ELECTRICITY GENERATION AND DISTRIBUTION

STATS BRIEF, FOURTH QUARTER 2014

STATISTICS BOTSWANA

Contact Statistician: Larona T. Kaisara
Industry Statistics Unit
Email: ltkaisara@gov.bw

Tel: (+267) 367 – 1300 **Ext.** 326

Statistics Botswana. Private Bag 0024 Botswana
Tel: (267) 367 1300. **Fax:** (267) 395 2201. **Email:** info@statsbots.org **Website:** www.cso.gov.bw

Table of Contents

4. List of Tables

1.0 Preface

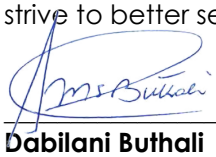
This statistical brief is intended to apprise on Electricity Generation, Importation and Distribution by presenting Monthly, Quarterly and Yearly Volumes as well as Indices for Electricity Generation in Botswana. Also included are Year-on-Year Percentage Changes in Indices of Electricity Generation from 2005 to the last quarter of the year 2014, using 2011 as a base year.

Amongst its duties, Statistics Botswana is mandated to compile data on industrial production in Botswana, hence electricity indices only confined to local electricity generation. However, importation and distribution volumes as well as percentage changes on the volumes of importation and distribution will be included. This is intended to give users a guide as to whether Botswana is managing, over time, in generating enough electricity to meet her demand. The data used in this stats brief is sourced from the Botswana Power Corporation.

The release further shows changes in the volume of electricity generation in a given period against the base year, and hence provides a reflection of the trend in the local electricity sector.

For more information and further enquiries, contact the Directorate of Stakeholder Relations at 3671300. All Statistics Botswana outputs/publications are available on the website at www.cso.gov.bw and at the Statistics Botswana Library (Head-Office, Gaborone).

We sincerely thank all stakeholders involved in the formulation of this brief, for their continued support, as we strive to better serve users of our services.



Dabilani Buthali
Acting Statistician General
March 2015

2.0 Summary of Findings

Table 1 below provides summarized key figures of the fourth quarter of 2014 as compared to the same quarter of 2013. It can be observed that the Electricity Generation Index increased by 16.9 percent from 567.1 recorded during the fourth quarter in 2013 to 663.0 recorded during the same quarter of 2014.

Table 1: Selected Key Figures for Electricity Generation, Importation and Distribution in Mega Watts Hour (MWH)

Electricity (MWH)	October – December (Quarter 4) 2013	October – December (Quarter 4) 2014	% change between Q4 2013 and Q4 2014
Distribution	805, 758	1,013,192	25.7
Generated	430, 128	502, 881	16.9
Imported	375, 630	510, 311	35.9
Indices of Physical Volume of Electricity (2011 = 100)			
Electricity Generation	567.1	663.0	16.9

2.1 Generation of Electricity

Table 2 gives data on the physical volume of electricity generated during the period under consideration (2005 – 2014 fourth quarter). The Table further forms the basis for indices of the physical volume of electricity generation as presented on Table 3. Table 4 shows the annual percentage change in the physical volume of electricity generation.

The index of the physical volume of electricity generation stood at 663.0 during the fourth quarter of 2014 as compared to 567.1 during the same quarter in 2013, indicating an increase of 16.9 percent (refer to Tables 1 and 4). However, comparison of the physical volume of electricity generation for the third and fourth quarters of 2014 shows that there was a decline of 38.4 percent, from 816, 465 MWH recorded during the third quarter to 502, 881 MWH during the fourth quarter (refer to Table 2).

The decline is attributable to failure of power generators at Morupule B power plants as recorded during the months of October and December 2014. In order to offset the electricity shortages, the Botswana Power Corporation increased output of the emergency power generators located at Orapa and Matsiloje to feed into the national power grid, even though this did not completely meet the demand. The Morupule A power plant is currently shut down and there has not been any production at the plant during the entire period of 2014. Electricity generation has been solely on Morupule B power plant.

2.2 Imported Electricity

During the fourth quarter of 2014, the volume of imported electricity (refer to Table 5) amounted to 510, 311MWH, compared to 375, 630 MWH recorded during the last quarter of 2013. The above figures show that importation of electricity increased by 35.9 percent between the fourth quarter of 2014 and the same quarter of 2013 (refer to Table 6). The increase in importation of electricity is attributed to the need to complement electricity generated locally, especially during the month of October 2014 as electricity generation locally was very low. As a result the country was forced to import more in order to meet the demand.

