

# ECONOMIC REVIEW

fourth quarter october-december 2019

## in this issue ...

COMMENTARY **1**

KEY  
ECONOMIC  
VARIABLES **4**

NEWS  
HIGHLIGHTS **7**

MACRO-  
ECONOMIC  
DATA **12**

BOTSWANA'S  
OPTIONS  
FOR FUTURE  
POWER  
GENERATION **13**

## COMMENTARY

## A flat end to 2019, as 2020 will be the make-or-break year for the new Government

### Introduction

There is a widespread feeling that the economy ended the year on something of an anti-climactic note, after a long period of excitement leading up to the national elections in October. In the run-up to the dramatic election victory of His Excellency President Mokgweetsi Masisi and the Botswana Democratic Party (BDP), there had been an expectation that such an outcome would presage some bold reforms that would help to shift the economy onto a new growth path. This may well still happen, but so far there has been no dramatic change visible.

sponsored by



**Bifm**  
Dynamic  
Wealth Management

The impression of a slowdown in economic momentum was supported by the GDP growth data released at the end of December. Overall annual GDP growth for the year to September 2019 slowed to 3.7%, and non-mining private sector growth slowed to 4.2%, in both cases a fall of 1.3% compared to a year earlier. While this is still a respectable growth rate, the slowdown is apparent, nonetheless.

The somewhat downbeat economic mood has not been helped by a bleak year for the international diamond market, notwithstanding a small improvement in December. Throughout most of 2019, the international market for rough diamonds was characterised by weak demand, falling prices, reduced sales and the build-up of unsold inventory. Over the year as a whole, rough diamond sales through De Beers Global Sightholder Sales (DBGSS) in Gaborone fell by 25% to USD4.04 billion. This has in turn impacted negatively on government revenues and Botswana's export earnings.

Fortunately, the final diamond sight of the year in December saw a turnaround from this trend. Demand was stronger, sales were up and prices were stable, reflecting improved conditions in the midstream (dealers, cutters and polishers) with improved margins and reduced inventory levels. There are also reports of a reasonably strong Christmas season in the US, which remains the dominant market, accounting for 50% of global diamond jewellery sales. All of this bodes well for 2020 and suggests that it should be a better year than 2019.

Other domestic economic developments provided a mixed picture. Perhaps the greatest concern is in the banking sector, where lending to the private business sector fell by 5.2% over the year to October, a degree of contraction that has not been experienced for over 20 years. This reflects both an increase in bad debts (perhaps making banks less willing to lend) as well as a reduction in borrowing by oil companies as the National Petroleum Fund has been replenished. On a more positive note, the Botswana Stock Exchange domestic companies index (DCI) rose marginally over the final quarter of 2019, following a long period of declining share prices. Inflation also fell, to 2.2% in December, and has been at its lowest ever levels during the quarter.

### Outlook for 2020

As we enter 2020, many challenges face the new government. On February 3rd, the new Minister of Finance and Economic Development, Dr Thapelo Matsheka, will present his first budget, for the 2020/21 financial year. This will also mark the start of the second half of the National Development Plan (NDP) 11 period. The fiscal situation is quite challenging, with reduced mineral revenues due to diamond market weakness combined with increased expenditures following the substantial public sector pay rise spread over 2019 and 2020. This will have an inevitable impact on the availability of funds for development (capital) projects, at a time when expectations for new projects are high following the 2019 general election. The Budget (and the Mid-Term review of NDP 11) will need to focus on the delivery of public services, and the need to dramatically improve value for money in the public sector, to minimise the need to raise taxes to balance the budget. We comment more on this below.

As for growth expectations in 2020, we see real GDP growth for the year at a similar level to 2019, in a range of 3.5% to 4%. There have not yet been enough reforms to the business environment to jump-start private sector growth or attract significantly more foreign investment. In the mining sector, there will be little scope to increase diamond production in 2020 given the high levels of inventory held by De Beers as a result of weak sales in 2019. The 2020 Budget is unlikely to involve an increase in Government spending in 2020/21, in order to keep the fiscal deficit under control.

The announcement by MFED that the Pula exchange rate basket will be adjusted to allow a 1.5% downward crawl during 2020 is welcome. This slight depreciation in nominal terms will help to counteract what, in our view, is an over-valued Pula, and thus support export competitiveness.

### The key to transformation: public sector reform

Much has been made of the need for "transformation", and many people are anxiously waiting to hear what the National Transformation Strategy Task Force will be proposing. While there is need for some visionary thinking, there is also a need to deal first with getting the basics right. Economic development in Botswana is increasingly being held

back by an inefficient, wasteful and, in parts, obstructive public sector. The government sector is huge and impacts on almost all aspects of daily life and economic activity. It is also in need of urgent reform, to introduce much greater accountability, and to ensure that it discharges its mandates efficiently. Citizens have a right to expect that government will deliver services, especially those that are not complicated: get the streetlights and traffic lights working, fix potholes, get textbooks in the schools and medicines in the clinics and make sure that government IT systems work. In an upper-middle income country, there is no reason for the quality of these public services to be more akin to those that would be expected in a low- or lower-middle income country. Above all, government must just “get stuff done”, be decisive and act with a sense of urgency rather than indifference. Investors will not wait for ever for government to make decisions, or implement policies that have supposedly long been agreed and adopted, and the public will not sit patiently while public officers act as if they are doing them a favour, at best. And the country can no longer afford to pay over the odds for infrastructure projects or poor quality health and education outcomes.

In 2015, the World Bank prepared a Strategic Country Diagnostic for Botswana, to underpin the Bank’s country assistance programme over the subsequent decade. The Bank commented that:

“Above all, improving outcomes in Botswana will require a significant reform and modernization of the public sector, which is increasingly seen as a source of weakness rather than strength. Poor outcomes in public investment have been most visible, but the problems appear to run across the board. Reforms will require improvements in planning,

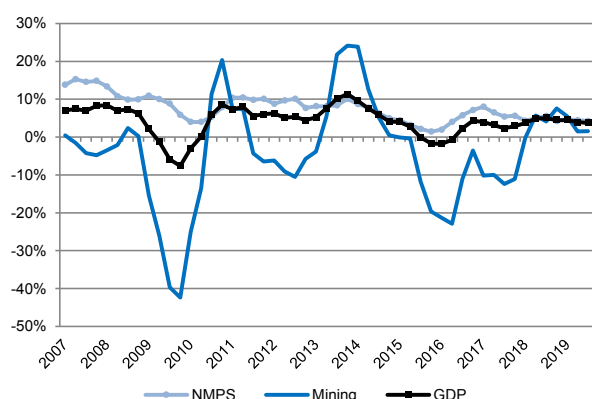
procurement, and management processes. They will also require far greater attention to monitoring and evaluation. But more than anything, they will require a new approach to government – a mindset that focuses on efficiency and accountability. This, in turn, will require improvements in capacity (human capital), as well as an adoption of modern technologies and techniques. Support for a more effective public service, as well more informed policymaking, requires substantial upgrading of statistical capacity to ensure access to more regular, consistent, and comprehensive data”(p.x).

This remains as true as it did five years ago, if anything with a greater urgency in view of the lack of progress since 2015. In our view, the key to transformation in Botswana is public sector reform – not just central and local government, but parastatals as well.

President Masisi has a great opportunity to introduce important and much-needed economic reforms, but there is no time to lose. These include the public sector reforms noted above, but also implementing real reforms to the business environment and getting rid of obstructive and unnecessary regulations, as well as winding up or reforming ineffective policies, programmes and institutions. He has political capital, having won the election convincingly, and this has to be invested in bringing about reforms that may not be immediately popular, but which will deliver dividends within 2-3 years – i.e. before the next election. Any delay, and this window of opportunity will be lost. Transformation implies change, and real change is always uncomfortable, at least for some, while providing opportunities to the majority.

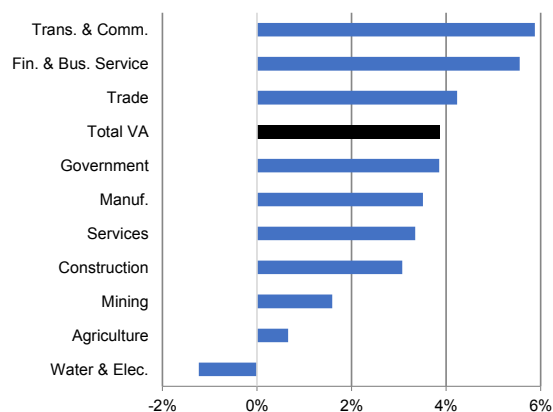
## KEY ECONOMIC VARIABLES

### Annual GDP Growth



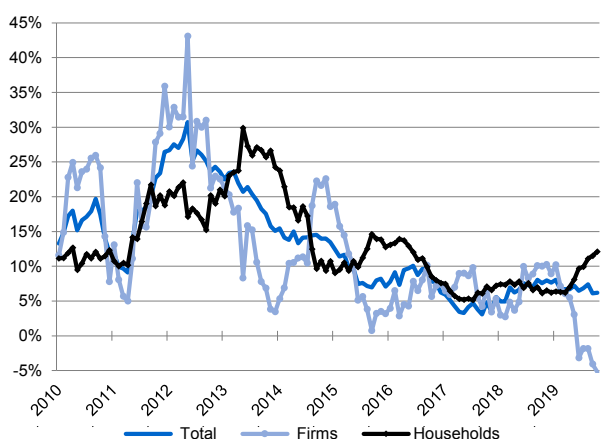
Overall economic growth continued its steady decline during the third quarter of 2019. Annual GDP growth fell to 3.7% in Q3 2019, down from 3.9% in Q2. This was driven by a decline in growth of the non-mining private sector (NMPS) which fell from 4.5% during the previous quarter to 4.2% in Q3 2019. The decline in NMPS growth is due to a significant slowdown in the growth of both the Agriculture and Trade sectors. On a more positive note, Mining growth improved, marginally, to 1.6% in Q3 2019, up from 1.5% in Q2.

