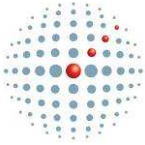


Climate Change: Risks and Opportunities for the South African Economy



Case Study

The Construction Industry's Path towards a Low Carbon Trajectory



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Author: Trade and Industrial Policy Strategies (TIPS)

QA: Alex McNamara

Corresponding contact person:

Email: alex.mcnamara@camcoglobal.com

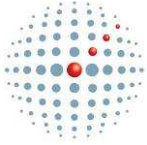
Telephone: +27 11 253 3400

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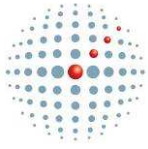
Should the reader wish to acquire further information in regard to this study, you are encouraged to visit the project website at: www.climateriskandopportunity.co.za where additional research reports, resources and information are available.

For further information regarding this particular case study, please e-mail Meagan Jooste at: meagan@tips.org.za



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List of Acronyms

CC	Climate Change
CDP	Carbon Disclosure Project
CETA	Construction Education and Training Authority
CIDB	Construction Industry Development Board
CO₂	Carbon Dioxide
COP	Conference of the Parties
DTI	Department of Trade and Industry
E + C	Engineering and Construction
EE	Energy Efficiency
EIA	Environmental Impact Assessment
FIFA	International Federation of Association Football
GBCSA	Green Building Council of South Africa
GHG	Greenhouse Gas
HVAC	Heating, Ventilating, and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISO	International Organization for Standardization
LTMS	Long-Term Mitigation Scenarios
RE	Renewable Energy
TJ	Terajoules
SA	South Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBHO	Wilson Bayly Holmes-Ovcon

1 Background

1.1 Brief overview of the sector

The construction sector has a key role to play in greenhouse gas (GHG) emissions reductions. Not only can firms in the sector, by using less energy-intensive and polluting strategies and techniques, contribute to this reduction, these firms can also encourage clients to utilize such technologies. The construction sector encompasses a range of segments; the building sector with primary building work demolitions, maintenance, repairs and alterations and heavy construction work. Typically, however, the construction sector is seen as encompassing residential building (houses and residential property), non-residential building (industrial buildings) and civil works (or civil engineering). As noted in the economic sector review of the construction industry, the building sector dominates. This segment accounted for 62.5% of all construction activities in value terms in 2009.

Economic Role of the Construction Industry

The construction sector is important for South Africa's economic performance and growth: the industry, which has made an increasing contribution to South Africa's growth,¹ currently contributes 5.8% to South Africa's total value of output, a share that has increased from 4.3% in 2000. Demand has grown rapidly supported by infrastructure and social housing developments. The latter is the result of limited investments prior to 1994 causing severe infrastructure backlogs. This sector has grown at around 6% per year between 1995 and 2009 but a higher 9% annual rate of growth characterise the 2000-2009 period.

Construction, which employs 430 000 plus 283 000 formal and informal employees in South Africa, is also a relatively labour intensive sector.² Moreover, whilst a large proportion of construction workers are informal workers, real output per worker has increased by about 6.8% per year between 2000 and 2009 compared to an increase of 3.65% for what has been observed for all economic activities. Productivity has also improved markedly in the sector compared to all economic sectors, although concerns have been raised that productivity is still low in construction, linked to poor management and planning. Noting this, 4.3% of total formal employment was in construction in 2009, the proportion increasing to 7.1% once informal employees are included - up from 6.9% in 2000.

In general, some construction sub-sectors expanded in 2010. Whilst jobs were lost during the international economic crisis, the effect was somewhat buffered by FIFA World Cup activities and the need for firms to retain semi-skilled and skilled workers for the medium term economic recovery. Currently, media reports indicate that construction companies have lost international contracts (e.g. in Dubai³, the Democratic Republic of Congo) and that smaller firms in the industry have been those most markedly affected by reduced overall demand in the context of intense competition on a cost basis.⁴ The downturn was

¹ Expanding from 0.1% to 0.6% in total real annual economic growth rate between 2000 and 2007 (Jooste et al., 2009:17).

² The sector would be about 6.4 times more labour intensive than all economic activities in 2009, in spite of a sharp growth of the capital labour ratio over time.

³ Unsustainable investment in Dubai meant that many South African construction companies operating in that country had their contracts cancelled. In particular, the Group Five construction company assessed in this case study had to cancel R4 billion worth of contracts. See: http://www.tradeinvestsa.co.za/feature_articles/420623.htm.

⁴ The resilience of employment changes in construction is typically reported upon in the press. According to miscellaneous data from Statistics South Africa (StatsSA), between July-September 2009 and July-September 2010, employment in construction increased by 15.1% compared to economy-wide employment losses of 1.2% over this period. However, formal job losses were high - 68 000 formal jobs were lost - relative to what was observed in other economic sectors. In July 2010, StatsSA reported large losses in construction in the second quarter of 2010 compared to those in the first quarter of the year: 54,000 formal jobs were lost in construction (a reduction of 7.1%) in spite of increases in gross earnings; perversely 40 000 informal jobs emerged in the sector that period. Between the second and third quarter of 2010 30 000 new jobs were created in construction however.

most pronounced in private sector construction work from 2009 as individuals, mining companies, and others reduced demand for construction activities. Credit tightening and increases in interest rates in particular contributed to the decline in demand. This is in contrast to infrastructure spending by the public sector that remained buoyant.

The Future of the Construction Industry

Noting these changes, there are currently a number of opportunities which exist to further an expansion of the construction sector. These range across a number of activities or sub-segments: in water and sanitation and public housing as well as around continued transport infrastructure upgrading and new developments (public as well as private e.g. transport corridors in the Southern African region, new retail space emerging, etc.) and in the introduction of energy saving technologies.

In turn, infrastructure was emphasised in the recent budget speech as a key recipient of public-sector investment. A total of R846 billion is planned to be spent on infrastructure between 2010 and 2013 with investments expanding to a 20 year time horizon. A fourth of this amount could be received by the construction industry which may put pressure on the sector to augment its base of skilled workers or to train current employees further.⁵ Whilst this is in a context of growing competition in the sector, some larger firms are well placed to take advantage of new international opportunities.

1.2 Greening and the construction sector in South Africa

The construction sector has been increasingly focused on both the introduction of green practices and on energy saving technologies. Thus, although demand for environmentally sustainable construction services is however still reported as limited,⁶ construction companies appear to be expanding their portfolio of such projects and related products. Further, recent media reports generally indicate that some construction companies (such as Group Five and Aveng) are also moving quite discernably into renewable energy (RE) developments in the hope that they can secure a share of the renewables allocation under the Integrated Resource Plan (IRP) for electricity.

