

Module: Introduction**0.1 Introduction**

Please give a general description and introduction to your organization

BARLOWORLD ("the group") distributes leading international brands providing integrated rental, fleet management, product support and logistics solutions. Core divisions of the group comprise Equipment (earthmoving and power systems), Automotive (car rental, motor trading and fleet services), Handling (forklift truck distribution and fleet management) and Logistics (logistics management and supply chain optimisation). The group offers flexible, value adding, integrated business solutions to its customers, backed by leading global brands. Brands it represents on behalf of its principals include Caterpillar, Hyster, Avis, Audi, BMW, Ford, General Motors, Mercedes-Benz, Toyota, Volkswagen and others.

BARLOWORLD has a proven track record of effectively managing long-term relationships with global principals and customers. BARLOWORLD has the ability to develop and grow businesses in multiple geographies including challenging territories with high growth prospects. One of its core competencies is ability to leverage systems and best practices across its chosen business segments.

BARLOWORLD was founded in 1902, is listed on Johannesburg, London and Namibian Stock Exchanges and has operations in 38 countries around the world, with 62% of its more than 18,000 employees in South Africa.

BARLOWORLD is driven by the maxim of creating long term sustainable value for all its stakeholders and is committed to play a leading role in sustainable development, which embraces economic, social and environmental aspects of the group's activities. Long term value creation for all of its stakeholders requires BARLOWORLD to operate, manage and report its activities in a harmonious manner, without prejudicing the future of any of its stakeholders. BARLOWORLD is committed to operational integrity and effectiveness of managing and reporting energy consumption, emissions, water usage (source and recycling), materials consumed, use of recycled input materials, waste and destination or disposal methods and full compliance with regulations. Non-financial reporting, which includes GRI reporting, is aligned with financial reporting. 2009 was established as group's base year for reporting its GHG emissions inventory under the rules of the GHG Protocol. Independent third party assurance is obtained on key indicators, including energy usage and carbon emissions.

BARLOWORLD is committed to creating long term value for all its stakeholders and this includes:

- Providing customers with integrated and environmentally sound solutions they require to meet their sustainable development objectives (including managing their impact on climate change);
- Acting in best interests of principals and representing them in a manner that reflects their sustainable development objectives;
- Ensuring inspiring climate for employees to work in and within which all have equal opportunity to fulfil their aspirations and be proud ambassadors of group;
- Delivering sustainable returns to its shareholders that are not achieved at expense of future generations and;
- Being regarded as a responsible corporate citizen by all its stakeholders, including communities in which it operates.

This is underscored by integrated management approach which requires accountability and responsibility for economic, social and environmental aspects of business activity, entrenched risk management approach, stakeholder engagement and strategic planning framework that structures activity and management focus on group's 6 strategic focus areas of:

- Integrated customer solutions
- People
- Empowerment and transformation
- Sustainable development
- Financial returns and profitable growth.

Sustainable development strategic focus area positions climate change response as central to success of group's long term value creation objectives. Although BARLOWORLD's GHG emissions are fairly limited, Scope 1 and Scope 2 emissions were 199 053 tons in 2009 and 201 733 tons in 2010. BARLOWORLD understands the climate change impacts of its products and customer offerings and strives to conduct its activities in a responsible manner. The group has set internal aspirational targets of a 12% efficiency improvement for both its non-renewable energy consumption and emissions (scope 1 and scope 2) by 2014 off a 2009 baseline, and has models to predict and assess its performance which is monitored on ongoing basis. These aspects are included in performance scorecards including those of executive and senior management.

BARLOWORLD's geographic regions of activity are South Africa, Rest of Africa, Europe and United Kingdom, Australia, North America, Middle East and Asia, and reported emissions reflect this activity.

0.2 Reporting Year

Please state the start and end date of the year for which you are reporting data.
The current reporting year is the latest/most recent 12-month period for which data is reported.

Enter Periods that will be disclosed

Thu 01 Oct 2009 - Thu 30 Sep 2010

0.3 Country list configuration

Please select the countries for which you will be supplying data. This selection will be carried forward to assist you in completing your response

Select country
1. Andorra
2. Angola
3. Australia
4. Belgium
5. Botswana
6. Burundi
7. Cape Verde
8. China
9. Congo, Democratic Republic of the
10. Cote d Ivoire
11. Dubai
12. Germany
13. Ghana
14. Hong Kong
15. India
16. Ireland
17. Kenya
18. Lesotho
19. Madagascar
20. Malawi
21. Mauritius
22. Mozambique
23. Namibia
24. Netherlands
25. Nigeria
26. Portugal
27. Russia
28. Sao Tome and Principe
29. South Africa

Select country
30. Spain
31. Swaziland
32. Tanzania
33. Togo
34. United Arab Emirates
35. United Kingdom
36. United States of America
37. Zambia
38. Zimbabwe

0.4 Currency selection

Please select the currency in which you would like to submit your response. All financial information contained in the response should be in this currency.

ZAR (R)

Further Information

Sustainable development strategy, which includes environmental and climate change objectives, is embedded in core operations, including tracking and managing performance against KPI's and efficiency improvement targets.

At group level, performance against safety, health, environmental and climate change issues is reviewed at regular quarterly meetings of the risk and sustainability committee. This is a sub-committee of the board, members of which include executive directors and which is chaired by an independent non-executive director. The chairman reports to the board, which endorses decisions of the risk and sustainability committee. Data on performance against safety, health, environmental and climate change issues is included in BARLOWORLD's annual report for review by all stakeholders.

Daily responsibility for managing business divisions' environmental performance, in the context of the group's and divisional environmental and climate change policies, GHG and other relevant group standards, policies and protocols, is delegated to divisional CEO's and their respective boards. All divisions have sustainability champions whose responsibilities include collection and submission of sustainability data (including energy consumption and emissions), which is regularly reviewed as part of established management, executive and board processes. Ultimately, in the context of the group's values and ethics, which include specific aspects relating to responsible custodianship of the environment, every employee is responsible for sustainability of the organisation through dedicated fulfilment of their respective roles.

Functional responsibilities are managed through a group-wide, integrated performance scorecard system which includes sustainable development aspects. Independent, external auditors verify energy consumption, water use and emissions data. Organisational boundaries for collection of data reflect those used for financial purposes to ensure alignment between financial, social and environmental management and reporting.

Data from operations in Ivory Coast, Democratic Republic of Congo, Siberia and Zimbabwe is not consolidated into financial and non-financial reporting since these are not companies over which BARLOWORLD exercises financial control. This is in line with the GHG Protocol Reporting Standard (financial control).

Sale of BARLOWORLD's car rental operations in Scandinavia was effected during the reporting period and reported data (including carbon footprint and baselines for efficiency targets) have been restated to include continued operations only.

Module: Management [Investor]

Governance

1.1 Where is the highest level of direct responsibility for climate change within your company?

Individual/Sub-set of the Board or other committee appointed by the Board

1.1a Please identify the position of the individual or name of the committee with this responsibility

The group risk and sustainability committee, which is one of seven sub-board committees established to assist the board in ensuring good corporate governance, improving internal controls and performance of company, acts according to a written terms of reference approved by the board, which sets out its purpose, membership requirements, duties and reporting procedures. It assists the board in recognising all risks and sustainability issues to which the group is exposed and ensuring that the requisite risk management culture, practices, policies and systems are progressively implemented and function effectively. These include, among other aspects, business continuity management, occupational health and safety, sustainable development, environmental management and climate change-related issues, and ethical commercial behaviour.

1.2 Do you provide incentives for the management of climate change issues, including the attainment of targets?

Yes

1.2a Please complete the table

Who is entitled to benefit from these incentives?	The type of incentives	Incentivised performance indicator
Board chairman	Recognition (non-monetary)	Achievement of defined group sustainability objectives, energy and emissions efficiency targets.
Director on board	Monetary reward	Achievement of defined group sustainability objectives, energy and emissions efficiency targets.
Chief Executive Officer (CEO)	Monetary reward	Achievement of group strategy which incorporates sustainable development objectives including energy and emissions efficiency objectives and targets. BARLOWORLD provides incentives for management of issues related to climate change, which is incorporated into sustainable development objectives. Management of this process is facilitated through an integrated performance scorecard system. Specifically included are the group's aspirational targets for improvements in energy consumption and emission intensities. Functional responsibilities are managed through a group-wide, integrated performance scorecard system. Relevant management information is reviewed at meetings at various organisational levels from operations, divisional boards and group board level (risk and sustainability committee). This information applies to all other categories of employee mentioned in this section.
Environment/sustainability managers	Monetary reward	Achievement of defined sustainability initiatives/objectives, including energy and emissions efficiency targets
Risk managers	Monetary reward	Achievement of defined sustainability initiatives/objectives, including energy and emission efficiency initiatives
Facility managers	Monetary reward	Achievement of defined sustainability initiatives and objectives which include energy and emissions efficiency. Independent third party auditors verify their reported energy consumption, water use and emissions data.
Process operation managers	Monetary reward	Achievement of defined sustainability objectives, including energy and emissions efficiency and targets. Daily responsibility of managing business divisions' environmental performance, in the context of the group's and divisional environmental and climate change policies, GHG and other relevant group standards, policies and protocols.
All employees	Recognition (non-monetary)	Energy efficiency initiatives and savings. Ultimately, in the context of the group's values and ethics, which include specific aspects relating to responsible custodianship of the environment, every employee is responsible for the sustainability of the organisation through the dedicated fulfilment of their respective roles. In 2010 nomination of a CEO Award finalist was based on exceptional work done regarding energy and emission efficiency improvement
Other: Divisional CEO's	Monetary reward	Energy and emission efficiency Intensity improvement and savings. Achievement of divisional strategy which incorporates sustainable development objectives including energy and emissions efficiency objectives and targets.

Strategy

2.1 Please select the option that best describes your risk management procedures with regard to climate change risks and opportunities

Integrated into multi-disciplinary company-wide risk management processes

2.1a Please provide further details (see guidance)

The group has integrated financial, social and environmental management practices and reporting to link financial profits with responsible use of natural resources and impacts on environment.

Risks and opportunities, including those associated with or impacted by climate change, are identified and/or re-evaluated through detailed, robust, systematic strategic planning, risk and opportunity assessment procedures that engage every level of organisation, and involve continual review and reporting at management, executive and board levels. Through dedicated divisional risk assessment interventions, which include internal audit and group risk services as appropriate, risks (including risks at an asset level) are identified and evaluated in terms of their probability, severity and potential financial impacts, as well as the quality of the existing control environment. They are recorded in divisional and group registers, detailed, comprehensively assessed and given residual risk scores. This results in a hierarchy of risks and allows for measurement of progress made. Risks are then addressed through acceptance, transfer, avoidance or reduction strategies.

Divisional management is responsible for ongoing monitoring and management of their operating companies' risks, and this includes adequate evaluation. Formal reporting on risk related issues to the group risk and sustainability committee, a sub-committee of the board which is chaired by an independent non-executive director, takes place bi-annually. This committee assists the board in recognising all material risks and sustainability issues to which BARLOWORLD is exposed and in ensuring that the requisite risk management culture, practices, policies and systems are progressively implemented and functioning effectively. These include, among other aspects, business continuity management, occupational health and safety, environmental management and ethical commercial behaviour.

Functions of the committee include:

- Setting out a formal policy for management of risks;
- Reviewing and assessing the integrity and effectiveness of risk management process each year;
- Considering annually consolidated risk assessment results and determining trends, common areas of concern, emerging risks, and most significant risks for reporting to the board;
- Monitoring and reviewing changes in stakeholder expectations;
- Corporate governance codes and best practice guidelines relating to risk issues;
- Receiving reports covering matters relating to substantive environmental and health and safety risks;
- Reviewing and approving the insurance renewal programme;
- Reviewing and approving sustainability reporting; and
- Determining and recommending to the board for approval BARLOWORLD's risk appetite.

Arising from these processes, including the strategic planning process, are initiatives to address identified risks, development and implementation of business continuity and disaster recovery plans for unscheduled events or occurrences. These plans include information technology and communications solutions, as appropriate. While this planning is regularly reviewed at executive and board levels, internal audit also plays a significant role in reviewing processes, procedures and controls.

Opportunities are also identified which are then assessed and pursued if appropriate and commercially feasible. Aspects of these include providing environmentally sound customer solutions which assist customers in achieving their own environmental goals and objectives. The group is determined that these aspects will underscore its long-term value creation capability for all its stakeholders. This approach has also been embraced by its principals who continue to focus on developing products and services which have reduced negative environmental impacts as well as conducting their operations in an environmentally responsible manner.

2.2 Is climate change integrated into your business strategy?

Yes

2.2a Please describe the process and outcomes (see guidance)

BARLOWORLD, a diversified industrial group with a decentralised management approach, is committed to sustained value creation for all its stakeholders through its value based management philosophy: customers, suppliers/principals, employees, shareholders and communities, without prejudicing their future. This encompasses responsible custodianship of the environment.

One of BARLOWORLD's 10 Pillars of Sustainability is Social and Environmental legitimacy: taking active steps to measure, set targets, reduce and minimise BARLOWORLD's carbon footprint, which will be off-set when and where appropriate.

BARLOWORLD's Code of Ethics includes: Protect the environment. BARLOWORLD understands these responsibilities as well as the commercial wisdom underlying sustainable development.

BARLOWORLD's strategic framework outlines 6 strategic focus areas to which executive teams give priority to ensure sustainable value creation for all stakeholders:

- Integrated customer solutions
- Employees
- Empowerment and transformation
- Sustainable development
- Financial returns
- Profitable growth

Stakeholder engagement and consultation informs and guides group activities. This approach is institutionalised through structured strategic planning and risk management initiatives.

Functional responsibilities are managed through a group-wide, integrated performance scorecard system, with short- and long-term incentive schemes designed to retain and incentivise employees with key skills. Management practices include detailed measurement of material aspects of activity and consistent, transparent and comparable reporting.

An executive with a combined group strategy and sustainability role is in place. BARLOWORLD's strategic planning framework is cascaded throughout the organisation and appropriately adapted for each operation. BARLOWORLD's six strategic focus areas are supported by critical success factors, appropriate action plans and measurable performance indicators.

Strategic intent of BARLOWORLD's focus on sustainable development is:

- Achieve profitable growth by offering products and services which capitalise on emerging business opportunities, including climate change;
- Realise cost savings through energy efficiencies and other sustainable business practices;
- Enhance BARLOWORLD's reputation by taking a leading role in these;

- Engage stakeholders to guide appropriately BARLOWORLD's value propositions;
- Approach management and reporting in an integrated manner that entrenches accountability for economic, environmental and social activities;
- 12% Improvement in energy and emissions efficiencies 2010 to 2014 off a 2009 baseline year;
- MARSO (measure, avoid, reduce, switch, offset) to minimise carbon and wider environmental footprints;
- Provide solutions that create value for BARLOWORLD's customers by assisting them to achieve their own sustainable development objectives, which include addressing climate change.

Significant insurance cover (up to €200 million) is provided at group level which extends to physical damage and consequential damages. Performance against safety, health and environmental issues, including climate change, is reviewed at regular quarterly meetings of a risk and sustainability committee, a sub-committee of the board. Members include executive directors and it is chaired by an independent non-executive director who reports to the board, which endorses decisions of the committee. Data on performance against safety, health, environmental and climate change issues is included in BARLOWORLD's annual report for review by all stakeholders.

Daily responsibility for managing business divisions' environmental performance against environmental and climate change policies, GHG and other group standards, policies and protocols, is delegated to divisional CEO's and their respective boards. All divisions have sustainability champions whose responsibilities include ensuring training and awareness programmes are in place and collection and submission of sustainability data, which is regularly reviewed as part of established management, executive and board processes. Ultimately, in context of BARLOWORLD's values and ethics, which include specific aspects relating to responsible custodianship of the environment, every employee is responsible for sustainability of the organisation through dedicated fulfilment of their respective roles. Performance scorecards include sustainable development aspects. Independent, external auditors verify energy and water consumption and emissions data.

As BARLOWORLD conducts its activities in an environmentally sensitive manner, it also strives to provide the market and its customers with products, services and integrated solutions which enable them to achieve their own sustainable development goals and objectives. This strategy addresses one of BARLOWORLD's top risks, which is that of competitor actions eroding its competitive advantage.

BARLOWORLD recognises that responsible product stewardship includes initiatives to manage and mitigate environmental impacts of its products, services and customer solutions, which ultimately would include product disposal, and acts in conjunction with its principals to address these issues. Existing business models, as well as recycling, rebuild and remanufacture initiatives proactively mitigate the disposal implications of group products. Remanufacturing returns end of life components to their original condition, reducing waste and minimising the need for raw materials to produce new parts and machines. This keeps non-renewable resources in circulation for multiple lifetimes.

World class principals' commitment and technology underpin BARLOWORLD's ability to provide environmentally responsible customer solutions. Caterpillar Inc's 2020 internal and customer goals include: 20% reduction in customer greenhouse gases (GHG's), 20% increase in customer energy efficiency and 20% increase in customer materials efficiency by 2020. BMW was voted the world's most sustainable car company again in 2010, the 6th time in a row. Other leading automotive manufacturers have developed hybrid and electric vehicles, more efficient diesel and petrol engines and technology. In some instances 'zero emission' vehicles are a reality. BARLOWORLD Handling's principal, NMHG, whose brands include Hyster, is committed to sustainable development and all its American and European manufacturing facilities have achieved ISO 14001 certification. NMHG is the largest volume producer of zero emissions electric trucks in North America and offers lift trucks which operate on cleaner burning alternative fuels such as LP, CNG and clean diesel. BARLOWORLD Logistics has developed a 'green trailer' and CAST-CO2 products which respectively increase fuel and emission efficiency, optimise supply chains and minimise carbon emissions. BARLOWORLD is investing R274.2m to increase its component rebuild facilities in South Africa and Russia. BARLOWORLD's car rental fleets comprise vehicles with latest fuel and emission efficiency technology (all vehicles less than 12 months old) and customers are advised of emissions generated by their rentals. Shortly customers will be able to select to offset these.