2.3 Distribution of Electricity

Table 7 shows the physical volume of electricity distributed from 2005 to the fourth quarter of 2014. During the fourth quarter of 2014 the volume of electricity distributed stood at 1, 013, 192 MWH, showing a decline of 2.2 percent from 1, 036, 387 MWH of electricity distributed during the third quarter of the same year (Tables 7 and 8). However, it can be noted that there has been a 20.5 percent increase when comparing electricity distributed during the fourth quarter of 2014 (1,013,192 MWH) to the same quarter in 2013 (805,758 MWH).

It can be observed from Table 9 that electricity generated locally contributed 59.2 percent of the distributed electricity during the year 2014 as compared to 48.0 percent during 2013. This notable increase is attributable to on-going developments at Morupule power plant, which has also subsequently led to reduced imports of electricity in 2014.

It should further be noted that all the figures contained in this report are not seasonally adjusted.

Table 2: Physical Volume of Electricity Generation (MWH); Jan 2005 – Dec 2014

PERIOD	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	81,040	80,089	56,291	53,926	33,922	44,442	39,195	26,574	110,960	137,802
February	63,304	57,774	56,291	49,732	37,890	38,641	32,847	16,938	80,410	77,067
March	67,654	73,826	57,521	51,072	46,413	55,401	20,079	67,761	88,358	102,377
April	79,507	79,764	56,127	49,313	38,987	40,872	29,593	34,069	94,011	151,675
May	64,802	71,473	49,358	61,558	49,464	41,943	15,762	39,826	140,454	252,235
June	81,897	75,929	49,358	58,334	20,132	30,676	23,045	48,928	137,414	321,453
July	82,891	63,899	61,290	54,588	38,103	33,156	27,814	81,013	158,120	318,627
August	65,513	62,379	62,544	47,278	48,795	39,594	24,536	11,205	223,420	296,036
September	73,052	51,072	52,235	39,890	36,522	35,177	21,063	97,177	218,222	201,802
October	78,323	55,444	41,183	42,689	32,361	37,746	27,166	77,236	32,183	71,243
November	59,405	62,900	38,502	40,367	26,443	20,894	23,044	113,384	203,228	244,723
December	69,227	59,723	44,046	38,538	34,885	38,430	19,231	89,101	194,717	186,915
Q1	211,998	211,689	170,103	154,730	118,225	138,485	92,120	111,274	279,728	317,245
Q2	226,206	227,166	154,844	169,206	108,584	113,491	68,400	122,823	371,879	725,363
Q3	221,456	177,350	176,068	141,756	123,420	107,927	73,413	189,395	599,762	816,465
Q4	206,955	178,066	123,731	121,594	93,689	97,070	69,441	279,721	430,128	502,881
TOTAL	**866,615**	**794,271**	**624,746**	**587,286**	**443,918**	**456,972**	**303,374**	**703,213**	**1,681,497**	**2,361,954**

Table 3: Indices of the Physical Volume of Electricity Generation – January 2005 – December 2014 (2011=100)

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	320.6	316.8	222.7	213.3	134.2	175.8	155.0	105.1	438.9	545.1
February	250.4	228.5	222.7	196.7	149.9	152.8	129.9	67.0	318.1	304.8
March	267.6	292.0	227.5	202.0	183.6	219.1	79.4	268.0	349.5	405.0
April	314.5	315.5	222.0	195.1	154.2	161.7	117.1	134.8	371.9	600.0
May	256.3	282.7	195.2	243.5	195.7	165.9	62.3	157.5	555.6	997.7
June	323.9	300.3	195.2	230.7	79.6	121.3	91.2	193.5	543.5	1,271.5
July	327.9	252.8	242.4	215.9	150.7	131.1	110.0	320.4	625.4	1,260.3
August	259.1	246.7	247.4	187.0	193.0	156.6	97.1	44.3	883.7	1,171.0
September	289.0	202.0	206.6	157.8	144.5	139.1	83.3	384.4	863.2	798.2
October	309.8	219.3	162.9	168.9	128.0	149.3	107.5	305.5	127.3	281.8
November	235.0	248.8	152.3	159.7	104.6	82.6	91.2	448.5	803.9	968.0
December	273.8	236.2	174.2	152.4	138.0	152.0	76.1	352.4	770.2	739.3
Q1	279.5	279.1	224.3	204.0	155.9	182.6	121.5	146.7	368.8	418.3
Q2	298.3	299.5	204.2	223.1	143.2	149.6	90.2	161.9	490.3	956.4
Q3	**292.0**	**233.8**	**232.1**	**186.9**	**162.7**	**142.3**	**96.8**	**249.7**	**790.8**	**1076.5**
Q4	**272.9**	**234.8**	**163.1**	**160.3**	**123.5**	**128.0**	**91.6**	**368.8**	**567.1**	**663.0**
TOTAL	**285.7**	**261.8**	**205.9**	**193.6**	**146.3**	**150.6**	**100.0**	**231.8**	**554.3**	**778.6**

