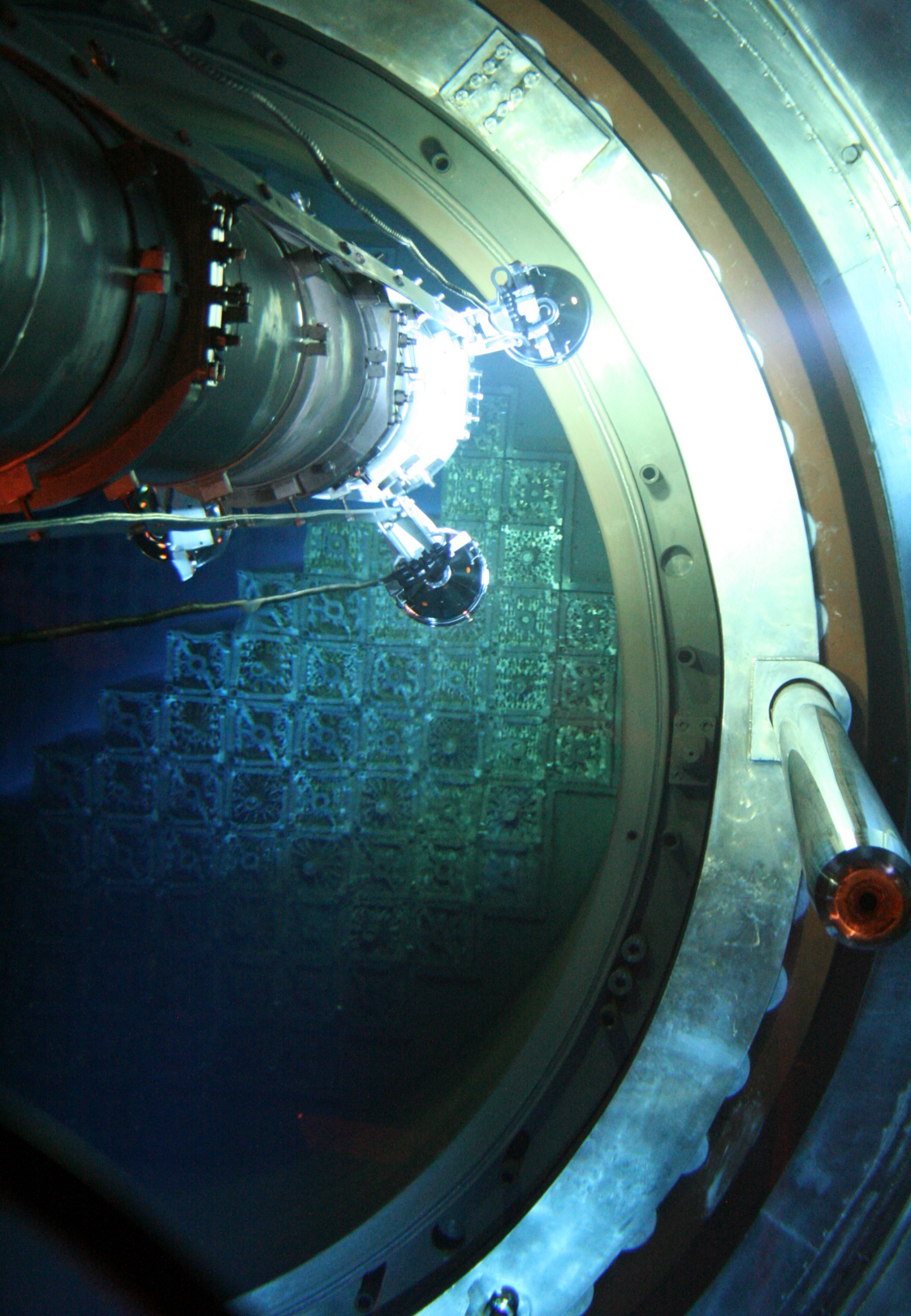


The background of the entire page is a photograph. In the foreground, three zebras are grazing in a green field. In the background, a large, grey, dome-shaped industrial structure, likely a cooling tower or part of a power station, is visible behind a chain-link fence. The sky is clear and blue.

Economic Impact Assessment of Koeberg Power Station

Eskom Holdings SOC Ltd.

March 2017





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How did Koeberg develop?