2.3 Do you engage with policy makers to encourage further action on mitigation and/or adaptation?

Yes

2.3a Please explain (i) the engagement process and (ii) actions you are advocating

(i) BARLOWORLD engages in dialogue and participates in written submissions through:

a. Organised business:

- Business Unity SA on country/region long term mitigation strategies, climate change negotiations, COP 17, formal and voluntary country emissions reduction commitments made at ICC Kyoto and Copenhagen, policy and regulatory approaches to climate change: National Energy Efficiency Strategy, National Climate Change Response Green Paper, Integrated Resource Plan, Industrial Policy Action Plan. These include issues such as energy security and energy pricing, incentives for energy efficiencies; mandatory reporting on emissions and emissions taxes.

- Business Leadership SA: BARLOWORLD has representation on this high level think tank committed to contributing to climate change negotiations.

b. Non-mandated voluntary-membership business organisations:

- National Business Initiative: in collaboration with other companies to provide leadership and peer support in achieving energy efficiencies and reducing emissions, provide inputs to power conservation plans through medium term risk mitigation plan for electricity in South Africa, to standards, measurement and verification, investments in energy efficiencies, renewable and non-renewable energy sources and related developments, shared learning through best practices, including those emerging from CDP and CDP Water responses.

- World Business Council on Sustainable Development, which attempts to address concerns about government capacity to address sustainable development issues, lack of alignment of governmental policy, governance, poverty alleviation and its impact on consumption trends, climate change strategies to address energy scarcity while reducing GHG, REDDS, and science and technology innovation.

c. Environmental conservation organisations:

- WWF SA: BARLOWORLD participates in climate change roundtables to discuss adaptation and mitigation scenarios and strategies, renewable energy, water conservation.

d. Industry associations: BARLOWORLD's business units engage through their industry associations, as appropriate, concerning various climate change-related regulations, adaptation scenarios and strategies, levies, surcharges and taxes.

e. BARLOWORLD also engages directly with government structures. In SA on climate change related issues these are chiefly: SARS / National Treasury, Department of Energy, Department of Environment Affairs and Water, Department of Trade and Industry, National Energy Regulator.

f. BARLOWORLD also engages with analytical and performance review initiatives and organisations, completing requests for information from JSE SRI, CDP and CDP Water and UN Global Compact, as well as engaging with certain other international organisations, agencies and thought leaders from time to time.

- (ii) Where feasible or necessary, BARLOWORLD will comment on proposed policy or changes to regulatory environment that may adversely affect its operations, its stakeholders and/or jurisdictions in which it does business. Issues are complex and interrelated and it is important that policy and regulations are properly coordinated across broad government agendas, as well as responsible departments' development objectives.

Generally, BARLOWORLD advocates responsible, sustainable approaches to address energy security and climate change, including both mitigation and adaptation strategies, considering also business competitiveness and socio-economic development objectives, including being an attractive business/investment destination and job creation, in South Africa.

Principally feedback is provided through appropriate business and industry associations and participates in relevant structures.

Over last 24 months, SA government has begun to implement a policy and regulatory response to energy and GHG/climate change challenges. Planning and Strategy has included:

The National Climate Change Response Green Paper – Although committed to action to address climate change, BARLOWORLD's concerns include potential negative consequences for competitiveness of the economy and companies, the goal of delivering a better life for all which may be prejudiced, that CDMs should be considered, particularly for the transport and industrial sectors, and mandatory reporting proposed for 2013;

The Carbon Tax Discussion Paper – BARLOWORLD is committed to a process that ensures that right price signals are sent through supply- and demand-side measures, has voiced its concern about SA government's preference for a carbon tax over other carbon pricing mechanisms (including CDM, with this mechanism's capability for supporting the country's socio-economic development and job creation objectives), that no thresholds for eligibility for this tax are contained in the document, and the impact price of carbon will have on viability of its suppliers, customers and operations and on FDI into SA.

Targets and Initiatives

3.1 Did you have an emissions reduction target that was active (ongoing or reached completion) in the reporting year?

Intensity target

3.1b Please provide details of your intensity target

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Base year emissions (metric tonnes CO2e)	Target year	Comment
001	Scope 1+2	100%	12%	metric tonnes CO2e per unit revenue	2009	199053	2014	It is an aspirational target and based on a "business as usual" scenario which tracks turnover as a proxy for business activity. It is not anticipated that the target will be achieved in a linear manner on an annual basis, but will be reached by the end of 2014. The intention is to focus attention and drive commitment to improving energy and emission efficiency with concomitant benefits of positively contributing to climate change and realising cost savings.

3.1c Please also indicate what change in absolute emissions this intensity target reflects

ID	Direction of change anticipated in absolute Scope 1+2 emissions at target completion?	% change anticipated in absolute Scope 1+2 emissions	Direction of change anticipated in absolute Scope 3 emissions at target completion?	% change anticipated in absolute Scope 3 emissions	Comments
001	Increase	30.7%	No change	0%	It is anticipated that absolute emissions will increase by 30.7% over the target period, 2009 to 2014 but at a substantially lesser rate than a 'business as usual' scenario due to BARLOWORLD's aspirational efficiency targets.

3.1d Please provide details on your progress against this target made in the reporting year

ID	% complete (time)	% complete (emissions)	Comment
001	20%	0%	BARLOWORLD is currently below its aspirational target. It is not anticipated that this will be achieved in linear annual tranches but by the end of the group's 2014 financial year.

3.1e If no target, please explain (i) why not; and (ii) forecast how your emissions will change over the next five years

3.2 Does the use of your goods and/or services directly enable GHG emissions to be avoided by a third party?

Yes

3.2a Please provide details (see guidance)

BARLOWORLD and its principals are committed to providing customer solutions that assist customers meet their particular sustainable development objectives, including expectations and requirements in respect of climate change. Illustrations of customer solutions offered in this regard are reflected below.

BARLOWORLD Equipment distributes Caterpillar earthmoving equipment. Caterpillar's innovative ACERT® technology which was developed to meet American and European regulations restricting harmful emissions from diesel engines, is utilised in both "on highway" and "off-road" applications. ACERT technology in Cat engines ensures they are 3-5% more efficient. Since 1995, Cat technology has resulted in a 75% NOx and particulate reduction. Caterpillar's new earthmoving machine, D7E tractor, features the first all-electric drive train. A wide range of options exist to upgrade older diesel- and gas-powered Caterpillar 3500 engines.

BARLOWORLD Power is a recently established BARLOWORLD business unit which offers leading energy solutions to customers, including efficiency and renewable aspects. Generator sets can be retrofitted from mechanical to electronic fuel injection technology, providing fuel savings and associated reduction in GHG emissions. Retrofits can also provide latest electronic fuel system technology for Caterpillar D3600 generator sets, as an alternative to replacing them. BARLOWORLD OEM Caterpillar reports that worldwide their power generation products provide approximately 10.5 million MWh of electricity per year from renewable energy sources.

BARLOWORLD OEM NMHG, manufacturers of Hyster, is the largest volume producer of zero emission electric trucks in the US and offer lift trucks which operate on cleaner burning fuels such as LP, CNG and clean diesel. The XN electric truck series launched in 2009 use less energy than their predecessor in the Hyster range and offers up to 31% lower power consumption than equivalent competitor trucks.

In BARLOWORLD Automotive division, motor retail operations represent leading global vehicle manufacturers which continue to develop and introduce energy efficient vehicles, low emission vehicles, hybrid vehicles and electric vehicles. Also, offered in car rental fleets are hybrid vehicles such as Toyota's Prius which emits on average 89g CO2 per km. All fleets include latest vehicle models and technology, which results in general improvement in energy efficiency and emission reductions.

BARLOWORLD Logistics division provides, through the CAST-CO2 module of its leading supply chain design system, the ability to calculate and optimise carbon emissions from any supply chain model. The programme provides various optimisation scenarios of supply chains with transport modes, loads, inventories and routes which minimise carbon emissions. The CAST suite of solutions uses advanced mathematical modelling techniques to optimise supply chain networks. Logistics division also has an innovative green trailer design that has in its seven month trial reduced emissions by 10.6% on Johannesburg-Durban route. Plans are in place to increase the green trailer fleet.

BARLOWORLD measures and reports aspects of its business that contribute to climate change and strives to manage, avoid, reduce, switch and, as a final step, to offset these activities where and when appropriate. BARLOWORLD is not currently accessing CDM.

3.3 Did you have emissions reduction initiatives that were active within the reporting year (this can include those in the planning and/or implementation phases)

Yes

3.3a Please provide details in the table below

Activity type	Description of activity	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
Other	EE28 and EE29 BARLOWORLD is currently investing to increase its component rebuild facilities in South Africa and Russia in 2011. Rebuild and remanufacture initiatives proactively mitigate the disposal implications of BARLOWORLD group products. Remanufacturing returns end of life components to their original condition, reducing waste and minimising the need for raw materials and energy and emissions involved in producing new parts and machines. This keeps non-renewable resources in circulation for multiple lifetimes, with positively effects for Scope 3 emissions.	00	274 200 000	>3 years
Energy efficiency: building fabric	Continual retrofitting for energy and Scope 2 emissions efficiency improvements at existing facilities around the world - e.g. EE04 Equipment SA division's Isando Training Centre - Student Accommodation, which include: De-commissioning present hot water system consisting of 43 x 200 and 150 litre geysers and replace with 11 Heat Pump Water units; Lighting upgrade to energy saving units at Student Accommodation; Changing light fittings to energy saving luminaries Installation of timers and thermostats to manage usage of wall mounted panel heaters (once installed and alterations to main distribution board carried out). These initiatives have not been costed as a discrete project but are included in the general upgrade of facilities in 2011.	00	1 270 000	>3 years
Energy efficiency: building services	EE06 Power factor correction equipment is being installed at all major South African sites to reduce Scope 2 emissions. BARLOWORLD's new Power business unit has assisted sixteen SA sites to install 90 PowerWatch meters, a technology used to measure electricity use in real time, create awareness among users and manage peak demand periods. In addition, PowerWatch facilitates formal M&V (measurement and verification) and SATS 50010 compliance. This will enable companies to apply for tax allowances in respect of energy savings.	00	1 231 572	1-3 years
Energy efficiency: building fabric	Green building principles are incorporated into new building developments to reduce Scope 2 emissions: e.g. EE03 Automotive division's BMW Fountains Dealership new facility which incorporate: Energy savings light fittings Power factor correction equipment Air conditioning – inverter control mechanism, timers, variable speed mechanisms; Sunscreens to minimise impact on HVAC; Sun Energy clear windows. Projected savings are 30% on electricity costs over a 5 year period.	132 859	1 198 298	>3 years

Activity type	Description of activity	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
Energy efficiency: processes	EE30 160 servers in Logistics division were 'virtualised' in 2010, effecting an infrastructural savings of R7.8 million, reducing space and energy requirements. This has resulted in an energy savings of 1.1 million KWh and 6 tons of CO2e emissions.	00	964 000	<1 year
Energy efficiency: building services	Continual retrofitting for energy and Scope 1 emissions efficiency improvements at existing facilities around the world - e.g. EE07 Group corporate office, Barlow Park, additional retrofits and energy management initiatives completed in year under review and immediately planned: Geysers Blankets installed; Timers on water pumps and air cons; Switching off lights in unoccupied offices and meeting rooms; Installation of energy saving lights; Installation of motion sensors. In 2010 BARLOWORLD corporate headquarters won a bronze award in the inaugural Energy Cybernetics Energy Barometer Awards. Sixteen major South African companies competed in the head office category. Energy use at Corporate Office is 27% below national average. These awards were a new initiative to encourage companies to become aware of their energy consumption levels and to improve these in the interest of their own bottom lines as well as the national economy, whilst providing a platform for comparison and learning.	540 000	928 500	1-3 years
Other	EE23 Offsets for own use: In 2009 Avis Rent a Car South Africa achieved a CarbonNeutral® accreditation for offset of its internal fuel and energy usage CO2 emissions. In this regard 33 000 tons of carbon emissions have been offset by purchasing carbon credits in five Voluntary Carbon Standard (VCS) projects: Hufu waste heat recovery project in China, Govinderpuram wind power project in India, Unchindle-Mapanda reforestation project in Tanzania, Tieling coal mine methane project in China, and Maharashtra wind power project in India. Savings and payback period will be determined when cost of carbon is finally established in SA. Scope 1 and 2 emissions are offset.	00	747 825	>3 years
Energy efficiency: building fabric	Continual retrofitting for energy and Scope 2 (and AC Scope 3) emissions efficiency improvements at existing facilities around the world - e.g. EE05 Equipment Iberia premises: Upgrade to more efficient air conditioning systems; Replacement of old roofing - new roofing specified better insulation to reduce air conditioning costs and energy-related emissions; Upgrade to more energy efficient IT servers are estimated will save R191 043 in energy costs. These upgrades are taking place over 2010 and 2011 financial years. Generally investments are not ring-fenced but incorporated into operating cost base.	00	610 255	>3 years
Transportation: fleet	EE25 Logistics division's Green Trailer is an aerodynamically designed/modified truck and trailer unit to transport goods from Johannesburg to Durban which has effected a 10.6% fuel saving (with ensuing Scope 1 emissions efficiency) year-to-date. BARLOWORLD Logistics won the Enviro Award at the 2010 annual Logistics Achiever Awards for this project.	76 000	147 000	1-3 years
Energy efficiency: processes	EE11 At Handling UK Warrington site, introduction of computerised Clarke Control System for the heating system in the Warrington Workshop in 2011 will provide both operational and guaranteed savings benefits by reducing gas consumption and Scope 1 emissions by 25%.	59 370	59 370	1-3 years
Energy efficiency: processes	EE10 At Handling UK West Bromwich site, upgrade Vickers Energy Management System which currently controls warm air heating for building to provide both operational and guaranteed savings benefits reducing gas consumption and Scope 1 emissions by 18%. Initiative to be implemented in 2011.	85 757	34 303	1-3 years

Activity type	Description of activity	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
Behavioural change	EE01 BARLOWORLD works to create general awareness with employees and contractors on site about need to live sustainable lifestyles by reducing consumption, conserving energy and reducing emissions. A range of efforts are made to provide leadership and create awareness such as regular communications on progress on energy savings and emissions reduction. Practical information is provided on how employees can save energy and reduce or avoid emissions-generating activities, both in their work and private lives. They are encouraged, where possible, to switch off appliances and lights in rooms that are not in use. Limited use of individual office air conditioners is promoted, as is switching off all non-essential lights overnight, over weekends and holidays. Efforts are ongoing and scopes 1, 2 and 3 emissions are affected.	00	00	<1 year
Behavioural change	EE08 Reporting limited Scope 3 business travel has resulted in closer monitoring of business travel across group, with consequence Scope 3 emissions savings.	00	00	<1 year
Behavioural change	EE12 Company policy change: In Handling division, environmentally-led changes in the company fleet policy and use over last 12 months have resulted in a 6% decrease in average Scope 1 emissions from use of diesel in UK company car fleet (219 vehicles) (from 147 to 138 gm per km). Prescribed driving methods and installation of speed limiters in company vehicles have also contributed to these emissions efficiency gains.	00	00	<1 year
Energy efficiency: building fabric	EE02 Continual retrofitting for energy and Scope 2 emissions efficiency improvements at existing facilities around the world: A number of sites are improving building insulation: installing double glazing on windows and translucent roof sheeting to aid natural lighting. Solar water heaters and 'smart' lighting are being investigated at some of our sites. Costs are not generally ring-fenced but incorporated into ongoing cost bases of BARLOWORLD companies.	00	00	>3 years
Energy efficiency: processes	EE09 Behaviour change of facilities and security personnel and employees is encouraged through sharing best practice across the group and through Power business unit's energy and emissions advisory services. Behaviour change includes: Managing monitoring and reporting of energy consumption; Ensuring monthly meter readings are provided to utility suppliers so consumption can be monitored; ensuring that consumption is aligned with PowerWatch or other power factor correction equipment readings for accuracy of billing and reporting. Efforts are ongoing and scopes 1, 2 and 3 are affected.	00	00	<1 year
Energy efficiency: processes	EE13 Group-wide reduction in paper usage (1 075 867 kgs 2009 to 906 039 kgs 2010) due to IT and operational changes and leading to reductions in Scope 3 emissions, e.g. printers settings to print double-sided, tightened controls around issuing of paper reams to staff for copier machines and printers, annual and interim reports available to shareholders electronically on request, electronic newsletters, sending correspondence, customer invoices and statements by e-mail instead of printing and posting. Most waste paper in the group is recycled.	00	00	<1 year
Energy efficiency: processes	EE15 Efforts to optimise transport logistics have saved fuel, emissions and working days. Scopes 1, 2 and 3 emissions are positively affected and efforts are ongoing. In 2010 BARLOWORLD Logistics released CINO (Combined Inventory and Network Optimisation) tool, and continued to run significant client interventions with its CAST CO2 software, which can be used anywhere in world to measure and optimise	00	00	<1 year