Table 4: Annual Percentage Change in the Physical Volume of Electricity Generation: Jan 2006 – Dec 2014

PERIOD	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	(1.2)	(29.7)	(4.2)	(37.1)	31.0	(11.8)	(32.2)	317.5	24.2
February	(8.7)	(2.6)	(11.7)	(23.8)	2.0	(15.0)	(48.4)	374.7	(4.2)
March	9.1	(22.1)	(11.2)	(9.1)	19.4	(63.8)	237.5	30.4	15.9
April	0.3	(29.6)	(12.1)	(20.9)	4.8	(27.6)	15.1	175.9	61.3
May	10.3	(30.9)	24.7	(19.6)	(15.2)	(62.4)	152.7	252.7	79.6
June	(7.3)	(35.0)	18.2	(65.5)	52.4	(24.9)	112.3	180.9	133.9
July	(22.9)	(4.1)	(10.9)	(30.2)	(13.0)	(16.1)	191.3	95.2	101.5
August	(4.8)	0.3	(24.4)	3.2	(18.9)	(38.0)	(54.3)	1,893.9	32.5
September	(30.1)	2.3	(23.6)	(8.4)	(3.7)	(40.1)	361.4	124.6	(7.5)
October	(29.2)	(25.7)	3.7	(24.2)	16.6	(28.0)	184.3	(58.3)	121.4
November	5.9	(38.8)	4.8	(34.5)	(21.0)	10.3	392.0	79.2	20.4
December	(13.7)	(26.2)	(12.5)	(9.5)	10.2	(50.0)	363.3	118.5	(4.0)
Q1	(0.1)	(19.6)	(9.0)	(23.6)	17.1	(33.5)	20.8	151.4	13.4
Q2	0.4	(31.8)	9.3	(35.8)	4.5	(39.7)	79.6	202.8	95.1
Q3	(19.9)	(0.7)	(19.5)	(12.9)	(12.6)	(32.0)	158.0	216.7	2.5
Q4	(14.0)	(30.5)	(1.7)	(22.9)	3.6	(28.5)	302.8	53.8	16.9
TOTAL	**(8.3)**	**(21.3)**	**(6.0)**	**(24.4)**	**2.9**	**(33.6)**	**131.8**	**139.1**	**40.5**

Note: ( ) denotes negative numbers

Table 5: Physical Volume of Imported Electricity MWH; Jan 2005 – Dec2014

PERIOD	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	156,153	159,086	206,867	210,395	201,994	236,110	243,795	272,338	193,786	192,251
February	157,125	163,078	206,795	213,161	188,165	219,836	229,027	274,079	185,022	216,031
March	166,979	179,445	215,819	227,289	203,111	250,756	269,723	249,777	216,621	207,923
April	149,853	148,030	192,109	209,664	205,743	234,466	256,694	253,390	206,965	162,767
May	170,282	177,752	212,303	214,604	223,094	280,917	277,975	271,135	169,159	85,246
June	151,803	189,630	204,987	216,285	267,277	275,405	279,130	275,063	151,442	33,474
July	154,880	193,270	197,880	245,954	270,073	276,165	275,387	245,151	161,866	39,365
August	173,404	202,512	200,591	246,899	220,243	259,190	268,187	296,226	82,084	48,497
September	175,051	197,552	206,166	233,921	247,990	248,636	256,871	200,082	78,365	132,060
October	171,099	206,608	227,681	247,374	263,707	266,963	264,952	240,631	123,785	266,785
November	184,856	194,428	231,581	239,255	262,763	271,584	274,539	209,811	123,785	96,415
December	163,584	195,562	215,786	223,135	238,572	268,052	272,789	212,114	128,060	147,112
Q1	480,257	501,608	629,482	650,845	593,269	706,702	742,544	796,194	595,429	616,205
Q2	471,938	515,412	609,399	640,554	696,114	790,788	813,799	799,587	527,566	281,487
Q3	503,336	593,334	604,636	726,774	738,305	783,991	800,444	741,459	322,315	219,922
Q4	**519,539**	**596,597**	**675,048**	**709,764**	**765,042**	**806,599**	**812,281**	**662,556**	**375,630**	**510,311**
YEAR	**1,975,069**	**2,206,951**	**2,518,565**	**2,727,938**	**2,792,730**	**3,088,080**	**3,169,068**	**2,999,797**	**1,820,940**	**1,627,926**

