



## Measuring Eskom’s footprint in South Africa

### Summary

Eskom is a vertically integrated, state-owned utility operating in South Africa. This case study highlights the “Eskom Factor”, a collective term used to refer to the company’s footprint in the country, which has been quantified through a comprehensive assessment of the economic, social and environmental impact, both positive and negative. First instituted in the 2011 financial year, the assessment is based on the “Measuring Impact” methodology developed by the World Business Council for Sustainable Development, which has been applied within the utility’s specific context. The “Eskom Factor” project is a culmination and analysis of a series of qualitative and quantitative data sets totaling some 150 indicators, which yielded six key areas of influence where Eskom’s footprint helps to shape South Africa’s development.

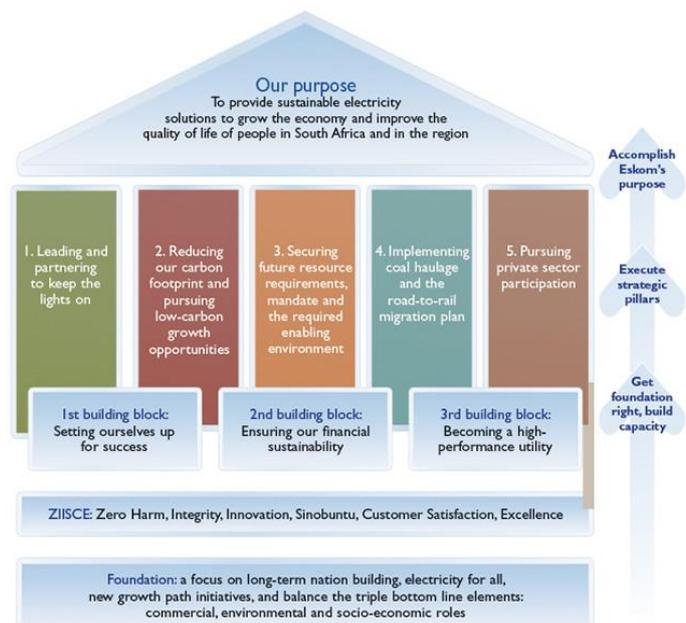
### About Eskom

Eskom Holdings SOC<sup>1</sup>, Ltd. is a state-owned company wholly owned by the government of South Africa. Eskom is Africa’s largest electricity producer, generating approximately 95% of electricity used in South Africa and approximately 45% of electricity used across the continent. It is also one of the top 20 utilities in the world when measured by generating capacity.

The company is active in all elements of the electricity supply chain including generating, transmitting and distributing electricity to industrial, mining, commercial, agricultural,

residential customers and redistributors. The utility is regulated under licenses granted by the National Energy Regulator of South Africa (NERSA) and receives revenue based on NERSA-approved set tariffs.

According to Eskom’s joint shareholder compact with the Department of Public Enterprises, the utility’s mandate is to provide electricity in an efficient and sustainable manner and integrates the importance of its commercial, environmental and socio-economic roles into its core strategy. Eskom is a critical and strategic contributor to the government’s ability to provide citizens with a secure supply of electricity. In pursuing its



<sup>1</sup> SOC: State Owned Company

mandate, Eskom aims to provide sustainable electricity solutions to facilitate economic growth and improve the quality of life of beneficiaries. While the majority of its operations are focused in South Africa, the utility has active relationships with the other countries in the Southern African Development Community region through its participation in the Southern African Power Pool (SAPP).<sup>2</sup>

Insufficient supply of electricity is perhaps one of the largest problems facing Eskom and the whole of South Africa. Eskom estimated the average cost of electricity un-served (COEU) for the overall economy to be around US\$2.7/kWh. Given the current estimated gap in supply as described above, the overall cost to South Africa of the electricity gap amounted to more than US\$11.7 billion in the 2011 financial year. Not only is this a major disruption for the wider public, it has also harmed South Africa's competitiveness as an investment destination. This makes Eskom's commitment to expanding energy supply crucial with regard to attracting new fixed investment and providing an environment in which economic growth can be promoted.

