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

ANNUAL STATISTICS REPORT 2020

Statistic Report 2019

Qatar General Electricity & Water Corporation “KAHRAMAA”

Prepared by: Planning & Quality Department
in collaboration with KAHRAMAA Departments

Production : Public Relations & Communication Departement

KAHRAMAA Publications
2021©

His Highness

Sheikh Tameem Bin Hamad Al-Thani

Emir of the State of Qatar

Table of Contents

MINISTER'S FOREWORD

Qatar continues to rise as one of the world's most dynamic and fastest growing economies to achieve phenomenal GDP increase. The National Vision 2030 guides the country's growth. The government is committed to creating a dynamic, competitive and broad-based economy by increasing economic diversification through the re-investment of Qatar's significant energy wealth. The outcome is evident in the rapid changes and urbanization during the last decade, brought about by wise national economic planning, stable state revenues and Qatar's vision of shaping Doha as a world-scale metropolis. This means continued buoyancy for the private sector in Qatar, and a surge in economic activities in infrastructure creation and building of civic amenities. Large opportunities for investment and energy trade are present, coupled with continuing lifestyle improvement, development of telecommunications, information technology, knowledge economy, renewable resources and business efficiency. Qatar's rapid public infrastructure expansions and real estate development are driving the continual population growth,

H.E. SAAD SHERIDA AL-KAABI
Minister of State for Energy Affairs

primarily due to the need for more expatriate manpower. Large scale investments in transport, communications, tourism, sports facilities and other services are in progress.

Continuing industrialization largely due to the oil and gas sector and rapid urbanization has generated increased demand for major improvements and expansion of basic infrastructure and services most notably electricity and water. Qatar's preparations to host the 2022 FIFA World Cup add more challenges to the readiness of Kahramaa. The Qatar National Development Strategy-II (NDS2) is providing the overarching framework and impetus for KAHRAMAA's efforts to ensure quality services, whilst ensuring sustainability of electricity and water production and consumption.

The relatively lesser effect due to global pandemic situation in 2020 has revealed the strength and diversity of Qatar's economy, which is evident by the admirable performance of economic indicators, as seen in the energy and water sectors.

Peak electricity demand in 2020 was 8,600 MW, grew by 1.5% as compared to 2019. Total energy transmitted in 2020 was 45,826 GWh, -1.3 % over 2019. The system maximum demand was 443 MIGD, increased by 5% as compared to 2019. Total water Forwarded in 2020 was 673 million cubic meters, an increase by 3.9% over 2019.

KAHRAMAA is implementing strategic planning and transformation program to enhance customer services, meet demand growth, improve business efficiency and strengthen its workforce. Kahramaa continued vision is to transform itself into self-sustaining business, providing high quality and sustainable electricity and water by diversifying energy sources such as solar energy for better living in Qatar.

Thanks are due to His Highness, Sheikh Tamim Bin Hamad Al Thani, the Emir of the State of Qatar for his extensive support for KAHRAMAA business development, thus contributing towards the prosperity of the State of Qatar. Thanks are also due to all KAHRAMAA employees for their efforts towards achieving KAHRAMAA's objectives and enabling KAHRAMAA in achieving much success in 2020 and beyond.

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 National 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

Essa Bin Hilal Al-Kuwari
KAHRAMAA President

influence the lifestyle of Qatar's residents in domestic consumption, as well as implement water and electricity saving technologies. Along with this effort Kahramaa is developing 700 MW of electricity from solar energy, and has implemented alternative potable water production techniques such as reverse osmosis.

Despite the COVID-19 situation since last one year, the State of Qatar has maintained adequate supply of electricity and water, reinforced by reliable and efficient transmission and distribution network across the country.

To align with Qatar National Vision (QNV 2030), Qatar National Development Strategy-II (NDS2 2018-2022) and Qatar Water Strategy (QWS), Kahramaa continues to pursue its long term road map towards its vision to become world class utility via the following 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 the people of Qatar, and the quality of their environment. Kahramaa 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 pursues its long term strategy upto 2030 to become a customer centric organization by adopting leading global practices for customer services in the utility sector. It also seeks financial sustainability, which will be achieved with increased revenues and reduction in financial support from Government. Continual progress is being made to preserve the distinguished position that Kahramaa has reached to build the state economy by innovation and transformational initiatives.

Despite prevailing pandemic challenges, Kahramaa continues its successful march towards excellence. 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 and other stakeholders. 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.

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.

	2015	2016	2017	2018	2019	Average % Change
A. ELECTRICITY						
Generated, GWh	42,307	45,555	47,913	49,873	49,259	**3.51%**
% Change	1.9%	7.6%	5.2%	4.1%	-1.2%	
Sent Out, GWh	39,668	42,806	44,655	46,435	45,826	**3.38%**
% Change	2.1%	7.9%	4.3%	3.9%	-1.3%	
Maximum Demand, MW	7,435	7,855	7,875	8,475	8,600	**3.45%**
% Change	2.3%	5.6%	0.3%	7.6%	1.5%	
No. of customers (billed & non-billed, based on number of meters)	344,445	364,597	376,636	410,661	433,751	**5.68%**
% Change	4.6%	5.9%	3.3%	9.0%	5.6%	
B. WATER						
Water Production Mm3	560	606	637	671	691	5.26%
% Change	5.1%	7.7%	5.1%	**5.4%**	**3.0%**	
Maximum Production, Mm3/Day	1.64	1.78	1.84	1.98	2.06	**5.33%**
% Change	3.1%	8.5%	3.4%	7.6%	4.0%	
No. of Water customers (billed & non-billed, metered plus served by water tankers)	297,261	317,215	329,832	363,338	382,932	**6.68%**
% Change	**7.0%**	**6.7%**	**4.1%**	**10.2%**	**5.4%**	

The average growth of peak demand for electricity and water are growing at about 4-5% which highlights steady 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.

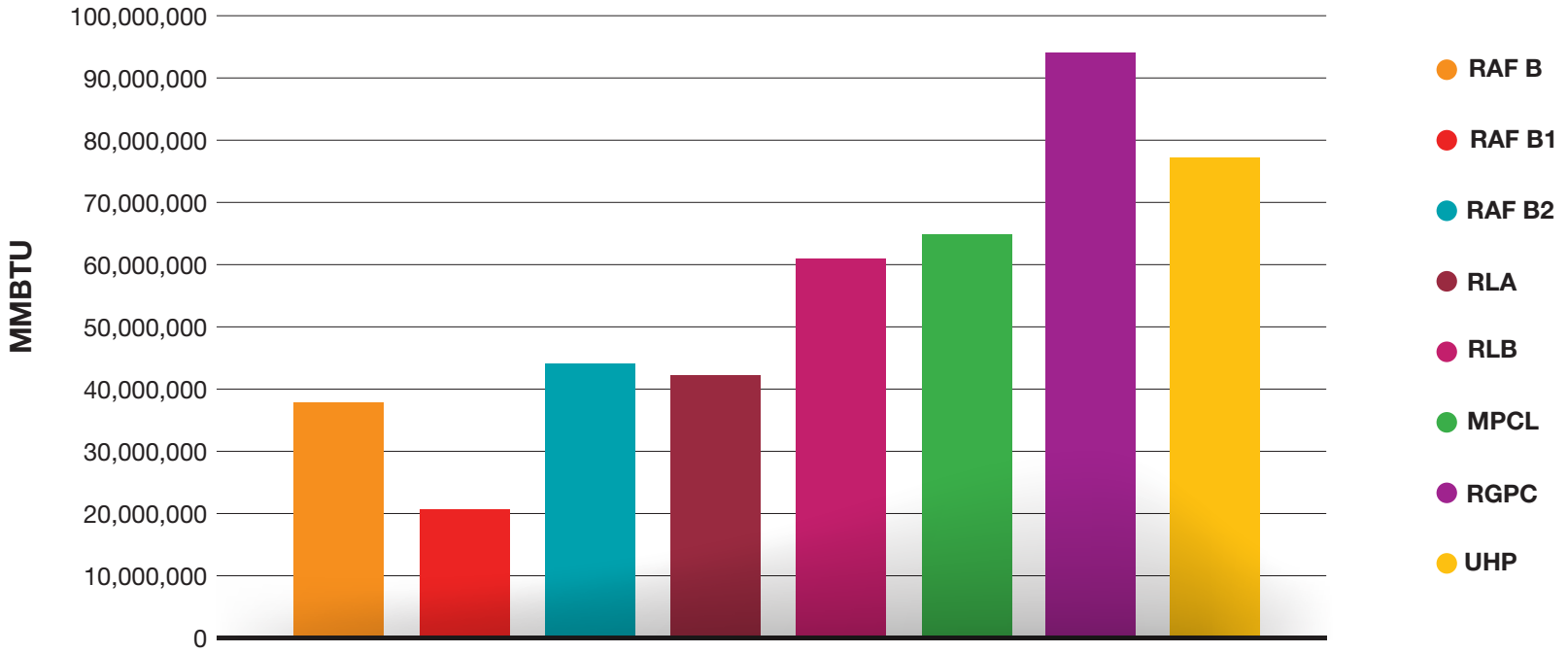
Some of the key projects are given below.

- Additional Capacity from IWPPs – Facility E (In Progress)
- Solar Power project of 700 MW (In Progress)
- Advanced Metering Infrastructure- AMI (In Progress)
- Installation of Electricity & Water SMART Meters (In Progress)
- Billing and Customer Relationship Management Project (In Progress)
- Qatar Power Network Expansion- Phase 12, 13 & additional projects (In Progress)
- Water Mega Reservoirs- Pipelines & Network (In Progress)
- Water Mega Reservoirs- Primary Reservoir Pumping Stations (In Progress)

EWT3 GAS CONSUMPTION BY IWPP (MMBTU) IN 2020

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	2,842,211	2,327,879	3,303,112	3,520,069	4,618,967	2,053,856	4,622,142	5,136,426	**28,424,662**
Feb	2,664,172	2,211,581	2,583,112	3,110,882	3,916,557	1,782,426	5,000,175	5,267,360	**26,536,265**
Mar	3,205,334	2,621,815	3,669,677	3,968,461	4,041,646	2,376,582	5,948,882	4,333,481	**30,165,877**
Apr	3,024,289	3,146,988	4,777,831	3,881,924	4,235,825	3,053,335	6,671,534	4,515,279	**33,307,005**
May	2,956,690	2,414,473	3,667,830	3,808,791	5,334,086	7,284,788	7,454,063	5,919,767	**38,840,488**
Jun	3,105,331	2,853,710	4,229,023	3,719,247	5,777,546	8,557,349	9,654,936	6,932,023	**44,829,165**
Jul	3,959,881	3,067,896	4,663,261	4,338,809	5,747,576	9,080,586	11,244,293	8,477,302	**50,579,605**
Aug	3,978,391	3,131,794	4,748,729	3,782,893	5,860,285	8,639,795	10,481,948	9,427,730	**50,051,566**
Sep	3,821,423	3,127,343	4,341,853	4,315,139	5,207,224	8,638,285	9,282,645	7,946,209	**46,680,122**
Oct	3,362,561	3,059,103	3,298,412	3,697,154	5,869,026	6,662,375	7,781,534	6,717,201	**40,447,365**
Nov	2,989,619	2,059,477	3,101,757	3,139,520	5,357,320	4,088,761	6,553,625	5,700,518	**32,990,597**
Dec	3,144,329	2,162,933	3,025,531	3,142,804	4,241,635	1,918,438	5,839,102	5,735,167	**29,209,938**
Total	**39,054,232**	**32,184,992**	**45,410,128**	**44,425,692**	**60,207,694**	**64,136,576**	**90,534,879**	**76,108,462**	**452,062,655**

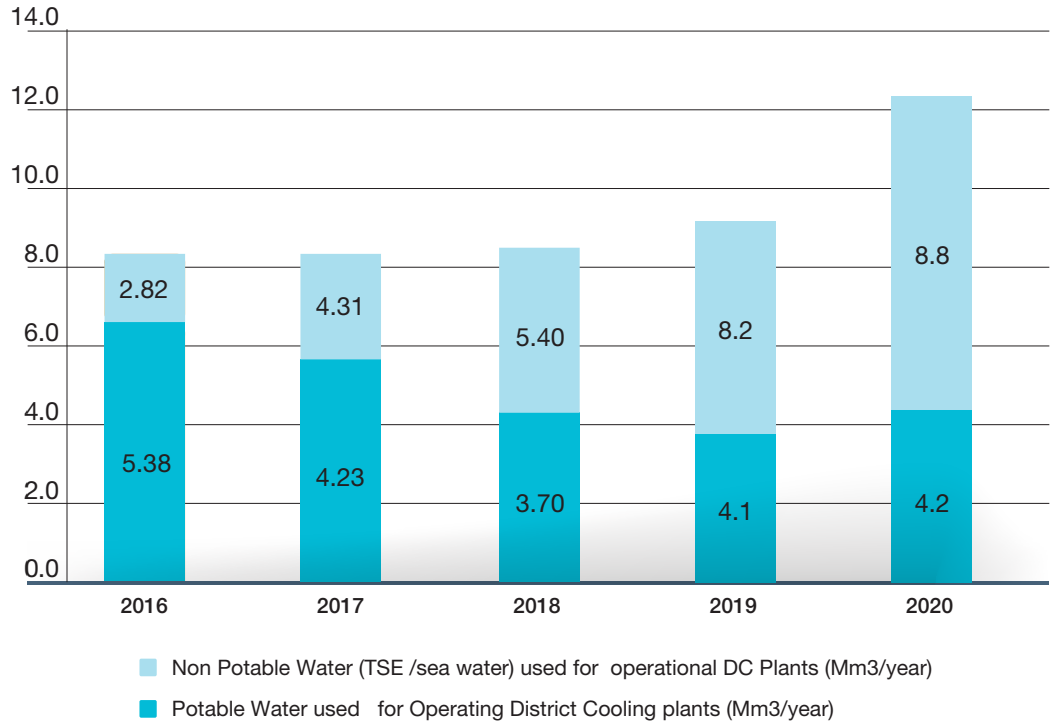
Gas consumption by IPPs in year 2020



EWT4 NON-POTABLE WATER USED IN DISTRICT COOLING

Year	2016	2017	2018	2019	2020
Potable Water used for Operating District Cooling plants (Mm3/year)	5.38	4.23	3.70	4.1	4.2
Non Potable Water (TSE /sea water) Used for operational DC Plants (Mm3/year)	2.82	4.31	5.40	8.2	8.8
Total Makeup Water demand for Cooling (Mm3/year)	8.2	8.54	9.1	12.3	13.0

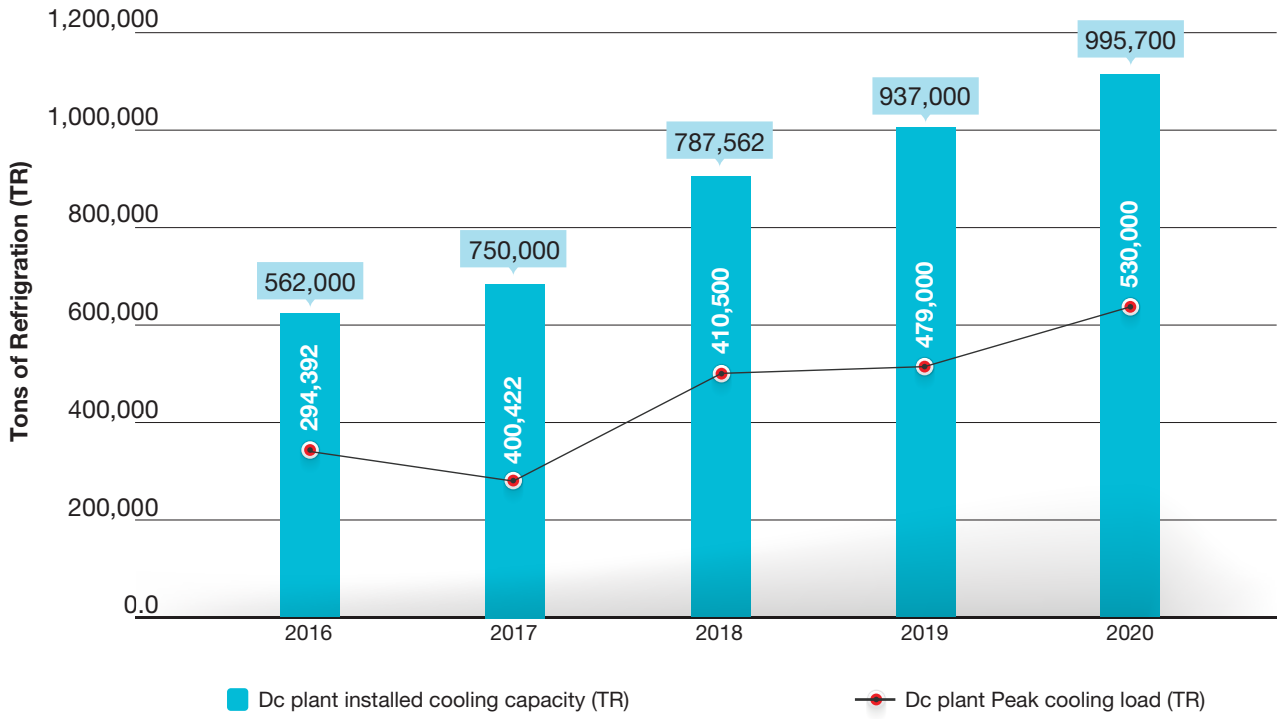
Make up Water used for Operational Distrcit Cooling Plants (Mm3) in Years (2016-2020)



