KAHRAMAA
كهرماء
المؤسسة العامة القطرية للكهرباء والماء
Qatar General Electricity & Water Corporation

2017
STATISTICS REPORT

His Highness
Sheikh Tamim bin Hamad Al Thani
Amir of the State of Qatar

His Highness
Sheikh Hamad bin Khalifa Al Thani
The Father Amir

H.E. Engineer Essa bin Hilal Al-Kuwari
President, Qatar General Electricity & Water Corporation “KAHRAMAA”

PRESIDENT'S FOREWORD

In compliance with the mandate from the government of Qatar, Kahramaa publishes this annual statistical report. The purpose is to provide other Qatari government institutions, investors, the academe and the general public with information relevant to and provides the end-user an understanding and appreciation of the development of electricity, water and district cooling sectors in Qatar.

Tracing the development plan in the State of Qatar, one finds that the highest priority goes to the provision of services for all residents. It targets the promotion of the national economy and enhancement of productivity and organizational efficiency at all state authorities to cope with the international economic development. We serve a rapidly growing economy and population in a region with an abundance of fossil fuels, yet scarce in water sources. In this context, it is imperative that we use our resources and manage our growth efficiently and wisely. To address this need, in 2012 Kahramaa launched "Tarsheed", the National Conservation Program to create sustainable culture and lifestyle among its residents, the public and private sector in cooperating towards conservation & efficiency to ensure optimal use of water as well as electrical energy. Kahramaa has implemented legislative measures enforcing compliance to the national conservation laws. It aims to influence the lifestyle of Qatar's residents in domestic consumption, as well as implement water and electricity saving technologies. Along with this effort Kahramaa has plans in place to source at least 2% of electricity from renewable sources such as solar energy, and has implemented alternative potable water production techniques such as reverse osmosis.

The State of Qatar has enough of its electricity and water production and it was not affected by the unjustified blockade imposed.

To align with Qatar National Vision (QNV 2030) and Qatar National Development Strategy-II (NDS2 2018-2022) Kahramaa is vigorously pursuing its long term road map and strategy including 10 strategic objectives: Optimize asset performance, Provide high quality water and electricity, Enhance processes and systems, Improve corporate governance and risk management, Ensure a safe and healthy working environment, Attract, develop and retain a high-performing workforce and support Qatarization, Increase social advocacy and environmental compliance, Excel at customer service, Strengthen financial performance to provide high quality and sustainable electricity and water for better living in Qatar.

Basic infrastructures are not an end in themselves; rather, they are means for ensuring the delivery of goods and services. They are crucial to achieving prosperity and growth in a way that enhances the quality of life, including the social well-being, health and safety of citizens, and the quality of their environment. We undertake these commitments seriously as we believe in the values of corporate social responsibility, customer centricity and teamwork in order to live our aspirations and to meet our mandate as a sole service provider.

KAHRAMAA seeks to achieve financial sustainability, which will be achieved with increased revenues and reduction in financial support from Government. Based on the speech of His Highness Sheikh Tamim Bin Hamad Al Thani, the Emir of the State of Qatar, KAHRAMAA stresses that more efforts are being made to preserve the distinguished position that it has reached and it will continue to build the state economy by innovation and constructive initiatives.

I reiterate that the real challenge we encounter is continuing our successful march. We are determined to exert all efforts to maintain the place of pride KAHRAMAA has achieved. We endeavour to promote and maintain the good relationship with our customers. In fact, these objectives demand focus on sound and prudent business planning in order to achieve sustainability and KAHRAMAA is capable of realizing it. We look confidently into the future and feel proud to be part of Qatar's success story.

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KAHRAMAA'S BUSINESS MANDATE

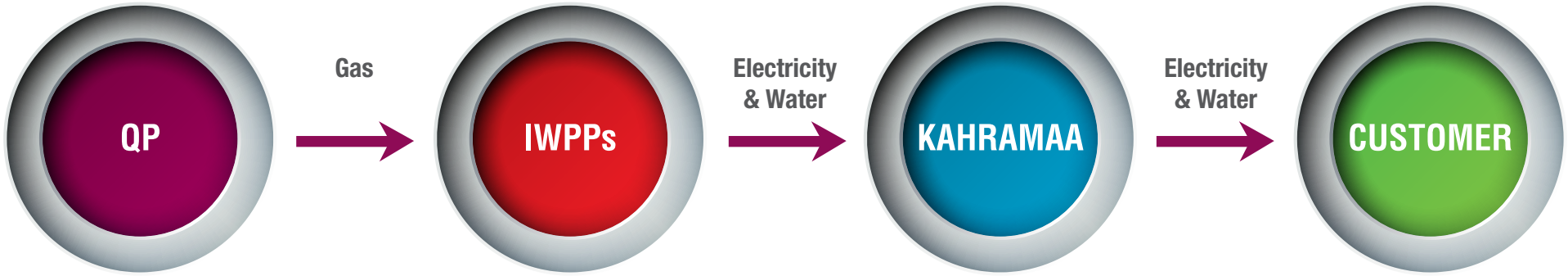
Up to the year 1999, electricity generation and water production, transmission and distribution services were carried out by the former Ministry of Electricity and Water (MEW).

To achieve some degree of deregulation and to encourage private investors, in the year 2000 power generation and water production services were separated and privatized into a business named Qatar Electricity and Water Company (QEWC). Since that date, several additional facilities have been built to accommodate Qatar's increasing power and water needs. Transmission and distribution of electricity and forwarding and distribution of water remained as a government service carried out by the new government corporation named KAHRAMAA (Qatar General Electricity and Water Corporation).

KAHRAMAA, now a more streamlined service organization, operates and maintains the sole electricity and water network in the country, focusing only in delivering these basic services to all consumers. The government continues to encourage its entrepreneur citizens to invest in the power generation and water desalination business, otherwise known as IPWP's (Independent Power and Water Providers), adopting global trends of deregulation.

QP (Qatar Petroleum) remains the sole source of natural gas as fuel for the Power & Water Production facilities run by the IPWP's.

The following diagram illustrates the linkage of four key business entities in Qatar that comprise the supply chain up to the consumer:



As it directly interfaces with consumers, forecasting of electricity and water demand in Qatar remains with KAHRAMAA. KAHRAMAA is intensively involved in initiating and negotiating with IWPP developers for the construction of new power stations and desalination plants. Forecasting of oil and gas and fuels consumption is centralized at QP.

EWT1 KEY GROWTH INDICATORS

In a nutshell, the following table lists key growth indicators for KAHRAMAA in the last five years.

		2013	2014	2015	2016	2017	Average % Change
ELECTRICITY	Generated, GWh	34,668	38,693	41,499	42,307	45,555	5.64%
	% Change	-0.30%	11.60%	7.30%	1.90%	7.68%	
	Sent Out, GWh	32,224	36,125	38,852	39,667	42,806	5.84%
	% Change	-0.40%	12.10%	7.50%	2.10%	7.91%	
	Maximum Demand, MW	6,000	6,740	7,270	7,435	7,855	4.80%
	% Change	-4.10%	12.30%	7.90%	2.27%	5.65%	
	No. of customers (number of meters)	293,604	310,107	329,310	344,445	364,597	4.77%
	% Change	1.60%	5.60%	6.20%	4.60%	5.85%	
WATER	Water Production Mm^3	465	494	533	560	606	6.76%
	% Change	6.30%	6.20%	8.00%	5.07%	8.21%	
	Maximum Production, Mm^3/Day	1.38	1.48	1.59	1.64	1.78	6.50%
	% Change	6.15%	7.25%	7.43%	3.14%	8.54%	
	No. of Water customers	242,552	262,018	277,433	297,261	317,215	5.67%
	% Change	0.60%	8%	5.90%	7.15%	6.71%	

The average growth of peak demand for electricity and water are growing at the same rate which is about 6-7%. This highlights rapid growth of Qatar economy.

EWT2 STRATEGIC ELECTRICITY & WATER INFRASTRUCTURE PROJECTS

KAHRAMAA has initiated various projects for the construction of production, transmission, distribution and storage capacities to meet the escalating electricity and water demand and meet customer satisfaction.

Some of the key projects are given below.

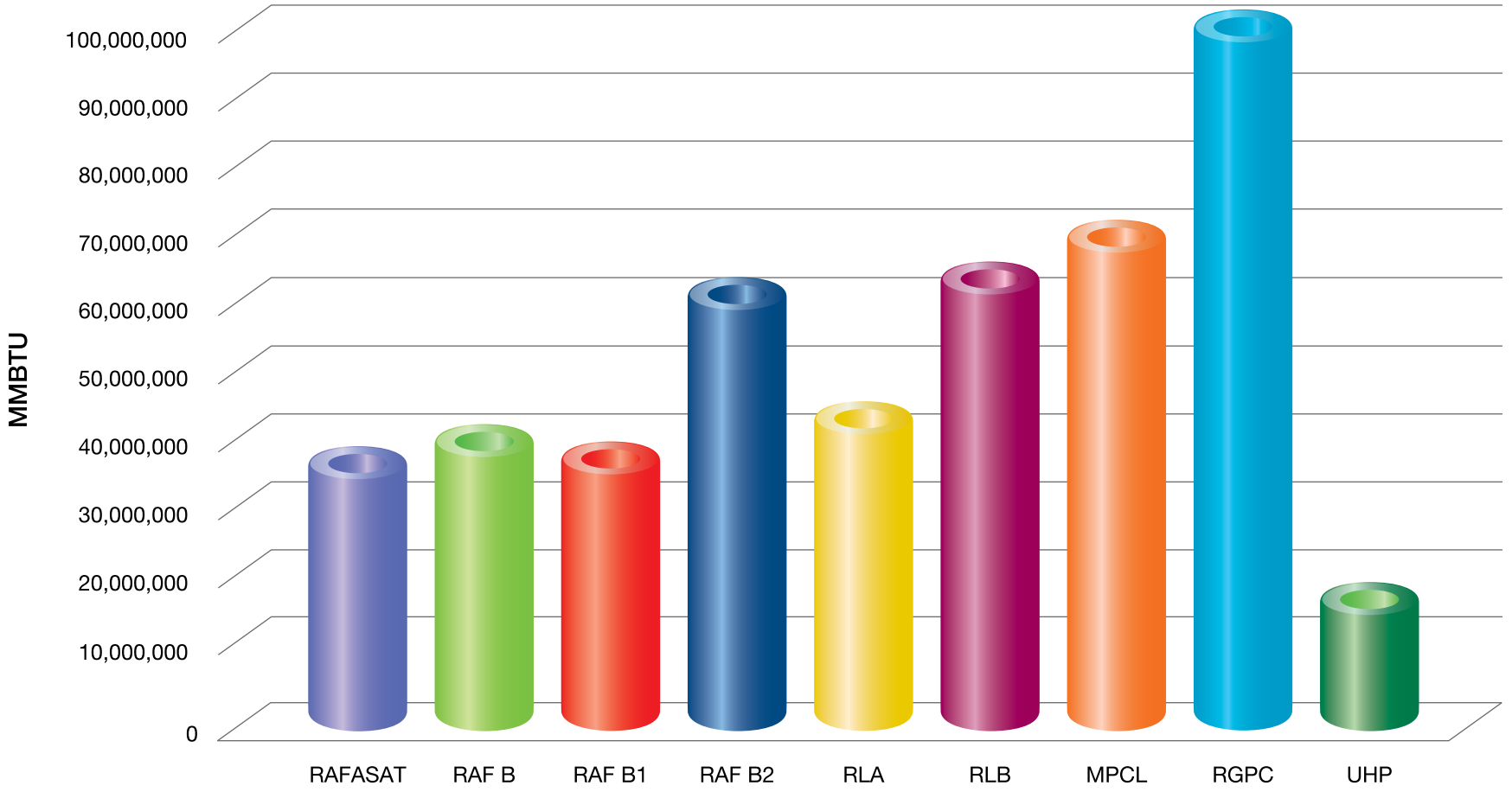
- Additional Capacity from IWPPs - Umm Al-Houl *(In Progress)*
- Qatar Power System Expansion - Phase 13 *(In Progress)*
- Qatar Power System Expansion - Phase 10, 11, 12 *(In Progress)*
- Extension of Water Distribution Mains - Phase 6 *(In Progress)*
- Water Mega Reservoirs - Pipelines *(In Progress)*
- Water Mega Reservoirs - PRPSs *(In Progress)*
- Smart meters project *(In Progress)*
- Solar project of 200 to 500 MW *(In Progress)*
- Billing and Customer Relationship Management Project *(In Progress)*

EWT3 GAS CONSUMPTION BY IPPS (MMBTU) IN 2017

In a nutshell, the following table lists key growth indicators for KAHRAMAA in the last five years.

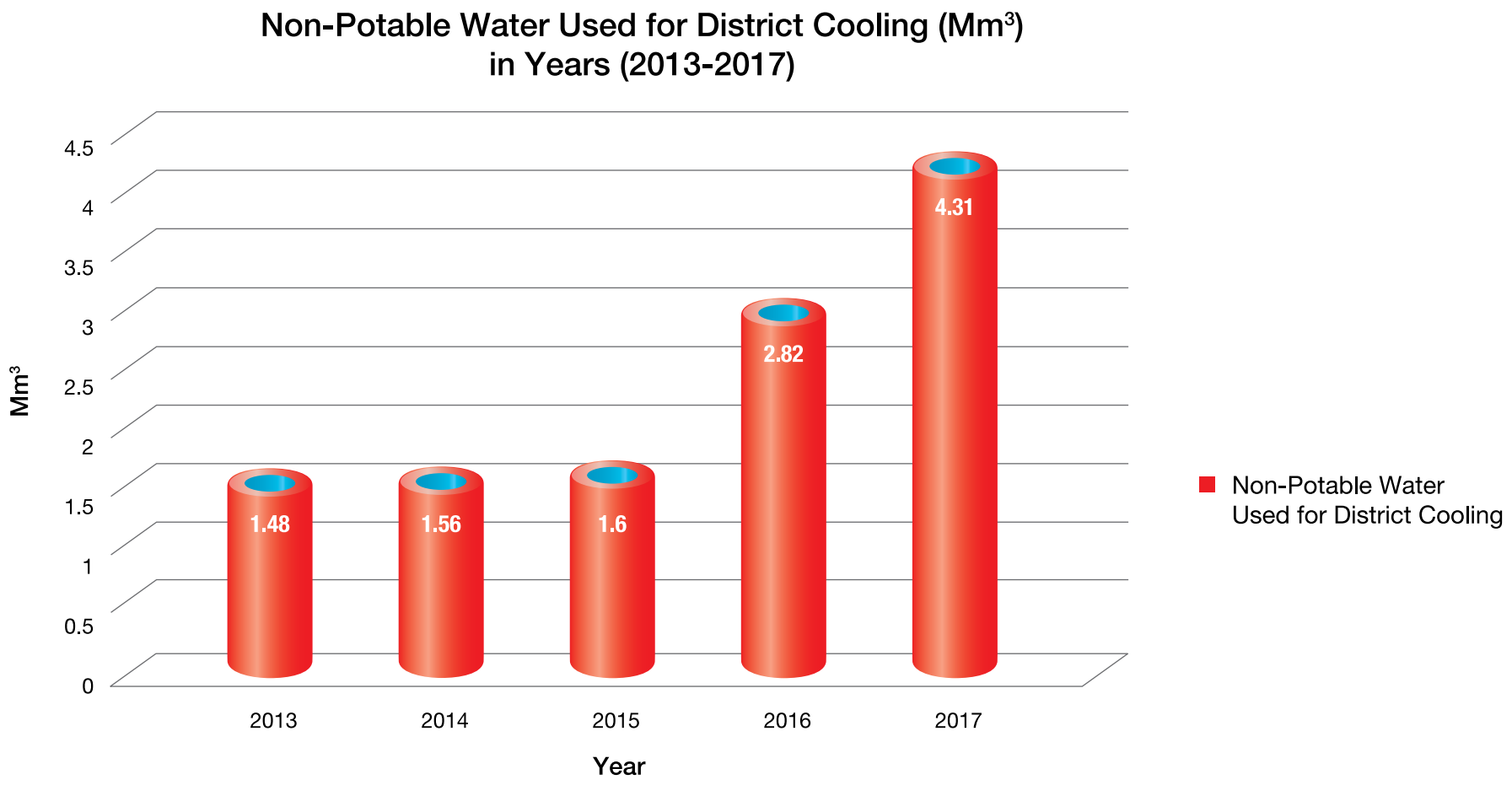
Month	RAF A	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	4,913,129	2,718,627	3,466,212	3,672,333	2,905,729	4,698,130	1,807,347	5,736,887	-	**29,918,394**
Feb	3,661,738	2,694,366	2,742,306	4,479,938	2,865,974	4,041,311	961,450	4,787,177	-	**26,234,259**
Mar	3,543,962	2,654,092	3,020,258	5,131,098	3,687,665	4,468,471	2,659,255	5,589,974	-	**30,754,775**
Apr	3,419,851	2,663,112	3,201,125	4,724,907	3,842,620	5,502,800	5,123,668	6,025,479	37,844	**34,541,406**
May	2,869,580	2,804,687	3,106,755	5,327,960	4,629,958	5,284,804	8,176,767	9,626,595	223,150	**42,050,254**
Jun	2,815,626	3,283,277	2,976,988	5,009,158	3,507,014	4,701,169	8,619,687	11,564,423	290,156	**42,767,498**
Jul	2,706,521	3,499,913	3,250,846	5,061,900	3,536,006	5,611,474	9,046,206	11,212,003	3,309,977	**47,234,846**
Aug	2,676,102	4,024,328	3,245,331	5,116,536	3,368,644	5,836,044	9,355,113	11,411,677	4,091,288	**49,125,064**
Sep	2,515,303	3,331,750	2,939,302	4,886,630	3,244,638	5,516,295	8,852,858	10,609,977	2,202,961	**44,099,712**
Oct	2,779,216	4,148,129	2,966,131	4,728,376	3,583,275	5,607,938	5,973,920	10,580,371	1,740,935	**42,108,292**
Nov	2,839,914	3,682,981	2,395,568	4,903,362	3,362,859	4,814,980	3,612,396	6,604,248	2,175,313	**34,391,621**
Dec	438,940	2,996,668	2,344,920	5,373,472	3,064,738	4,285,476	2,012,256	5,863,168	2,676,796	**29,056,433**
Total	**35,179,881**	**38,501,930**	**35,655,743**	**58,415,670**	**41,599,119**	**60,368,890**	**66,200,924**	**99,611,979**	**16,748,420**	**452,282,556**

GAS CONSUMPTION BY IPPs IN YEAR 2017



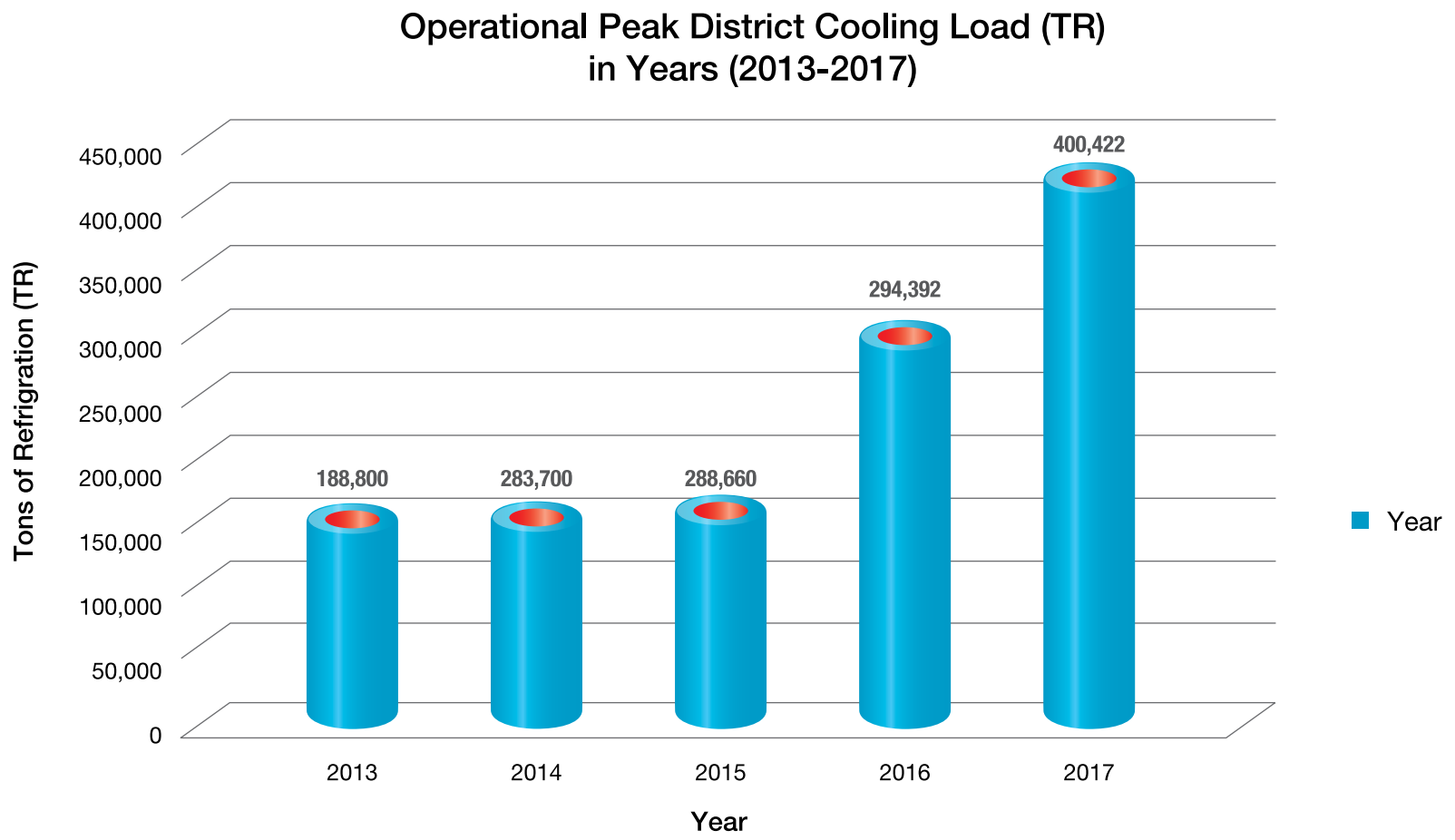
EWT4 NON-POTABLE WATER USED IN DISTRICT COOLING