### Sectoral GDP Growth



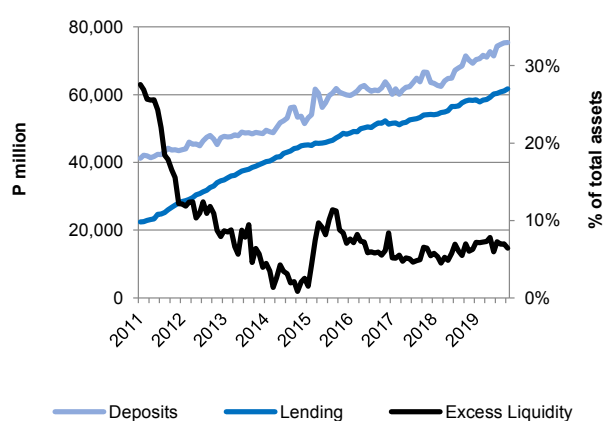
Consistent with the reduction in overall economic growth during the quarter, all sectors except Manufacturing, Mining and Financial & Business services recorded lower annual growth rates in Q3 2019 when compared to Q2. There were significant decreases in the growth rates of the Agriculture and Trade sectors, which recorded y-on-y growth of 0.7% and 4.2% respectively. The best performing sectors in Botswana continue to be those in the service industries.

### Annual Credit Growth



Annual bank credit growth fell from 6.8% in July 2019 to 6.2% in October. This was due to the continued and sharp contraction in credit extended to private firms. Annual growth in credit to the private sector fell to minus 5.2% in October 2019, down from minus 1.8% in July, reaching its lowest level since before 2005. However, growth in credit to households rose from 9.9% to 12.1% between July and October 2019. This is attributable to a 5.9% increase in unsecured loans to households during the period. The large decline in credit to the private sector, although concerning, may partially be explained by the reimbursements received by fuel companies from the National Petroleum Fund (NPF) as the NPF has gradually accumulated funds from the excess of local fuel prices over international prices. However, a high level of arrears in lending to business has also made banks more cautious in their lending to private business.

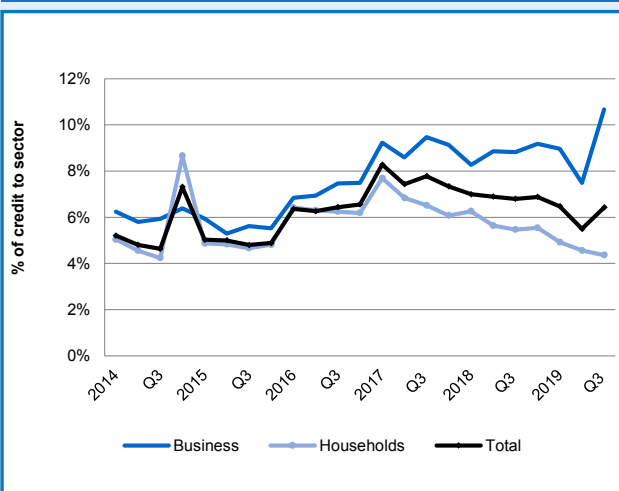
### Bank Deposits, Lending & Liquidity



Bank liquidity decreased in October 2019. Excess liquidity fell to 6.4% of total assets in October, down from 7.2% in July. The decline in excess liquidity is mainly due to an increase in required reserves to be held by commercial banks, along with a reduction in the holdings of cash, treasury bills and interbank lending- all of which are assets that earn very low returns. It also reflects the faster growth of lending than deposits during the period. Bank deposits rose by P1.1 billion between July and October reaching a total of P75.4 billion. During the same period, advances rose by P1.3 billion, reaching P61.7 billion by October 2019.

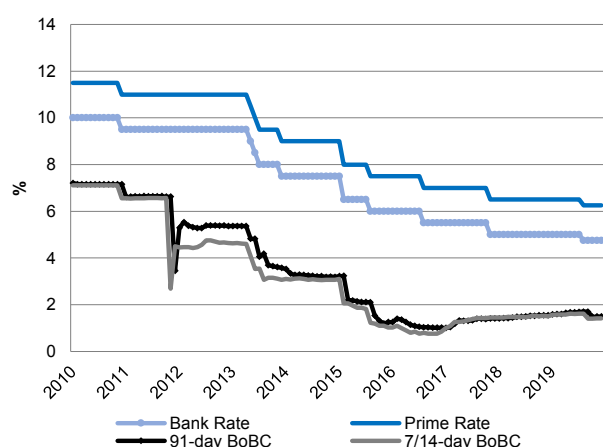
## KEY ECONOMIC VARIABLES

### Arrears on Bank Lending



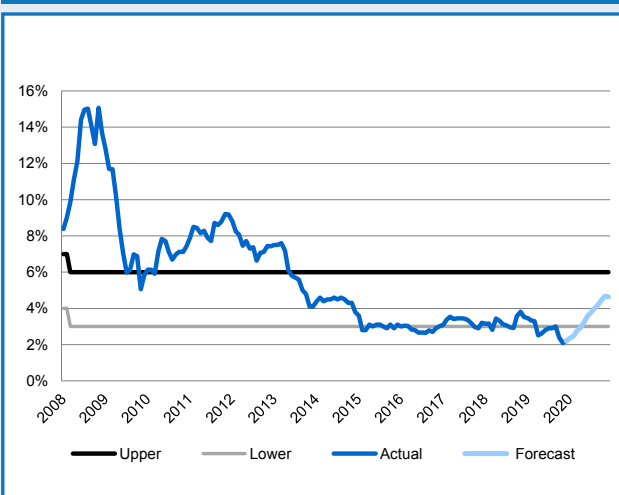
Total arrears on bank lending as a proportion of total banking assets increased during the third quarter of 2019. Arrears rose from 5.5% in Q2 2019, to 6.4% in Q3. This was driven by a sharp increase in arrears on lending to business from 7.5% in Q2 2019, to 10.7% in Q3, its highest recorded level. The implications of this are already visible as credit to private business has begun to contract. Arrears on household lending fell, marginally, to 4.4% in Q3 2019, down from 4.6% in the previous quarter.

### Interest Rates



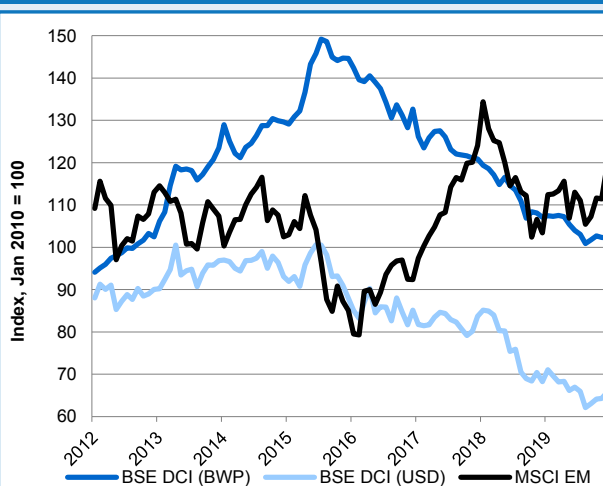
The Bank of Botswana's Monetary Policy Committee (MPC) maintained the Bank Rate at 4.75% at their final meeting of 2019, held in December. The decision was taken because the Bank maintains a positive inflation outlook in the medium term. As a result, the commercial bank Prime Lending Rate has remained unchanged at 6.25%. Money market rates rose over the first three quarters of 2019 but fell sharply following the MPC's decision to cut the Bank Rate by 25 basis points in August 2019. As a result, the 7-day BoBC rate fell from 1.5% in December 2018, to 1.41% in December 2019; during the same period, the 91-day BoBC rate fell from 1.54% to 1.49%.

### Inflation and Forecast



Annual inflation was 2.2% at the end of December 2019, down from 3.0% in September. Group indices continued to remain stable, all recording changes of less than 1% when compared to the previous quarter. Core inflation, was registered at 1.8%, whilst inflation excluding administered prices was 2.5%. The recent adjustment of the Pula's downward crawl will result in upward inflationary pressure, as a result, inflation is expected to rise in the medium term but will remain within the Bank's objective range of 3-6%.