EWT5 OPERATIONAL PEAK DISTRICT COOLING LOAD IN YEARS 2016-2020

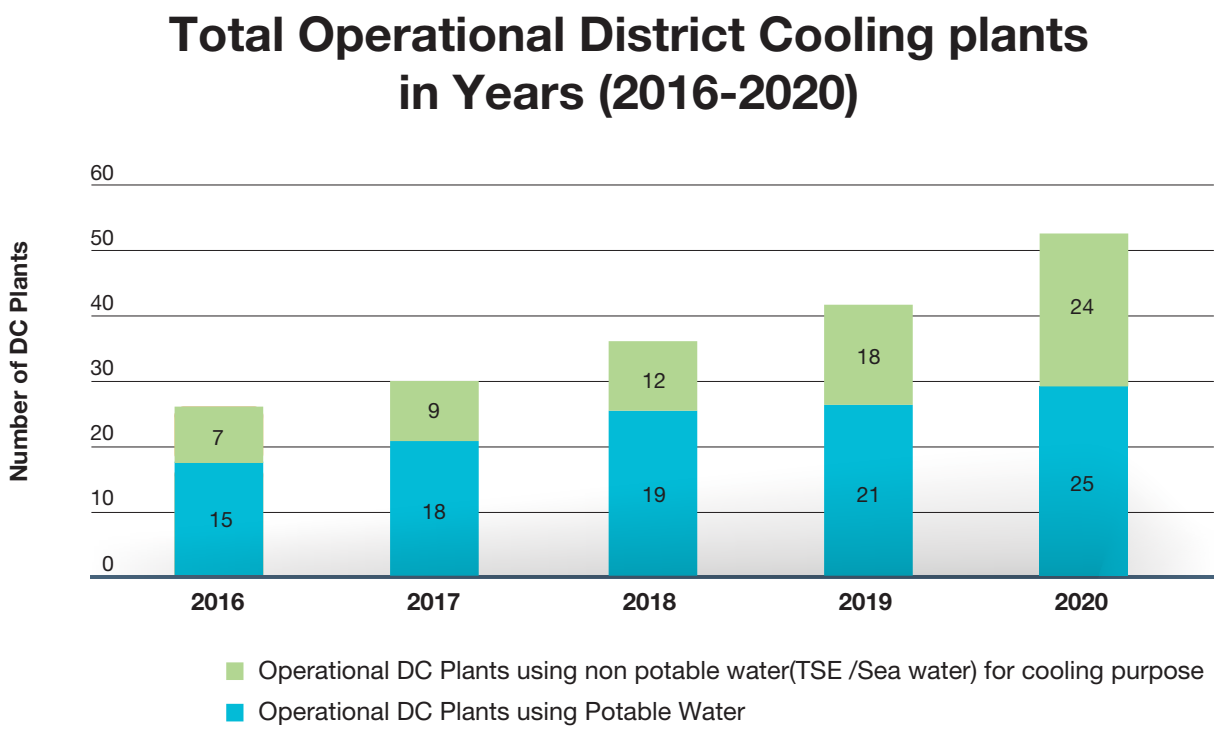
Year	2016	2017	2018	2019	2020
DC plant Peak Cooling Load (TR)	294,392	400,422	410,500	479,000	530,000
DC plant Installed Cooling Capacity (TR)	562,000	750,000	787,562	937,000	995,700

DC plant installed cooling capacity and peak load (TR) in years 2016- 2020



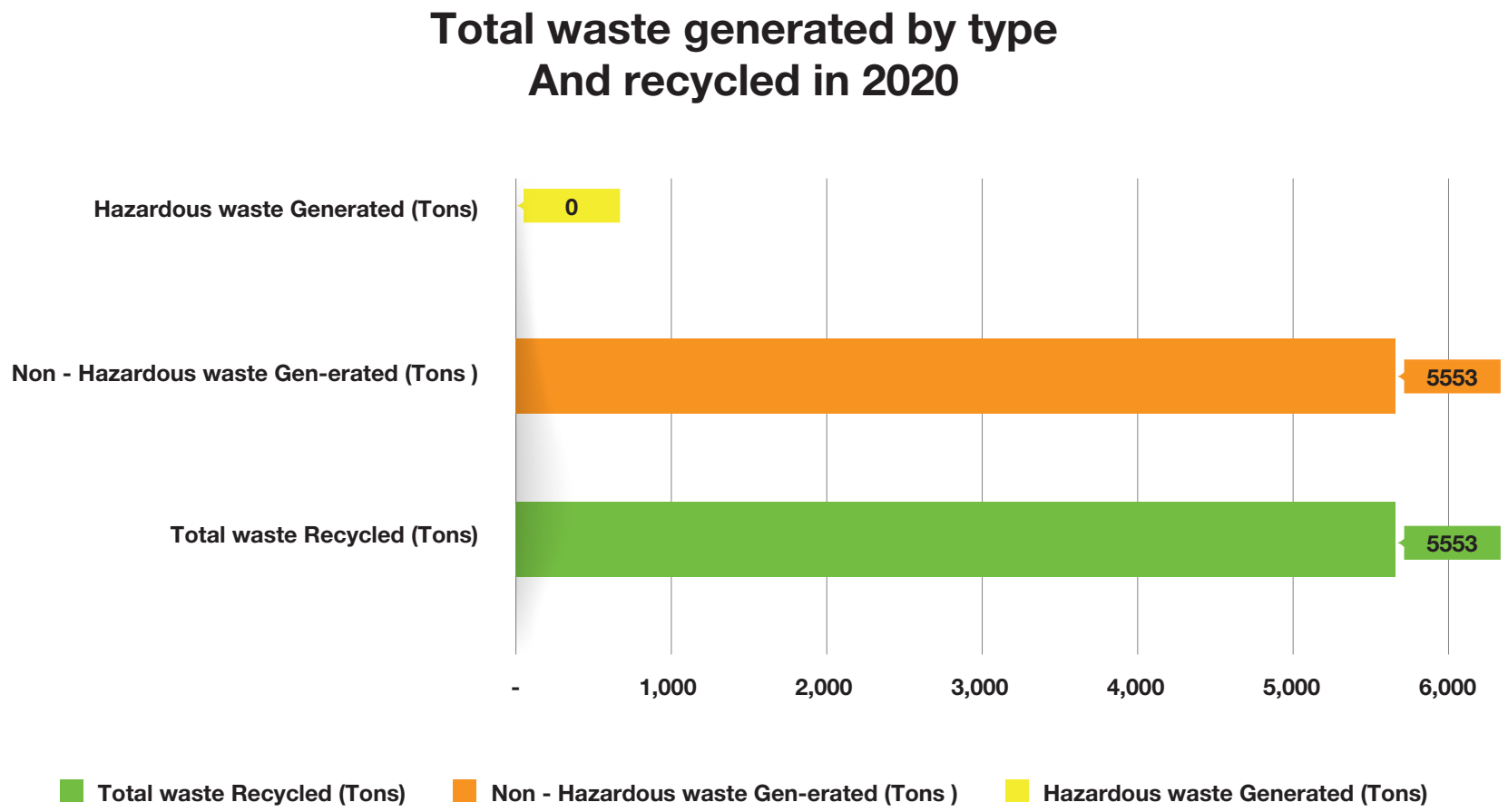
EWT6 OPERATIONAL DISTRICT COOLING PLANTS IN YEARS 2016-2020

Year	2016	2017	2018	2019	2020
Total Operational District Cooling plants	22	27	31	39	49
Number of operational DC Plants using non potable water(TSE /Sea water) for cooling purpose	7	9	12	18	24
Operational DC Plants using Potable Water	15	18	19	21	25



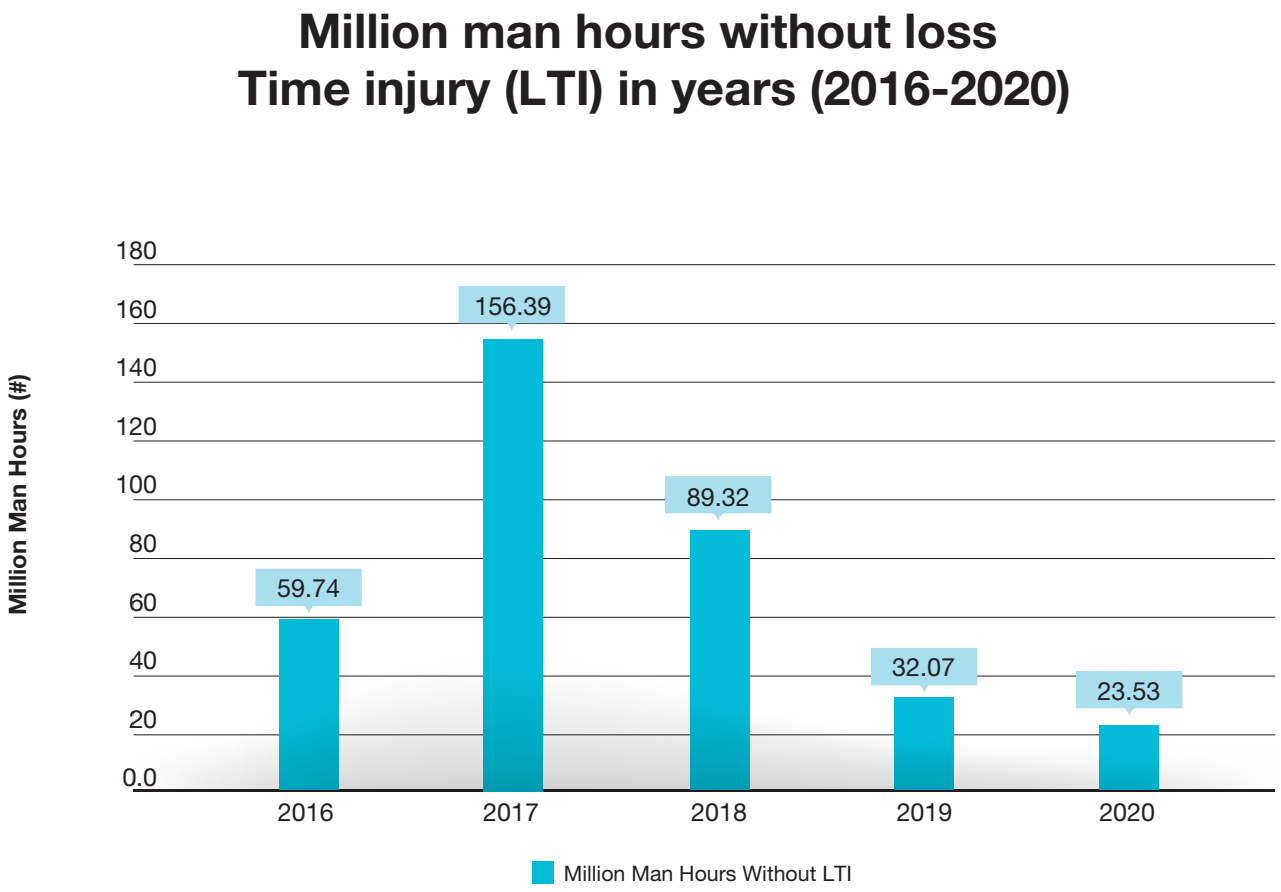
EWT7 TOTAL WASTE GENERATED BY TYPE AND RECYCLED IN 2020

Year 2020	Total waste Recycled* (Tons)	Non - Hazardous waste Generated (Tons)	Hazardous waste Geerated (Tons)
	5553	5553	0



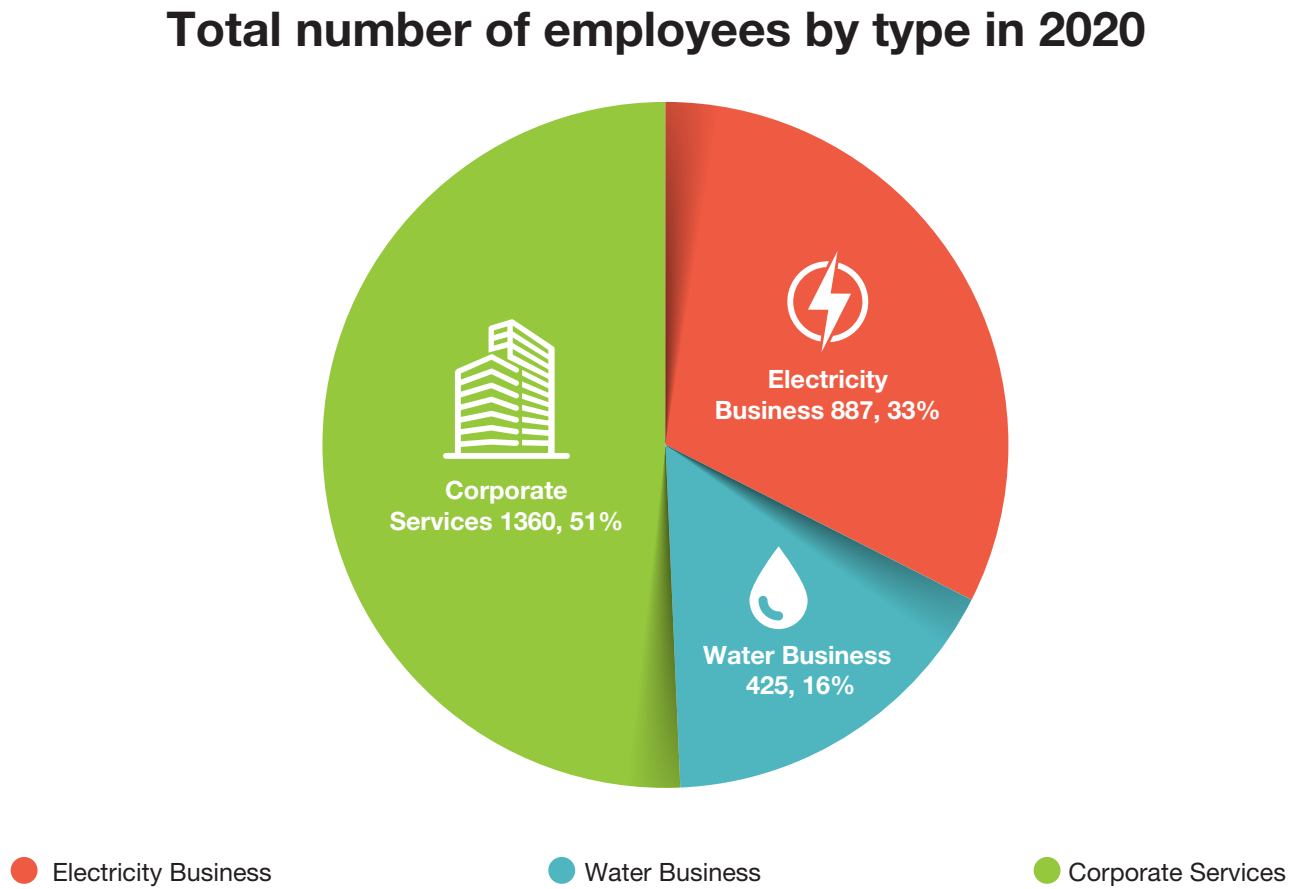
EWT8 MILLION MAN HOURS WITHOUT LTI IN YEARS (2016-2020)

Year	2016	2017	2018	2019	2020
Million Man Hours without LTI	59.74	156.39	89.32	32.07	23.53



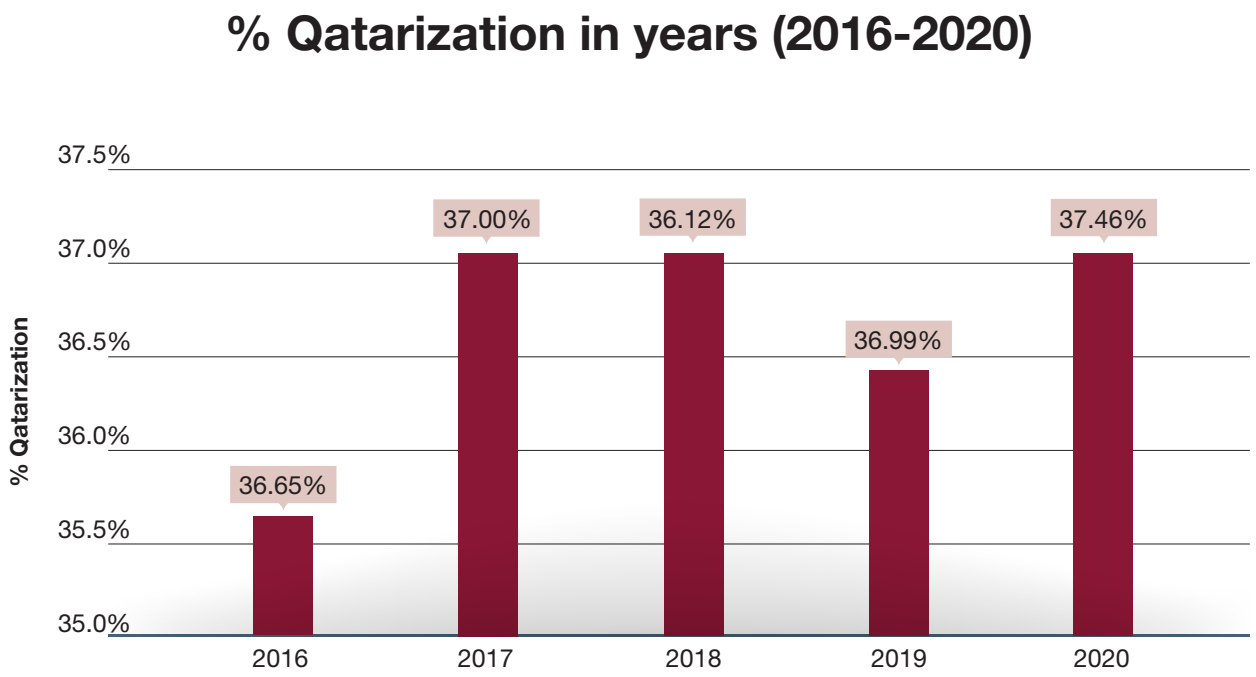
EWT9 TOTAL NUMBER OF EMPLOYEES BY TYPE IN 2020