Year	2013	2014	2015	2016	2017
Non-Potable Water Used for District Cooling	1.48	1.56	1.6	2.82	4.31



EWT5 OPERATIONAL PEAK DISTRICT COOLING LOAD IN YEARS 2013-2017

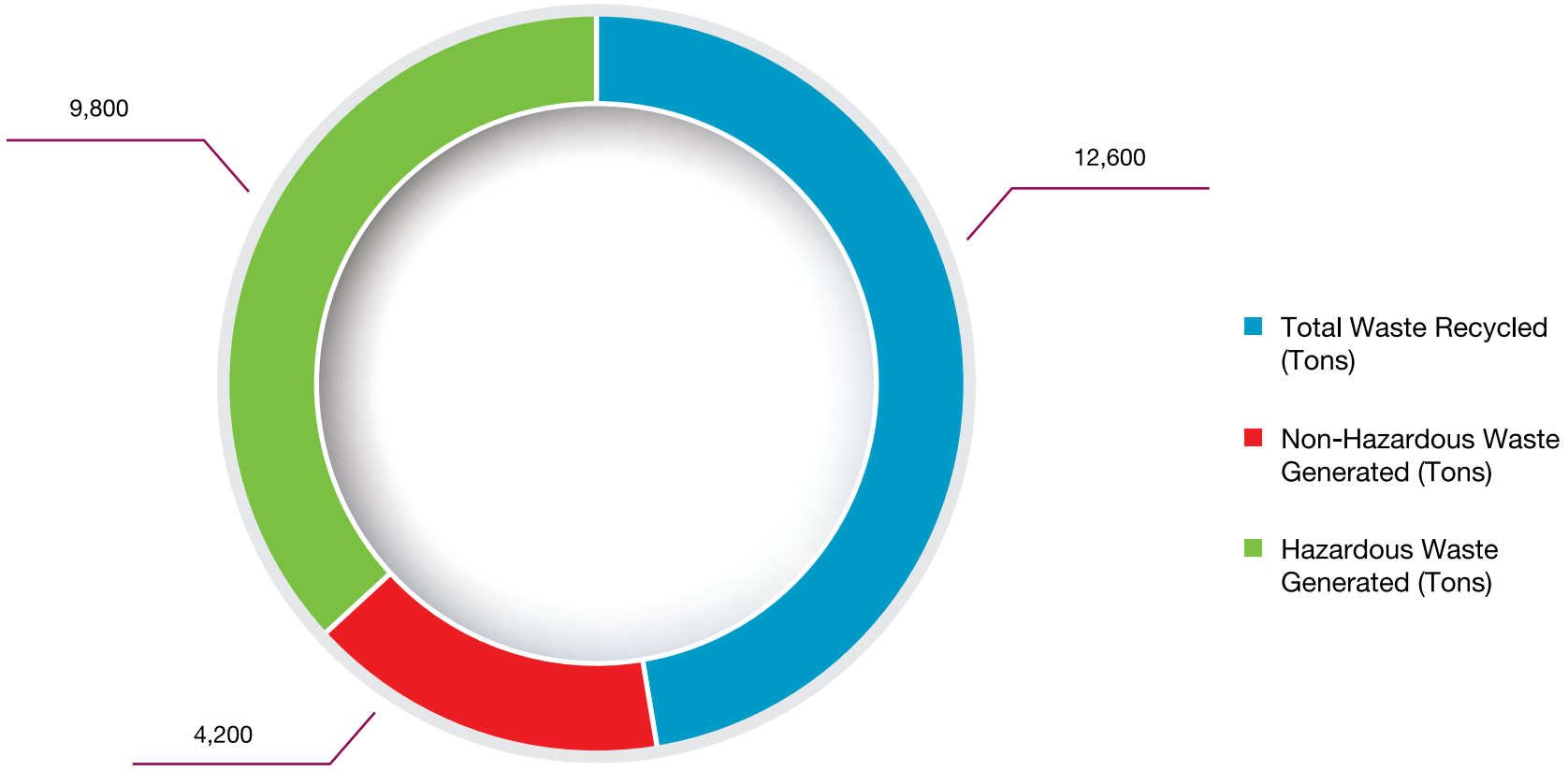
Year	2013	2014	2015	2016	2017
Operational Peak Cooling Load (TR)	188,800	283,700	288,660	294,392	400,422



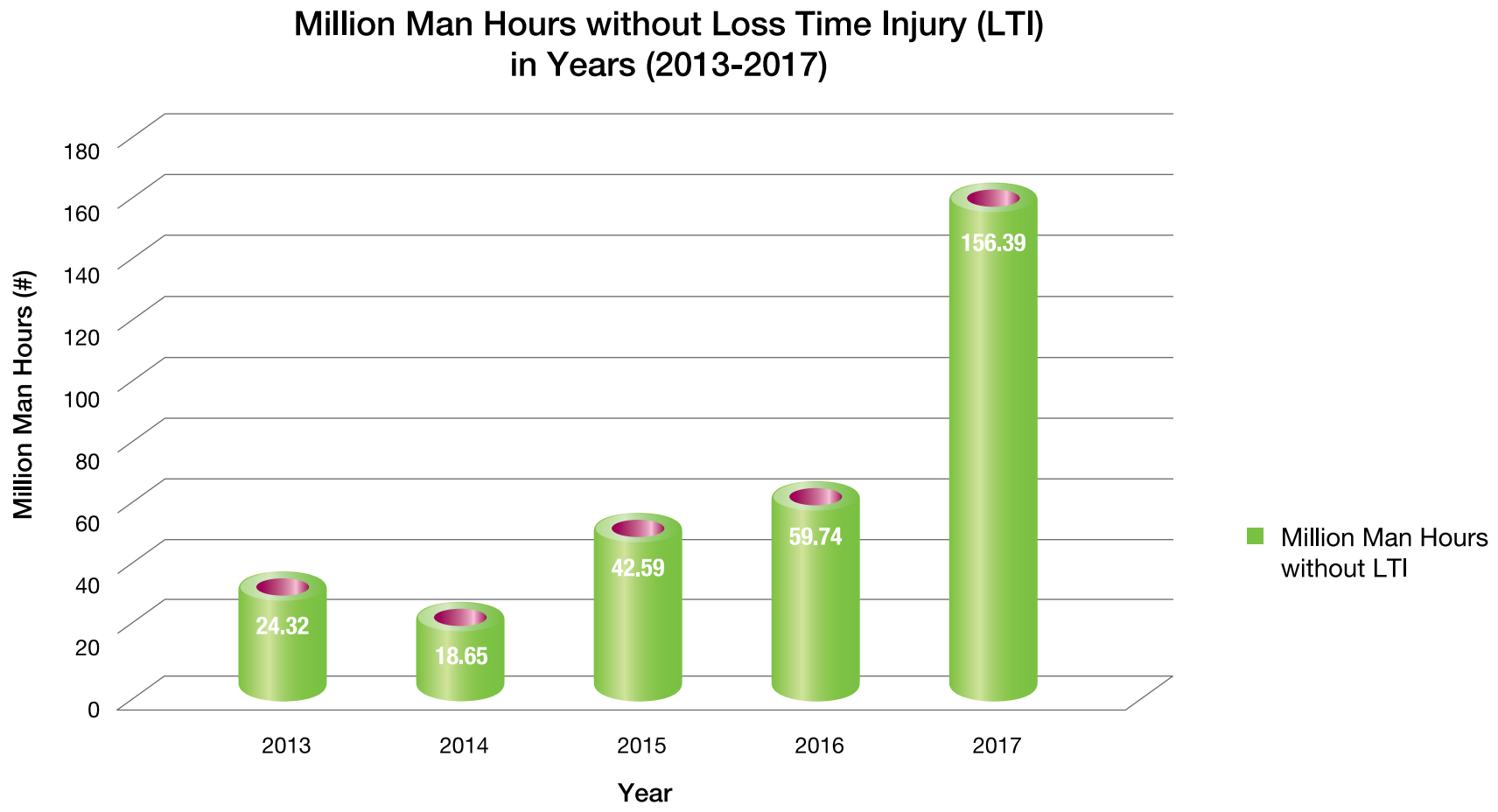
EWT6 WASTE RECYCLYING IN 2017

Year 2017	Total Waste Recycled* (Tons)	Non-Hazardous Waste Generated (Tons)	Hazardous Waste Generated (Tons)
	12,600	4,200	9,800

Total Waste Generated (Tons) by Type in 2017

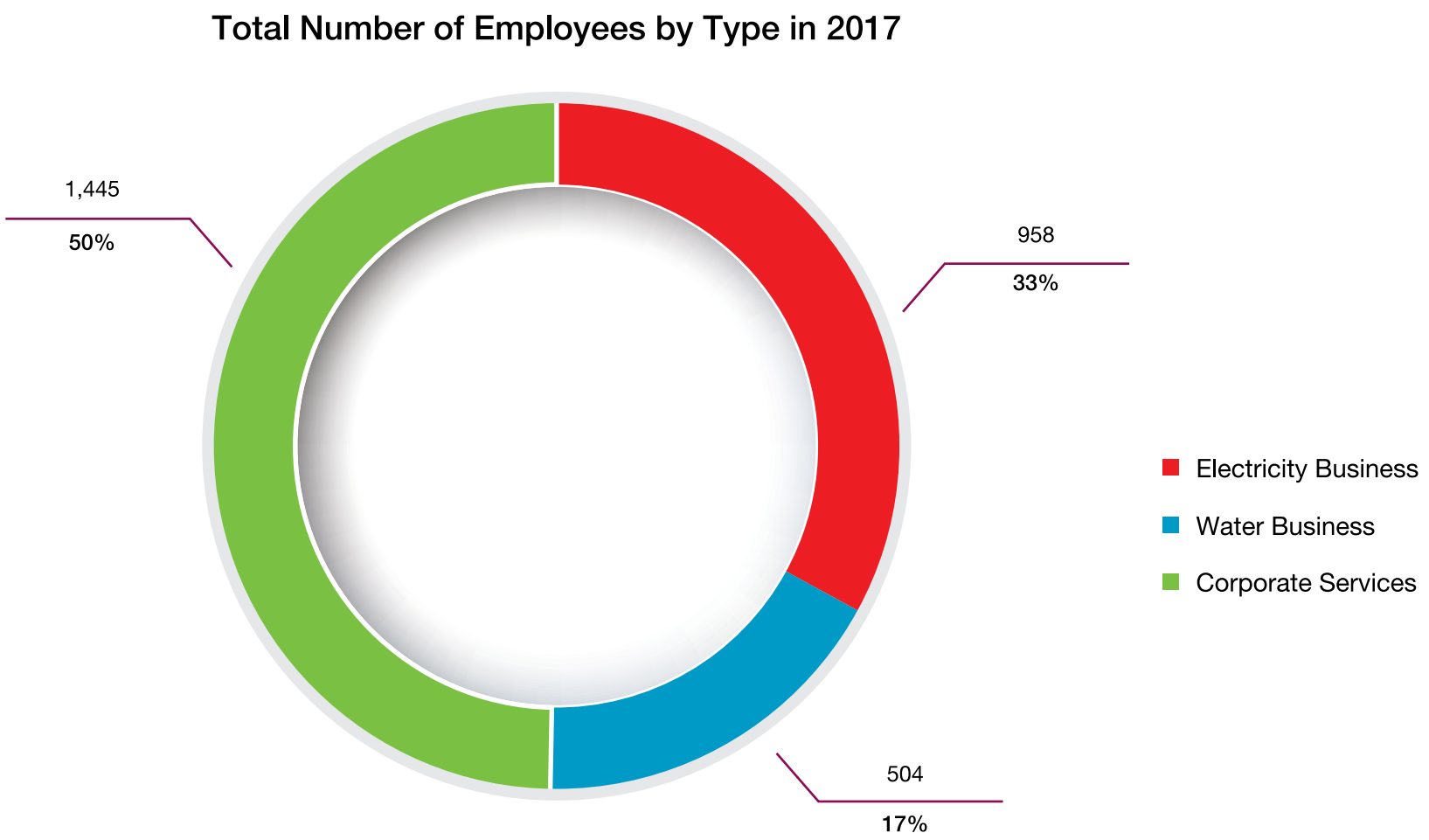


EWT7 MILLION MAN HOURS WITHOUT LTI IN YEARS (2013-2017)



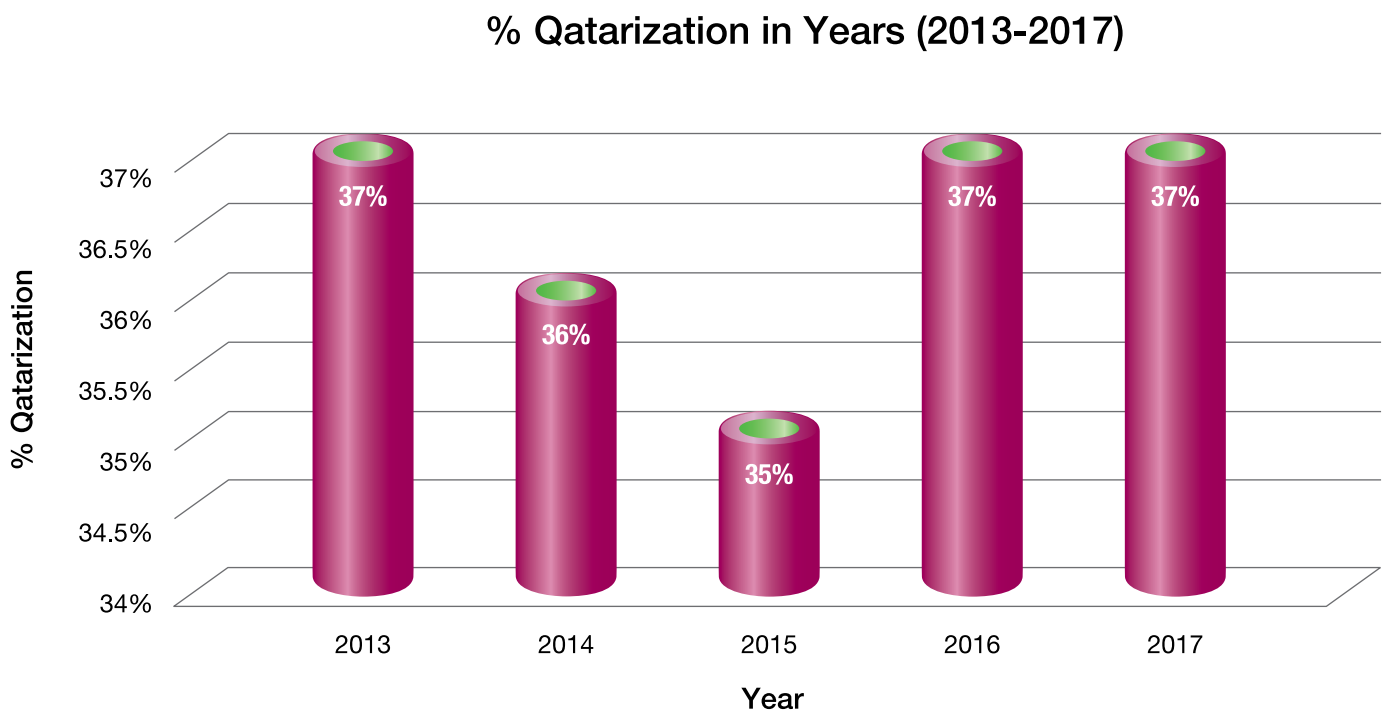
EWT8 TOTAL NUMBER OF EMPLOYEES BY TYPE IN 2017

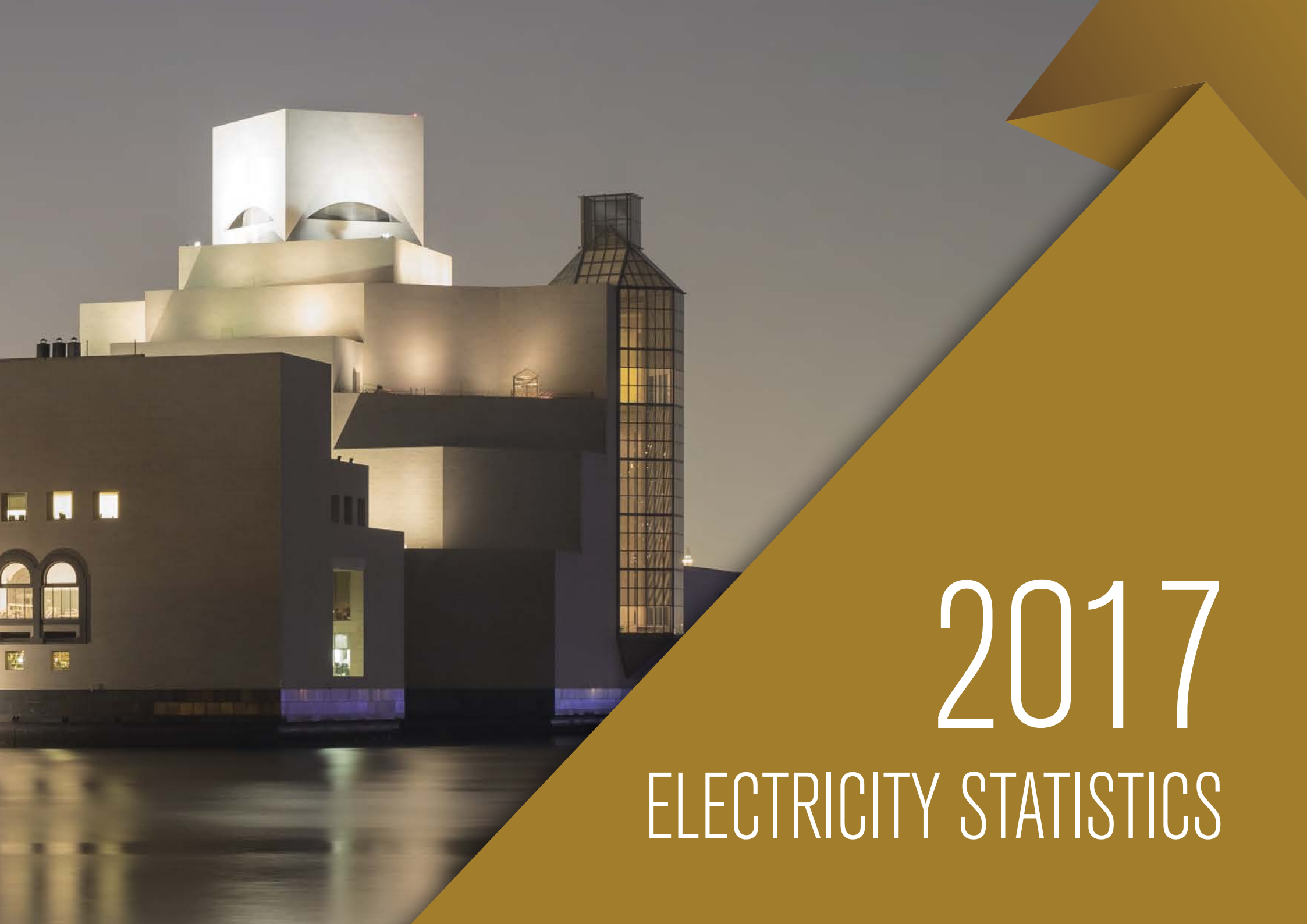
	Electricity Business	Water Business	Corporate Services
Total Number of Employees by Type in 2017	958	504	1,445