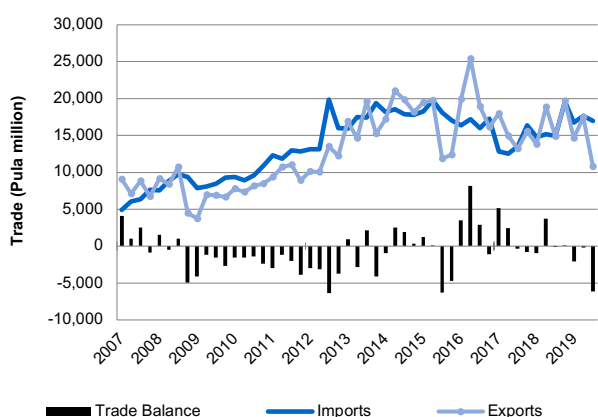
### Stock Markets



The Botswana Stock Exchange (BSE)'s Domestic Companies Index strengthened in Q4 2019. The DCI rose by 0.5% and 4.3% in Pula and Dollar terms respectively. Overall, the BSE has performed poorly throughout 2019, declining by 4.6% in Pula terms and 3.6% in Dollar terms. Conversely, 2019 saw a recovery in global markets with the MSCI World Index and MSCI Emerging Markets Index growing by 25.2% and 15.4% respectively.

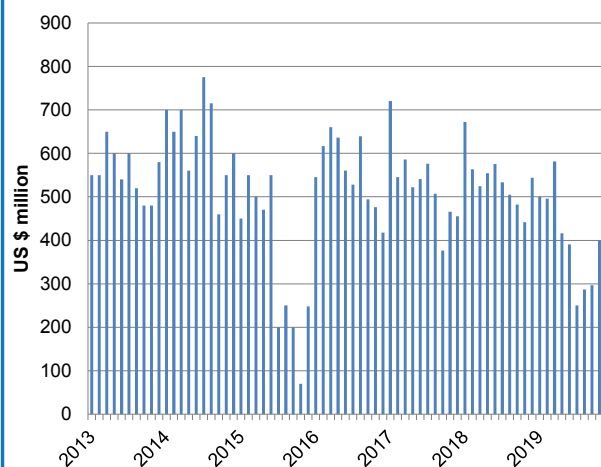
## KEY ECONOMIC VARIABLES

### International Trade



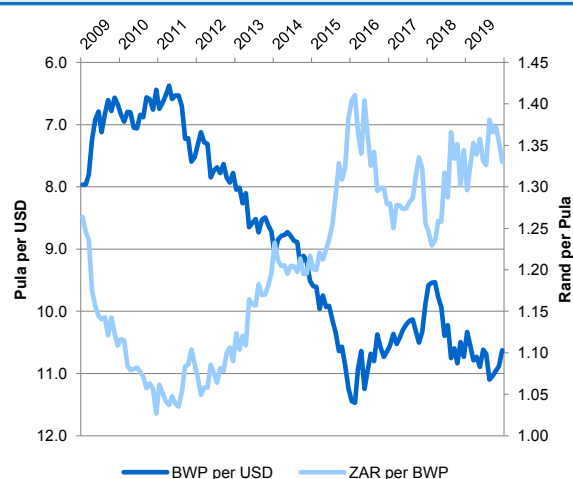
Total international trade slowed down during Q3 2019. Imports fell by 4.0% to P17.0 billion in Q3, down from P17.7 billion in Q2. Exports declined sharply, by 38.2%, during the quarter, to P10.8 billion, down from P17.5 billion in the previous quarter. The decline in both imports and exports are a reflection of the poor performance in the diamond market during Q3. The significant drop in exports led to an increase in the trade deficit from P0.2 billion in Q2 2019, to P6.1 billion in Q3.

### De Beers Diamond Sales



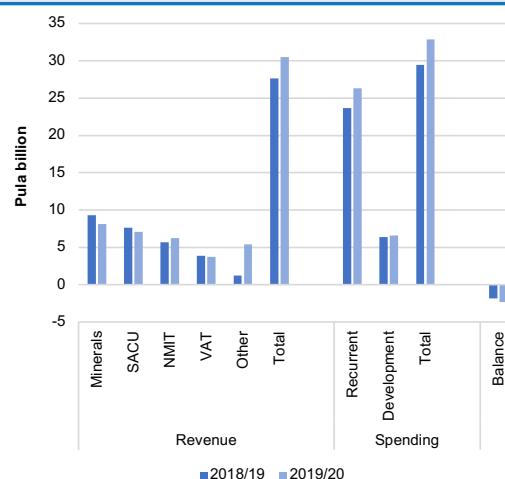
The global market for rough diamonds has been weak throughout 2019. De Beers Global Sightholder Sales (DBGSS) experienced a sales drop of 25.0%, ending 2019 with a total sales value of USD4.0 million, down from USD5.4 billion in 2018. There were signs of some stability returning to the market during the holiday season in Q4 2019 with sales marginally decreasing by 1.1% to USD825 million, from USD834 million in Q3 2019, despite having one less sightholder during the fourth quarter.

### Exchange Rates



The Pula weakened against the Rand and strengthened against the US Dollar during Q4 2019. The Pula depreciated against the Rand by 2.6%, ending December with an exchange rate of ZAR1.33, down from ZAR1.37 in September. The Pula-US Dollar exchange rate went from 11.04, to 10.63 during the same period, reflecting an appreciation of 3.9%. This reflects the appreciation of the SA rand against the US dollar during the quarter, in the context of the Pula basket exchange rate mechanism.

### Quarterly Fiscal Data



Data for the first half of the 2019/20 fiscal year reports a budget deficit of P2.4 billion, up from a deficit of P1.8 billion in H1 2018/19. The reported deficit is in line with the large fiscal deficit that is expected to be recorded during the 2019/20 financial year. Revenue in H1 2019/20 rose by 10.4% compared to H1 2018/19; this was due to a large increase in non-tax revenue during the first quarter, which mainly comprised of a once off payment from BoB based on its 2018 profits. Total expenditure in H1 2019/20 rose by 11.5% when compared to H1 2018/19; this was driven by increases in the recurrent and development budgets, which rose by 11.1% and 3.5% respectively, combined with changes in net lending to parastatals.

## NEWS HIGHLIGHTS

2nd October	Karowe yields rare blue and pink diamonds. (Rapaport News)	Lucara Diamond Corp has recovered two gem-quality coloured diamonds from the high-value portion of its Karowe mine in Botswana, a 9.74 carat blue diamond and a 4.13-carat pink diamond. This follows the recovery of two gem-quality white stones in the south lobe, weighing 123 and 375 carats respectively in the previous month. "Lucara is extremely pleased with the recovery of these rare, sizeable, fancy-coloured diamonds, which have the potential to contribute meaningful value to our regular production of large, high-value type Ila diamonds," Lucara CEO Eira Thomas said. The miner will offer the blue and pink diamonds at tender in December.
4th October	Notification regarding business policies and progress pertaining to sustainability. (Marubeni Corporation)	Marubeni Corporation gave an update and progress report on its "Notification on Policies in Relation to Coal-Fired Power Generation Business and Renewable Energy Generation Business", which was first announced in September 2018. The company noted in the report that it has pulled out of its coal-fired project in Botswana, as part of the company's plan to reduce coal-fired net power generation capacity to about 1.5GW by 2030. This may be as a result of Marubeni's intention to expand the ratio of power generated by renewable energy sources in its own net power supply from 10% to 20% by 2023.
9th October	Botswana joins the global Energy Resource Governance Initiative. (Mining Review Africa)	Botswana has joined the Energy Resource Governance Initiative (ERGI), an initiative to support the discovery and development of mineral reserves of strategic metals used to make batteries for electric vehicles. The ERGI also promotes best practices in the mining sector and resilient energy mineral supply chains. It encourages the adoption and implementation of high safety and environmental standards in mineral development projects globally.
21st October	Statutory instruments on import ban bear fruit – MITI. (Weekend Post)	The Ministry of Investment Trade & Industry (MITI) has been making use of its statutory powers on cross-border trading to restrict the importation of selected goods from outside Botswana, forcing the market to source the commodities locally. This is to give space for locally-produced and packaged goods and push for their retail uptake by the domestic market. At a Fast Moving Consumer Goods (FMCG) seminar, the Ministry noted that its decision has showed some positive results. There is improved participation of Botswana-produced and packaged goods in the market and an increase in employment. The import restrictions were introduced under the Control of Goods, Prices and Other Charges Act.
26th October	Botswana falls on Doing Business Ranking 2020. (World Bank)	Botswana fell one place in the recently released World Bank Doing Business (DB) report, 2020. Botswana performs poorly on the DB rankings, deteriorating from 19 in 2005 to 87 in 2020. However, the absolute measure of the quality of the business environment has remained more or less unchanged in recent years, and Botswana's ranking has fallen as other countries have improved. This confirms the need to take action to enhance the business environment. Besides the factors measured in the Doing Business assessment, other required reforms include liberalising restrictive immigration requirements further, improving efficiency in the public sector, improving statistical capacity, investment in ICT and speeding up the legislative process.
28th October	Over a million people have access to banking services - Bank of Botswana. (Weekend Post)	The Bank of Botswana's Banking Supervision Annual Report for 2018 revealed that more than 1.1 million people have access to banking services in the country, an increase of 10.7% compared to one million people in 2017. The adult population with access to banking services increased to 70% in 2018, up from 64.4% in 2017. In 2018, there were 10 licensed commercial banks in Botswana, along with 3 statutory banks. The number of automated teller machines (ATMs) increased from 473 in 2017 to 523 in 2018.