### **WBCSD methodology and its application by Eskom**

The framework used to determine Eskom's footprint in South Africa is based on the "Measuring Impact" methodology developed by the World Business Council for Sustainable Development (WBCSD).<sup>3</sup> The methodology enables businesses to measure and assess their contribution to economic and broader development goals in the societies in which they operate. This understanding can then be used to inform operational and long-term investment decisions and allow for better informed conversations with stakeholders.

The framework is based on a four-step methodology that attempts to merge the business perspectives of its contribution to development with the societal perspectives of what is important where that business operates. It is rooted in a business approach and begins with measuring what business does through its business activities.

The WBCSD framework was applied to define Eskom's economic, social and environmental impact along the three key stages of the utility's major activities:

#### **1. BUILD: The construction of new power plants**

Eskom is currently building two of the world's largest dry-cooled, coal-fired power plants and a pumped storage scheme returning three power stations to service, as well as investing in improvements to the transmission grid. All together, the total capital expansion program is estimated at some US\$ 40 billion excluding capitalized interest, and will add 17GW of much-needed electricity generating capacity to the national grid upon completion in 2018. Through three mega new-build projects (Medupi, Kusile and Ingula), Eskom has awarded a total contract value of over US\$ 7.6 billion to local South African suppliers.

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<sup>2</sup> See <http://www.sapp.co.zw>

<sup>3</sup> The full details of the WBCSD methodology are available at <http://www.wbcspd.org/work-program/development/measuring-impact.aspx>

Eskom facilitates local employment through construction of new facilities as well as providing necessary training with the goal of building transferrable skills. Eskom's localization content exceeds 50% across all major capacity expansion projects, meaning that for every Rand spent by Eskom, more than half remains within the country. This has an immediate positive impact on the local community and increases future employment opportunities for those who have acquired these additional skills. During the construction process, Eskom makes a significant contribution to local infrastructure through the development of roads, railways, telecommunication, sewage and other infrastructure required to support major projects and in furtherance of supporting communities' developmental needs

## **2. OPERATE: The generation, transmission, distribution and retailing of electricity**

Since 1994, the economy of South Africa has grown substantially, with gross domestic product having risen by 67%. Over this period, however, electricity generation capacity has increased by just 14%. This has resulted in a mismatch between supply and demand, with the shortfall of energy supply resulting in increased load-shedding from 2005 through 2008. While the utility is now able to reliably continue serving the wider public, various Eskom customers still cannot expand their businesses due to the limited supply of electricity.

It is widely accepted that reliable access to electricity is an important aspect of social and economic development. However, financing the expansion of electricity supply facilities also imposes a negative impact on the economy in that cost-reflective pricing results in large price increases scheduled throughout the near future. This will, in turn, increase production costs for the energy-intensive industrial sector and could reduce competitiveness in export markets. Through a progressive tariff scheme, an increase in per-unit cost of electricity which mirrors rising consumption and the continued promotion of free basic electricity, Eskom seeks to neutralize the negative impact of electricity price increases for low-income and low energy consumption customers.

## **3. END USAGE: The usage of electricity by customers for lighting, heating, cooling, mechanical and chemical energy**