Pre-1980s

Prior to the development of Koeberg

- South Africa was highly **dependent on coal**
- In the 1950s there were discussions on **diversification** through other means of energy generation and **the utilisation of nuclear power**
- Nuclear power was seen as a **viable alternative** due to lower operating costs and lower carbon emissions relative to coal-based power generation
- In 1966, Eskom purchased a farm near Cape Town, which would become Koeberg
- Koeberg, South Africa's first nuclear power station, became operational in **1985**

After the development of Koeberg

- Initially Koeberg supplied **100% of all energy** demanded in the Western Cape
- This has changed to **50%**, due to changing demand*
- Koeberg is the **only nuclear power station in Africa**
- Koeberg can **accommodate several additional nuclear power reactors**, which is under consideration
- Koeberg has the capacity to **supply 1860MW to the national grid**, which amounts to approximately **5.6%** of South Africa's electricity needs**



Post-1980s

*Eskom, Koeberg Power Station, nd. http://www.eskom.co.za/AboutElectricity/VisitorCentres/Pages/Koeberg_Power_Station.aspx

**Eskom, Eskom Integrated Report, 2016. http://www.eskom.co.za/IR2016/Documents/Eskom_integrated_report_2016.pdf

Koeberg and economic growth



Electricity is a **key input** for the majority of products and processes in our economy, making Koeberg a **direct contributor to economic growth**, both in the Western Cape and South Africa

Koeberg's **forward and backward linkages** with other industries expands on this direct impact in the form of **indirect and induced impacts**

Koeberg produces energy in a **cheap** and **reliable** way



Koeberg's investment in infrastructure **contributed positively** towards improving **economic development** in the Western Cape, as well as the rest of South Africa over the past few years



2012/13

to

2015/16

Koeberg's electricity generation and operations contributed to a **more efficient and productive economy** through the **long-term nature of the economic benefit streams** it created, especially in **downstream user industries**

It is also evident that **future investment in Koeberg** will continue to have a **positive impact** on the Western Cape and South African economies

IRP key targets

Increase generation capacity to **81 350MW** by 2030*



Integrated Resource Plan (IRP)

Through Koeberg's **planned investment**, Eskom is on track to contribute to achieving this target

*Integrated Resource Plan, IRP 2010-2030.
http://www.energy.gov.za/files/irp_frame.html

Koeberg's estimated combined impact

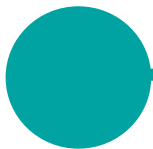
Current (2012/13 – 2015/16)



Estimated economic activity of
R53.3 billion

R30.2 billion
in Western Cape

R23.1 billion
in the rest of South Africa



Sustained on average per year, 1 786 direct jobs
and created 14 110 indirect and 19 837 induced
jobs



19 086
on average per year, in Western Cape

16 647
on average per year, in the rest of
South Africa



Estimated government revenue
of R16.4 billion

R7.8 billion
in Western Cape

R8.6 billion
in the rest of South Africa

through investment and operations

Planned (2016/17 – 2019/20)

Estimated economic activity of
R52.9 billion



R29.6 billion
in Western Cape

R23.3 billion
in the rest of South Africa

Estimated to sustain on average per year 1 564
direct jobs and create 14 852 indirect and 20 312
induced jobs



19 538
on average per year, in Western Cape

17 190
on average per year, in the rest of
South Africa

Estimated government revenue
of R16.4 billion



R7.7 billion
in Western Cape

R8.7 billion
in the rest of South Africa

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Western Cape

Koeberg's estimated contribution to long- ...through future capital investments



Capital investment is important to ensure Koeberg's sustained existence which includes operational projects as well as plant and machinery

Every **R1** of new investment potentially adds **70 cents** to the Western Cape economy and another **50 cents** to the rest of South Africa's **GDP**



3 jobs in the Western Cape and **1 job** in the rest of South Africa per **R1 million** invested



Every **R1** new investment potentially adds **36 cents** to **national government revenue**



Potential **poverty alleviation** as **14%** of household income generated in the Western Cape and **17%** in the rest of South Africa will flow to **low-income households**



term economic development

...through day-to-day operations

Since GDP represents the total value of all final goods and services produced in the country, it is fundamental to estimate Koeberg's contribution through **day-to-day operations** towards economic growth



Every **R1** of spend on operational cost adds **83 cents** to the Western Cape economy and another **64 cents** to the rest of South Africa's **GDP**



2 jobs in the Western Cape and **2 jobs** in the rest of South Africa per **R1 million** spent



Every **R1** of spend potentially adds **45 cents** to **national government revenue**



Potential **poverty alleviation** as **12%** of household income generated in the Western Cape and **15%** in the rest of South Africa will flow to **low-income households**





Quality of jobs

WANTED



The government's identification of the **top 100 occupations in high demand** in South Africa features many skills associated with the **electricity sector** that are in **short supply**



The **semi-skilled and skilled jobs** offered by Eskom comes with **above-average salaries** in order to **recruit and retain** these employees with **scarce skills**

National Development Plan 2030 envisages building a developmental state with skilled managers and workers in the labour force

National goals

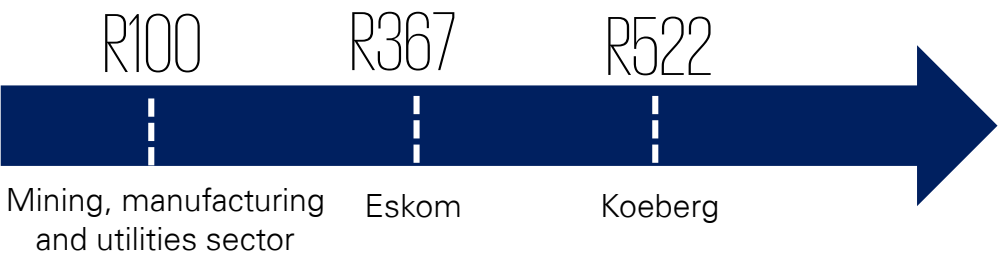
United Nations Development Programme: "full and productive employment, and decent work, for all women and men by 2030."