## NEWS HIGHLIGHTS

6th November	De Beers reduces prices at November sight. (Rapaport news)	De Beers took a decision to lower prices at the November 2019 rough-diamonds sale as a way of helping to improve margins in the manufacturing sector. The company reduced prices of both higher-end and cheaper category goods and allowed a 20% buyback option for goods weighing 2 carats or more to avoid unwanted inventory in the downstream sectors. The company has been keeping watch on the rough diamond market in 2019 and responding to market supply needs, hence reducing oversupply of rough diamonds which create unnecessary inventories.
7th November	Lucara to expand Karowe diamond mine underground. (Mining Magazine)	Lucara Diamond Corp. has released a feasibility study detailing plans to expand its Karowe diamond mine in Botswana and extend the life of the mine to 2040. Lucara envisages production of 7.8 million carats of rough diamonds with a pre-production capital cost of USD514 million for the underground project. Gross revenue is forecast to be USD5.25 billion and the payback period is expected to be 2.8 years.
11th November	Struggling manufacturing sector failing to pay banks. (Weekend Post)	According to the Bank of Botswana's Banking Supervision Annual Report 2018, the manufacturing and trade sectors continued to dominate Non Performing Loans (NPLs) in 2018, accounting for 29.5% of private business NPLs. The increase in NPLs was mainly due to defaults by a few large corporate clients. The Bank notes that the manufacturing sector's NPL trend has shown an increase since 2014, from 9% to more than 31% in 2018.
15th November	Judgement due for Lerala diamonds seized in Belgium. (Mmegi)	The High Court is due to make judgement in a case in which the liquidator of the Lerala Mine is suing the former owner over a 53,755 carat parcel of diamonds which were sold just before the mine closed in 2017. It is stated that the sale for the diamonds was initiated a day before workers were informed that the mine will cease operations. The liquidator, who is representing the mine's creditors, suspects that the diamonds were taken out of the country so that they could not be counted as part of the mine's assets during the liquidation process. The Lerala Mine was sold in 2018 after it was placed under provisional liquidation in 2017.
26th November	IMF Staff Completes 2019 Article IV Mission to Botswana. (IMF)	An IMF team has completed Article IV consultations with Botswana. Economic growth is estimated at 3.5% in 2019, due to weaknesses in the diamond market, drought and slower regional growth. Growth is expected to recover to 4.2% in 2020, as the diamond market returns to normality and new copper production comes on stream, and is projected to be around 4% thereafter. The IMF notes that the pace of economic growth in Botswana is too low to achieve development objectives and create new jobs and that Botswana remains vulnerable to volatile mineral revenues, SACU transfers and climate shocks. Thus, a new growth model that is private sector and export-driven is needed to achieve development objectives. The IMF team recommended extensive fiscal reforms to move Botswana forward including: i) modifying the fiscal rule to prevent further erosions in buffers and achieve Botswana's intergenerational equity objectives; ii) greater revenue mobilization through broadening the tax base and advancing tax reform; iii) public financial management reforms to enhancing the efficiency of spending; iv) reforming parastatals and other extra-budgetary entities, including by enforcing compliance to best governance practices and strengthening their monitoring and accountability, and v) revamping the debt management framework.
29th November	Surrender of a licence to transact banking business. (Bank of Botswana)	Pursuant to Section 11(4) of the Banking Act (Cap. 46:04), the Bank of India Botswana has surrendered its banking licence, with immediate effect, following its acquisition by First Capital Bank Limited. The acquisition follows the decision by the bank to voluntarily close operations in Botswana.



## NEWS HIGHLIGHTS

29th November	Tlou Energy searching for funding. (The Voice)	Tlou Energy has announced that it is negotiating with the Botswana Development Corporation (BDC) to provide the initial capital required to start production at its Lesedi Coal Bed Methane (CBM) project. BDC is to provide approximately P300 million towards the development of the first 10 megawatts (MW) of the Lesedi gas-to-power project with a minimum of P100 million required to connect 2MW to the grid. Tlou Energy aims to become the first producer of gas-fired energy in Botswana, and also has plans for solar power production in the future.
2nd December	EU injects P72 million into fight against FMD. (Botswana Gazette)	The European Union (EU) has approved EUR6 million, approximately P72 million, under its Economic Partnership Agreement (EPA) with Botswana towards the fight to eradicate Foot and Mouth Disease (FMD). According to the EU, the money will help consolidate the integrity of the FMD-free zones through improved implementation of the Botswana Animal Information and Traceability System (BAITS). It will also be used to support beef value chains and the roll-out of the commodity-based trade approach that is currently being piloted in Ngamiland. The improved BAITS will enable farmers and extension officers to access functions of the system offline and enable registration of communal holdings and geo-references, thus giving communal farmers a better opportunity to access the EU market.
5th December	Minergy puts AIM listing on hold. (Mining Weekly)	Minergy, owner of the Masama coal mine, has put its listing on the London Stock Exchange's AIM on hold as a result of unfavourable market conditions and uncertainty of Brexit. The CEO noted that, once market conditions have improved, the company will reconsider the AIM listing as the London market offers opportunities including an enhanced trading platform for shareholders and access to a larger pool of funds for future mine developments and enhancements. The mine will continue its focus on operations and related efficiencies around the plant and product output.
6th December	Deficit reaches P2.4billion at fiscal year halfway point. (Mmegi)	Data from the Ministry of Finance and Economic Development has showed a fiscal deficit of P4.5 billion in the second quarter of the 2019/20 government financial year, compared to a surplus of P2.2 billion recorded in the first quarter of the fiscal year. This resulted in a cumulative deficit of P2.4 billion in the first half of 2019/20. Total revenues amounted to P30.5 billion while total expenditures reached P32.9 billion in the first half 2019/20 fiscal year. The game changer was a once-off P4.3 billion windfall received by Government from the Bank of Botswana as residual income in April 2019 which helped the first quarter of the fiscal year to a surplus. The cumulative deficit was funded from local sources through the government debt issuance programme. According to the ministry, increased revenue streams will be needed to restore financial stability during NDP 11 which has been forecasted to record a deficit overall. The government is looking into broadening the tax base as another way to finance government expenditures.
11th December	De Beers lowers 2020 production forecast. (Rapaport news)	De Beers has announced its 2020 production forecast, which entails taking a prudent approach to the supply of rough diamonds. The company has lowered its production outlook to between 32 and 34 million carats in 2020, from a previous outlook of 33 to 35 million carats. Output is forecast to rise to between 34 and 36 million carats in 2021, compared to a previous projection of 35 to 37 million carats. The company notes that its production outlook is informed by supply and demand in the market, and the industry is rebalancing after oversupply of polished diamonds in the manufacturing sector and sluggish consumer demand caused the rough diamond to slow down in 2019. This in turn forced De Beers to decrease prices as a way of responding to the market and helping the manufacturers to profitability.

## NEWS HIGHLIGHTS

13th December	BoB weighs in on tax debate. (Mmegi)	The Ministry of Finance and Economic Development has proposed broad tax reviews as part of measures to restore fiscal stability in NDP 11, which is projected to have an P18 billion budget deficit. The Bank of Botswana (BoB) supports the government's decision to broaden its tax revenues. The Bank suggested the reduction of tax exemptions to reduce distortions and taxation of unused land to encourage productive use of land resources.
14th December	Botswana loss-making retailer Choppies to exit 3 more African countries. (Reuters Africa)	Choppies Group has announced that it will exit three more African markets, Tanzania, Kenya and Mozambique, less than a fortnight after it said it would sell its loss-making South African operations for only 1 rand a share. The Group would have halved its footprint in Africa, while continuing to operate in Botswana, Zimbabwe, Zambia and Namibia.
17th December	Choppies financial results for the financial year 2018 have been released. (Sunday Standard)	The long awaited Choppies Enterprises' audited financial results for the year 2018 has finally been released, a year after the new auditors picked irregularities in reporting. The results showed a loss of P445 million after tax, compared to P170 million loss recorded in 2017. The deficit is attributable to a spike increase in administration expenses, which came about from increased expenditures on store acquisitions, and impairment losses. The latter amounted to P335 million in 2018 compared to P167 million in 2017. Total assets decreased marginally to P3.01 billion from P3.04 billion in 2018 and 2017 respectively.
18th December	Profit margins improve at USD425 million De Beers sale. (Rapaport news)	De Beers' rough sales improved in the last sightholder sales of 2019, totalling USD425 million in December, up from USD400 million in November, although this was still 22% lower than USD544 million sales a year ago. DBGSS sales in the last cycle of the year were the highest since April 2019, as lower price levels and better profit margins spurred an upturn in rough diamond demand from sightholders. Profits have improved for manufacturers as prices have become more attractive.
19th December	Forbes to host first ever under 30 Africa summit Botswana. (Mmegi)	Forbes has announced that it will host the first-ever Under 30 Africa Summit in Botswana, from 19-23 April 2020, a move that recognises Botswana as an emerging centre for entrepreneurship focused on global growth, start-up acceleration and innovation. The summit will be hosted in partnership with the President's initiative and brings together about 600 entrepreneurs and game changers from around the world for mentorship, networking and to engage in conversations centred around sustainability, innovation and entrepreneurship. The event is expected to start in Gaborone and continue in Chobe National Park.
19th December	Lucara tender beats expectations. (Rapaport news)	Lucara Diamond Corp. achieved higher sales than expected at its final tender of the year as market stabilisation drove an increase in rough prices. According to the owner of Karowe mine, actual rough sales were 16% above the mine's forecasted sales, at USD52.9 million. According to Lucara, the mine benefited from a strong demand for rough on its digital supply platform, and its customer base increased from 4 to 27 clients during the year.
31st December	Ecspontent acquires major stake in Botswana's maize seed seller. (Sunday Standard)	South African financial services firm, Ecspontent, has announced the acquisition of 45.5% shares in Crosscorn, a Botswana company producing, selling and distributing seeds. The transaction will take place in two phases. The company will first acquire 26.25% shares in Crosscorn for USD1.4 million, and later acquire 19.25% in exchange for the issue of 101.3 million Ecspontent shares. Ecspontent's move into Botswana is an opportunity to acquire a strategic investment in the country and benefit from the government's subsidies for crop seeds and livestock feeds. Crosscorn is wholly owned by Scipion Active Trading Fund (SATF) and has market share in excess of 50% of maize seeds sales in Botswana.

