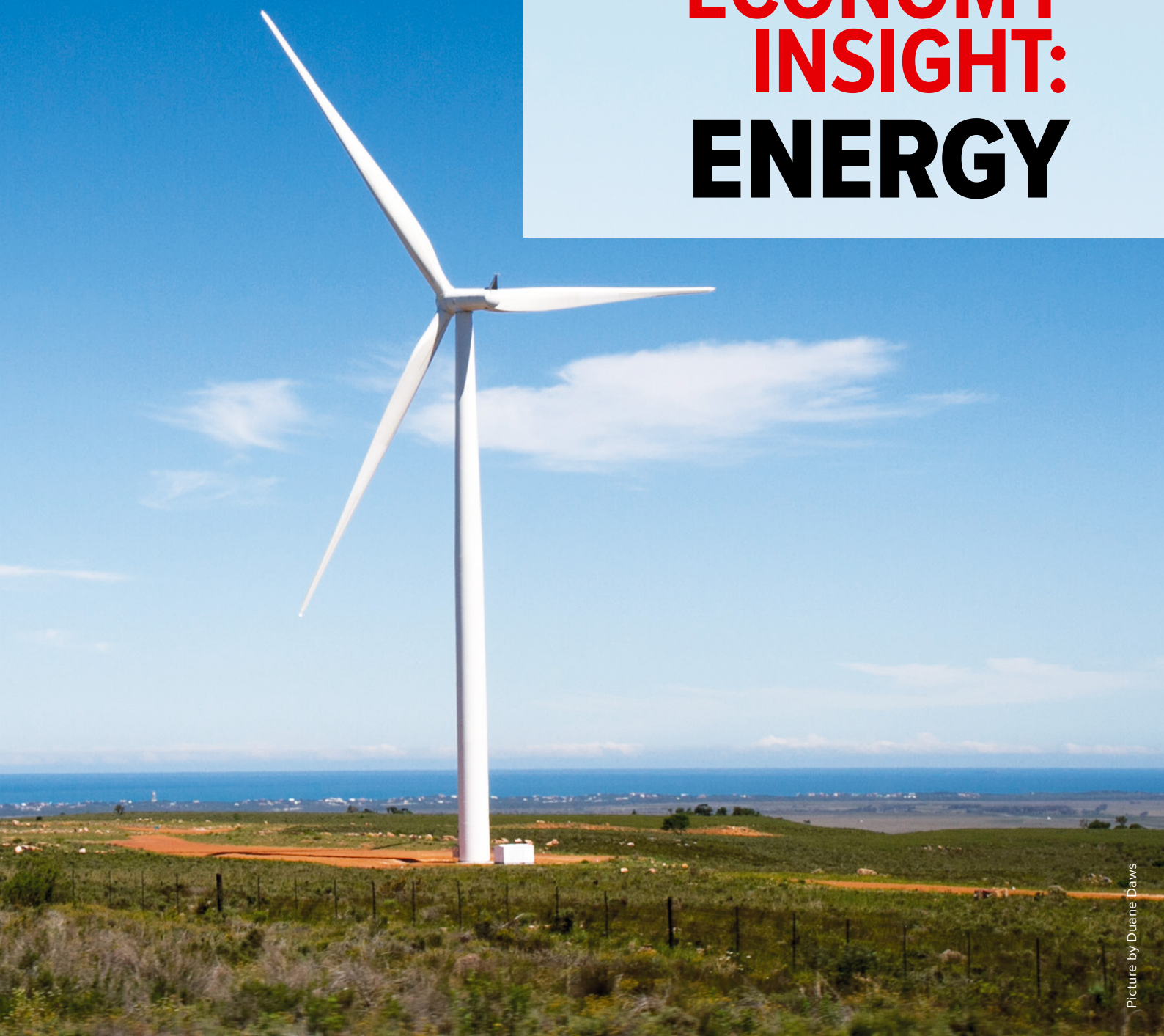


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REAL ECONOMY INSIGHT: ENERGY



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Real Economy Yearbook: Energy

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A significant shift has occurred in the electricity market over the past year, as South Africa progressed from a debilitating power supply deficit to an electricity supply surplus – a position that is expected to be sustained until at least 2021.