Activity type	Description of activity	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
	impact of a supply chain network on carbon emissions. In SA BARLOWORLD Logistics and key customer Nike won a Platinum Award for excellence in supply chain management and logistics for performance on Nike 2010 FIFA World Cup contract.			
Energy efficiency: processes	EE16 Materials, water, energy and waste management programmes are undertaken at site and division level, many of which involve employees, such as BARLOWORLD Equipment's "War on Waste" and Avis' "Earth Champions" campaigns. Scope 1, 2 and 3 emissions are positively affected and efforts are ongoing.	00	00	<1 year
Other	EE14 Video and audio conferencing has continued to replace business travel, where feasible, facilities are continually being upgraded and usage by duration has increased through the group's headquarters by 27% and 32% for video and audio respectively 2010 over 2009. Scope 3 emissions are positively affected and efforts are ongoing.	00	00	<1 year
Other	EE17 BARLOWORLD is a signatory to voluntary Energy Efficiency Accord with Department of Energy and other businesses in South Africa, which originally committed the group to a 15% efficiency improvement in Scope 1 and 2 emissions intensity off a 2004 baseline. BARLOWORLD has since divested from a number of companies, among them relatively high emitter PPC, which resulted in a change in the group's operating profile, emissions being substantially reduced. Consequently, a revised voluntary aspirational efficiency target has been set. Nevertheless, this early adoption of energy efficiency objectives has assisted in enlightening executives and employees on climate change issues and focusing the group on embedding climate change issues into environmental policies, systems and processes to measure, manage and report energy and water consumption and emissions.	00	00	<1 year
Other	EE18 Voluntary mitigation actions: BARLOWORLD has committed to 12% energy efficiency and Scope 1 and 2 emissions intensity improvement targets against a business as usual trajectory over 5 years off a 2009 base year. Comprehensive energy management plans are in place and a portfolio of efficiency projects established. As necessary, this has involved energy audits, installation of additional meters and systems to manage power demand. Where costs are incurred in effecting these efficiencies, they are regarded as part of operational cost base. Targeted gross opportunity savings over a 5 year period are R200m to R300m. However, due to inelasticity in certain base consumption levels across divisions, efficiency gains in energy consumption, achievements against emissions and savings targets across group are not expected to be linear on an annual basis.	00	00	>3 years
Other	EE19 Voluntary mitigation actions: Handling Netherlands and Belgium sites have joining local "Lean and Green" organised business initiatives which commit them to reductions in Scope 1, 2 and 3 CO2e emissions over defined periods along with other industry champions.	00	00	>3 years
Other	EE20 In Handling US, a multi-disciplinary "Green Team" has been formed to explore and disseminate best practice, including energy and emissions efficiencies. Scope 1, 2 and 3 emissions are anticipated will be positively affected and efforts are ongoing.	00	00	>3 years

Activity type	Description of activity	Annual monetary savings (unit currency)	Investment required (unit currency)	Payback period
Other	EE21 Leadership and awareness: Information on sustainability is included in BARLOWORLD's induction, leadership and executive development programmes, which provide platforms to inculcate BARLOWORLD's values and culture and to share strategic information with new employees, identified talent and future leaders, senior managers and executives in the group. Content specifically addresses the imperatives and operational elements of responsible corporate citizenship. In terms of the group executive and leadership development programmes (EDP and LDP), action learning projects are an important element of the programme and address strategic issues for the group. Teams of delegates are tasked with evaluating issues which have been identified as being strategically important for the group. Formal feedback is given to group executives, including the group and divisional CEOs. In many instances these projects are incorporated into strategic plans and operations of the relevant divisions. In 2010 the winning project was on renewable energy offerings and solutions that could be provided by BARLOWORLD. These programmes are continual and Scope 1, 2 and 3 emissions could be positively affected.	00	00	>3 years
Other	EE22 Awareness and leadership: BARLOWORLD's Global Leaders Conference draws together executive and senior management from across the group and has a significant role in developing sustainable competence and intellectual capital that the group requires to achieve its vision and fulfil its value creation objectives. In 2010 plans were underway to host a conference in March 2011 which would include a full session dedicated to sustainable development and a working group breakaway session dedicated to achievement of aspirational energy and emissions efficiency targets and savings. In the event, many of the recommended strategies and actions which emerged from the "White Space" sessions involved issues which were intended to underpin the group's sustainable development, including mitigation and adaption to climate change. This is a regular event in the group calendar and Scope 1, 2 and 3 emissions could be affected.	00	00	>3 years
Other	EE24 Tree planting (usually indigenous) projects are undertaken each year at group level and by Avis, and Scope 1, 2 emissions are sequestered. Employee volunteers also work with conservation bodies.	00	00	>3 years
Transportation: fleet	EE26 Avis car rental operations in South Africa are involved in research into propelling some of the group's fleets with electricity, as well as compressed natural gas or hydrogen, the latter technologies which have lower GHG emissions. Projects are still in experimental stages; however, it is intended that Scope 3 emissions will be positively affected.	00	00	>3 years
Transportation: use	EE27 Scope 3 carbon emissions offsets for customers: Car rental operations in SA already provide information on emissions generated in car rentals by their customers on their invoices and intend to offer their customers the opportunity to purchase carbon credits to offset these emissions in near the future.	00	00	1-3 years

3.3b What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Compliance with regulatory requirements/standards	Ensure full compliance with regulatory requirements / standards, and have established targets / commitments in support of these.
Dedicated budget for energy efficiency	Costs of energy efficiency initiatives are not at this stage generally ring-fenced but incorporated into standard budgets and ongoing cost base of BARLOWORLD companies.
Dedicated budget for low carbon product R&D	Logistics division's development of CINO (Combined Inventory and Network Optimisation) tool, CAST CO2 software, Green Trailer, an aerodynamically designed/modified truck and trailer unit , and new Power business unit's customer offerings which provide energy efficiency, energy demand management and emissions management services.
Dedicated budget for other emission reduction activities	Currently employing MARSO approach: measure, avoid, reduce, switch and, finally, offset. Dedicated budgets for offsetting, if and when appropriate, are likely to be a consideration.
Employee engagement	Internal and external communication strategies developed. Employee engagement used as a means to drive behaviour change that will result in greater awareness and energy savings. Appointment of specific employees, or sustainability champions, to communicate and liaise at division level, monitor and measure usage/emissions. Their functional responsibilities are managed through a group-wide, integrated performance scorecard system, with short- and long-term incentive schemes. Management practices include detailed measurement of material aspects of activity and consistent, transparent and comparable reporting. Communication on initiatives and progress, as well as pertinent relevant information takes through management meetings, performance ownership meetings, 'green' community of practice meetings, publications, intranet sites, screen savers, posters, exhibitions and newsletters. Communications initiatives share information on energy consumption/ emissions/ costs by branch or division and disseminate information on best practice.
Financial optimization calculations	Incorporated into feasibility studies and capital vote applications. All new property developments to incorporate sustainable "green building" principles which are based on optimal financial calculations. As a Logistics division business offering, operational optimisation is effected through network optimisation, which includes financial optimisation.
Internal price of carbon	Savings targets linked to energy efficiencies have been established as one of the group's key priorities, tracked and reported into risk and sustainability and executive committees twice a year. Employees have access to a carbon calculator on the intranet. These methods are used to create awareness of the total cost of energy, current and future.
Internal incentives/recognition programs,	Group, division, team and individual aligned strategies, objectives, KPI's, scorecards, incentives and recognition awards.
Other	Functional responsibilities are managed through a group-wide, integrated performance scorecard system which includes sustainable development aspects, and defined climate change objectives. An aspirational target of a 12% improvement in non-renewable fossil fuel and GHG emission efficiencies has been set off a 2009 baseline year. BARLOWORLD has developed models to predict and assess its performance in this respect, which is monitored on an ongoing basis.
Partnering with governments on technology development	SA government has introduced a tax allowance for energy efficiency savings governed under section 12L of the Income Tax Act, No.58 of 1962 which is expected to be operational towards the end of 2011. Accelerated depreciation for investments in renewable energy has also been allowed. SA Department of Trade and Industry is including energy efficiency requirements in new tax incentives. For example, section 12I of the Act sets out an incentive for industrial policy projects that manage to meet energy efficiency requirements. Although not yet accessed, BARLOWORLD operations are considering these aspects in their respective business models, strategic plans and in developing customer offerings.

Method	Comment
Marginal abatement cost curve	Whilst not yet being pursued or implemented, emissions trading could reduce the group's or group companies' overall cost of compliance with emission constraints by taking advantage of differences in marginal abatement costs across different emission sources.

Communication

4.1 Have you published information about your company's response to climate change and GHG emissions performance for this reporting year in other places than in your CDP response? If so, please attach the publication(s)

Publication	Page/Section Reference	Identify the attachment
In annual reports (complete)	Underscoring our sustainability Pages 7, 11, 15, 20, 24, 27-28, 37, 40, 41-42, 46-47, 50, 54-55, 57, 60, 63, 65, 67, 100, 111, 112, 122-136, general: 98-161	Barloworld full annual report 2010
In voluntary communications (complete)	Not in public domain	JSE SRI 2010 response
In voluntary communications (complete)	Avis web address: Our sustainability journey	http://www.aboutavis.co.za/main.aspx?ID=1332
In voluntary communications (complete)		Briefing Barloworld: Barloworld's commitment

Attachments

- [https://www.cdproject.net/Sites/2011/29/1529/Investor CDP 2011/Shared Documents/Attachments/InvestorCDP2011/4.Communication/Barloworld full annual report 2010.pdf](https://www.cdproject.net/Sites/2011/29/1529/Investor%20CDP%202011/Shared%20Documents/Attachments/InvestorCDP2011/4.Communication/Barloworld%20full%20annual%20report%202010.pdf)
- [https://www.cdproject.net/Sites/2011/29/1529/Investor CDP 2011/Shared Documents/Attachments/InvestorCDP2011/4.Communication/Briefing Barloworld Issue 2 \(sustainability\).pdf](https://www.cdproject.net/Sites/2011/29/1529/Investor%20CDP%202011/Shared%20Documents/Attachments/InvestorCDP2011/4.Communication/Briefing%20Barloworld%20Issue%20(sustainability).pdf)

Module: Risks and Opportunities [Investor]

Climate Change Risks

5.1 Have you identified any climate change risks (current or future) that have potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply

- ✓ Risks driven by changes in regulation
- ✓ Risks driven by changes in physical climate parameters
- ✓ Risks driven by changes in other climate-related developments

5.1a Please describe your risks driven by changes in regulation

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Reg05	Carbon taxes	SA govt is considering further carbon taxes, details of which will be announced in the 2012 budget. Implementation will be either up- or downstream of emissions. SA National Treasury's December 2010 discussion paper on carbon tax mentions a tax of R75 per ton of CO2 with an increase to around R200 per ton CO2 at 2005 prices. The Integrated Resource Plan 2010 suggests a price of R165 per ton CO2 as a carbon tax. If implemented downstream on direct emissions, in SA estimated at R165 ton = R24.8m p.a. additional cost to BARLOWORLD. Carbon tax at this level will have significant negative implications for economic activity, for BARLOWORLD, its customers and suppliers.	Increased operational cost	1-5 years	Direct	Very likely	High
Reg06	Carbon taxes	SA govt is considering further carbon taxes, details of which will be announced in the 2012 budget. Implementation will be either up- or downstream of emissions. SA National Treasury's December 2010 discussion paper on carbon tax mentions a tax of R75 per ton of CO2 with an increase to around R200 per ton CO2 at 2005 prices. Integrated Resource Plan 2010 suggests a price of R165 per ton CO2 as a carbon tax. If levied upstream on fossil fuels, a tax rate of R165 per ton CO2 would have following effects	Increased operational cost	1-5 years	Direct	Very likely	High

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		<p>on SA fuel costs: Price of electricity could increase by R165 per MWh = an addition cost of R9.9m p.a. to BARLOWORLD (R34b p.a. in additional tax to government) (based on Eskom's 2010 Annual Report); Price of diesel could increase by R434 per kl = an additional cost of R8.4m to BARLOWORLD (R1b p.a. in additional tax to government) (based on Econex diesel consumption figures for 2009); Price of petrol could increase by R381 per kl = an additional cost of R3.7m to BARLOWORLD (R955m p.a in additional tax to government) (based on Econex petrol consumption figures for 2009). This would result in an additional R22m p.a. to BARLOWORLD - overall, an additional cost of R36b to SA business - in fuel costs. Carbon tax at this level will have significant negative implications for economic activity, for BARLOWORLD, its customers and suppliers. The country's socio-economic development and job creation objectives would be compromised. A tax rate of R100 per ton CO2 would have the following impact: Price of electricity could increase by R100 per MWh = an additional cost of R6m p.a. to BARLOWORLD (R20b p.a. in additional tax to government) (based on Eskom's 2010 Annual Report). Price of diesel could increase by R263 per kl = an additional R5.1m p.a. to BARLOWORLD (R579m p.a. in additional tax to government) (based on Econex diesel consumption figures for 2009). Price of petrol could increase by R231 per kl = an additional R2.3m to BARLOWORLD (R647m p.a. in additional tax to government) (based on Econex petrol consumption figures for 2009). This would result in an additional R13.4m p.a. to BARLOWORLD in fuel costs - overall, an additional tax income to government of R21.2b. Energy security for the man-in-the-street would be</p>					

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		compromised due to lack of affordability. Carbon taxes transferred into energy costs would need to be factored into operating costs and pricing, leading to price inflation.					
Reg16	International agreements	At the UN Climate Change Summit in Copenhagen at the end of 2009, SA committed to emission reduction targets of 34% by 2020 and 42% by 2025, dependent on, among other things, receipt of technical and financial assistance. While BARLOWORLD is mindful of the impact its commercial activities have on the environment, the seriousness of climate change and the need for this to be addressed, 150 150 tons or 74% of BARLOWORLD's CO2e emissions (60.4% of revenue) are in South Africa, a country which relies heavily on coal-generated energy. It is believed that the greater part of responsibility for achieving country targets imposed will be passed on to the private sector, in one way or another, affecting BARLOWORLD financially as well as its principals and customers.	Increased operational cost	1-5 years	Direct	Likely	High
Reg26	Voluntary agreements	Reputation risk, increased cost of doing business due to possibly not attaining targets, or requiring significant capital expenditure in new technologies to achieve them. In the event that targets are not met, possible 'green washing' allegations would negatively affect the group's reputation.	Reduced demand for goods/services	Current	Direct	Unlikely	High
Reg01	Air pollution limits	BARLOWORLD considers air pollution standards around the world as both a risk and an opportunity. Caterpillar's innovative ACERT® technology was developed to meet American and European regulations restricting harmful emissions from diesel engines, utilised in both "on highway" and "off-road" applications, as well as Caterpillar's new earthmoving machine, D7E tractor, which features an all-electric drive train. Hyster is the largest volume producer of zero emissions electric trucks in North America and offers lift trucks which operate on cleaner burning alternative fuels such as LP, CNG and clean diesel. However, customer offerings may become uncompetitive	Reduced demand for goods/services	Current	Direct	Exceptionally unlikely	Medium-high

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		unless pollution limit specifications are anticipated and met by the group's products across multiple geographies.					
Reg08	Fuel/energy taxes and regulations	Policy and financial instruments intended to facilitate energy security and emissions reduction may have a significant negative impact on economic activity.	Reduced demand for goods/services	1-5 years	Indirect (Client)	Very likely	Medium-high
Reg10	General environmental regulations, including planning	Although the group's Scope 1 and Scope 2 emissions are fairly limited (201 733 CO2e tons in 2010) as it is primarily engaged in equipment and motor retail, after-market and logistics' activities, its customer industry segments are, using the group's products, significant sources of Scope 3 emissions. Reputation risk, increased cost of doing business due to possibly not attaining targets, or requiring significant capital expenditure in new technologies to achieve them. In the event that targets are not met, possible 'green washing' allegations.	Reduced demand for goods/services	1-5 years	Indirect (Supply chain)	Very unlikely	Medium-high
Reg25	Uncertainty surrounding new regulation	Energy and/or clean energy costs may rise sharply in response to regulatory pressure.	Increased operational cost	1-5 years	Direct	More likely than not	Medium-high
Reg22	Product labelling regulations and standards	The requirement to include carbon footprint data on product labels would be a short term risk as suppliers conform.	Reduced demand for goods/services	1-5 years	Direct	More likely than not	Medium
Reg23	Uncertainty surrounding new regulation	Costs associated with responsibility to dispose of products may become significant.	Increased operational cost	1-5 years	Indirect (Supply chain)	More likely than not	Medium
Reg24	Uncertainty surrounding new regulation	Possible or impending changes to regulatory framework: Create uncertainty in business environment; Impose additional administrative burden; Impose additional operating cost; Impact business decisions on issues such as competitive products, services and customer offerings, sectors in which to operate, business models and optimal locations; Operating across a number of industries and under many jurisdictions presents challenges in adapting group standards and strategies.	Increased operational cost	1-5 years	Direct	More likely than not	Medium
Reg12	General environmental regulations,	Customers' continued use of products and services that BARLOWORLD offers as a brand manager will depend on the extent and pace at which the group's principals and	Reduced demand for goods/services	Current	Direct	Exceptionally unlikely	Medium

