel, using energy efficient bulbs, installing motion sensors and individual light switches for offices, and removing geysers where hot water is not a necessity.

> "We are at the stage now where if somebody walks past your office, you are not there but your light is on, they will turn it off" (Multi-national Auto Manufacturing Company)

ISO accredited companies closely monitor energy consumption against targets and have installed meters where appropriate across particular functions for this purpose.

> "I ask each and every business unit or dealership to go through an exercise and see how they are going to save fuel." (Large National Motor Retail Company)

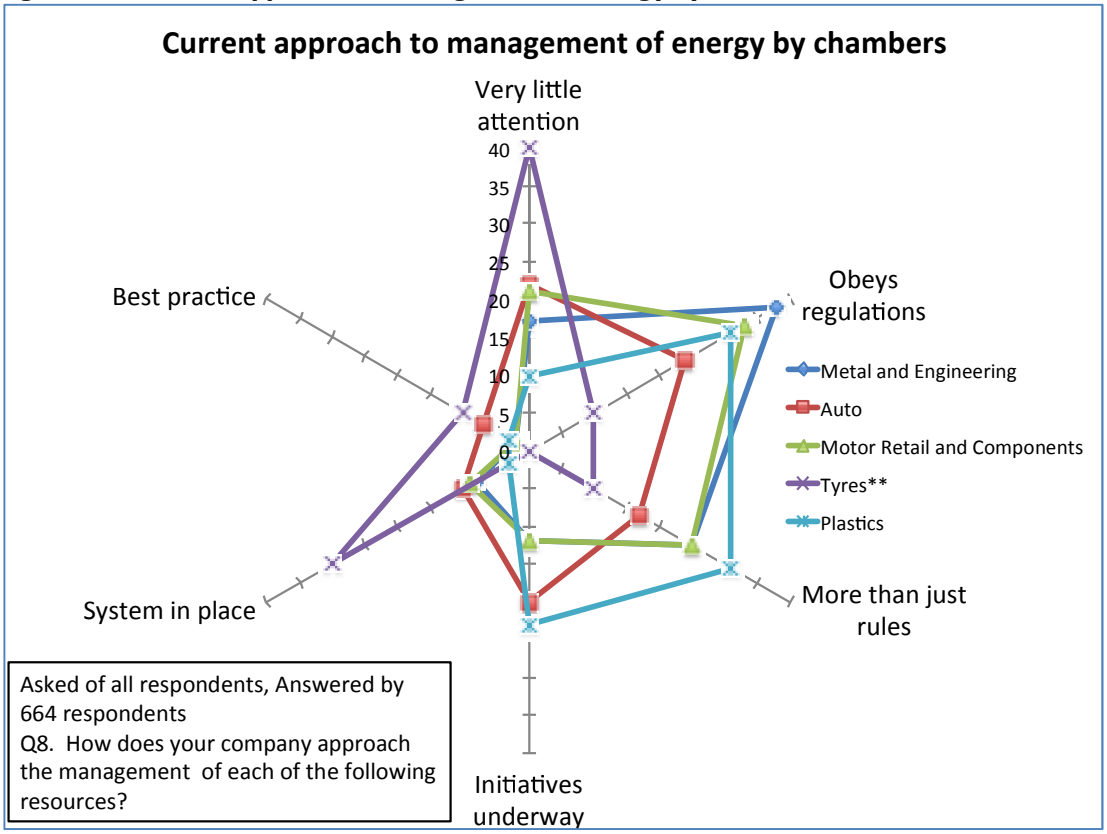
Whilst there is an intention to move to renewable energy sources, particularly solar and wind, the cost is currently prohibitive, even for multi-national manufacturers. However, investment in more efficient electronic equipment and automated processes is on the radar, to replace hydraulic and pneumatic processes that are high consumers of

energy. This suggests an increased need for new competencies to include understanding and operation of electronics and more technologically advanced machinery.

> "... more energy efficient equipment and machinery - if cost allows" (Small Metal and Engineering Company)

> "Next step is solar and putting up a solar farm but it is still pretty costly. A project like that would be done as part of a product launch, a new car to global market" (Multi-national Auto Manufacturing Company)

Figure 29: Current Approach to Management of Energy by Chambers



We see a correlation between qualitative and quantitative findings with very little evidence of best practice such as investment in renewable energy, although the intention to move in this direction in the future was expressed by a number of respondents. Water management highlights activities in three core areas: resource efficiency, recycling and contamination monitoring and prevention.

> "We annually report to Germany on our water saving" (Multi-national Motor Component Manufacturing Company)

Companies with water usage restricted to human use only appear to pay limited attention to conserving water, other than the obvious avoidance of dripping taps and water leaks.

However, across most of the industry where steam is used in the manufacturing process for heating and cooling purposes, many companies have installed tanks to harvest rainwater or have put in boreholes, which they perceive to be a more sustainable practice (rather than a cost saving exercise which over time is detrimental to overall water resource management). Companies mostly recycle through reticulation and filtration systems; with one multi-national Auto Manufacturer having just invested in a modern effluent plant.

> "Water goes through our new effluent plant - cost us R22 million, that water is recycled and used for the paint shop and boiler and cooling and welding etc." (Multi-national Auto Manufacturing Company)

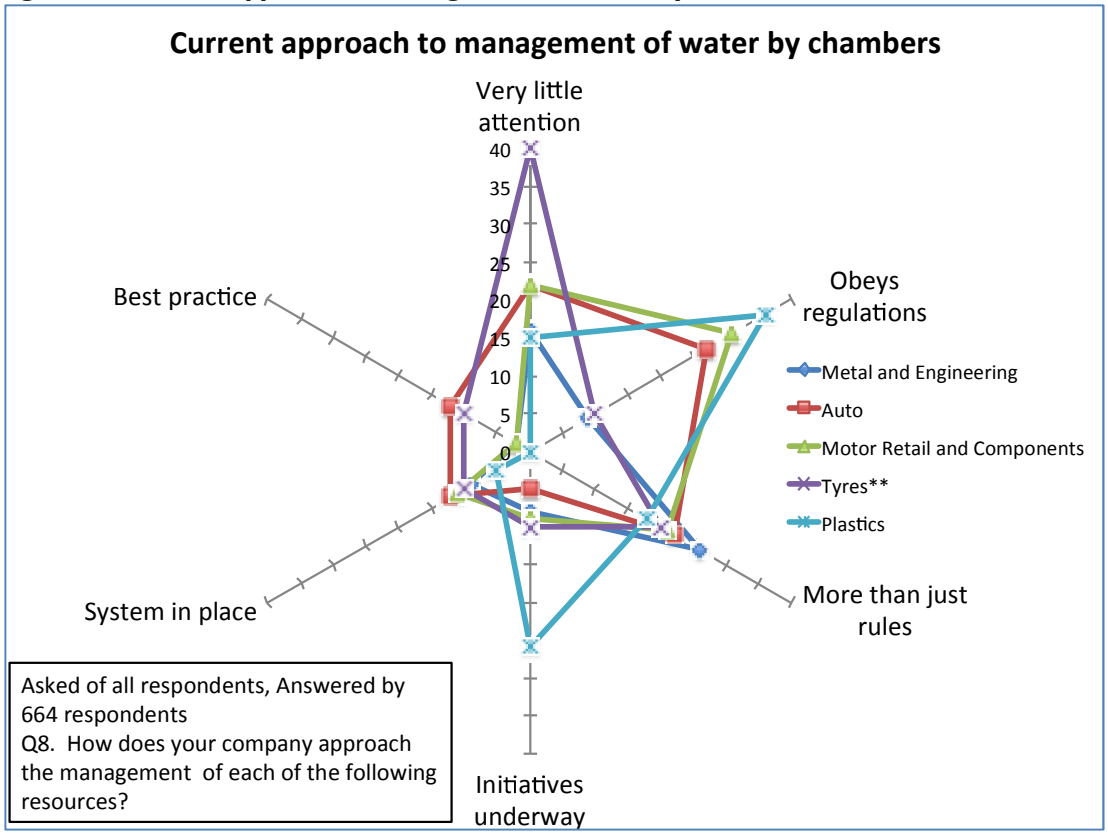
Recycling of water has driven an increased need to monitor water quality; and when water is disposed of, measures are in place to monitor water flow direction and potential contamination of storm and ground water. Whilst companies with boreholes use them to access ground water, one company has strategically placed six boreholes across the plant to monitor potential contamination of ground water.

The future view is around driving and investing further in modern recycling systems.

> "We have a borehole but we don't recycle yet" (Multi-national Metal and Engineering Company)

> "Our aim is that the water from the effluent plant is clean enough for human drinking" (Multi-national Auto Manufacturing Company)

Figure 30: Current Approach to Management of Water by Chambers



Management of water resources is the area where most chambers pay some attention. The exception is the Tyre Manufacturers chamber but owing to the small sample, data is probably not reliable.

3.9.2 Materials used in Production

Qualitative discussions indicated that there is a high level of awareness that materials used in the production process have a direct impact on a product's level of environmental friendliness, and by default, its perceived acceptability. Where options exist, manufacturers are opting to use material components that are biodegradable, recyclable, non-toxic and non-hazardous, and a bonus is those that are more cost-effective through using less energy in production.