State-owned power utility Eskom has improved the performance of its existing coal-fired fleet by adhering to a strict maintenance schedule, while adding new generation capacity through an expansion programme and connecting new supply from renewable-energy independent power producers (IPPs). At the same time, demand has remained flat over the past decade, leaving the utility with a daily surplus of about 4 000 MW.

With more electricity produced than is needed, Eskom is controversially refusing to procure more capacity from renewable-energy IPPs, seriously damaging confidence in the hitherto successful Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), which the Department of Energy (DoE) is spearheading.

The parastatal is also at the centre of several other controversies, including corruption allegations involving the politically connected Gupta family. Eskom CEO **Brian Molefe** was implicated in former Public Protector **Thuli Madonsela's** 'State of Capture' report and left the utility at the end of last year, only to be controversially reinstated five months later. Public Enterprises Minister **Lynne Brown** has announced that a "broad scope" investigation, overseen by a retired judge, will be instituted into allegations of corruption at Eskom. This is in addition to a planned parliamentary portfolio committee probe into affairs at the State-owned entity.

Eskom is also championing the nuclear energy expansion programme, which critics say South Africa does not need and cannot afford. The issue of nuclear expansion is contentious, especially after the Western Cape High Court in April set aside two Ministerial determinations for nuclear as unlawful and unconstitutional. The Energy Minister has indicated that a new, legally-compliant determination may be issued ahead of the finalisation of a new Integrated Resource Plan (IRP), which will be updated early next year. The IRP2010, which is widely

regarded as outdated, is calling for 9 600 MW of new nuclear capacity.

The ruling on nuclear has also cast doubt on the legal standing of the Ministerial determinations for the procurement of other generation capacity, including renewable energy and gas power.

Supply and demand

Eskom has significantly expanded its generation capacity in the past decade and now boasts an installed capacity of 45 125 MW, comprising mainly coal-fired power stations.

Eskom started a 17 348 MW capacity expansion programme in 2005 and by early 2017, 8 030 MW of the expanded generation capacity had been delivered. Since then, the final unit of the 1 332 MW Ingula pumped-storage scheme, on the border of the Free State and KwaZulu-Natal, has been fully commissioned.

Over the next five years, the Medupi coal-fired power station, in Limpopo, and the Kusile coal-fired power station, in Mpumalanga, will be fully commissioned. Two units of the 4 764 MW Medupi power station have been connected to the grid and are operating commercially. A third unit was synchronised at the end of May and will reach full commercial operation in 2018. The remaining three units will be commissioned over the next three years. The first unit of the 4 800 MW Kusile power station was synchronised to the grid in December and will enter into commercial operation in July next year. The power station will be fully commissioned in 2022.

Besides Medupi and Kusile, the group's baseload power stations are generally old and require more maintenance. Eskom currently adheres to a maintenance target of 11 500 MW in summer and 8 500 MW in winter. The 80:10:10 strategy strives for 80% plant availability by 2020/21, requiring unplanned losses to be limited to 10% on average, while allowing for 10% planned maintenance.

The maintenance plan has helped to improve the performance of the coal-fired fleet, with the group's energy availability factor having increased from 70.79% in 2015 to 75.66% by the end of 2016.

Supply and demand trends at December 31, 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Energy sent out (GWh)	245 610	240 096	235 328	244 370	244 885	238 857	236 219	233 777	232 605	225 395
Energy sent out growth from 2007	–	–2.245%	–4.186%	–0.505%	–0.295%	–2.750%	–3.82%	–4.82%	–5.30%	–8.23%
Peak demand (MW)	36 513	35 959	35 845	36 664	36 219	35 527	34 979	34 768	32 985	34 177
Peak demand growth from 2007	–	–1.52%	–1.83%	0.41%	–0.81%	–2.70%	–4.20%	–4.78%	–9.66%	–6.40%

Source: Nersa System Adequacy Outlook (January 2017)

However, demand has failed to keep up with additional supply, owing to weak economic conditions and steep electricity price increases in recent years. The National Energy Regulator of South Africa (Nersa) estimates 2016's peak demand at 34 177 MW, which is an increase on 2015's peak demand of 32 985 MW, but below 2007's peak demand of 36 139 MW.