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
	including planning	group companies can introduce new technology in products, adapt existing products, services and solutions so that offerings do not become uncompetitive in a carbon-constrained market-place.					
Reg14	General environmental regulations, including planning	Due to complexity and the changing nature of regulations which govern many of BARLOWORLD's activities, including those regulations related to climate change, across industries and geographical spectrum of the group's activities, there are risks of not staying abreast of all developments and maintaining full compliance.	Inability to do business	Current	Direct	Exceptionally unlikely	Medium
Reg15	International agreements	The United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol have set targets and timeframes for reductions in emissions for GHG's and, although agreement on further targets could not be reached at Copenhagen, the context has been set for country-based emission targets in future. These country-based commitments to emission reductions present physical, financial, technological and reputational challenges for BARLOWORLD as well as its principals and customers and their continued viability.	Reduced demand for goods/services	Current	Direct	Exceptionally unlikely	Medium
Reg04	Carbon taxes	The levy on electricity generated from non-renewable sources, a pre-existing carbon tax, was increased in April 2011 from 0.5c to 2.5c per KWh. In February 2010 in SA annual increases in Eskom's electricity tariff of 24.8%, 25.8% and 25.9% for 2011 to 2013 respectively were approved by the National Energy Regulator. Increased electricity costs will bring to bear inflationary pressures and negatively impact economic activity.	Increased operational cost	Current	Direct	Virtually certain	Low-medium
Reg09	General environmental regulations, including planning	New regulations, including regulations that involve transfer or sharing of risk, may complicate procedures and/or lengthen waiting periods for obtaining licences, applying for tenders or finance, presenting future business constraints.	Increased operational cost	1-5 years	Direct	Likely	Low-medium
Reg03	Carbon taxes	CO2 Emissions Tax implemented in 2010 on new passenger vehicles has been passed on to customers as an up-front, one-off cost, resulting in price inflation rather than a shift in consumer behaviour to achieve energy and emissions efficiency.	Reduced demand for goods/services	Current	Direct	Virtually certain	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Reg07	Emission reporting obligations	Mandatory reporting of GHG emissions adds to the administrative burden on enterprises, particularly when same information may need to be supplied using different definitions through several channels. Reporting obligations should be aligned. The SA National Climate Change Response Green Paper mentions development of a GHG reporting framework for SA by 2013 which will require significant emitting companies to submit GHG emission data to the National Atmospheric Emission Inventory. The emission thresholds for submission of this data have not yet been communicated.	Increased operational cost	1-5 years	Direct	Very likely	Low
Reg02	Cap and trade schemes	Corruption and lack of capacity to manage cap and trade schemes, particularly in emerging markets, may present challenges. Carbon markets may be susceptible to undue influence by vested interests, e.g. over-allocation in EU of carbon permits may have contributed to record profits reported by Europe's largest power producers. Cost of verification is reported as a major constraint to CDM, particularly in developing countries such as SA.	Increased operational cost	1-5 years	Direct	Unlikely	Low
Reg18	International agreements	BARLOWORLD's emissions from operations in Australia represent 3% of 5 692 tons CO ₂ e of its carbon footprint (9.2% of revenue). Australia committed to a 5 to 15%, or 25%, reduction in GHG emissions by 2020 from 2000 levels in ICC negotiations. Their Carbon Pollution Reduction Scheme and Carbon Tax - Aimed at reducing Australia's carbon emissions, government's CPRS is a cap-and-trade emissions trading scheme meant to become operational in 2010. However, it has been rejected in Parliament twice and introduction has been put on hold until after the end of 2012 when there is greater clarity on climate change legislation in the international arena going forward. BARLOWORLD's Australian facilities are at their current levels below the 25 000 tons p.a. threshold for compliance. However, the group could be impacted through its supply chain. In February 2010, government announced a carbon tax from July 2012, to be implemented over a 3 to 5 year period, after	Increased operational cost	Current	Direct	Very unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		<p>which the country will switch to the proposed cap-and-trade system.</p> <p>The price of carbon has not been set but is likely to be around \$A25 per tonne CO2 (theoretically, an additional tax to BARLOWORLD Australia at current level of emissions = R1.1m p.a.), with funds earmarked to assist businesses and households in transition to renewable energy.</p>					
Reg19	Lack of regulation	<p>Africa's carbon emissions represent 4% of total global emissions and South Africa is responsible for about half of those.</p> <p>Most African countries do not have climate change legislation - in 2009, World Energy Council surveyed 15 countries in Africa which are responsible for 75% of total African carbon inventory, of which only 6 had energy efficiency programs and quantitative targets. However, Africa is growing rapidly and there is acknowledgement of need to develop along a low carbon trajectory.</p> <p>There is also need for financing to flow from developed countries to Africa and the progression of climate change and energy efficiency programmes might be a condition for this finance.</p> <p>BARLOWORLD has operations (which generate 6% or 12 599 tons CO2e of its emissions, and 9.7% of its revenue) and a wide customer base operating in African countries other than SA which might be impacted by climate change and energy efficiency regulations.</p>	Increased operational cost	6-10 years	Indirect (Client)	Very unlikely	Low
Reg20	Lack of regulation	<p>BARLOWORLD's operations in US generate 1% of its emissions or 2 951 tons CO2e and 3.5% of its revenue.</p> <p>In Copenhagen Accord, US committed to an emission reduction of 17% from 2005 levels by 2020. However, US currently has no national climate change legislation, although there have been a number of bills drafted and rejected or held up, e.g. American Clean Energy and Security Bill (Waxman Markey Bill) and American Power Act. A number of states have introduced climate change regulations and programmes.</p> <p>Their Environmental Protection Agency (EPA) has included GHG's in the Clean Air Act which regulates pollutants that</p>	Increased operational cost	6-10 years	Indirect (Supply chain)	Very unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		have global warming potentials and introduced standards for vehicle emissions in 2010. The unknown future direction of US's action, regulatory or otherwise, on climate change presents potential financial, technological and reputational challenges for the group.					
Reg17	International agreements	UK committed to a 20% to 30% reduction in GHG emissions by 2020 from 1990 levels under the Copenhagen Accord. Domestically, the target is 34% reduction by 2020 and 80% by 2050 from 1990 levels. 10% or 20 719 tons of BARLOWORLD's CO2e emissions are from its operations in UK and EU, and 17.2% of its revenue. In April 2010, the UK government launched the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme, a mandatory climate change and energy saving scheme which places a price on carbon emissions to ensure energy efficiency and encourage mitigation of carbon emissions. Organisations that consumed more than 6,000 MWh p.a. of half hourly metered electricity during 2008 are eligible. Organisations with consumption below the threshold make mandatory disclosures to the scheme. All group Handling facilities in UK have registered for scheme but currently fall inside the 6,000 MWh threshold. There are financial penalties for not conforming with the various requirements of the scheme, one of which is failure to keep adequate records on emissions.	Increased operational cost	Current	Direct	Very unlikely	Low
Reg21	International agreements	SA government and NGO efforts to demonstrate gains ahead of COP 17 in South Africa in December 2011 is resulting in pressure to 'fast track' policies, regulations, voluntary agreements and solutions. If these are not well considered (with full impact analyses) and equitable, country solutions to climate change may not be successful.	Increased operational cost	Current	Direct	Very unlikely	Low
Reg11	General environmental regulations, including planning	Customer offerings may become uncompetitive due to a shift in customer preferences in response to government introduced disincentives (or incentives) intended, for example, to move road freight to rail and/or effect a passenger modal shift to public transport.	Reduced demand for goods/services	1-5 years	Direct	Exceptionally unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Reg8a	Fuel/energy taxes and regulations	Increased road transportation costs would shift demand to rail transportation, negatively affecting the group's trucking and road based logistics operation	Reduced demand for goods/services	1-5 years	Direct	Very likely	Medium-high
Reg24	Uncertainty surrounding new regulation	<p>Possible or impending changes to regulatory framework:</p> <ul style="list-style-type: none"> ○ Create uncertainty in business environment; ○ Impose additional administrative burden; ○ Impose additional operating cost; ○ Impact business decisions on issues such as competitive products, services and customer offerings, sectors in which to operate, business models and optimal locations; ○ Operating across a number of industries and under many jurisdictions presents challenges in adapting group standards and strategies. 	Inability to do business	1-5 years	Direct	More likely than not	Medium

5.1b Please describe (i) the potential financial implications of the risk before taking action; (ii) the methods you are using to manage this risk; and (iii) the costs associated with these actions

Reg01-26

- (i) Financial implications relate to loss of revenue as consequence of reputational damage due to non-compliance and inability to provide competitive customer solutions, and increased costs structures as result of increased taxes, levies and surcharges and investment to meet required standards and related obligations. Where meaningful estimation is possible, attempts to quantify financial implications are made, otherwise BARLOWORLD records risk and benefits for proactive identification and awareness. Financial implications of climate change risks are not ring-fenced but incorporated into ongoing activities, revenue and cost bases of BARLOWORLD companies.
- (ii) In assessing impact and likelihood of risks for CDP response, control factors have been taken into account. Management of risk is embedded in BARLOWORLD's commitment to long term value creation for all its stakeholders, an integrated management approach that requires accountability and responsibility for economic, social and environmental aspects of business activity, an entrenched risk management approach, stakeholder engagement and a planning framework that focuses on BARLOWORLD's 6 strategic focus areas: Integrated customer solutions, people, empowerment and transformation, sustainable development, financial returns and profitable growth. Sustainable development strategic focus positions climate change and related aspects as central to success of group's long term value creation objectives. Identification and management of risks are embedded in ongoing management of group which includes decentralised local attention and group consolidation and review. Close relationships with world class principals ensures competitive advantage and ability to provide integrated customer offerings incorporating latest energy emissions efficiency technology which mitigate customers' risk.
- (iii) Costs directly relating to climate change issues are incorporated into ongoing activities and cost base of BARLOWORLD companies, as actions which address climate change are regular management activities. In some instances these are identifiable; however these actions invariably deliver a range of benefits which are broader than narrowly defined climate change. Where costs are incurred in offering products and services that address climate change,

environmental footprint, energy and emission efficiencies, they are regarded as part of operational cost base. Generally these costs would include increased cost of energy, additional taxes and levies and investment in energy efficiency initiatives

Air pollution limits Reg01

- (i) Loss of revenue, increased cost base
- (ii) Continual review and improvement of customer solutions. Implementation of internal energy and emission efficiencies and controls.
- (iii) Incorporated into operational cost base of company and its principals.

Cap and Trade schemes Reg02

- (i) Loss of revenue. Increased cost base
- (ii) Continual review and improvement of customer solutions. Implementation of internal energy and emission efficiencies and controls.
- (iii) Incorporated into operational cost base of company and its principals.

Carbon taxes Reg03, Reg04, Reg05, Reg06

- (i) Internally, proposed downstream taxes in South Africa at R165 per ton would have added an additional cost of R24.8m to group in 2010. If levied upstream, cost (due to increased fuel and electricity costs) would have been R22m. Loss of revenue may also result as customers are negatively affected.
- (ii) In 2005 BARLOWORLD signed Energy Efficiency Accord in South Africa and in 2009 group implemented an aspirational target of a 12% improvement in non-renewable fossil fuel and GHG emission efficiencies off a 2009 baseline year. Concurrently, group implemented a strategic approach to managing its carbon footprint under acronym MARSO: measure; avoid, reduce, switch, offset. Also included is a continual review and improvement of customer solutions.
- (iii) Incorporated into operational cost base of company and its principals. Costs relating to group's current carbon offset programme were R747 825 in 2010.

Emissions reporting obligations Reg07

- (i) Increased cost base
- (ii) Standardised reporting structures based on GHG Protocol
- (iii) Incorporated into operational and reporting cost base of company

Fuel/Energy taxes and regulations Reg08, 08a

- (i) Internally, proposed downstream taxes in SA at 165 per ton = additional R24.8m cost to group in 2010. If levied upstream, cost (due to increased fuel and electricity costs) = R22m. Loss of revenue may also result as customers are negatively affected.
- (ii) In 2005 BARLOWORLD signed Energy Efficiency Accord in South Africa and in 2009 group implemented an aspirational target of a 12% improvement in non-renewable fossil fuel and GHG emissions (Scope 1 and 2) efficiencies off a 2009 baseline year. Concurrently, BW implemented approach to managing carbon footprint MARSO: measure, avoid, reduce, switch, offset. Continual review and improvement of customer solutions
- (iii) Incorporated into operational cost base of company and its principals

General environmental regulations including planning Reg09, Reg10, Reg11, Reg14

- (i) Loss of revenue, increased cost base
- (ii) Diversification (customer offerings, geography, industries and principals)
- (iii) Incorporated into operational cost base of company and its principals

International agreements Reg15, Reg16, Reg17, Reg18

- (i) Loss of revenue, increased cost base
- (ii) Diversification (customer offerings, geography, industries and principals)

(iii) Incorporated into operational cost base of company and its principals

Lack of regulations Reg19, Reg20

- (i) Loss of revenue, increased cost base
- (ii) Implemented internal energy and emission efficiency targets. Diversification (customer offerings, geography, industries and principals)
- (iii) Incorporated into operational cost base of company and its principals

Other regulatory drivers Reg21

- (i) Loss of revenue, increased cost base
- (ii) Engage in process
- (iii) Incorporated into operational cost base of company and its principals

Product efficiency regulations and standards Reg12

- (i) Loss of/increased revenue
- (ii) Continual review and improvement of customer solutions. Implementation of internal energy and emission efficiencies and controls. Diversification.
- (iii) Incorporated into operational cost base of company and its principals

Product labelling regulations and standards Reg22

- (i) Loss of/increased revenue
- (ii) Continual review of regulations and standards with OEM's
- (iii) Incorporated into operational cost base of company and its principals

Uncertainty surrounding new regulations Reg23, Reg24, Reg25

- (i) Loss of revenue. Increased cost base
- (ii) Engage in process. Continual review and improvement of customer solutions. Implementation of internal energy and emission efficiencies and controls. Diversification. Incorporated review and improvement of customer solutions. Implementation of internal energy and emission efficiencies and controls. Diversification
- (iii) Incorporated into operational cost base of company and its principals

Voluntary agreements Reg26

- (i) Loss of revenue, increased cost base
- (ii) Remain engaged in process Implementation of internal energy and emission efficiencies and controls
- (iii) Incorporated into cost base

5.1c Please describe your risks that are driven by change in physical climate parameters