## MACRO-ECONOMIC DATA

Key Economic Data										
	unit	2014	2015	2016	2017	2018	2019Q1	2019Q2	2019Q3	2019Q4
<b>Annual Economic Growth</b>										
GDP	%	4.1	-1.7	4.3	2.9	4.5	4.5	3.9	3.7	..
Mining	%	0.5	-19.6	-3.7	-11.1	5.3	5.5	1.5	1.6	..
Non-mining private sector	%	4.9	1.4	7.1	5.6	4.7	4.8	4.5	4.2	..
GDP current prices	P mn	145,868	146,066	170,564	180,103	190,365	49,015	49,212	49,561	..
GDP 2006 prices	P mn	87,569	86,083	89,787	92,395	96,533	24,454	24,838	24,892	..
<b>Money &amp; Prices</b>										
Inflation	%	3.8	3.1	3.0	3.2	3.5	3.3	2.8	3.0	2.2
Prime lending rate	%	9.0	7.5	7.0	6.5	6.5	6.5	6.5	6.25	6.25
BoBC 7/14-day	%	3.07	0.97	0.84	1.45	1.52	1.60	1.60	1.40	1.41
<b>Trade &amp; Balance of Payments</b>										
Exports - total goods	P mn	76,261	63,484	80,336	61,672	67,162	14,672	17,494	10,818	..
Exports - diamonds	P mn	65,328	52,730	70,781	54,384	60,411	13,519	16,088	9,413	..
Balance of payments	P mn	6,246	-4 148	-3 280	-4 278	-4 204	- 907	-2,684	..	..
<b>Foreign Exchange</b>										
Exchange rate BWP per USD	end	9.515	11.236	10.650	9.872	10.730	10.787	10.616	11.038	10.627
Exchange rate ZAR per BWP	end	1.217	1.383	1.279	1.256	1.344	1.353	1.331	1.366	1.330
FX reserves	\$ mn	8,323	7,546	7,189	7,502	6,657	6,843	6,765	6,517	..
FX reserves	P mn	79,111	84,881	76,804	73,693	71,427	73,505	71,814	72,008	..
<b>Financial Sector</b>										
Deposits in banks	P mn	51,492	59,961	62,438	63,581	69,271	71,640	71,484	75,357	..
Bank credit	P mn	45,116	48,307	51,316	54,181	58,332	58,362	60,177	61,101	..
BSE index (DCI)		9,501.6	10,602.3	9,727.7	8,860.1	7,853.5	7,885.6	7,622.5	7,461.0	7,494.6
<b>Business Indicators</b>										
Diamond production (a)	'000 cts	24,658	20,732	20,880	22,961	24,377	6,081	5,828	5,785	..
Copper production (b)	tonnes	46,721	23,050	16,878	1,239	1,462	..	..	..	..
Nickel production	tonnes	14,958	16,789	13,120	0	0	..	..	..	..
Business confidence index		52%	44%	43%	46%	..	..	..	..	..
No. of companies formed		16,300	19,134	17,133	20,707	..	..	..	..	..
Electricity consumption	GWh	3,990	3,974	3,929	3,772	3,919	966	926	927	..
Crude oil (Brent)	\$/bar	55.27	36.61	54.96	66.73	50.57	67.93	67.52	60.99	67.77
<b>Employment (formal)</b>										
Government		129,918	130,220	129,216	129,009	133,238	..	..	..	..
Parastatals		18,790	19,411	19,008	19,444	19,830	..	..	..	..
Private sector		191,399	191,484	194,202	193,745	195,681	..	..	..	..
Total		340,107	341,115	342,426	342,198	348,749	..	..	..	..
<b>Govt Budget</b>										
		2016/17 (d)	2017/18 (d)	2018/19 Preliminary (d)	2019/20 Revised (e)	2020/21 Projections (e)				
Revenues	P mn	57,398	56,411	54,513	58,238	59,125				
Spending	P mn	56,275	58,393	60,858	66,025	66,067				
Balance	P mn	1,123	-1,982	-6,345	-7,787	-6,941				
Public debt & guarantees	P mn	36,864	45,542	46,012	52,980	..				
Govt deposits at BoB	P mn	29,819	30,094	21,559	..	..				
GDP	P mn	174,630	182,195	194,901	207,568	224,607				
Revenues	%GDP	32.9%	31.0%	28.0%	28.1%	26.3%				
Spending	%GDP	32.2%	32.0%	31.2%	31.8%	29.4%				
Balance	%GDP	0.6%	-1.1%	-3.3%	-3.8%	-3.1%				
Public debt & guarantees	%GDP	21.1%	25.0%	23.6%	25.5%	..				
Govt deposits at BoB	%GDP	17.1%	16.5%	11.1%	..	..				

Sources: Bank of Botswana; MFED; Statistics Botswana; Department of Mines; Registrar of Companies; BSE; Econsult

**Notes:**

- (a) From 2013, figures include production from Lucara Diamonds (Karowe mine) and Debswana. From 2016, figures also include production from Gem Diamonds (Ghagoo) and Lerala mines, which ceased in February 2017 and April 2017 respectively
- (b) Copper production starting Q2 2017 for Mowana mine
- (c) Numbers in Italics reflect revisions from the previous review
- (d) Actual
- (e) Budget

## SPECIAL FEATURE

# Botswana's options for future power generation<sup>1</sup>

## Introduction

During 2020, Botswana will need to make some crucial decisions regarding investment in new electricity generation capacity. Although the new capacity is not required immediately, energy generation investments are large and have a long lead time, and hence investment decisions need to be made soon. At one level the key decision can be presented in simple terms: does Botswana intend to continue relying on coal as its main source of electricity, or should a switch to large-scale solar power generation be made now? In other words, will the next big power investment be in coal or solar power generation? The Government is also developing an Integrated Resource Plan (IRP) for power generation, which will provide a masterplan for electricity provision over the next 20-30 years.

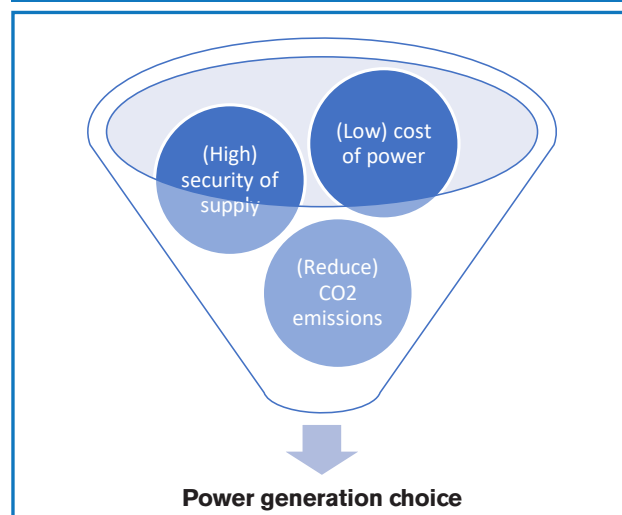
While the decision can be presented in simple terms, the issues to be considered in reaching a decision are complex. They include the economic and financial feasibility of the different options; the projected growth of electricity consumption and patterns of demand; a wide range of technical issues regarding power generation, emissions and electricity storage; other potential sources of supply and regional power markets; as well as the roles of different institutions in the power generation and distribution mix.

Also important are broader trends and concerns about global warming and climate change. This is now one of the world's most pressing geo-political issues, and actions taken by Botswana have to be seen in this context as well as in terms of the commitments that Botswana has made as part of the international community. Partly because of the urgency of climate change issues, the environment within which power generation decisions are being taken is changing rapidly, from all perspectives, including technical, financial, economic, policy and political. Anticipating where these changes will lead is important in making decisions that will prove to be appropriate over the next 10-20 years.