Progress has been made in converting solvent paints to water based paints, driven by the Auto Manufacturers, which impacts particularly on the Motor and Metal sectors. Although water-soluble paints are more expensive to use, they dry much quicker and do not have strong fumes, thereby saving energy and lowering emissions. Biodegradable oil cleaners are assisting to lift oil off floors and preventing oil seeping into surrounding ground. Oil (in this case as a material) is recycled, as are plastic and fabric components, extending the material life cycle and reducing the carbon footprint.

> "This year we switched to water soluble paint which can go into municipal water waste ... it was a BIG change and the whole paint process needed to be re-engineered and re-trained which is tough with general workers who have followed the same process for more than 10 years!" (Small Motor Manufacturing and Component Company)

> "As a hydraulics business, we get a lot of oil on our floors and now have biodegradable floor cleaners" (Small Metal and Engineering Company)

> "We now have a lot of components going into our vehicles that come from old telephone and PC housing, jeans and that sort of thing - recycled materials." (Multi-national Auto Manufacturing Company)

Interestingly, the first two comments above are initiatives of non-ISO accredited companies.

Companies recognise that their processes include particular chemical materials that are highly toxic, and despite their best intentions, have not yet found alternatives, e.g. Chromium 6 in making borehole pumps and the chemical vulcanisation process in tyres.

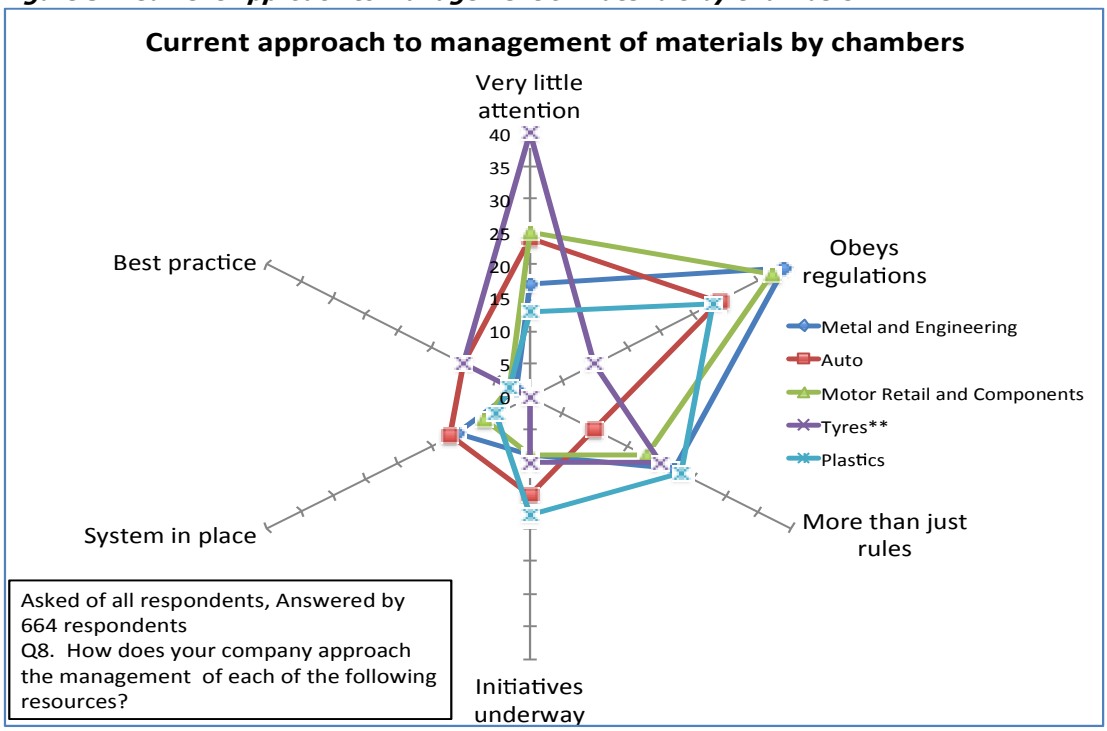
> "Chromium 6, not a nice chemical. We are looking at ways to replace that with alternative materials ... that's what I mean by Best Practice" (Multi-national Metal and Engineering Company)

Research and development into alternative materials is driven heavily by multi-nationals who have the funding to do so. Many South African representatives of these companies rely on development from head office, as such, almost accepting the status quo. Amongst smaller companies, cash flow does not enable this kind of intensive investment into research.

> "We at the plant don't have much say in that, the materials come to us to be fitted, but the R&D for 'greener' materials happens overseas" (Multi-national Auto Manufacturing Company)

> "What goes in is what goes in, no alternative types of materials yet ... it becomes cost prohibitive because you have to stay competitive against the Chinese" (Multi-national Metal and Engineering Company)

Figure 31: Current Approach to Management of Materials by Chambers



Confirming the comments made above regarding the management of materials lagging behind that of energy, water and waste, it is evident from this graph that fewer companies extend their approach much beyond obeying the rules and regulations laid down and possibly having a few initiatives in place.

3.9.3 Waste

Many respondents in the qualitative research indicated that the environmental management areas that most companies are engaging in is that of waste, with all companies recycling in some way and many having to dispose of hazardous waste and sewerage according to legislative requirements.

At a basic level, items such as paper, cardboard boxes, wood, metal scrap, tyres, and plastic are mainly recycled through third parties who purchase the recyclables and sell it on to recyclers. This is particularly evident amongst the smaller companies who do not have the resources to manage the process more extensively.

> "We don't have time and labour to do that (recycle) as well. They (people who purchase) specialise in this and they charge us very little" (Small Motor and Component Manufacturing Company)

In comparison, there is a move by some bigger companies to actively sell their waste to recyclers without going through a 'middle man', and thereby created a fairly viable revenue stream. One company uses these funds towards other environmental protection initiatives.

> "We are turning waste into an income stream to be self-supporting in our environmental initiatives" (Multi-national Motor and Component Manufacturing Company)

Some of the waste product is recycled back into production, e.g., steel shavings from hydraulic cutting; flash rubber back into the production of tyres; old tyres into retreads; etc.

> "We recycle 'flash' to fine rubber powder which goes back into stage 1 production" (Multi-national Tyre Manufacturing Company)

There also appears to be a growing awareness of the risk of contamination from poorly disposed of solid, inorganic and chemical waste products into the ground, into the water system or into the air. For many, a sense of responsibility and 'doing the right thing' manifests in the waste management area perhaps because it carries one the highest levels of risk to safety and health of people and the planet, as well as being legally mandated.

> "A year ago I spent R200,000 at our top use dealership for rehabilitation of the soil. It's because the people were ignorant, the staff they just say aghh you know it's nothing they've got bricks. Then we starting opening up we found the oil and diesel has gone right though the bricks into the soil" (Multi-national Auto Manufacturing Company)

A trend is emerging, particularly around Multi-national and larger South African companies of setting a target of sending 0% to landfill. One company had its own goal to generate natural gas from landfill sites – the concept of using natural gas to power forklifts is currently being tested in one of the manufacturing plants. This company is also looking at cow manure for energy and seeking collaboration with other small companies to intelligently create solid products from waste.

How waste is captured, stored and transformed is also leading innovation in some way – particularly the effluent plant and its ability to make water waste inert.

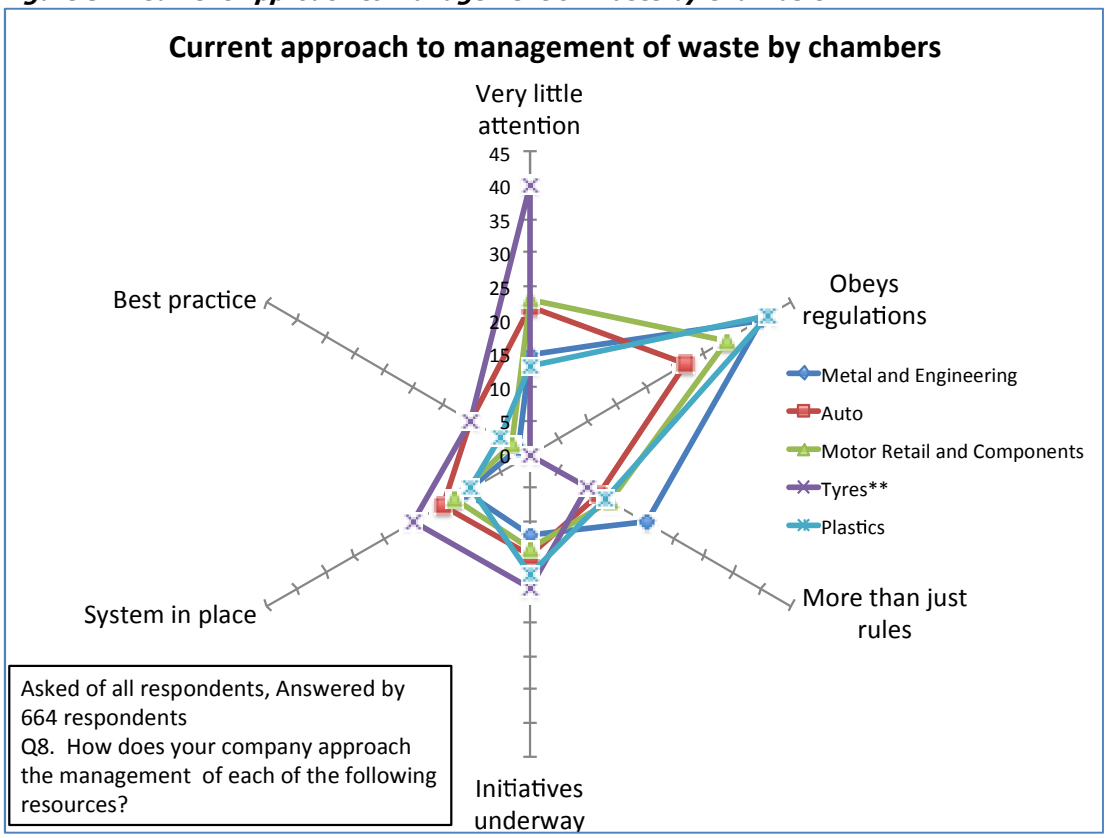
> "We want to innovate in the waste management arena, build stable processes for waste and create product from waste through intelligent process and technology. Our targets are 0% emissions and 0% waste to landfill, and to replace electricity from natural resource energy" (Multi-national Auto Manufacturing Company)

There is quite strong sentiment amongst companies that South Africa could benefit in proper waste management systems, from source to grave, with training and collaboration between universities, colleges, municipalities, recyclers and corporate.