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph01	Change in mean (average) precipitation	Shortages (and consequential prices increases) of water are a risk for the group as an important aspect of its business model in all operations is the washing and cleaning of equipment, plant and motor vehicles. Customers may also be negatively affected, particularly opencast mining operations in the event of increased precipitation levels. Increased rain may also lead to an increase in car rental vehicle accidents which affects fleet utilisation, reduce resale of repaired vehicles and may result in additional injuries to customers. Increased insurance premiums would result.	Increased operational cost	1-5 years	Direct	Likely	Low-medium
Ph17	Uncertainty of physical risks	Could result in a cautious approach by the group, its customers and supply-chain, delayed decision making by such parties and lost opportunities. Could also increase insurance premiums and delay investment decisions.	Reduced stock price (market valuation)	Current	Direct	Likely	Low-medium
Ph07	Change in precipitation pattern	These patterns could mean a combination of decreased or increased precipitation, change in timing and extreme patterns. Any of these would negatively affect operations, the extent of which would be in concert to the severity of the change. Customers would be similarly affected resulting in both internal pressures and change in customer demand patterns. Similarly, these would also impact the group's supply chain negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Reduced demand for goods/services	Current	Direct	Likely	Low
Ph09	Change in temperature extremes	This could affect working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Severe heat or cold could result in unsafe working environments and ultimately stop operations. Temperatures beyond safe operating ranges for plant, equipment and vehicles would also halt operations. Customers would be similarly affected which may require a reallocation of expenditure and resources which could reduce demand. Similarly, these would also impact the group's supply chain negatively, affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Increased operational cost	6-10 years	Direct	Likely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph13	Sea level rise	This could damage harbour infrastructure and disrupt low-lying areas and industries, with negative consequences on BARLOWORLD's supply chains as significant amount of plant and equipment is transported by sea. Optimal and efficient routes may be affected.	Increased operational cost	>10 years	Indirect (Supply chain)	Likely	Low
Ph15	Snow and ice	This could affect the working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Severe snow and ice could result in unsafe working environments and ultimately stop operations. Temperatures below safe operating ranges for plant, equipment and vehicles would also halt operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.	Increased operational cost	Current	Direct	Likely	Low
Ph16	Tropical cyclones	These would cause physical damage to facilities, result in unsafe working environments and ultimately stop operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Increased operational cost	Current	Direct	Likely	Low
Ph03	Change in mean (average) temperature	This could affect working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Customers would be similarly affected, which may require a reallocation of resources and reduce demand. If extreme, operation of plant, equipment and vehicles would be negatively affected. It may also require a new technology in required customer solutions which competitors may provide more competitively. These would also impact the group's supply chain, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Increased operational cost	6-10 years	Direct	Unlikely	Low
Ph05	Change in precipitation extremes and droughts	Flooding could damage company infrastructure, stock and negatively affect operations including field servicing, operation of plant, equipment and vehicles. Drought would also negatively affect operations through water shortages, water price increases and operational inconvenience. Both flooding and droughts may require expenditure on	Increased operational cost	Current	Direct	Unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		<p>infrastructure to overcome related difficulties. If severe, they may ultimately require changes to existing business model or relocation.</p> <p>Flooding would damage customer infrastructure, vehicles and equipment and negatively affect their operations through inability to operate plant, equipment and vehicles, resulting in reduced revenues for them.</p> <p>Drought would also negatively affect customer operations through water shortages, water price increases and operational inconvenience.</p> <p>Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties, which may reduce demand.</p> <p>Increased insurance premiums would increase cost base of company and its customers.</p> <p>Similarly, these would also impact the group's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.</p>					
Ph17	Uncertainty of physical risks	Could result in a cautious approach by the group, its customers and supply-chain, delayed decision making by such parties and lost opportunities. Could also increase insurance premiums and delay investment decisions.	Reduced demand for goods/services	Current	Direct	Likely	Low
Ph10	Change in temperature extremes	Changes in temperature extremes may result in relocation of communities and industrial areas, which may negatively affect demand for BARLOWORLD's customer offerings. This may also result in reallocation or redirection of expenditure and resources to infrastructural development. In the extreme, these relocations could be to areas not covered in the group's agreements with its principals.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unlikely	Low
Ph11	Induced changes in natural resources	As provision of solutions into agricultural industry is considered to be one of the group's growth strategies, any negative influence or change in agricultural growth patterns and regions could affect group, particularly if agricultural centres shifted away from areas covered by the group's geographic footprint.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unlikely	Low
Ph14	Sea level rise	A rise in sea levels could result in relocation of communities and industrial areas, which may negatively affect demand for BARLOWORLD's customer offerings.	Reduced demand for goods/services	>10 years	Indirect (Client)	Unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph02	Change in mean (average) precipitation	Changes in water patterns may result in relocation of communities and industrial areas which may negatively affect demand for the group's customer offerings. Competition for water may also result in political upheaval which may also negatively affect demand for the group's customer offerings.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unlikely	Low
Ph04	Change in mean (average) temperature	Changes in average temperature may result in relocation of communities and industrial areas which may negatively affect demand for the group's customer offerings. They may also result in reallocation or redirection of expenditure and resources to urgent relief activities.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unknown	Low
Ph06	Change in precipitation extremes and droughts	Changes in precipitation extremes and droughts may result in relocation of communities and industrial areas which may negatively affect demand for the group's customer offerings. They may also result in reallocation or redirection of expenditure and resources to urgent relief activities.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unknown	Low
Ph08	Change in precipitation pattern	Changes in precipitation patterns may result in relocation of communities and industrial areas which may negatively affect demand for the group's customer offerings. This may also result in reallocation or redirection of expenditure and resources to infrastructural aspects required as a result of changed patterns.	Reduced demand for goods/services	6-10 years	Indirect (Client)	Unknown	Low
Ph17	Uncertainty of physical risks	Could result in a cautious approach by group, its customers and supply-chain, delayed decision making by such parties and lost opportunities. Could also increase insurance premiums and delay investment decisions.	Increased operational cost	Current	Direct	Likely	Low-medium
Ph07	Change in precipitation pattern	These patterns could mean a combination of decreased or increased precipitation, change in timing and extreme patterns. Any of these would negatively affect operations, the extent of which would be in concert to the severity of change. Customers would be similarly affected resulting in both internal pressures and change in customer demand patterns. Similarly, these would also impact the group's supply chain negatively affecting supply with its concomitant restraints on the group's ability to provide its integrated customer solutions.	Inability to do business	Current	Direct	Likely	Low
Ph09	Change in temperature extremes	This could affect working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Severe heat or cold could result in unsafe working environments and ultimately stop operations. Temperatures beyond safe operating ranges for	Reduction/disruption in production capacity	6-10 years	Direct	Likely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		plant, equipment and vehicles would also halt operations. Customers would be similarly affected which may require a reallocation of expenditure and resources which could reduce demand. Similarly, these would also impact the group's supply chain negatively, affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.					
Ph13	Sea level rise	This could damage harbour infrastructure and disrupt low-lying areas and industries, with negative consequences on BARLOWORLD's supply chains as significant amount of plant and equipment is transported by sea. Optimal and efficient routes may be affected.	Inability to do business	>10 years	Indirect (Supply chain)	Likely	Low
Ph15	Snow and ice	This could affect the working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Severe snow and ice could result in unsafe working environments and ultimately stop operations. Temperatures below safe operating ranges for plant, equipment and vehicles would also halt operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.	Reduction/disruption in production capacity	Current	Direct	Likely	Low
Ph15	Snow and ice	This could affect the working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Severe snow and ice could result in unsafe working environments and ultimately stop operations. Temperatures below safe operating ranges for plant, equipment and vehicles would also halt operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.	Inability to do business	Current	Direct	Likely	Low
Ph16	Tropical cyclones	These would cause physical damage to facilities, result in unsafe working environments and ultimately stop operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Reduction/disruption in production capacity	Current	Direct	Likely	Low
Ph16	Tropical	These would cause physical damage to facilities, result in unsafe	Inability to do	Current	Direct	Likely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
	cyclones	working environments and ultimately stop operations. Customers would be similarly affected. These would also impact BARLOWORLD's supply chains, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	business				
Ph03	Change in mean (average) temperature	This could affect working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Customers would be similarly affected, which may require a reallocation of resources and reduce demand. If extreme, operation of plant, equipment and vehicles would be negatively affected. It may also require a new technology in required customer solutions which competitors may provide more competitively. These would also impact the group's supply chain, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Reduction/disruption in production capacity	6-10 years	Direct	Unlikely	Low
Ph03	Change in mean (average) temperature	This could affect working environment requiring additional expenditure on heating, ventilation and air-conditioning (HVAC) infrastructure at all group operations. Customers would be similarly affected, which may require a reallocation of resources and reduce demand. If extreme, operation of plant, equipment and vehicles would be negatively affected. It may also require a new technology in required customer solutions which competitors may provide more competitively. These would also impact the group's supply chain, negatively affecting supply with concomitant restraints on the group's ability to provide its integrated customer solutions.	Reduced demand for goods/services	6-10 years	Direct	Unlikely	Low
Ph05	Change in precipitation extremes and droughts	Flooding could damage company infrastructure, stock and negatively affect operations including field servicing, operation of plant, equipment and vehicles. Drought would also negatively affect operations through water shortages, water price increases and operational inconvenience. Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties. If severe, they may ultimately require changes to existing business model or relocation. Flooding would damage customer infrastructure, vehicles and equipment and negatively affect their operations through inability	Reduction/disruption in production capacity	Current	Direct	Unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		<p>to operate plant, equipment and vehicles, resulting in reduced revenues for them.</p> <p>Drought would also negatively affect customer operations through water shortages, water price increases and operational inconvenience.</p> <p>Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties, which may reduce demand. Increased insurance premiums would increase cost base of company and its customers.</p> <p>Similarly, these would also impact the group's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.</p>					
Ph05	Change in precipitation extremes and droughts	<p>Flooding could damage company infrastructure, stock and negatively affect operations including field servicing, operation of plant, equipment and vehicles.</p> <p>Drought would also negatively affect operations through water shortages, water price increases and operational inconvenience.</p> <p>Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties. If severe, they may ultimately require changes to existing business model or relocation.</p> <p>Flooding would damage customer infrastructure, vehicles and equipment and negatively affect their operations through inability to operate plant, equipment and vehicles, resulting in reduced revenues for them.</p> <p>Drought would also negatively affect customer operations through water shortages, water price increases and operational inconvenience.</p> <p>Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties, which may reduce demand. Increased insurance premiums would increase cost base of company and its customers.</p> <p>Similarly, these would also impact the group's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.</p>	Reduced demand for goods/services	Current	Direct	Unlikely	Low

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph05	Change in precipitation extremes and droughts	<p>Flooding could damage company infrastructure, stock and negatively affect operations including field servicing, operation of plant, equipment and vehicles.</p> <p>Drought would also negatively affect operations through water shortages, water price increases and operational inconvenience. Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties. If severe, they may ultimately require changes to existing business model or relocation.</p> <p>Flooding would damage customer infrastructure, vehicles and equipment and negatively affect their operations through inability to operate plant, equipment and vehicles, resulting in reduced revenues for them.</p> <p>Drought would also negatively affect customer operations through water shortages, water price increases and operational inconvenience.</p> <p>Both flooding and droughts may require expenditure on infrastructure to overcome related difficulties, which may reduce demand. Increased insurance premiums would increase cost base of company and its customers.</p> <p>Similarly, these would also impact the group's supply chains negatively affecting supply with concomitant restraints on BARLOWORLD's ability to provide its integrated customer solutions.</p>	Inability to do business	Current	Direct	Unlikely	Low
Ph10	Change in temperature extremes	<p>Changes in temperature extremes may result in relocation of communities and industrial areas, which may negatively affect demand for BARLOWORLD's customer offerings. This may also result in reallocation or redirection of expenditure and resources to urgent relief activities. In the extreme, these relocations could be to areas not covered in the group's agreements with its principals.</p>	Inability to do business	6-10 years	Indirect (Client)	Unlikely	Low
Ph14	Sea level rise	<p>A rise in sea levels could result in relocation of communities and industrial areas, which may negatively affect demand for BARLOWORLD's customer offerings.</p>	Wider social disadvantages	6-10 years	Indirect (Client)	Unlikely	Low

5.1d Please describe (i) the potential financial implications of the risk before taking action; (ii) the methods you are using to manage this risk; and (iii) the costs associated with these actions

Ph01-17

- (i) Financial implications relate to loss of revenue as consequence of inability to conduct business due to damaged infrastructure, vehicles, plant and equipment, and an increased cost base resulting from physical damage and resulting operational inefficiencies. Where meaningful estimation is possible, attempts to quantify financial implications are made, otherwise BARLOWORLD records risk and benefits for proactive identification and awareness. Financial implications of climate change risks are not ring-fenced but incorporated into ongoing activities, revenue and cost bases of BARLOWORLD companies.
- (ii) In assessing impact and likelihood of risks for this response, control factors have been taken into account. Risk management is embedded in BARLOWORLD's commitment and approach to long term value creation for all its stakeholders, its integrated management approach of accountability and responsibility for economic, social and environmental aspects of business activity, its risk management approach, stakeholder engagement and a strategic planning framework that structures activity and management focus on BARLOWORLDs 6 strategic focus areas: Integrated customer solutions, people, empowerment and transformation, sustainable development, financial returns and profitable growth. Sustainable development positions climate change and related aspects as central to success of BARLOWORLD's long term value creation objectives. Identification, management of risks (and ideally of realising opportunities) driven by physical damage are embedded in ongoing management of BARLOWORLD, which includes decentralised local attention, as well as group consolidation and review. All BARLOWORLD facilities maintain business plans that incorporate emergency response actions (disaster recovery plans) and business continuity (business continuity plans). Sensible location of facilities with appropriate emergency infrastructure, and geographic, industrial and principal diversification mitigate risks due to physical damage. BARLOWORLD maintains a flexible business model which can be adapted as circumstances require. Close relationships with leading world class principals and customers ensures open dialogue and a constructive approach would be adopted by affected parties in order to address challenges that arise due to climate change.
- (iii) It is usually difficult to quantify costs directly relating to climate change issues as they are not ring-fenced but incorporated into ongoing activities and cost base of BARLOWORLD companies, as actions which address climate change are integrated into day-to-day management activities of organisation. In some instances these are identifiable; however these actions invariably deliver a ranges of benefits which are broader than narrowly defined climate change, e.g. where costs are incurred in offering products and services that assist in addressing risks due to physical damage, they are regarded as part of operational cost base. Significant insurance cover (up to €200 million) is provided at group level which extends to physical damage and consequential damages.

Change in mean (average) precipitation Ph01, Ph02

- (i) Loss of revenue and increased cost base
- (ii) Water harvesting and recycling initiatives are in place. BARLOWORLD recycles some 9% of its water consumption. Increased precipitation levels are addressed through appropriate facilities, building plans and infrastructure.
- (iii) Incorporated into operational cost base of company and its principals

Change in mean (average) temperature Ph03, Ph04

- (i) Loss of revenue and increased cost base
- (ii) Appropriate HVAC is provided in all facilities. Employee health and safety is addressed through relevant standards and benchmarks.
- (iii) Incorporated into operational cost base of company and its principals

Change in precipitation extremes and droughts Ph05, Ph06

- (i) Loss of revenue and increased cost base
- (ii) Implemented disaster recovery and business continuity plans. Water harvesting and recycling initiatives are in place. BARLOWORLD recycles some 9% of its water consumption. Increase precipitation levels are addressed through appropriate facilities, building plans and infrastructure
- (iii) Incorporated into operational cost base of company and its principals

Change in precipitation pattern Ph07, Ph08

- (i) Loss of revenue and increased cost base
- (ii) Geographic, industrial and principal diversification. Well established customer and supply chain relationships.
- (iii) Incorporated into operational cost base of company and its principals

Change in temperature extremes Ph09, Ph10

- (i) Loss of revenue and increased cost base
- (ii) Appropriate HVAC is provided in all facilities. Employee health and safety is addressed through relevant standards and benchmarks.
- (iii) Incorporated into operational cost base of company and its principals

Induced changes in natural resources Ph11

- (i) Loss of revenue and increased cost base
- (ii) Geographic, industrial and principal diversification. Well established customer and supply chain relationships
- (iii) Incorporated into operational cost base of company

Sea level rise Ph13, Ph14

- (i) Loss of revenue and increased cost base
- (ii) Well located facilities. Optimal planning of alternative supply routes. Well established customer and supply-chain relationships.
- (iii) Incorporated into operational cost base of company

Snow and ice Ph15

- (i) Loss of revenue and increased cost base
- (ii) Appropriate HVAC is provided in all facilities. Employee health and safety is addressed through relevant standards and benchmarks. Optimal planning of alternative supply routes. Well established customer and supply-chain relationships.
- (iii) Incorporated into operational cost base of company

Tropical cyclones Ph16

- (i) Loss of revenue and increased cost base
- (ii) Existing disaster recovery and business continuity plans. Geographic, industrial and principal/ supplier diversification. Well established customer and supply chain relationships
- (iii) Incorporated into operational cost base of company

Uncertainty of physical risks Ph17

- (i) Loss of revenue and increased cost base
- (ii) Comprehensive strategic planning and insurance placement processes underpinned by risk management structures
- (iii) Incorporated into operational cost base of company

5.1e Please describe your risks that are driven by changes in other climate-related developments

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Oth01	Changing consumer behaviour	Shifts in consumer preference to locally sourced products with a reduced carbon footprint (or regulation which has a similar effect) may affect group's logistics business, as well as other products supplied by group.	Reduced demand for goods/services	1-5 years	Direct	Unlikely	High
Oth02	Changing consumer behaviour	There are competitive risks from suppliers who may enter market with technologies, products and services with greater energy and emission efficiencies or lower impacts on environment.	Reduced demand for goods/services	1-5 years	Direct	Very unlikely	High
Oth03	Fluctuating socio-economic conditions	A loss of business confidence may result due to climate change events as financial and social consequences add to inflationary pressures and detrimentally affect morale, standards of living, and affect production and business costs.	Reduced demand for goods/services	1-5 years	Indirect (Client)	Very unlikely	High
Oth03	Uncertainty in social drivers	A loss of business confidence may result due to climate change events as financial and social consequences add to inflationary pressures and detrimentally affect morale, standards of living, and affect production and business costs.	Reduced demand for goods/services	1-5 years	Indirect (Client)	Very unlikely	High
Oth11	Reputation	BARLOWORLD is committed to ensuring its environmental legitimacy and managing its impacts on climate change. The group has integrated management practices and reporting. Sustainable development is included in one of group's Strategic Focus Areas, and Social and Environmental legitimacy is one of group's 10 Pillars of Sustainability. However, there may be risks associated with shareholder or public activism arising from climate change issues, and litigation, financial and reputational risks for companies that might inadvertently fall foul of regulations or public opinion. Reputational damage could negatively affect commercial standing and activity of group as well as its ability to attract and retain key skills.	Reduced demand for goods/services	Current	Direct	Very unlikely	High
Oth10	Other drivers	Lack of appropriate skills. Having identified the importance of a growing number of climate change related issues over the past decade, BARLOWORLD needs to recruit / retain intellectual capacity and strategic employee skills required to address these challenges across a range of disciplines in order to identify and understand trends and risks that affect group, and to implement	Inability to do business	Current	Direct	Exceptionally unlikely	High

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
		necessary mitigation and adaptive strategies. Efforts to create awareness and provide leadership have led to a better grasp and acceptance of issues surrounding climate change and firm commitment within the group to action.					
Oth05	Increasing humanitarian demands	Additional taxes to fund humanitarian needs and CSI/socio-economic development spend expectations and/or regulations, may be revised upwards. Companies being increasingly viewed as co-responsible with elected governments for remedying socio-economic problems.	Increased operational cost	1-5 years	Direct	More likely than not	Medium
Oth07	Induced changes in human and cultural environment	Longer term risks such as marked changes in prevailing temperature – excessively cold winters, heat waves – and rainfall patterns, interrupted energy supplies and water shortages, loss of food security, flash fires, rising sea levels, severe weather and damaged infrastructure affecting supply and delivery of essential services, raw materials and goods would all have profound effects on broader society, including the group's employees, suppliers and customers.	Wider social disadvantages	6-10 years	Indirect (Client)	More likely than not	Medium
Oth09	Other drivers	Value chains may be affected as suppliers and/or customers attempt to pass on certain risks or costs associated with climate change.	Increased capital cost	1-5 years	Direct	More likely than not	Medium
Oth08	Other drivers	BARLOWORLD has commenced addressing energy and emissions efficiencies and may be prejudiced as interventions already in place and the group's 2009 baseline year could make it relatively more difficult to effect significant further reductions in energy consumption/ intensities (fossil fuel based) and consequent emission reductions/intensities, or not be able to access any financial incentives that may be available for this purpose.	Increased operational cost	1-5 years	Direct	About as likely as not	Medium
Oth06	Induced changes in human and cultural environment	Possible new health impacts on employees would need to be managed through safety and health structures and functions, e.g. impacts on employee wellness and assistance programmes will need to be considered and addressed.	Increased operational cost	1-5 years	Direct	More likely than not	Low
Oth04	Fluctuating socio-economic conditions	Changes in human settlement patterns, as well as in financial and insurance markets, could take place and this would impact on long term strategic decisions such as business models and locations, and how capital and human resources are allocated, accessed and managed.	Reduced demand for goods/services	>10 years	Direct	Unlikely	Low

5.1f Please describe (i) the potential financial implications of the risk before taking action; (ii) the methods you are using to manage this risk; (iii) the costs associated with these actions

Oth01-11

- (i) Financial implications - loss of revenue due to shifts in consumption patterns and loss of competitive advantage in event that other suppliers have better technology and solutions, general loss of business confidence, and costs resulting from increased taxes, expectations on business to provide humanitarian aid, possible increased expenditure on employee wellness programmes, employment costs to attract and retain appropriate scarce skills and increased insurance commitments as responsibility for climate change is passed on to suppliers. BARLOWORLD attempts to quantify financial implications of identified risks, otherwise it records risk and benefits for proactive identification and awareness purposes. Financial implications relating to climate change risks are incorporated into ongoing activities and revenue and cost bases of BARLOWORLD companies.
- (ii) In assessing impact and likelihood of risks for this response, control factors have been taken into account. Methods to manage risk are embedded in BARLOWORLD's commitment and approach to long term value creation for all its stakeholders, an integrated management approach that requires accountability and responsibility for economic, social and environmental aspects of business activity, entrenched risk management, stakeholder engagement and a strategic planning framework that structures activity and management focus on the group's 6 strategic focus areas, one of which is sustainable development. This positions climate change and related aspects as central to BARLOWORLD's long term value creation. Identification and management of risks (and ideally of realising opportunities) driven by climate change are embedded in ongoing management which includes decentralised local attention, as well as group consolidation and review.
- (iii) It is usually difficult to quantify costs directly relating to climate change issues as they are not ring-fenced but incorporated into ongoing activities and cost base of BARLOWORLD companies, as actions which address climate change are integrated into day-to-day management activities. In some instances these are identifiable; however these actions invariably deliver a range of benefits broader than narrowly defined climate change, e.g. costs incurred in offering products and services that address climate change, environmental footprint, energy and emission efficiencies are regarded as part of operational cost base.