Making appropriate power generation choices means balancing three, sometimes competing, objectives. These are:

1. **Minimising the costs of electricity**
2. **Maximising the security and reliability of supply**
3. **Reducing carbon dioxide (CO<sub>2</sub>)/greenhouse gas (GHG) and other harmful emissions**

**Figure 1:**  
**Balancing Power Supply Objectives**



Sometimes these objectives conflict. For instance, solar power is cheap and has zero GHG emissions, but does not provide security of supply. Adding electricity storage to provide security of supply makes the cost much higher. Coal provides more security of supply, at medium cost, but has high GHG emissions. This article discusses these issues and trade-offs in more depth.

<sup>1</sup> This feature has benefitted from helpful inputs from Dr Stefan Schwarzfischer, former CEO of BPC.

## SPECIAL FEATURE

### Current power generation

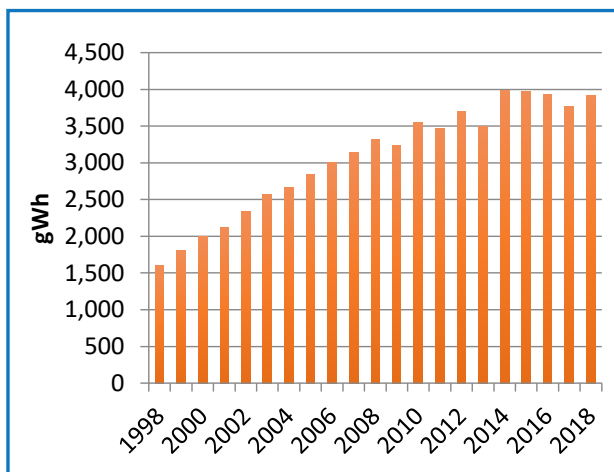
Botswana has historically relied upon coal-fired power generation to provide the majority of its domestic electricity supplies. From 1989 until 2011 this was based on the 132 megawatt (mW) Morupule A power station, operated by the Botswana Power Corporation (BPC). In 2014 the much larger 600mW Morupule B power station was commissioned. Both Morupule A and B have been beset by technical problems. Partly as a result, these supplies have never been sufficient to meet total domestic demand, and have been supplemented by power imports from South Africa (which also generates most of its electricity from coal). There are also small amounts of power imported from Mozambique, Zambia and Namibia. At times, imports from South Africa have been constrained, and Botswana had to resort to (very expensive<sup>2</sup>) supplementary diesel generation capacity, and load shedding when total supplies from all sources were insufficient. There are relatively insignificant contributions from small-scale solar power generation. After being closed in 2011, Morupule A power station has been rehabilitated and is being recommissioned.

BPC currently has a monopoly over large-scale power generation, importation, transmission, and customer (end user) supplies. Energy policy is the primary responsibility of the Ministry of Minerals, Green Technology and Energy Security, with the Ministry of Environment, Natural Resources Conservation and Tourism playing a subsidiary role. The Botswana Energy Regulatory Authority (BERA) is the sector regulator. In principle, the law allows for the provision of electricity by Independent Power Producers (IPPs), but no such deals have yet been made by Government and BPC.

### Electricity consumption and demand

In general, electricity demand and consumption rises along with economic growth, with a general expectation that, as a country develops, the growth of demand for electricity will be somewhat higher than economic growth as, for instance, the rate of household electrification increases. In Botswana, electricity consumption increased on average by 4.6% a year over the two decades from 1998 to 2018, very similar to the average real GDP growth rate over the same period. However, the pattern of growth has changed over time, with relatively fast growth (7.5% a year) in electricity consumption from 1998-2008, but much slower growth (1.7% a year) from 2008-2018. The slower recent growth may be for a number of reasons, including supply constraints and load-shedding in some years, and the closure of the BCL mine – previously the country's largest single consumer of electricity - in late 2016. There has also been an increase in self-provision by consumers, e.g. using diesel generators and rooftop solar panels. In 2018, total consumption of electricity through the national grid was 3,919 gigawatt hours (gWh), of which 70% was generated domestically and 30% was imported.

**Figure 2:**  
Electricity Consumption, 1998-2018



Source: Statistics Botswana

Of more relevance than total consumption is peak demand, i.e. the maximum load that the system will have to deliver at any point in time. Demand for electricity varies considerably over time - throughout the day, throughout the week, and throughout the year. In Botswana, where the largest source of demand is households, the maximum power demand is roughly 6pm-8pm and 6am-8am in the winter (June-July), at around 550mW. In theory, Morupule B power station can deliver 540mW (net), and hence just about meet Botswana's peak demand, although in practice it has performed far below its design capacity and has been unable to meet domestic demand; hence the continued reliance on imported power.

Morupule B is currently undergoing a major repair and refurbishment exercise, and if this is successful, it should – along with the refurbished and rehabilitated Morupule A – be able to meet current peak demand. However, if peak demand continues to grow at 3-5% a year, the combined maximum Morupule A and B capacity will be exhausted within the next 3-5 years. There is also uncertainty over how much power Morupule A and B will be able to deliver in practice, even when refurbished, given their troubled history. Given that there is a lead time of up to five years between an investment decision and the commissioning of new power generation capacity, a decision on where the next capacity will come from is required as early as possible in 2020.

<sup>2</sup> The cost of diesel emergency power was around USD2.50/kWh



## SPECIAL FEATURE

### Power generation options

#### Coal

As noted above, Botswana has traditionally relied upon coal-fired power stations to generate electricity. This partly reflects available technology when investment decisions were made (in the 1970s for Morupule A and the 2000s for Morupule B), along with Botswana's readily available coal deposits. These are estimated at over 200 billion tonnes – although proven reserves (to conventional standards of geological certainty) are much lower than this. Much of the coal is close to the surface and hence easy to mine through open-pit or shallow underground mines. Its quality is, however, generally average to poor, with a relatively low thermal capacity and high ash and sulphur contents. Overall, however, for mine-mouth power generation, Botswana's coal is a relatively cheap resource in financial terms (although not necessarily in economic terms once the cost of externalities such as pollution and CO<sub>2</sub> emissions is taken into account).

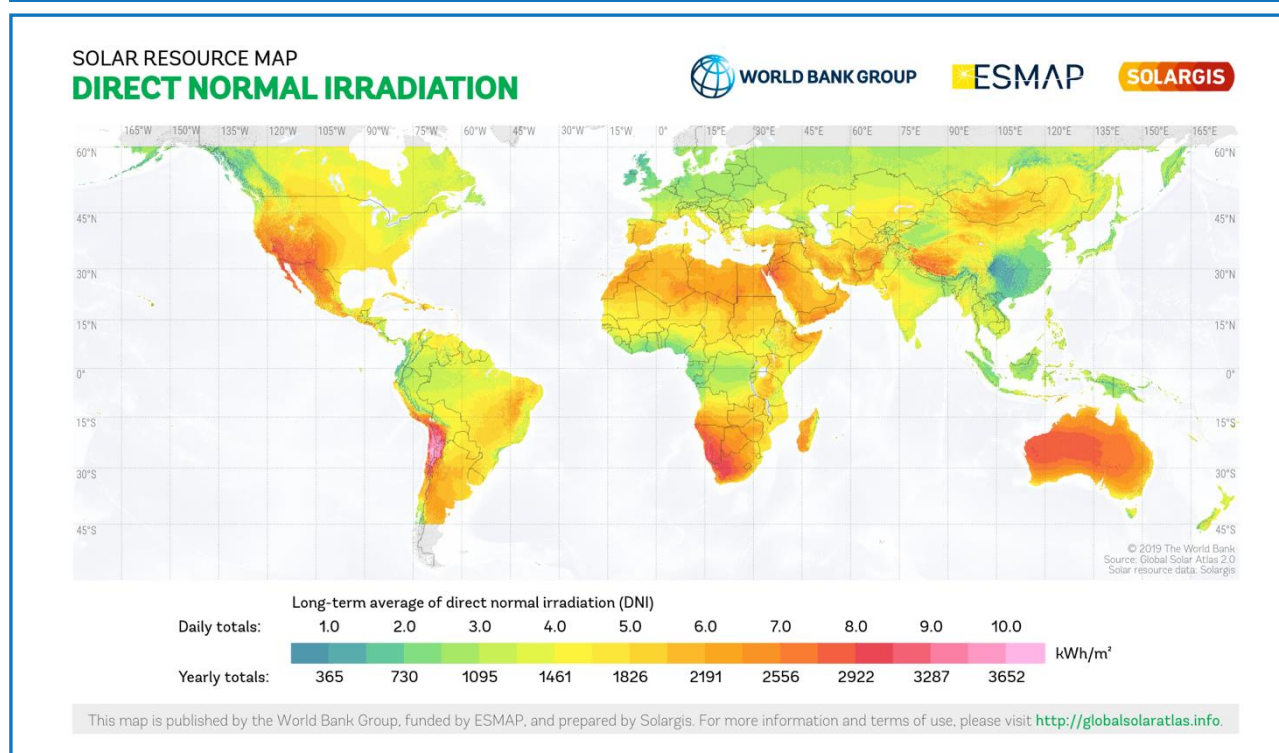
Coal-fired power generation has other perceived advantages. In principle, the technology is well-established and reliable – although the problems experienced with Morupule B with unreliable performance, frequent breakdowns and delivery of power well below design capacity shows that this perception may be misplaced. Coal can provide stable

base-load power and has some flexibility to increase and decrease electricity output to meet variations in demand. Botswana's coal-fired power stations should be able to provide electricity at a cost of USD 0.08-0.10 per kilowatt hour (kWh)<sup>3</sup>. However, the poor experience with Morupule B suggests that the real cost of electricity from this source may be higher than this.