EWT9 QATARIZATION IN LAST FIVE YEARS

Year	2013	2014	2015	2016	2017
% Qatarization	37%	36%	35%	37%	37%





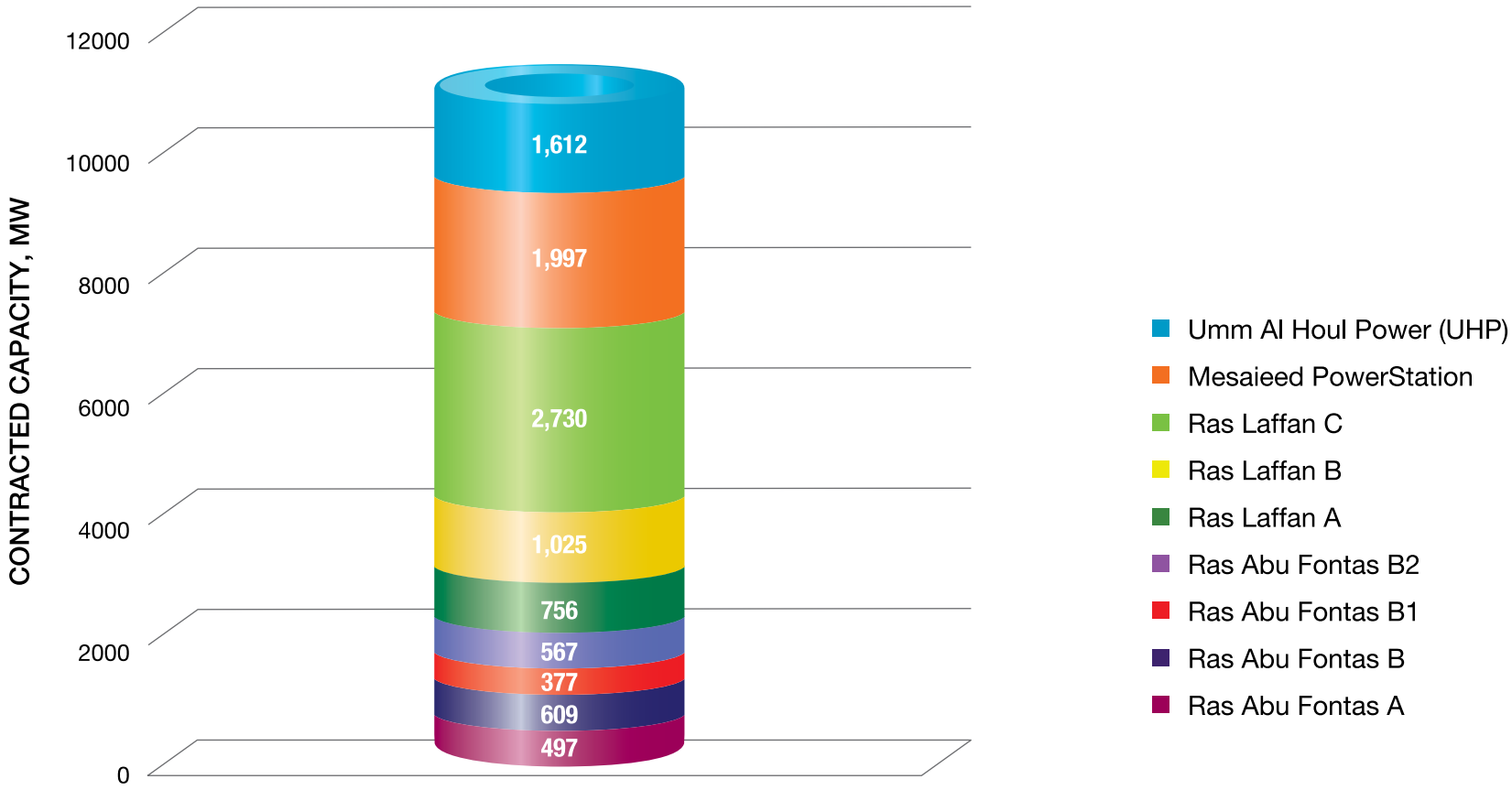
2017

ELECTRICITY STATISTICS

ET1 CONTRACTED CAPACITIES BY IWPPs

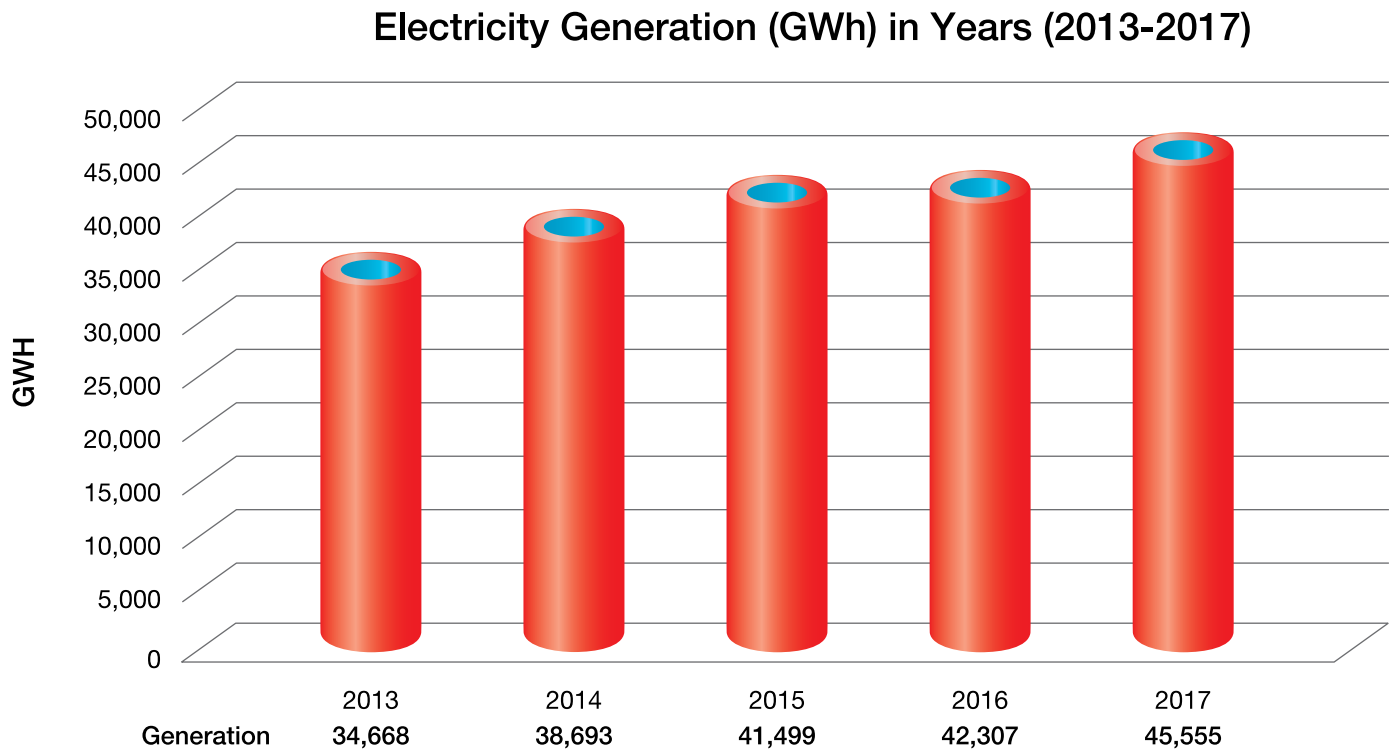
Independent Power & Water Producer		Contracted Capacity, MW
Qatar Electricity & Water Company	Ras Abu Fontas A	497
	Ras Abu Fontas B	609
	Ras Abu Fontas B1	377
	Ras Abu Fontas B2	567
	Sub-Total	**2,050**
Ras Laffan	Ras Laffan A (Ras Laffan Power Company)	756
	Ras Laffan B (Q Power)	1,025
	Ras Laffan C (Ras Girtas Power Company)	2,730
	Sub-Total	**4,511**
Mesaieed Power Company Limited	Mesaieed PowerStation	**1,997**
Umm Al Houl Power Company	Umm Al Houl Power (UHP)	**1,612**
	Total Capacity	**10,170**

Electricity Contracted Capacity by IWPPS in 2017



ET2 ANNUAL ELECTRICITY GENERATION (2013-2017)

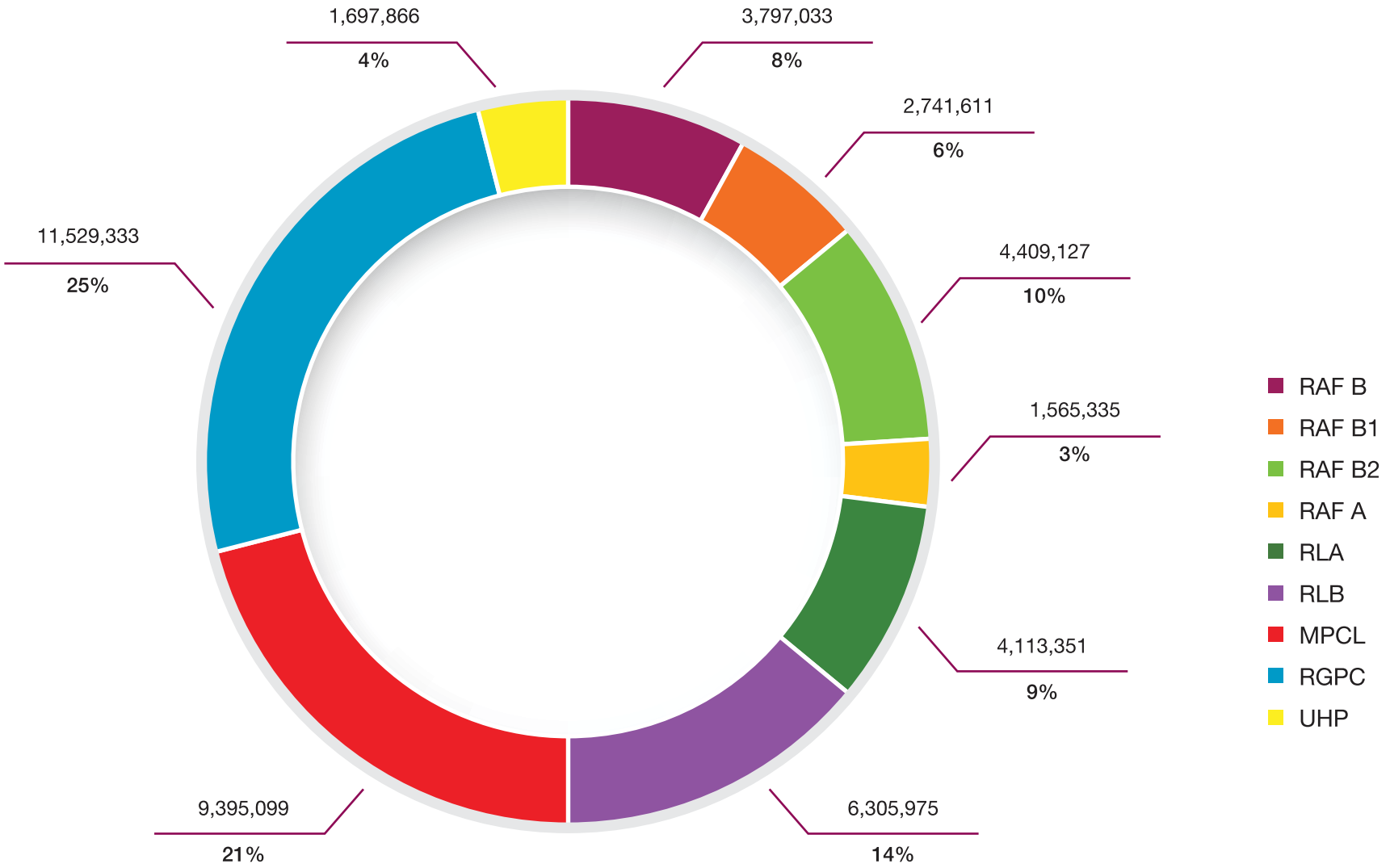
Year	Annual Increase, %	GWh
2013	-0.3%	34,668
2014	11.6%	38,693
2015	7.3%	41,499
2016	1.9%	42,307
2017	7.7%	45,555



ET3 MONTHLY ELECTRICITY GENERATION IN 2017, MWh

Month	RAF B	RAF B1	RAF B2	RAF A	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	276,271	254,393	265,633	169,966	293,933	457,267	249,371	561,941	-	**2,528,775**
Feb	271,175	202,201	321,215	147,128	263,161	392,312	127,632	481,980	-	**2,206,804**
Mar	270,578	232,512	388,128	169,245	350,500	424,442	371,527	555,142	-	**2,762,073**
Apr	285,355	251,059	374,639	168,887	378,950	575,764	730,324	628,773	-	**3,393,751**
May	283,932	243,575	408,164	133,771	496,373	519,380	1,159,546	1,153,784	16,766	**4,415,291**
Jun	334,719	221,701	383,674	131,678	328,367	468,534	1,253,303	1,436,008	57,787	**4,615,770**
Jul	364,156	255,923	384,551	124,232	336,185	615,054	1,286,723	1,397,966	383,661	**5,148,450**
Aug	365,253	256,338	390,402	131,310	336,067	651,505	1,331,365	1,421,353	407,818	**5,291,412**
Sep	352,597	235,516	374,488	122,034	331,776	620,976	1,254,669	1,320,029	221,135	**4,833,220**
Oct	381,615	224,578	353,880	125,554	354,669	619,707	841,723	1,266,341	170,082	**4,338,149**
Nov	334,299	185,328	366,395	141,530	333,297	511,539	509,534	713,431	203,171	**3,298,524**
Dec	277,083	178,486	397,958	-	310,074	449,496	279,380	592,587	237,447	**2,722,511**
Total	**3,797,033**	**2,741,611**	**4,409,127**	**1,565,335**	**4,113,351**	**6,305,975**	**9,395,099**	**11,529,333**	**1,697,866**	**45,554,730**

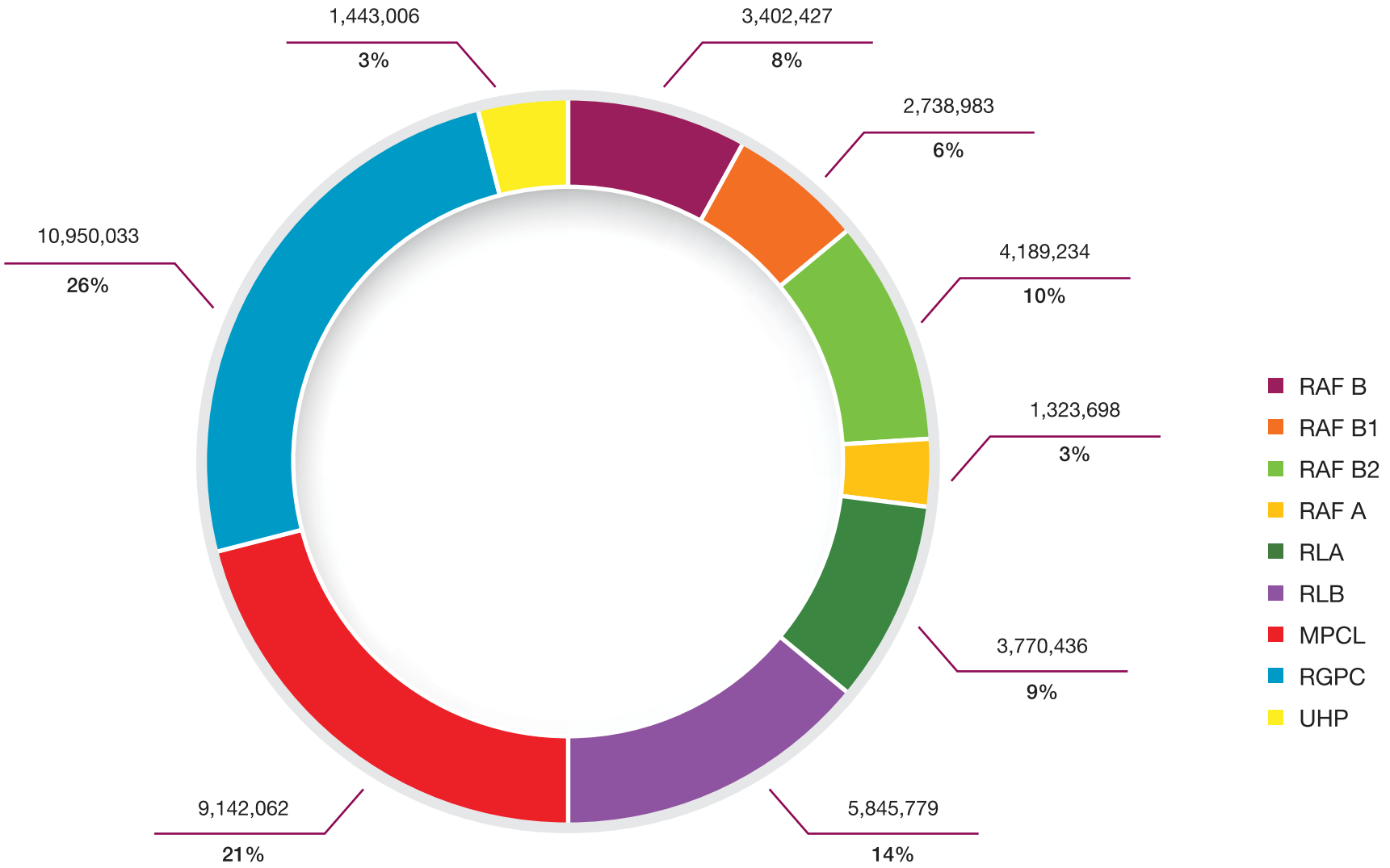
Electricity Generation by IWPPs in 2017 (MWh)



ET4 ENERGY TRANSMITTED IN 2017, MWh

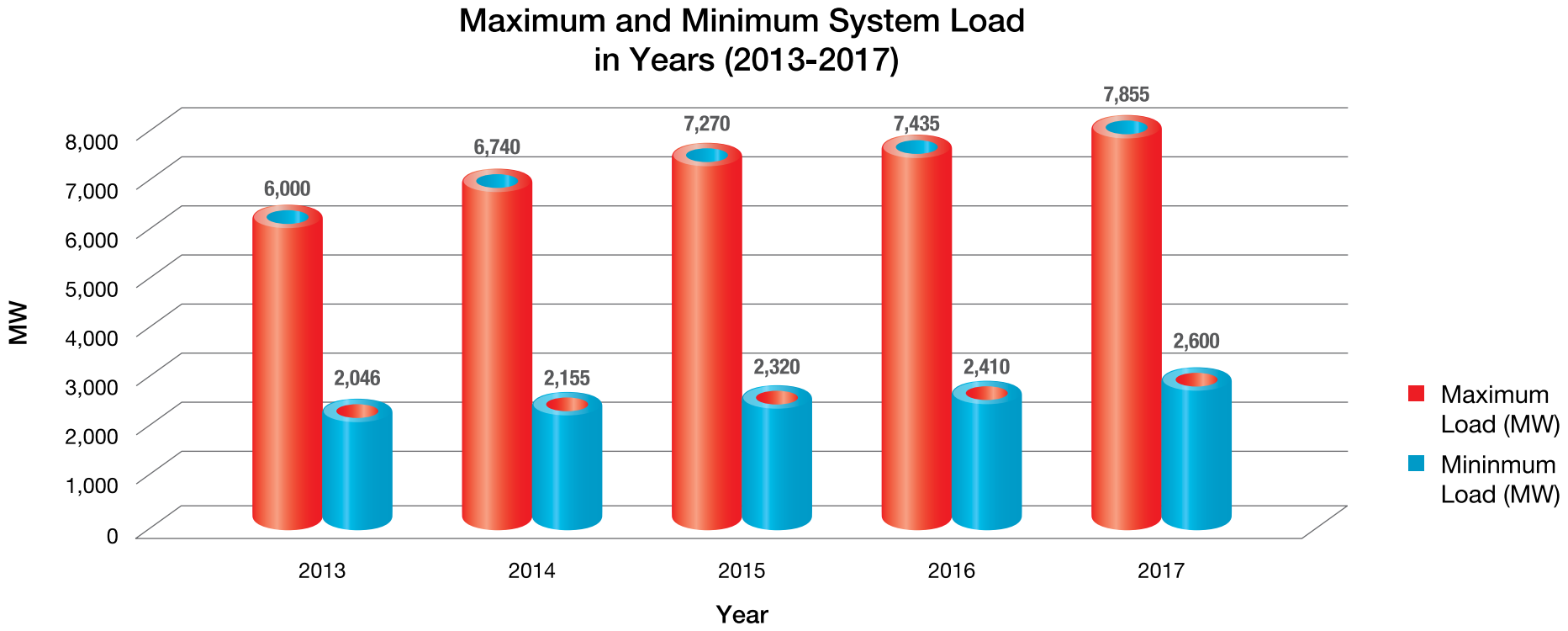
Month	RAF B	RAF B1	RAF B2	RAF A	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	245,125	254,149	254,695	144,437	265,626	418,203	240,494	522,753	-	**2,345,482**
Feb	242,361	202,003	303,856	124,351	238,187	357,659	122,493	447,908	-	**2,038,819**
Mar	240,967	232,295	368,911	147,653	317,634	386,189	359,955	516,232	-	**2,569,836**
Apr	254,893	250,820	355,368	147,762	348,168	534,788	711,143	588,454	-	**3,191,396**
May	251,513	243,338	388,163	110,774	463,628	479,154	1,129,671	1,102,907	13,155	**4,182,303**
Jun	300,188	221,483	364,547	109,665	297,900	430,708	1,221,383	1,377,360	44,510	**4,367,744**
Jul	328,657	255,677	365,655	101,023	305,625	574,019	1,254,068	1,337,070	344,349	**4,866,143**
Aug	328,020	256,091	370,763	109,202	309,823	610,175	1,298,182	1,359,099	361,822	**5,003,178**
Sep	316,974	235,288	355,426	103,191	306,641	581,849	1,222,639	1,261,255	191,984	**4,575,247**
Oct	344,892	224,364	334,795	104,896	325,954	580,749	817,877	1,210,869	137,582	**4,081,979**
Nov	301,038	185,151	348,557	120,741	305,605	476,623	494,898	672,204	160,065	**3,064,882**
Dec	247,799	178,323	378,498	-	285,646	415,663	269,259	553,920	189,540	**2,518,648**
Total	**3,402,427**	**2,738,982**	**4,189,234**	**1,323,698**	**3,770,436**	**5,845,779**	**9,142,062**	**10,950,033**	**1,443,006**	**42,805,657**

Electricity Transmitted by IWPPs in 2017 (MWh)