The movements outlined above take place in the context of a number of political processes occurring at the national level, which are underway to determine South Africa's role in reducing its GHG emissions. Of relevance to the construction industry is the potential implementation of sectoral development policies although, ultimately, for such policies to be effectively implemented, they would require buy-in from, and interactive engagement between government and the private sector.

Internationally, the building sector is said to contribute more than one third of total energy use and associated GHG emissions in society (UNEP, 2009:5). The Intergovernmental Panel on Climate Change in its Fourth Assessment Report highlighted the fact that the building sector has the greatest ability to reduce its GHG emissions (ibid: 1). In South Africa, the national Long-Term Mitigation Scenarios (LTMS) illustrated a significant role for the building sector, in particular in terms of commercial buildings, in becoming low carbon.⁷

⁵ According to the Danish Embassy Sector Note, 25% of general building activity would be linked to public spending. The figure rises to 80% of civil engineering activity being linked to such spending. (See: <http://www.ambpretoria.um.dk/en/menu/CommercialServices/MarketOpportunities/SectorReports/ConstructionSector/>).

⁶ See: http://www.tradeinvestsa.co.za/feature_articles/420623.htm. The 2009 KPMG Global Construction Survey illustrated that many construction companies are aware that engaging in sustainable policies (in terms of health, safety and environmental programmes) is crucial and in many cases these are pursued so as to satisfy client-demands. However, some companies are yet to see the return on such capital outlays.

⁷ Such activities include improved efficiencies in Heating, Ventilating, and Air Conditioning (HVAC), lighting, water heating as well as other appliances.

Economy-wide, the sector which consumes the largest share of energy in South Africa is manufacturing, which is closely followed by transport (Table 1). However, building sector operations generate at least 23% of GHG emissions and the manufacturing of building materials amounts to 4% of total carbon dioxide (CO₂) emissions.⁸

Table 1: Energy consumption per sector by Fuel Type (TJ) in the Building Sector (figures in brackets reflect the % per sector of fuel consumption)

Sector	Electricity	Renewables & Waste	Coal	Petroleum Products	Gas	Total
Commercial	103798 (61)		34599 (20)	30287 (18)	864 (1)	169549 (100)
Residential	142815 (69)	21422 (10)	2856 (1)	38867 (19)		205960 (100)
Transport	12527 (2)			714069 (98)		726596 (100)
Manufacturing	306459 (35)		446682 (51)	15470 (2)	101920 (12)	870531 (100)
Mining	113412 (56)		53282 (26)	32388 (16)	2900 (1)	201982 (100)
Other	97649 (54)		861 (0)	82825 (46)		181335 (100)
Total	776661 (33)	21422 (1)	538280 (23)	913905 (39)	105685 (4)	2355953 (100)

Source: Department of Mineral and Energy (2006). Aggregate Energy Balances (adjusted), 2006. in: United Nations Sustainable Buildings and Climate Initiative. 2009. 'Greenhouse Gas Emission Baselines and Reduction potentials from Buildings in South Africa: A Discussion Document'. Page 27. Accessible at: <http://www.unep.org/sbci/pdfs/SBCI-SAreport.pdf>

A number of key energy-efficiency and demand-side management programmes have already made a contribution to the greening of the construction industry – particularly in the building segment - as well as in setting the pace for future initiatives that would be driven by the construction industry. UNEP (2009) outlines the full spectrum of such programmes but of particular interest are the South African National Standard (SANS 204)⁹, the Construction Industry Development Board (CIDB) Act 38 of 2000, the Green Building Council of South Africa's (GBCSA) Green Star South Africa Office rating tool and Energy Efficiency Demand Side Management, all of which were highlighted as important when Group Five was approached on the topic.

⁸ Some of the core building materials utilized include cement, reinforcing steel and sections, roofing and vertical cladding, walling, face bricks, face blocks, stock bricks and stock blocks many of which are energy intensive. For instance, the production of cement is responsible for 3% of the world's total GHG emissions. Generally, the sector is major consumer of resources. According to van Wyk (2009), construction and the built environment consume 50% of global resources (including 70% of all timber products and 40% of world water usage). Some of this consumption could rely on less energy and water intensive products as well as on the use of recycled materials.

⁹ This standard applies to buildings and construction and is designed for artificially ventilated buildings and would form part of the National Building Regulations (Mulholland and Matshe, 2009 and Saint-Gobain, 2010). The purpose of this standards programme being to reduce the operational energy use of new buildings without reducing comfort and amenity (Saint-Gobain, 2010).

Whilst Table 2 provides a comparison of the various emission reduction policies (based on criteria utilized by the UNEP Sustainable Building and Construction Initiative in assessing the applicability of energy and environmental policies to the building sector¹⁰⁾ for South Africa, UNEP (2009) finds that the success of the policies' implementation has been limited.¹¹

Table 2: Assessment of Energy Efficiency/GHG Emission Reduction Policies

Policy Instrument	Emission Reduction Effectiveness	Cost-Effectiveness	South African Status
Appliance standards	High	High	Not readily available in SA, no requirements in place
Energy-efficiency obligations and quotas	High	High	National draft recommendations in place
Demand-side management programmes (DSM)	High	High	National DSM programme in place but constrained by finance
Tax exemptions/reductions	High	High	Under consideration
Cooperative procurement	High	Medium/High	No requirements
Building codes	High	Medium	SANS204 currently only voluntary and could take up to 3 years to be mandatory. Will only specify minimum standards and only applicable to new buildings
Mandatory audit requirement	High, but variable	Medium	No requirements in place
Energy performance contracting /Energy Service companies' support	High	Medium	Limited use for public-sector retrofitting but stopped due to irregularities
Capital subsidies, grants, subsidised loans	High	Low	Very limited
Labelling and certification programmes	Medium/High	High	Voluntary certification in place, with mandatory requirements for public buildings under consideration
Public leadership programmes, incl. procurement regulations	Medium/High	High/Medium	Public leadership growing, often constrained by finance, capacity or regulatory obstacles
Voluntary and negotiated agreements	Medium/High	Medium	Energy-efficiency agreements in place amongst industry and public sector, progress somewhat limited
Public benefit charges	Medium	High	Not in place
Energy-efficiency certificate schemes/white certificates	Medium	High/Medium	Not in place
Detailed billing and disclosure programmes	Medium	Medium	Not in place
Education and information programmes	Low/Medium	Medium/High	Limited use for public-sector retrofitting but stopped due to irregularities
Kyoto Protocol flexible mechanisms	Low	Low	Some progress
Taxation (on CO ₂ for fuels)	Low	Low	Under consideration

Source: United Nations Sustainable Buildings and Climate Initiative. 2009. 'Greenhouse Gas Emission Baselines and Reduction potentials from Buildings in South Africa: A Discussion Document'. Page 59. Accessible at: <http://www.unep.org/sbci/pdfs/SBCI-SAreport.pdf>

This report will proceed to, in Section 2, outline the strategic greening efforts of the Group Five construction company and some of the barriers they have faced in doing so, as well as what lessons can be learnt by other companies in the industry. Section 3 then summarizes some of the points for taking greening action forward in the South African construction industry.

