STATISTICS BOTSWANA

ELECTRICITY GENERATION & DISTRIBUTION

STATS BRIEF, SECOND QUARTER 2015

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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 second quarter of 2015. This report uses 2013 as base year or period.

Amongst its duties, Statistics Botswana is mandated to compile data on industrial production in Botswana, hence electricity indices are only confined to local electricity generation. However, importation and distribution volumes, and their percentage changes will be included as well. This is intended to shed light as to whether Botswana is managing, over time, in generating enough electricity to meet her demand. The data used is this 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, contact the Directorate of Stakeholder Relations at 3671300. All Statistics Botswana outputs/publications are available on the website at www.cso.gov.bw and also at 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.

A. N. Majelantle
Statistician General
November 2015

2.0   Summary of Findings

All figures in this report are not seasonally adjusted.

Table 1 gives key indicators of Electricity Generation from the first quarter of 2013 to the second quarter of 2015. During the second quarter of 2015, the electricity generation index stood at 149.9 showing a decrease of 13.2 percent from 172.6 during the same period in 2014.

Comparison of the index of Electricity Generation during the second quarter of 2015 and the first quarter of the same year shows an increase of 21.4 percent from 123.4 during the first quarter to 149.9 during the second quarter.

Table 1: Selected Key Indicators for Electricity Generation

Period	Index of the Physical Volume of Electricity generation	Year-on-Year Percentage Change	Quarter-on-Quarter Percentage Change
2013_First Quarter	66.5	151.4	0.0
Second Quarter	88.5	202.8	33.1
Third Quarter	142.7	216.7	61.2
Fourth Quarter	102	53.8	(28.5)
2014_First Quarter	75.5	13.4	(26)
Second Quarter	172.6	95.1	128.6
Third Quarter	194.2	2.5	12.5
Fourth Quarter	119.6	16.9	(38.4)
2015_First Quarter	123.4	63.5	3.2
Second Quarter	149.9	(13.2)	21.4

2.1   Indices of Electricity Generation

Data on the physical volume of electricity generated during the period under consideration (2005 – 2015 second quarter) is shown on **Table 2**, which forms the basis for the indices of the physical volume of electricity generation as presented on **Table 3**. The annual percentage changes in the physical volume of electricity generation are shown on **Table 4**.

Table 3 shows the index of the physical volume of electricity generation from January 2005 to June 2015. During the second quarter of 2015, the index of the physical volume of electricity generation stood at 149.9, which is a decrease of 13.2 percent from 172.6 during the same quarter in 2014 **(Tables 3 & 4).** However, comparison of indices for the second quarter of 2015 and the first quarter of the same year shows an increase of 21.4 percent from 123.4 to 149.9 as shown on **Table 1**.

The extensive use of diesel emergency power generating plants located at Orapa and Matshelagabedi contributed substantially to the increase in power generation. The two plants contributed a combined 22, 465 MWH and 51, 795 MWH, being 4.3 and 8.2 percent of electricity generated during the first and second quarter of 2015 respectively. The diesel generators are usually run for a short period as it is too expensive to run the same for a long time. However, as there was acute shortage of electricity during the first six months of 2015, the period during which diesel generators had to run was extended to assist in electricity generation.

2.2   Imported Electricity

During the second quarter of 2015, the volume of imported electricity **(Table 5)** amounted to 376, 248 MWH, giving an increase of 33.7 percent when compared to importation of 281, 478 MWH during the same quarter in 2014 **(Tables 5 & 6)**. This increase in imported electricity was as a result of low generation during the period, leading to increased importation to meet the demand for electricity distribution.

Comparison of the volume of imported electricity during the second quarter of 2015 and the first quarter of the same year shows a decrease of 16.6 percent (74, 844 MWH) from 451, 092 MWH during the first quarter to 376, 248 MWH during the second quarter of the same year (Table 5). This decrease in importation is attributable to the fact that there was improvement in generation during the second quarter of 2015 and hence less importation. The major source of imported electricity (South Africa) was also experiencing rising electricity needs thus reducing exports to Botswana in order to meet her own market demand.

2.3   Distribution of Electricity

Table 7 shows the physical volume of electricity distributed from 2005 to the second quarter of 2015. Comparison of distribution during the second quarter of 2015 and the second quarter of 2014 shows a slight decrease of 0.1 percent from 1, 006, 850 MWH to 1, 006, 224 MWH.

During the second quarter of 2015, the volume of electricity distributed rose by 3.7 percent from 969, 920 MWH during the first quarter of the same year to 1, 006, 224 MWH **(Table 7).**

Table 9 gives electricity generation, importation, distribution as well as generation as a percentage of distribution. This table is intended to give guidance with regard to whether electricity generated locally is improving in order to reduce reliance on importation.