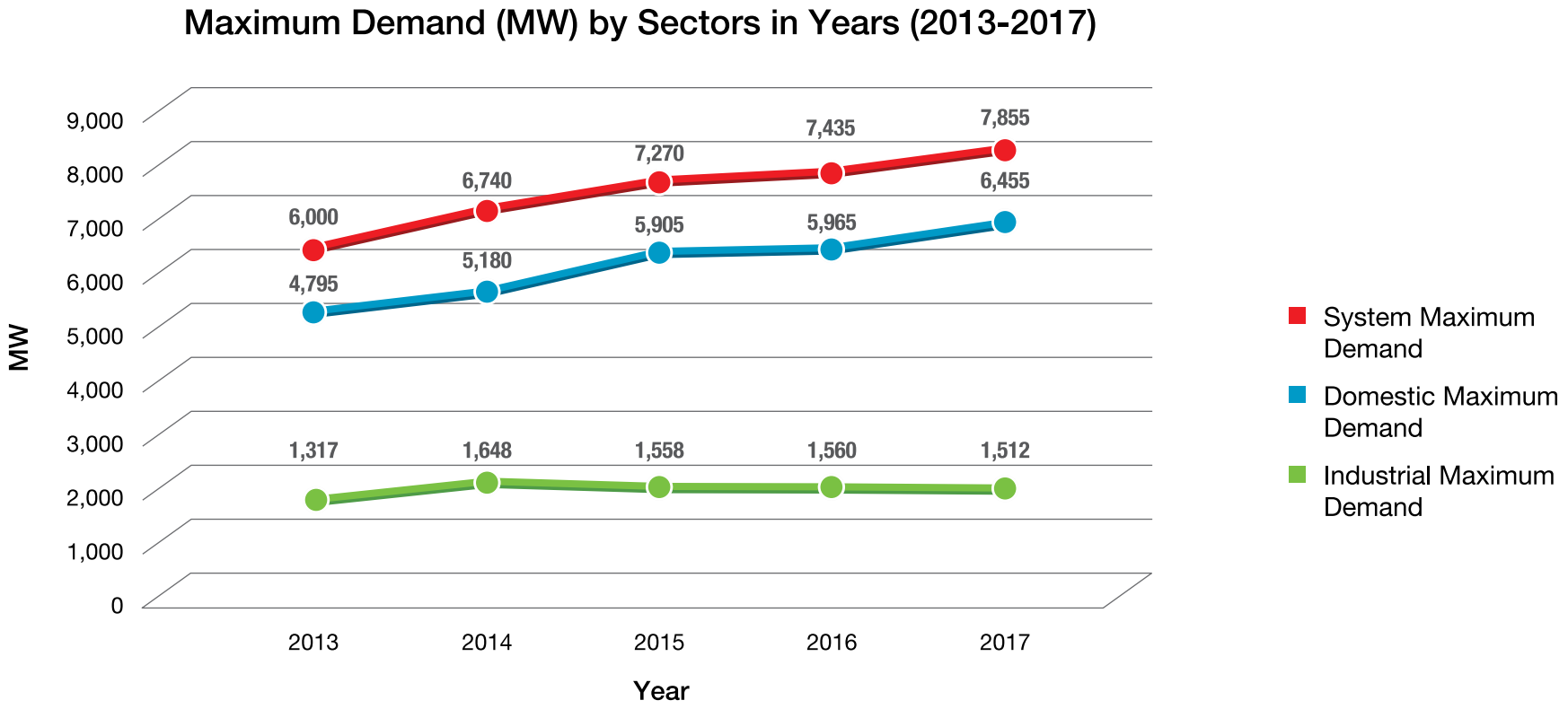
ET5 MAXIMUM AND MINIMUM SYSTEM LOAD LAST FIVE YEARS, MW

Year	Maximum Load (MW)	Maximum Load Date (mm/dd/yyyy)	Minimum Load (MW)	Minimum Load Date (mm/dd/yyyy)
2013	6,000	7/18/2013	2,046	1/16/2013
2014	6,740	9/7/2014	2,155	2/12/2014
2015	7,270	9/1/2015	2,320	2/24/2015
2016	7,435	9/3/2016	2,410	1/19/2016
2017	7,855	8/14/2017	2,600	2/25/2017



ET6 MAXIMUM DEMAND BY SECTORS FROM 2013 TO 2017

Demand Type	2013	2014	2015	2016	2017
System Maximum Demand	6,000	6,740	7,270	7,435	7,855
Industrial Maximum Demand	1,317	1,648	1,558	1,560	1,512
Domestic Maximum Demand	4,795	5,180	5,905	5,965	6,455



ET7 SECTORAL MAXIMUM DEMANDS IN 2017, MW

Demand Type	Magnitude (MW)	Demand Date (mm/dd/yyyy)
System Maximum	7,855	08/14/2017
Industrial Maximum	1,512	09/12/2017
Domestic Maximum	6,455	08/14/2017

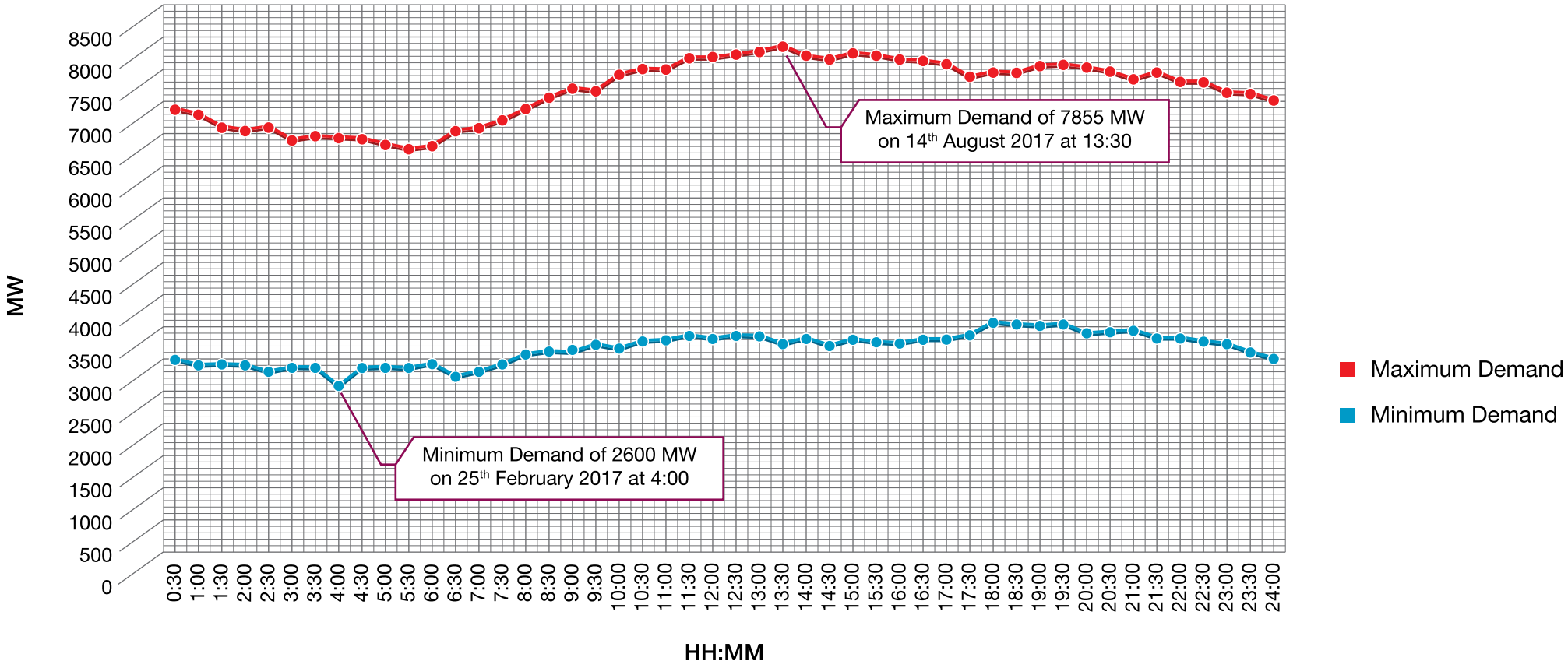
ET8 ANNUAL LOAD FACTORS IN 2017

Demand Type	Load Factor, %
System Maximum	64.43%
Industrial Maximum	85.03%
Domestic Maximum	58.48%

ET9 ANNUAL GROWTH (%) FROM 2016 TO 2017

Demand Type	Peak Demand (MW) Growth
System Maximum	5.6%
Industrial Maximum	-3.1%
Domestic Maximum	8.2%

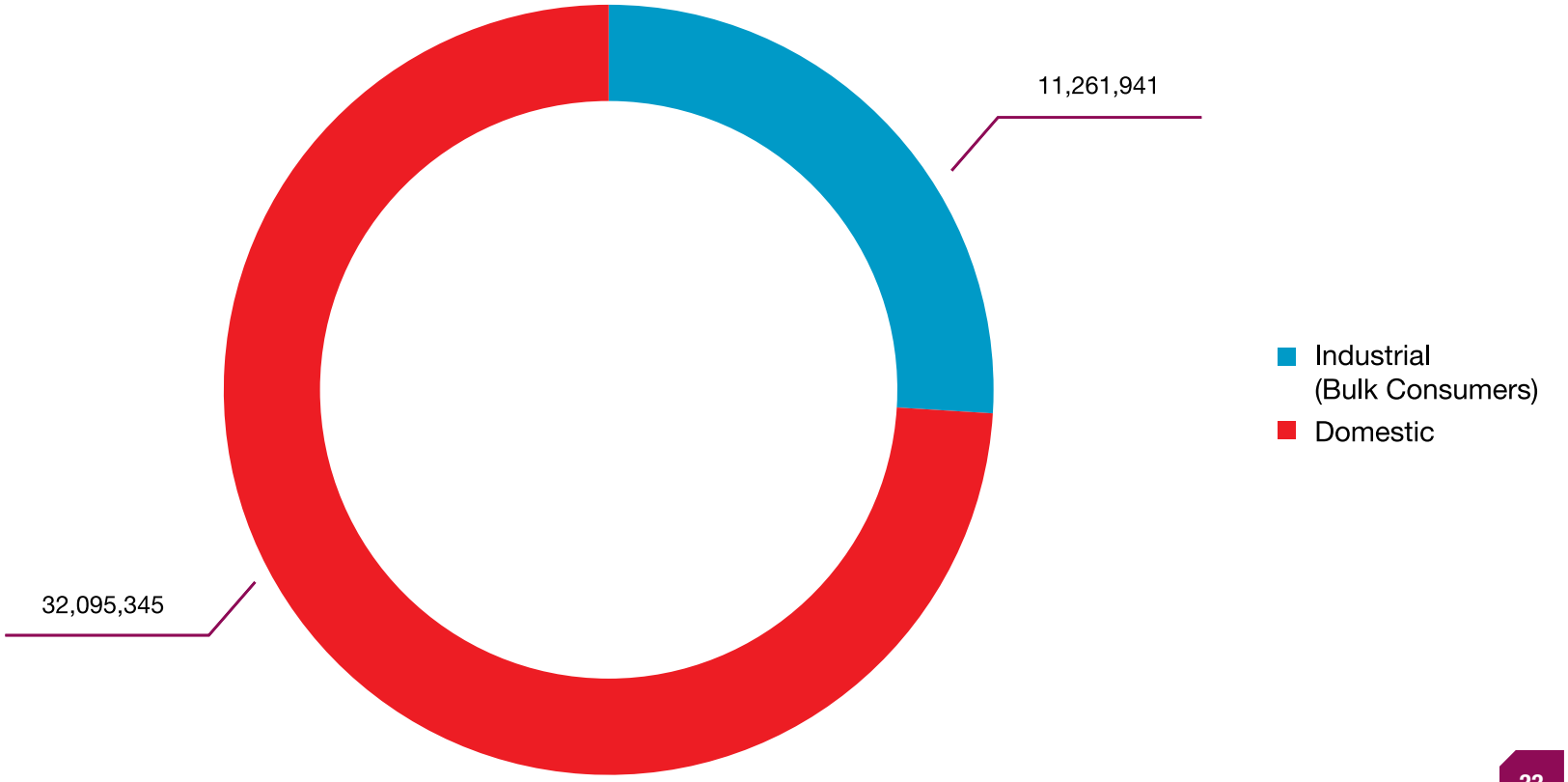
System Maximum and Minimum Demand (MW)
Half Hourly Load Curve in 2017



ET10 SECTORAL CONSUMPTION IN 2017, MWH

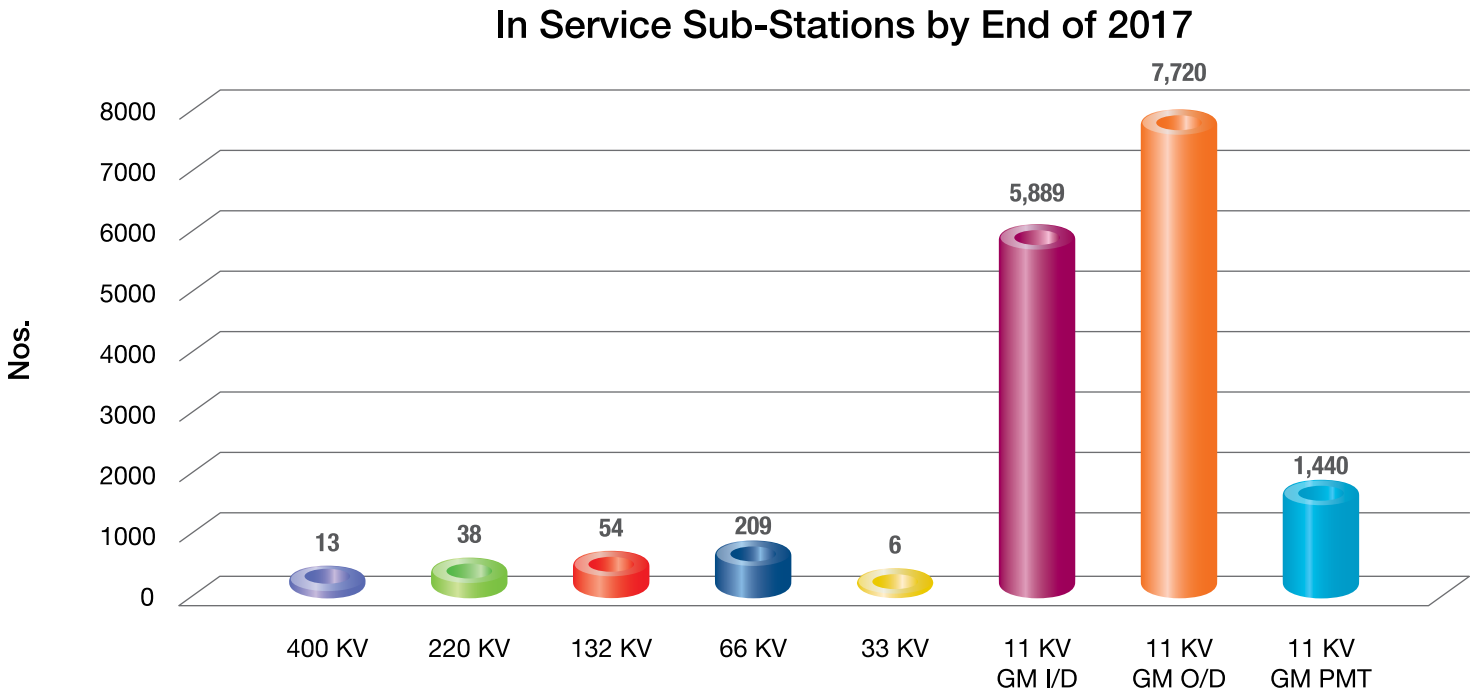
Sector	Industrial (Bulk Consumers)	Domestic	Auxiliary	Transmission and Distribution Losses	Total Injected Generation	Total Electricity Generation (IPPS)
Consumption, MWh - 2017	11,261,941	32,095,345	2,831,204	2,694,696	43,459,957	45,554,730

Sectorial Consumption (MWh) in 2017



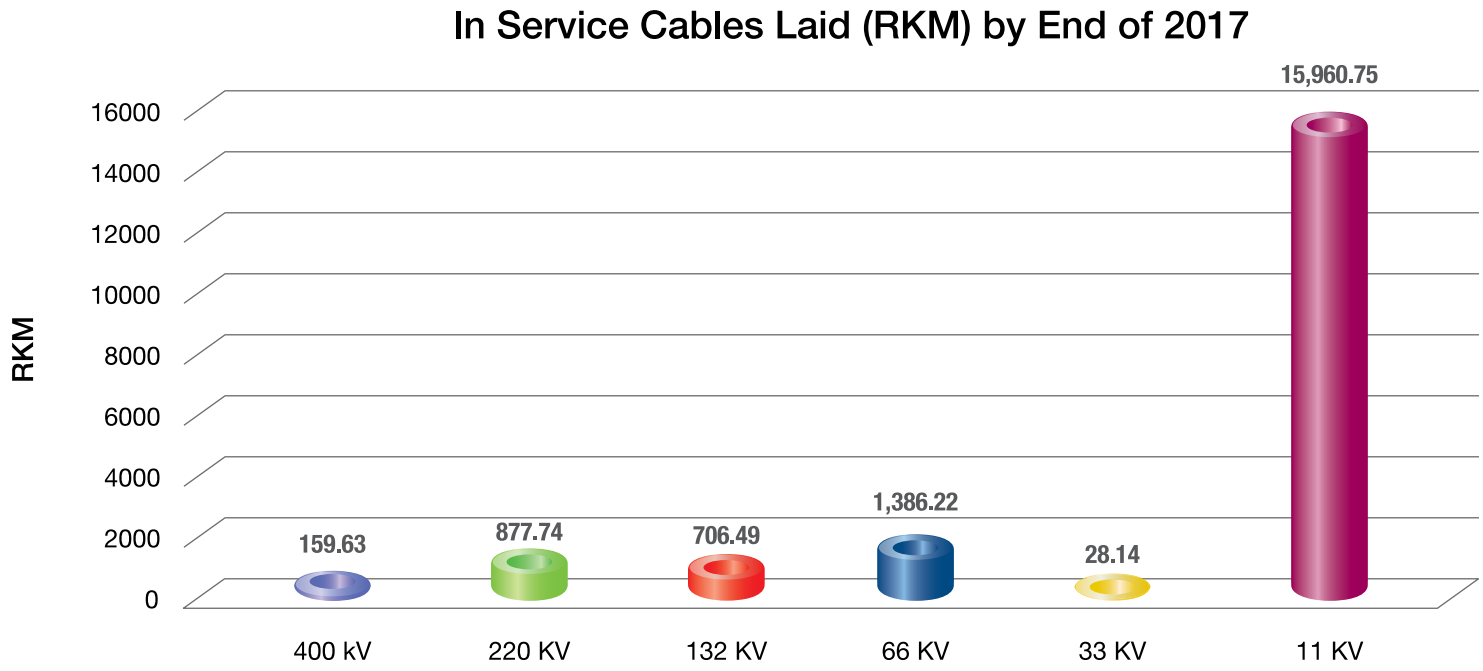
ET11 SUB-STATIONS

Substations	400 kV	220 kV	132 kV	66 kV	33 kV	11kV GM I/D	11kV GM O/D	11kV PM PMT
In service (as at 31/12/2012)	07	25	33	167	7	3,686	5,961	1,289
Commissioned - 2013	02	00	05	10	00	296	287	45
Commissioned - 2014	02	02	03	10	00	407	425	44
Commissioned - 2015	0	08	05	10	00	437	447	38
Commissioned - 2016	0	02	07	06	00	540	527	66
Commissioned - 2017	02	02	06	25	00	593	474	55
In service (as at 31/12/2017)	**13**	**38**	**54**	**209**	**06**	**5,889**	**7,720**	**1,440**



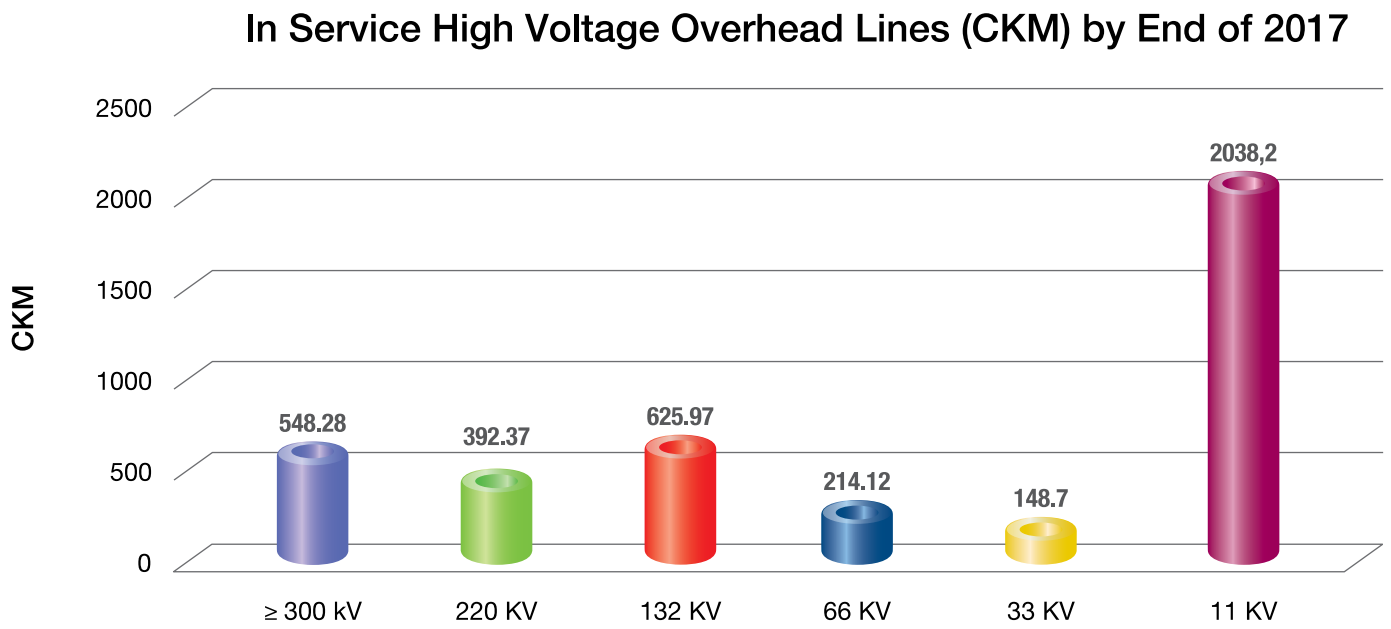
ET12 CABLES LAID (RKM)