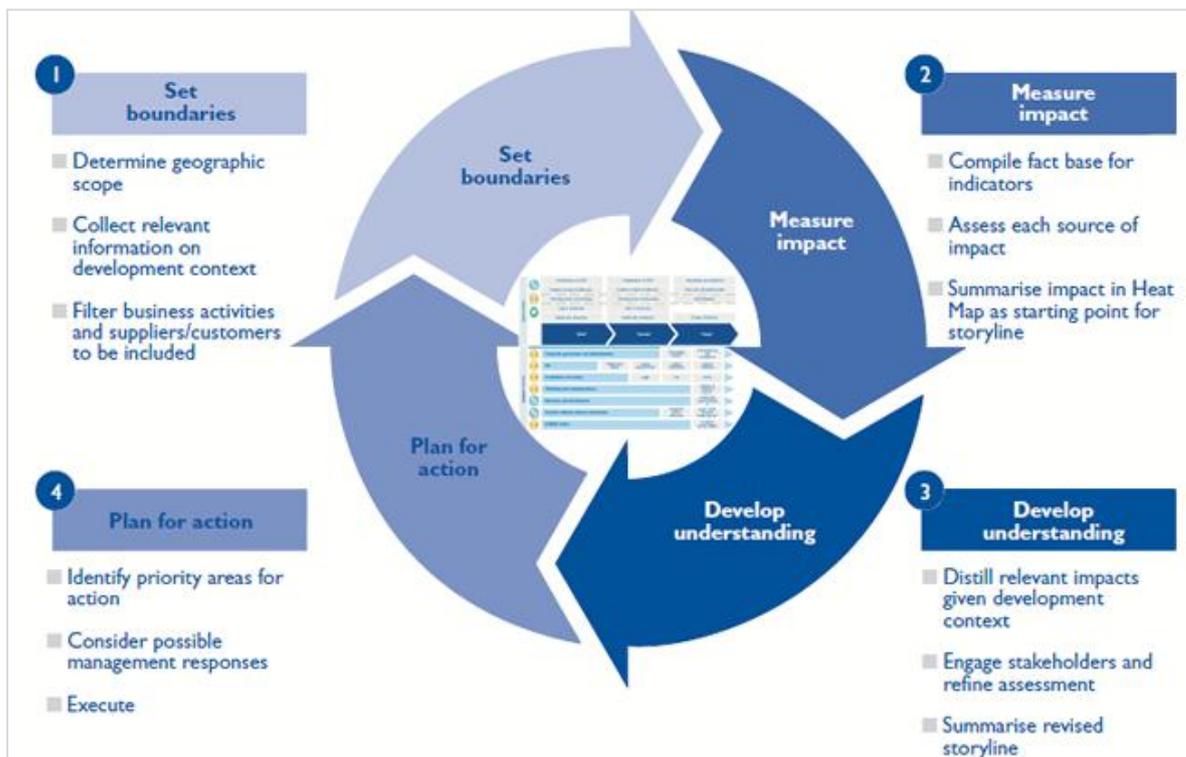
Eskom is a critical and strategic contributor to the government's performance with regard to provision of a secure supply of electricity. The utility supports the South African government's objective of expanding electrification and has committed to assisting the government in its aim to achieve universal access to electricity for all South Africans. Eskom has helped to electrify four million homes since the start of South Africa's electrification program in 1991 and by the end of the 2011 financial year, 83% of South African households had access to electricity. Moreover, through the establishment of new electricity generation and transmission capacity, Eskom contributes significantly to improving power availability and reliability.

As reflected in a 2008 study by the World Bank, *The Welfare Impact of Rural*

*Electrification: A Reassessment of the Costs and Benefits*<sup>4</sup>, families in non-electrified homes in South Africa spend more than one hour per day collecting firewood – with the majority of the burden falling on women. Electrification allows this time to be spent on a combination of educational and income-generating activities by allocation the additional hours of light to educational purposes while reducing the domestic burden on women and thus contributing to closing the gender gap. In addition, electrification supports improved health outcomes by enabling refrigeration (from medicines to food) and medical technologies. Indoor pollution through displacement of domestic wood and coal burning can also be avoided through electrification or the deployment of gas.

Furthermore, the impact of supporting activities was also included. These cover, for example, governance, human resources, marketing and communications, research and development and procurement practices.

The WBCSD’s Measuring Impact Framework consists of four steps – the following diagram shows how Eskom depicted them:



<sup>4</sup> Available at <http://go.worldbank.org/QZGMM1PID0>

The assessments were carried out through the structured four-step approach:

### Step 1: Setting the boundaries of the assessment

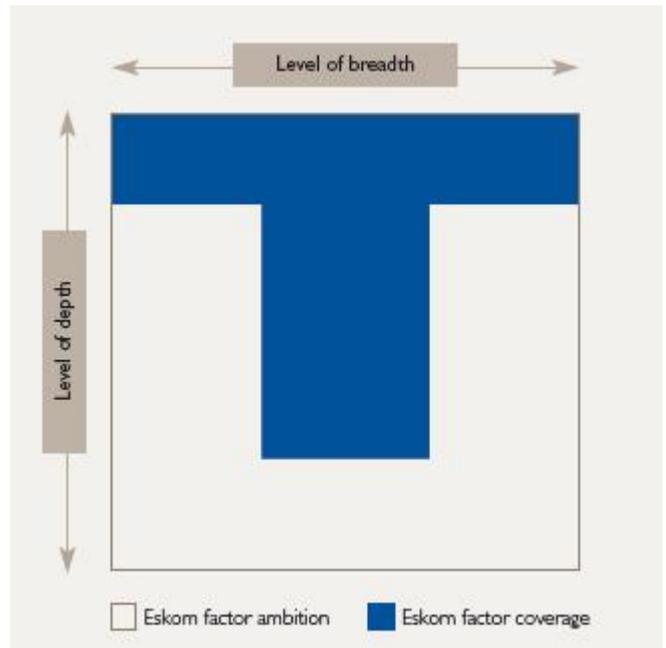
This step includes determining the geographical regions and activities of the business for inclusion in the assessment, as well as understanding the broader development goals and circumstances of the selected geographies.

For this first assessment, Eskom set the boundary as its South African operations. In order to assess the full impact of Eskom’s activities, the sources of impacts were extended to include the activities of Eskom’s suppliers and, to some extent, those of the employees and key customers, insofar as they are attributable to Eskom’s business context, and the information is readily available.

The Eskom factor therefore covers an extended impact area termed “the Eskom cloud”.

In order to set realistic goals for the initial factor report, a balance needed to be created between available time to complete the study and an ambition to be comprehensive and complete in the assessment.

The scope of the study, as illustrated in the adjacent graphic, therefore provides a broad overview of Eskom’s entire footprint in South Africa, identification and description of the Eskom key sources of impact and an in-depth review of the impacts of the new-build projects. Eskom plans to expand the “T” in future iterations of the report to include in-depth study of the impacts of other areas of operations, with a specific focus on additional details up and downstream of their activities.



### Step 2: Measuring the impact

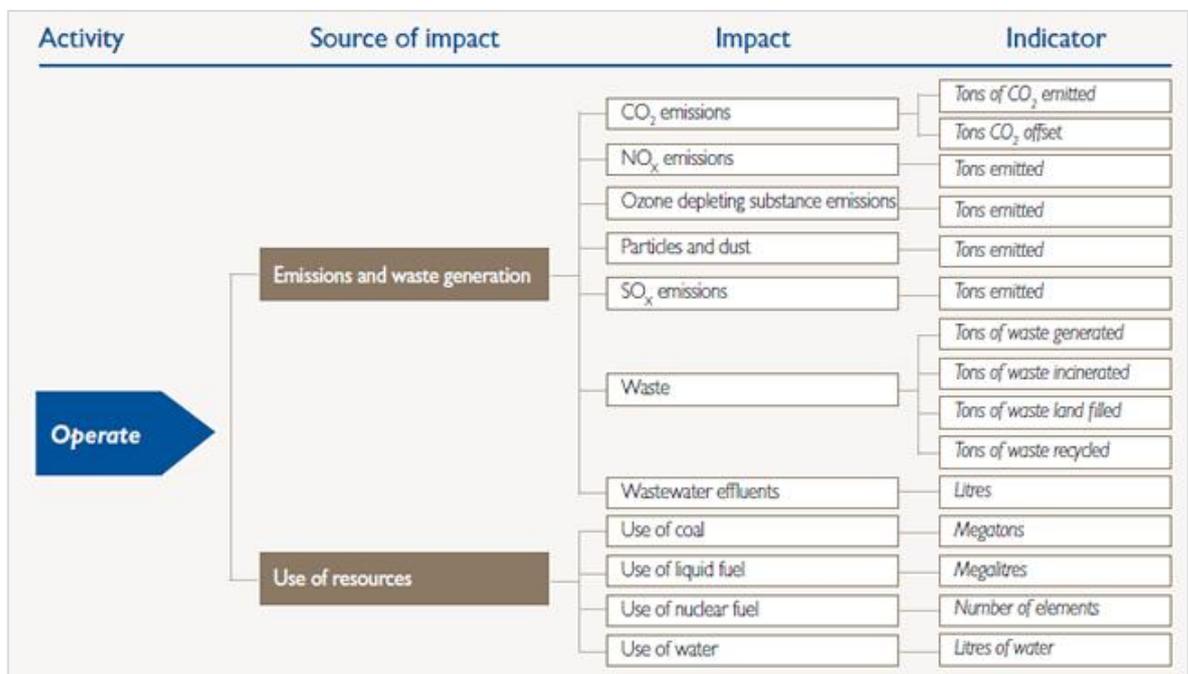
This second step consists of identifying and measuring, where possible, the direct and indirect impacts arising from the company’s activities and mapping out what impacts are within the control of the company and what it can influence through its business.