> "There is a massive need for training in this country in terms of waste management and recycling, especially the management of plastics, to reduce carbon footprint" (Small Plastics Industry Company)

Waste management was suggested by some respondents in the qualitative sample as an area which may be the 'low hanging' fruit for merSETA to start addressing green skills. It is accessible, cost effective and possibly, one of the most significant areas in which GHG can be reduced, i.e., can have a measurable impact which is encouraging for participation and the building of environmental awareness and value.

Figure 32: Current Approach to Management of Waste by Chambers



The quantitative results indicate that both the Auto and Tyre Manufacturers are at the forefront when it comes to managing waste.

Many companies in the Metal and Engineering and Plastics Industries appear content to merely obey regulations when it comes to waste management, falling in line with other small companies.

As mentioned above, there appears to be a significant opportunity to educate companies around the currently 'hidden' value of waste.

3.9.4 Emissions

The majority of emissions mentioned in the qualitative interviews come from carbon levels (fuel), smoke (coal burners) and chemical fumes (welding flaxes and wire; chromium 6; paint solvents, etc.). There is a fairly ambivalent attitude towards emissions because, on the one hand, targets for 0% emissions are set in place, yet on the other, there's a sense of abdication in that 'we don't do anything beyond acceptable measures'.

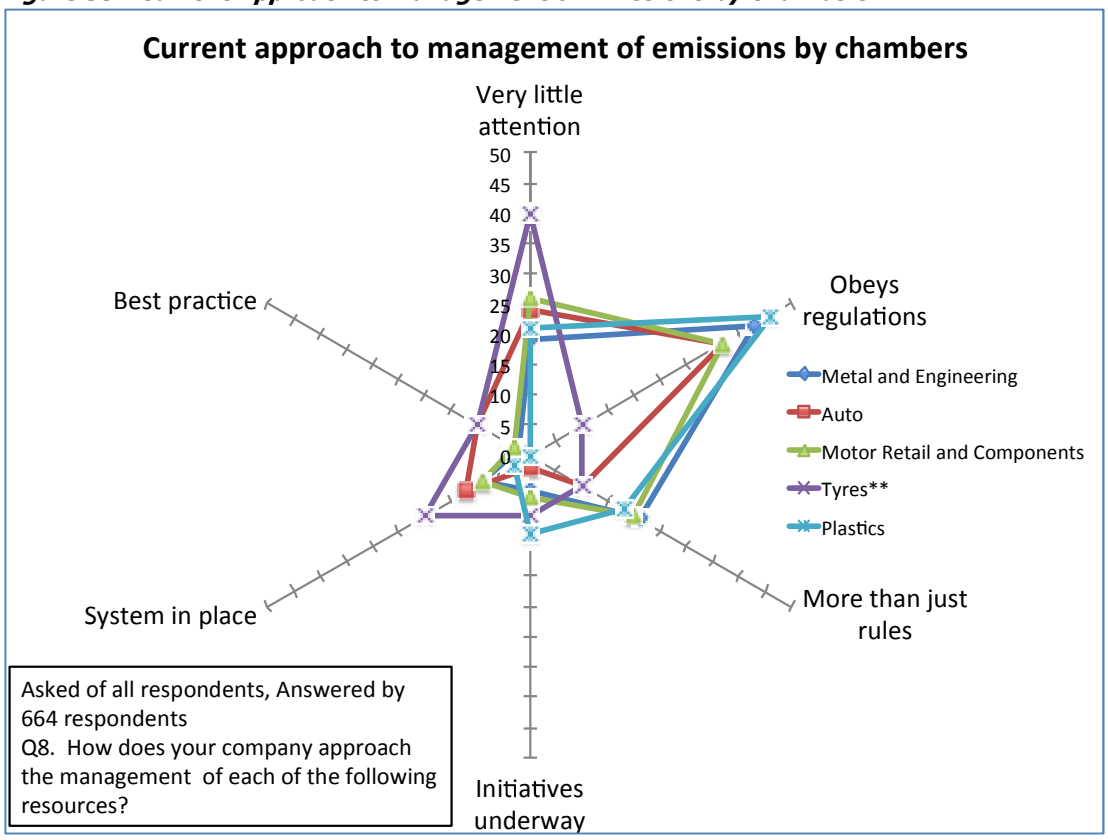
> "We have the correct extractors and clean fans regularly ... but we are not putting anything back into the atmosphere beyond the levels, you know acceptable levels" (Medium Motor Component Manufacturing Company)

Innovations in the form of effluent plants and suppressions systems are out of reach for the majority of companies, which may explain an attitude that hides a sense of not knowing what to do about this. Even Multi-national companies to some extent feel disempowered and unsure of reaching globally set targets. To reach a target of 0% emissions will require the use of clean and / or renewable energy as well as the use of alternate materials, many of which are not feasible options in the foreseeable future from a cost and R&D perspective.

"We use suppression systems, it's like a foam blanket, to keep the Chromium 6 fumes inside ... but we are currently busy looking at Extraction systems with Scrubber systems - but it is nearly a R2 million investment" (Multi-national Metal and Engineering Company)

"Lowering emissions of product as well as production going to air and constant monitoring this" (Multi-national Auto Manufacturing Company)

Figure 33: Current Approach to Management of Emissions by Chambers



The qualitative interviews confirmed the survey findings that the management of emissions is not as advanced as that of energy, water and waste, with few companies extending their approach much beyond obeying rules and regulations.

3.10 Current attitudes and Behaviour towards Investment in Innovation

The growing awareness and participation in environmental practice amongst the merSETA member companies in South Africa is encouraging as it demonstrates a degree of willingness to actively engage in behaviours that will have a positive impact.

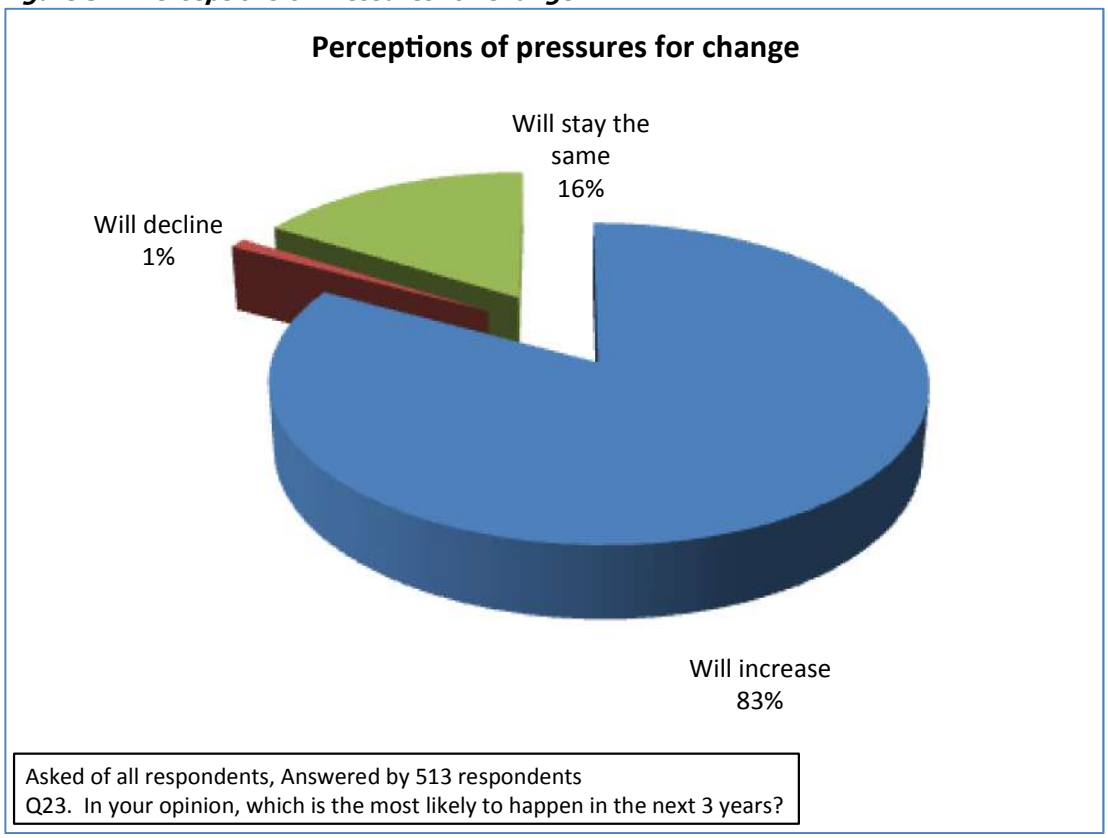
Unfortunately, there appears to be a sense of disempowerment amongst many companies surveyed however when it comes to innovative environmental practice - for a couple of reasons.