Changing consumer behaviour Oth01 Oth02

- (i) Loss of revenue, increased cost base
- (ii) World class principals with leading technologies. Strong customer relationships built on providing competitive solutions that address environmental footprint. Internal legitimacy assured through aspirational energy and emission efficiency improvements. Geographic, industrial and principal / supplier diversification, a range of integrated solutions and flexible business model. Proactive stakeholder engagement to identify value requirements and address accordingly. Entrenched strategic planning processes ensures identification of relevant trends and evolving customer solutions.
- (iii) In cost base of company

Uncertainty in market signals Oth04

- (i) Loss of revenue
- (ii) World class principals with leading technologies. Strong customer relationships built on providing competitive solutions that address environmental footprint. Internal legitimacy assured through aspirational energy and emission efficiency improvements. Geographic, industrial and principal / supplier diversification, and flexible business model. Proactive stakeholder engagement to identify value requirements and address accordingly. Address internal efficiencies and leverage financial returns in company
- (iii) Incorporated into cost base of company

Fluctuating socio-economic conditions Oth03, Oth04 and Uncertainty in social drivers Oth03

- (i) Increased cost base
- (ii) Secure revenue through appropriate business model through entrenched strategic planning initiatives, supported by world-class principals with leading technologies. Strong customer relationships built on providing competitive solutions that address environmental footprint. Internal legitimacy assured through aspirational energy and emission efficiency improvements. Geographic, industrial and principal / supplier diversification, and flexible business model. Proactive stakeholder engagement to identify value requirements and address accordingly. Ensure efficient operations and leverage financial returns
- (iii) In cost base of company.

Increasing humanitarian demands Oth05

- (i) Increased cost base
- (ii) Secure revenue through appropriate business model with entrenched strategic planning initiatives, supported by world-class principals which have leading technologies. Strong customer relationships built on providing competitive solutions that address environmental footprint. Internal legitimacy assured through aspirational energy and emission efficiency improvements. Geographic, industrial and principal / supplier diversification, and flexible business model. Proactive stakeholder engagement to identify value requirements and address accordingly. Ensure efficient operations and leverage financial returns
- (iii) In cost base of company

Induced changes in human and cultural environment Oth06, Oth07

- (i) Increased costs
- (ii) Continued application of employee value creation model throughout the group to ensure optimal value created by and for employees
- (iii) In cost base of the company

Other drivers (reporting) Oth08

- (i) Increased cost base
- (ii) Continue with initiatives to achieve aspirational energy and emission efficiency targets. Ensure recognition of baseline year and implemented initiatives
- (iii) Incorporated into cost base of company

Other drivers (passing on of risks) Oth09

- (i) Loss of revenue and increased cost base
- (ii) Constructive and transparent customer relations enabling identification and equitable distribution of risk. Provision of leading solutions which minimise environmental footprint and assist customers to achieve their sustainable development objectives.
- (iii) In cost base of company

Other drivers (skills) Oth10

- (i) Loss of revenue and increased cost base
- (ii) Attract and retain skills through leading reputation underpinned by internal initiatives and leading customer solutions. Skills attraction and retention central to group employee value creation strategy. Implemented internal initiatives include energy and emission efficiency improvement targets, carbon offset programme, structured non-financial reporting, integrated management and reporting and sustainable development entrenched in group's strategic framework, code of ethics and 10 Pillars of Sustainability
- (iii) In cost base of company

Reputation Oth11

- (i) Loss of revenue and increased cost base

- (ii) Aspirational energy and emission efficiency improvement targets set and performance closely monitored. Sustainable development and climate change entrenched into group integrated management and reporting structures. Membership of JSE SRI (Leadership category). Carbon management process (MARSO) and carbon neutrality of Avis (internal consumption).
- (iii) In cost base of company. R747 825 for Avis RAC carbon neutrality

Climate Change Opportunities

6.1 Have you identified any climate change opportunities (current or future) that have the potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply

- ✓ Opportunities driven by changes in regulation
- ✓ Opportunities driven by changes in physical climate parameters
- ✓ Opportunities driven by changes in other climate-related developments

6.1a Please describe your opportunities that are driven by changes in regulation

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
Reg53	Carbon taxes	BARLOWORLD Power business unit has been established to offer customer offerings which provide energy security, energy efficiency, energy demand management and emissions management services. The opportunities associated with the likely shift to rail-based transport can be realised through the group's emerging ability to supply into the rail industry.	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium-high
Reg53	Fuel/energy taxes and regulations	BARLOWORLD Power business unit has been established to offer customer offerings which provide energy security, energy efficiency, energy demand management and emissions management services. The opportunities associated with the likely shift to rail-based transport can be realised through the group's emerging ability to supply into the rail industry.	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium-high
Reg55	General environmental regulations, including planning	Anticipated regulatory requirements around GHG emissions and mandatory energy efficiency targets will increase market for products, services and customer solutions that are energy and emission efficient, environmentally sound and innovative. In addition, opportunities are presented for customer offerings which provide energy security, energy	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium-high

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
		efficiency, energy demand management and emissions management services. The group continues to consider these aspects in provision of their customer solutions, which include plant and equipment, motor vehicles, car rental, power solutions and logistics supply chain management and optimisation. The range and scope of these products/ services is continually being reviewed and expanded.					
Reg56	General environmental regulations, including planning	Potential exists for establishment of new business units offering supplementary or complementary products, services and solutions. Recently established BARLOWORLD Power division offers standby generation and energy efficiency management solutions which it is driving within group as well as externally to customers.	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium-high
Reg57	General environmental regulations, including planning	The group regularly reviews policy compliance and international regulations and targets, including those which are climate change and energy related. It participates in formulation of government policy, is guided by standards embedded in, among other sources, King III, GHG protocols and GRI framework, and participates in JSE SRI and CDP reviews of its governance, planning and performance. These activities ensure that group is aware of topical issues, and potential and emerging risks and opportunities are dealt with timeously in formal strategy and risk management processes. All of these aspects reduce BARLOWORLD's overall risk profile. Opportunity to differentiate from competitors by implementing internal initiatives which positively affect emissions, and developing competitive solutions which assist customers to address their emission and pollution limits or constraints. Being an early signatory to Energy Efficiency Accord and generally an early adaptor of standards and legislation, group has a head-start on monitoring, measuring and reporting its emissions. Standards and conditions imposed by international agreements on climate change will drive compliance		Current	Direct	Virtually certain	Medium-high

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
		behaviour and demand for appropriate products and solutions.					
Reg51	Air pollution limits	Opportunity to differentiate from competitors by implementing internal initiatives which positively affect emissions, and developing competitive solutions which assist customers to address their emission and pollution limits or constraints.	Reduced operational costs	Current	Direct	Virtually certain	Medium
Reg54	Emission reporting obligations	Being an early signatory to Energy Efficiency Accord and generally an early adaptor of standards and legislation, group has a head-start on monitoring, measuring and reporting its emissions.	Reduced operational costs	Current	Direct	Virtually certain	Medium
Reg58	International agreements	Standards and conditions imposed by international agreements on climate change will drive compliance behaviour and demand for appropriate products and solutions.	Increased demand for existing products/services	1-5 years	Direct	Virtually certain	Medium
Reg59	Other regulatory drivers	<p>The group could benefit from governments' intentions to create enabling environments for shift to low carbon economies.</p> <p>In SA, measures to create an enabling environment include ensuring that 1.5% of GDP is allocated to research and development by 2015, sending the right 'price signals' and implementing subsidy reforms and rebates.</p> <p>The SA government has introduced a tax allowance for energy efficiency savings governed under section 12L of Income Tax Act, No.58 of 1962 which is expected to be operational towards end of 2011. Accelerated depreciation for investments in renewable energy has also been allowed.</p> <p>The SA Department of Trade and Industry is including energy efficiency requirements in new tax incentives. For example, section 12I of the Act sets out an incentive for industrial policy projects that manage to meet energy efficiency requirements.</p> <p>BARLOWORLD operations continue to consider these aspects in their respective business models, strategic plans and in developing customer offerings.</p>	Increased demand for existing products/services	1-5 years	Direct	Virtually certain	Medium

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
Reg62	Other regulatory drivers	<p>Opportunities exist for generation of renewable energy (South African on-grid target 30% by 2025), and services aimed at achieving an optimal and reliable energy mix, including independent power supply for own consumption and potential for selling energy into regional energy grids.</p> <p>The National Energy Regulator in SA has released incentives for renewable energy and cogeneration Independent Power Producers, Renewable Energy and Cogeneration Feed In Tariffs. These offer a higher price for electricity produced from renewable energy or cogeneration sources which are fed onto national grid, as well as price certainty over 20 years. These incentives are not operational yet.</p> <p>The UK government has committed to sourcing 15% of energy from renewable sources by 2020 and offering feed in tariffs for small-scale low-carbon electricity produced from renewable energy technologies (which have recently been reviewed). BARLOWORLD operations are considering these aspects in their respective business models, strategic plans and in developing customer offerings.</p>	Increased demand for existing products/services	1-5 years	Direct	Virtually certain	Medium
Reg63	Other regulatory drivers	<p>New regulations which require disclosure of information on environmental stewardship, including climate change, may provide opportunities for BARLOWORLD companies to differentiate from their competitors and gain competitive advantage in, for example, applying for licences, tenders or finance.</p>	Other: Competitive advantage	Current	Direct	Virtually certain	Medium
Reg64	Product efficiency regulations and standards	<p>Customers request products and solutions which assist them in achieving internal energy and emission targets, and it is anticipated that this trend will grow. This includes customers with operations spanning multi-geographies who may require, in terms of their own internal environmental commitments, high environmental standards and technology in products, services and solutions ahead or regardless of prevailing local/regional regulations and legislation. Supported by its principals, BARLOWORLD is committed to providing leading products and solutions</p>	Increased demand for existing products/services	1-5 years	Direct	Virtually certain	Medium

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
		that enable customers to meet their sustainable development objectives, including environmental stewardship by improving lifecycle environmental footprint of products through energy and emission efficiencies, as well as product disposal.					
Reg67	Voluntary agreements	Efforts to meet the group's commitments in terms of the Energy Efficiency Accord, which was signed in 2005, have given BARLOWORLD companies a head start in embedding energy and emissions efficiency in policy, strategies and operations. The company is better informed on climate change issues and well positioned to engage on and deal with emerging and existing climate-change related regulations and taxes.	Reduced operational costs	Current	Direct	Virtually certain	Medium
Reg65	Product efficiency regulations and standards	Some of BARLOWORLD's businesses are dependent on a small number of principals and/or suppliers and the group's success is linked to the availability, competitiveness and quality of their products and services. As anticipated regulatory requirements around GHG emissions and mandatory energy efficiency targets grow markets for products and services incorporating clean, green technologies, so arguably will number of principals, contributing to BARLOWORLD group's customer offerings and increasing customers and channels to market.	New products/business services	1-5 years	Direct	More likely than not	Medium
Reg60	Other regulatory drivers	International technical assistance programmes and increasing scale of concessionary finance being made available through development finance institutions and banks to encourage private sector solutions to climate change, and present opportunities for new ventures. BARLOWORLD operations consider these in their respective business models, development of customer offerings and strategic plans.	Investment opportunities	1-5 years	Direct	About as likely as not	Medium
Reg66	Product labelling regulations and standards	Requirement to include carbon footprint data on product labels would present an opportunity, since labelling would be beneficial to environmentally friendly products that group offers to customers. Product labelling regulations would assist in addressing threats presented by 'grey goods'.	Increased demand for existing products/services	Current	Direct	Virtually certain	Low
Reg52	Cap and trade	Opportunity to develop CDM projects locally for own	Investment	Current	Direct	About as	Low

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact
	schemes	offsets to reduce group's carbon footprint, and for market, which may also assist in meeting group's local CSI and country's socio-economic development objectives.	opportunities			likely as not	
Reg51	Air pollution limits	Opportunity to differentiate from competitors by implementing internal initiatives which positively affect emissions, and developing competitive solutions which assist customers to address their emission and pollution limits or constraints.	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium

6.1b Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity; (iii) the costs associated with these actions

Reg51-67

- (i) Financial implications - Increased revenues due to providing competitive integrated customer solutions which enable customers to comply with relevant regulations and meet their own targets for energy and emission improvements, and reduced costs structures resulting from efficiency initiatives. BARLOWORLD attempts to quantify financial implications of identified opportunities, otherwise it records opportunities and benefits of proactively pursuing them. It is usually difficult to quantify financial implications relating to climate change opportunities as they are incorporated into ongoing activities and revenue and cost bases of BARLOWORLD companies.
- (ii) In assessing impact and likelihood of opportunities for this response, control factors have been taken into account. Methods for managing opportunity are embedded in BARLOWORLD's long term value creation for all its stakeholders, an integrated management approach that requires accountability and responsibility for economic, social and environmental aspects of business activity, entrenched risk management, stakeholder engagement and a strategic planning framework that structures activity and management focus on group's 6 strategic focus areas, one of which, sustainable development, positions climate change and related aspects as central to BARLOWORLD's long term value creation objectives. Identification and realising of opportunities driven by changes in regulation are embedded in ongoing management which includes decentralised local attention, as well as group consolidation, review and attention.
- (iii) Costs relating to climate change issues are incorporated into ongoing activities and cost base of BARLOWORLD companies. In some instances these are identifiable; however these actions invariably deliver a range of benefits which are broader than narrowly defined climate change.

Air pollution limits Reg51

- (i) Increased revenue and reduced cost base
- (ii) Group aspirational energy and emission reduction targets set; referenced in code of conduct. World-class principals providing leading technology regarding energy consumption and emission control. Caterpillar's ACERT® technology developed to meet American and European regulations restricting harmful emissions from diesel engines; Caterpillar's D7E tractor which features first all-electric drive train; Hyster XN truck which offers up to 31% lower power consumption than equivalent competitor trucks; represented automobile manufacturers that are leaders in energy efficient and low emission vehicles; hybrid vehicles and electric vehicles. Internal solution offerings include BARLOWORLD Logistics' 'Green Trailer' initiative that is some 10% more fuel efficient and their

CAST-CO2 module of its leading supply chain design system which form basis of designing low-carbon efficient supply-chains. BARLOWORLD Power division provides customers with leading energy reduction and efficiency solutions. PowerWatch technology, which enables live monitoring and of electricity consumption, is currently implemented in 17 major SA sites of group. Ongoing communication and education of employees. Appointment of sustainability champions in all divisions and executive responsibility at group level.