Period Commisioned	400 kV	220 kV	132 kV	66 kv	33 kV	11 kV
In service (as at 31/12/2012)	67.30	592.90	542.20	1,260.10	54.90	9736.70
Commissioned - 2013	65.90	08.30	76.90	38.60	00	850
Commissioned - 2014	48.50	45.60	17.80	31	00	1,053
Commissioned - 2015	00.73	166.39	84.02	38.80	00	1,129.86
Commissioned - 2016	00	27.85	21.18	53.48	8.818	1,593
Commissioned - 2017	43.86	36.85	28.35	156.55	00	1904.08
In service (as at 31/12/2017)	**159.63**	**877.74**	**706.49**	**1,386.22**	**28.14**	**1,5960.75**



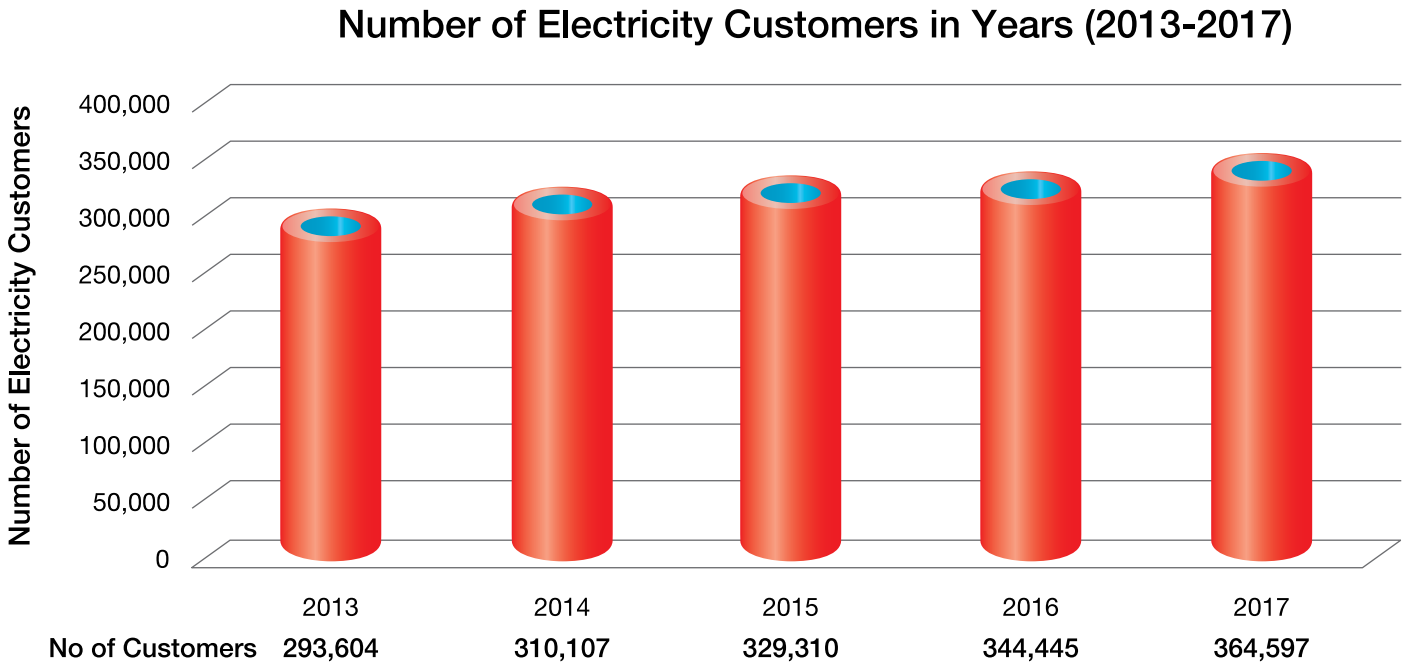
ET13 HIGH VOLTAGE OVERHEAD LINES (CKM)

Period	≥ 300 kV	220 kV	132 kV	66 kv	33 kV	11 kV
In service (as at 31/12/2012)	465.90	466.18	603.89	201.01	146.64	110.00
Commissioned -2013	47.90	00	17.84	13.05	00	60
Commissioned -2014	34.18	08	08.77	00	00	67
Commissioned -2015	00	00	00	00	00	00
Commissioned -2016	00	00	16.88	00	00	59
Commissioned -2017	00	0.85	121.16	00	00	58.69
In service (as at 31/12/2017)	**548.28**	**392.37**	**625.97**	**214.12**	**148.70**	**2038.20**



ET14 NUMBER OF ELECTRICITY CUSTOMERS FROM 2013 TO 2017

Year	2013	2014	2015	2016	2017
No of Customers	293,604	310,107	329,310	344,445	364,597
Annual Growth (%)	1.6%	5.6%	6.2%	4.6%	5.9%



ET15 AVERAGE ELECTRICITY PER CAPITA CONSUMPTION

Average Electricity Per Capita Consumption: (KWh Per Person Per Year)

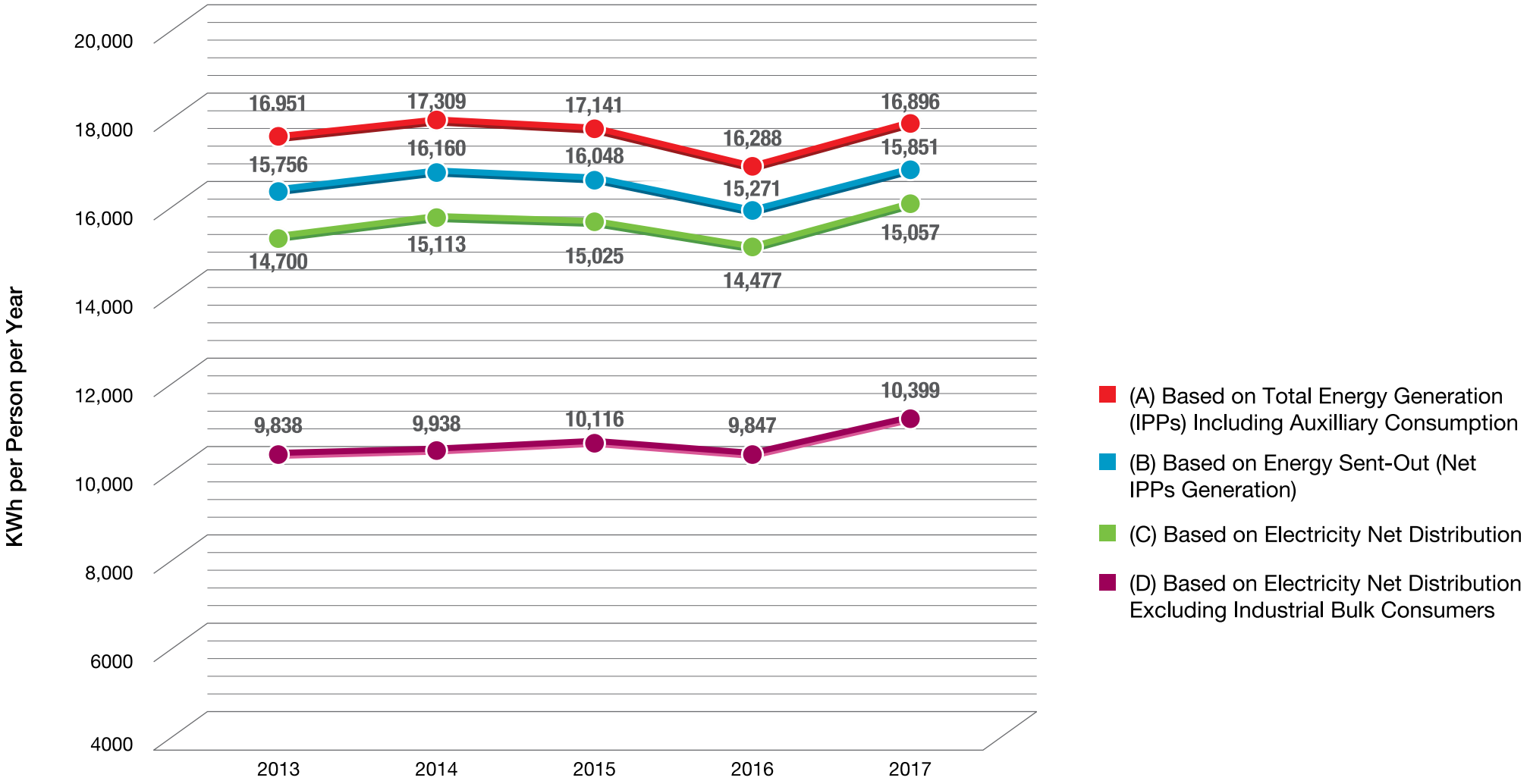
Year	2013	2014	2015	2016	2017
Population	2,045,239	2,235,431	2,421,055	2,597,453	2,700,539
Population Annual Increase (%)	11.40%	9.30%	8.30%	7.30%	4.00%
Total Energy Generation (IPPs) inlcuding all auxilliary consumption GWh	34,668	38,693	41,499	42,307	45,555
Energy Sent-Out GWh (Net IPPs Generation)	32,225	36,125	38,852	39,667	42,806
Electricity Net Distribution GWh	30,172	33,777	36,752	37,603	40,663
Electricity Net Distribution excluding Industrial Bulk Consumers GWh	20,121	22,216	24,491	25,108	29,401
(A) Based on Total Energy Generation (IPPs) including Auxilliary Consumption	16,951	17,309	17,141	16,288	16,869
(B) Based on Energy Sent-Out (Net IPPs Generation)	15,756	16,160	16,048	15,271	15,851
(C) Based on Electricity Net Distribution	14,700	15,113	15,025	14,477	15,057
(D) Based on Electricity Net Distribution excluding Industrial Bulk Consumers	9,838	9,938	10,116	9,847	10,399

* Electricity Net Distribution GWh = Injected Generation – Export to GCCIA – T&D losses

** Electricity Net Distribution GWh excluding Industrial Bulk Consumers = Injected Generation – Export to GCCIA – T&D losses - Industrial Bulk Consumers. Starting 2017, “Electricity Consumption” term revised to “Electricity Net Distribution GWh excluding Industrial Bulk Consumers”

Note: Starting from year 2017, Per Capita Consumption calculation is based on maximum population for the year.

Electricity per Capita Consumption (KWh per Person per Year)



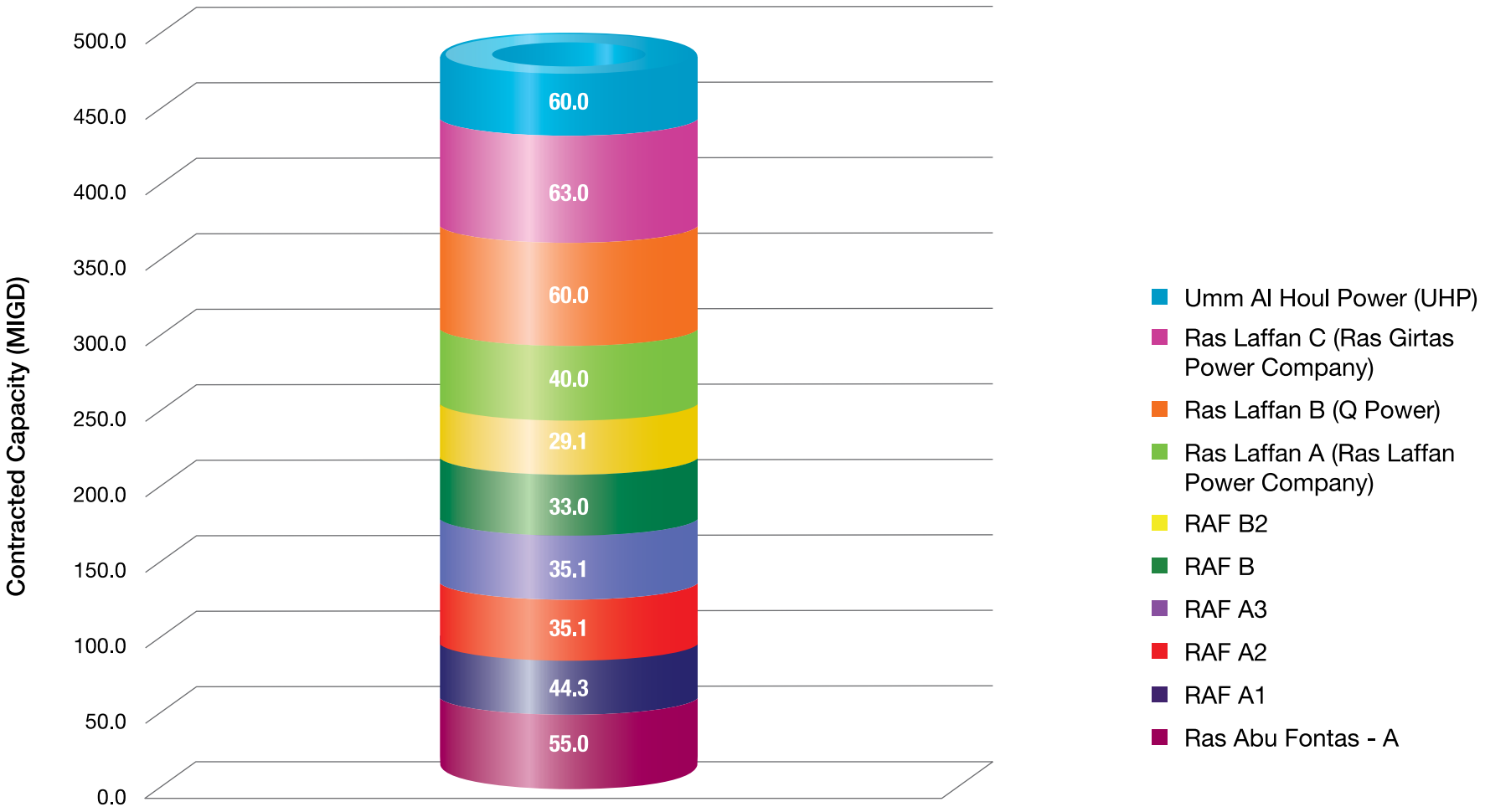
2017

WATER STATISTICS

WT1 CONTRACTED CAPACITIES BY IPWP AT END OF 2017

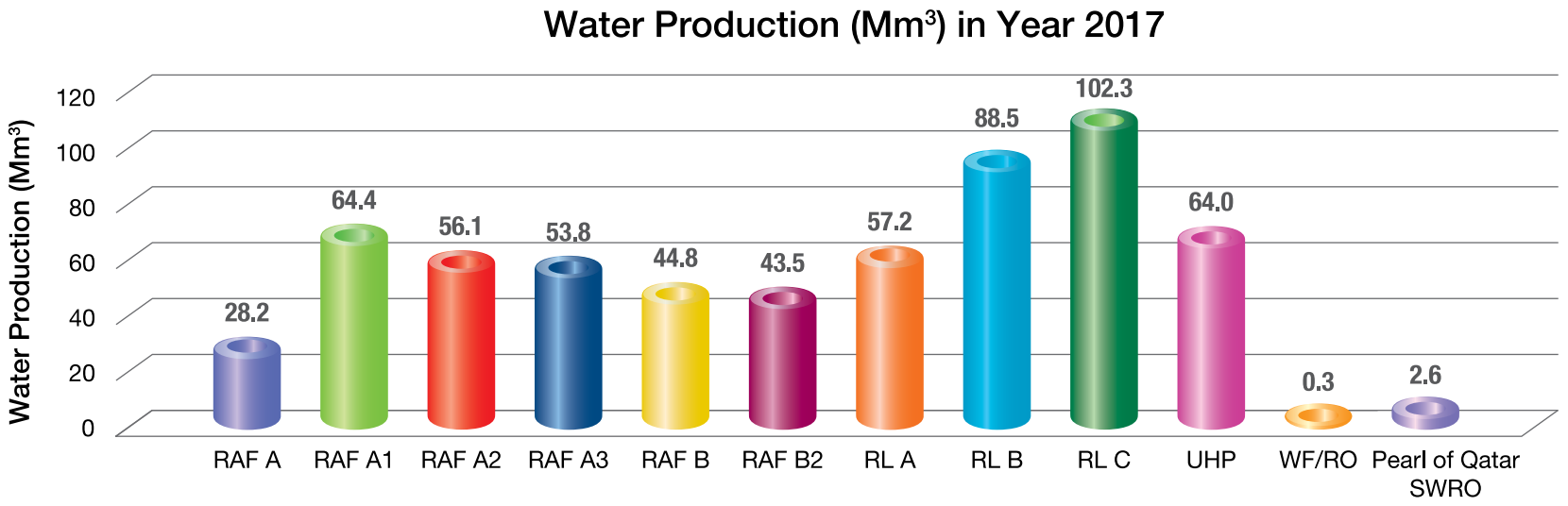
Independent Power & Water Producer		Contracted Capacity - Water (MIGD)	Mm^3/Day
Qatar Electricity & Water Company	Ras Abu Fontas (RAF) - A	55.0	0.25
	Ras Abu Fontas RAF A1	44.3	0.20
	Ras Abu Fontas RAF A2	35.1	0.16
	Ras Abu Fontas RAF A3	35.1	0.16
	Ras Abu Fontas RAF B	33.0	0.15
	Ras Abu Fontas RAF B2	29.1	0.13
	Sub-Total	**231.7**	**1.05**
Ras Laffan	Ras Laffan A (Ras Laffan Power Company)	40.0	0.18
	Ras Laffan B (Q Power)	60.0	0.27
	Ras Laffan C (Ras Girtas Power Company)	63.0	0.29
	Sub-Total	**163.0**	**0.74**
Umm Al Houl Power Company	Umm Al Houl Power (UHP)	**60.0**	**0.27**
	Total Capacity	454.7	2.07

Water Contracted Capacity by IWPPs in Year 2017



WT2 WATER PRODUCTION IN 2017

IWPPs	Water Production (Million Cubic Meters)	Million Imperial Gallons (MIG)
RAF A	28.2	6,207
RAF A1	64.4	14,169
RAF A2	56.1	12,350
RAF A3	53.8	11,825
RAF B	44.8	9,856
RAF B2	43.5	9,564
RL A	57.2	12,572
RL B	88.5	19,476
RL C	102.3	22,497
UHP	64.0	14,084
WF/RO	0.3	58
Pearl of Qatar SWRO	2.6	562
Total	**605.7**	**133,226**



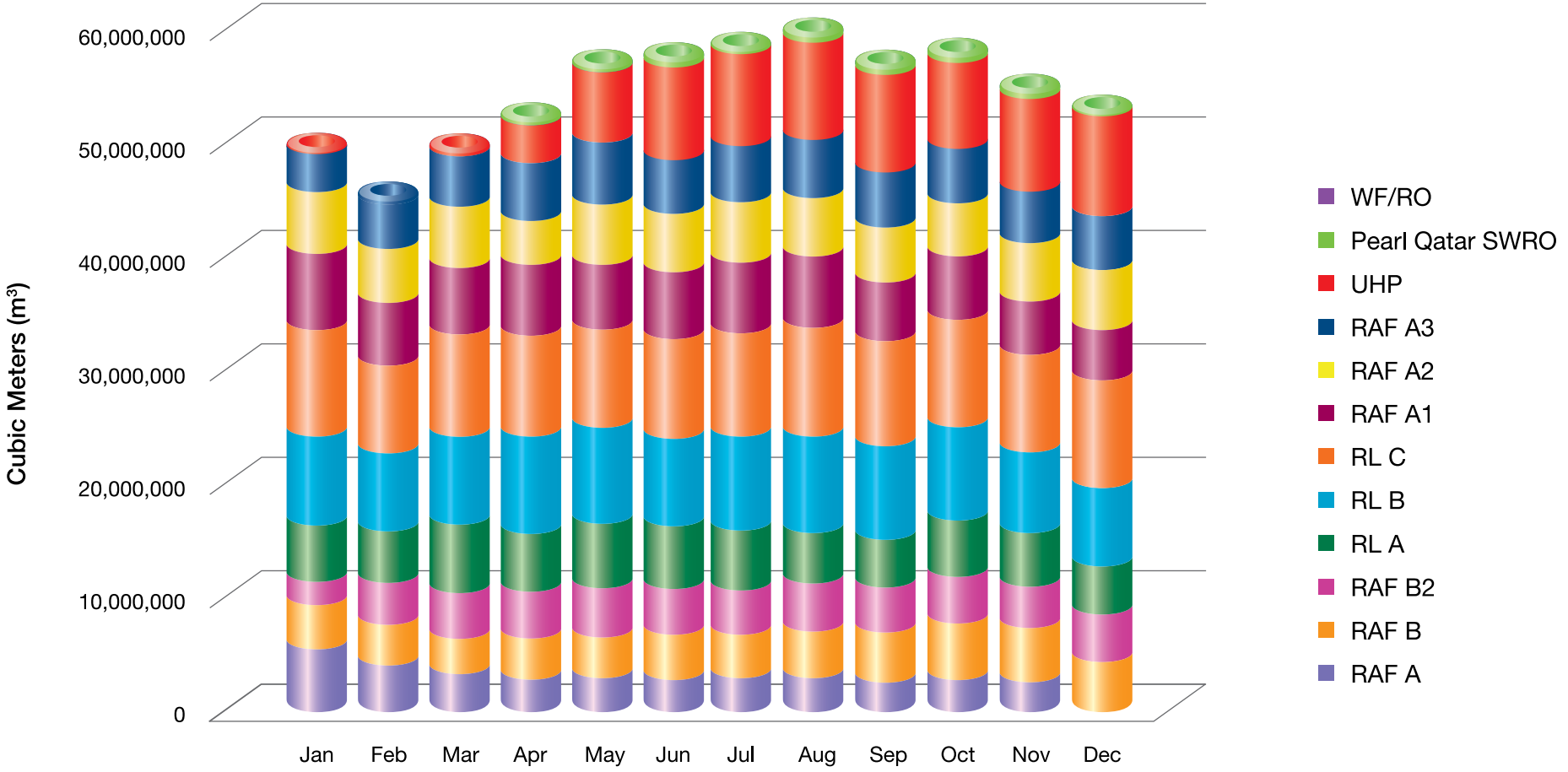
WT3 POTABLE WATER PRODUCTION CAPACITIES FROM WELLS IN 2017

Well Fields	Total No. Of Wells	Wells with Pumps	Designed Capacity, M^3/Day	Actual Average Output, M^3/Day	Remarks
Al Rushaidah	84	84	24,192	0	All Wells has been rehabilitated and ready to use during emergency
Al Dibiyah	87	87	25,056	0	
Al Judiyah	41	41	6,888	0	
Al Otoriyah	80	80	23,040	0	
Abu Thailah	30	30	8,640	0	
Abu Samra RO Plant	5	4	680	715	Supply to Immigration / Customs & TFS
Army North Camp RO PLANT	5	5	1,200	451	North Camp R.O. station kept standby since 22.10.2005. The station is being operated weekly for 30 minutes for maintaining system healthiness
Total	**332**	**331**	**89,696**	**1,166**	