#### Solar – Photovoltaic (PV) and Concentrating Solar Power (CSP)

Solar energy is another method of power generation that is reckoned by many to have high potential in Botswana. In general, the country has amongst the highest levels of direct normal (solar) irradiation (DNI) of any location in the world, with over 3,000 kWh/m<sup>2</sup> per annum (figure 3). So, while many people argue that Botswana should use its ample reserves of (cheap) coal for power generation, the same argument applies to its ample supplies of (free) sunshine. Clearly there is much more to the choice of power generation technology than the cost of the inputs (for instance, capital costs are more important than input costs in determining the overall costs of power from different sources), but the point is that access to those inputs does not provide any useful guidance as to whether coal should be preferred over solar, or vice versa. Other issues are much more significant.

**Figure 3:**  
**World Solar Irradiation**



Source: <http://solargis.com>

<sup>3</sup> Discussions of the cost of power generation generally refer to the "Levelised Cost of Electricity" (LCOE). The LCOE of a given technology is the ratio of lifetime costs to lifetime electricity generation, discounted back to a base year using a discount rate that reflects the average cost of capital.

## SPECIAL FEATURE

There are two main types of solar power generation technology. Concentrating Solar Power (CSP) uses mirrors or lenses to concentrate the sun's energy and heat up a suitable liquid medium, such as molten salt. This liquid is then used for thermal power generation through a steam turbine, in much the same way as coal is burned to provide heat to create steam. Solar PV uses the sun's energy to generate electricity directly through a chemical reaction in solar panels.

Of course, one of the main issues with solar power using either of these two technologies is its intermittency – power is only generated directly when the sun is shining, and hence no power is generated at night and less is generated when the weather is cloudy. This contrasts with coal, which can be used to generate electricity regardless of the weather and at any time of day or night.

Hence, for solar power to provide dispatchable electricity (i.e., in response to demand at any time of day or night), some form of storage is required. The need for storage is one of the weaknesses of solar energy, as storage technology is not yet as well developed as power generation technology – although this is changing very fast. CSP can be combined with thermal storage, whereby the heat generated during the day is transferred to the molten salt, which has a high heat retention capacity, which can then be used to produce steam for power generation at a later point in time. CSP with storage can now deliver electricity on a 24-hour basis. Reliable solar PV requires battery storage, which is still expensive. The cost of direct solar PV electricity generation has been falling very fast, and it is now a competitive way of meeting daytime electricity needs. However, it is not currently competitive for utility-scale grid supplies of dispatchable power, or meeting peak power requirements, due to battery storage costs. Nevertheless, solar PV with some battery storage capacity is already a cost-effective way of providing off-grid electricity solutions, and the cost of large-scale battery storage solutions is falling fast.

Costs for both forms of solar power generation have been falling rapidly. In 2018, electricity from newly commissioned CSP projects (with storage) averaged USD0.185 per kWh. Utility-scale solar PV was cheaper, at USD0.085 per kWh in 2018 (without storage). The rapid reduction in costs for these technologies experienced between 2010 and 2018 is expected to continue, with costs of USD 0.08 and USD 0.05 per kWh for CSP and solar PV respectively by 2022 – making them cheaper than typical coal projects, even before the costs of externalities are taken into account<sup>4</sup>.

#### Other sources –hydro, gas, wind and nuclear

**Hydro and wind power.** Elsewhere in the world the cheapest forms of renewable energy (RE) are hydro-electric power and wind energy, especially onshore wind. Hydro power is particularly good, not just because of its low cost but because of its flexibility in terms of its ability to deliver power on demand. Unfortunately hydro power is not an option for Botswana, given the country's topography and lack of large rivers. Nor is wind power an option for large-scale power generation, due to low wind speeds.

**Gas.** Many countries use natural gas-fired power stations to meet a portion of their electricity needs, especially at peak times as supply can be ramped up quickly. Although gas is also a fossil fuel, it is less damaging than coal in terms of pollution and GHG emissions. Botswana has natural gas in the form of coal-bed methane (CBM) associated with coal deposits. CBM is a potential fuel source for electricity generation, and small CBM projects are currently being developed. The 90mW generating plant in Orapa has been used to generate power using diesel in the past, but can also use gas. Gas-fired electricity generation has the advantage of being very flexible, due to easy storage and the ability to increase output rapidly to meet peaking demand. However, it is relatively expensive<sup>5</sup>.

**Nuclear.** Although designs for micro- and small-scale modular nuclear power plants exist, their adoption globally has been very limited and their economics uncertain. They also have demanding requirements for water for cooling purposes, which makes them unsuitable for Botswana, and as well there are long-term waste storage issues.

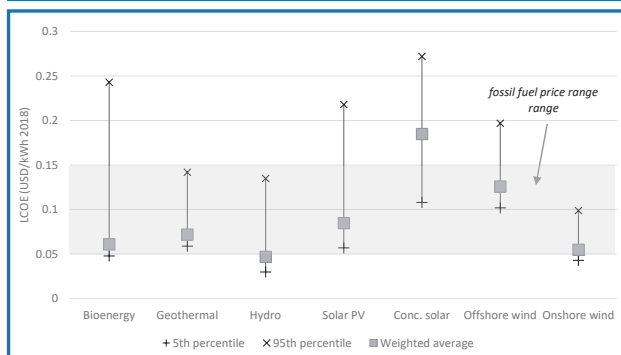
<sup>4</sup> All figures taken from the International Renewable Energy Agency (IRENA) publication, Renewable Power Generation Costs in 2018, <https://www.irena.org/publications/2019/May/Renewable-power-generation-costs-in-2018>

<sup>5</sup> Estimated costs of CBM electricity are in the range of USD1.20-1.60 per kWh



## SPECIAL FEATURE

**Figure 4:**  
**Comparative Costs of Renewable Energies**



Source: IRENA, Renewable Power Generation Costs, 2018

### Global warming and climate change

Any discussion of power generation options needs to relate to climate change and global warming issues. Concern about climate change due to rising global temperatures is now one of the most pressing international policy issues (environmental, political and economic), and it is well established that emissions of CO<sub>2</sub> and other gases are the main cause of global warming<sup>6</sup>. Emissions come largely from fossil fuels, whether used in power generation or as fuel for transportation (diesel, petrol, aviation fuel etc.). Some steps have been taken for international collective action to limit harmful emissions, dating back to the 1997 Kyoto Protocol, and more recently under the 2015 COP 21 Paris Agreement<sup>7</sup>. This agreement recognised that CO<sub>2</sub> emissions would have to be reduced to “net zero” by 2050 (carbon neutrality) in order to prevent a potentially disastrous increase in global temperatures (more than 1.5-2.0 degrees centigrade above pre-industrial levels).

Most countries made commitments to reduce CO<sub>2</sub> emissions at COP 21, although these are voluntary and lack an enforcement mechanism. There are major concerns (e.g. as expressed at the COP 25 Madrid meeting) that many countries are falling behind on their emission reduction commitments, leading to much faster global warming. This would lead to rising sea levels, higher average temperatures and more extreme weather, which will be reflected in drought conditions and lower rainfall in some areas, major impacts on the habitability of coastal cities and other areas, on food production, and disease.

Although global warming is still at an early stage, there are already real impacts. At the time of writing, Australia is experiencing another round of deadly bush fires that have been widely attributed to global warming. There are also

major concerns about the future viability of producers of fossil fuels, such as oil companies and oil producing nations, given that some known reserves of oil cannot be developed if CO<sub>2</sub> emission targets are to be met, and hence such companies and countries will have “stranded assets”. Coal producers are particularly vulnerable, as coal is the most polluting of fossil fuels in terms of CO<sub>2</sub> emissions per unit of energy produced. As a result, many coal projects are now extremely difficult to finance commercially – including coal mines, coal-fired power stations, and coal transport projects such as railway lines – as many banks are not convinced that there will be a business case for coal over the financing lifetimes of such projects. In addition, with international public opinion turning strongly against coal, banks are also concerned that financing coal projects will have adverse impacts on their business more generally. The pull-back of banks from coal projects applies to both purely commercial banks as well as multilateral development banks such as the World Bank and African Development Bank. As a result, any coal projects that do proceed will need to be financed – directly, or indirectly through guarantees – by government, which has implications for public debt and compliance with statutory limits on government indebtedness.