¹⁰ Accessible at: http://www.unep.org/themes/consumption/pdf/SBCI_CEU_Policy_Tool_Report.pdf

¹¹ This is because of financial and capacity constraints as well as the time scales needed to ensure their effective implementation. Further, gaps are evident in the measures currently underway with regard to appliance standards, mandatory audit requirements as well as labelling and certification programmes.

2 A Company Perspective: Group Five

There is great variety and complexity in the construction sector. Whilst this is emphasized by the Construction Education and Training Authority (CETA), there are about 35 000 employers in the sector.¹² In terms of industry structure, micro and small firms dominate, representing over 95% of firms with low levels of participation and being composed of many low grade contractors. In contrast, a handful of firms dominate with an international footprint. Those frequently mentioned are: Murray & Roberts - by far the leading and fastest growing South African construction firm - Grinaker-LTA (75% owned by Aveng), Wilson Bayly Holmes-Ovcon (WBHO), Group Five and Basil Read.¹³ Whilst other large companies are mentioned that operate in the construction material sub-sector (e.g. Pretoria Portland Cement Company), we present Group Five in what follows.

Group Five had approximately 15000 employees across 22 countries prior to the FIFA World Cup. The Group is expanding its portfolio of activities into both public infrastructure and private sector developments. The Group has a range of clusters: beyond construction, these are investments and concessions; manufacturing; and construction materials.¹⁴ Noting this, the Group, involved in Africa in mining and energy and also active in the Middle East, is focused on multi-disciplinary projects thus covering activities from project design to management activities (e.g. managing concessions) so as to tap into its project management capabilities and higher margin projects which it is seeking outside South Africa.

Although the main source of GHG emissions varies across the large South African construction companies, in the case of Group Five, emissions arose predominantly from its Construction cluster: this division amounted to 95% and 65.4% of Scope 1 and Scope 2 emissions respectively. In terms of Scope 3 emissions, Business Travel comprises 36% thereof as compared to the Transportation of Consumables (such as raw materials from suppliers) and Deliveries which amounts to 64% (CDP, 2010: Responses to questions 12.4, 13.4 and 15.1). Group Five should thus focus its GHG emission reduction efforts on activities related to construction projects and contracts and, transportation of consumables and deliveries.

Approximately 18 months ago Group Five was inspired to take advantage of its potential to participate in South Africa's move towards a low carbon economy. This shift links to a combination of factors: media reporting, international construction industry experiences in the renewable energy sector, investor and private sector led initiatives (such as their involvement in the Carbon Disclosure Project – CDP) and demand or client-driven initiatives (with respect to one particular construction project) together with the possibility for new legislative requirements of the construction industry to emerge.¹⁵ In this respect, the company completed an assessment of potential activities it could engage in order to

¹² With CETA reporting the following occupational groupings: contractors (58% of employers), professionals (27%), material manufacturers (11%) and others (4%).

¹³ See <http://www.privateprojects.co.za/global/news/Article/Article.asp?ID=5815> for some additional details.

¹⁴ In turn, construction covers Building and Housing, Civil Engineering including Roads and Earthworks, Engineering Projects.

¹⁵ One particular construction project saw the request of the client that the company complies with very strict environmental requests and regulations, such as those applicable in Cape Town. In turn, Environmental Impact Assessments (EIAs) have played a role in the process; new developments require the completion of an EIA to ensure that the scale of environmental impact of a new development is limited in so far as possible or, does not go ahead if it the development is seen to impose too significant a degree of environmental risks to the environment. These EIAs ensure compliance with the National Environment Management Act (NEMA), 1998 (Act No.107 of 1998) which was promulgated in terms of Sections 24(5), 24M and 44 by the National Minister of Water and Environmental Affairs, MEC Buyelwa Sonjica, on 18 June 2010 and came into effect on 2 August 2010 (Department of Environmental Affairs and Development Planning, 2010). Whilst Group Five did not report carrying out EIAs, one of its competitors, Murray & Roberts appear to have sub-contracted the EIA for some of its projects – e.g. the Green Point Stadium. Aveng, in contrast, notes in its 2010 Annual Report that it conducts EIAs in some of its business segments for projects at the design stage.

improve its profile of greening actions. In the process, a number of barriers to the successful implementation of such programmes have been identified. These are discussed below.

2.1 Strategic greening efforts for clients and positioning the company to take up new opportunities

The current policy and economic environment in South Africa is one where mitigating climate change (CC) will entail active industrial transformations. Group Five recognises that CC is directly affecting the environment in which they participate (CDP, 2010: Response to Question 1.2). As such, the Group Five Executive Committee approved the development of its own 'Integrated Green Strategy'¹⁶ so as to thrive in the construction industry. For Group Five, CC presents more opportunities than risks (CDP, 2010: Response to Question 2.1). A newly formed business unit within Group Five, Engineering and Construction (E+C), will complete a market analysis to identify the opportunities associated with CC mitigation so that the group can take advantage of the emerging market opportunities in RE generation and green buildings (CDP, 2010: Response to Question 2.1).

The 2010 CDP report for the group (Response to Question 6.6) also states that "in particular the group has submitted a tender for a wind project in the Eastern Cape. The key focus of the Engineer and Construct (E+C) units are Group Five being on concentrated solar thermal power, wind energy and small hydro plants to be built in South Africa". The 2010 Group Five Annual Report further adds that biofuel projects are also being looked at. This is a sector for which construction firms involved with the construction, repairs and maintenance of electricity plants see some opportunities, together with prospects in the registration of Clean Development Mechanism (CDM) projects.