Total Number of Employees by Type in 2020	Electricity Business	Water Business	Corporate Services
	887	425	1,360



EWT10 QATARIZATION IN LAST FIVE YEARS

% Qatarization	2016	2017	2018	2019	2020
	36.65%	37.00%	36.12%	36.99%	37.46%

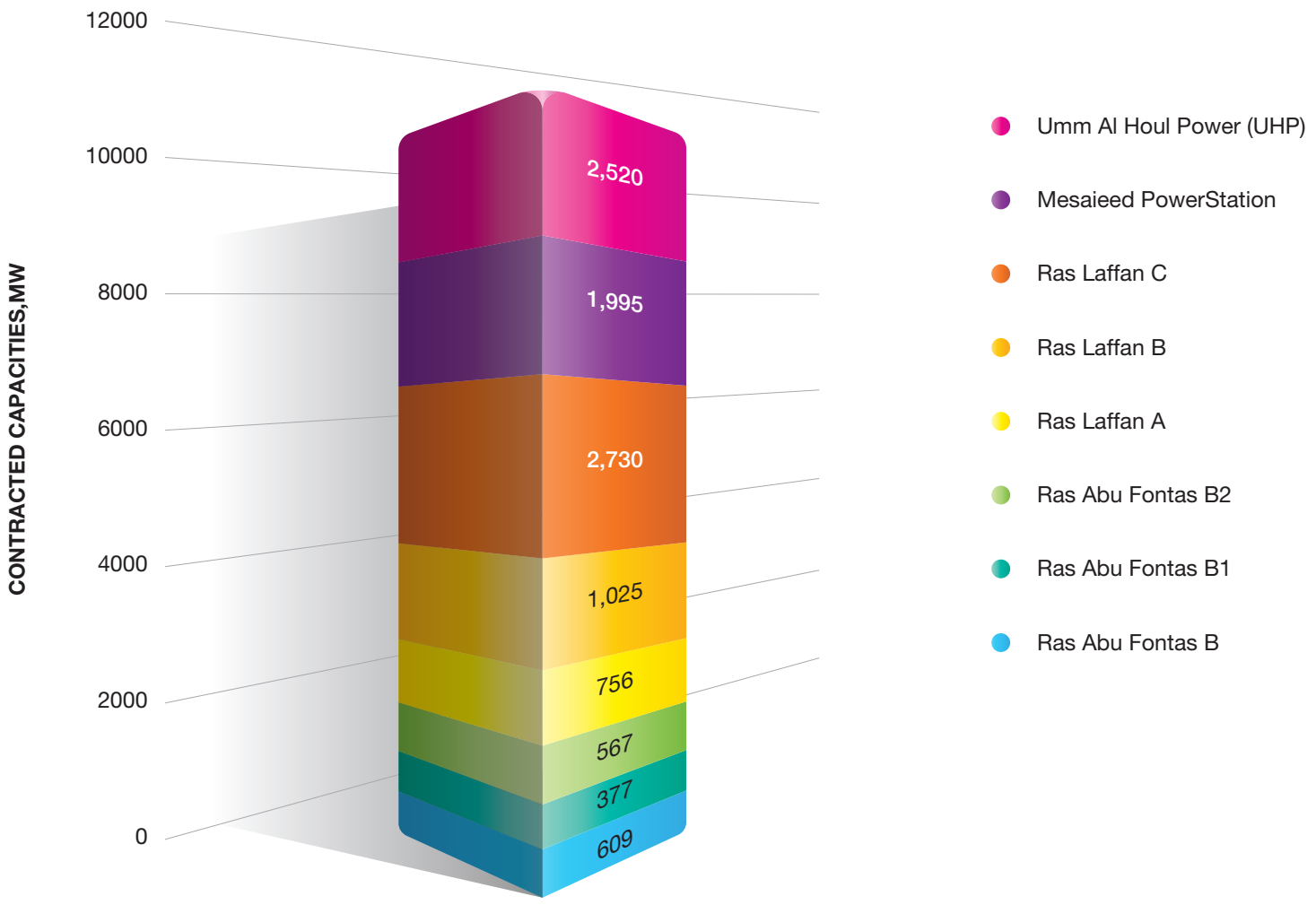


Electricity Statistics 2020

ET1 CONTRACTED CAPACITIES BY IWPPs

Independent Power & Water Producer	Contracted Capacity,MW
Qatar Electricity & Water Company	
Ras Abu Fontas B	609
Ras Abu Fontas B1	377
Ras Abu Fontas B2	567
Sub-Total	1,553
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	1,995
Umm Al Houl Power Company	
Umm Al Houl Power (UHP)	2,520
Total Capacity	**10,579**

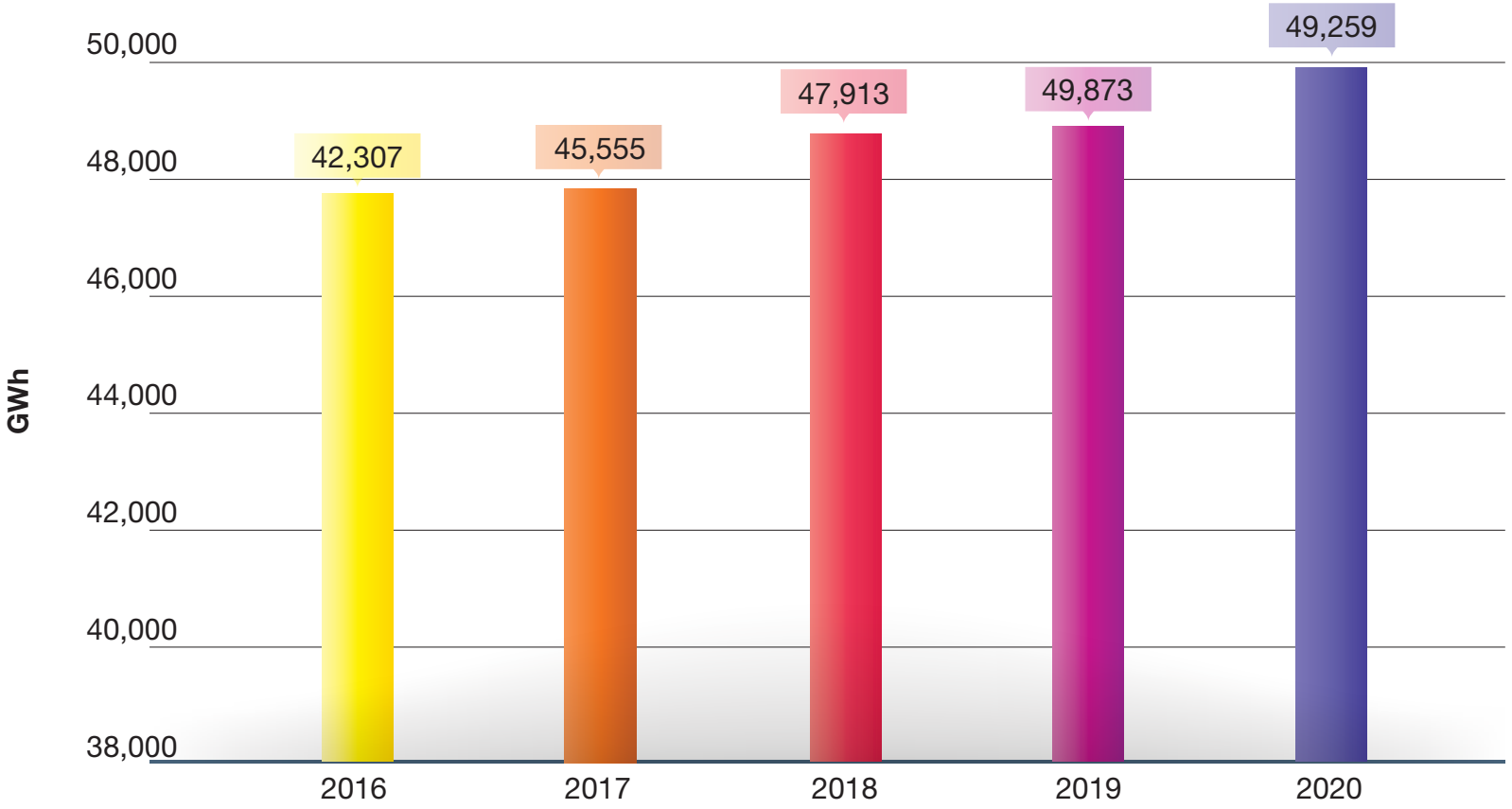
Electricity contracted capacity by iwpps in 2020



ET2 ANNUAL ELECTRICITY GENERATION (2016 – 2020)

Year	Annual Increase, %	GWh
2016	1.9%	42,307
2017	7.7%	45,555
2018	5.2%	47,913
2019	4.1%	49,873
2020	-1.2 %	49,259

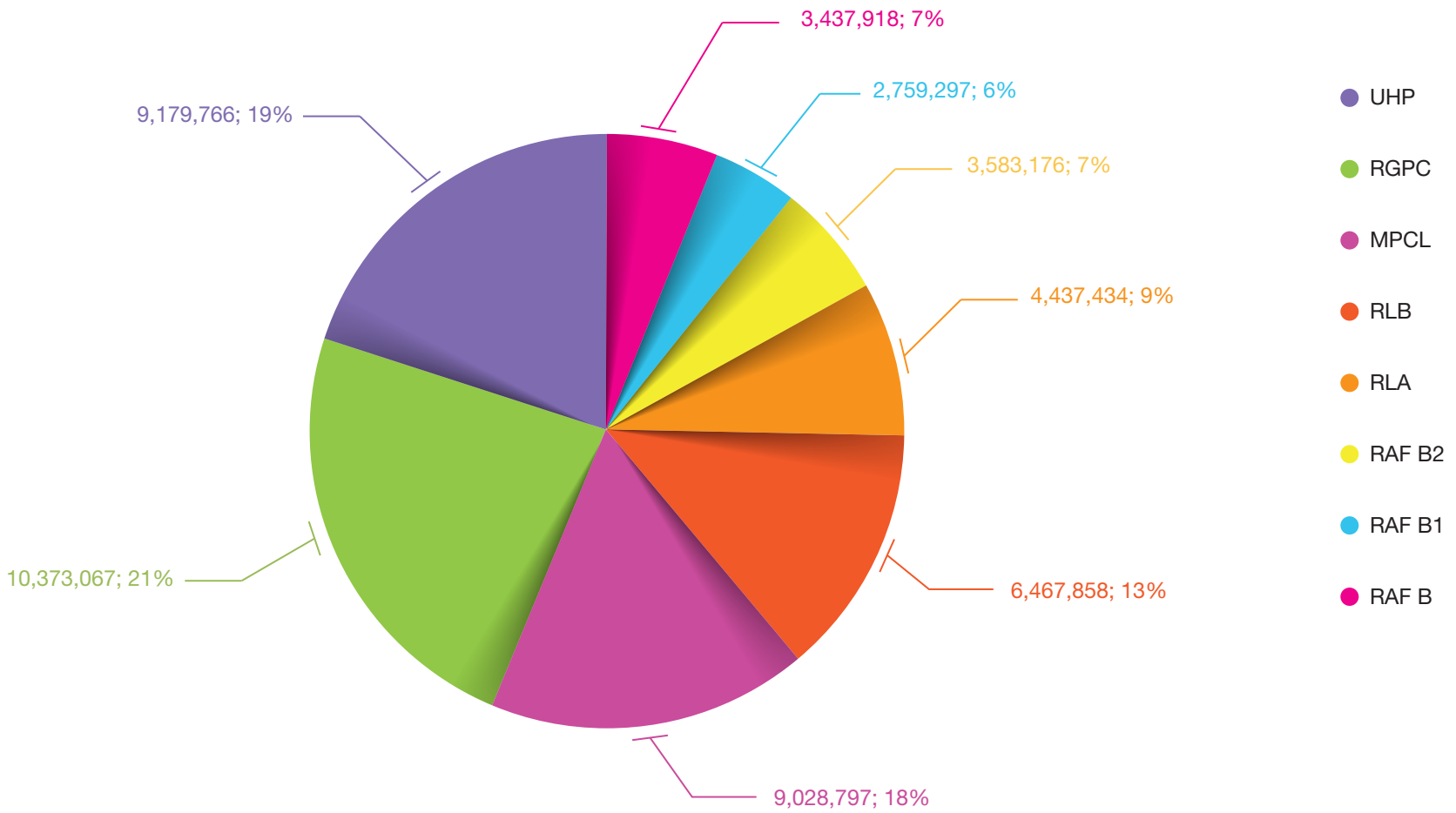
Electrcity generation (GWh) in years (2016-2020)



ET3 MONTHLY ELECTRICITY GENERATION IN 2020, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	236,912	202,841	255,180	362,525	479,852	283,356	482,860	567,399	**2,870,925**
Feb	220,742	195,290	194,787	330,822	403,678	242,826	527,467	585,796	**2,701,407**
Mar	274,938	230,878	287,080	397,266	418,779	331,790	618,396	506,488	**3,065,615**
Apr	274,005	247,744	374,709	378,627	445,177	424,975	738,077	544,952	**3,428,266**
May	273,406	199,030	281,522	354,246	580,091	1,027,425	875,293	687,748	**4,278,761**
Jun	272,731	238,588	330,563	345,280	643,192	1,216,769	1,153,499	850,397	**5,051,019**
Jul	347,889	274,082	379,360	456,829	624,307	1,285,031	1,369,128	1,094,275	**5,830,900**
Aug	353,290	271,297	380,706	358,118	646,077	1,225,553	1,289,101	1,211,194	**5,735,335**
Sep	339,331	262,937	338,725	431,846	577,647	1,218,239	1,118,656	1,021,937	**5,309,318**
Oct	297,214	269,263	260,071	349,849	646,695	935,093	893,851	809,535	**4,461,570**
Nov	267,922	177,943	252,184	330,741	578,275	569,008	707,573	655,567	**3,539,213**
Dec	279,538	189,406	248,289	341,283	424,090	260,377	599,166	644,479	**2,986,627**
Total	**3,437,918**	**2,759,297**	**3,583,176**	**4,437,434**	**6,467,858**	**9,020,441**	**10,373,067**	**9,179,766**	**49,258,957**