Eskom has embarked on a strategy to stimulate demand, particularly among cross-border clients and energy intensive users such as mines and smelters. The utility intends raising export sales by 8% a year between 2017/18 and 2020/21 and aims to increase domestic sales by 2.1% a year over the same period.

The organisation is considering special pricing arrangements with energy intensive users to stimulate demand, although discounts could prove controversial, owing to ongoing disquiet over special pricing agreements with aluminium smelters in KwaZulu-Natal and Mozambique. The Energy Intensive User Group of Southern Africa (EIUG) believes several sections in government's Electricity Pricing Policy are accommodative of special deals. The Electricity Regulation Act No 4 of 2006 also permits Nersa to deviate, in prescribed circumstances, from set or approved tariffs.

Eskom has emphasised that it will not use a blanket approach to requests for incentive pricing and that each case will be dealt with separately and taken to Nersa for consideration.

The regulator has already considered a two-year arrangement for Silicon Smelters, which is linked to the performance of the silicon price. Steel producer ArcelorMittal South Africa is also interested in making a case for its power-heavy operations.

Besides incentive pricing, Eskom will also fast-track connections for companies planning to expand operations in a bid to shore up demand.

Given the prospect of surplus capacity for several years, Eskom is considering retiring the Camden, Grootvlei, Hendrina, Komati and Kriel power stations, in Mpumalanga. The decommissioning plan comes five years after Eskom completed its return-to-service projects, which entailed mothballing Camden, Grootvlei and Komati at a cost of R25-billion.

The timing of the closure of the five power stations depends on electricity demand growth, but Eskom has indicated that the first units could close as early as March next year. Labour unions have expressed their disapproval of the decommissioning

Capacity and capacity margins at yearly peak

	Yearly peak demand	Eskom installed capacity	Eskom installed capacity plus imports	Eskom purchases excluding renewable energy (RE)	RE, including Sere wind farm	Other non-Eskom capacity	Capacity including imports, RE and other purchases	Eskom reserve excluding RE and other purchases	Eskom reserve including imports, RE and other purchases
	MW	MW	MW	MW	MW	MW	MW	%	%
2011	36 212	41 201	42 339	862	–	–	43 201	16.92%	19.30%
2012	35 895	41 696	43 196	1 142	–	–	44 338	20.34%	23.52%
2013	34 979	41 975	43 475	1 327		1 593	46 395	28.08%	32.65%
2014	34 590	42 308	43 808	13	1 212	1 500	45 563	26.69%	31.72%
2015	32 985	42 308	43 808	13	1 212	1 500	45 563	32.85%	38.13%
2016	34 177	45 125	46 625	1 018	2 021	1 834	49 881	39.40%	45.95%

Source: Nersa System Adequacy Outlook (January 2017)

plan, which they say threatens 50 000 direct and indirect jobs.

Eskom is currently conducting socioeconomic-impact assessments for its Mpumalanga power stations and is treating the studies for Camden, Grootvlei, Hendrina, Komati and Kriel as a priority.

Eskom has previously considered a fleet-renewal strategy for its older power stations aimed at extending their lives by ten years.

Koeberg socioeconomic-impact assessment

The socioeconomic-impact assessment compiled by KPMG Services for the Koeberg power station, in the Western Cape, has offered an overwhelmingly positive assessment.

The power station contributed an estimated R53.30-billion to the country's economy between 2012/13 and 2015/16, of which R30.20-billion related to the Western Cape, while sustaining a yearly average of 1 786 direct jobs and 14 110 indirect jobs over the same period.

Over the next three years to 2019/20, Koeberg is estimated to contribute R52.90-billion to the South African economy, R29.60-billion of which relates to the Western Cape economy, while sustaining a yearly average of 1 564 direct jobs and 14 852 indirect jobs.