The strategy recently put in place and going forward requires Group Five to shift to a comprehensive approach instead of following *ad-hoc* requests, as has been the case until recently. In particular, the Integrated Green Strategy highlighted how activities should be implemented from the site to the office incorporating issues of compliance. Crucially it also looked at the innovation potential of the company. The level of responsibility for CC within the company rests with a Director on the Executive Committee who is the Group Five Risk Officer and a Managing Director of Group Five Energy with the entire grouping termed the 'Green Team'. In general, there has been a commitment to pursue green initiatives throughout the Group with the Green Team meeting every six weeks so as to assess progress with each business unit's programmes.¹⁷

Group Five subsequently has its own 'Green Team' whose responsibility, amongst other things, is to find ways to expand the skills and training of Group Five staff in terms of green building techniques and practices. This Green Team is led by an executive committee member who drives the full structure and objectives of the team. As an example, these objectives range from innovation to power division to power projects, wind farms, RE initiatives, and so forth. Currently, the Green Team is designing a list of benefits towards going green, emphasizing why it is beneficial to do so as well as what some of the alternatives to doing so are. Progress in this regard is slowly being made and in particular,

¹⁶ A key purpose of this strategy is to identify the opportunities and risks associated with CC and how to "capitalize on the opportunities and mitigate the risks." (CDP, 2010: Response to question 1.2).

¹⁷ In contrast to demand by clients being expressed for sophisticated environmentally advanced projects in South Africa, demands from other African countries - where Group Five has a presence - for green initiatives are limited in scale. African countries are not as advanced on the green agenda and only Ghana and Mauritius seem to have representation at miscellaneous green construction events. The nature of involvements in Europe, whilst more advanced on green requests, does not affect the company's activities.

at the recent Green Building Council Conference held in Cape Town in September, many construction industry individuals started to buy into the idea of going green as they realized that there are economic benefits, in the long-run, to partaking in such a niche market.

In the green building arena, in 2009 Group Five became the Gold Founding Member of the Green Building Council of South Africa (GBCSA) (CDP, 2010) which focuses on green principles. The motivation for the development of this programme being that the company recognized few companies were involved in green building activities, despite a significant demand and numerous opportunities being available for this. In linking to Group Five's broader growth plans, the company utilizes the GBCSA Green Star rating system, which is based on the Australian rating system.¹⁸ Group Five anticipates that this green-rating system, or a variant of it, might become compulsory in the future. There are thus first mover advantages to moving towards meeting these targets (many of which are quite stringent already). However, the fact that the company has actively pursued submitting tenders for green-rating for particular public buildings indicates that municipalities are now also moving towards the implementation of green policies themselves.¹⁹

The company's key star-rated project was one which was completed for the Nedbank Group. This particular client made special requests for construction to comply with green standards. The motivation from the client's side being that, as a large commercial bank in South Africa, a key feature of Nedbank's advertising campaign (and broader company strategy) is an emphasis on its engagement in green initiatives. This project drew significant attention at the recent Green Building Council Conference held in Cape Town in September. Group Five was approached by numerous individuals (particularly from other large construction companies in the country) who asked questions about the building materials and products or technologies utilized. Clearly, both on the demand and supply-side there are now clear incentives emerging to partaking in green initiatives.

In turn, whilst still limited, there is (occasional) further scope for engagement in RE developments which matter to the firm. This has been evident in certain African countries. For example, in Ghana, where electricity prices are high relative to international tariffs, requests have been made to introduce and to diversify into electricity (and more price) efficient technologies. This alternative energy generation market is developing globally as well as in South Africa; solar and wind projects have been pursued in South Africa by Group Five, indicative of an expansion of the portfolio of alternative energy generation sources by this Construction company.

2.2 Influence on the supply chain

In respect of suppliers, discussions are underway with the suppliers of a key building material to improve the energy efficiency of their product. Further, these discussions relate to the suppliers broader energy efficiency efforts and compliance with environmental standards. The aforementioned product efficiency process is however still at the stage of tests and trials. Importantly, the links between construction company product demands and product suppliers is however evolving in terms of suppliers being encouraged to engage in environmental efforts (and to eventually comply with certain environmental standards).

¹⁸ Six levels of performance are provided for under this, Australian adapted, rating system (UNEP, 2009: 48): 1 Star: Minimum Practice; 2 Star: Average Practice; 3 Star: Good Practice; 4 Star: Best Practice; 5 Star: Local Excellence; 6 Star: World Leadership. In Australia, compliance with this rating system is mandatory and government departments refuse to occupy any building which has not complied with the four-star rating on this green-rating system. This system is voluntary in South Africa.

¹⁹ A typical case in point being Group Five having to meet the eThekweni (Durban) and City of Cape Town Municipal standards in regard to specific levels of CO₂ emissions and noise levels in the construction of the Moses Mabhida and Green Point World Cup stadiums, respectively.

Internally, Group Five is considering making requests for its miscellaneous business units to identify three building products that are critical to its activities. The suppliers of those products will then be approached to improve their products along environmental principles. In parallel, international energy efficient developers who are seeking to introduce products in South Africa are also emerging. The products of such developers may be considered for use by Group Five if (internal) tests confirm their reliability and efficiency.

Group Five also hosts an annual 'supplier day' in the company, where the main suppliers are invited to provide feedback on how they have fared in reducing their carbon footprint.²⁰ In order for Group Five to establish its own progress in reducing its carbon footprint (and for their reporting to the CDP) as well as to guide their procurement strategy, the suppliers are brought into the process of evaluating their own products and activities. As such, feedback and information as well as changes in strategy from the suppliers are crucial for Group Five to move on its own green initiative. A key objective of Group Five in this vein is to identify suppliers that are geographically closer to the sites where construction occurs.

2.3 Barriers to implementing greening strategies

Mindset

One current challenge for Group Five is overcoming the barriers to rolling out the know-how and momentum internally so that the Group has a critical mass of expertise. A range of views prevail within the company. For instance, there is the view that they, construction companies, *cannot* influence design. This is a significant mind-set barrier. To date, what Group Five has successfully done is to put forward the idea and principles of green buildings as an *alternative*. However, a further barrier to implementing such alternatives is the lack of capacity to pursue such alternatives within its different business units. This thus constrains its ability to succeed in green programmes.

In particular, approximately ten projects have been identified by the Group (for example, the GBCSA marketing, outlining green product alternatives, etc.) and representatives from the various business units are meant to set up a team and then compile a proposal and assign responsibilities to achieving the objectives delineated therein. However, there is yet to be a dedicated team of individuals from each department that is responsible for ensuring the successful implementation of these proposals. At the moment, this remains a 'second' responsibility or part-time approach. This will have to shift to a more dedicated approach for a new model to emerge. The challenge is in terms of convincing staff and clients that it makes sense to go green. As an example, while the Green Team in Group Five are making great strides in going green, staff that have been in the company for a long time have some difficulties in embracing the concept of greening and the reality that it requires new procedures and a new operational system. However, these mind-sets have slowly begun to change as the sector sees it as good timing to engage in such changes when there is a high demand for it.