Even though Botswana is small in the global context, and its GHG emissions have little significant global impact, it is party to the COP21 Paris Agreement, and has committed contribute to global reductions in GHG emissions. Botswana’s (non-binding) Intended Nationally Determined Contribution (INDC) is “to achieve an overall emissions reduction of 15% by 2030, taking 2010 as the base year. Base year emission estimation is 8307 Gg of CO<sub>2</sub> equivalent”. From the background documents to the Government’s COP21 submission, this appears to mean a 15% reduction in CO<sub>2</sub> emissions relative to the level that would apply in 2030 without such mitigation measures, rather than an absolute 15% reduction from the base year level (which is impractical). Clearly this implies a shift away from coal-fired power generation towards renewable (i.e. solar) energy, as well as limitations on other potential coal-based projects (such as coal-to-liquids).

Despite intensifying concerns about global warming and climate change, achieving concerted global policy action to achieve reductions in CO<sub>2</sub> emissions is proving challenging. From an economic perspective, the optimal approach would be to have an internationally agreed carbon tax paid by all emitters of CO<sub>2</sub>. This has the advantage of making real to CO<sub>2</sub> emitters (polluters) the costs of the damage they are causing – i.e. of internalising costs that are currently manifested as externalities, borne by others but not by those who produce the emissions. Under this “polluter

<sup>6</sup> Other emissions also contribute to global warming, notably methane; these are generally measured in terms of tonnes of CO<sub>2</sub> equivalent (tco<sub>2</sub>e).

<sup>7</sup> Convention of the Parties (COP), members of the United Nations Framework Convention on Climate Change (UNFCCC)

## SPECIAL FEATURE

pays” principle, making emitters bear these costs, the intention is that behaviour would change to reduce emissions and hence global warming. A carbon tax would have the additional advantage of providing resources to finance mitigation and adjustment measures.

### Botswana’s options

So where does this leave Botswana in terms of power generation decisions? As noted, there is very little current solar power generation, despite the rapid global shift towards renewables. Most current solar power initiatives are private and small-scale, mostly in off-grid locations such as farms and safari camps. However, some steps are being taken by government: tenders have been issued for two 50mW solar generation facilities to supply power to the national network, as well as for 12 smaller-scale (1-5mW) solar projects. There are also plans to allow households and small business to generate their own electricity using rooftop solar installations and sell any surplus back to the BPC grid.

However, there still seems to be an official preference for making another large investment in coal-fired power – the proposed 300mW Morupule B Units 5/6 project has been on the cards for years. It has, however, been delayed due to problems in reaching agreement with the project promoters and financiers – Marubeni of Japan and Posco of South Korea, as well as those countries’ export credit organisations – who now appear to have pulled out of the project. Nevertheless, a further 300mW of coal-fired power still appears to be in BPC’s planning strategy<sup>8</sup>.

It is difficult to see how this could be justified in commercial or financial terms, given the rapidly declining costs of solar power generation. It is even more puzzling in economic terms. A proper planning decision – as per the formal principles adopted by the Ministry of Finance and Economic Development and as laid out in the Planning Officer’s Manual – specifies that major public investment decisions should undergo an economic appraisal reflecting economic costs and benefits, rather than financial costs only, using shadow prices where necessary to incorporate externalities. Applying these principles to power generation decisions requires that the shadow price of CO<sub>2</sub> emissions is included in the economic assessment of any potential investment in coal-fired power generation. A rough calculation using the World Bank recommended shadow price of USD30 per tonne of CO<sub>2</sub> emissions, and based on Botswana’s historical emissions, suggests that the cost of CO<sub>2</sub> emissions would add USD0.035-0.040 per kWh to the cost of coal-fired electricity (compared to a financial cost of USD0.08-0.10 per kWh) – i.e. an increase of 35-50%. This significantly shifts the economic calculation away from coal and towards solar power<sup>9</sup>.

Another big investment in coal-fired power generation would also appear to be inconsistent with the (draft) Botswana Climate Change Strategy<sup>10</sup>. This proposes “a robust approach to reduction of GHG” emissions, “particularly in the energy sector”, and states that “government will adopt and enforce carbon taxes” (pp.25-26). This too implies a big shift towards solar power generation. Besides properly reflecting economic costs and incentivising the production of green energy, carbon taxes could also raise substantial revenues for government. To be consistent, a carbon tax would also have to apply to petrol and diesel.

However, even if Botswana decides to move decisively towards solar power and build no more coal-fired power stations, this still leaves unresolved the question of solar power’s intermittency, especially if the lowest cost solar option (PV) is adopted. Ample, cheap electricity can be generated by solar PV in the daytime. But as noted above, peak demand occurs on a winter morning, when it will have been dark for more than 12 hours. There are also issues around the reliability of solar power supplies during cloudy periods, which can last a week or more in summer.

There are several ways of dealing with the intermittency problem, and addressing the challenge of meeting peak electricity demand on a cold, dark winter morning. One is to rely on imports from neighbouring countries – which in practice means utilising coal-fired power generated in South Africa (hence “outsourcing” GHG emissions). Looking further ahead, it may be possible to utilise renewable hydro power from Zambia or the Democratic Republic of Congo (DRC), through the Southern African Power Pool (SAPP). A second option is to use Botswana’s CBM gas to meet peak demand. This is still a fossil fuel, but much less damaging than coal. Power generation from CBM in Botswana is still at an early stage, but could be introduced quickly once a power purchase agreement (PPA) is agreed. A combination of solar and gas fired power generation could be a compelling and cheaper option than coal.

A third option is to shift the time patterns of demand, rather than take it as given. For instance, long-distance water pumping – such as the North-South Carrier – can easily be done in the daytime using cheap electricity from solar PV, with no storage required. Introducing variable time-of-day tariffs – with more expensive power at peak times and cheaper power at off-peak times – would provide an incentive for consumers to adjust their consumption patterns and spread demand more evenly, and match it to periods of high supply.

<sup>8</sup>Presentation to Botswana-China Business Forum on Electricity Supply in Botswana, August 2018.

<sup>9</sup>This shadow price is similar to the price of carbon under the EU’s Emissions Trading Scheme (ETS) at the end of 2019, but lower than the US Government’s guide price of US\$50 per tonne.

<sup>10</sup>Ministry of Environment, Natural Resources Conservation and Tourism

Fourth, storage technology is developing rapidly and falling in price. Competitive storage options for CSP can already provide dispatchable power at any time of day. Similar trends under way with large-scale battery storage will soon enable solar PV to provide dispatchable power at any time. Once solar can provide the cheapest source of electricity at 7am on a winter morning, it really is game over for coal, and that point may not be far off.

## Conclusion

Botswana needs to consider many factors in deciding – quickly – where the next 300mW of power will come from. Choosing coal rather than solar runs the risk of being backward-looking rather than anticipating likely technical, economic and political changes over the next two decades. Many commentators believe that the world is close to a tipping point with regard to the shift from fossil-fuel based energy to renewable energy (RE), with the dramatic reduction in costs of RE technologies such as solar and wind energy, battery storage costs, and the shift towards electric vehicles. Although collective policy actions to deal with global warming – such as carbon taxes – are proving difficult to agree on, economics is doing the job, in terms of changing the relative economics of fossil fuel and RE sources. Once this tipping point is reached, change will happen very rapidly. Botswana needs to be wary of being on the wrong side of history. But government also needs to be decisive and move much more quickly: bidding rounds for solar energy have been cancelled twice, while the current invitations for IPPs to provide electricity from solar and CBM sources are moving at a glacial pace. Because of this, combined with

sub-economic electricity tariffs, the current environment is not conducive for private investment in power generation, despite this being a declared aim of government policy.

A further point is that electricity has been sold too cheaply in Botswana for many years. For political reasons, BPC has not been permitted to sell electricity at a cost that covers generation, import and distribution cost, hence requiring expensive subsidies. In addition, BPC has not had to pay for the environmental damage that its activities cause. If these issues are to be addressed, the price of power will have to rise. A change in the pricing and taxation structure (higher average prices, carbon taxes, variable time-of-day tariffs, while allowing users to partially offset this by generating and selling power back to BPC) would lead to a much more economically and environmentally rational set of incentives.

From a domestic perspective, a great deal of focus is being placed on the role that innovation can play in Botswana's economic transformation. Investing in coal provides little or no opportunity for useful innovation, as coal is almost certainly a fuel of the past, globally. By contrast, solar power generation is set to expand rapidly; the International Energy Agency (IEA) predicts a 50% expansion of renewable power capacity from 2019 to 2024, of which 60% will be accounted for by solar PV<sup>11</sup>. By committing to solar energy, Botswana could provide opportunities for local innovation, that could in turn be at the cutting edge of important global technological developments. This is consistent with Vision 2036 and its ambition of an information based society harnessing the new technologies.

<sup>11</sup><https://www.iea.org/reports/renewables-2019>

PO Box 45016, Gaborone, Botswana

tel [ + 267] 390 0575

fax [ + 267] 390 0585

email keith@econsult.co.bw  
sethunya@econsult.co.bw  
kitso@econsult.co.bw  
www.econsult.co.bw

*The Econsult Economic Review is sponsored by BIFM, Botswana's largest asset manager. All content and commentary in the Review is produced by Econsult and should not be attributed to BIFM.*



**Bifm**  
Dynamic  
Wealth Management