The Eskom Factor Impact Tree depicted below gives an overview of the Eskom factor methodology. An activity gives rise to the first level of impact. These key sources or drivers of impact – for instance the use of resources – further branch out into more specific areas of indirect impacts, i.e. water usage, use of land, etc. At the next level, the methodology includes concrete measurable indicators for each impact. In this example, liters of water used and square meters of the different types of land employed are

quantified. Based on these numbers, it is possible to then judge whether the overall impact is positive or negative. The same process is followed for each first-level impact.

As explained above, Eskom identified the sources of impact with respect to the three major activities of the company: building new facilities, operating these facilities and, ultimately, providing electricity to South Africans. Around each of the three core activities, the Eskom factor methodology details the main sources of economic, social and environmental impact. More than 150 indicators were identified, evaluated and consolidated to determine the Eskom Factor.

### *Eskom Factor Impact Tree*

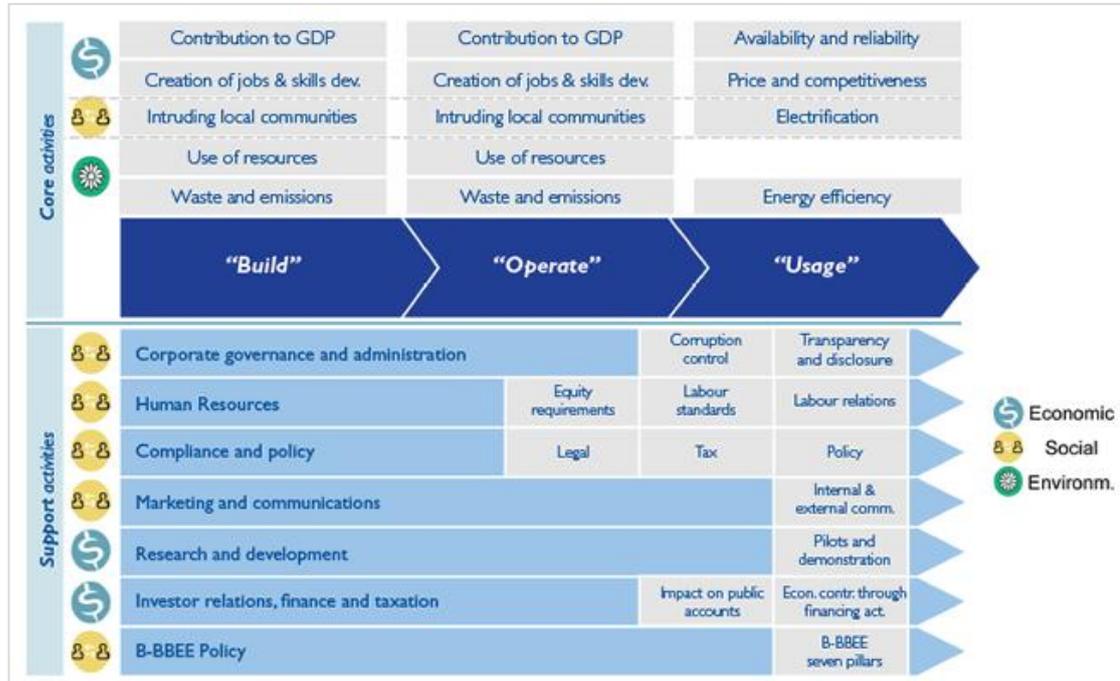


### **Step 3 : Developing understanding**

Key activities to complete this step are to define the most relevant impacts for the given development context, engaging with stakeholders to refine the assessment and to use this input to revise understanding in order to provide a balanced result.