Table 6: Annual Percentage Changes for the Physical Volume of Imported Electricity: Jan 2006 – Dec 2014

PERIOD	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	1.9	30.0	1.7	(4.0)	16.9	3.3	11.7	(28.8)	(0.8)
Feb	3.8	26.8	3.1	(11.7)	16.8	4.2	19.7	(32.5)	16.8
March	7.5	20.3	5.3	(10.6)	23.5	7.6	(7.4)	(13.3)	(4.0)
April	(1.2)	29.8	9.1	(1.9)	14.0	9.5	(1.3)	(18.3)	(21.4)
May	4.4	19.4	1.1	4.0	25.9	(1.0)	(2.5)	(37.6)	(49.6)
June	24.9	8.1	5.5	23.6	3.0	1.4	(1.5)	(44.9)	(77.9)
July	24.8	2.4	24.3	9.8	2.3	(0.3)	(11.0)	(34.0)	(75.7)
August	16.8	(0.9)	23.1	(10.8)	17.7	3.5	10.5	(72.3)	(40.9)
September	12.9	4.4	13.5	6.0	0.3	3.3	(22.1)	(60.8)	68.5
October	20.8	10.2	8.6	6.6	1.2	(0.8)	(9.2)	(48.6)	115.5
November	5.2	19.1	3.3	9.8	3.4	1.1	(23.6)	(41.0)	(22.1)
December	19.5	10.3	3.4	6.9	12.4	1.8	(22.2)	(39.6)	14.9
Q1	4.4	25.5	3.4	(8.8)	19.1	5.1	7.2	(25.2)	3.5
Q2	9.2	18.2	5.1	8.7	13.6	2.9	(1.7)	(34.0)	(46.6)
Q3	17.9	1.9	20.2	1.6	6.2	2.1	(7.4)	(56.5)	(31.8)
Q4	14.8	13.1	5.1	7.8	5.4	0.7	(18.4)	(43.3)	35.9
TOTAL	**11.7**	**14.1**	**8.3**	**2.4**	**10.6**	**2.6**	**(5.3)**	**(39.3)**	**(10.6)**

Note: ( ) denotes negative numbers

Table 7: Physical Volume of Electricity Distribution (MWH): Jan 2005 – Dec 2014

PERIOD	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	237,193	239,174	263,158	264,322	235,916	280,552	282,990	298,912	304,746	330,053
February	220,429	220,852	263,086	262,893	226,055	258,477	261,873	291,017	265,432	293,098
March	234,633	253,271	273,340	278,361	249,524	306,157	289,801	317,538	304,979	310,300
April	229,360	227,794	248,236	258,978	244,730	275,338	286,287	287,459	300,976	314,442
May	235,084	249,225	261,661	276,163	272,558	322,860	293,737	310,961	309,613	337,481
June	233,699	265,559	254,346	274,619	287,410	306,081	302,176	323,990	288,856	354,927
July	237,771	257,169	259,169	300,542	308,176	309,321	303,201	326,165	319,986	357,992
August	238,917	264,891	263,134	294,177	269,037	298,784	292,723	307,431	305,504	344,533
September	248,104	248,624	258,402	273,811	284,512	283,813	277,934	297,258	296,587	333,861
October	249,422	262,052	268,864	290,063	296,067	304,709	292,118	317,867	155,968	338,027
November	244,261	257,327	270,083	279,622	289,206	292,478	297,584	323,195	327,013	341,138
December	232,811	255,285	259,832	261,673	273,458	306,482	292,020	301,215	322,777	334,027
Q1	692,255	713,297	799,584	805,576	711,494	845,186	834,665	907,468	875,157	933,451
Q2	698,144	742,578	764,243	809,759	804,698	904,279	882,199	922,411	899,445	1,006,850
Q3	724,792	770,684	780,705	868,531	861,725	891,918	873,857	930,854	922,077	1,036,387
Q4	726,494	774,664	798,779	831,358	858,731	903,669	881,721	942,277	805,758	1,013,192
Year	**2,841,685**	**3,001,223**	**3,143,311**	**3,315,223**	**3,236,648**	**3,545,052**	**3,472,442**	**3,703,010**	**3,502,437**	**3,989,880**

Table 8: Annual Percentage Changes for the Physical Volume of Electricity Distribution: Jan 2006 – Dec 2014