Ultimately, the issue is one of theoretical versus practical buy-in. While most individuals are supportive of a focus on environmental or 'going green' activities, implementing these strategies requires some fundamental changes. Further, with the global financial crisis there is a great concern around construction costs and how to reduce these. As such, the tendency by staff and firms in the sector is to keep the construction products already in use (many of which *appear* available at lower prices than some environmentally friendly alternatives) rather than risking the use of unknown/less known and established 'green'

²⁰ For example, whether suppliers try to source supplies from suppliers who are in closer proximity to them or if they utilize green products, etc. are queried. This objective of gathering information about the origin of products overlaps with both more environmentally friendly products being used by Group Five and procurement (green procurement).

products. Detailed information and knowledge around new products is critical in this process. Whilst potentially requiring a new role for some key sectoral organisations to provide detailed on products and suppliers, Group Five are slowly making progress in inducing changes.

Technology & Economics

A significant barrier to the use of local construction supply alternatives is the risk associated with new alternatives. In particular, if a particular technology fails or a product turns out to be unreliable, it could imply failure of an entire green initiative. Further, with the current global financial crisis, many construction firms are concerned with cutting costs and are risk-averse in terms of trying new, riskier, alternatives. For such firms, the risk of using such alternatives could supersede the benefits in terms of reduced costs.

Institutional

Group Five finds it difficult to apply for and comply with the set of relevant grants and incentives available from the Department of Trade and Industry (**the dti**) as part of their green initiative. From a regulatory perspective, in its CDP Report (2010), Group Five identified a number of current and future (i.e. likely to occur in the next 1-5 years) risks to its activities. These include: the potential implementation of carbon taxes or fuel or energy taxes and regulations, emission reporting obligations, uncertainty regarding new regulation and uncertainty of regulatory environments in regions where the group partakes in activities but does not have a permanent presence in such regions (CDP, 2010: Response to Question 3.2A).

Of particular concern to the Group Five respondent is the lack of clarity on the country's climate change strategy and what government is seeking to achieve in terms of climate change mitigation, in particular with regards to the proposed carbon tax for the national economy.²¹ This lack of clarity is seen as an important hurdle to greening progress.²²

The carbon tax is also seen as putting a key burden on firms. Further, a customized sectoral climate change mitigation plan for the construction industry has not been developed. This implies an absence of guidance on how the construction industry should operate so as to support the country-wide objective of meeting South Africa's emission reduction pledge under the Copenhagen Accord.²³ It is difficult for construction firms, including Group Five, to develop a green strategy if no clear indications are provided in this respect.

²¹ A 2c/kWh tax on non-renewable electricity was implemented by the Minister of Finance, Trevor Manuel, on 1 July 2009. This is equivalent to a R20/ton CO₂ tax (CDP, 2010: Response to Question 3.5). With the carbon tax it has been made clear by National Treasury that there is no plan to ring-fence the funds for incentives redeemed, for instance, to subsidise solar water heaters or the development of renewable technologies and green incentives, etc., although possibilities of soft earmarking are being considered.

²² As an example, it is unclear how the emission reduction pledge outlined by South Africa in the Copenhagen Accord was decided upon.

²³ The Long-Term Mitigation Scenarios (LTMS) (2007) proposed a peak, plateau, decline emission reduction scenario whereby emissions would rise to 2020/25, plateau until 2035 and decline from 2035 so as to achieve the required-by-science target of a 30-40% reduction by 2050. The South African delegation to the Conference of the Parties (COP15) talks in Copenhagen in December saw the reinforcement of this pledge to reduce emissions by 34% of a business as usual trajectory by 2020, and 42% by 2025, subject to international technological and financial assistance (Tyler, 2010: 4).

Sectoral Interaction

Little appears to have been achieved through relations between construction companies in South Africa around greening initiatives to date. There are a few organizations which Group Five belongs to, such as the Construction Development Board and the Council for Civil Engineers, but there is no discussion at this level about the green strategy and moving this forward. The focus rather, tends to be around labour related issues. Group Five is more advanced than many of the larger players in the sector on the environmental front, however this is because implementing such initiatives in practice is difficult.

2.4 Way forward

Going forward Group Five sees it as critical in moving forward to unlock marketing opportunities in respect to green initiatives. Implementing changes and convincing clients takes time and the returns from greening are influenced by the payback period. For instance, with solar water heaters, the payback period, which is getting shorter and shorter, is progressively inducing new clients to make a switch. However, some changes require large capital outlays and are longer-term in nature. Nevertheless, while the prevailing view is that “green” is expensive, this is not systematically the case with important variations across products.

More research is needed into the available set of green building products in the market as well as what can be proposed in terms of greener alternatives. Group Five has a preference for interaction with greener suppliers. However, as stated above, an important problem lies in changing mind-sets. The change of suppliers should be towards a local alternative. A further issue is that suppliers and the construction industry have tended to focus solely on cost-cutting initiatives such that the shift, in terms of suppliers making the necessary adjustments, will be difficult.

In order for mind-sets to change in the industry, education and awareness-raising will be needed. In particular, what is needed is knowledge development around the available set of green alternatives. Group Five itself will utilize information available from banks (in terms of energy efficiency etc.) to compile a detailed set of financial information which can then act as a case study to show others in the sector what the implications of going green are. This can also be used as scientific evidence to prove to others that green initiatives have been tested and proven to work. This exercise could be applied more broadly to fill a knowledge-gap in the industry right now around available scientific evidence and actual proofs that green products are efficient and beneficial.

Other activities, which could be spearheaded by the GBCSA for example, is the development of a database of green product suppliers in South Africa. Specifically, such a database should ideally indicate what stock the respective companies house, and the amount of support they can provide the construction industry in going green. Group Five has already compiled a template of requirements and requested its different units within the company, as well as suppliers (or sub-contractors) to provide some critical information in this regard. The key objective of compiling this template is to educate sub-contractors on how they can go green.

3 Experience of another Construction Company: Murray & Roberts

3.1 Overview of greening efforts

Company strategy in respect of greening actions

Murray & Roberts operates in Southern Africa, the Middle East, Southeast Asia, Australasia and North and South America. Its "...home base..." is located in Johannesburg, South Africa where it has a public listing on the Johannesburg Stock Exchange (JSE) Limited. The company has an international coordinating office in the United Kingdom and principle offices in Australia, Botswana, Canada, Namibia, United Arab Emirates and Zimbabwe (Murray & Roberts, 2010a).