(iii) In cost base of company

Cap and Trade schemes Reg52

(i) Increased revenues and reduced cost base

(ii) Opportunity to develop a CDM utilising the group's competencies in energy efficiencies and potentially renewable energy technology. This could be in association with group corporate social investment and enterprise development strategies

(iii) In cost base of company

Carbon taxes and Fuel and energy taxes and regulations Reg53

(i) Increased revenue and reduced cost base

(ii) Group aspirational energy and emission reduction targets set; referenced in code of conduct. World-class principals providing leading technology regarding energy consumption and emission control. Caterpillar's ACERT® technology developed to meet American and European regulations restricting harmful emissions from diesel engines; Caterpillar's D7E tractor which features first all-electric drive train; Hyster XN truck which offers up to 31% lower power consumption than equivalent competitor trucks; represented automobile manufacturers that are leaders in energy efficient and low emission vehicles; hybrid vehicles and electric vehicles. Internal solution offerings include BARLOWORLD Logistics' 'Green Trailer' initiative that is some 10% more fuel efficient and their CAST-CO2 module of its leading supply chain design system which form basis of designing low-carbon efficient supply-chains. BARLOWORLD Power division provides customers with leading energy reduction and efficiency solutions. PowerWatch technology, which enables live monitoring and of electricity consumption, is currently implemented in 17 major sites of group. Ongoing communication and education of employees. Appointment of sustainability champions in all divisions and executive responsibility at group level.

(iii) In cost base of company

Emissions reporting obligations Reg54

(i) Reduced cost base

(ii) Early adaption of Energy Efficiency Accord in South African and implementation of a group aspirational target of a 12% non-renewable energy and a GHG (scope 1 and 2 CO2e) emissions efficiency improvement by end 2014 of a 2009 baseline year ensures structured data collection, reporting and management attention. Customer reporting obligations will focus attention on emissions and demand for energy and emission efficient solutions and offerings. BARLOWORLD is well positioned to meet these requirements

(iii) In cost base of company

General environmental regulations including planning Reg55, Reg56, Reg57

(i) Increased revenues

(ii) Providing integrated customer offerings backed by leading principals incorporating latest energy and emission efficiencies

(iii) Incorporated into operational cost base of company

International agreements Reg58

(i) Increased revenues

(ii) Providing integrated customer offerings backed by leading principals incorporating latest energy and emission efficiencies

(iii) Incorporated into operational cost base of company

Other regulatory drivers Reg59, 60, 62, 63

- (i) Increased revenues
- (ii) Providing integrated customer offerings backed by leading principals incorporating latest energy and emission efficiencies
- (iii) Incorporated into operational cost base of company

Product efficiency regulations and standards Reg64, 65

- (i) Increased revenues
- (ii) Providing integrated customer offerings backed by leading principals incorporating latest energy and emission efficiencies
- (iii) Incorporated into operational cost base of company

Product labelling regulations and standards Reg66

- (i) Increased revenues
- (ii) Ensures transparent standards of competitive products and solutions, proactively highlights to customers offerings incorporating latest energy and emissions efficiencies
- (iii) In cost base of company

Voluntary agreements Reg67

- (i) Reduced cost base
- (ii) Providing integrated customer offerings backed by leading principals incorporating latest energy and emission efficiencies
- (iii) In cost base of company

6.1c Please describe the opportunities that are driven by changes in physical climate parameters

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph58	Other physical climate drivers	Physical evidence of climate change has arguably had the greatest impact on opinion and behaviour change, leading to shifts in consumer sentiment and demand to more environmentally friendly products and services, and greater awareness of the environmental footprint of inputs, to the group's benefit.	Increased demand for existing products/services	Current	Direct	Virtually certain	Medium-high
Ph59	Other physical climate drivers	Continuing shift towards assessing profits in context of resource depletion and monetising natural capital e.g. establishing more accurate values for delivered water and energy (and managing waste) presents opportunities in that management of these will require more efficient civil infrastructure which will utilise BARLOWORLD's products and services.	Increased demand for existing products/services	Current	Direct	More likely than not	Medium

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Ph51	Change in mean (average) precipitation	Decreases and water shortages will motivate group to speed up implementation of feasible water recycling and efficiency measures. Increases an abundance in water will enable water harvesting and possible cost reduction	Reduced operational costs	Current	Direct	Virtually certain	Low-medium
Ph51	Change in precipitation pattern	Decreases and water shortages will motivate group to speed up implementation of feasible water recycling and efficiency measures. Increases an abundance in water will enable water harvesting and possible cost reduction	Reduced operational costs	Current	Direct	Virtually certain	Low
Ph61	Snow and ice	Severe weather conditions will require specialised plant equipment, plant and vehicles which group is well positioned to provide.	Increased demand for existing products/services	Current	Direct	More likely than not	Low
Ph62	Other physical climate drivers	Tropical cyclones. Damaged infrastructure will need to be repaired. Damaged plant, equipment and vehicles will need to be replaced. Logistics solutions will be required to facilitate these aspects. This will create a demand for group's customer offerings.	Increased demand for existing products/services	Current	Direct	More likely than not	Low
Ph63	Other physical climate drivers	Uncertainty of physical risks may create a demand for precautionary expenditure on infrastructure, standby plant and equipment for power generation. This creates a demand for group solutions.	Increased demand for existing products/services	Current	Direct	More likely than not	Low
Ph52	Change in mean (average) precipitation	Changes in water patterns may result in relocation of communities and industries which will require demand for group's offering.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph52	Change in precipitation pattern	Changes in water patterns may result in relocation of communities and industries which will require demand for group's offering.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph53	Change in mean (average) temperature	Shifts in weather and temperature patterns and effects of these on local ecologies might open up new tourism destinations, which may positively affect group's car hire operations.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph54	Change in mean (average) temperature	Changes in weather patterns may result in relocation of communities and industries which will require demand for groups offering.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph54	Change in temperature extremes	Changes in weather patterns may result in relocation of communities and industries which will require demand for groups offering.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph55	Change in precipitation	Flooding could damage infrastructure and droughts could negatively affect communities requiring relocation or	Increased demand for existing	6-10 years	Direct	Unknown	Low

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
	extremes and droughts	development of infrastructure to mitigate effects. These would create a demand for groups equipment and other offerings including its Logistics offering	products/services				
Ph56	Change in temperature extremes	Changes in temperature extremes may result in relocation of communities and industries which will require related infrastructure and increase demand for group's offerings.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph57	Induced changes in natural resources	Cultivation of food will become increasingly important and shifts in production areas will require additional equipment and infrastructure development which may positively impact demand for group offerings.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low
Ph60	Other physical climate drivers	Sea level rise. Will result in relocation and construction of related infrastructure. This may also positively affect demand for logistics solutions. BARLOWORLD is well positioned to provide such solutions.	Increased demand for existing products/services	6-10 years	Direct	Unknown	Low

6.1d Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity; (iii) the costs associated with these actions

Ph 51-60

- (i) Financial implications principally relate to increased revenue and reduced cost structures. Increase of revenue principally as a consequence of repair to damaged infrastructure, provision of power generation, replacement of damaged plant equipment and vehicles and logistics. Longer term opportunities arise from relocations of communities and industries consequent to permanent physical climate change. It is usually difficult to quantify financial implications relating to changes in physical climate parameters as they are not ring-fenced but incorporated into ongoing activities and revenue and cost bases of BARLOWORLD companies, as actions which address climate change are integrated into day-to-day management activities of organisation.
- (ii) In assessing impact and likelihood of opportunities for this response, control factors have been taken into account. Methods to manage opportunity are embedded in group's commitment and approach to long term value creation for all its stakeholders which is underscored by an integrated management approach that requires accountability and responsibility for economic, social and environmental aspects of business activity, an entrenched risk management approach, stakeholder engagement and a strategic planning framework that structures activity and management focus on group's 6 strategic focus areas, one of which is sustainable development which positions climate change and related aspects as central to success group's long term value creation objectives. Accordingly, identification and realisation of opportunities driven by changes in physical climate parameters are embedded in ongoing management of group which includes decentralised local attention, as well as group consolidation and review. Details are included in specific responses to addressed opportunities.
- (iii) It is usually difficult to quantify costs directly relating to climate change issues as they are not ring-fenced but incorporated into ongoing activities and cost base of BARLOWORLD companies, as actions which address climate change are integrated into day-to-day management activities of organisation. In some instances these are identifiable; however these actions invariably deliver a range of benefits which are broader than narrowly defined climate change.

Generally these include: costs associated with the identification, assessment and operationalising of new opportunities; additional investment in vehicles, plant and equipment, investment in appropriate water recycling initiatives, and in sourcing and/or up-skilling human resources. These together with costs incurred in developing and offering products and services that address climate change, environmental footprint, energy and emission efficiencies are regarded as part of operational cost base.

Change in mean (average) precipitation and Change in precipitation patterns Ph51, Ph52

- (i) Increased revenues
- (ii) Group has implemented water conservation measures which include recycling and rain harvesting. Group is also well positioned to provide necessary plant and equipment required for development of required infrastructure
- (iii) In cost base of company, additional investment in appropriate water initiatives as well as stock.

Change in mean (average) temperature Ph53, Ph54 and Change in temperature extremes Ph54

- (i) Increased revenues
- (ii) Relocation of communities and industries will stimulate demand to infrastructural development. Increased tourism opportunities will benefit car rental operations and stimulate infrastructure development. BARLOWORLD is well positioned to provide necessary plant and equipment required for development of required infrastructure.
- (iii) In cost base of company, additional investment in skills and stock.

Change in precipitation extremes and droughts Ph55, Ph56

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide necessary plant and equipment required for development of required infrastructure.
- (iii) In cost base of company, additional investment in appropriate water initiatives as well as stock

Induced changes in natural resources Ph57

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide necessary plant and equipment required for development of agriculture and related infrastructure.
- (iii) In cost base of company, additional investment in skills and stock.

Other Physical Climate Drivers Ph58 Ph59

- (i) Increased revenues
- (ii) Well positioned through its leading principals to supply products and solutions (vehicles, plant, equipment, efficient power generation and energy efficiency) that incorporate latest technology and assist customers in achieving their climate change objectives. BARLOWORLD Logistics, car rental and fleet solutions are also environmentally sensitive and include the latest technology in vehicles and supply chain optimisation. BARLOWORLD's internal activities include its energy and emission efficiency improvement targets, evidence of its commitment to sustainable development.
- (iii) In cost base of company, may require additional investment in skills and stock.

Sea level rise Ph60

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide necessary plant and equipment required for reconstruction and repair of damaged facilities as well as for construction of new infrastructure
- (iii) In cost base of company, may require additional investment in stock

Snow and ice Ph61

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide necessary plant and equipment required to alleviate situation, including standby power generation for heating, ice and snow removal, as well as plant and equipment that can operate in prevailing conditions for commercial purposes (e.g. mining)
- (iii) In cost base of company, may require additional investment in stock

Tropical cyclones Ph62

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide necessary plant and equipment required for reconstruction and repair of damaged facilities as well as for construction of new infrastructure. Group is also positioned to supply standby power generation and logistics support.
- (iii) In cost base of company, may require additional investment in stock.

Uncertainty of physical risks Ph63

- (i) Increased revenues
- (ii) BARLOWORLD is well positioned to provide plant and equipment required for precautionary standby purposes (this includes power generation and emergency vehicles)
- (iii) In ongoing cost base of company, may require additional investment in stock.

6.1e Please describe the opportunities that are driven by changes in other climate-related developments

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Oth58	Other drivers	BARLOWORLD has the skills base and continues to recruit, train and develop employees needed to support innovative, energy efficient new technologies and customer solutions.	Increased production capacity	Current	Direct	Virtually certain	High
Oth53	Induced changes in human and cultural environment	There are opportunities to create stakeholder value through corporate social investment by working with NGO development partners to develop strong, responsible leadership and deepen capacity to address social and socio-economic issues highlighted and aggravated by climate change, as BARLOWORLD group has done for past 3 decades.	Wider social benefits	Current	Direct	Virtually certain	Medium
Oth53	Fluctuating socio-economic conditions	There are opportunities to create stakeholder value through corporate social investment by working with NGO development partners to develop strong, responsible leadership and deepen capacity to address social and socio-economic issues highlighted and aggravated by climate change, as BARLOWORLD group has done for past 3 decades.	Wider social benefits	Current	Direct	Virtually certain	Medium

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
Oth53	Increasing humanitarian demands	There are opportunities to create stakeholder value through corporate social investment by working with NGO development partners to develop strong, responsible leadership and deepen capacity to address social and socio-economic issues highlighted and aggravated by climate change, as the BARLOWORLD group has assisted NGO partners to address problems in society for the past 3 decades.	Wider social benefits	Current	Direct	Virtually certain	Medium
Oth59	Other drivers	Disseminating best practice and collaboration. There are opportunities to expedite information sharing and activities regarding climate change with other companies, non-governmental organisations and government agencies through relevant and appropriate forums.	Wider social benefits	Current	Direct	Very likely	Medium
Oth60	Other drivers	Competitiveness. An opportunity for group to differentiate itself arises from its willingness to behave in an ethical and responsible manner to ensure that risks are fairly and equitably managed, in an era when general trend may be for parties to attempt to avoid or pass-on risk associated with climate change.	Increased demand for existing products/services	Current	Direct	Very likely	Medium
Oth57	Other drivers	SA will host 17th United Nations Framework Convention on Climate Change Conference or COP 17 in Durban in December 2011. Previous two conferences failed to provide world with a legally-binding international climate change agreement. In addition, first commitment period of Kyoto Protocol expires at end of 2012. Outcomes of COP17 will be expected to provide business with greater clarity on way forward. To gear up to conference as host, SA government is pushing to implement a number of clean energy and energy efficiency programmes which will provide opportunities for businesses, which BARLOWORLD will track and consider in developing its strategies and business offerings to customers.	Increased demand for existing products/services	Current	Direct	More likely than not	Medium
Oth51	Changing consumer behaviour	Climate change legislation may be lagging in developing economies but public opinion and voluntary compliance drive urgency to implement adaptation strategies to address climate change and to include these in BARLOWORLD's customer offerings.	Increased demand for existing products/services	Current	Direct	More likely than not	Medium
Oth52	Changing consumer	An opportunity exists for BARLOWORLD to create competitive advantage in times of growing public activism on sustainability	Increased demand for existing	Current	Direct	More likely than not	Medium

ID	Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
	behaviour	matters through sound values, exemplary conduct and performance.	products/services				
Oth54	Reputation	The group has skills base and products/services to satisfy significant customers in all regions that require same high standards in their products, levels of service and environmental commitments, no matter where they operate.	Increased demand for existing products/services	Current	Direct	More likely than not	Medium
Oth55	Other drivers	Emissions risk. Due to its proactive position on energy and emission efficiency, company may be relatively less exposed to penalties for non-compliance with emission reduction targets and carbon taxes.	Reduced operational costs	Current	Direct	More likely than not	Medium
Oth56	Other drivers	Commercial opportunity. An opportunity exists to facilitate development of local emissions offset projects (Clean Development Mechanism – CDM – which provides carbon credits to registered projects that can be traded and provide an additional income stream).	Investment opportunities	1-5 years	Direct	About as likely as not	Low-medium

6.1f Please describe (i) the potential financial implications of the opportunity; (ii) the methods you are using to manage this opportunity; (iii) the costs associated with these actions

Oth51-60

- (i) Increased revenue is mainly a consequence of customer initiatives undertaken due to public opinion, voluntary compliance and leveraging available skills within group. Principally these relate to proactively implementing energy and emission efficiency measures in anticipation of legislation and on expectation of competitive advantage. Financial implications of opportunities driven by changes in other climate-related developments are not ring-fenced but incorporated into ongoing activities and revenue and cost bases of BARLOWORLD companies.
- (ii) In assessing impact and likelihood of opportunities for this response, control factors have been taken into account. Methods to manage opportunity are embedded in groups commitment and approach to long term value creation for all its stakeholders which is underscored by an integrated management approach that requires accountability and responsibility for economic, social and environmental aspects of business activity, an entrenched risk management approach, stakeholder engagement and a strategic planning framework that structures activity and management focus on group's 6 strategic focus areas, one of which is sustainable development which positions climate change and related aspects as central to success group's long term value creation objectives. Accordingly, identification and realisation of opportunities driven by changes in other climate related developments are embedded in ongoing management of group which includes decentralised local attention, as well as group consolidation and review. Principally, these relate to leveraging group's ability to provide energy and efficient solutions incorporating latest technologies from leading principals in motor vehicles, plant and equipment as well as power generation. Also included are car rental and fleet management as well as Logistics, including supply chain management and optimisation. Other aspects which provide group a platform to realise such opportunities are its implemented energy and emission efficiency targets, entrenched reporting approach and other sustainable development initiatives. Details are included in specific responses to addressed opportunities.

- (iii) It is usually difficult to quantify costs directly relating to climate change issues as they are not ring-fenced but incorporated into ongoing activities and cost base of BARLOWORLD companies, as actions which address climate change are integrated into day-to-day management activities of organisation. In some instances these are identifiable; however these actions invariably deliver a range of benefits which are broader than narrowly defined climate change. Generally these costs include those associated with the identification, assessment and operationalising new projects; sourcing and/or up-skilling human resources, increased stock levels, possible increased insurance premiums due to rearranged risk assumption and internal energy and emission efficiency initiatives. These and costs incurred in developing and offering products and services that address climate change, environmental footprint, energy and emission efficiencies are regarded as part of operational cost base.

Changing customer behaviour Oth51, Oth52

- (i) Increase revenue
- (ii) Given its relationship with individual customers across a number of geographies, group is able to leverage best practise in respect of environmentally sensitive solutions for such customers across their operations in an efficient and effective manner. This includes providing solutions that embrace leading technology in energy and emissions efficiency of plant, equipment, motor vehicles and logistics.
BARLOWORLD strives to achieve competitive advantage through leadership in sustainable development, sound values, exemplary conduct and performance.
- (iii) In cost base of company, may require additional investment in skills and stock.