At a macro level, the Auto and Tyre companies with the biggest environmental budgets are limited in their ability to innovate as their R&D function is located outside the country. At a micro level, small and medium companies do not have the financial budgets for best practice and innovation. Coming up with new ideas for 0% emissions and waste to landfill, or alternate environmentally friendly materials and 'chemicals' is restricted to entrepreneurial environmental businesses, or global leading companies.

Innovations that are mentioned, e.g., the new effluent plant and natural gas powered forklifts are the domain of Auto Manufacturers, supported by big budgets. Specialist environmental consultants and global engineering teams provide the skill, with which these innovations have been accomplished.

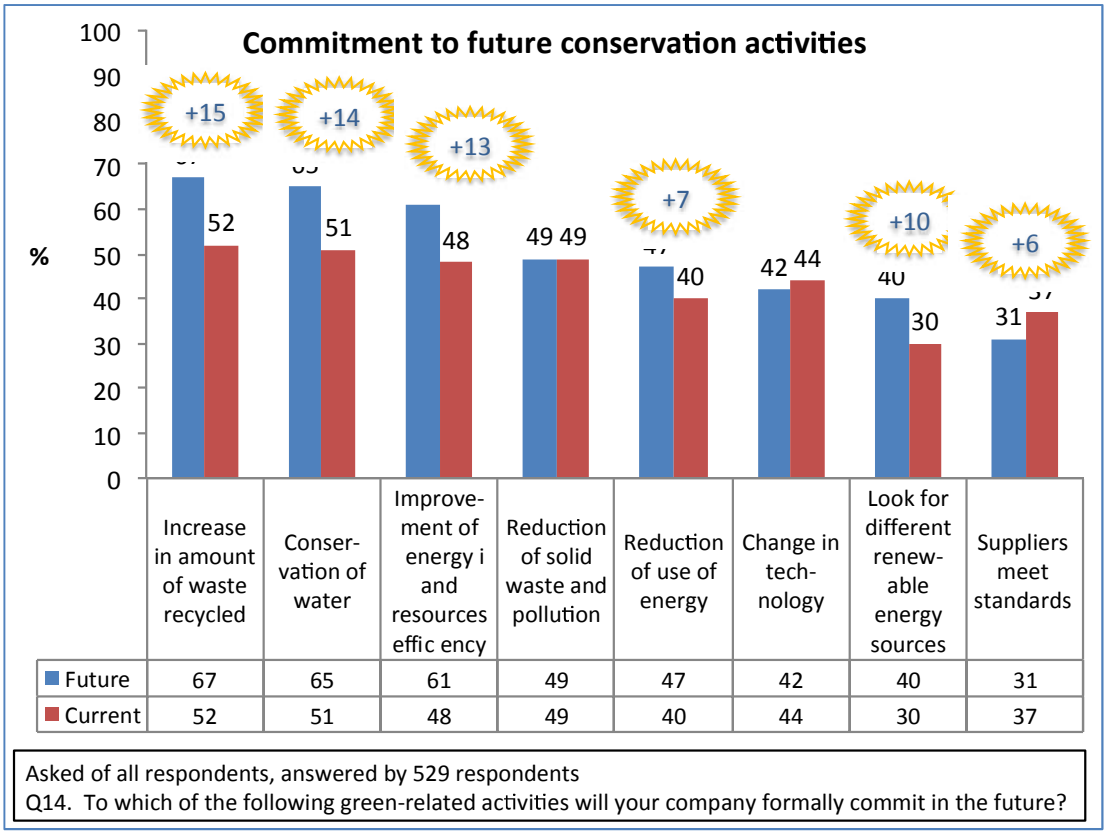
As such, it seems that in comparison to mature environmental management markets, South Africa's merSETA companies are still laying down the foundation of environmental practice, albeit following the example put in place by Multi-national companies.

Figure 34: Perceptions of Pressures for Change



Among all companies in the quantitative survey, a very strong perception exists that the pressures for change within the next three years will increase.

Figure 35: Commitment to Future Conservation Activities



With this in mind, these companies are prepared to commit themselves to an increase in conservation activities, with the two top activities being around the recycling and conservation of water and the third being the improvement of energy and resources efficiency.

Involvement in two activities will not change – reducing the amount of solid waste left over and the amount of pollution produced and changing technology to improve production and make it cleaner.

3.11 Current and Future Identified Training Needs

As pressure to adopt more environmentally friendly practices and to invest in environmental innovation increases, we are likely to see a corresponding increase in the need for awareness, training and education. Currently however, training needs in environmental management across the merSETA base vary on many different levels: from awareness and understanding of environmental basics to highly technical and advanced skills.

3.11.1 Training the basics

Across the qualitative sample, there is consensus that basic resource and waste management needs to be taught to all workers, as well as the general public, and school children. Most people interviewed believe there is little understanding at community level the importance of protecting natural resources and how we can go about this.

> "The approach we used was "what can we do to save money at home?" Because if they start to feel the saving in their pocket at home, it will hopefully become a habit and bring that positive habit into the work environments where they don't pay for their electricity" (Large Motor Retail and Component Manufacturing Company)

> "It should start at home and with schools, if little kids get the idea then eventually you will have a community that believes in that" (Multi-national Auto Manufacturing Company)

The respondents interviewed expressed the belief that merSETA can play a fundamental role in this by creating 'back to basics' 2-3 day courses for all levels of workers that address widely relevant environmental aspects such as the management of hazardous and general waste. The awareness training could tackle both community and broad industry impacts, for example addressing the impact of oil seeping into the ground, the impact of litter such as plastics ending up in the sea, and the need to separate waste at source and the need for renewable energy and where it comes from.

Currently, there is a lot of policing, monitoring and measurement of behaviour, but there is a fundamental lack of understanding of the 'why' we do this in order to sustain people, the plant and business profit.

In small companies, there is no formal training; training is happening on the job and 'by the by' with no structure, no consistent messaging and little relevance. Consequently, it means little more than 'just another thing to do'.

> "We do our own environmental training – why, where, how – at very basic levels, then we act like policemen" (Small Motor Retail and Component Manufacturing Company)

> "Well we don't have environmental specific training but during the induction, I give a full training on safety, health environment and quality. So I believe once we've gone the formal route there will be a little bit more about environment. At the moment we handle basics like waste management and handling of oil, used oil filters and anti-freeze" (Multi-national Auto Manufacturing Company)

The people interviewed feel that basic awareness training has to change people's beliefs in order to be effective. If what people understand does not change, and if attitudes around wasting water and electricity or throwing litter on the ground remain as they are, then training will have achieved nothing.

Finding environmental / water / resource champions, people at any level in business that are passionate about the topic, is believed to be critical in the success of further building upon basic awareness and knowledge. Champions require access to more complex training to strengthen their roles as champions and to prepare them to become tomorrow's environmental supervisors and managers.

3.11.2 Targeting the low hanging fruit

The scope of environmental management across key inputs and outputs is regarded as very broad for immediate skills development. The results across companies have shown that waste management is currently a strong focus – companies are actively engaging in recycling initiatives and see opportunities for making a difference and they are compelled to meet waste legislation requirements.

In contrasts, whilst the basics regarding conservation of energy and water (the other two active areas) are very necessary to understand, until renewable sources of energy are more accessible, companies do not see much innovation happening, nor do they see the need for specific skills development.

Given that every company and every home produces waste – both organic and inorganic – it is the most accessible area in which to educate and innovate. This is fortuitous given that landfills are significant contributors to GHG production. A countrywide phenomenon, concentrated in metro areas, is the growth of an informal recycling industry. Anywhere

that waste, rubbish and litter accumulate offers an opportunity by which 'entrepreneurial recyclers' are generating a living. Consequently, we see the rise of informal settlements around landfill areas, where purchasers of recycled material have a ready supply of stock. However, there is still too much domestic and industrial waste that is inaccessible to informal 'traders'.

Most companies are recycling waste in one way or another and feel they would benefit by more knowledge and skill in waste management in particular. Understanding the value of waste, e.g., of different plastics and their varied life spans; of the different benefits of rubber, etc. and how waste can become income – these were identified as significant areas for job creation and economy building – both within companies and the broader community.

A small plastics company representative highlighted the need for municipal waste managers to be trained in waste management and realising the potential economic benefits of waste expressed a belief that the merSETA could play an important role in this regard. Many waste managers seem to be Health Inspectors who don't have training in waste management. An opinion by a small plastic company was that merSETA could provide training to people in similar positions in order to understand the value of waste. Suggestions were also made that the merSETA could also assist the 'entrepreneurial recyclers' to become gainfully employed at municipalities in separating and distributing waste appropriately. This contribution by the merSETA could help to ensure that waste is better managed by municipalities in the future.

> "The opportunity exists for grass roots jobs, after significant school and public arena training"
>
> "There is political will to implement and monitor but frustration as it doesn't get implemented. People (municipalities) are willing to learn but no-one is addressing the whole system" (Small Plastics Industry Company)

In summary, the immediate need for environmental skills training is driven by the most common environmental actions taken by companies, which are waste management, water use and pollution management and sustainable energy use (minimisation of energy use, use of alternative sources of energy).