Koeberg contributed R16.40-billion to government revenue between 2012/13 and 2015/16 and is expected to match that contribution over the next three years.

Koeberg is Africa's only nuclear power station, with an installed capacity of 1 860 MW, which services half of the Western Cape's electricity demand.

Source: KPMG

Eskom financial status and tariffs

Eskom's financial year runs from April 1 to March 31. The group's latest available financial results are for the interim period to the end of September 2016. Revenue in the six months increased from R87.88-billion in the first half of 2015/16 to R97.13-billion in the first half of the 2016/17 financial year.

Net profit for the six months decreased from R10.35-billion in 2015/16 to R9.36-billion in 2016/17. Eskom highlighted that its earnings before interest, taxes, depreciation and amortisation (Ebitda) increased by 23% year-on-year to R31.50-billion in the six-month period. However, credit ratings agencies have pointed out that Ebitda is not a useful measurement for a company with large debt, such

as Eskom. S&P Global Ratings have expressed concern about Eskom's free cash flow after interest payments.

Eskom's debt has been growing in recent years to pay for the new Medupi, Kusile and Ingula power stations. By September 2016, the utility's debt had increased to R332.92-billion, from R297.40-billion a year earlier, resulting in an 87% increase in net finance costs to R6.54-billion.

The cost of the debt is set to increase, after S&P in March this year downgraded its long-term foreign and local currency corporate credit rating on Eskom from 'BB-' to 'B+', following its ratings action to downgrade South Africa's long-term foreign currency rating credit rating to 'BB+'. Moody's Investor Services also placed Eskom's Ba1 senior unsecured medium term note rating on review for downgrade and placed Eskom's global scale corporate family rating of Ba1 and its national scale rating of A2.za on review for downgrade.

Eskom CFO Anoj Singh has downplayed the effect of the ratings agencies' actions and has said he is confident Eskom will successfully execute its funding plan for the current financial year and over the next five years. The Eskom board has approved a borrowing programme of R327-billion through to March 2021.

S&P has raised concern about Eskom's lower-than-expected tariff increase for 2017/18, with Nersa having capped the increase at 2.2%, rather than the 8% increase granted under the third multiyear price determination (MYPD3), which covers April 1, 2013 to March 31, 2018.

Nersa stated in February that the 2.2% increase would allow revenues of R205-billion for the financial year, which should be sufficient to cover allowed cost and a return of R33.67-billion. The allowable revenue also includes R23-billion for purchases from IPPs as a cost pass-through, in line with the MYPD3 methodology.

Nersa capped the tariff increase for 2017/18 after making accommodations for the Regulatory Clearing Account (RCA) adjustment, which resulted in Eskom's tariffs rising by 9.4% in 2016 and by 12.69% in the previous year, owing to the respective RCA reconciliations for the first year of the MYPD3, as well as the full MYPD2 period, which ran from April 1, 2010, to March 31, 2013.

Last year, the Gauteng High Court ruled that Nersa's processes in considering the RCA were illegal. The regulator is appealing the ruling and, in the meantime,

it is holding back from processing further RCA applications. Eskom has applied for RCA adjustments of R19-billion and R23-billion respectively for the 2014/15 and 2015/16 financial years.

Coal supply

Eskom's dealings with coal suppliers have been the subject of much scrutiny, after the Public Protector's 'State of Capture' report was published in November 2016. The sale of the Optimum coal mine to a company owned by the Gupta family, Tegeta Exploration & Resources, featured prominently in the report.

The report suggests Eskom had intentionally pushed the Optimum mine, then owned by Glencore, into business rescue by refusing to renew a coal supply contract for the Hendrina power station. The report also states that Eskom had assisted Tegeta to buy the mine through awarding additional contracts to supply the Arnot power station and observes that the sole purpose of the Arnot supply contract was to fund Tegeta to enable it to acquire Optimum. The report further considers a R650-million prepayment to Tegeta as suspicious as it appears to have been used by Tegeta to buy Optimum shortly after bank funding was refused.