PERIOD	2006	2007	2008	2009	2010	2011	2012	2013	2014
January	0.8	10.0	0.4	(10.7)	18.9	0.9	5.6	2.0	8.3
February	0.2	19.1	(0.1)	(14.0)	14.3	1.3	11.1	(8.8)	10.4
March	7.9	7.9	1.8	(10.4)	22.7	(5.3)	9.6	(4.0)	1.7
April	(0.7)	9.0	4.3	(5.5)	12.5	4.0	0.4	4.7	4.5
May	6.0	5.0	5.5	(1.3)	18.5	(9.0)	5.9	(0.4)	9.0
June	13.6	(4.2)	8.0	4.7	6.5	(1.3)	7.2	(10.8)	22.9
July	8.2	0.8	16.0	2.5	0.4	(2.0)	7.6	(1.9)	11.9
August	10.9	(0.7)	11.8	(8.5)	11.1	(2.0)	5.0	(0.6)	12.8
September	0.2	3.9	6.0	3.9	(0.2)	(2.1)	7.0	(0.2)	12.6
October	5.1	2.6	7.9	2.1	2.9	(4.1)	8.8	(50.9)	116.7
November	5.3	5.0	3.5	3.4	1.1	1.7	8.6	1.2	4.3
December	9.7	1.8	0.7	4.5	12.1	(4.7)	3.1	7.2	3.5
Q1	3.0	12.1	0.7	(11.7)	18.8	(1.2)	8.7	(3.6)	6.7
Q2	6.4	2.9	6.0	(0.6)	12.4	(2.4)	4.6	(2.5)	11.9
Q3	6.3	1.3	11.2	(0.8)	3.5	(2.0)	6.5	(0.9)	12.4
Q4	6.6	3.1	4.1	3.3	5.2	(2.4)	6.9	(14.5)	25.7
Year	**5.6**	**4.7**	**5.5**	**(2.4)**	**9.5**	**(2.0)**	**6.6**	**(5.4)**	**13.9**

Table 9:Yearly Distribution of Electricity in Mega Watts Hour (MWH) - Jan 2005 – Dec 2014

Year/ Utility	Electricity Generation	Imported Electricity	Electricity Distribution	% Contribution of Generated Electricity to Distribution
2005	866,615	1,975,069	2,841,685	30.5
2006	794,271	2,206,951	3,001,223	26.5
2007	624,746	2,518,565	3,143,311	19.9
2008	587,286	2,727,938	3,315,223	17.7
2009	443,918	2,792,730	3,236,648	13.7
2010	456,972	3,088,080	3,545,052	12.9
2011	303,374	3,169,068	3,472,442	8.7
2012	703,213	2,999,797	3,703,010	19.0
2013	1,681,497	1,820,940	3,502,437	48.0
2014	2,361,954	1,627,925	3,989,880	59.2

3.0 Technical Notes

3.1 Background

The generation of electricity in Botswana started in 1985 with a coal fired thermal power station at Morupule operating at a capacity of 132 MWH. Prior to this period, most of Botswana's electricity was imported from South Africa's power utility, Eskom. In 2008 South Africa's electricity demand started to exceed its supply, resulting in the South African government restricting power exports. As a result, Botswana and the entire Southern African region experienced massive power shortages because of the reduced electricity exports from South Africa (http://en.wikipedia.org/wiki/Energy_in_Botswana).

To avert the situation, the Botswana Government opted for alternative ways of sourcing electricity for the country; hence the plan to increase local generation of electricity at Morupule Power Station. The Morupule A power plant of capacity 132 MWH was augmented with Morupule B power plant which will have a capacity of 600 MWH upon completion (BPC Annual Report, 2010).

3.2 Concepts and formula of the Index of Electricity Generation, Importation and Distribution

The Index of Electricity Generation is a Laspeyres index. The weighted average for electricity generation equals one because there is only one electricity product. The index is thus calculated using the formula;

$$I = \frac{\sum R*W}{\sum W}$$

Where;

I is the index
R is the electricity generation relative
W is the weight

The electricity generation relative for the quarter has been calculated by using the formula:

$$R = \frac{P_c}{P_0}$$

Where P_c is the electricity generation of the current quarter and P_0 is the generation of electricity of the base year.

The calculation of the monthly generation indices is based on the volume of electricity units produced.

3.3 Base Year

The base year, also referred to as **reference period** used in this brief is 2011, which is set at 100. The selection of the reference period was informed by the availability of relevant data and synchronization of data with other sectors within the industry.