This suggests that to start with, environment skills training could focus on these priority areas, and such training could be targeted at the workplace – with intensive training for environment champions and 'general' training for all staff (workers and managers), as well as at the community – at schools and the general public.

3.11.3 Building environmental training into current qualifications

Aligned to principles of sustainability, is the concept that elements of environmental practice come into effect across functions. Some respondents mentioned that it would be useful to include 'green awareness' into current merSETA qualifications and trades where appropriate.

> "We were hoping to hear what they are planning in terms of bringing green into your everyday skill development programmes. Into your learnerships, into your apprenticeships, sort of training the green thing" (Multi-national Auto Manufacturing Company)

3.11.4 Alignment with industry needs

As mentioned earlier in the report, multi-national auto manufacturers lead the way with formal training programmes that address both technical and soft skill aspects of environmental sustainability – practices that go across the business as well as those

particular to certain functions. Whilst this sector drives training and inductions for suppliers as well, there are other companies within the various sectors that have also developed their own environmental training, specific to their own needs.

Companies interviewed were fairly consistent in their observation and experience that merSETA training currently offered has gaps. In other words, it does not meet many of the trade needs in the sector (more broadly than just in the area of environmental management). Consequently, despite paying Skills Development Levies, there is an opinion that they need to look at other training providers or undertake their own training and skills development.

> "merSETA offers us nothing – we train 5 artisans for every 1 they pay for, they are no help really, our training is much more superior. It is fraught with incompetency and corruption, but yet, we have to pay the levy!" (Large Plastics Industry Company)
>
> "Are SETAs and FET colleges responding appropriately to the skills needs identified by particular industries?"
>
> "Institutions do their thing and industry does their thing and yet they should be both working towards growing the industry" (Small Plastics Industry Company)
>
> "A lot of the training that merSETA is giving them (the panel beater apprentices) to learn – for example, they have to learn about lead wiping. That is such an outdated procedure. We haven't done it in years. It is 40 hours that they need to do on this." (Small Motor Retail and Component Manufacturing Company)
>
> "It doesn't matter what MerSETA puts in their training manual, if the OEM's don't have the buy in, then dealers will not be able to implement anything.- merSETA has to liaise with OEMs to ensure that the training is aligned to what OEMs want. Otherwise we can't access our PIVOTAL grant funds" (Large Motor Retail and Component Manufacturing Company)

For SMMEs particularly, it is important to remember that managing environmental issues happens in the broader context of business sustainability and financial survival. Currently many companies are more concerned with the competency gaps relating to critical skills at levels of management, trade and general workers; compounded by the cost of just doing business (including compliance and corporate governance). In other words, building internal environmental skill capacity and competencies are, at this point, a 'nice to have' rather than commanding much focus.

SMMEs express concern around the drop in the quality of trade's people and the loss of artisan skill within the industry. A couple of companies interviewed commented that really good people are hard to come by and when they do, they are snapped up by bigger companies. Not recouping PIVOTAL grant money from merSETA places unnecessary strain on smaller companies that could be used to invest in ISO accreditation or innovative and efficient technology.

> "We pay about 5k to 6k a month in SDL. The money would be better spent on us becoming ISO 9000 accredited. merSETA does not offer us the training we need for our specific kind of hydraulic turning and welding" (Small Metal and Engineering Company)

3.11.5 Accreditation to drive innovation

Currently, respondents interviewed – particularly Auto and Tyre manufacturers - reported that most R&D in environmentally sustainable practices, particularly in innovation around renewable energy sources are located outside of South Africa.

There is significant scope for the funding of R&D for green innovation and accreditation that would assist to develop green economy solutions that are appropriate for the conditions in South Africa. A particular case highlighted is the lack of investment by big business in wind and solar energy – it is just too expensive given that R&D, skill and production have to be imported or developed from scratch locally. Respondents believe that green technologies will be more readily adopted when produced locally.

Innovation in renewable energy resources, recycling of natural resources and emissions technology offers many opportunities for new skills development and job creation. However, merSETA needs to accredit the skills required to credibly lead innovation.

> "We are busy assessing the training needs and gaps at the moment. This is a big thing for the effluent plant because it needs completely new and advanced skills - currently being run by the consultants who built it, who are also training our staff. These guys work with chemicals, operate & repair equipment - work with valves, pumps, water pumps, Programmable Logic Controllers, friendly waste disposal.... they have to be multi skilled! (Multi-national Auto Manufacturing Company)

3.11.6 Specific environmental qualifications

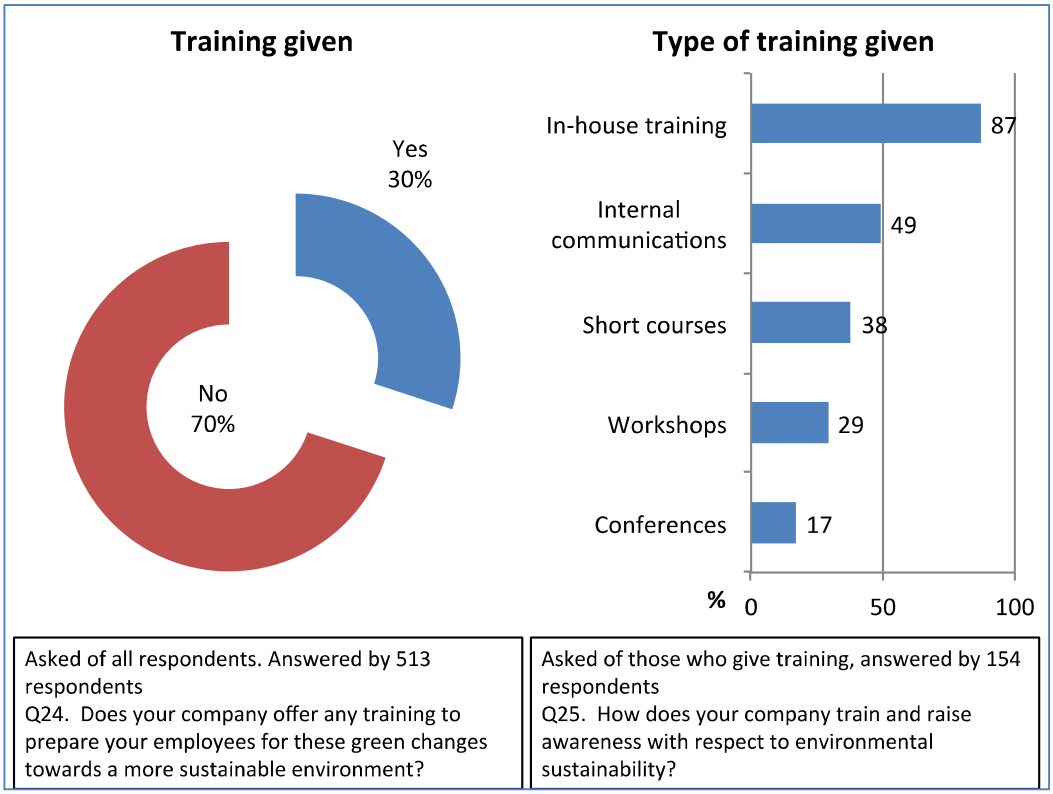
Currently, the percentage of environmental positions within companies in the merSETA membership is very small, indicating that the majority of companies consider the environmental portfolio as 'over and above' rather that a dedicated function. This will change slowly over time as the concept of sustainability matures and more companies become ISO accredited. ISO structures are currently very beneficial in assisting companies to establish the roles and capabilities required to make decisions, implement systems and strategies, measure performance and monitor impact.

Qualifications of this nature are a future requirement as the scope and demand amongst membership is not here yet. The ISO guidelines may however be useful in developing basic environmental management training.

3.11.7 Training currently provided by companies

As previously alluded to in the qualitative interviews, some companies are offering environmental sustainability training. The quantitative survey reports that thirty percent of companies are currently training their employees to prepare them for changes towards a more sustainable environment. This figure rises to 37% among companies in the Auto Manufacturing chamber and to 53% among large companies.