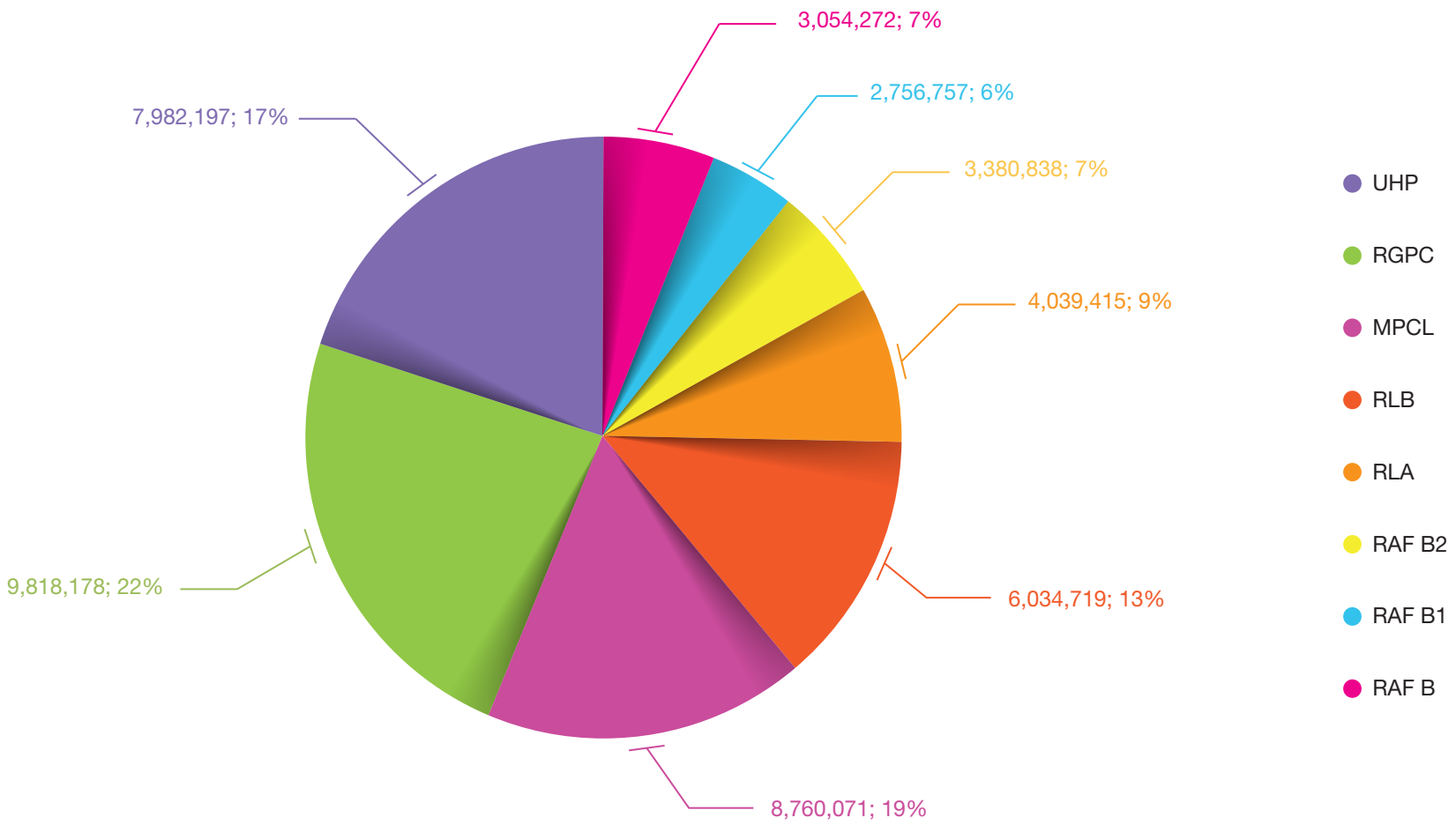
Electricity generation by iwpps in 2020 (MWh)



ET4 ENERGY TRANSMITTED IN 2020, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	207,091	202,652	242,906	330,216	445,010	273,722	455,041	474,425	**2,631,063**
Feb	193,556	195,115	183,640	303,299	373,574	234,601	492,545	494,867	**2,471,197**
Mar	243,157	230,676	269,775	364,202	387,887	321,286	576,876	424,874	**2,818,733**
Apr	242,132	247,513	353,978	345,888	413,593	411,905	695,498	477,496	**3,188,003**
May	241,152	198,847	263,242	321,453	542,192	997,773	828,040	585,423	**3,978,122**
Jun	241,037	238,362	311,353	314,017	603,267	1,183,443	1,099,720	743,748	**4,734,947**
Jul	314,338	273,836	358,192	403,684	583,289	1,250,238	1,309,846	979,592	**5,473,015**
Aug	317,777	271,042	359,601	326,649	604,913	1,191,873	1,231,006	1,093,510	**5,396,371**
Sep	304,881	262,691	320,084	399,804	542,177	1,184,667	1,063,631	910,818	**4,988,752**
Oct	262,935	269,014	244,116	317,457	606,445	908,027	844,358	701,175	**4,153,528**
Nov	238,374	177,781	238,037	301,040	540,337	551,667	663,659	555,123	**3,266,018**
Dec	247,842	189,228	235,914	311,706	392,035	250,869	557,958	541,145	**2,726,697**
Total	**3,054,272**	**2,756,757**	**3,380,838**	**4,039,415**	**6,034,719**	**8,760,071**	**9,818,178**	**7,982,197**	**45,826,447**

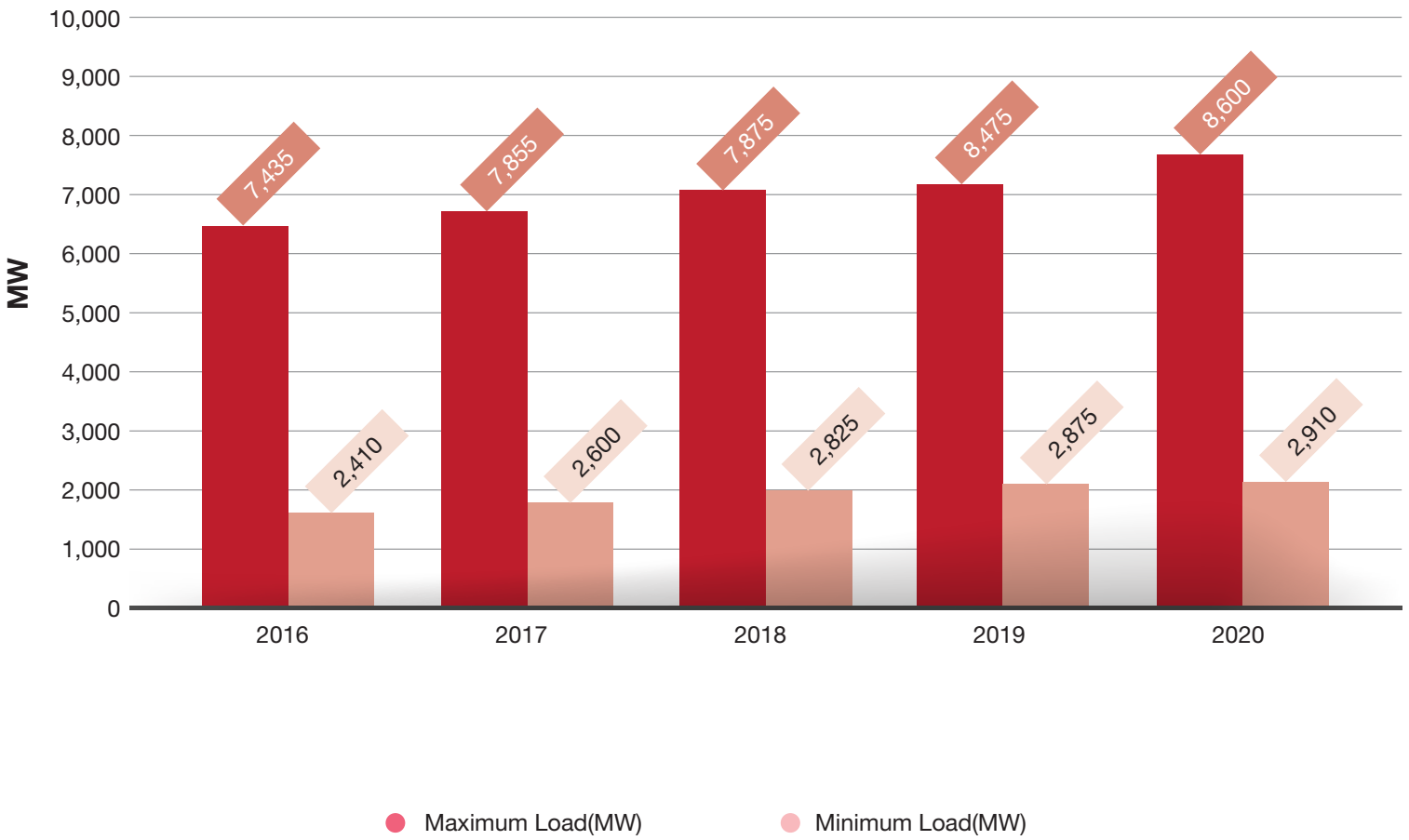
Electricity transmitted by IWPPs in 2020 (MWh)



ET5 MAXIMUM AND MINIMUM SYSTEM LOAD LAST FIVE YEARS, MW

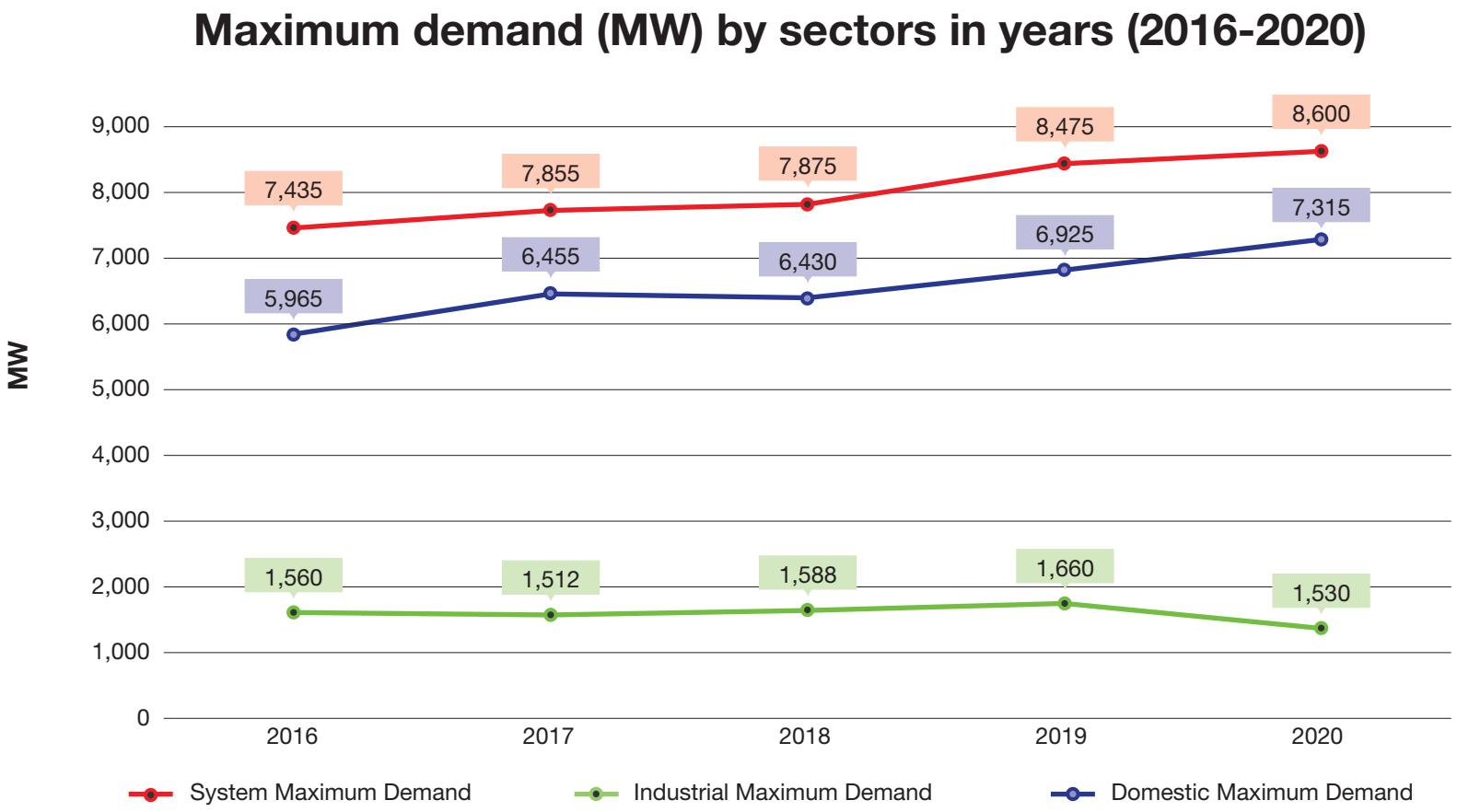
Year	Maximum Load (MW)	Maximum Load Date (mm/dd/yyyy)	Minimum Load (MW)	Minimum Load Date (mm/dd/yyyy)
2016	7,435	09/03/2016	2,410	01/19/2016
2017	7,855	08/14/2017	2,600	02/25/2017
2018	7,875	07/12/2018	2,825	01/21/2018
2019	8,475	09/02/2019	2,875	01/20/2019
2020	8,600	07/30/2020	2,910	02/15/2020

Maximum and minimum system load
In years (2016-2020)



ET6 MAXIMUM DEMAND BY SECTORS FROM 2016 TO 2020

Demand Type	2016	2017	2018	2019	2020
System Maximum Demand	7,435	7,855	7,875	8,475	8,600
Industrial Maximum Demand	1,560	1,512	1,588	1,660	1,530
Domestic Maximum Demand	5,965	6,455	6,430	6,925	7,315



ET7 SECTORAL MAXIMUM DEMANDS IN 2020, MW

Demand Type	Magnitude (MW)	Demand Date (mm/dd/yyyy)
System Maximum	8,600	07/30/2020
Industrial Maximum	1,530	01/27/2020
Domestic Maximum	7,315	07/22/2020

ET8 ANNUAL LOAD FACTORS IN 2020

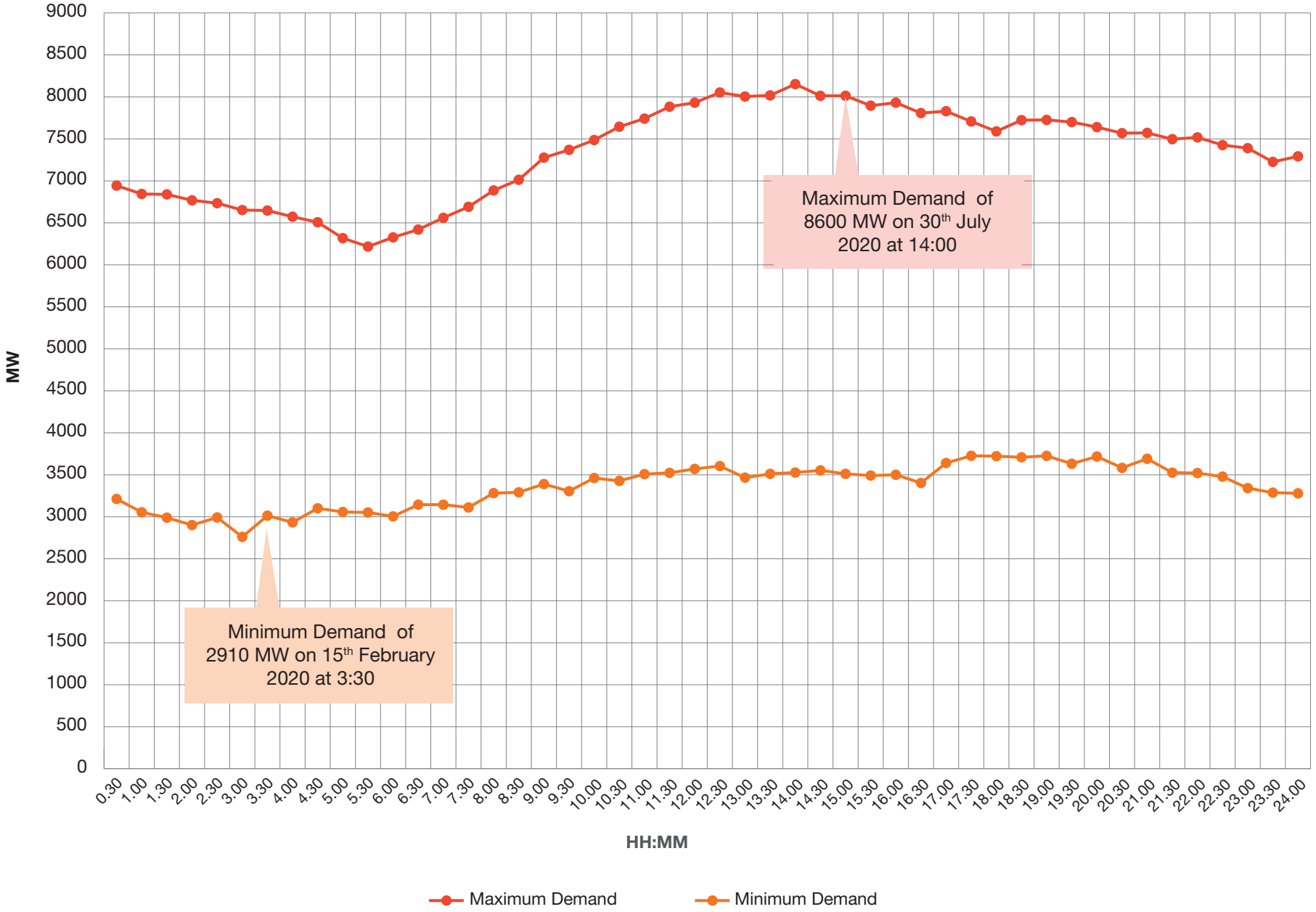
Demand Type	Load Factor, %
System Maximum	62.07%
Industrial Maximum	77.87%
Domestic Maximum	56.69%

* Note: Starting 2020, Load factors calculations have been revised by including assist generation which is captive generation from some of the bulk customers and auxiliary power from QEWC stations.