Even though there are ups and downs in the volume of electricity generated, in general **Table 9** shows that the contribution made by electricity generated locally to electricity distributed has been improving since 2013.

This table shows that electricity generated locally contributed 62.6 percent of electricity distributed during the second quarter of 2015 as compared to 72.0 percent of electricity distributed during the same period in 2014. Locally generated electricity during the first quarter of 2015 accounted for 53.5 percent of electricity distributed during the quarter.

On average, electricity generated locally during the first six months of 2015 accounted for 58.1 percent of electricity distributed during that period.

Table 2: Physical Volume of Electricity Generation: Jan 2005 – June 2015

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	81,040	80,089	56,291	53,926	33,922	44,442	39,195	26,574	110,960	137,802	158,907
Feb	63,304	57,774	56,291	49,732	37,890	38,641	32,847	16,938	80,410	77,067	180,520
Mar	67,654	73,826	57,521	51,072	46,413	55,401	20,079	67,761	88,358	102,377	179,400
Apr	79,507	79,764	56,127	49,313	38,987	40,872	29,593	34,069	94,011	151,675	195,568
May	64,802	71,473	49,358	61,558	49,464	41,943	15,762	39,826	140,454	252,235	206,905
Jun	81,897	75,929	49,358	58,334	20,132	30,676	23,045	48,928	137,414	321,453	227,503
Jul	82,891	63,899	61,290	54,588	38,103	33,156	27,814	81,013	158,120	318,627	-
Aug	65,513	62,379	62,544	47,278	48,795	39,594	24,536	11,205	223,420	296,036	-
Sep	73,052	51,072	52,235	39,890	36,522	35,177	21,063	97,177	218,222	201,802	-
Oct	78,323	55,444	41,183	42,689	32,361	37,746	27,166	77,236	32,183	71,243	-
Nov	59,405	62,900	38,502	40,367	26,443	20,894	23,044	113,384	203,228	244,723	-
Dec	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	518,828
Q2	226,206	227,166	154,844	169,206	108,584	113,491	68,400	122,823	371,879	725,363	629,976
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	1,148,804

Note:
1. – Indicates that data is not available
2. 2015 Data is for the first 2 quarters*

Table 3: Indices of Physical Volume of Electricity Generation: Jan 2005 – June 2015

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	57.8	57.2	40.2	38.5	24.2	31.7	28.0	19.0	79.2	98.3	113.4
Feb	45.2	41.2	40.2	35.5	27.0	27.6	23.4	12.1	57.4	55.0	128.8
Mar	48.3	52.7	41.0	36.4	33.1	39.5	14.3	48.4	63.1	73.1	128.0
Apr	56.7	56.9	40.1	35.2	27.8	29.2	21.1	24.3	67.1	108.2	139.6
May	46.2	51.0	35.2	43.9	35.3	29.9	11.2	28.4	100.2	180.0	147.7
June	58.4	54.2	35.2	41.6	14.4	21.9	16.4	34.9	98.1	229.4	162.4
July	59.2	45.6	43.7	39.0	27.2	23.7	19.8	57.8	112.8	227.4	
August	46.8	44.5	44.6	33.7	34.8	28.3	17.5	8.0	159.4	211.3	
September	52.1	36.4	37.3	28.5	26.1	25.1	15.0	69.4	155.7	144.0	
October	55.9	39.6	29.4	30.5	23.1	26.9	19.4	55.1	23.0	50.8	
November	42.4	44.9	27.5	28.8	18.9	14.9	16.4	80.9	145.0	174.6	
December	49.4	42.6	31.4	27.5	24.9	27.4	13.7	63.6	139.0	133.4	
Q1	50.4	50.4	40.5	36.8	28.1	32.9	21.9	26.5	66.5	75.5	123.4
Q2	53.8	54.0	36.8	40.3	25.8	27.0	16.3	29.2	88.5	172.6	149.9
Q3	52.7	42.2	41.9	33.7	29.4	25.7	17.5	45.1	142.7	194.2	
Q4	49.2	42.4	29.4	28.9	22.3	23.1	16.5	66.5	102.3	119.6	
TOTAL	**51.5**	**47.2**	**37.2**	**34.9**	**26.4**	**27.2**	**18.0**	**41.8**	**100.0**	**140.5**	

Note:
1. The quarterly indices have been revised as there was an error in the formula for Quarter 1 computations.
2. 2015* Data is for the first 2 quarters

Table 4: Annual Percentage Changes in the Indices of the Physical Volume of Electricity Generation: Jan 2005 – June 2015