Figure 36: Training on Green Issues Provided by Companies (multiple answers possible)



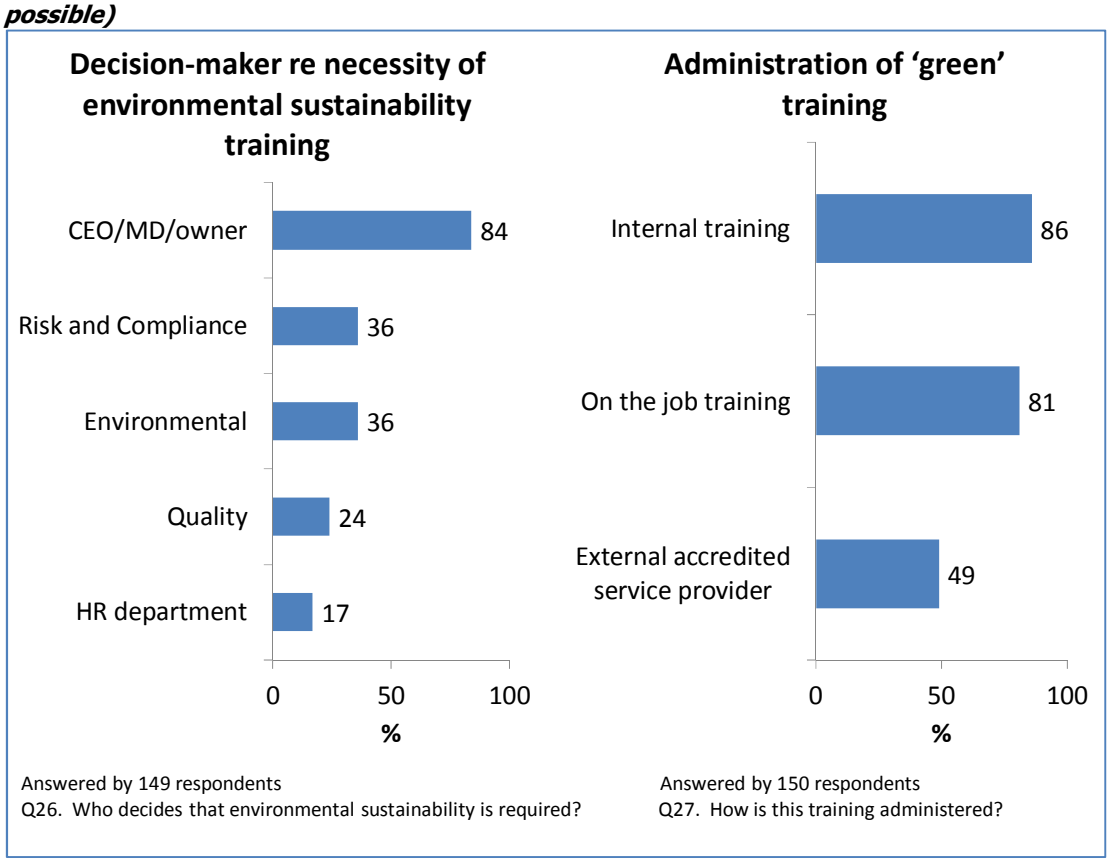
The majority of this 'green' training is in-house. Internal communications are also used to impart knowledge to employees, especially among the Metal and Engineering companies, those in the Auto Manufacturing chamber and large companies.

Companies in the Auto Manufacturing chamber and large companies are more likely to make use of short courses, workshops and conferences to offer 'green' training to staff.

The decision-maker when it comes to training on environmental sustainability is usually the CEO/managing director/ owner.

Decisions taken by Risk and Compliance and/or Environmental in this regard occur about a third of the time and more often in large companies.

Figure 37: Decision-Making Regarding 'Green' Training and Administration (multiple answers possible)



In summary, Auto and Tyre manufacturing, as well as large companies are providing for current environmental training needs amongst staff and suppliers. Within this, the dominant need currently is for basic training in knowledge, attitudes and practices relating to waste, water and energy issues; followed by assessing environmental practices for current trade and apprenticeship training currently offered by merSETA.

In addition, there is a need to assess the competencies required to manage sustainable practices in water, waste and energy, and to develop innovative solutions in each sector. In the future, as companies expand their focus to include the reduction of emissions, basic training and qualifications will have to be developed in this area too.

Assisting the industry to accredit production of 'green' innovations and new technology could open the floodgates to new functions at technical and artisan levels for the future. Also for future development, are specific NQL (National Qualifications Level) for specific environmental roles.

4 Conclusion and Recommendations

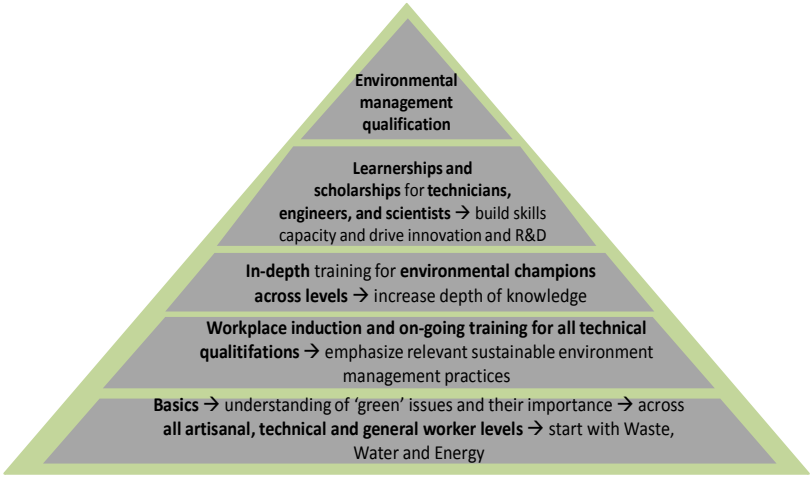
The findings show that the 'high' group of companies which employ best practice 'green' initiatives tend to be the multi-national, larger companies, while most others (the 75% in the 'low' category) are focusing on compliance and not introducing any 'green' initiatives beyond that. Smaller companies are constrained by limited resources, including human resources with specific environment skills or knowledge.

As identified in the research, the priority areas for most of the merSETA companies in the sample have been related to waste, water and energy – the latter possibly offer more accessible cost saving benefits whereas waste is possibly more highly regulated. These

therefore suggest an appropriate starting (but not end) point for skills development within merSETA companies.

In order to support the intentions of most of the companies to increase their environment sustainability actions in the future, skills development could include a range of activities. Possibly, using a tiered framework, from basic advocacy, general awareness and knowledge of each of the input and output resource areas, through to a specialised qualification, that integrates the complexity of cross-resource management.

Figure 38**: **Summary of recommendations for training and development of green skills.



At the most basic level, an understanding of broad 'green' issues and of the need for sustainable environment approaches should be introduced for the many artisanal, technical and general worker levels. The outcome of this basic level is aligned to the needs of Level One of the proposed Environmental Maturity Matrix; to bring appropriate environmental considerations into the merSETA sub-chambers. This will enable these levels of workers to understand the 'what' environmental management is about and why it is important.

Further to the immediate scope of the merSETA membership, the membership see significant value in merSETA also reaching out and offering general environmental management education to schools, public offices, municipalities, etc. However, it is acknowledged that this need of the membership may be better met through other government education departments or offices.

The next level, focused specifically on the industry workplace, looks at emphasising sustainable environmental management practices in basic training (induction and ongoing) such as management of hazardous waste such as oil, paint, chemicals, etc.). This could start driving awareness towards Level 2 of the matrix; building understanding of what activities must be undertaken in the areas of inputs and outputs to comply with all regulations and by-laws. Compliance therefore starts to grow roots into building an environmental value system. This can be done in the same way as health and safety issues are emphasised and supported by ongoing training, environmentally responsible procedures, and monitoring.

More in-depth training for environmental 'champions' could be provided at a next level, to increase the depth of understanding within the sector and to prepare them to play

specific environment management roles in the future. This is like a bridging level from compliance to more formal structures and targeted at all levels of the organisation – from technical workers to supervisors to managers.

Learnerships and scholarships for technicians, engineers and scientists in the broad range of environment sciences will be needed to plug the skills shortage and to contribute to the development of local R&D and innovation and to enable firms to introduce best practices in their operations. With growing awareness and a developing environmental infrastructure, companies can start formalising policies; identify the environmental competency and skills sets needed; promote communication and build an environmental value proposition.

Further, merSETA may consider promoting environmental sustainability within the sector, within an overall framework of sustainable business management which mirrors its current thought leadership towards forging sustainable relationships between Planet, People and Profit, i.e. driving the Triple Bottom Line principle.[36] This aligns with the survey results which identify a trend amongst Multi-national leaders in the metal and engineering and Auto Manufacturing sector that consider environmental sustainability as just one pillar of overall sustainability. At this level of development, companies would be maturing into Level 4 and Level 5 of the proposed Environmental Matrix.

In order to ensure that there are skilled people available to take on the environmental management positions that can drive best practice, which we believe will be the norm in the future, the merSETA is recommended to develop an environmental management qualification, which integrates an understanding of environmental sustainability within the framework of business management - so that such managers are able to understand and build a business case for environment sustainability.

As the strategy of the proposed Matrix suggests, merSETA is required to develop skills that can build the industry's environmental journey. One that is starting from a position dominated by companies doing very little; towards a destination where more, rather than less companies can sustain environmental practices aligned with best practice.