WT4 MONTHLY WATER PRODUCTION, CUBIC METERS IN 2017

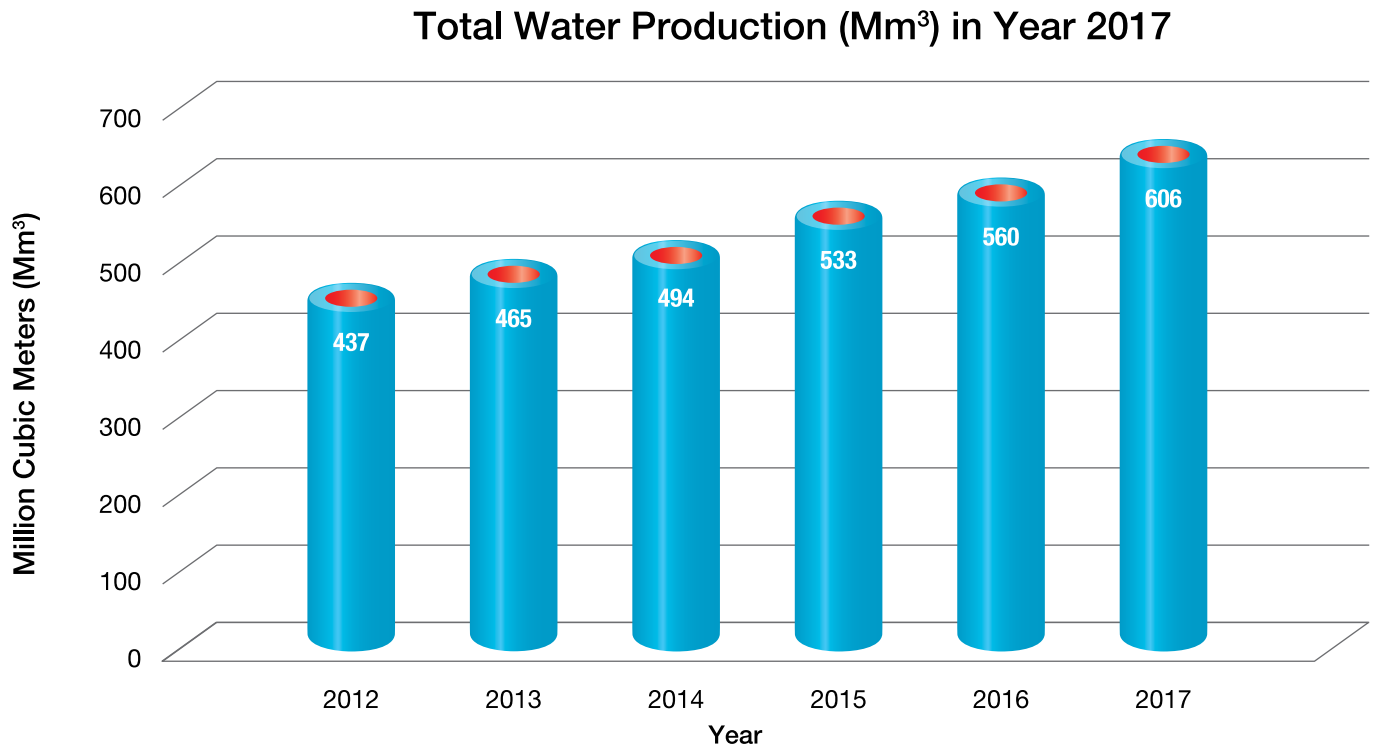
Month	RAF A	RAF B	RAF B2	RL A	RL B	RL C	RAF A1	RAF A2	RAF A3	UHP	Pearl Qatar SWRO	WF/RO	Total
Jan	4,701,816	3,710,441	1,853,353	4,765,606	7,423,508	8,863,659	6,208,248	5,102,311	3,312,156	0	88,640	22,636	46,052,374
Feb	3,308,433	3,431,954	3,513,261	4,331,858	6,390,680	7,387,877	5,098,092	4,553,845	3,618,774	0	55,044	18,357	41,708,175
Mar	2,801,191	2,857,475	3,721,526	5,666,120	7,228,517	8,571,519	5,611,372	5,040,503	4,469,974	0	96,534	20,261	46,084,992
Apr	2,223,868	3,361,693	3,729,001	5,186,368	7,875,937	8,447,380	5,836,258	3,647,512	4,767,810	3,299,009	198,542	21,197	48,594,575
May	2,296,083	3,300,906	4,086,784	5,469,512	7,975,194	8,098,287	5,584,249	4,888,200	5,010,715	6,007,290	329,717	23,671	53,070,608
Jun	2,173,583	3,680,003	3,873,903	5,181,896	7,294,668	8,309,342	5,626,737	4,666,171	4,690,558	7,669,554	406,774	22,957	53,596,146
Jul	2,375,637	3,502,294	3,676,162	5,007,380	7,886,022	8,620,679	5,846,959	4,890,638	4,859,851	7,673,913	145,934	24,632	54,510,101
Aug	2,059,109	4,183,732	3,965,276	4,246,340	8,084,979	9,100,167	5,773,766	4,844,162	4,783,488	8,081,442	239,589	23,914	55,385,964
Sep	1,921,650	4,210,039	3,737,732	4,035,521	7,668,851	8,766,865	4,893,280	4,563,672	4,649,233	7,989,955	332,106	22,607	52,791,511
Oct	2,279,755	4,631,469	3,789,610	4,776,784	7,716,140	8,900,513	5,327,452	4,298,926	4,610,749	7,080,496	358,518	22,742	53,793,154
Nov	2,076,760	4,274,048	3,570,077	4,503,460	6,631,057	8,213,439	4,335,672	4,689,956	4,374,835	7,962,350	220,211	21,330	50,873,195
Dec	0	3,662,955	3,961,678	3,985,808	6,369,864	8,999,078	4,272,921	4,962,845	4,613,615	8,267,730	83,174	20,131	49,199,799
Total	28,217,885	44,807,009	43,478,363	57,156,653	88,545,417	102,278,805	64,415,006	56,148,741	53,761,758	64,031,739	2,554,783	264,435	605,660,594

Monthly Water Production (m^3) in Year 2017



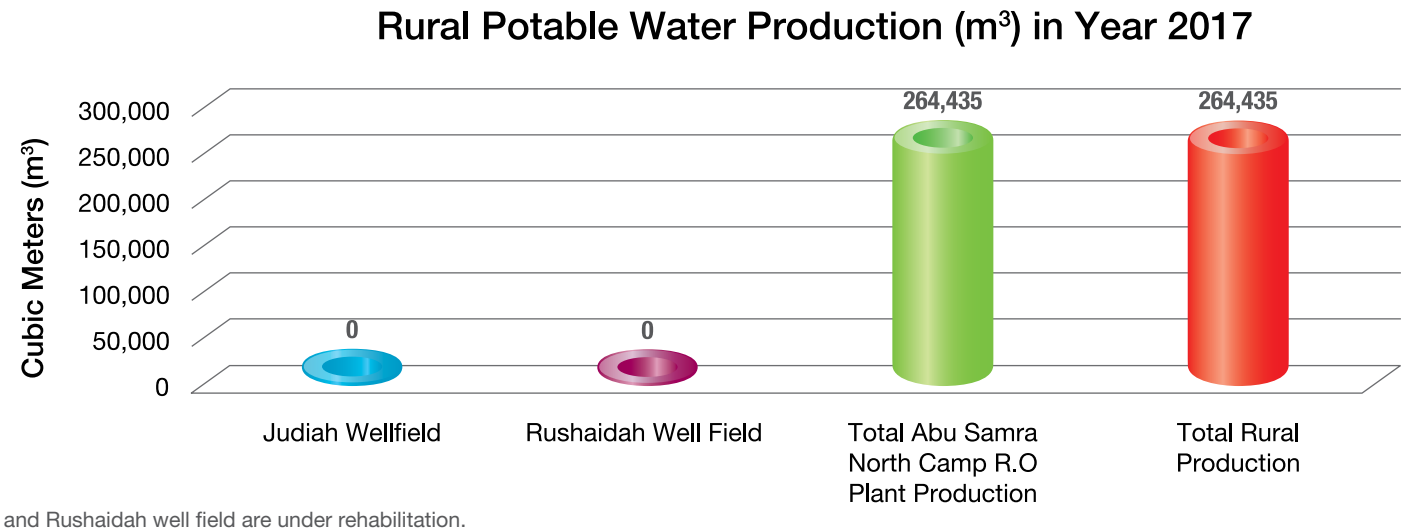
WT5 TOTAL ANNUAL WATER PRODUCTION, MILLION CUBIC METERS

Water Production	2013	2014	2015	2016	2017
Production, Mm^3	465	494	533	560	603
Annual Growth (%)	6.3%	6.2%	8.0%	5.1%	7.7%
Average Growth last five years (%)					6.7%



WT6 RURAL POTABLE WATER PRODUCTION, CUBIC METERS

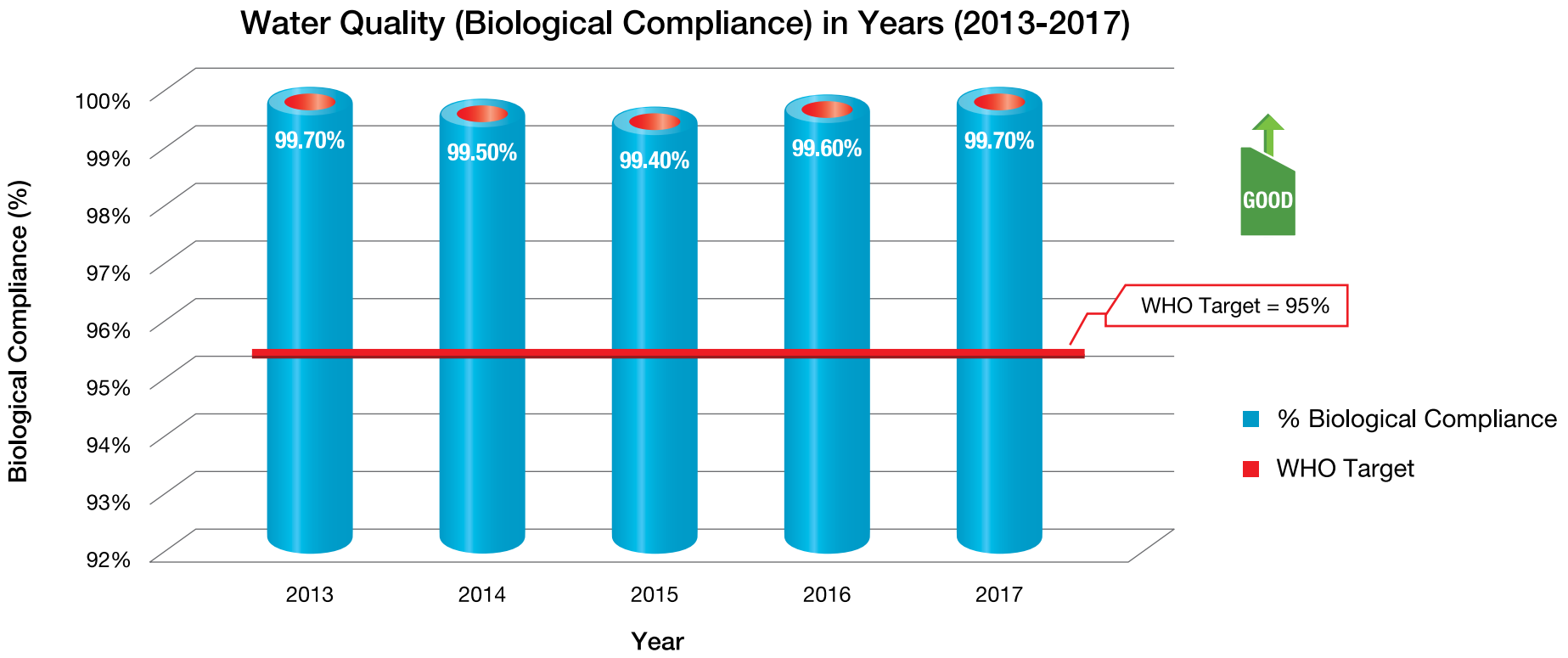
Month	Judiyah Well Field*	Rushaidah Well Field*	Total Abu Samra North Camp R.O. Plant Production	Total Production
Jan	0	0	22636	22,636
Feb	0	0	18357	18,357
Mar	0	0	20261	20,261
Apr	0	0	21197	21,197
May	0	0	23671	23,671
Jun	0	0	22957	22,957
Jul	0	0	24632	24,632
Aug	0	0	23914	23,914
Sep	0	0	22607	22,607
Oct	0	0	22742	22,742
Nov	0	0	21330	21,330
Dec	0	0	20131	20,131
Total	**0**	**0**	**264,435**	**264,435**



* Note: Judiyah well field and Rushaidah well field are under rehabilitation.

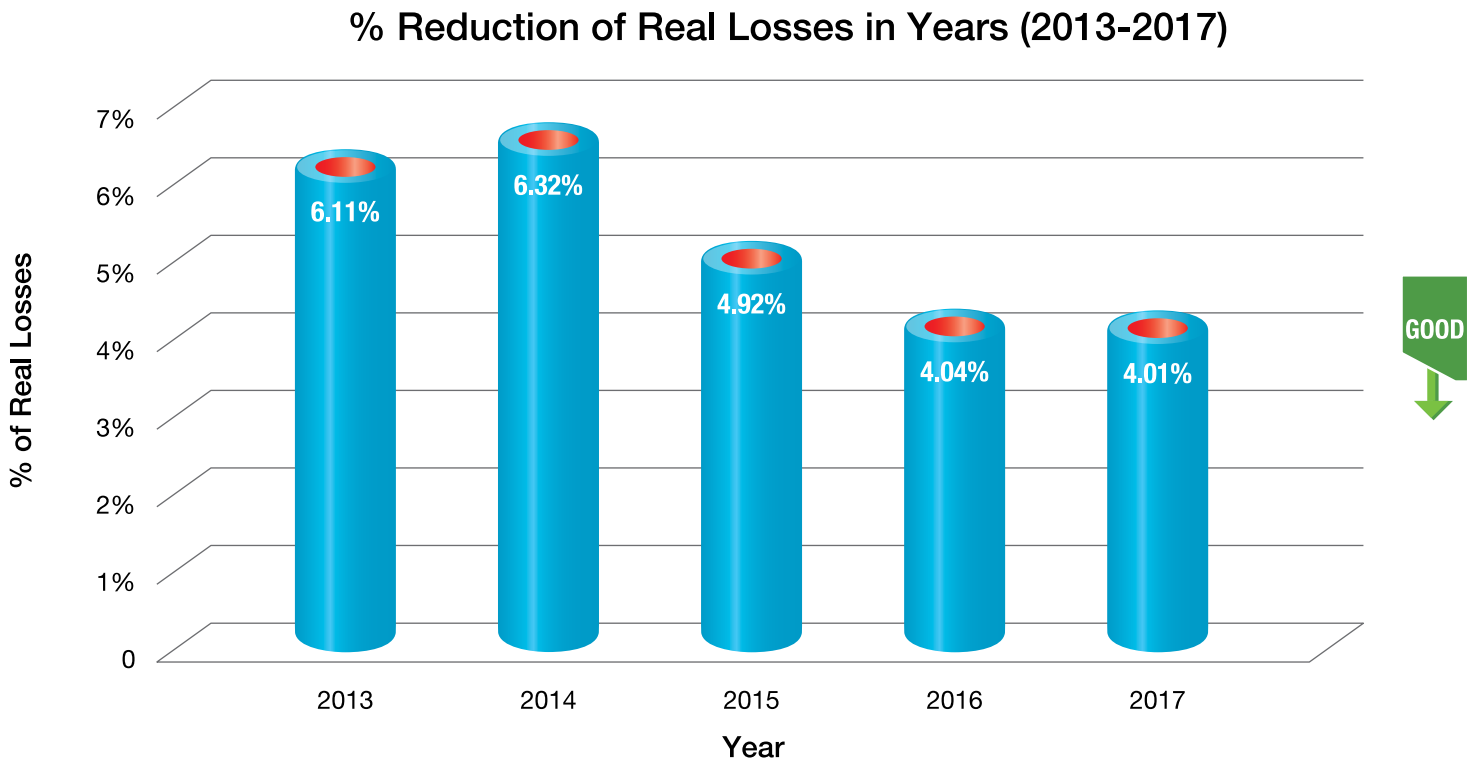
WT7 WATER QUALITY (BIOLOGICAL COMPLIANCE)

Year	% Biological Compliance	WHO Target
2013	99.70%	95%
2014	99.50%	95%
2015	99.40%	95%
2016	99.60%	95%
2017	99.70%	95%



WT8 WATER REAL LOSSES REDUCTION

Year	% Real Losses
2013	6.11%
2014	6.32%
2015	4.92%
2016	4.04%
2017	4.01%



WT9 LENGTH OF MAINS LAID FROM 2013 TO 2017 IN METERS

Pipe Diameter, millimetres	2013	2014	2015	2016	2017
100	174,123	104,970	33,110	60,565	49,112
1000	565	0	0	6	362
110	0	0	871	2,842	247
1200	8,375	13,354	60,186	66,277	15,544
125	0	0	16,949	12	145
1400	3,547	17,605	48,707	61,162	8,850
150	72,298	67,129	57,169	104,010	73,540
1600	0	1,752	143,836	177,400	35,855
180	0	0	7,961	894	40
200	71,540	63,408	81,526	61,999	42,467
225	0	0	1,044	96	-
2400	0	0	76	203	1,249
250	0	0	8,771	1,234	316
280	0	0	6,109	0	-
300	103,189	49,659	59,915	100,715	62,082
315	0	0	503	2,614	13
355	0	0	3,087	2,325	492
400	47,913	34,823	27,358	41,683	35,410
450	0	0	0	29	4
500	0	0	2,186	3,536	257
600	24,257	35,572	32,979	34,868	36,069
700	0	0	474	15	-
80	224	171	1,238	11	478
800	0	0	167	650	3,755
900	13,565	19,091	53,913	33,209	27,400
Total	**519,596**	**407,534**	**648,135**	**756,355**	**393,687**

WT10 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2017, IN METERS

Service size from 20 mm up to 63 mm (MDPE pipe) – Domestic & Commercial (meters)

Type of Service	20 mm Length	20 mm Nos	25 mm Length	25 mm Nos	32 mm Length	32 mm Nos	50 mm Length	50 mm Nos	63 mm Length	63 mm Nos	Total Length	Total Nos.
New Service	0	0	63,625	4,682	29,297	277	5,964	147	14,781	209	113,667	**5,315**
Reconnection	0	0	0	0	0	0	0	0	0	0	0	**0**
Disconnection	0	0	0	635	0	0	0	0	0	0	0	**635**
Maintenance or Replacement	505	101	55,997	14,873	10,941	1,786	1,167	329	1,773	432	70,383	**17,521**
Transpose	0	0	502	70	206	6	4	2	78	2	790	**80**
Size Increase	0	0	0	0	0	1	42	7	78	5	120	**13**
New Water Meter Installation	0	16,216	0	47	0	185	0	274	0	0	0	**16,695**
Water Meter Replacement	0	12,872	0	2	0	109	0	65	0	0	0	**13,048**

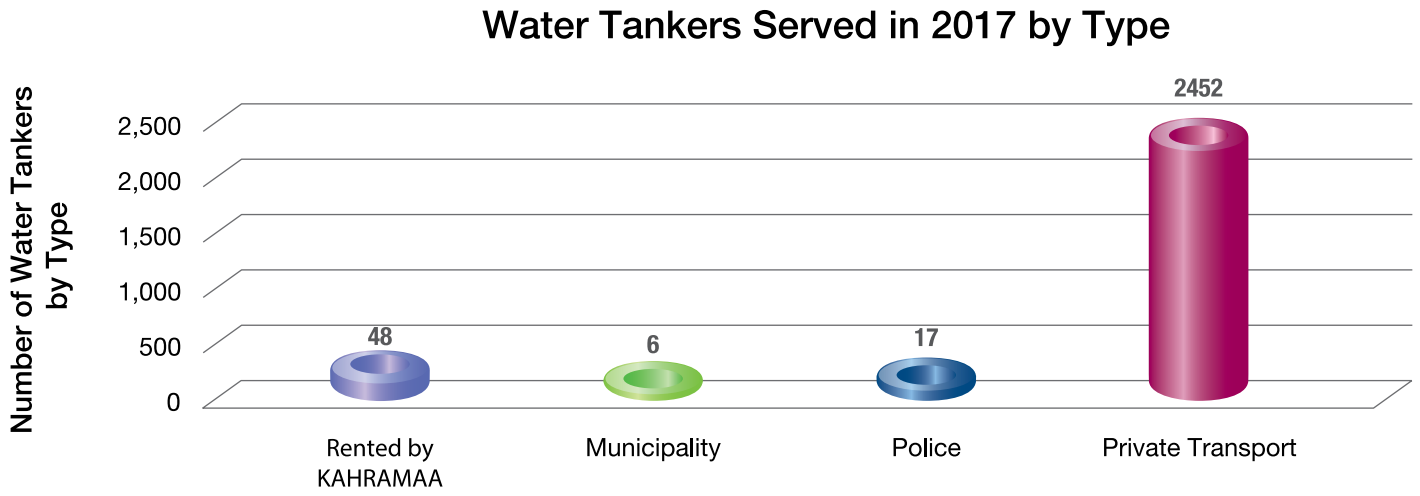
WT11 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2017, IN METERS