To determine the relevance and significance of areas of impact, key questions posed were: “Would it have happened without Eskom?” and “Does Eskom have influence over it?” The resultant major impacts were grouped with respect to South Africa’s developmental goals and portrayed in a single image, referred to as the Eskom Factor Heat Map. The latter, depicted below, was the basis of engagement with stakeholders, as detailed on this site: [http://www.eskomfactor.co.za/stakeholder\\_engagement.php](http://www.eskomfactor.co.za/stakeholder_engagement.php)

## Eskom Factor Heat Map Framework



### Step 4 : Planning for action

Finally, Eskom was not only seeking insight into its impacts but was looking to convert this knowledge into business actions that ensure continual improvement. By identifying key areas for action and evaluating different possible interventions, the utility could put together a plan aimed at continually improving Eskom's impacts.

### Eskom's impacts on South Africa's economy, society, and environment

The "Eskom Factor" project is a culmination and analysis of a series of qualitative and quantitative data sets totaling some 150 indicators. The result of this analysis has identified the following six key areas of influence where Eskom's economic, social and environmental footprint helps to shape South Africa's development:

#### **Economic growth engine**

*Contribution to the economy directly through economic value-add and indirectly through provision of primary energy, capital investments projects, wages and other operational expenditure*

Eskom's impact on the economy of South Africa is extensive, with the economic value added by the utility to the South African economy reaching US\$ 4.93 billion in the 2011 financial year.

In 2010, Eskom contributed approximately 1.3% of total South African gross domestic

product through its core activities – the generation, transmission and distribution of electricity.

Through the provision of electricity, Eskom also supports a range of other industries that supply it with goods and services ranging from coal, metals and petroleum to engineering, construction, financial and business services. Overall, approximately 7.4% of South Africa's gross domestic product can be traced back to the direct, indirect and induced impacts of Eskom.

In addition to facilitating investment through increased stability, Eskom's procurement practices support the shared growth principles of the new National Growth Path and the broad empowerment of South Africans. Since the introduction of the Broad-Based Black Economic Empowerment (B-BBEE) Codes of Good Practice in February 2007, Eskom has been working to comply with the new standard and to focus its sourcing activities on B-BBEE-compliant suppliers. Eskom aims to allocate at least 50% of their expenditures to B-BBEE-compliant suppliers. During the 2011 financial year, Eskom surpassed this target for the first time (52.4%).

#### ***Employer, job creator and capabilities developer***

*Provision of direct and indirect jobs and creation of new jobs through expansion of operations and formal and on-the-job skills development*

Eskom is one of the largest employers and buyers of goods and services in the country. In addition to the over 40'000 people Eskom employs directly, indirect employment amounts to some 89'000 jobs. Overall, these jobs sustain the livelihoods of some 516'000 South Africans.

That being said, the price increases approved by the decision of the National Energy Regulator of South Africa's to move towards a cost reflective tariff will have a negative impact on all users of electricity, but particularly industrial, commercial and residential customers. This may result in an estimated loss of around 16'000 jobs, mainly in energy-intensive industries as they cut back on production.

During 2011, Eskom provided 298'000 training days, equivalent to seven days of training per employee. Furthermore, Eskom trains current and potential business partners and creates training opportunities at its major suppliers.

#### ***Impact on local communities***

*Employment and education of local people, provision of infrastructure and low impact relocations*

Eskom's objective is to create as much local employment as possible in the construction of its new facilities and to provide local communities with the necessary training. 54% of the workers employed on site to build this new infrastructure are sourced from the same areas where construction is underway. This has an immediate positive impact on the local community and even when the employment is temporary, it increases the future employment opportunities for people who have acquired additional skills. In the process of construction, Eskom makes a significant contribution to local infrastructure through the

development of road, rail, telecommunication, sewage and other infrastructure that is required to support a major project.