ET9 ANNUAL GROWTH (%) FROM 2019 TO 2020

Demand Type	Peak Demand (MW) Growth
System Maximum	1.5%
Industrial Maximum	-7.8%
Domestic Maximum	5.6%

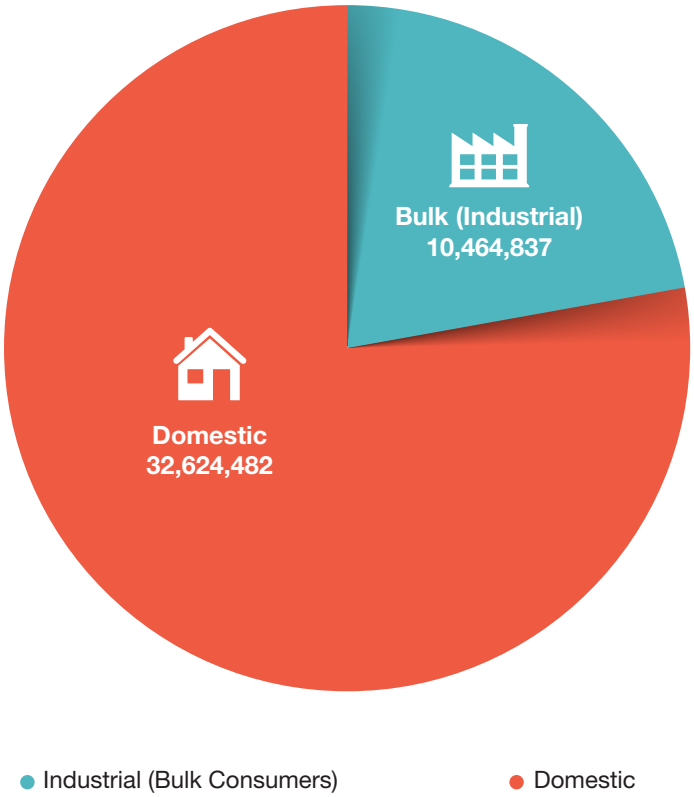
System maximum and minimum demand (MW)
Half hourly load curve in 2020



ET10 SECTORAL CONSUMPTION IN 2020, MWH

Sector	Bulk (Industrial)	Domestic	Auxiliary	Transmission and Distribution Losses	Total Injected Generation	Total Electricity Generation
Consumption, MWh -2020	10,464,837	32,624,482	3,433,881	2,774,269	46,446,036	49,258,957

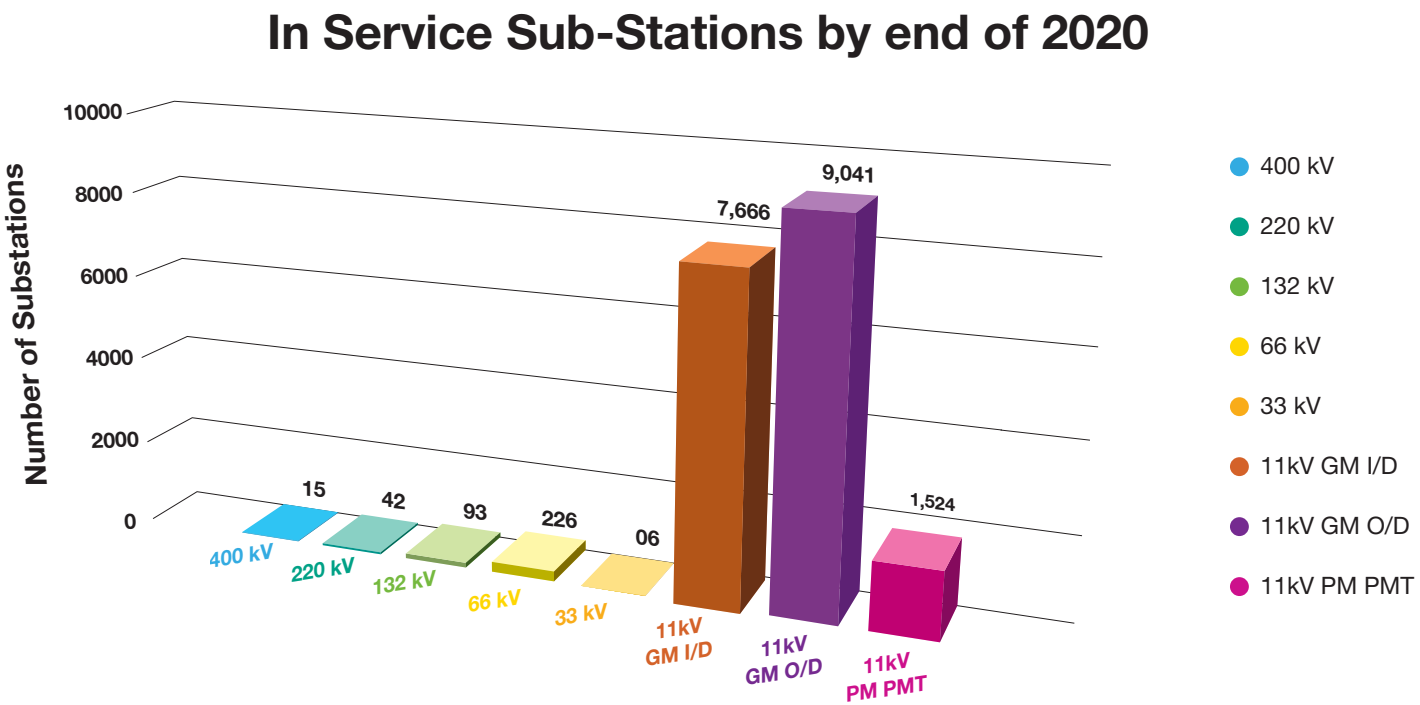
Sectorial consumption (MWh) in 2020



ET11 SUB-STATIONS

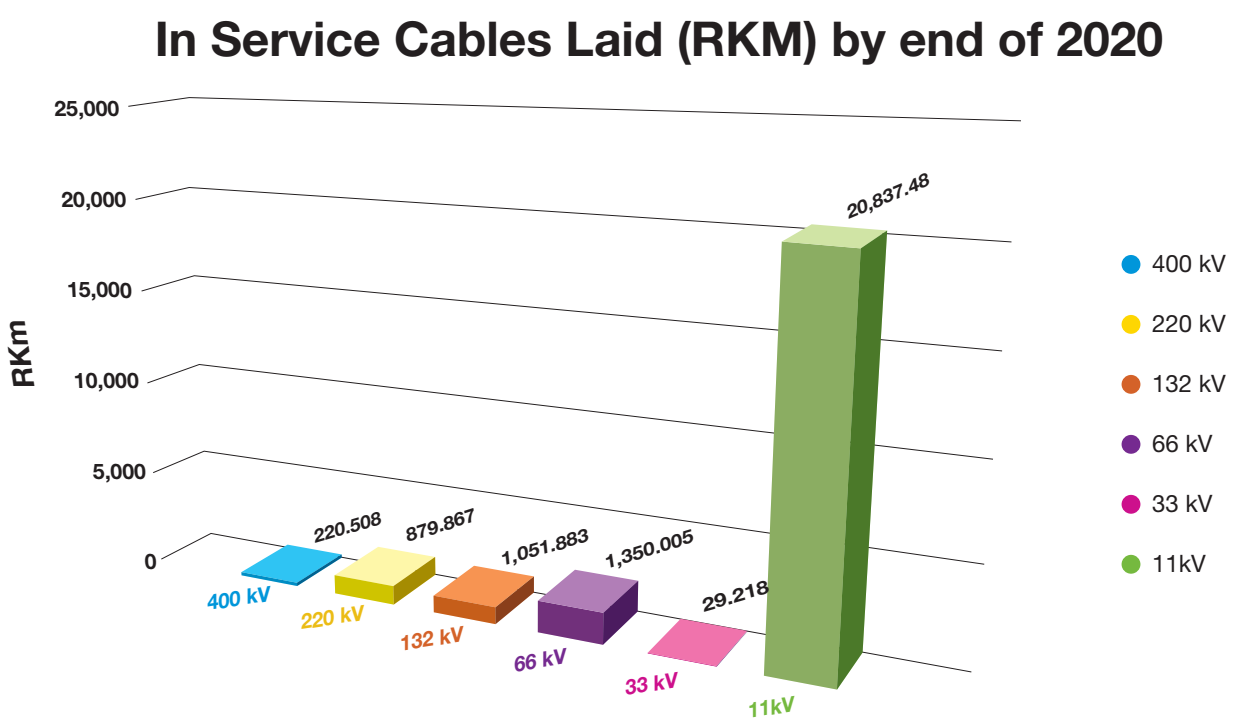
SUBSTATIONS	400 kV	220 kV	132 kV	66 kV	33 kV	11kV GM I/D	11kV GM O/D	11kV PM PMT
In service (as at 31/12/2015)	11	34	42	180	7	4,860	7,872	1,416
Commissioned -2016	0	2	7	6	0	375	579	38
Commissioned -2017	2	2	6	25	0	593	474	55
Commissioned -2018	1	1	17	14	0	599	413	58
Commissioned -2019	0	1	9	12	0	706	701	42
Commissioned -2020	1	2	18	7	1	558	424	71
***In service (as at 31/12/2020)**	15	42	93	226	6	7,666	9,041	1,524

*Note: Starting 2018, number of substations is based on those owned, operated and maintained by Kahramaa.



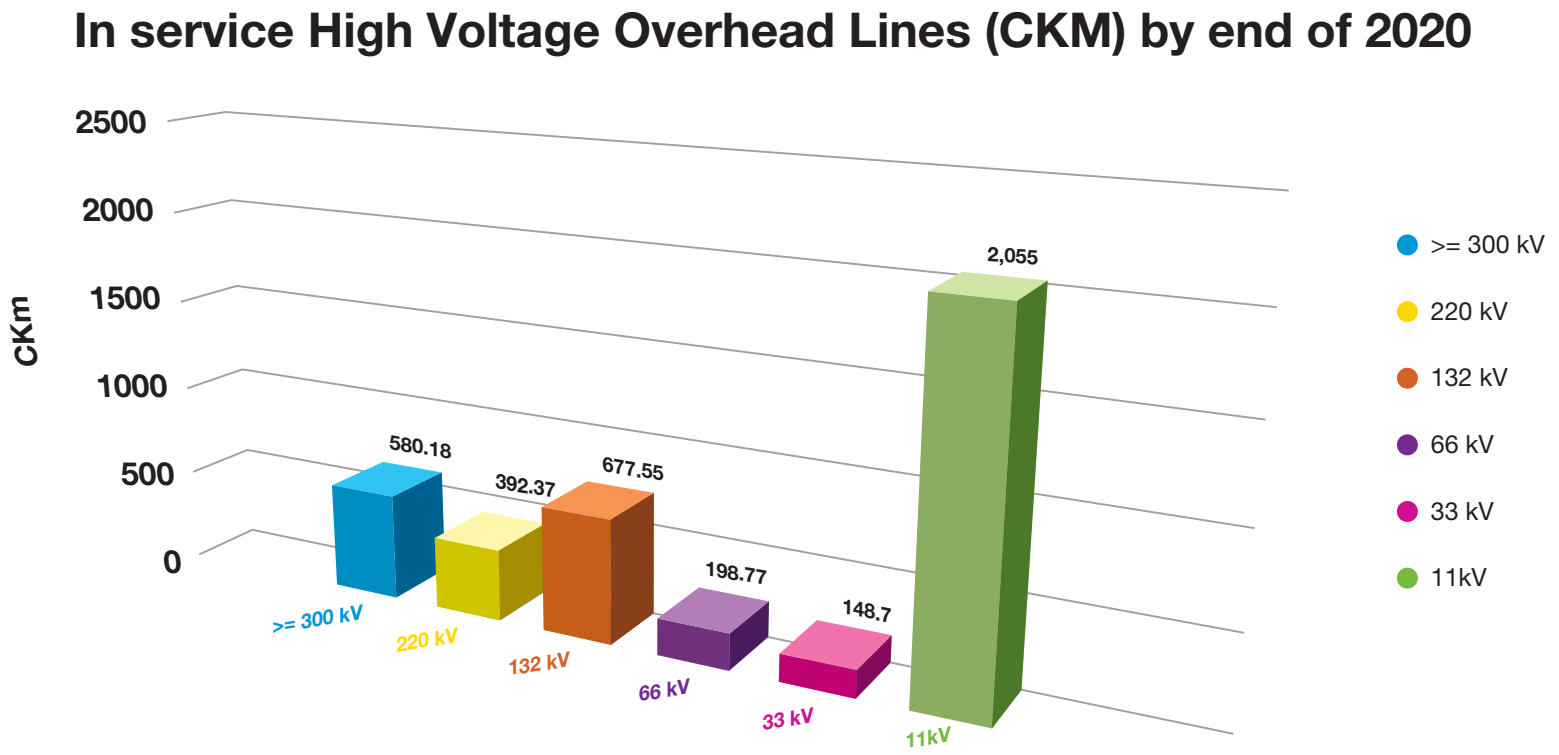
ET12 CABLES LAID (RKM)

Period Commissioned	400 kV	220 kV	132 kV	66 kV	33 kV	11 kV
In service (as at 31/12/2015)	115.733	812.99	657.017	1,176.23	19.32	12,464.24
Commissioned -2016	0	27.854	21.18	53.482	8.818	14,056.67
Commissioned -2017	43.86	36.85	28.35	156.55	0	1,904.08
Commissioned -2018	0.351	5.742	83.471	63.286	2.676	1,983
Commissioned -2019	1.147	15.7	86.08	54.83	1.08	1,713
Commissioned -2020	32.395	46.249	156.422	18.336	0	1,180.48
In service (as at 31/12/2020)	**220.508**	**879.867**	**1,051.883**	**1,350.005**	**29.218**	**20,837.48**



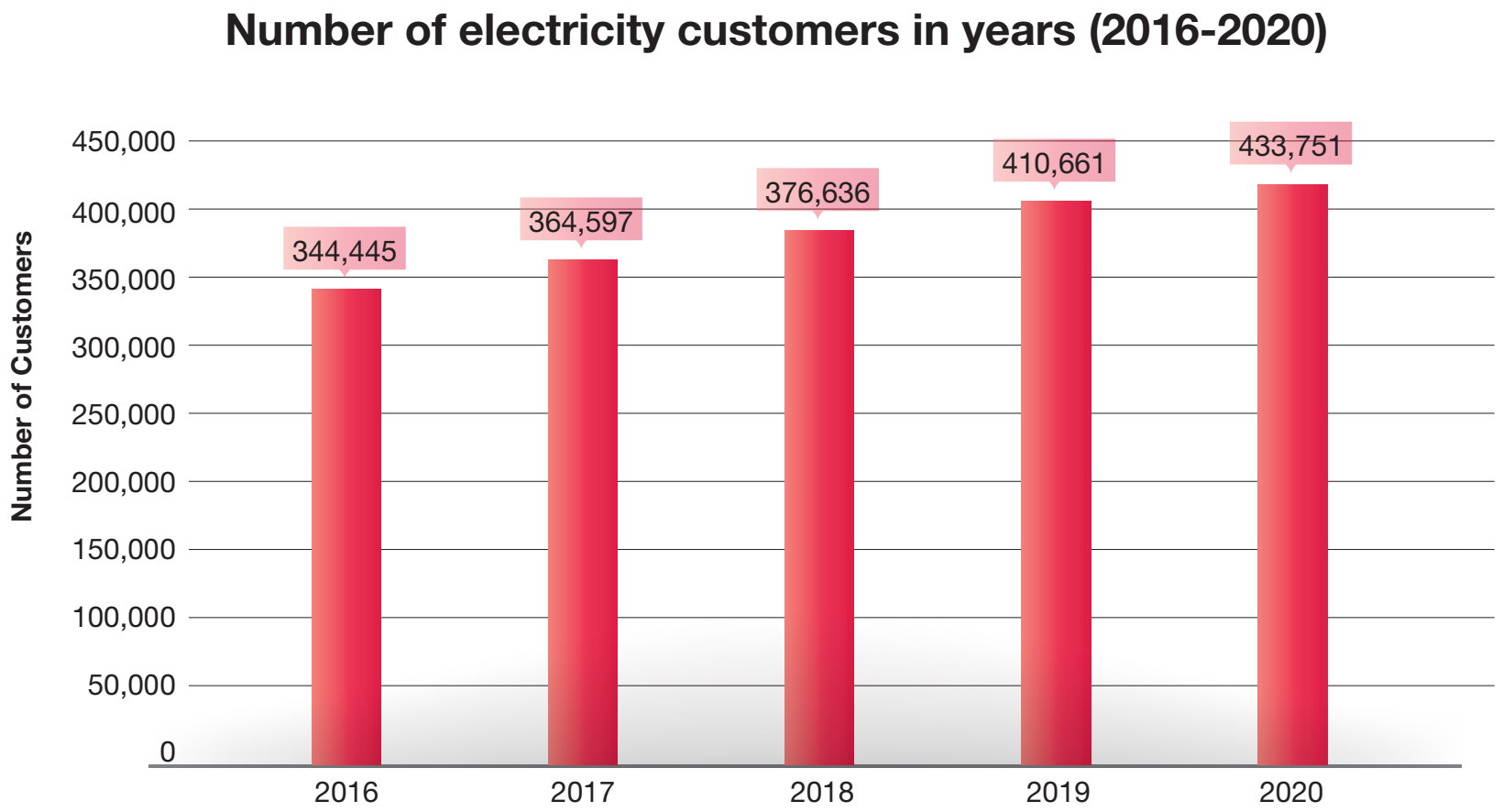
ET13 HIGH VOLTAGE OVERHEAD LINES (CKM)