A PricewaterhouseCoopers report has also highlighted serious failures in Eskom's dealings with Tegeta. The report, which was prepared for the National Treasury, has identified several contraventions of government's rules on supply chain management in the coal supply contract with Tegeta.

Meanwhile, Eskom is increasingly using its buying power to transform the coal mining industry and to do more business with smaller, majority black-owned coal miners. A black emerging miner strategy was adopted in December 2012 and has resulted in Eskom increasing its coal purchases from black-owned junior firms from R1.70-billion (6%) in 2012 to R6.90-billion (18%) in 2015. This is projected to increase to R14-billion in 2020.

The group is changing its coal-sourcing model away from participating in the creation of new mines through cost-plus contracts with large mining companies. The utility has expressed its dissatisfaction with the performance of many of the cost-plus mines, stating that they are unable to meet contracted volumes, costs and quality parameters. The cost-plus mines also require significant money to be recapitalised, which Eskom is not prepared to spend.

Eskom is signing new contracts only with suppliers that are more than 50% black owned, although the approach is inconsistent with the 26% black economic-

Eskom leadership

Brian Molefe was reinstated as CEO of Eskom in May, five months after his departure in the aftermath of a furore over his links to the politically connected Gupta family. Molefe's return was sparked by a dispute over a R30-million pension pay-out, which Public Enterprises Minister **Lynne Brown** blocked in April. The board's remedy to the pension dispute was that the 50-year old Molefe agree to repay any pension money received and be reinstated as CEO for the remainder of his five-year contract to 2020.

Molefe's return to Megawatt Park has been widely condemned, but the board's chairperson, **Ben Ngubane**, has defended his reinstatement, describing Molefe as an asset to the nation.

The cloud over the CEO reappointment darkened only days after his return to Eskom when former Mineral Resources Minister **Ngoako Ramatlhodi** came forward with allegations that Molefe and Ngubane pressurised him to help the Guptas take over the Optimum mine by suspending Glenore's mining licences in South Africa. Ramatlhodi was removed as Mineral Resources Minister shortly afterwards.

Before his reinstatement as Eskom CEO, Molefe had a brief stint as a African National Congress MP. At one stage, there was strong speculation that President **Jacob Zuma** planned to appoint him as Finance Minister to replace **Pravin Gordhan**. In the event, **Malusi Gigaba** was appointed new Finance Minister on March 31.

While Molefe was absent from Eskom, **Matshela Koko** acted as CEO. Serious allegations of conflict of interest were lodged against Koko in March, relating to R1-billion in contracts awarded to a company in which his stepdaughter is a shareholder. Koko has denied being directly involved in the awarding of the tenders, but has agreed to go on leave while Cliffe Dekker Hofmeyr conducts a forensic and legal investigation.

Molefe's return to the helm of Eskom, however, was short lived. On May 21, government ordered that his reinstatement be rescinded and conceded that it had inflicted reputational harm on the country and the power utility.

Molefe has since approached the courts to overturn his sacking.



Former Eskom CEO Brian Molefe

Picture by Duane Daws

Source: Engineering News

empowerment (BEE) ownership requirement of the Mining Charter. None of its main suppliers, including Anglo American Coal South Africa, South32, Exxaro Resources and Glencore, currently comply with Eskom's black ownership requirements.

Independent power producers

Government has committed to procure a significant share of new electricity capacity from IPPs to enhance electricity generation capacity and to diversify the country's power mix, but a recent development has created much uncertainty about the legal standing of past Ministerial determinations, which provide the framework for the procurement of new generation capacity.

Ministerial determinations have been published for the procurement of 30 115 MW of capacity from private producers, including 14 725 MW of renewable energy and 15 390 MW of nonrenewable-energy capacity. However, the recent High Court ruling declaring two determinations for nuclear power unlawful on the basis that they had not been

subjected to public consultation has implications for the determinations calling for renewable-energy, coal, gas and hydro generation capacity as these have also not been subjected to Nersa-led public consultations. Energy Minister **Mmamoloko Kubayi** said in May that remedial steps might be required to ensure that these determinations were not also open to legal challenge.