At the same time, these activities also cause disruption, place pressure on existing facilities and produce dust and noise during the construction period, which can last several years. At times, there has been a need to relocate people in the immediate surroundings of the construction sites to other areas. Eskom tries to minimize the negative impact of these moves and works closely together with the affected families and local community leaders to find solutions that will be acceptable to all involved.

Despite Eskom's efforts to improve the well-being of South Africa, Eskom's activities carry negative social impacts as well. Due to the large-scale nature of power generation projects and the need to operate a national power grid, relocation of displaced populations is sometimes necessary. The company uses consultations and agreements in an inclusive approach in order to minimize the negative impact on affected populations. Relocations are combined with the offer of benefits such as electrification of the new home and agricultural training aimed at moving beyond subsistence farming.

There are also health and safety issues associated with construction. Eskom aims to eliminate injuries and fatalities both in the public, within the company, as well as its suppliers and business partners through the implementation of activities included in its Zero Harm Policy.

### ***Environmental footprint***

*Minimization of impacts of its activities on the natural environment through improved efficiencies*

Given its current power generation mix focused on coal, Eskom has a considerable CO<sub>2</sub> footprint and is a large emitter of sulphur dioxide and nitrogen oxides (SO<sub>2</sub> and NO<sub>x</sub>) and particulates. During the 2011 financial year, the company emitted some 230 metric tons of CO<sub>2</sub>. When benchmarking Eskom's carbon footprint against a set of seven leading developed and developing economies, the company ranks as the second-highest emitter of CO<sub>2</sub>.

Eskom's carbon footprint will continue to grow in the short term despite planned gains in CO<sub>2</sub> efficiency. The utility has therefore undertaken the strategic objective of indentifying and managing the impacts of climate change. It is also adding more renewable energy projects to its power mix. Eskom is installing photovoltaic solar panels at 17 sites with the intention for all sites to be operational in 2013. The Greenfields wind farm at Sere, in the Western Cape, will add another 100MW to the power supply system when completed in 2014. Additionally, a 100MW solar thermal power pilot plant is in development, with construction expected to start by the end of 2015.

Eskom's coal-focused generation mix also requires a significant use of water, a scarce and important resource in South Africa. In the 2011 financial year, the utility used 327 billion liters of fresh water. 1.35 liters of water were needed to generate each kilowatt-hour of electricity, making it presently responsible for around 2% of the annual consumption of South Africa's fresh water supply. Over the coming years, Eskom intends to increase its water usage efficiency and reduce its water consumption. Both coal-fired new-build

projects, Medupi and Kusile, will use dry-cooling technology, which will reduce Eskom's relative water consumption per unit of electricity produced by as much as 90% compared to a wet-cooled station. In future years, Eskom also intends to apply a number of new innovative water-saving technologies to reduce its water usage by 26% by 2030.

***Enabler of South African economic and social development through electricity provision***

*Support investment to enhance availability and reliability of electricity supply in support of government's objective to advance electrification*

Eskom is supporting the government's objective of advancing electrification. Since the beginning of the electrification program, Eskom has electrified over four million homes and plans to assist government to achieve universal access to all South Africans, improving lifestyles and providing opportunity to enter the economy. Moreover, through the building of new electricity generation and transmission capacity, the company will contribute significantly to improving power availability and reliability.

A demand-supply gap had been forecasted for South Africa in the order of 6 terawatt hours (TWh) for the 2011 financial year. Load shedding in 2011 was avoided through tight operational controls. Through a progressive tariff scheme, charging more per unit of electricity as consumption rises, and the continued promotion of free basic electricity, Eskom seeks to neutralize the negative impact of electricity price increases for low-income/low-energy consumption customers.

Finally, Eskom is committed to promoting energy efficiency initiatives such as the 49-million campaign, which aims to increase awareness of wastage and help customers reduce their electricity usage.

***Catalyst for change in South Africa***

*Working as a role model for responsible business in South Africa through adherence to standards, regulations and government policies; upholding accountability, transparency and responsibility in daily business operations*

At the community level, Eskom carries out corporate social investment programs through the Eskom Foundation, a non-profit company wholly funded by Eskom. The activities of the foundation focus on three main areas: job creation, skills development and poverty alleviation.