The company's South African operations alone comprise 79% of its carbon footprint (Murray & Roberts, 2010b). Its Health, Safety and Environment (HSE) Committee met five times during the 2009-2010 period. This committee comprises four non-executive directors and the group chief executive which is chaired by ADVK Knott-Craig, an independent non-executive director. The key aim of the committee is to achieve 'zero harm' in respect of health, safety and the natural environment (Murray & Roberts, 2010c).

In general, the company has made concerted efforts to measure the impact of their construction activities on the natural environment and specifically in terms of climate change impacts. They have been involved in the CDP for the past three years and have a good understanding of their carbon footprint and the impact which its different business units have on the environment. Their largest impact sector is in manufacturing as well as in the company's mining activities (which fall outside the scope of their construction activities studied in this case study). Much of the company's business revolves around heavy labour-oriented activities rather than capital-intensive ones.

In 2010, after divisional impact assessments of carbon emissions, the company launched a division-wide Energy Management Initiative (EMI) for its "South African operating companies to ensure effective and efficient use of energy and to reduce energy cost" (Murray & Roberts, 2010c). The benefits of energy efficiency (EE) rest in the cost-saving it entails which in general act as a crucial motivation for business to engage therein. The EE project at Murray & Roberts in particular focuses on achieving efficiencies at the level of operations within the company, particularly in terms of site and office energy efficiencies to be attained.

3.2 Greening opportunities identified

In general the company identifies a number of key risks and opportunities to the Group in terms of climate change as shown in Table 3 below. These cover the spectrum of regulatory, physical, reputational, financial, market and other factors (Murray & Roberts, 2010b). A factor of potential opportunity listed amongst these is 'demand of low carbon solutions from clients', which, if adhered to, could lead to substantial business gains for the company.

Table 3: Climate Change Risks and Opportunities identified by Murray & Roberts

Category	Risk and Opportunity
Regulatory	<ul style="list-style-type: none"> • Fuel /taxes and regulations • Carbon taxes • General environmental regulations, including planning (building codes and legislation)
Physical	<ul style="list-style-type: none"> • Changes in precipitation patterns • Changes in frequency of extreme weather events • Induced changes in human, natural and cultural resources
Reputational	<ul style="list-style-type: none"> • Litigation exposures, insurance costs and unforeseen environmental remediation expenses resulting from the increasing number and scope of regulatory requirements
Financial	<ul style="list-style-type: none"> • Increased transportation costs: carbon tax and fuel levies will increase transportation costs
Market	<ul style="list-style-type: none"> • Trade and market risks of carbon intensive products (steel, asphalt, clay bricks) compared to lower carbon alternatives • Demand of low carbon solutions from clients
Others	<ul style="list-style-type: none"> • Changes in the availability and costs of goods and services

Source: Murray & Roberts. 2010b. Resource Efficiency and Carbon Footprint. Pages 3-4.

In terms of more specific changes underway in the company, market shifts are acting as incentives for the company to engage in cleaner technologies. Further, the anticipation of South Africa's government policy and regulatory shifts (in order to achieve the country's emission reduction ambitions), has led the company to alter some of its business activities. In particular, on expectation of a carbon tax being implemented in the next 5-7 years, the company has begun alterations to its Much Asphalt Company's activities by modifying the plant to reduce the mixing temperature of asphalt to below 130 degrees Celsius. This reduces not only the energy consumption but also the emissions-intensity of production (CDP, 2009: Response to Question 1.1a).

In addition to its recognition that EE is where the real business and energy gains can be made, the company has also identified its power sector activities as presenting great opportunities to move towards a lower carbon path. Specifically, in diversifying away from coal the company is dedicating much time to investigating nuclear energy for South Africa. The company has strong and immense civil engineering capacities and a favourable nuclear competency. The company has been engaged in the Pebble-Bed Modular Reactor (PBMR) programme for ten years as well as the Nuclear 1 bid in recent times. Murray & Roberts indicated that it can direct a portion of their management capacity for such projects and hence the exploration of large projects.

While the company has been involved in hydropower projects since the 1970s, it does not have a strong presence in that sub-sector of RE in the African region.²⁴ While the company will consider looking into the potential for solar and wind technologies in future, its civil contractor skills make it less well-positioned to engage in such technologies without transforming its skills-set accordingly.

Rail projects are another key growth sector for the company with their management of the Gautrain project for the last four to five years. The company also recognizes its potential role in supporting government in the management of its water systems and infrastructure so as to secure better maintenance of such facilities.

3.3 Responsible industry action

Murray & Roberts Construction company recently joined the GBCSA and are aware that clients will in future make requests in regard to their desire for greening compliance. The respondent interviewed indicated that the GBCSA is primarily an architect-led programme

²⁴ They had bid for a hydro tender in the region but were unsuccessful.

which supports the views of property developers. In general, Murray & Roberts recognizes that there are cost implications to cleaner or more environmentally friendly construction activities, and that the cost per square metre of construction activities can be reduced through greener and more efficient practices over the life cycle of a building. While the company is currently not green star compliant in terms of buildings constructed, they do believe they have the capacity to be compliant in future. The company's knowledge of green products and materials is perhaps one limiting factor, however, as it is felt that the array of green materials is constrained but will hopefully evolve overtime.

The company has, similarly to Group Five's experience with its Nedbank Group client, experienced a direct client demand for greener building, with its ABSA Towers in the South of Johannesburg. In South Africa however, there is still a long road ahead before clients are willing to put money behind going completely green. Murray & Roberts indicated that there have been instances where clients have been informed of the available green technologies or products, but have not pursued them in their building due to possibly, financial constraints as discussed below.

3.4 Knowledge of government policy and incentives

Murray & Roberts indicated that they currently have a low level of understanding of government incentives as they are not apparent in relevant sectoral policy to date. The recently released National Climate Change Response Green Paper by the Department of Environmental Affairs mentions the need for the construction industry to incorporate green practices into construction activities in terms of EE in particular. Despite its mention however, the company reiterates the lack of clarity on government sectoral regulation which also emerged from the interview with Group Five. They did however mention anticipation of the impending regulation of commercial buildings which may have an impact on their business.

3.5 Barriers to the successful implementation of greening practices

A significant barrier recognized by Murray & Roberts has remnants of that identified by Group Five in that, scepticism around the problem of CC (or mind-sets) is seen to be one of the major inhibiting factors in the implementation of green practices in the industry to date. Certain sector role-players brush-off the concept of CC as a serious threat on the basis that they believe insufficient evidence exists to prove it is a problem. As such, knowledge of the economic imperative as well as the potential positive impacts of greening activities is needed in order to transform mind-sets in the industry.