Service size from 80mm (3”) up to 400mm (16”) – Bulk

Type of Service	80 mm Length	80 mm Nos	100 mm Length	100 mm Nos	150 mm Length	150 mm Nos	200 mm Length	200 mm Nos	250 mm Length	250 mm Nos	300 mm Length	300 mm Nos	400 mm Length	400 mm Nos	Total Length	Total Nos.
New Service	179	10	602	4	7	1	19	1	0	0	0	0	0	0	807	16
Reconnection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disconnection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maintenance or Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transpose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Size Increase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Water Meter Installation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Meter Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

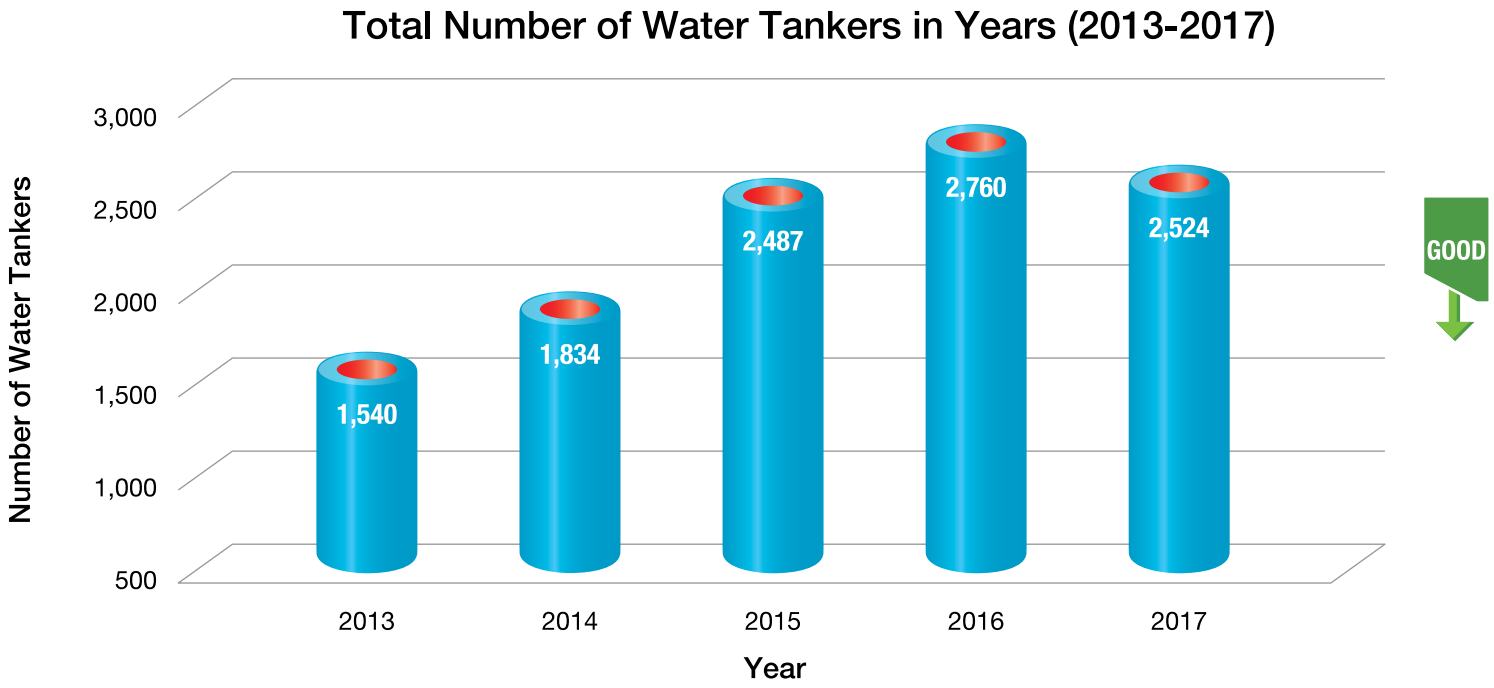
WT12 TANKER WATER SUPPLY IN 2017

Station	Rented by KAHRAMAA	Municipality	Education	Defence	Police	Other	Rural Tankers	Private Transport
Al Sailiyasalal	26	1	0	0	7	0	0	854
UMM Salal	1	2	0	0	3	0	0	667
Al Khor	1	1	0	0	2	0	0	179
Al Shahaniyah	5	0	0	0	2	0	0	188
Al Wakrah	6	0	0	0	2	0	0	331
Al Jameliyah	9	0	0	0	0	0	0	55
Al Shamal	0	1	0	0	1	0	0	63
Mesaieed	0	1	0	0	0	0	0	86
Al Mazroua	0	0	0	0	0	0	0	0
Al Ghuwariyah	0	0	0	0	0	0	0	29
Gharaffa	0	0	0	0	0	0	0	0
Total	**48**	**6**	**0**	**0**	**17**	**0**	**0**	**2,452**



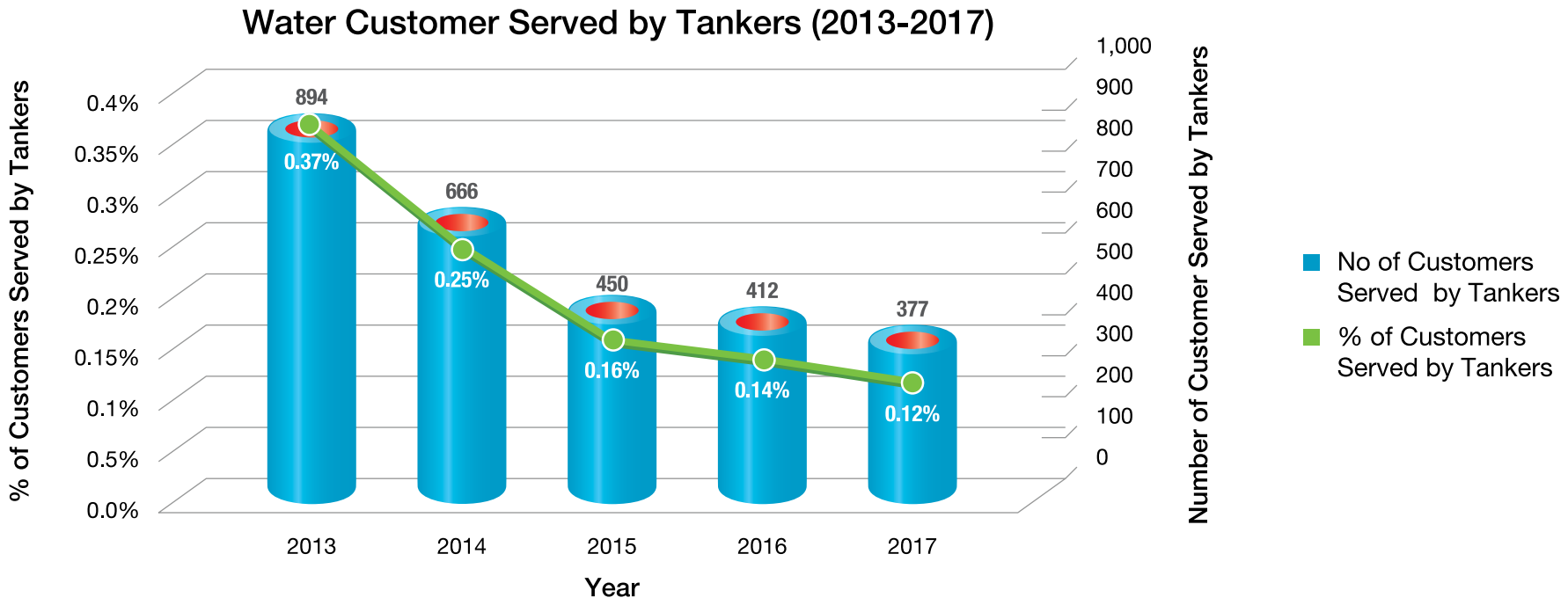
WT13 WATER TANKER SERVICES LAST 5 YEARS

Water Production	2013	2014	2015	2016	2017
No of Water Tankers	1,540	1,834	2,487	2,760	2,524
No of KM Rented Water Tankers	76	67	55	53	48
Total Reduction	603	-294	-653	-273	236
Total Reduction (%)	28.1%	-19.1%	-35.6%	-11.0%	8.6%
KM - Rented Reduction	4	9	12	2	5
KM - Rented Reduction (%)	5.0%	11.8%	17.9%	3.6%	9.4%



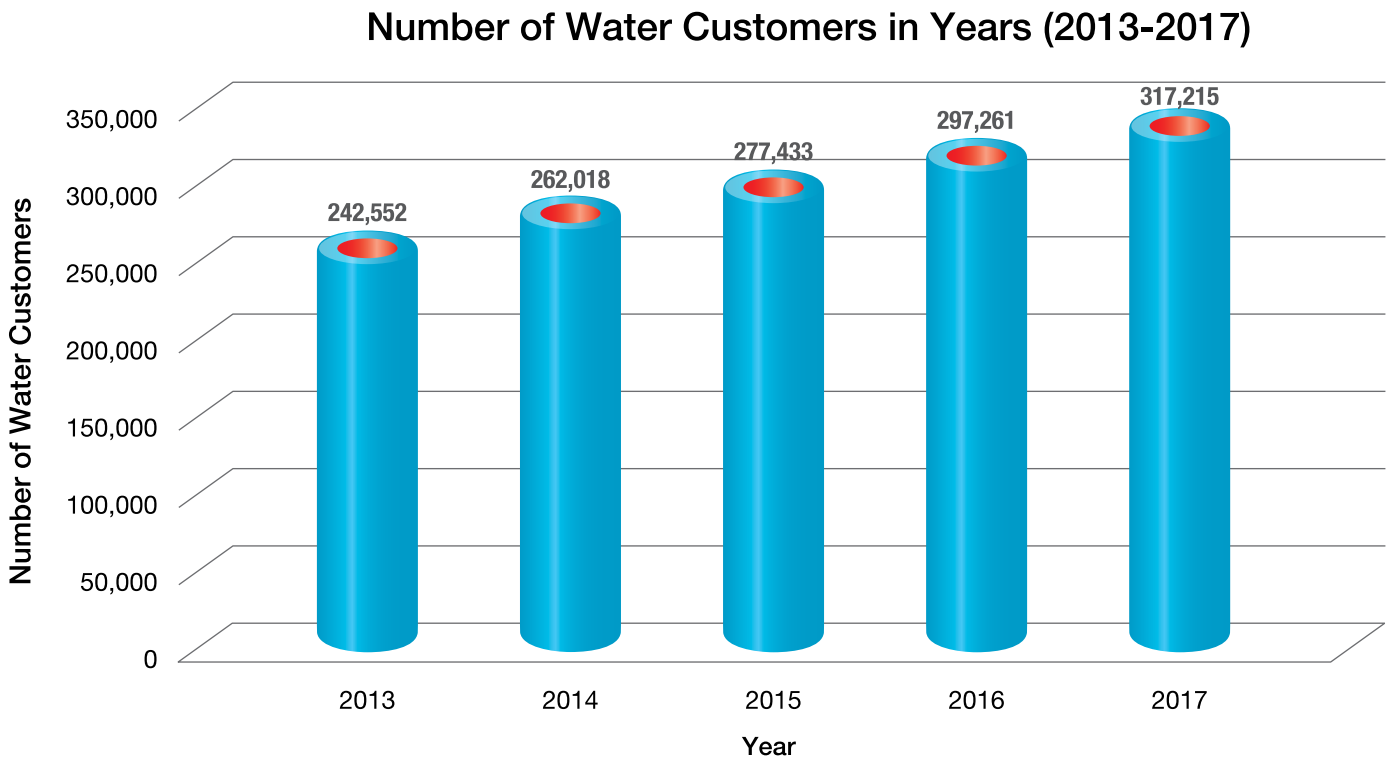
WT14 PERCENTAGE OF CUSTOMERS SERVED BY TANKERS

Water Production	2013	2014	2015	2016	2017
Total No. of Water Customers	242,552	262,018	277,433	296,846	316,838
No of Customers Served by Tankers	894	666	450	412	377
Percentage of Customers Served by Tankers (%)	0.37%	0.25%	0.16%	0.14%	0.12%
Reduction	-24	228	216	38	35
Percentage Reduction (%)	-0.01	0.12	0.09	0.02%	0.02%



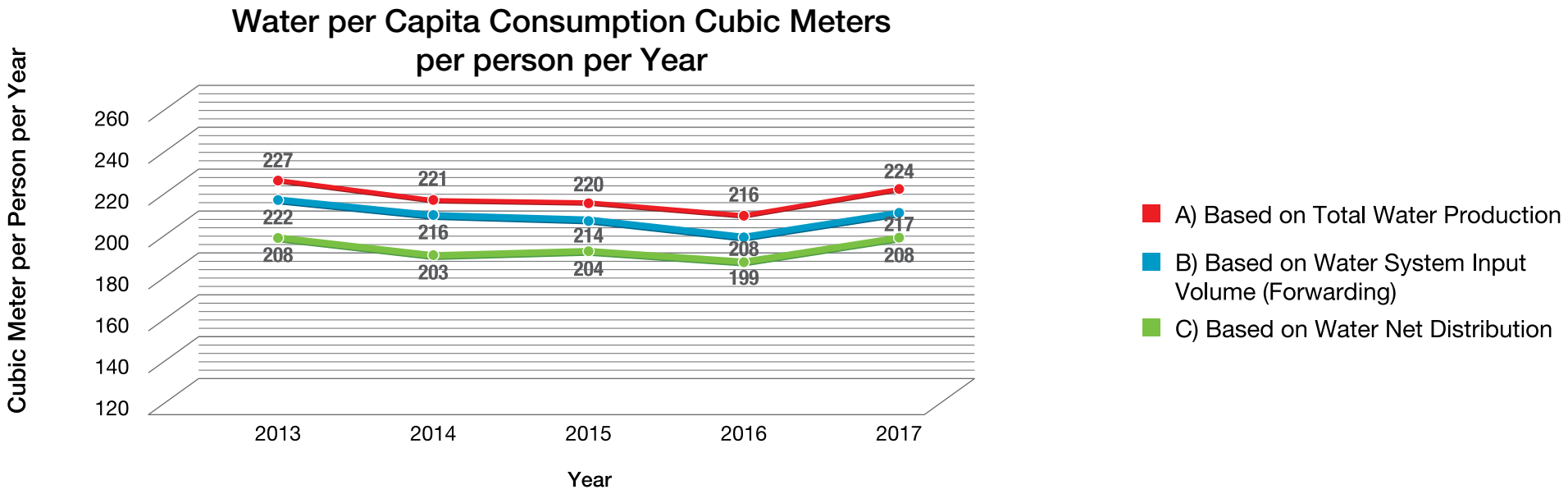
WT15 NUMBER OF WATER CUSTOMERS

Year	No of Customers	Annual Growth
2013	242,552	0.6 %
2014	262,018	8.0 %
2015	277,433	5.9 %
2016	297,261	7.1%
2017	317,215	6.7%



WT16 AVERAGE WATER PER CAPITA CONSUMPTION, LAST FIVE YEARS

Year	2013	2014	2015	2016	2017
Population	2,045,239	2,235,431	2,421,055	2,597,453	2,700,539
Population Annual Increase (%)	11.40%	9.30%	8.30%	7.30%	4.00%
Total Water Production Mm^3	465	494	533	560	606
System Input Volume (Forwarding) Mm^3	453	482	518	540	585
Water Net Distribution Mm^3 = System Input Volume Mm^3 (Forwarding) - Real Losses	426	452	493	518	562
Average Water Per Capita Consumption: (Cubic meter per person per year)					
A) Based on Total Water Production	227	221	220	216	224
B) Based on Water System Input Volume (Forwarding)	222	216	214	208	217
C) Based on Water Net Distribution	208	202	204	199	208



Note: Starting from year 2017, Per Capita Consumption calculation is based on maximum population for the year.

WT17 WATER STORAGE IN IWPP RESERVOIRS IN 2017

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, m^3	Non-Operating Capacity, m^3	Operating Capacity, m^3	Remarks
RAF A	38	-	38	172,727	-	172,727	
RAF A1	45	-	45	204,545	-	204,545	
RAF A2	36	-	36	163,636	-	163,636	
RAF A3	36	-	36	163,636	-	163,636	
RAF B	19.3	-	19.3	87,727	-	87,727	
RAF B2	29	-	29	131,818	-	131,818	
RL A	40	-	40	181,818	-	181,818	
RL B	60	-	60	272,727	-	272,727	
RL C	63	-	63	286,364	-	286,364	
UHP	136	-	136	618,182	-	618,182	New Station Commissioned. 40 MIGD (First Water) on 27 April 2017 and additional 20 MIGD (total 60 MIGD) on 07 June 2017 with total reservoir capacity of 136 MIG
Total	**502**	**-**	**502**	**2,283,182**	**-**	**2,283,182**	

WT18 WATER STORAGE IN KAHRAMAA RESERVOIRS IN 2017

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, m^3	Non-Operating Capacity, m^3	Operating Capacity, m^3	Remarks
Airport	30	-	30	136,364	-	136,364	
Old Salwa	-	-	-	-	-	-	All reservoirs demolished for upgrading
New Salwa	30	-	30	136,364	-	136,364	
Salwa Industrial	51	-	51	231,818	-	231,818	
Doha South	84	-	84	381,818	-	381,818	
Mesaimeer	108	-	108	490,909	-	490,909	
Wakrah	10	-	10	45,455	-	45,455	
Mes Town	24	-	24	109,091	-	109,091	New Reservoir 3 and 4 (6 MIG each) commissioned on 30/01/17 and 01/02/17 respectively
Mes Industrial	28	-	28	127,273	-	127,273	
Garrafa	50	-	50	227,273	-	227,273	
Westbay	56	-	56	254,545	-	254,545	
Duhail	142	-	142	645,455	-	645,455	
Umm Qarn	71	-	71	322,727	-	322,727	
Bani Hajr	36	-	36	163,636	-	163,636	
Muaither	105	-	105	477,273	-	477,273	
Al Khor 2	6	-	6	27,273	-	27,273	

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, m^3	Non-Operating Capacity, m^3	Operating Capacity, m^3	Remarks
Al Khor 3	18	-	18	81,818	-	81,818	
Al Khor 1	4	-	4	18,182	-	18,182	
Umm Salal 1	6	-	6	27,273	-	27,273	
Shahaniyah 2	12	-	12	54,545	-	54,545	
Shahaniyah 3	12	-	12	54,545	-	54,545	
Guwairiyah	1	-	1	2,273	-	2,273	
M. Shamal	10	-	10	45,455	-	45,455	
Pearl of Qatar	4	-	4	18,182	-	18,182	
Small and Medium	8	-	8	35,909	-	35,909	
Umm Salal 2	18	-	18	81,818	-	81,818	
Wukair	36	-	36	163,636	-	163,636	
Labor City	7	-	7	30,000	-	30,000	
Total	**966**	**-**	**966**	**4,390,909**	**-**	**4,390,909**	

WT19 WATER STORAGE IN GROUND TANKS IN 2017

Location	Ground Tank Non-Operating (MIG)	Ground Tank Operating (MIG)	Non-Operating (m^3)	Operating (m^3)	Remarks
North Camp	-	0.68	-	3,073	
Abu Samra	-	0.50	-	2,273	
Al Ghuwairiyah	-	0.50	-	2,273	
Shahaniyah 1	0.50	1.00	2,273	4,545	GST No. 2 (0.5 MIG) not in service. Under maintenance and repair
Mazruah	1.50	-	6,818	-	Station is not in service (On Standby)
New Jemiliyah	0.50	-	2,273	-	GST not in service and under maintenance and repair
Dukhan	0.50	-	2,273	-	Station is not in service (On Standby)
Total	**3.00**	**2.68**	**13,636**	**12,164**	