The Foundation supports social and economic projects and provides grants and donations to community-based organizations, development agencies and organizations involved in philanthropic work for the development of disadvantaged populations as well as providing grants to small and medium-sized black enterprises.

The utility has invested some US\$ 7.3 million in corporate social investment initiatives during the 2011 financial year.

At the personal level, Eskom offers its employees access to comprehensive occupational health and wellness services. Eskom offers an assistance program, including consultation

on work-life balance, counseling on traumatic events and health evaluation. Regarding chronic diseases, Eskom has implemented initiatives to combat tuberculosis and HIV/AIDS. In addition, it has run a large campaign on HIV awareness among staff.

### Stakeholder engagement

The Eskom Factor is intended to be a thorough assessment of Eskom's impact on the economy, society and the environment during the 2011 financial year not only in a direct sense, but also through Eskom's immediate suppliers and business partners.

The WBCSD methodology used to develop Eskom's impact assessment encourages stakeholder engagement through open dialogue in order to create a shared understanding of business impacts and societal needs and to explore what the company could do to address these needs.

Once Eskom developed the initial impact assessment, a draft report was used as the basis of engagement with a range of financing institutions, major suppliers and customers, nongovernmental organizations, and employees. Relevant forums were targeted for select one-on-one engagements with key stakeholders. These engagements involved delivering a presentation on the Eskom Factor Heat Map and summarizing Eskom's impacts as stated in the report. An open discussion followed to understand the stakeholders' views on the results presented. Additionally, key stakeholders were encouraged to comment on the online version of the report and to answer a questionnaire regarding their opinions of the document.

Overall, the report was received positively by stakeholders, particularly with regard to Eskom's impact on gross domestic product, direct and indirect job creation, the six key messages, electricity being an important driver of regional cooperation, and Eskom's water efficiency programs. However, the questionnaire indicated that Eskom needs to bolster public awareness, particularly around the WBCSD Measuring Impact Framework and Eskom's B-BBEE processes and achievements. A general consensus was reached that Eskom, with the assistance of the government, should invest in educating South African communities on how they can reduce the use of electricity, as several respondents expressed disagreement that consumers were aware of consumption reduction methods. As per the WBCSD framework's methodology, the overall assessment was refined in order to incorporate stakeholder feedback in the final Eskom Factor report.

### Looking ahead

Eskom aims to further increase its positive impact on South Africa while reducing its negative environmental burden. The utility produced the "Eskom Factor" study as a basis for stakeholder engagement and invites its stakeholders to participate further.

Looking ahead, based on Eskom's initial assessment and stakeholder feedback, the utility has two key priority areas for action:

1. Supply chain assessment
2. Carbon reduction aspirations and research investments

As the attempt at conducting a quantitative analysis was unsuccessful due to limited public data availability, improving the robustness of the quantitative data analysis in the future will require in-depth engagements with suppliers. With regard to carbon reduction, Eskom is currently working to diversify its power sources by adding more renewable energy projects to its power mix. In accordance with stakeholder emphasis on a viable mix of sustainability and access, this will remain a key priority for Eskom over the next five years.

For the 2012-2013 financial year, Eskom has created a plan focusing on five key areas where step changes are required to create a solid platform to shift performance and grow sustainably, underpinned by the vision of becoming a top-five performing utility company (see table on the right):

- Safety
- “Keeping lights on”
- Ensuring financial sustainability,
- Improving operations
- Delivering on the capacity expansion program



### More information

- For a brief video summary of the Eskom Factor report, visit: <http://www.eskomfactor.co.za/eskom-factor-story.php>
- For the extended report, visit: [http://www.eskomfactor.co.za/downloads/Eskom\\_LO.pdf](http://www.eskomfactor.co.za/downloads/Eskom_LO.pdf)
- For a comprehensive list of Eskom’s key measurable indicators, visit: [http://financialresults.co.za/2012/eskom\\_ar2012/divisional-report/key-indicators.php](http://financialresults.co.za/2012/eskom_ar2012/divisional-report/key-indicators.php)
- WBCSD Measuring Impact Framework: <http://www.wbcscsd.org/work-program/development/measuring-impact.aspx>