Period	>= 300 kV	220 kV	132 kV	66 kV	33 kV	11 kV
In service (as at 31/12/2015)	547.98	391.52	487.92	214.12	148.7	1,920.83
Commissioned -2016	0	0	16.888	0	0	1,979.51
Commissioned -2017	0	0.85	121.16	0	0	58.69
Commissioned -2018	31.9	0	51.58	0	0	22.18
Commissioned -2019	0	0	0	0	0	39
Commissioned -2020	0	0	9.38	-5.52	0	26.9
In service (as at 31/12/2020)	**580.180**	**393.820**	**686.920**	**193.260**	**148.700**	**2,081.90**



ET14 NUMBER OF ELECTRICITY CUSTOMERS FROM 2016 TO 2020

Year	2016	2017	2018	2019	2020
No Of Customers	344,445	364,597	376,636	410,661	433,751
Annual Growth (%)	4.6%	5.9%	3.3%	9%	5.6 %



ET15 AVERAGE ELECTRICITY PER CAPITA CONSUMPTION

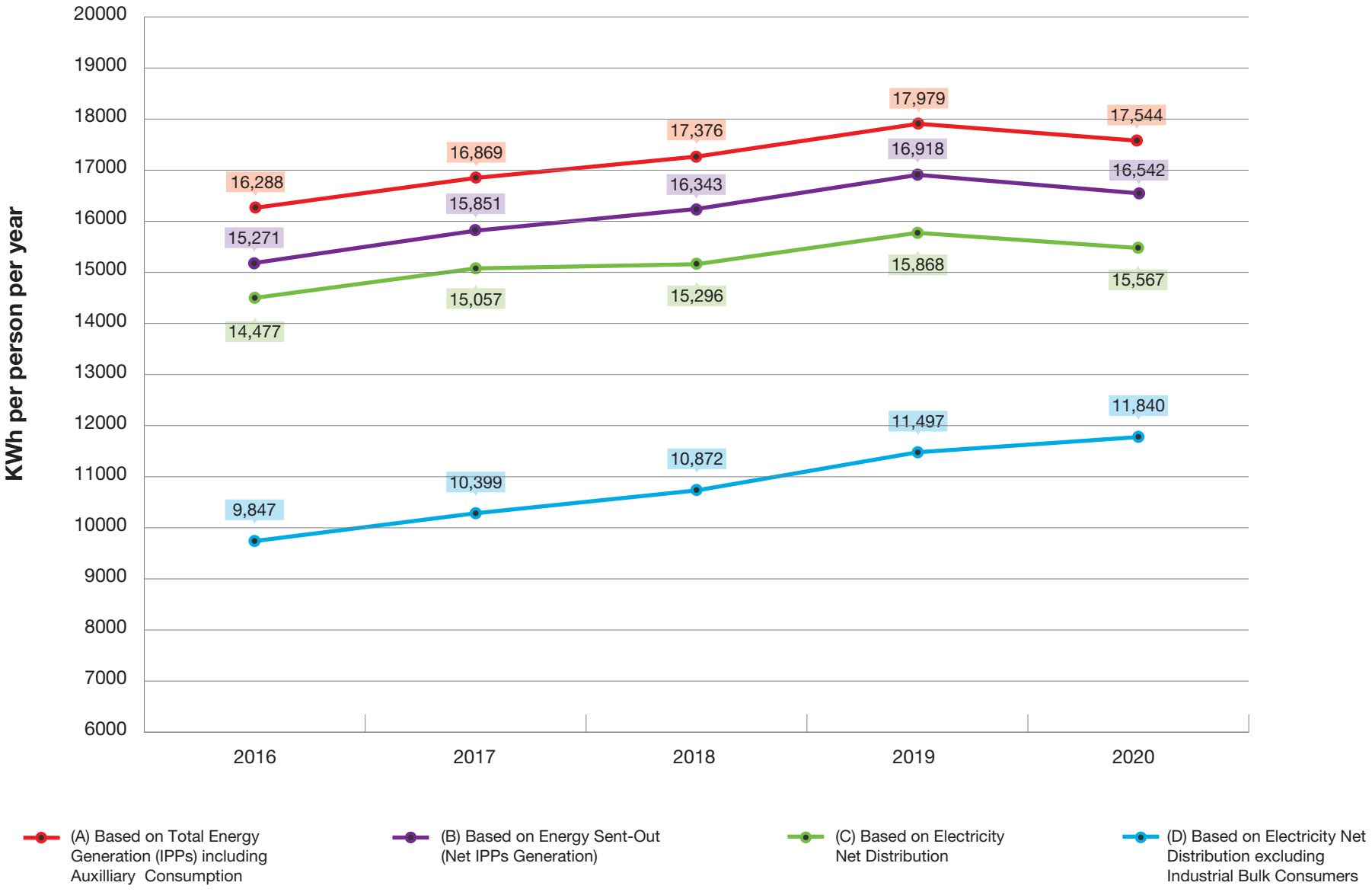
Year	2016	2017	2018	2019	2020
Population	2,597,453	2,700,539	2,757,437	2,773,885	2,807,805
Population Annual Increase(%)	7.30%	4.00%	2.10%	0.60%	1.22%
Total Energy Generation inlcuding all auxilliary consumption GWh	42,307	45,555	47,913	49,873	49,259
Energy Transmitted (Sent out) GWh = Generation minus Auxilliary Consumption	39,668	42,806	44,654	46,435	45,825
Electricity Net Distribution GWh = Injected Generation minus Real losses	37,603	40,663	42,177	43,550	43,710
Electricity Consumption GWh (Excluding Bulk Industrial)	25,108	27,428	30,082	31,539	33,245
Average Electricity Per Capita Consumption: (KWh Per Person per Year)					
(A) Based on Total Energy Generation (IPPs) including Auxilliary Consumption	16,288	16,869	17,376	17,979	17,544
(B) Based on Energy Sent-Out (Net IPPs Generation)	15,271	15,851	16,343	16,918	16,542
(C) Based on Electricity Net Distribution	14,477	15,057	15,296	15,868	15,567
(D) Based on Electricity Net Distribution excluding Industrial Bulk Consumers	9,847	10,399	10,872	11,497	11,840

* 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)

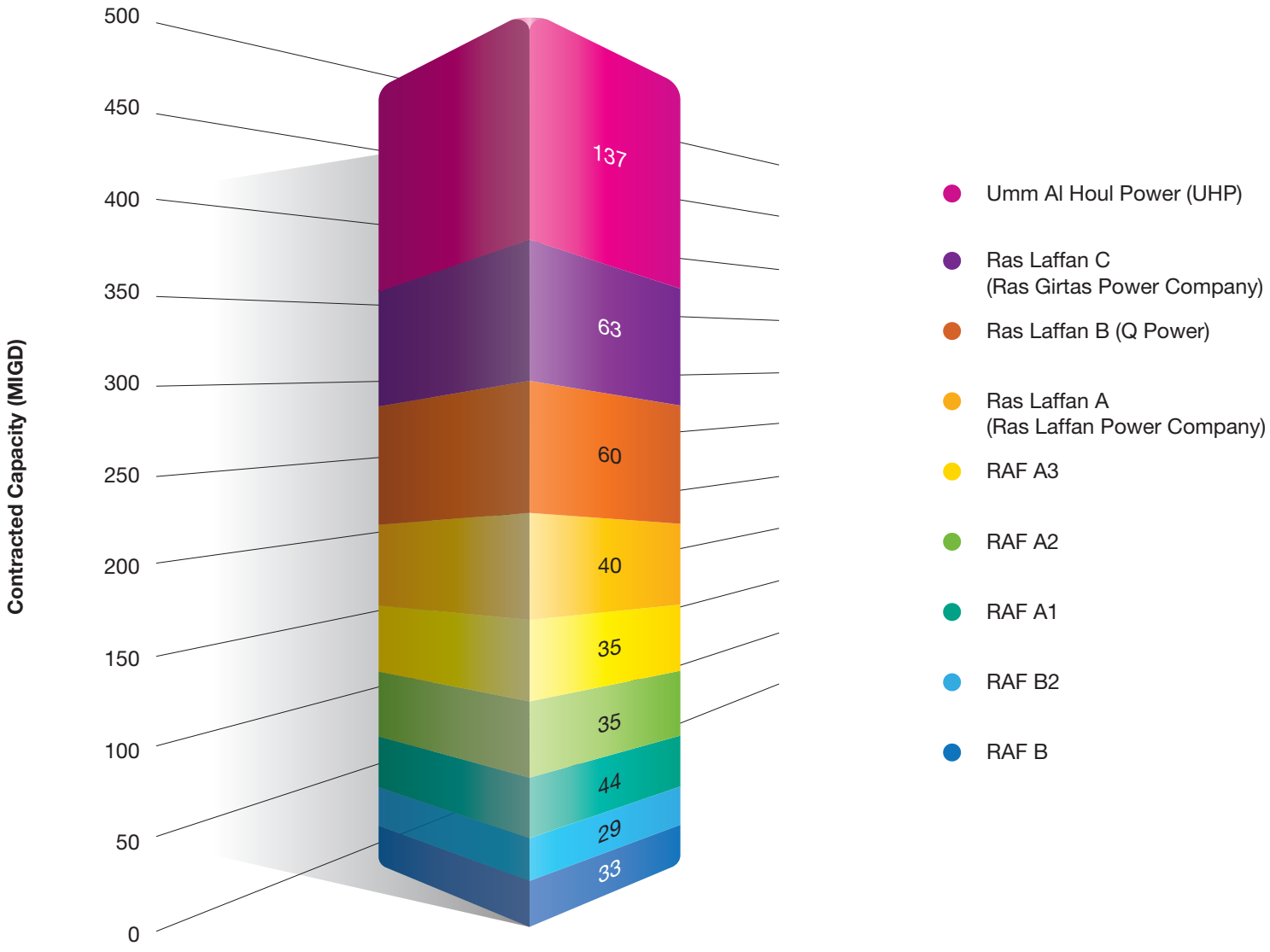


Water Statistics 2020

WT1 CONTRACTED CAPACITIES BY IPWP AT END OF 2020

Independent Power & Water Producer	Contracted Capacity - Water (MIGD)	Mm3/Day
Qatar Electricity & Water Company		
Ras Abu Fontas RAF A1	44.31	0.20
Ras Abu Fontas RAF A2	35.14	0.16
Ras Abu Fontas RAF A3	35.14	0.16
Ras Abu Fontas RAF B	33.00	0.15
Ras Abu Fontas RAF B2	29.14	0.13
Sub-Total	**176.73**	**0.80**
Ras Laffan		
Ras Laffan A (Ras Laffan Power Company)	40.00	0.18
Ras Laffan B (Q Power)	60.00	0.27
Ras Laffan C (Ras Girtas Power Company)	63.00	0.29
Sub-Total	**163.00**	**0.74**
Umm Al Houl Power Company		
Umm Al Houl Power (UHP)	136.50	0.62
Total Capacity	**476.23**	**2.16**

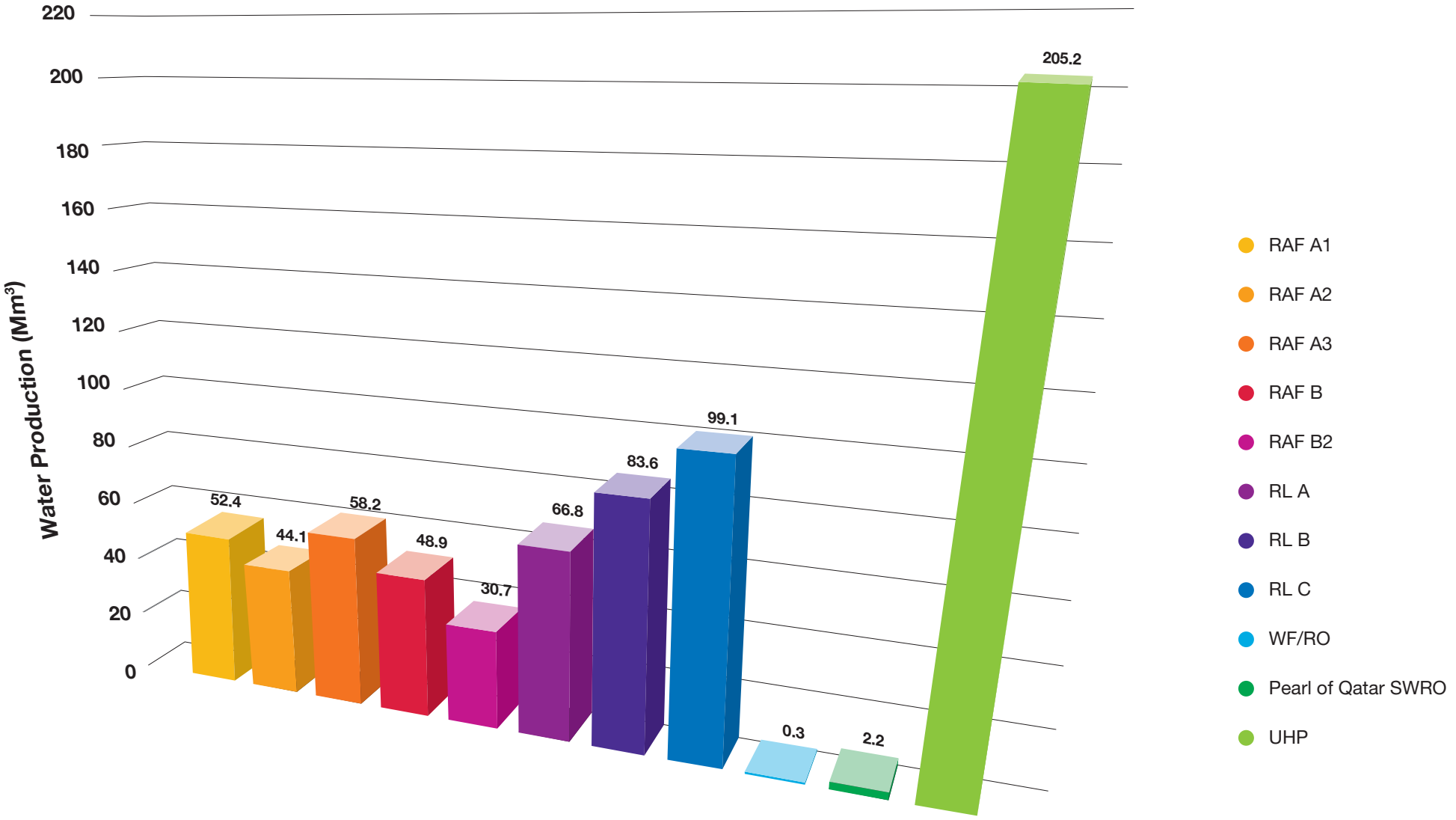
Water contracted capacity by IWPPs in year 2020



WT2 WATER PRODUCTION IN 2020

IWPPs	Water Production	Million Imperial Gallons (MIG)
(Million Cubic Meters)	Million Imperial Gallons (MIG)	11,537
RAF A2	44.1	9,711
RAF A3	58.2	12,810
RAF B	48.9	10,766
RAF B2	30.7	6,752
RL A	66.8	14,685
RL B	83.6	18,385
RL C	99.1	21,802
WF/RO	0.3	56
Pearl of Qatar SWRO	2.2	489
UHP	205.2	45,133
Total	**691.5**	**152,126**