Fluctuating socio-economic conditions; and Induced changes in cultural and human conditions; and Increasing humanitarian demands Oth53

- (i) Financial implications: Increased revenues
- (ii) By coordinating its corporate social investment and enterprise development programmes with its energy and efficiency solutions and competencies and technology, the group may be able to develop partnerships and initiatives which alleviate social need and suffering and positively contribute to climate change activities in disadvantaged communities.
- (iii) In cost base of company may require additional skills.

Reputation Oth54

- (i) Increased revenues
- (ii) BARLOWORLD strives to achieve competitive advantage through leadership in sustainable development, sound values, exemplary conduct and performance. This is reflected in integration of sustainable development into its strategy and day-to-day operations. Energy and emission efficiency targets have been implemented, structured stakeholder engagement identifies areas of concern and value and comprehensive stakeholder reporting on progress is in place. BARLOWORLD integrated customer solutions incorporate options to minimise environmental degradation.
- (iii) In cost base of company, no additional costs anticipated.

Other (emissions risk) Oth55

- (i) Reduced cost base
- (ii) Due to early implementation of energy and emission efficiency improvement targets and ensuring focus and management of these issues, the group may be relatively well positioned to accommodate any externally imposed targets, avoid penalties and minimise taxes. This would provide a competitive advantage and is considered an opportunity for group.
- (iii) In cost base of company, no additional costs anticipated.

Module: GHG Emissions Accounting, Energy and Fuel Use, and Trading [Investor]

Emissions Methodology

7.1 Please provide your base year and base year emissions (Scopes 1 and 2)

Base year	Scope 1 Base year emissions (metric tonnes CO2e)	Scope 2 Base year emissions (metric tonnes CO2e)
Wed 01 Oct 2008 - Wed 30 Sep 2009	107 905	91 148

7.2 Please give the name of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions

Please select the published methodologies that you use

The GHG Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

7.3 Please give the source for the global warming potentials you have used

Gas	Reference
Other: Carbon dioxide	IPCC Fourth Assessment Report (AR4 - 100 year)

7.4 Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data

Fuel/Material/Energy	Emission Factor	Unit	Reference
Diesel/Gas oil	2.77	Other: CO2e tons per KL	South Africa, rest of Africa, Middle East and Asia: GHG and Eskom 2007 and 2008
Diesel/Gas oil	2.66	Other: CO2e tons per KL	United Kingdom, Europe: NEF / DEFRA 2008
Diesel/Gas oil	2.70	Other: CO2e tons per KL	Australia: NGA Factors Oct 2008
Diesel/Gas oil	2.68	Other: CO2e tons per KL	USA: DoE, EIA, FORM EIA 1605 (June 2008)
Motor gasoline	2.49	Other: CO2e tons per KL	South Africa, Rest of Africa, Middle East and Asia: GHG and Eskom 2007 and 2008
Motor gasoline	2.42	Other: CO2e tons per KL	United Kingdom, Europe: NEF / DEFRA 2008
Motor gasoline	2.38	Other: CO2e tons per KL	Australia: NGA Factors (Oct 2008)
Motor gasoline	2.42	Other: CO2e tons per KL	USA: DoE, EIA, FORM EIA 1605 (June 2008)
Residual fuel oil	3.16	Other: CO2e tons per KL	South Africa, Rest of Africa, United Kingdom, Europe, Australia, USA, Middle East and Asia: GHG 2007, NEF / DEFRA 2008, NGA Factors Oct 2008, DoE, EIA, FORM EIA 1605 (June 2008)
Liquefied petroleum gas (LPG)	2.97	Other: tons CO2e per ton	South Africa, Rest of Africa, United Kingdom, Europe, Australia, USA, Middle East and Asia: GHG 2007, NEF / DEFRA 2008, NGA Factors Oct 2008, DoE, EIA, FORM EIA 1605 (June 2008)
Natural gas	2.12	Other: CNG/LNG tons CO2e per m3k	South Africa, Rest of Africa, United Kingdom, Europe, Australia, USA, Middle East and Asia: GHG 2007, NEF / DEFRA 2008, NGA Factors Oct 2008, DoE, EIA, FORM EIA 1605 (June 2008)
Electricity	1.20	Other: tons per kWh	South Africa, Rest of Africa: GHG and Eskom CDM 2007 and 2008
Electricity	0.54	Other: tons per kWh	United Kingdom, Europe: NEF/DEFRA 2008
Electricity	0.82	Other: tons per kWh	Australia, NGA Factors Oct 2008
Electricity	0.62	Other: tons per kWh	USA: ; DoE, EIA, FORM EIA 1605 (June 2008)
Electricity	0.71	Other: tons per kWh	Middle East and Asia: GHG 2007

Emissions Data - (1 Oct 2009 - 30 Sep 2010)

8.1 Please select the boundary you are using for your Scope 1 and 2 GHG inventory

Financial control

8.2a Please provide your gross global Scope 1 emissions figure in metric tonnes CO2e

108 864

8.3a Please provide your gross global Scope 2 emissions figure in metric tonnes CO2e

92 869

8.4 Are there are any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions which are not included in your disclosure?

No

8.5 Please estimate the level of uncertainty of the total gross global Scope 1 and Scope 2 figures that you have supplied and specify the sources of uncertainty in your data gathering, handling, and calculations

Scope	Uncertainty Range	Main sources of uncertainty	Please expand on the uncertainty in your data
Scope 1	Less than or equal to 2%	Other: Human error	Although Scope 1 and 2 emissions are independently assured and reporting of emissions and underlying energy consumption is monitored, reported at group level and trends are benchmarked quarterly, internal audits across group divisions have identified the risk of capturers at business unit level misinterpreting units of measure and magnitude of billed energy consumption.
Scope 2	Less than or equal to 2%	Other: Human error	Although Scope 1 and 2 emissions are independently assured and reporting of emissions and underlying energy consumption is monitored, reported at group level and trends are benchmarked quarterly, internal audits across group divisions have identified the risk of capturers at business unit level misinterpreting units of measure and magnitude of billed energy consumption. Power monitoring equipment is increasingly being used on major sites to verify billed electricity consumption.

8.6 Please indicate the verification/assurance status that applies to your Scope 1 emissions

Verification or assurance complete

8.6a Please indicate the proportion of your Scope 1 emissions that are verified/assured

More than 90% but less than or equal to 100%

8.6b Please provide further details of the verification/assurance undertaken, and attach the relevant statements

Type of verification or assurance	Relevant standard	Relevant statement attached
Limited assurance	ISAE 3000	Auditors statement 2010

8.7 Please indicate the verification/assurance status that applies to your Scope 2 emissions

Verification or assurance complete

8.7a Please indicate the proportion of your Scope 2 emissions that are verified/assured

More than 90% but less than or equal to 100%

8.7b Please provide further details of the verification/assurance undertaken, and attach the relevant statements

Type of verification or assurance	Relevant standard	Relevant statement attached
Limited assurance	ISAE 3000	Auditors statement 2010

8.8 Are carbon dioxide emissions from the combustion of biologically sequestered carbon (i.e. carbon dioxide emissions from burning biomass/biofuels) relevant to your company?

No

Attachments

[https://www.cdproject.net/Sites/2011/29/1529/Investor CDP 2011/Shared Documents/Attachments/InvestorCDP2011/8.EmissionsData\(1 Oct2009-30Sep2010\)/Auditors Statement 2010.pdf](https://www.cdproject.net/Sites/2011/29/1529/Investor%20CDP%202011/Shared%20Documents/Attachments/InvestorCDP2011/8.EmissionsData(1Oct2009-30Sep2010)/Auditors%20Statement%202010.pdf)

Scope 1 Emissions Breakdown - (1 Oct 2009 - 30 Sep 2010)

9.1 Do you have Scope 1 emissions sources in more than one country or region (if covered by emissions regulation at a regional level)?

Yes

9.1a Please complete the table below

Country	Scope 1 metric tonnes CO2e
South Africa	77 830
Other: Rest of Africa	7 395
Other: Europe and UK	13 104
Other: Australia	2 574
Other: North America	6 567
Other: Middle East and Asia	1 394

9.2 Please indicate which other Scope 1 emissions breakdowns you are able to provide (tick all that apply)

- By business division
- By GHG type

9.2a Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Automotive	26 224
Equipment	23 503
Handling	15 176
Logistics	43 918
Corporate	43

9.2c Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	108 864

Scope 2 Emissions Breakdown - (1 Oct 2009 - 30 Sep 2010)

10.1 Do you have Scope 2 emissions sources in more than one country or region (if covered by emissions regulation at a regional level)?

Yes

10.1a Please complete the table below

Country	Scope 2 metric tonnes CO2e
South Africa	72 319
Other: Rest of Africa	5 204
Other: Europe and UK	7 614
Other: Australia	3 118
Other: North America	3 057
Other: Middle East and Asia	1 557

10.2 Please indicate which other Scope 2 emissions breakdowns you are able to provide (tick all that apply)

By business division

10.2a Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
Automotive	52 332
Equipment	22 409
Handling	6 239
Logistics	11 099
Corporate	790

Emissions Scope 2 Contractual

11.1 Do you consider that the grid average factors used to report Scope 2 emissions in Question 8.3 reflect the contractual arrangements you have with electricity suppliers?

Yes

11.2 Has your organization retired any certificates, e.g. Renewable Energy Certificates, associated with zero or low carbon electricity within the reporting year or has this been done on your behalf?

No

Energy

12.1 What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

12.2 Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed during the reporting year

Energy type	MWh
Fuel	42 0221
Electricity	89 724
Heat	0
Steam	0
Cooling	0

12.3 Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Other: Gas/Diesel oil	286 691
Motor gasoline	124 182
Liquefied petroleum gas (LPG)	656
Natural gas	8 692

Emissions Performance

13.1 How do your absolute emissions (Scope 1 and 2 combined) for the reporting year compare to the previous year?

Increased

13.1a Please complete the table

Reason	Emissions value (percentage)	Direction of change	Comment
Other: The group's MARSO approach to managing energy and emissions efficiency improvement is being implemented. However, due to inelasticity in certain base consumption levels across divisions, efficiency gains in energy consumption, achievements against emissions and savings targets across group are not expected to be linear on an annual basis.	1	Increase	It is anticipated that absolute emissions will improve with increased levels of business activity and be positively affected by the group's energy efficiency initiatives. Although emissions will increase over target period, it will be at a lesser rate than a 'business as usual' scenario due to group's aspirational efficiency targets.

13.2 Please describe your gross combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO2e per unit currency total revenue

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Explanation
4.9	metric tonnes CO2e	unit total revenue	11.4	Increase	Against a 10% decline in revenue, the marginal increase in group petrol and diesel consumption, together with a 2.5% increase in electricity used resulted in increased emissions intensities. Efforts to improve reporting have contributed to the increase in part.

13.3 Please describe your gross combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO2e per full time equivalent (FTE) employee

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Explanation
11.1	metric tonnes CO2e	FTE Employee	0.9	Increase	Absolute group emissions increased by 1.3% and full-time employee numbers increased by 0.3% 2010 over 2009, hence the increased intensity. Efforts to improve reporting have contributed to the increase in part.

Emissions Trading

14.1 Do you participate in any emission trading schemes?

No, but we anticipate doing so in the next two years

14.1b What is your strategy for complying with the schemes in which you participate or anticipate participating?

BARLOWORLD has adopted a MARSO approach to managing its consumption of energy and emissions from fossil fuels: measure, avoid, reduce, switch energy sources if feasible and, finally, when and if appropriate, offset. Group companies that choose to become carbon neutral or which exceed local emission limits consider buying emissions credits from entities or projects which are able to stay below their own designated limits. Emissions trading will be considered to enable BARLOWORLD companies to meet their GHG targets cost-effectively, once all other MARSO approaches have been implemented. Emissions trading would be considered to reduce the overall cost of compliance with any emission constraints by taking advantage of differences in marginal abatement costs across different emission sources. Opportunities for cost savings would arguably be greatest when mitigation costs range widely among different sources covered by trading schemes.

14.2 Has your company originated any project-based carbon credits or purchased any within the reporting period?

No

Scope 3 Emissions

15.1 Please provide data on sources of Scope 3 emissions that are relevant to your organization

Sources of Scope 3 emissions	metric tonnes CO2e	Methodology	If you cannot provide a figure for emissions, please describe them
Use of sold products	94 453	These emissions are from the combustion of fossil fuels in the use phase of the BARLOWORLD product. The emissions would be estimated by multiplying an activity data (e.g. either consumption of fuel or km travelled) by an appropriate emission factor.	These emissions are associated with the use of the products of BARLOWORLD. It is in accordance with the concept of product stewardship to report on the emissions of the product use phase. The emissions currently being reported are for the rental days sold to Avis customers.
Business travel	3 120	The methodology followed to estimate the emissions involve multiplying activity data for mode of transport (e.g. km travelled) by an applicable emission factor for that mode of transport (e.g. ton CO2/km). The modes of transport include aircraft and automobiles. The GHG Protocol Initiative for Scope 3 Accounting and Reporting Standard was used.	The emissions associated with business travel include those from the combustion of the fuels consumed in road and air travel. Currently only air travel is reported.
Employee commuting		These emissions would be estimated by multiplying activity data (e.g. km travelled) by an emission factor (e.g. ton CO2/km). Reasonable assumptions and extrapolation would need to be used to do the estimation as BARLOWORLD is a large organisation. The GHG Protocol Initiative for Scope 3 accounting and Reporting Standard would be used to estimate the emissions from employee commuting.	Employee commuting emissions include those associated with the travel of employees between their homes and work from employee-owned vehicles and public transport. These have not been estimated to date.
Supplier emissions		The methodology used to estimate these emissions would involve allocating the suppliers' emissions to the purchased product based on an appropriate unit. (e.g. if the supplier emits 2,000 tons CO2 to produce 20 units of a product and BARLOWORLD only purchase 5 units, BARLOWORLD's Scope 3 emissions would be 2,000 tons CO2 x 5/20 = 500 tons CO2. The GHG Protocol Initiative for Scope 3 accounting and Reporting Standard would be used for this.	These emissions principally include those resulting from the combustion of fossil fuels (consumption of energy) by suppliers in the manufacturing process of products purchased by BARLOWORLD. The group has not yet quantified emissions from its supply chain, but it appreciates that these could be significant and is starting to consider carbon reporting and management in the supply chain. BARLOWORLD would work closely with principals to appropriately evolve this over time. These are not currently being included in reporting.

Sources of Scope 3 emissions	metric tonnes CO2e	Methodology	If you cannot provide a figure for emissions, please describe them
Transportation and distribution of sold products		The methodology used for the estimation of these emissions would be either fuel-based or distance-based, depending on the format of the available data. Fuel-based methodology involves multiplying the fuel consumed by an appropriate emission factor for the fuel type. The distance-based methodology involves multiplying the distance travelled by an appropriate emission factor. The GHG Protocol Initiative for Scope 3 accounting and Reporting Standard would be used.	This includes emissions from the transportation of goods purchased/acquired and sold by BARLOWORLD, e.g. the transportation of equipment and vehicles from the factory or to customers' sites. These emissions are not being quantified currently, but it is anticipated that they may be significant. BARLOWORLD is starting to consider carbon reporting and management in upstream and downstream activities.
Leased assets (upstream, not included in Scope 1 or 2)		These emissions would be estimated by multiplying relevant activity data by an emission factor.	This refers to emissions associated with customer usage of leased plant, vehicles and equipment. These have not been estimated to date.
Capital goods		The methodology used to estimate these emissions includes multiplying an industry average life cycle emission factor per unit of equipment with the number of units used by BARLOWORLD. The GHG Protocol Initiative for Scope 3 accounting and Reporting Standard would be used.	This refers to emissions associated with the manufacturing of the capital equipment (e.g. vehicles) of BARLOWORLD which the division uses to provide logistical service. This equipment has an extended life so that it is properly regarded as fixed assets. Emissions from this source have not yet been quantified, but could be significant. BARLOWORLD is starting to consider carbon reporting and management in upstream and downstream activities.
End of life treatment of sold products			Not undertaken at present. Component Rebuilds extend life of plant and equipment and mitigate such emissions
Fuel- and energy-related activities (not included in Scope 1 or 2)			This refers to emissions associated with plant, equipment and vehicle rental activities. These have not been estimated to date.
Purchased goods and services		The methodology used to estimate these emissions would be multiplying the applicable distance travelled by the applicable emissions conversion factor.	This refers to emissions associated with transportation of products sold. These have not been estimated to date.
Franchises (not included in Scope 1 or 2)			Data from JV operations in Ivory Coast, Democratic Republic of Congo, Siberia and Zimbabwe is not consolidated into financial and non-financial reporting since these are not companies over which BARLOWORLD exercises financial control.
Waste generated in operations		It is anticipated that the methodology used to estimate these emissions would include multiplying the appropriate weight of waste by the applicable emission factor.	This relates to the emissions generated in the group's waste disposal activities. The group disposed of some 1 464 927 kgs of solid waste during the period.

15.2 Please indicate the verification/assurance status that applies to your Scope 3 emissions

Not verified or assured

15.3 How do your absolute Scope 3 emissions for the reporting year compare to the previous year?

Increased

15.3a Please complete the table

Reason	Emissions value (percentage)	Direction of Change	Comment
Change in boundary	3.3	Increase	Limited Scope 3 business air travel emissions have been included with effect from 2010

Module: Sign Off

Sign Off

Please enter the name of the individual that has signed off (approved) the response and their job title

Executive Strategy and Sustainability: Christopher Whitaker

Carbon Disclosure Project