Government funding in support of going green was also seen as a potential hurdle to the development of RE in South Africa. As an example, the respondent recognized that it is perhaps a 'big stretch' for Eskom and the South African government to pursue the development of nuclear energy in the country as well as to apportion the human resources to manage the regulatory processes associated thereto. In particular, clarity on the terms of compliance will be needed in future with regard to the Integrated Resource Plan (IRP) for electricity. This diversification in power will lead to the base of high technology skills being expanded in order to maintain the management capacity of such projects.

3.6 Suggestions for the further development of green action in the industry

A suggestion put forth in respect of sectoral policy for the industry was that the state should regulate commercial buildings in regard to green building practices such that the construction industry would have to comply. The GBCSA would play a pivotal role in the implementation of such programmes as they could act as the communication network for compliance requirements. In general, the respondent advised that the key target group of such government policies should be project developers and asset owners who will bear the

costs of the maintenance of green buildings in the long-run. Specifically, while for example, Murray & Roberts would have to ensure compliance with green buildings regulations in future, it is the property owner who will have to commit to the long-term sustainability of the green building constructed.

In order for RE to be successfully implemented, the respondent also recommended that the South Africa labour market needs to build capacity in terms of the kinds of high-skilled labour that RE development requires. This could afford the industry and country the opportunity to take advantage of the RE global market as well as achieving human development in a country where a skills-mismatch persists.

Another key recommendation made was that there is a great deal which construction industry players can learn from each other in terms of going green. In essence, going green would entail the unpacking of the supply chain process. In future construction companies will likely need to detail, to their clients, their full CO₂ impact on the environment. In order to do so accurately, a company would need to have a clear understanding of the carbon footprint of each of its suppliers in aggregate as well as in its disaggregated components – for example in terms of steel, cement supplier etc. Collaboration across the industry could go a long way in pinpointing such information as knowledge-sharing could reduce the costs associated with acquiring such information from suppliers. Also, given the down-stream purchasing power, major industry groups could filter the “green message” downward to ensure that their suppliers also prioritise EE processes and practices.

4 Summary of Key Points and Conclusion

The construction sector operates such that it alters the physical environment. Variations in such environment in turn affect the performance of firms within the sector. Whereas construction firms typically emphasise physical environmental risk to their business, the sector has a key role to play directly and indirectly in moving the process of GHG emissions reduction forward.

A few key trends currently pertain to the construction sector as set out by Group Five and as observed for other firms in the sector. These are taking place in terms of complex changes which are setting the scene for; changes in construction practices, an increased focus on the environment and, the introduction of greener practices and technologies. These are also in terms of clarity required from the South African authorities in terms of environmental priorities as these influence the type of interventions, investment and training with which construction firms need to engage.

A first key point that emerges from the construction sector is that large South African construction firms have relatively recently begun to focus on pursuing green practices and projects. The responses reflect environmental pressure emerging in South Africa and overseas for such practices as well as new opportunities becoming available in some areas, such as RE.

In the case of Group Five, requests by clients have influenced the firm’s ability to re-assess, internally, the extent to which its business divisions are capable or prepared to, take on greener projects. Combined with a view that CC opportunities exceed risks, Group Five is seeking to develop capabilities around greener practices and technologies on a wide scale across its business units. For Murray & Roberts “the consolidated Group risk register is used to identify the top strategic risks ... The risk tolerance philosophy is communicated to all managers and employees in an endeavour to incorporate this philosophy into the culture of the Group.” (CDP, 2009: Response to Question 1.1.). Group Five and other construction groups, such as Murray & Roberts see it as critical for the group to have the ability to offer low carbon solutions as required by clients; and “clients may start to build the cost of energy

or penalties into projects to enforce an energy efficiency target” (CDP, 2009, Response to Question 3.1.) In fact, this group consider responding to “informed client requests” one of the numerous risks associated with CC.

In turn, construction firms are investigating and preparing themselves to become involved in new RE projects. This is associated with some amount of internal changes. Group Five set up a new unit for this. Aveng has recently appointed an environment manager for the Group but of particular prominence in recent media reports are efforts by the group to pursue RE developments in South Africa. To date the Aveng Group has undertaken RE projects in Australasia (through its subsidiary, McConnell Dowell Corporation Ltd) where the firm’s expenditure is more robust than in South Africa and thus acts as a counter-balance to their accounts during times of a global economic recession. The group is also positioning itself around wind and solar energy for bids that will emerge in this sector in the near future (Engineering News, 2010a).²⁵ Aveng was recently reported to have established a RE unit within its Engineering and Projects Company (E+PC) and invested R20 million so as to position itself to bid for RE projects when they come into play in late 2010, or early 2011, when the final Integrated Resource Plan (IRP) is released (Engineering News, 2010a and 2010b). The group aims to particularly focus on wind and solar RE technologies and has already begun research into these and has expressed their willingness “...to bring its balance sheet to bear to facilitate power projects” (Engineering News, 2010b).

A second point to note for the sector is that all the large construction firms are engaging with products or strategies that ensure reduced energy consumption. For instance, Murray & Roberts have adopted a new technology around asphalt (Much Asphalt) that saves energy (Murray & Roberts, 2010c).

Internally, the identification of areas where change is required relies on practices to be altered to set up as well as to generally enhance environmental reporting. This process is still unravelling in the case of Group Five with a shift from *ad hoc* responses to systematically incorporate the environment in the thinking so that these take place from the project tendering and inception phases onward. Murray & Roberts set out in their 2009 CDP report that “investing in specific products and services [as CC specific investments] is market-specific and will be looked at for each operating company” within the group (Response to Question 5.1). However, the Group 2010 Annual Report sets out that an energy management initiative has now been launched for South African companies to reduce energy cost, and to ensure that energy is used effectively and efficiently. The strategy in place in that group focuses in the first phase on operations that contribute most to energy consumption. Of note, moreover, is the observation that firms focus on a range of issues: water usage and conservation, surface and ground water releases, improvements in the quality of air emissions, reduction in waste generation and improvements in recycling amongst others. Biodiversity preservation is also taken into account by the companies.

In common with many other construction companies, almost all Group Five business units now follow environmental management systems based on ISO14001. In the case of Murray & Roberts, 64% of the group is now certified; Aveng has begun to roll this out but is making rapid progress on this front.