Some recommendations which the merSETA could consider as a result of this research are:

- **Database:** Taking the necessary steps to update and maintain its database. The data also needs to be verified as a significant portions of it are missing or incorrect;
- **Allocation of members:** 29% of the 13,568 members in the merSETA database were not allocated to one of the five chambers. To address this, the questionnaire required respondents to allocate their company to one of the five merSETA chambers. It is our finding that companies are allocating to the incorrect chambers. however the consultants do not have sufficient insight as to how companies are allocated but flag this as a possible issue;
- **Communications:** The merSETA should consider communicating more regularly with its members. Unless companies actively engage with their chamber representatives they are unlikely to hear from merSETA and as a result often have an inaccurate understanding of the services offered by the merSETA;
- **Advocacy and Awareness:** The majority of companies believe that for all the talk of sustainability and environmental awareness, there is little understanding of what this means at a practical level. Especially when it comes to unskilled and semi-skilled labour. More needs to be done at a national level to address this;

[36] Pan African Green Industrial Skills Conference – Leipzig 2013: Green Jobs – Future Jobs; Ansa Liebenberg

- **Company Intent:** 83% of companies believe that the pressure for change, for the items covered in the survey, will increase in the next three years. In addition, ~15-18% of companies in Level 1, 2 and 3 aim to improve their performance by moving to Level 4, 5 or 6. merSETA has an opportunity to develop a programme to work with these companies so that they can achieve their objectives.
- **merSETA's core mandate:** There were many opinions expressed in the qualitative interviews that despite the government mandate to build a green economy, the industry has critical core skill shortages which should be the focus of merSETA's energy; before driving environmental skills training. SMMEs in particular are unlikely to invest in training of the latter, whilst available yet limited budget must be prioritised on core technical skills. Given that around 80% of the sample comprises SMMEs, core skill provision must be urgently addressed if the SGJ is to be successful.
- **Collaboration with best practice partners:** Multi-national companies which have already developed sophisticated levels of environmental practice embedded in all levels, roles, values, decisions, etc, could be invited to collaborate in building a sustainable model of skills development with merSETA. As representatives of industry in which skill shortages exist, they could assist to bridge the divide between industry needs and implementation of a environmental skills development action plan.
- **Tracking progress:** The proposed Environmental Maturity Matrix can be used not just for companies as a guideline to track environmental performance, but also as a tool for research in a couple of years time to track industry progress against action plan goals.

We close with an extract from an article in SEIFSA NEWS by Ansa Liebenberg, July 2013, referenced in the recent "Green Jobs – Future Jobs" paper which supports the call from leading multi-national companies interviewed for the survey. This call is to align "green" orientation across business values, policy making, existing and new occupations, as well as to educate from the ground up, if we are to create a green economy:

> "Green skills, specifically green industrial skills, must be more than a mere response to climate change. All occupations and professions require a "green" orientation embedded in sustainability values and knowledge. In developing countries, where the green economy begins to drive policy and strategic planning, existing occupations will change and new skills will be needed, claimed Ursula Mueller from the Federal Ministry of Cooperation and Development (BMZ). This will require governments, business, industry and civil society to collaborate to ensure that the youth, as well as small and medium enterprises are fully on board in transferring to high-technology, green economies. "Green" transformation and technology also means ongoing advocacy, research and knowledge management."

5 Appendix

5.1 Appendix 1: SA Policy Landscape (relevant to merSETA companies)

	Energy	Waste	Climate Change	Industrial & Transport Sustainability
1994				
1995	Energy Regulator (NERSA) established			
1996			Green Paper on Environmental Policy	
1997				
1998	Energy White Paper Integrated Energy Plan	National Environmental Management Act		
1999				
2000		White Paper on Integrated Pollution and Waste Management		
2001				National Skills Development Strategy I
2002			UNFCCC Ratified	
2003	RE White Paper IEP			
2004	Eskom DSM Fund	National Environmental Management Air Quality	National GHG Inventory National CC Response Strategy	
2005	NEES DNA office created (CDM)			NSDS II
2006	EE Accord			
2007		National Framework for AQM	LTMS Notice to establish national framework (Air quality)	National Transport Master Plan
2008	NEES 1st Review National Energy Act SANEDI created	National Energy Management Waste Act		
2009	Renewable Energy Feed-In Tariff Integrated Resource Plan	Waste Tyre Regulations List of Waste Management Activities that have or are likely to have a detrimental effect on the environment	GN 813 of 3 August 2009: National Biodiversity Framework	National Land Transport Act King III (corporate framework)
2010		SAAQIS System NEMA EIA Regulations & Listing Notices		IPAP 1
2011	Integrated Resource Plan II	Draft National Standards for the Scrapping or Recovery of Motor Vehicles Draft National Norms and Standards for the Storage of Waste Fee Structure for Applications for Environmental Authorisations and Waste Management Licenses Draft National Norms and Standards for the Storage of Waste	National CC Response Policy Signatory Dresden declaration Biosphere and CC COP 17 - Climate change Flagship programmes	NSDS III IPAP 2 NGF Green Economy Accord
2012	NEES 2nd Review IPP Procurement Programme	National Waste Management Strategy Recycling & Economic Development Initiative of SA Draft Fee Structure for Consideration and Processing of Applications for Waste Management Licenses Draft Standard for Assessment of Waste for Landfil Disposal Draft Waste Classification and Management Regulations Draft National Standard for Disposal of Waste to Landfil Draft Regulations for Site Assessments and Reports National Waste Information Regulations		IPAP 3 NDP
2013	National Energy Efficiency Action Plan	Draft National Norms and Standards for the Remediation of Contaminated land and soil quality in the RSA		IPAP 4
2014				IPAP 5
2015				
0	NEEAP 1st Update			
	NEES = National Energy Efficiency Strategy	AQ = Air Quality	UNFCCC = UN Framework Convention on Climate Change	NGF = New Growth Path
	NEEAP = National energy Efficiency Action Plan	AQM = Air Quality management	CC = Cliamte Change	IPAP = Industrial Policy Action Plan
	DSM = Demand Side Management	SAAQIS = SA Air Quality Information System	LTMS = Long Term Mitigation Scenarios	NDP = National Development Plan
	DNA = Designated National Authority	EIA = Environmental Impact Assessment		
	CDM = Clean Development Mechanism	NEMWA= National Environmental Management Waste Act		NSDS = National Skills Development Strategy
	IEP = Integrated Energy Plan	IIWTMP = Integrated Industry Waste Tyre Management Plan		
	IRP = Integrated Resource Plan	REDISA = Recycling & Economic Development Initiative of SA		
	EE = Energy Efficiency	NEMA = National Environment Management Act		
	RE = Renewable Energy			
	REFIT = RE Feed-In Tariff Programme Announced			
	SANEDI = SA National Energy Development Institute			

5.2 Appendix 2: Qualitative Discussion Guide

- Core company function; number of employees; number of branches and location
- How does your company **define** environmental sustainability? (determine whether environment is part of integrated sustainability or seen as stand-alone)
- What is the **general culture** in the company around ES …. i.e., how do employees take it on board or not, what are the beliefs and feelings about it?
- Any **particular 'champions'** for the environment? To what extent does their passion influence the behaviour and beliefs of others?
- With whom does the **responsibility** for implementation and activities reside?
- Is there a **specific portfolio** it falls under – why this one?
- **How long** has environmental sustainability (ES) been on the company radar?
- Any recollection of **when it started** to gain traction and action in the company?
- What **influenced the uptake** of awareness? (drivers Q18)
- (Show and explain maturity matrix) where would you plot the company overall?
- Which of the **5 components** (inputs and outputs) does the company **most focus** on?
- What are the reasons for this? (refer to questionnaire Q18)
- Which of the 5 does the company **least focus** on?
- What are the reasons for this?
- Which, if any, of the **ISO standards** has the company put in place?
- What drove the reason for each?
- Are any planned for the future? Reasons?
- Do you **budget** at all for ES initiatives? Explore
- Do you regard any initiative or programmes you've implemented in the ES space to be **innovative**?
- How do you typically go about **training and development** in general in your company?
- Specifically in new areas the company is embarking on?
- Any particular areas of skill that you are currently lacking? For what reasons?
- Is there any skills training that is 'green related' as yet in your company?
- What green related skills have you identified at **artisanal / technical levels** in your company?
- Which of **the 5 areas identified above** would you say need / will need to be staffed and up-skilled first? What reason?
- What about **green 'jobs'** … any yet?
- Has thinking about ES brought any change to supply chain management, product re-imagining or new collaborative partnerships? Please explain
- How do you **stay in touch and aware** of what's happening on the 'green' front?
- How is new knowledge about environmental matters incorporated into the company?
- Where do you think **merSETA should start** in supporting you to implement sustainable operating models?
- Policy → technology → process → skill = **opportunities and competitive advantage** ….. where is your company on this continuum?

5.3 Appendix 3: Email Invitation to Participate

Unlimited Energy has been mandated by merSETA and the German Development Cooperation with South Africa (GIZ), to determine the level of "green activities, innovations and technology" within companies in the manufacturing and engineering sector, specifically the merSETA sub-sectors.

You are listed as the contact person for your company on the merSETA database. If you are not the right person to be answering some detailed questions about "green" related issues, please forward the questionnaire to the right person in your company. This could be the environmental manager or someone in a similar position. Please note that we are only looking for responses that relate directly to your company and its activities.

The merSETA's position on sustainability is as follows:

"Sustainable development is development that does not compromise the ability of future generations to meet their own needs"

merSETA is trying to work out what skills and abilities are needed to help companies to achieve the "green" targets that they have set – or the targets that they may be set by the changing policies, laws and regulations in South Africa. merSETA needs much more information about your business activities in order to be able to do this. We would really appreciate your help in answering some questions about these things.

In order to meet the deadline we have been given, we would really like you to complete this questionnaire within one week of receiving it, that is, by 13 August. We will send you some friendly reminders about this, in time for you to be able to complete it. The questionnaire should not take longer than 10 – 15 minutes to complete.

No one outside of the research team will see your answers and when we report on the results, all the answers are added together to give an overall result. This means that your responses will disappear into the overall result, and cannot be individually identified. So please be assured that your anonymity is guaranteed.

The findings from this survey will help merSETA to work out how to help companies like yours to train people better with regards to "green" issues and sustainability. The final report will be made available to all merSETA member companies.