The REIPPPP is the DoE's most advanced private power programme. Four separate Ministerial determinations have called for the procurement of 14 725 MW of renewable-energy capacity, drawing on onshore wind, solar photovoltaic (PV), concentrated solar power (CSP), biogas, biomass, landfill gas and small hydro.

Following six bid windows (windows 1, 2, 3, 3.5, 4 and the first bid window of the small-scale renewable-energy programme), the DoE's IPP Office has procured 6 376 MW (or 43% of the already determined capacity) from 102 IPP projects.

Eskom, which is the designated buyer of electricity produced by IPPs, has dealt the REIPPPP a serious blow by refusing to sign power purchase agreements (PPAs) for 37 projects procured in 2015. The utility is citing affordability concerns amid its surplus capacity. Eskom wants assurances on a cost-recovery mechanism for the IPP capacity, in light of the under-recovery of IPP costs through prevailing electricity tariffs, as well as legal uncertainty surrounding the possibility of recouping of such expenses through the RCA.

The impasse was initially expected to be broken in April after President **Jacob Zuma** confirmed in his State of the Nation address that all outstanding PPAs would be signed. However, an April 11 signing deadline was postponed after a Cabinet reshuffle, which resulted in Kubayi replacing **Tina Joemat-Pettersson** as Energy Minister.

A task team comprising officials from the DoE, supported by the IPP Office, and officials from the Department of Public Enterprises, supported by executives from Eskom, has been established to find solutions for the stalemate.

Other IPP programmes include the Coal Baseload Independent Power Producer Procurement Programme (CBIPPPP), the gas-to-power programme and the cogeneration IPP programme.

The CBIPPPP aims to procure 2 500 MW of electricity from coal-fired power stations. Two projects – the 557.3 MW Thabametsi project, in Limpopo, and the 306 MW Khanyisa project, in Mpumalanga –

Index shows South Africa is wasting its renewable-energy potential

Although South Africa is the country with the most potential "by far" in terms of its renewable-energy programmes, it is stuck in the "(Fitfully) Waking Giant" category, financial services provider Fieldstone Africa states in its first renewables index for the year.

When the Fieldstone Africa Renewables Index was introduced, South Africa was the leading country on the continent in terms of its renewable-energy programme. The index ranks national markets in terms of current suitability to investing time and capital in achieving successful renewable projects. However, the country's reputation and position on the index began to slip, owing to a refusal by State-owned energy utility Eskom to sign further power purchasing agreements with independent power producers (IPPs).

These issues aside, South Africa's potential remains high. The country could get back to the top of the index, based on its Integrated Resource Plan, which calls for 1 000 MW of renewable energy a year to be added for several years.

One positive development is that some small IPPs have been fast-tracked and the long-outstanding Round 4 bids seem likely to be given the go-ahead.

Morocco is still leading the continent in the field of renewable energy, followed by Uganda in second place. Zambia took the third place from Egypt in the latest index, owing to its solar and hydro initiatives.

Source: *Engineering News*

participated in the first window of the CBIPPPP. Both projects were successful and were announced as the preferred bidders of this round in October 2016. A second bid window for the balance of the 2 500 MW allocated to the CBIPPPP through a Ministerial determination will follow at a later stage.

The gas-to-power programme is being facilitated by Ministerial determinations for 3 726 MW of gas-fired power, of which 3 000 MW has been allocated to the Liquefied Natural Gas-to-Power Independent Power Producer Procurement Programme (LNG IPPPP) and 726 MW to separate programmes, including 600 MW for a public–private gas-fired power plant and 126 MW for a domestic gas programme.

Initially it was anticipated that a request for qualifications would be released before the end of 2016, followed by a commercial tender in early 2017. However,

IPP Office to be incorporated into Central Energy Fund

The highly respected Independent Power Producer (IPP) Office, which has overseen nearly R200-billion-worth of renewable-energy investment since 2011, is to be incorporated into the Central Energy Fund (CEF), which itself is to be overhauled.