Across all sectors in the Western Cape, Eskom employees – and in particular those **working at Koeberg** – earn **more than the industry average**



For each **R100** earned for a semi-skilled worker:



For each **R100** earned for a skilled worker:






Source: Eskom data and KPMG calculations

What happens with waste at Koeberg?

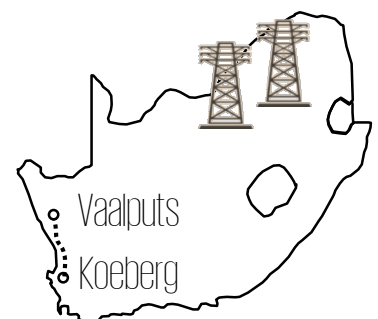


Koeberg produces nuclear waste, thus careful **waste management and disposal** is critical

	Low-level waste	Intermediate-level waste	High-level waste
Waste management	<p>Compressed into sealed and marked steel drums</p> <p>Initially stored at Koeberg in steel drums</p> 	<p>Solidified by mixing it with a cement mixture and then poured into concrete drums</p> <p>Initially stored at Koeberg in concrete drums</p>	<p>Intermediate storage through underwater storage in fuel racks in the reactor fuel pools or in dry storage casks at Koeberg</p>
Waste disposal	<p>Transported from Koeberg to Vaalputs in specially designed trucks for disposal in 10 meter deep trenches</p> <p>500 steel drums arrive at Vaalputs each year</p> 	<p>Transported from Koeberg to Vaalputs in specially designed trucks for disposal</p> <p>1 000 concrete drums disposed each year in 10 meter trenches</p>	 <p>Eventual disposal method of high-level waste is likely to be deep, underground geological disposal</p>

Vaalputs

- Northern Cape, **500km from Koeberg**
- The **national shallow land disposal site** for Koeberg's low and intermediate-level radioactive waste
- **Necsa** manages Vaalputs, while it is financed by fees paid by **Eskom**



Regulator engagement

Koeberg is well equipped to handle the **safety regulations of their nuclear plants** and has **operated safely** for over 33 years, emphasising their **nuclear safety culture**



National Nuclear Regulator

- **Oversees the safe operation** of nuclear installations at Koeberg and Vaalputs
- Committed to protect people, property and the environment against any nuclear damage by establishing **safety standards and regulatory practices**
- Prescribes **protective measures**, such as frequent public safety forums, a 24 hour emergency line and safety procedures to follow

Source: KPMG, *Economic Impact Assessment of Koeberg Power Station*, 2017.



Department of Energy

- Takes the lead governance role in **nuclear technology and safety**
- Minister of Energy is responsible for overseeing Necsa and the NNR
- Eskom's operations of Koeberg are **commended** by the Director General of the DoE especially in terms of its **nuclear safety record**



Source: KPMG, *Economic Impact Assessment of Koeberg Power Station*, 2017.

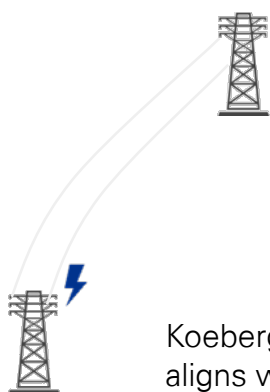
The way forward



As South Africa looks to intensify productivity and **bolster economic growth**, the full range of **role players** need to draw on their strengths and synergies.



With so many **linkages in the economy** through its various activities, Koeberg has an important role to play by **contributing to the country's energy needs** and thus, to **economic growth** more broadly.



For example, the government is currently considering the **addition of nuclear capacity** as an option to add up to **9 600MW*** to the national grid by 2030 in tranches that are affordable.

Koeberg, with its current capacity to supply **1 860MW,**** aligns with South Africa's energy policy and demands.

In addition, it provides the knowledge base to **expand the country's nuclear capacity** through new plants. This is clearly noted in the **Nuclear Energy Policy Framework of 2008**.

This highlights **Koeberg's role in the South African economy** at present, as well as going forward.

*BMI, 'Company Brief - Eskom Secures New Power Plant Funding', 2015

**Eskom, The Koeberg nuclear experience, 2016. <http://www.eskom.co.za/news/Pages/Mar29.aspx>





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