More broadly, the process is difficult. It relies on a process of buy in and of commitments. It also requires sound information about new technologies and their costs so that payback

²⁵ McConnell Dowell has undertaken two key RE projects in the Australasia region; the Bogong Hydro Power Project in Victoria, Australia (whereby a 6km long, 5m diameter head race tunnel, two vertical shafts, a 1km long steel-lined high pressure tunnel, a power station to house twin 70MW generators, and a tailrace outfall into Lake Guy will be constructed) and, the Te Apati Wind Farm in New Zealand (which involves the construction of 55 turbines each capable of generating 1,65MW and a total capacity of up to 90MW) (Aveng, 2010). Further, the group has engaged in the Adelaide Showground Solar project (Engineering News, 2010b).

periods are established and alternatives are properly considered. Information is also needed for new products. As such, firms carry some amount of costs around testing and information gathering. Staff will also require training on newer products and technologies. Particularly for Murray & Roberts, however, GHG reporting compliance costs is a key risk area.

Of note in terms of progress is that large firms are influencing the practices of suppliers. There is thus the opportunity for a more extensive process of energy efficient and environmentally-friendly products emerging within South Africa beyond construction firms – in manufacturing and through to service providers. The GBCSA can play an important role in working closely with the construction industry in engaging in green practices.

Thirdly, the large companies see a great number of risks associated with CC. Though physical risk is evidently critical for the companies, reputational risk features prominently amongst the list of CC risks. This is emphasised by Aveng in its Annual Report. For Group Five, reputational risks interact with the ability to tender, plan and execute a project that takes into account CC. For Murray & Roberts, it is operating in accordance with “regulatory requirements” as well as “stakeholders and client expectations [which] are constantly evolving and generally becoming more rigorous” (CDP, 2009, Response to Question 3.1).

A final point to draw from the industry is that greater efforts need to be deployed by the authorities on South Africa’s objectives around various environmental commitments.

Internationally, a joint plan is needed whereby government engages in discussions with business and assesses what is feasible (in the short-, medium- and long-term) and practical in terms of the implementation of the Cabinet-approved peak, plateau, decline trajectory of the Long-Term Mitigation Scenarios (LTMS). Nationally, the industry perceives that legislation is under way for mandatory reporting. Simply the expectation that these mandatory changes will come into effect has motivated firms to engage with related changes already. Murray & Roberts, in their 2009 CDP report state that “The mitigation strategy for regulatory threat is to be proactive rather than reactive, where possible changes in regulations are anticipated and plans put in place in advance of legislation/regulation changes.” Group Five is also independently developing a similar strategy.

Locally, municipal governments have a crucial role to play in the implementation of climate change mitigation policies as well as the monitoring and evaluation thereof. Cities are responsible for 80% of all CO₂ emissions and 60% of all freshwater consumption in South Africa. However, for local governments to have authority to enforce policies, it requires clarity on the structure thereof – which is communicated to them from a national government level.

The construction industry has recently experienced a significant downfall in its productivity in response to the global recession. It is now realizing that, by diversifying its portfolio of activities, construction firms can improve their competitiveness in the global market and mitigate market risks associated with investment volatility. The case study with Group Five revealed that labour market issues have been the dominant issue of discussions between industry and trade unions. In light of this, these discussions should be harnessed to focus on the benefits associated with green development and the linked green employment creation thereof. This will further link to other development agendas in the country especially in relation to job creation and poverty alleviation.

In general, while a sectoral climate change development plan could assist the construction industry in taking its green practices forward, it will require interactive discussions between government and construction industry players as well as a transformation of mind-sets within the sector. In particular, it is within the power of the construction industry players to affect the transition towards a low carbon path in the construction industry in South Africa, and this is evidenced by actions underway in large industry players like Group Five, Murray & Roberts and Aveng.

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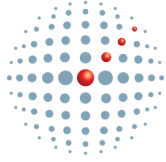
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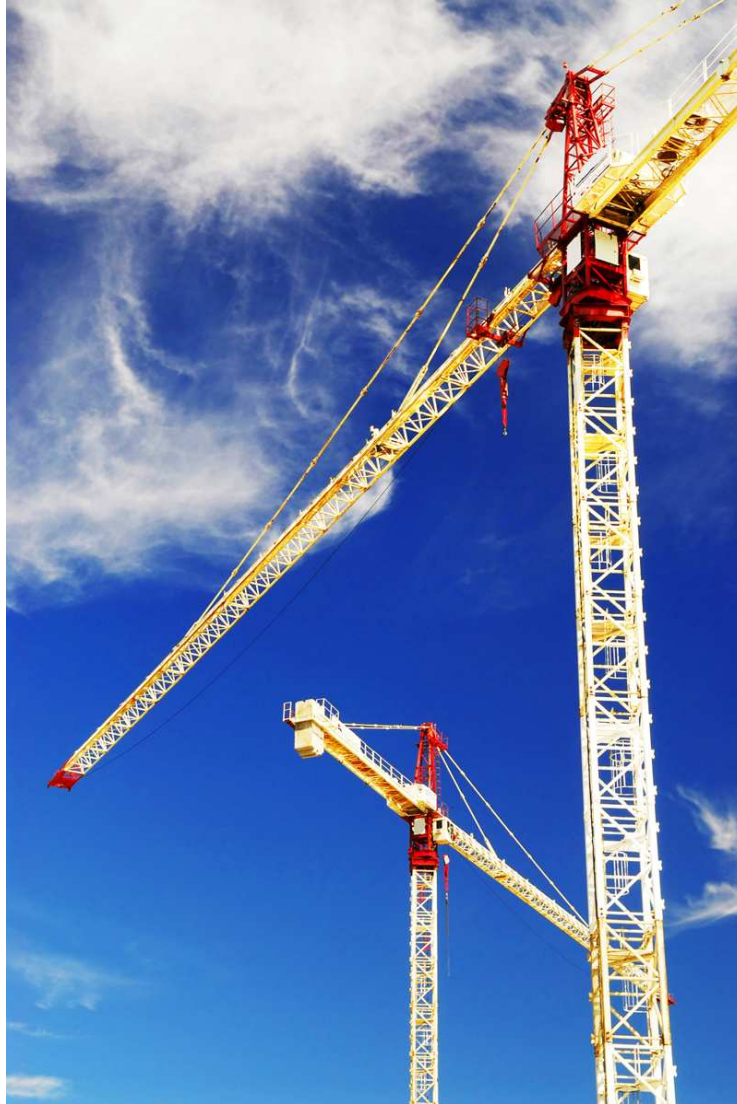
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Carbon Asset Management Company (PTY) Limited trading as Camco Advisory Services South Africa

PO Box 70 Woodlands Office Park, Western Service Road, Woodmead 2080

t +27 11 253 3400 f +27 11 804 1038

Registered office address as above