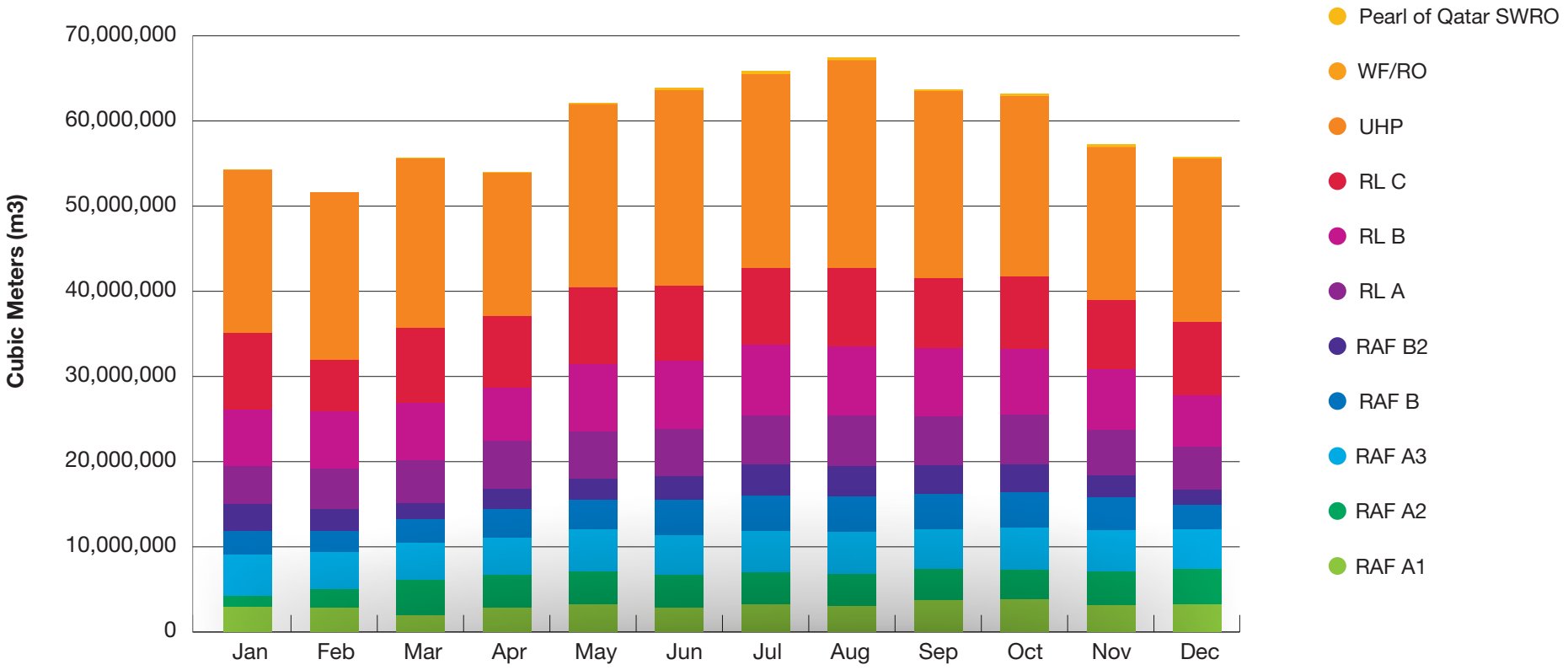
Water Production (Mm^3) In Year 2020



WT4 MONTHLY WATER PRODUCTION, CUBIC METERS IN 2020

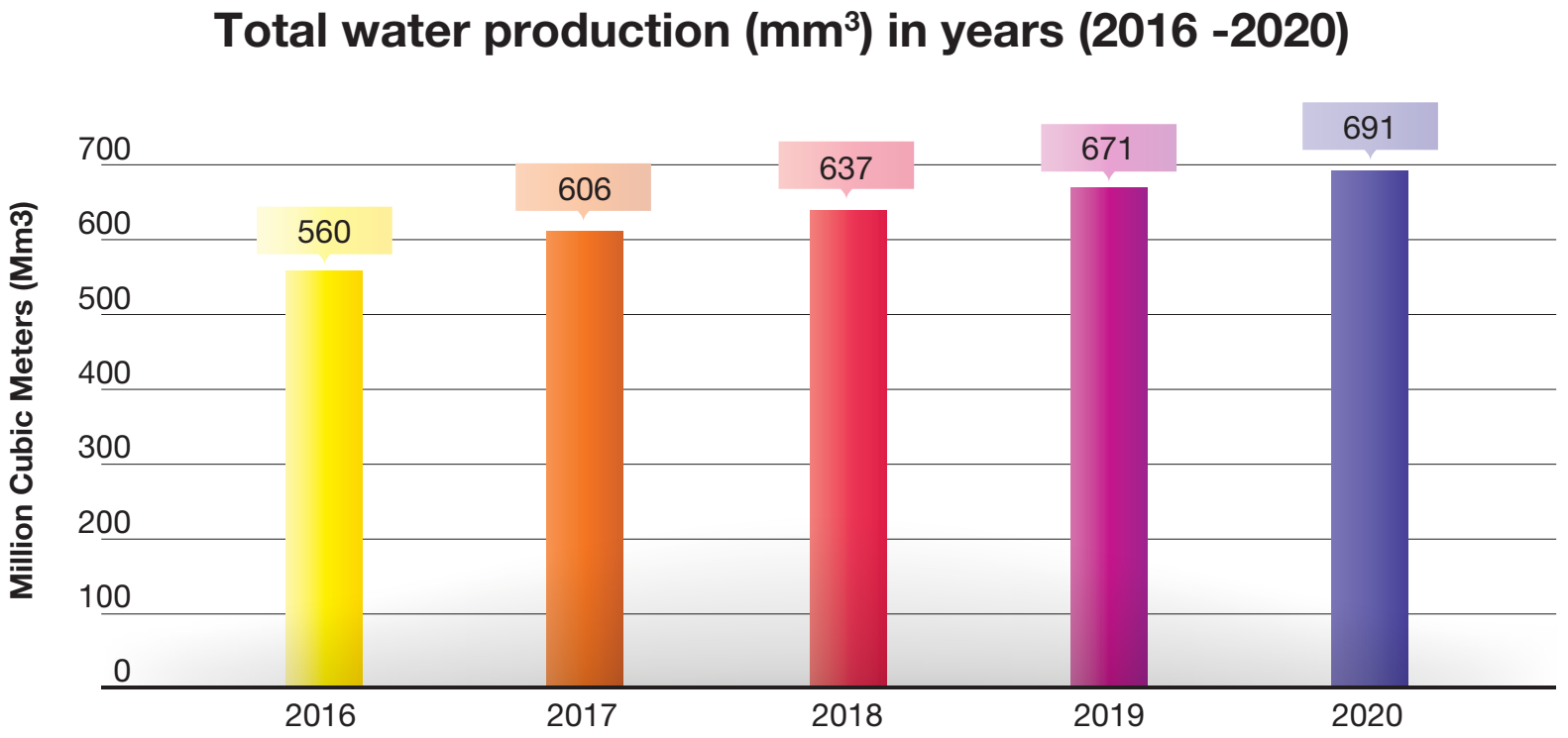
Month	RAF A1	RAF A2	RAF A3	RAF B	RAF B2	RL A	RL B	RL C	UHP	WF/RO	Pearl of Qatar	Total
Jan	3,583,267	4,022,570	4,916,009	3,747,698	1,816,865	5,608,904	6,651,241	5,916,380	17,131,974	28,666	53,182	**53,476,756**
Feb	3,522,796	2,905,902	4,666,936	3,668,418	1,650,163	4,741,024	5,194,768	7,374,944	16,651,637	21,992	54,045	**50,452,625**
Mar	4,373,300	4,055,586	4,916,796	4,461,176	2,384,149	5,945,848	5,366,591	8,639,525	13,962,492	26,341	88,800	**54,220,604**
Apr	5,738,762	4,292,523	4,668,678	4,322,854	3,738,165	5,761,336	5,754,026	8,347,693	10,340,723	23,816	117,920	**53,106,496**
May	4,190,903	4,036,941	4,978,864	4,378,961	2,431,635	5,891,824	7,111,862	8,228,585	18,048,779	32,245	175,763	**59,506,362**
Jun	4,745,685	4,207,581	4,802,168	3,940,504	3,026,054	5,797,176	8,120,195	8,758,887	18,185,195	36,630	242,553	**61,862,628**
Jul	4,699,219	3,659,047	4,972,283	3,989,950	3,627,963	5,940,928	8,099,064	9,049,478	18,743,161	33,798	407,993	**63,222,884**
Aug	4,876,638	3,884,962	5,030,003	4,442,958	3,570,924	5,506,096	8,292,931	8,957,488	18,962,387	21,037	317,947	**63,863,371**
Sep	5,166,871	4,202,838	4,866,859	4,178,646	2,736,910	5,708,032	6,880,789	8,716,212	18,273,485	13,870	299,784	**61,044,296**
Oct	4,714,237	3,761,087	5,036,473	4,066,536	1,864,413	5,826,826	8,145,869	8,473,164	18,745,908	6,080	224,972	**60,865,565**
Nov	3,372,536	2,749,580	4,873,966	3,817,465	1,909,086	5,074,280	7,652,006	8,411,102	17,580,670	6,972	143,162	**55,590,825**
Dec	3,457,729	2,364,125	4,499,434	3,921,975	1,932,462	4,948,448	6,298,362	8,226,405	18,523,880	2,244	97,524	**54,272,588**
Total	**52,441,943**	**44,142,742**	**58,228,469**	**48,937,141**	**30,688,789**	**66,750,722**	**83,567,704**	**99,099,863**	**205,150,291**	**253,691**	**2,223,645**	**691,485,000**

Monthly water production (m^3) in year 2020



WT5 TOTAL ANNUAL WATER PRODUCTION, MILLION CUBIC METERS

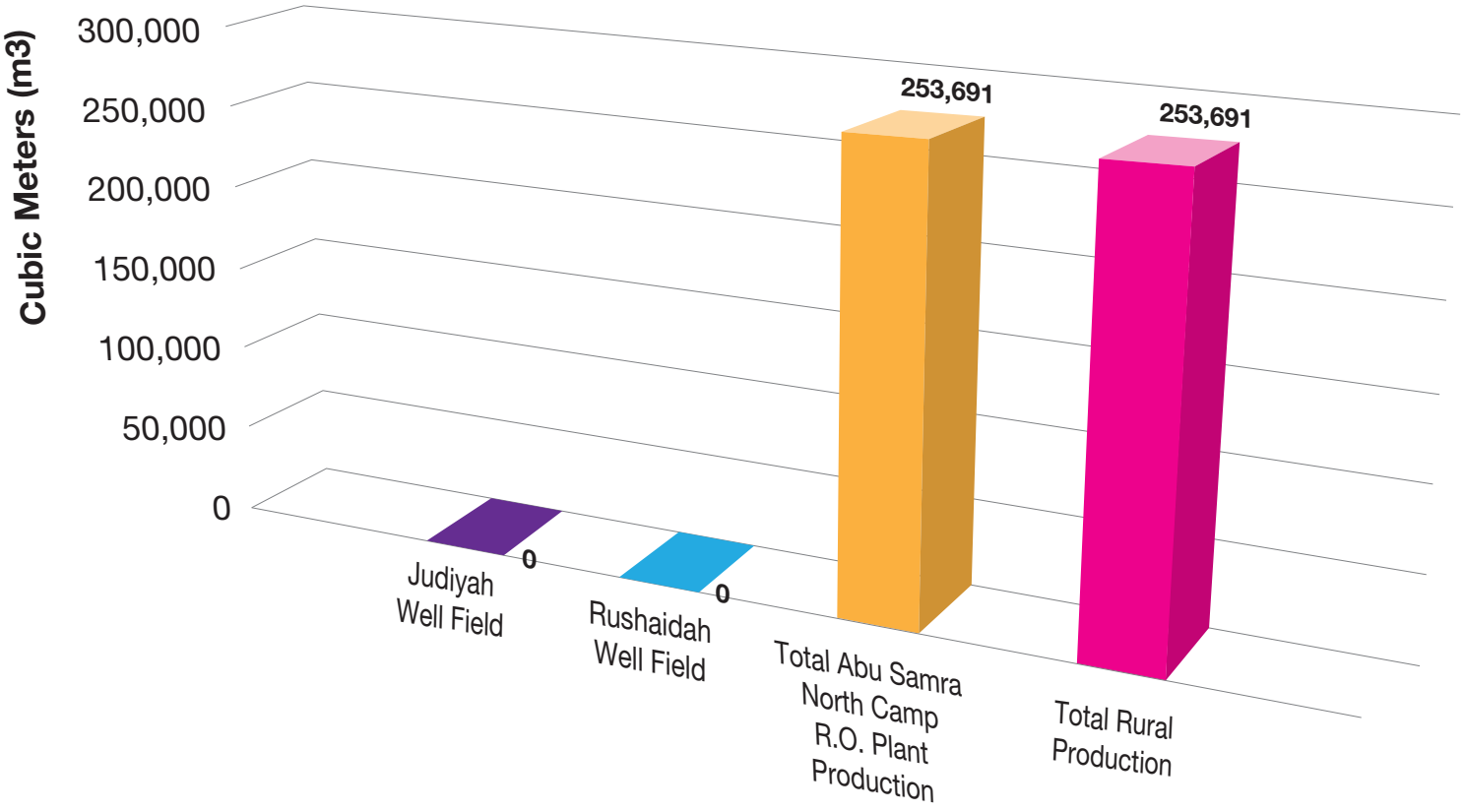
Water Production	2016	2017	2018	2019	2020
Production, MM3	560	606	637	671	691
Annual Growth (%)	5.1%	7.7%	5.1%	5.4%	3.0%
Average Growth last five years (%)					3.6%



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	28,666	28,666
Feb	0	0	21,992	21,992
Mar	0	0	26,341	26,341
Apr	0	0	23,816	23,816
May	0	0	32,245	32,245
Jun	0	0	36,630	36,630
Jul	0	0	33,798	33,798
Aug	0	0	21,037	21,037
Sep	0	0	13,870	13,870
Oct	0	0	6,080	6,080
Nov	0	0	6,972	6,972
Dec	0	0	2,244	2,244
Total	**0**	**0**	**253,691**	**253,691**

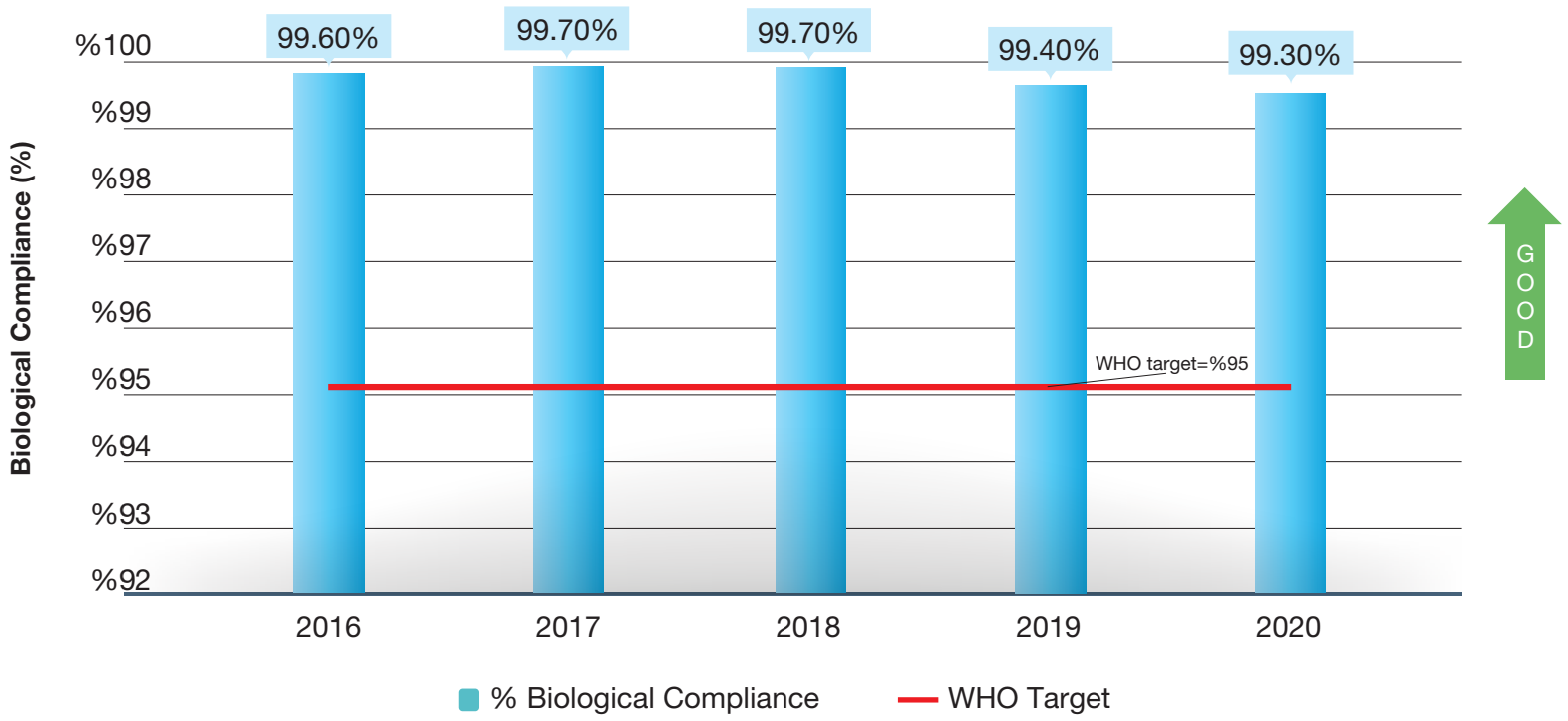
Rural potable water production (m^3) in year 2020



WT6 WATER QUALITY (BIOLOGICAL COMPLIANCE)