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	(1.2)	(29.7)	(4.2)	(37.1)	31.0	(11.8)	(32.2)	317.5	24.2	15.3
Feb	(8.7)	(2.6)	(11.7)	(23.8)	2.0	(15.0)	(48.4)	374.7	(4.2)	134.2
Mar	9.1	(22.1)	(11.2)	(9.1)	19.4	(63.8)	237.5	30.4	15.9	75.2
Apr	0.3	(29.6)	(12.1)	(20.9)	4.8	(27.6)	15.1	175.9	61.3	28.9
May	10.3	(30.9)	24.7	(19.6)	(15.2)	(62.4)	152.7	252.7	79.6	(18.0)
Jun	(7.3)	(35.0)	18.2	(65.5)	52.4	(24.9)	112.3	180.9	133.9	(29.2)
Jul	(22.9)	(4.1)	(10.9)	(30.2)	(13.0)	(16.1)	191.3	95.2	101.5	-
Aug	(4.8)	0.3	(24.4)	3.2	(18.9)	(38.0)	(54.3)	1,893.9	32.5	-
Sep	(30.1)	2.3	(23.6)	(8.4)	(3.7)	(40.1)	361.4	124.6	(7.5)	-
Oct	(29.2)	(25.7)	3.7	(24.2)	16.6	(28.0)	184.3	(58.3)	121.4	-
Nov	5.9	(38.8)	4.8	(34.5)	(21.0)	10.3	392.0	79.2	20.4	-
Dec	(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	63.5
Q2	0.4	(31.8)	9.3	(35.8)	4.5	(39.7)	79.6	202.8	95.1	(13.2)
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:
1. () Denotes negative numbers
2. 2015* Data is for the first 2 quarters

Table 5: Physical Volume of Imported Electricity MWH: Jan 2005 – June 2015

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	156,153	159,086	206,867	210,395	201,994	236,110	243,795	272,338	193,786	192,251	184,564
Feb	157,125	163,078	206,795	213,161	188,165	219,836	229,027	274,079	185,022	216,031	113,430
Mar	166,979	179,445	215,819	227,289	203,111	250,756	269,723	249,777	216,621	207,923	153,098
Apr	149,853	148,030	192,109	209,664	205,743	234,466	256,694	253,390	206,965	162,767	129,605
May	170,282	177,752	212,303	214,604	223,094	280,917	277,975	271,135	169,159	85,246	129,487
Jun	151,803	189,630	204,987	216,285	267,277	275,405	279,130	275,063	151,442	33,474	117,155
Jul	154,880	193,270	197,880	245,954	270,073	276,165	275,387	245,151	161,866	39,365	-
Aug	173,404	202,512	200,591	246,899	220,243	259,190	268,187	296,226	82,084	48,497	-
Sep	175,051	197,552	206,166	233,921	247,990	248,636	256,871	200,082	78,365	132,060	-
Oct	171,099	206,608	227,681	247,374	263,707	266,963	264,952	240,631	123,785	266,785	-
Nov	184,856	194,428	231,581	239,255	262,763	271,584	274,539	209,811	123,785	96,415	-
Dec	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	616,206	451,092
Q2	471,938	515,412	609,399	640,554	696,114	790,788	813,799	799,587	527,566	281,487	376,248
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	-
TOTAL	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	827,339

Note:
1. 2015* Data is for the first 2 quarters

Table 6: Annual Percentage Changes in the Physical Volume of Imported Electricity: Jan 2005 – June 2015

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	1.9	30.0	1.7	(4.0)	16.9	3.3	11.7	(28.8)	(0.8)	(4.0)
Feb	3.8	26.8	3.1	(11.7)	16.8	4.2	19.7	(32.5)	16.8	(47.5)
Mar	7.5	20.3	5.3	(10.6)	23.5	7.6	(7.4)	(13.3)	(4.0)	(26.4)
Apr	(1.2)	29.8	9.1	(1.9)	14.0	9.5	(1.3)	(18.3)	(21.4)	(20.4)
May	4.4	19.4	1.1	4.0	25.9	(1.0)	(2.5)	(37.6)	(49.6)	51.9
Jun	24.9	8.1	5.5	23.6	3.0	1.4	(1.5)	(44.9)	(77.9)	250.0
Jul	24.8	2.4	24.3	9.8	2.3	(0.3)	(11.0)	(34.0)	(75.7)	-
Aug	16.8	(0.9)	23.1	(10.8)	17.7	3.5	10.5	(72.3)	(40.9)	-
Sep	12.9	4.4	13.5	6.0	0.3	3.3	(22.1)	(60.8)	68.5	-
Oct	20.8	10.2	8.6	6.6	1.2	(0.8)	(9.2)	(48.6)	115.5	-
Nov	5.2	19.1	3.3	9.8	3.4	1.1	(23.6)	(41.0)	(22.1)	-
Dec	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	(26.8)
Q2	9.2	18.2	5.1	8.7	13.6	2.9	(1.7)	(34.0)	(46.6)	33.7
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:
1. () Denotes negative numbers
2. 2015* Data is for the first 2 quarters