Energy Minister **Mmamoloko Kubayi** announced plans for the restructuring during her inaugural Budget Vote address in May. Without elaborating, she indicated that the IPP Office faced financial constraints, which could be resolved through its incorporation under CEF. However, two CEF companies, PetroSA and the Strategic Fuel Fund (SFF) are facing serious financial and governance problems, which have the potential to undermine CEF's own sustainability.

PetroSA announced a loss of R449-million for 2015/16, after reporting a record operating loss of R14.60-billion in 2014/15. It is projecting losses of R2.20-billion for the year to end March 2017. In addition, its gas-to-liquids refinery is facing serious feedstock shortages. It has also emerged that CEF chairperson **Luvo Makasi** has written to the PetroSA board asking them to resign with immediate effect.

At SFF, an investigation is under way into the illegal sale of ten-million barrels of crude oil, sold at a discount to the already depressed spot prices prevailing at the time. The sale was initially described as a “stock rotation” by former Energy Minister **Tina Joemat-Pettersson**.

Department of Energy director-general **Thabane Zulu** has been seconded to SFF as acting CEO. Zulu's appointment is designed to ensure that there is no interference with the investigation of the sale or any restructuring of SFF.

Source: *Engineering News*

the LNG IPPPP process is not expected to proceed until PPAs for the outstanding renewables projects have been signed.

The LNG IPPPP aims to select successful bidders to develop, finance, construct and operate a gas-fired power generation plant at Richards Bay, in KwaZulu-Natal, and Coega, in the Eastern Cape. It is anticipated that the Richards Bay project will be a 2 000 MW facility and the Coega project will be a 1 000 MW power station.

The 600 MW gas-fired power generation project will be located in one of the major ports under consideration for the LNG IPPPP and will source its gas through the import infrastructure established through that programme.

In May, Kubayi expressed her support for the gas-to-power programme, suggesting that a procurement process should proceed despite the uncertainty regarding the legal standing of Ministerial determinations.

The cogeneration IPP programme aims to procure 1 800 MW from cogeneration facilities. Little progress has been reported since the request for bids was issued two years ago.

Electricity planning

The DoE published two key policy documents pertaining to energy in November – a draft Integrated Energy Plan (IEP) and a draft IRP update.

The IEP aims to guide future energy infrastructure investments to 2050 and identifies and recommends policy options to shape the future energy mix. The IRP is considered a subset of the IEP and deals specifically with government's plan for electricity provision. The Energy Minister uses the IRP to set determinations for new generation capacity.

The draft IRP is an update of the IRP2010, which was promulgated in March 2011 and which remains the official government plan for new generation capacity. A draft IRP update was prepared and published in 2013, but for various reasons it was never accepted by Cabinet.

The 2016 IRP update has a longer planning horizon than the IRP2010 and stretches to 2050, rather than 2030. The draft IRP update presents a least cost plan (base case), based on the promulgated IRP2010, and assumptions including additional capacity that has come on line and demand levels that are lower than previously expected. The base case assumes peak demand