WT20 WATER STORAGE IN ELEVATED TANKS IN 2017

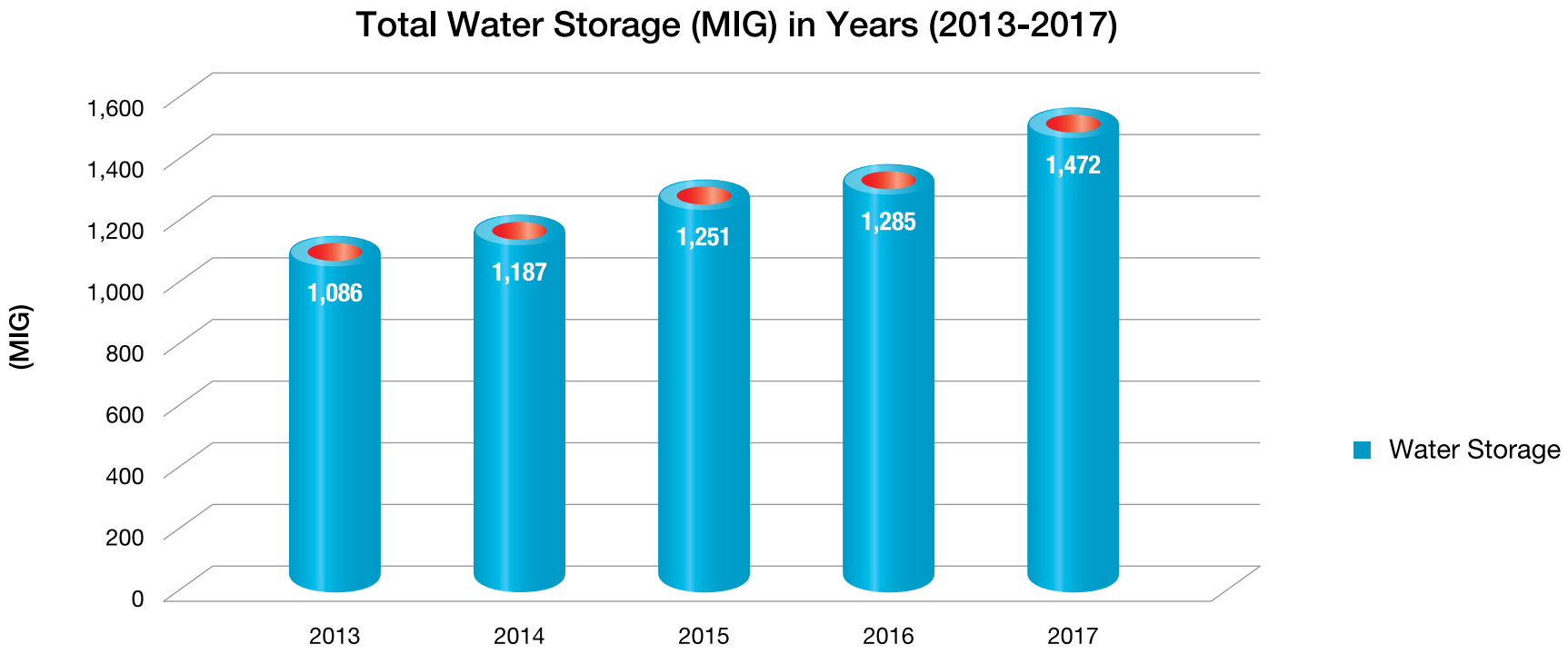
Location	Elevated Tank Capacity (Imperial Gallons)	Elevated Tank Operating Capacity (Imperial Gallons)	Capacity (m^3)	Operating Capacity (m^3)	Remarks
Madinat Shamal	55,000	-	250	-	Demolished
Al Ghuwairiyah	55,000	-	250	-	Bypassed
Al Khor 1	55,000	55,000	250	250	
Mazruah	200,000	-	909	-	Standby
Shahaniyah 1	69,000	-	314	-	ET not operational and is under maintenance and repair
Abu Samra	55,000	55,000	250	250	
New Jemiliyah	80,000	-	364	-	ET not operational. Under maintenance and repair
North Camp	88,000	88,000	400	400	
Total	**657,000**	**198,000**	**2,986**	**900**	

WT21 WATER STORAGE IN TOWERS IN 2017

Location	Capacity (Imperial Gallons)	Capacity (m^3)	Remarks
WT-1 (Airport)	495,000	2,250	Not in Service (Bypassed)
WT-3 (Luqta)	275,000	1,250	Not in Service (Bypassed)
WT-12 (Naeeja)	250,000	1,136	Not in Service (Bypassed)
WT-14 (Museum)	495,000	2,250	Not in Service (Bypassed)
WT-15 (Asiri)	495,000	2,250	Not in Service (Bypassed)
WT-17 (Ghanim Jadeed)	275,000	1,250	Not in Service (Bypassed)
WT-18 (Rumaillah)	495,000	2,250	Not in Service (Bypassed)
WT-19 (Hitmi)	275,000	1,250	Not in Service (Bypassed)
WT-20 (Garrafa)	275,000	1,250	Not in Service (Bypassed)
WT-21 (Khalifa Town)	275,000	1,250	Not in Service (Bypassed)
WT-22 (Messaieed Town)	495,000	2,250	In Service
WT-23 (Muraykh)	495,000	2,250	Not in Service (Bypassed)
WT-24 (Wakrah)	495,000	2,250	Not In Service
WT-25 (Salwa Industrial)	495,000	2,250	In Service
WT-26 (Bani Hajr)	495,000	2,250	Not in Service (Bypassed)
Total	**6,080,000**	**27,636**	

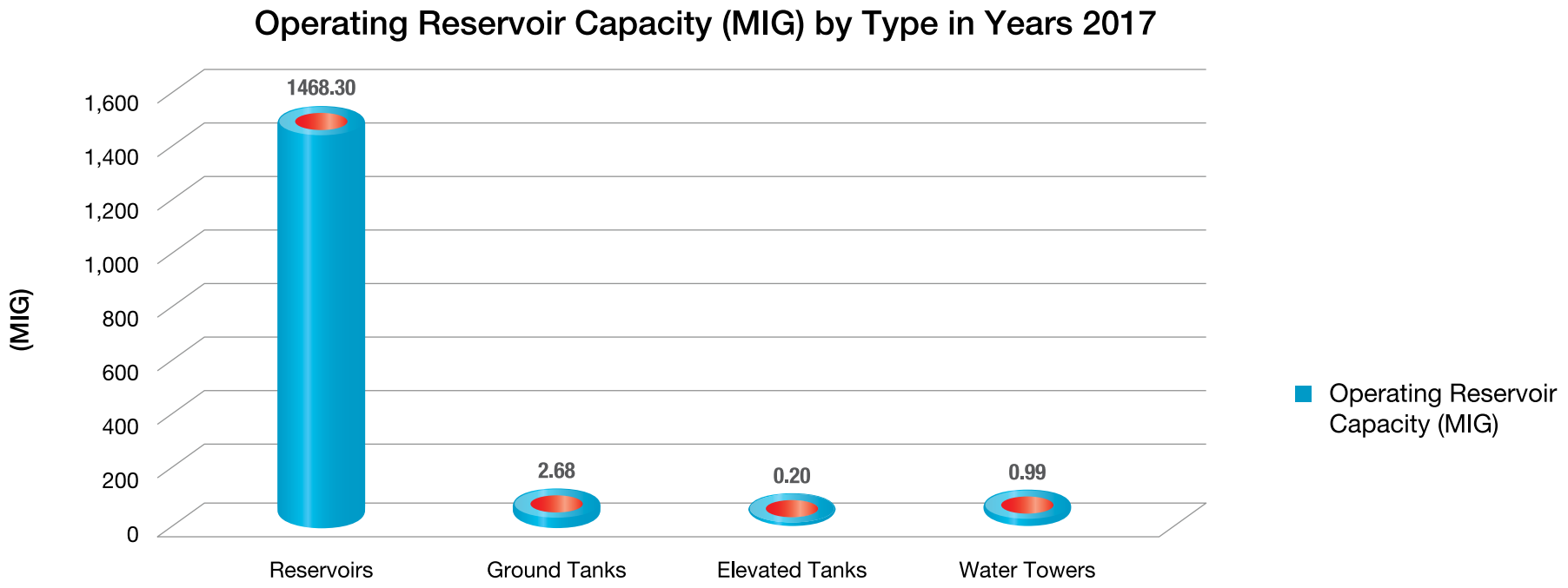
WT22 TOTAL WATER STORAGE 2013-2017

Water Storage	2013	2014	2015	2016	2017
Imperial Gallons (IG)	1,086,218,000	1,186,718,000	1,251,169,000	1,285,274,000	1,472,170,000
Meter Cube (m^3)	4,937,355	5,394,173	5,687,132	5,842,155	6,691,682
Million Meter Cube (Mm^3)	4.9	5.4	5.7	6.0	6.7
Million Imperial Gallons (MIG)	1,086	1,187	1,251	1,285	1,472



WT23 TOTAL WATER STORAGE BY TYPE 2013-2017

Type	Operating Reservoir Capacity (MIG)	%	Remarks
Reservoirs	1468.30	99.74%	-
Ground Tanks	2.68	0.18%	-
Elevated Tanks	0.20	0.01%	-
Water Towers	0.99	0.07%	Water Towers in Service are considered
Grand Total	**1472.17**	**100.00%**	**-**



GLOSSARY OF TERMS & ABBREVIATIONS

Abbreviation	Description
AMR	Automatic meter reading, or AMR, is the technology of automatically collecting data from water meter or energy metering devices (water, gas, and electric) and transferring that data to a central database for billing and/or analysing. This means that billing can be based on actual consumption rather than on an estimate based on previous consumption, giving customers better control of their use of electric energy, gas usage, or water consumption. AMR technologies include handheld, mobile and network technologies based on telephony platforms (wired and wireless), radio frequency (RF), or power line transmission.
Arab D	Several major projects have been completed including the development of Dukhan petroleum fields leading to raising oil production to 335,000 b/d, Arab D project to develop the production of gas and condensates in two stages inaugurated by H.H. the Emir of Qatar in 1998. The Arab D project will increase production of natural gas to about 1,500 tons p/d to supply LNG Plant 4 in Mesaieed, which is in the final phase, as well as a project to inject gas into dead wells (in its final stage) and Al-Shu'la project for all oil production stations in Dukhan for the purpose of environmental protection.
Auxiliary power consumption	Refers to the energy consumed internally by various integrated components of the main plant and supporting equipment necessary for the complete cycle of generating electrical energy and desalination of water, such as air compressors, pumps and fans.
Black Start	A black start is the process of restoring a power station to operation without relying on external energy sources. Normally, the electric power used within the plant is provided from the station's own generators. Often a transmission line will be installed to provide this station service power if all the main generators are shut down. However, during a wide-area outage, this off-site power supply will not be available. In the absence of grid power, a so-called black start needs to be performed to bootstrap the power grid into operation.
Combined cycle	Combined cycle describes when a power producing engine or plant employs more than one thermodynamic cycle. Heat engines are only able to use a portion of the energy their fuel generates (usually less than 50%). The remaining heat from combustion is generally wasted. Combining two or more "cycles" such as the Brayton cycle and Rankine cycle results in improved overall efficiency.
PQ	Planning & Quality: Departmental level business unit of KAHRAMAA that is responsible for the overall planning, forecasting, coordination of energy & water demand, developing the mission, vision, corporate objectives and vision, tariff development, negotiation of power and water purchase agreements and many other high-level management and business functions.
CPR	Corporate Performance Report: A report presented to the KAHRAMAA Board of Directors on a quarterly basis, which depicts the progress of KAHRAMAA's business and activities. In this report, the progress or achievement level of many activities are measured in terms of Key Performance Indicators (KPI's).
CSD	Customer Services Department: A department level business unit in KAHRAMAA that processes requests for building permits, service connections and customer billing.
Distribution substation	A distribution substation's purpose is to transfer power from the transmission system to the distribution system of some area. It is uneconomical to directly connect electricity consumers to the main transmission network (unless they use large amounts of energy); so the distribution station reduces voltage to a value suitable for connection to local loads.
Domestic	Refers to consumption of electricity or water that is not industrial in nature. In KARAMAA the National Control Centre tracks Qatar's entire electrical loads at two levels: industrial and domestic. Domestic loads cover residential, commercial and government demand.
DSM	Demand Side Management
ENA	Electricity Network Affairs: Directorate level business unit in KAHRAMAA that takes care of electricity network expansion and maintenance.
ESCWA	Economic and Social Commission for Western Asia

Abbreviation	Description
GT, Gas turbine	A type of engine using ignited gas running through a huge and very carefully designed multi-stage turbine to spin an output shaft that drives the plant's generator. In a gas turbine, a pressurized gas spins the turbine. In all modern gas turbine engines, the engine produces its own pressurized gas, and it does this by burning something like propane, natural gas, and kerosene or jet fuel. The heat that comes from burning the fuel expands air, and the high-speed rush of this hot air spins the turbine.
GDP	Gross Domestic Product: The total output of a country's economy.
Grid	A power transmission system is sometimes referred to colloquially as a "grid"; however, for reasons of economy, the network is not a mathematical grid. Redundant paths and lines are provided so that power can be routed from any power plant to any load centre, through a variety of routes, based on the economics of the transmission path and the cost of power. Much analysis is done by transmission companies to determine the maximum reliable capacity of each line, which, due to system stability considerations, may be less than the physical or thermal limit of the line. Deregulation of electricity companies in many countries has led to renewed interest in reliable economic design of transmission networks.
GW	Gigawatt = billions of watts (capacity)
GWh	Gigawatt Hour = billions of watts in 1 hour (electrical energy)
IWPP	Independent Water and Power Producers
KAH S/S	KAHRAMAA substation
KAHRAMAA	KAHRAMAA
KM	KAHRAMAA
kV	Kilovolt = 1,000 volts (capacity)
kW	Kilowatt = 1,000 watts (capacity)
kWh	Kilowatt-Hour = 1,000 watts in 1 hour (electrical energy)
Loading desk	Refers to a desk at NCC (National Control Centre) equipped with the required and hardware, software and connectivity used in tracking loads on the electricity grid and managing the loads in real-time.
m^3	Cubic Meters, unit of measurement for volume of water
MIC	Mesaieed Industrial City, south of Doha
MIG	Million Imperial Gallons, unit of measurement for volume of water
MIGD	Million Imperial Gallons per Day, unit of measurement for volume of water. Normally used to indicate the capacity of a water desalination plant.
Mm	Millimetre, normally used in measuring water pipe diameter
MMSCF	Million Standard Cubic Feet, a measure of gas volume
MOF	Ministry of Finance, Qatar government agency
MPC	Mesaieed Power Company, owns & operates power & desalination plants south of Doha

Abbreviation	Description
MSF	Multi-Stage Flash (MSF) is the most commonly used process for seawater desalination. A MSF facility is typically located so that it uses steam from a nearby electricity generation facility. Seawater is heated in a “brine heater” and proceeds to another receptacle, called a stage, where it immediately boils (flash) due in part to the ambient pressure. The steam yielded is the condensed on heat exchanger tubes that in turn heat up the incoming water, thereby decreasing the amount of thermal energy needed to heat the feed water.
MW	Megawatt = 1 million watts (capacity)
MWh	Megawatt Hour, 1 million watts in 1 hour (electrical energy)
n-1 policy or criteria	The supply system must be maintained stable during and after the disturbance in the system resulting in the loss of one generating unit or one circuit of transmission lines, as well as no loss of load is allowed.
NGL	Natural Gas Liquid(s)
NODCO	Qatar's National Oil Distribution Company
NWRMDS	National Water Resources Management and Development Strategy, a study sponsored by PWRC
PASS-OUT	Pass-Out: Refers to the steam passed out from combined-cycle gas turbines (CCGT). The pass-out steam from the steam turbine can be used to meet on-site heat requirements increasing overall efficiencies. This lowers electricity production, but improves overall economics.
Power Factor	The $\cos\varphi$, where φ is the angle between the current and voltage. Rated Power Factor = The minimum power factor at which a generator can supply the rated active power. The ratio of Active over Apparent Power (a typical value is around 0.9). The power factor can vary from customer to customer, as it depends on the electrical characteristics of the customer’s installed equipment.
PPA	Power Purchase Agreement
PWPA	Power & Water Purchase Agreement
P/S or PS	PowerStation: A power station (also referred to as generating station or power plant) is a facility for the generation of electric power. 'Power plant' is also used to refer to the engine in ships, aircraft and other large vehicles. Some prefer to use the term energy centre because it more accurately describes what the plants do, which is the conversion of other forms of energy, like chemical energy, gravitational potential energy or heat energy into electrical energy. Not all thermal energy can be transformed to mechanical power, according to the second law of thermodynamics. Therefore, there is always heat lost to the environment. If this loss is employed as useful heat, for industrial processes or district heating, the power plant is referred to as a cogeneration power plant or CHP (combined heat-and-power) plant. In countries where district heating is common, there are dedicated heat plants called heat-only boiler stations. An important class of power stations in the Middle East uses by-product heat for desalination of water.
PWRC	Permanent Water Resources Committee, an organization that plans and oversees security & sustainability of water supply in Qatar
QAFAC	Qatar Fuel Additives Company Limited
QAFCO	Qatar Fertilizer Company
QAPCO	Qatar Petrochemicals Company
QASCO	Qatar Steel Company
Q-Chem	Qatar Chemical Company, Ltd.
QNCC	Qatar National Cement Company

Abbreviation	Description
QVC	Qatar Vinyl Company, Ltd.
QEWC	Qatar Electricity and Water Company, one of the independent power producers (IPP's) in Qatar, supplying KAHRAMAA
QTS	Qatar Power Transmission System, one of the independent power producers (IPP's) in Qatar, supplying KAHRAMAA
RAA	Ras Abu Aboud, an area south of Doha
RAF	Ras Abu Fontas, an area south of Doha
RL	Ras Laffan, an area north of Doha
UHP	Umm Al Houl Power
RLPC	Ras Laffan Power Company, one of the independent power producers (IPP's) in Qatar, supplying KAHRAMAA
RO	Reverse Osmosis s used to reduce dissolved solids from feed waters with salinities up to 45,000 ppm TDS (total dissolved solids). Municipalities and industrial facilities are able to use RO permeate as a consistently pure drinking water supply and to transform drinking water to high purity water for industrial use at microelectronics, food and beverage, power, and pharmaceutical facilities. The technology is also very effective at removing bacteria, pyrogens, and organic contaminants.
S/S or SS (Substation)	Substation – normally refers to electrical power substation.An electrical power substation is a subsidiary station of an electricity generation, transmission and distribution system where voltage is transformed from high to low or the reverse using transformers.
SCADA	Supervisory Control & Data Acquisition System SCADA refers to a system that collects data from various sensors at a factory, plant or in other remote locations and then sends this data to a central computer which then manages and controls the data. SCADA is a term that is used broadly to portray control and management solutions in a wide range of industries. Some of the industries where SCADA is used are Water Management Systems, Electric Power, Traffic Signals, Mass Transit Systems, Environmental Control Systems, and Manufacturing Systems.
TA	Technical Affairs: Directorate level business unit in KAHRAMAA that manages large electricity and water network expansion and maintenance projects.
Transmission Substation	A transmission substation's main purpose is to connect together various transmission lines.The simplest case is where all transmission lines have the same voltage. In such cases, the substation contains high-voltage switches that allow lines to be connected together or isolated for maintenance.Transmission substations can range from simple to complex. A small "switching station" may be little more than a bus plus some circuit breakers. The largest transmission substations can cover a large area (several acres/hectares) with multiple voltage levels, and a large amount of protection and control equipment (capacitors, relays, switches, breakers, and voltage and current transformers).

<table>
<tr><th>Abbreviation</th><th>Description</th></tr>
<tr><td>Watt, W</td><td>The watt (symbol: W) is the SI derived unit of power, equal to one joule per second. A human climbing a flight of stairs is doing work at the rate of about 200 watts. A first class athlete can work at up to approximately 500 watts for 30 minutes. An automobile engine produces mechanical energy at a rate of 25,000 watts (approximately 30 horsepower) while cruising. A typical household incandescent light bulb uses electrical energy at a rate of 40 to 100 watts. The watt is named after James Watt for his contributions to the development of the steam engine, and was adopted by the Second Congress of the British Association for the Advancement of Science in 1889 and by the 11th Conference Générale des Poids et Mesures in 1960.

SI multiples
<table><tr><th>Multiple</th><th>Name</th><th>Symbol</th></tr><tr><td>10^{0}</td><td>watt</td><td>W</td></tr><tr><td>10^{1}</td><td>decawatt</td><td>daW</td></tr><tr><td>10^{2}</td><td>hectowatt</td><td>hW</td></tr><tr><td>10^{3}</td><td>kilowatt</td><td>kW</td></tr><tr><td>10^{6}</td><td>megawatt</td><td>MW</td></tr><tr><td>10^{9}</td><td>gigawatt</td><td>GW</td></tr><tr><td>10^{12}</td><td>terawatt</td><td>TW</td></tr></table></td></tr>
<tr><td>Waste heat</td><td>Waste heat refers to heat produced by machines and technical processes for which no useful application is found, and is regarded as a waste by-product.The electrical efficiency of thermal power plants, defined as the ratio between the primary product and input energy, ranges from 30 to 70%. It is often difficult to find useful application for large quantities of low quality heat, so the heat is qualified as waste heat and is rejected to the environment.</td></tr>
<tr><td>Well field</td><td>Multiple borings into the ground 30 meters deep or deeper to extract water deposits.</td></tr>
<tr><td>WNA</td><td>Water Network Affairs: Directorate level business unit in KAHRAMAA that takes care of water reservoirs & network expansion and maintenance.</td></tr>
<tr><td>Air Conditioning</td><td>“Air Conditioning” means the process of treating air to simultaneously control its temperature, humidity, and cleanliness and distribution of this air to meet the requirements of the conditioned space.</td></tr>
<tr><td>District Cooling</td><td>“District Cooling” means the centralized production and distribution of Cooling Energy in the form of Chilled Water from a central chiller plant to multiple Buildings through a network of underground pipes.</td></tr>
<tr><td>DC Plant</td><td>“DC Plant” means the plant, including pumping stations, chillers, TES facilities, Cooling Towers, associated electrical substations, emergency power supply equipment, systems control, switchgear, electrical installation auxiliary equipment, piping and other installations and ancillary equipment, used or useful in the production of Cooling Energy and the distribution of Chilled Water, operated and maintained for purposes of supporting the provision of DC Provider Services, to be installed on a DC Plot.</td></tr>
<tr><td>DC Provider</td><td>“DC Provider” means an entity which generates and distributes Cooling Energy by means of Chilled Water using a DC System.</td></tr>
<tr><td>Ton of Refrigeration “(TR)”</td><td>“Ton of Refrigeration “(TR)” or means ton of refrigeration, a unit used to measure instantaneous Cooling Load, which is equivalent to 12,000 BTUs per hour (3,514 Watts).</td></tr>
<tr><td>Treated Sewage Effluent”(TSE)</td><td>“Treated Sewage Effluent” (TSE) An environmentally safe fluid waste stream which has been treated to standards required for its various uses (i.e. made fit-for-purpose) and made available by Ashghal.</td></tr>
<tr><td>GST</td><td>Ground Storage Tank. Used for water storage.</td></tr>
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