5.4 Online Questionnaire

Survey of Sustainable Green-Related Activities, Trends and Innovations

INTRODUCTION

Please answer the questions so that they reflect the current and not desired state of "green' related activities and innovations within your organization. Please remember that no one outside of the research team will see your answers and when we report on the results, all the answers are added together to give an overall result. This means that your responses will disappear into the overall result, and cannot be individually identified.

***1. Please fill in your contact details and those of the business you represent:**

YOUR NAME	
YOUR JOB TITLE	
THE NAME OF THE BUSINESS	
PROVINCE	
EMAIL ADDRESS	

***2. To which of the following merSETA chambers does your company belong?**
PLEASE CLICK THE APPROPRIATE BUTTON

- Metal and engineering
- Auto manufacturing
- Motor retail and component manufacturing
- Tyre manufacturing
- Plastics industries

Survey of Sustainable Green-Related Activities, Trends and Innovations

***3. Where is your head office situated?**

- In South Africa
- Outside South Africa

***4. Do you have operations/businesses located?**

- In all nine provinces
- In one or more provinces
- In one province

***5. How many full time employees does your company have in South Africa?**

Number of employees

6. Which of the following types of personnel do you have in this company?

- Owner/CEO/managing director
- Directors/board members
- Senior managers
- Professionals (eg engineers, chemists, lawyers etc)
- Technicians, trade workers and artisans
- Community and personal service workers
- Sales workers
- Clerical and admin workers
- Artisans, technicians and assemblers
- Plant and machine operators
- Unskilled workers

Survey of Sustainable Green-Related Activities, Trends and Innovations

***7. Does your company currently hold any of the following certification? PLEASE ONLY TICK CERTIFICATIONS WHICH ARE CURRENTLY ACTIVE AND VALID**

- ISO 9000 series (Quality Management Systems)
- ISO 14000 series (Environmental Management)
- ISO 18000 (Occupational, Health and Safety)
- ISO 26000 (Social Responsibility)
- ISO 31000 (Risk Management)
- ISO 50000 (Energy Management)
- The company does not have any of the above
- Other (please specify)

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Survey of Sustainable Green-Related Activities, Trends and Innovations

***8. How does your company approach the management of each of the following resources?**

	Pays very little attention to 'green' issues	Obeys all regulations and bylaws with regard to 'green' issues	Accepts that sustainability is more than just following rules	Has a number of green initiatives underway	Our green initiatives fit together as part of an overall system that addresses 'greening'	Our green initiatives are best practice and we are known to be a 'green leader' in our sector
ENERGY - refers to all energy sources used in your operations, such as electricity, gas, petrol, diesel as well as renewable energy sources						
EMISSIONS – this refers to those wastes that are emitted to the air. For example, boiler stacks and vehicle emissions while transporting goods.						
WATER - this means how water is supplied and used as well as the volume and quality of waste-water.						
MATERIALS – the raw or input materials that your operations use to make products.						
WASTE – this refers to all solid wastes that are produced by the operations.						

Survey of Sustainable Green-Related Activities, Trends and Innovations

***9. Has your company tried to measure the impact that your operations have on the environment?**

- Yes
- No

Survey of Sustainable Green-Related Activities, Trends and Innovations

*10. IF YOU ANSWERED YES IN Q9: What have you done?

- Environmental audit
- Measured the amount of energy we use and the types of energy
- Measured the amount of water we use and what happens to the water after being used
- Measured the amounts and types of waste products that are left over after our goods or services are delivered
- Measured how much solid waste is produced as a result of our operations
- Checked what happens to our waste once it has been produced
- Identified what our operations emit to the air
- Measured the amount of emissions you emit to the air
- Assessed what greenhouse gases our operations emit.
- Other (SPECIFY)

Other (please specify)

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*11. Has your company tried to measure the impact that your products have on the environment?

- Yes
- No

Survey of Sustainable Green-Related Activities, Trends and Innovations

***12. IF YOU ANSWERED YES IN Q.11: What have you done?**

Survey of Sustainable Green-Related Activities, Trends and Innovations

***13. Which of the following conservation activities has your company/business undertaken? PLEASE MAKE USE OF THE SCALE BELOW:**

	Always	Very often	Quite often	Occasionally	Not at all
Change in our technology to improve production, to make it cleaner					
Improvement of our energy and resources efficiency					
We only buy from suppliers that meet our sustainability standards					
Conservation of water					
Reduction of the use of energy, of fossil fuels and of raw materials					
Increase in the amount of waste that is recycled					
Reduction of the amount of solid waste left over and the amount of pollution we produce					
We look for different kinds of renewable energy sources to find ways of implementing such alternatives					

Other (please specify)

Survey of Sustainable Green-Related Activities, Trends and Innovations

***14. To which of the following green-related activities will your company FORMALLY COMMIT IN THE FUTURE?**

- Reduction of our use of energy, of fossil fuels and of raw materials
- Look for different kinds of renewable energy sources to find ways of implementing such alternatives
- Improvement of our energy and resources efficiency
- Reduction of the amount of solid waste left over and the amount of pollution we produce
- Will only buy from suppliers that meet our sustainability standards
- Increase in the amount of waste that is recycled
- Change our technology to improve our production, to make it cleaner
- Conservation of water
- Other (please specify)

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Survey of Sustainable Green-Related Activities, Trends and Innovations

***15. Have specific budgets been allocated to green-related interventions with .....**

	Yes	No	Don't know
Waste			
Emissions			
Water			
Energy			
Materials			

Survey of Sustainable Green-Related Activities, Trends and Innovations

16. In your company, what level makes decisions about spending money on sustainable development?

- The Board of directors
- The Environmental manager/SHE (Safety, Health and Environment) representative
- The Operations manager
- The Finance director
- A Committee arranged for this purpose/special task force
- Other

Survey of Sustainable Green-Related Activities, Trends and Innovations

***17. You completed the table near the beginning of the questionnaire about your company's current approach to sustainable development. If you take into account the company's resources and finances, where do you believe your company will be in three years time?**

	Paying very little attention to 'green' issues	Obeying all regulations and bylaws with regard to 'green' issues	Accepting that sustainability is more than just following rules	Having a number of green initiatives underway	Green initiatives will fit together as part of an overall system that addresses 'greening'	Green initiatives will be best practice and we will be known to be a 'green leader' in our sector
ENERGY - refers to all energy sources used in your operations, such as electricity, gas, petrol, diesel as well as renewable energy sources						
WATER - this means how water is supplied and used as well as the volume and quality of waste-water.						
MATERIALS – the raw or input materials that your operations use to make products.						
EMISSIONS – this refers to those wastes that are emitted to the air. For example, boiler stacks and vehicle emissions while transporting goods.						
WASTE – this refers to all solid wastes that are produced by the operations.						

***18. Which of the following have affected your company's current approach to WATER management? YOU CAN CHOOSE MORE THAN ONE ANSWER.**

- Company policies and values
- Procurement process requirements
- South African government regulations
- Reducing costs
- Operational efficiencies and innovation
- International pressures
- Industry regulations
- South African government policy
- ISO accreditation
- Other (please specify)

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***19. Which of the following have affected your company's current approach to ENERGY management? YOU CAN CHOOSE MORE THAN ONE ANSWER.**

- Global mandates
- Government regulations
- Government policy
- Industry regulations
- Company policy/values
- Procurement process requirements
- ISO accreditation
- Saving costs
- Other (please specify)

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Survey of Sustainable Green-Related Activities, Trends and Innovations

***20. Which of the following have affected your company's current approach to MATERIALS management? YOU CAN CHOOSE MORE THAN ONE ANSWER.**

- ISO accreditation
- Global mandates
- Industry regulations
- Government policy
- Company policy/values
- Saving costs
- Procurement process requirements
- Government regulations
- Other (please specify)

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***21. Which of the following have affected your company's current approach to EMISSIONS management? YOU CAN CHOOSE MORE THAN ONE ANSWER.**

- Procurement process requirements
- Saving costs
- Government regulations
- Industry regulations
- Company policy/values
- Government policy
- ISO accreditation
- Global mandates
- Other (please specify)

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Survey of Sustainable Green-Related Activities, Trends and Innovations

***22. Which of the following have affected your company's current approach to WASTE management? YOU CAN CHOOSE MORE THAN ONE ANSWER.**

- Saving costs
- Global mandates
- Procurement process requirements
- Government regulations
- Industry regulations
- Government policy
- ISO accreditation
- Company policy/values
- Other (please specify)

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Survey of Sustainable Green-Related Activities, Trends and Innovations

***23. In your opinion, which is the most likely to happen in the next 3 years?**

- The pressures for change will increase
- The pressures for change will decline
- The pressures will stay the same

***24. Does your company offer any training to prepare your employees for these green changes towards a more sustainable environment?**

- Yes
- No

Survey of Sustainable Green-Related Activities, Trends and Innovations

***25. How does your company train and raise awareness with respect to environmental sustainability?**

- In house training
- Short courses
- Workshops
- Conferences
- Internal communications
- Other (please specify)

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26. Who decides that environmental sustainability is required

- Human Resources Department
- CEO / MD /; owner
- Environmental
- Risk and Compliance
- Quality
- Other

27. How is this training administered (multiple answers)

- Internal training
- On the job training
- External accredited service provider
- Other (please specify)

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28. Are there any specific innovations or measures which you company has undertaken which you would like to share with merSETA?

***29. Please fill the date of completion below.**

DD MM YYYY

Date: / /

On behalf of merSETA. GIZ and Unlimited Energy, thank you very much for your cooperation.