Integrated Resource Plan update base case												
	New build options											
	Solar PV	Wind	Landfill gas	Demand response	Nuclear	OCGT	CCGT	Coal	Imported hydro	Carbon dioxide emissions	Peak demand (MW)	Reserve margins (%)
2016												
2017												
2018												
2019												
2020										253	44 916	24
2021	160									264	46 130	28
2022	160									268	47 336	23
2023	370	200								272	48 547	20
2024	440	500		1 000		396				279	49 656	18
2025	650	1 000	15	1 000		2 376	732			278	51 015	19
2026	580	1 000	5	1 000		264	1 464			278	52 307	19
2027	580	1 000	230	1 000		264	2 196			276	53 561	19
2028	580	1 000		500		396	1 464	1 500		277	54 567	20
2029	580	1 100		1 000			1 464	1 500		273	56 009	18
2030	580	1 200		1 000		1 716		2 250	1 000	274	52 274	20
2031	580	1 200		1 000		1 584		750		274	58 630	20
2032	580	1 000		500			732	1 500	1 000	278	59 878	22
2033	580	1 200					1 464	750	500	276	61 388	23
2034	580	1 600		1 000		1 452				278	62 799	22
2035	580	1 600		500			1 464	1 500		278	64 169	23
2036	580	1 600		1 000				1 500		278	65 419	21
2037	580	1 400		500	1 359		732	2 250		277	66 993	22
2038	580	1 600				1 848	1 464	750		273	68 375	22
2039	650	1 500			1 359		2 928			267	69 584	22
2040	650	1 600		1 000		1 056	732			261	70 777	20
2041	650	1 600		1 000	4 077	792		750		236	72 343	21
2042	650	1 600		500			2 196			233	73 800	21
2043	650	1 600		500						232	75 245	21
2044	650	1 800			1 359					228	76 565	21
2045	770	1 600		500	2 718		2 196			230	78 263	23
2046	790	1 600		1 000	1 359	924				225	79 716	20
2047	720	1 800		500	1 359		732			219	81 117	19
2048	720	1 600		500	2 718	264				211	82 509	20
2049	660	1 500		500	1 359					206	84 213	20
2050	720	1 400		500	2 718					196	85 804	20
Total (MW)	17 600	37 400	250	500*	20 385	13 332	21 960	15 000	2 500	–	–	–

Source: Department of Energy

* Demand response is not cumulative

of 52 274 MW in 2030, compared with the IRP2010 peak demand assumption of 85 241 MW for the same year. The updated plan forecasts peak demand of 85 804 MW in 2050.

The base case calls for 17 600 MW of new PV capacity, 37 400 MW of new wind capacity, 20 385 MW of new nuclear capacity, 35 292 MW of new gas capacity, 15 000 MW of new coal capacity and 2 500 MW of imported hydropower by 2050.

The base case dramatically increases the allocation for wind and solar PV, with a combined 55 000 MW to be introduced between 2021 and 2050. However, the plan includes limits for how much renewables can be introduced in a single year. It only allows for 1 600 MW a year of wind and 790 MW a year of solar PV at peak to be added. The base case does not make provision for any new CSP to be added.

The draft update's limit on yearly renewable-energy capacity additions and the cost assumptions used have raised concern among stakeholders. The base case uses cost assumptions for renewable energy that are higher than those that have already been achieved during the most recent bidding rounds.

The public consultation period for the plan ended in March. The Council for Scientific and Industrial Research (CSIR) participated in the consultation process and proposed a new build mix that deviates materially from the base case. The CSIR used the same modelling framework as the DoE to develop what it describes as a "least-cost, unconstrained electricity mix by 2050". The council's techno-economic model, therefore, does not include the limitations imposed in the base case on the amount of renewable-energy capacity that can be added in a single year.

Most other input assumptions have been retained by the CSIR, including a discount rate of 8.2% and yearly average growth rates of 2.3% and 1.4% as outlined in the 'High' and 'Low' forecasts contained in the base case. However, its cost assumptions for solar PV and wind have been adjusted to reflect the tariffs bid during the most recent bid window of the REIPPPP. The outcome is a new-build mix comprising predominantly solar PV and wind, supported by flexible power generators, such as gas, CSP, hydro and biogas. The share of renewables in this "cost optimal" mix is greater than 70% by 2050. The CSIR's mix also includes no new nuclear capacity, representing a marked deviation from the base case. The CSIR concludes that the least-cost mix would be R70-billion-a-year less expensive by 2050 than the newly proposed base case.

Prospects

Eskom expects South Africa to have surplus electricity capacity until at least 2021, although the Energy Intensive User Group is more pessimistic about the outlook. The organisation believes the overcapacity situation could endure until the late 2020s, citing weak prospects for significant demand growth over the short term, while new capacity is being added to the system.

The surplus capacity means South Africa should have stable electricity supply to support improved economic prospects. However, the DoE has warned that distribution infrastructure poses a "very real threat" to the security of electricity supply to end-users. Municipalities' inability to adequately invest in infrastructure maintenance and upgrades is regarded as the main reason for the dilapidated state of distribution infrastructure.



Picture by Duane Daws



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