Table 7: Physical Volume of Electricity Distribution (MHW): Jan 2005 – June 2015

Period	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	237,193	239,174	263,158	264,322	235,916	280,552	282,990	298,912	304,746	330,053	343,471
Feb	220,429	220,852	263,086	262,893	226,055	258,477	261,873	291,017	265,432	293,098	293,950
Mar	234,633	253,271	273,340	278,361	249,524	306,157	289,801	317,538	304,979	310,300	332,498
April	229,360	227,794	248,236	258,978	244,730	275,338	286,287	287,459	300,976	314,442	325,173
May	235,084	249,225	261,661	276,163	272,558	322,860	293,737	310,961	309,613	337,481	336,392
Jun	233,699	265,559	254,346	274,619	287,410	306,081	302,176	323,990	288,856	354,927	344,658
Jul	237,771	257,169	259,169	300,542	308,176	309,321	303,201	326,165	319,986	357,992	-
Aug	238,917	264,891	263,134	294,177	269,037	298,784	292,723	307,431	305,504	344,533	-
Sep	248,104	248,624	258,402	273,811	284,512	283,813	277,934	297,258	296,587	333,861	-
Oct	249,422	262,052	268,864	290,063	296,067	304,709	292,118	317,867	155,968	338,027	-
Nov	244,261	257,327	270,083	279,622	289,206	292,478	297,584	323,195	327,013	341,138	-
Dec	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	969,920
Q2	698,144	742,578	764,243	809,759	804,698	904,279	882,199	922,411	899,445	1,006,850	1,006,224
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	1,976,143

Note:
1. – Indicates that data is not available
2. 2015* Data is for the first 2 quarters

Table 8: Annual Percentage Changes for the Physical Volume of Electricity Distribution: Jan 2005 – June 2015

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Jan	0.8	10.0	0.4	(10.7)	18.9	0.9	5.6	2.0	8.3	4.1
Feb	0.2	19.1	(0.1)	(14.0)	14.3	1.3	11.1	(8.8)	10.4	0.3
Mar	7.9	7.9	1.8	(10.4)	22.7	(5.3)	9.6	(4.0)	1.7	7.2
Apr	(0.7)	9.0	4.3	(5.5)	12.5	4.0	0.4	4.7	4.5	3.4
May	6.0	5.0	5.5	(1.3)	18.5	(9.0)	5.9	(0.4)	9.0	(0.3)
Jun	13.6	(4.2)	8.0	4.7	6.5	(1.3)	7.2	(10.8)	22.9	(2.9)
Jul	8.2	0.8	16.0	2.5	0.4	(2.0)	7.6	(1.9)	11.9	-
Aug	10.9	(0.7)	11.8	(8.5)	11.1	(2.0)	5.0	(0.6)	12.8	-
Sep	0.2	3.9	6.0	3.9	(0.2)	(2.1)	7.0	(0.2)	12.6	-
Oct	5.1	2.6	7.9	2.1	2.9	(4.1)	8.8	(50.9)	116.7	-
Nov	5.3	5.0	3.5	3.4	1.1	1.7	8.6	1.2	4.3	-
Dec	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	3.9
Q2	6.4	2.9	6.0	(0.6)	12.4	(2.4)	4.6	(2.5)	11.9	(0.1)
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	

Note:
1. () Denotes negative numbers
2. 2015* Data is for the first 2 quarters

Table 9: Generation of Electricity (MWH) as a Percentage of Distribution – 2005 to Second Quarter of 2015

Year\ Utility	Electricity Generation	Imported Electricity	Electricity Distribution	% Contribution of Generated Electricity to Distributed
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
2013	1,681,497	1,820,940	3,502,437	48
2014	2,361,954	1,627,925	3,989,879	59.2
2015*	1,148,804	827,339	1,976,143	58.1
2013_Q1	279,728	595,429	875,157	32
Q2	371,879	527,566	899,445	41.3
Q3	599,762	322,315	922,077	65
Q4	430,128	375,630	805,758	53.4
2014_Q1	317,245	616,206	933,451	34
Q2	725,363	281,487	1,006,850	72
Q3	816,465	219,922	1,036,387	78.8
Q4	502,881	510,311	1,013,192	49.6
2015_Q1	518,828	451,092	969,920	53.5
Q2	629,976	376,248	1,006,224	62.6

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 2013, 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.