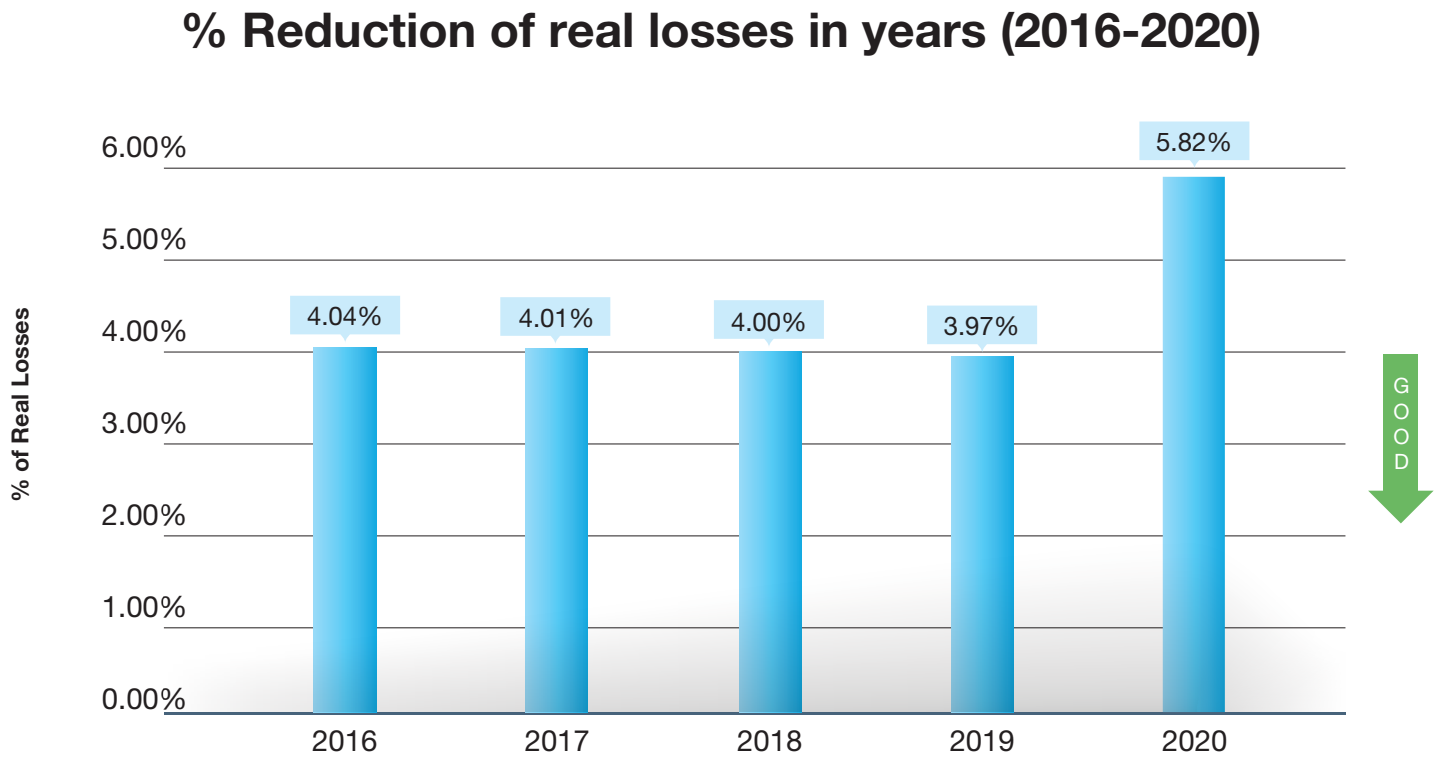
Year	% Biological Compliance	WHO Target
2016	99.60%	95%
2017	99.70%	95%
2018	99.70%	95%
2019	99.40%	95%
2020	99.30%	95%

Water quality (biological compliance) in years (2016-2020)



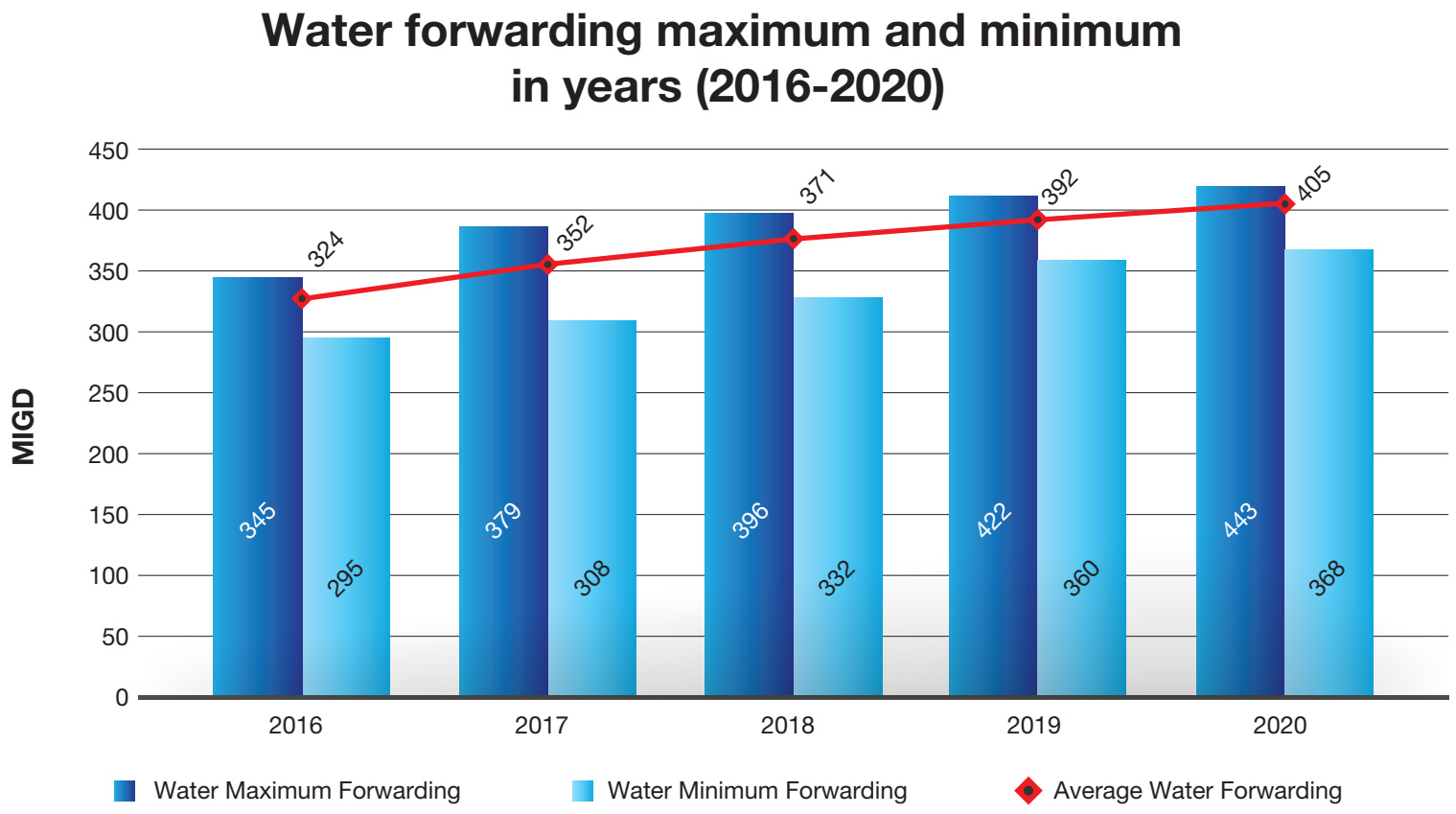
WT7 WATER REAL LOSSES REDUCTION

Year	% Real Losses
2016	4.04%
2017	4.01%
2018	4.00%
2019	3.97%
2020	5.82%



WT8 WATER FORWARDING MAXIMUM AND MINIMUM DEMAND IN YEARS (2016-2020)

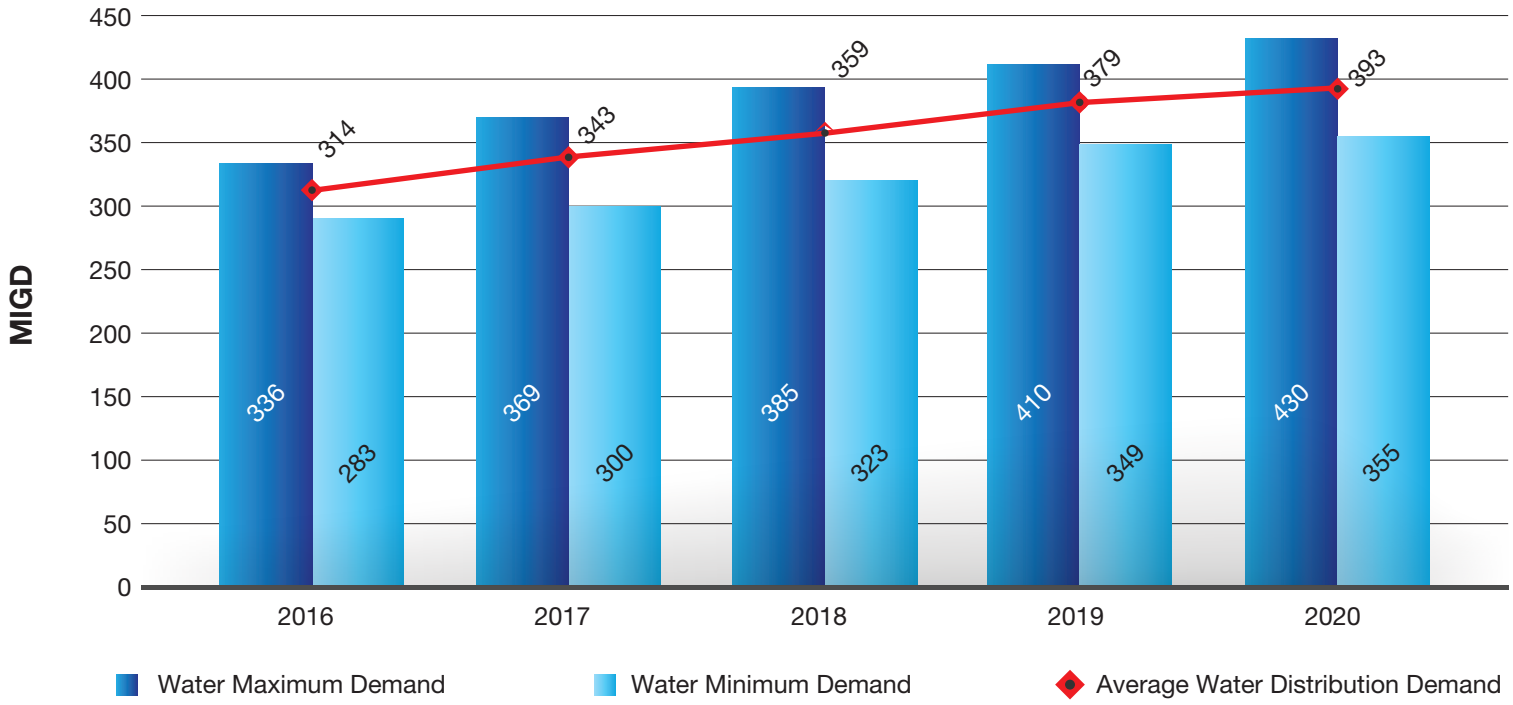
Year	Average Forwarding, MIGD	Maximum Forwarding Month	Minimum Forwarding, MIGD	Minimum Forwarding Month
2016	324	October	295	January
2017	352	August	308	February
2018	371	September	332	January
2019	392	September	360	February
2020	405	August	368	January



WT9 WATER DISTRIBUTION MAXIMUM AND MINIMUM DEMAND IN YEARS (2016-2020)

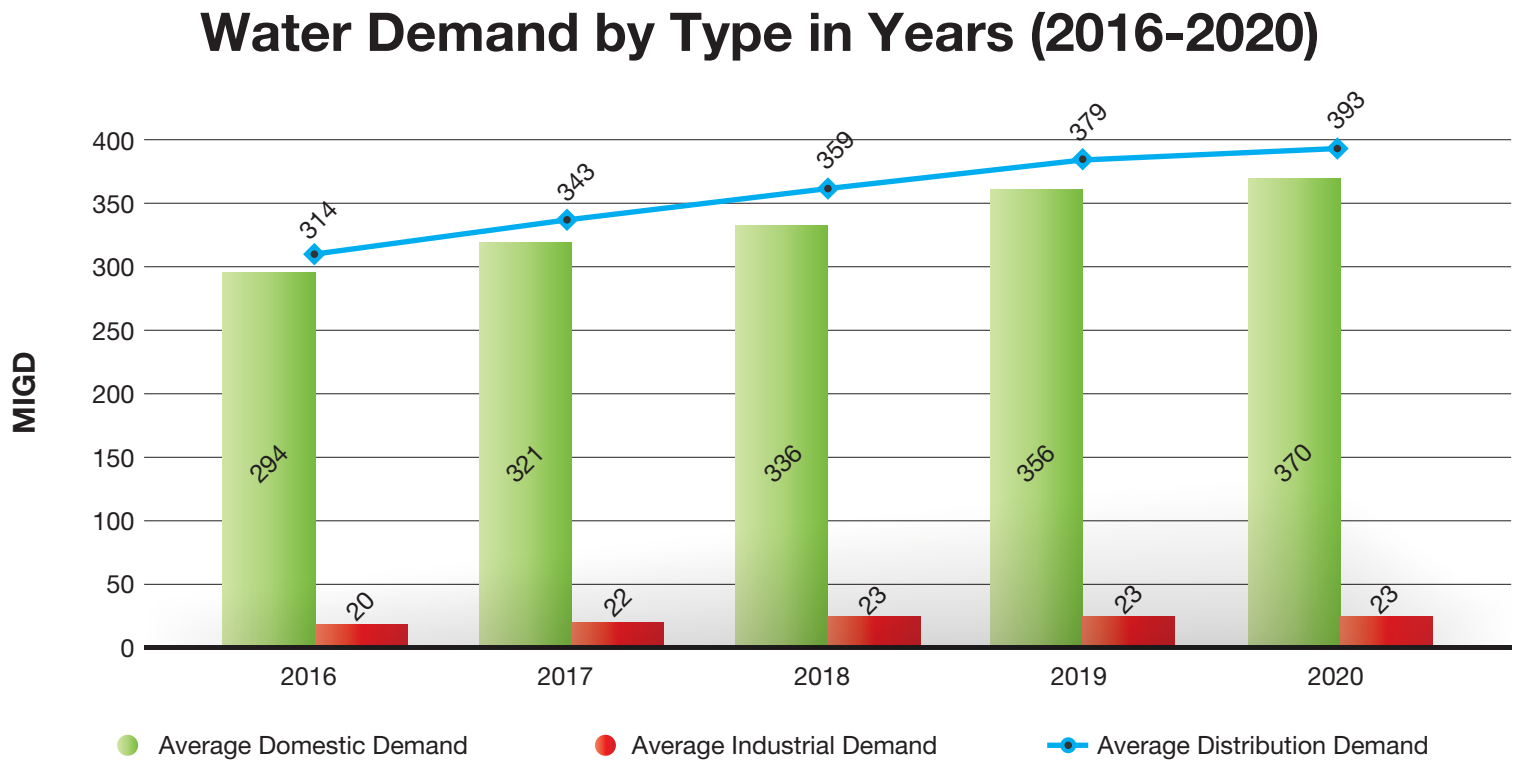
Year	Average Distribution Demand, MIGD	Growth (%)	Maximum Demand, MIGD	Maximum Demand Month	Minimum Demand, MIGD	Minimum Demand Month
2016	314	4.4	336	October	283	January
2017	343	9.2	369	August	300	February
2018	359	4.8	385	September	323	January
2019	379	5.5	410	September	349	February
2020	393	3.7	430	August	355	January

Water distribution demand in years (2016-2020)



WT10 WATER DEMAND BY TYPE IN YEARS (2016-2020)

Water Demand By Type, MIGD	2016	2017	2018	2019	2020
Average Distribution Demand	314	343	359	379	393
Average Industrial Demand	20	22	23	23	23
Average Domestic Demand	294	321	336	356	370



WT11 LENGTH OF MAINS LAID FROM 2016 TO 2020 IN METERS

Pipe Diameter, millimetres	2016	2017	2018	2019	2020
80	11	478	676	141	117
100	60,565	49,112	78,210	82,973	48,079
110	2,842	247	348	3	0.1
125	12	145	602	-	-
150	104,010	73,540	88,909	95,729	38,027
180	894	40	97	-	8
200	61,999	42,467	45,314	69,195	51,609
225	96	-	40	-	2
250	1,234	316	974	25	61
280	-	-	-	-	-
300	100,715	62,082	55,613	63,125	36,711
315	2,614	13	60	-	4
355	2,325	492	3,591	13	2
400	41,683	35,410	17,862	11,142	10,597
450	29	4	5	1	-
500	3,536	257	933	199	2
600	34,868	36,069	29,608	22,664	9,550
700	15	-	30	1	2
800	650	3,755	1,631	455	3
900	33,209	27,400	21,818	11,585	8,620
1,000	6	362	712	31	352
1,200	66,277	15,544	10,727	6,458	2,163
1,400	61,162	8,850	8,509	5,343	274
1,600	177,400	35,855	17,198	10,470	1,477
2,000	-	-	-	158	-
2,200	-	-	-	1,941	69
2,400	203	1,249	2,583	1,097	31
Total	756,355	393,687	386,050	382,749	207,758

WT12 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2020, IN METERS

Service size from 15 mm up to 54 mm (Copper pipe) – Domestic & Commercial (meters)

Type of Service	15mm Length	15mm Nos	22mm Length	22 mm Nos	28 mm Length	28 mm Nos	42 mm Length	42 mm Nos	54 mm Length	54 mm Nos	Total Length	Total Nos.
New Service	-	-	49,077	3,379	14,145	215	1,963	54	4,017	92	69,201	3,740
Reconnection	-	-	-	-	-	-	-	-	-	-	-	-
Disconnection	-	-	972	-	-	-	-	-	-	-	972	-
Maintenance or Replacement	-	-	79,488	10,130	25,357	3,553	463	45	547	55	105,855	13,783
Transpose	-	-	589	58	104	2	11	1	149	2	853	63
Size Increase	-	-	-	-	-	-	-	-	-	-	-	-
New Water Meter Installation	-	-	-	18,079	-	1,336	-	153	-	207	-	19,775
Water Meter Replacement	-	-	-	8,370	-	131	-	100	-	202	-	8,803

WT13 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2020, IN METERS

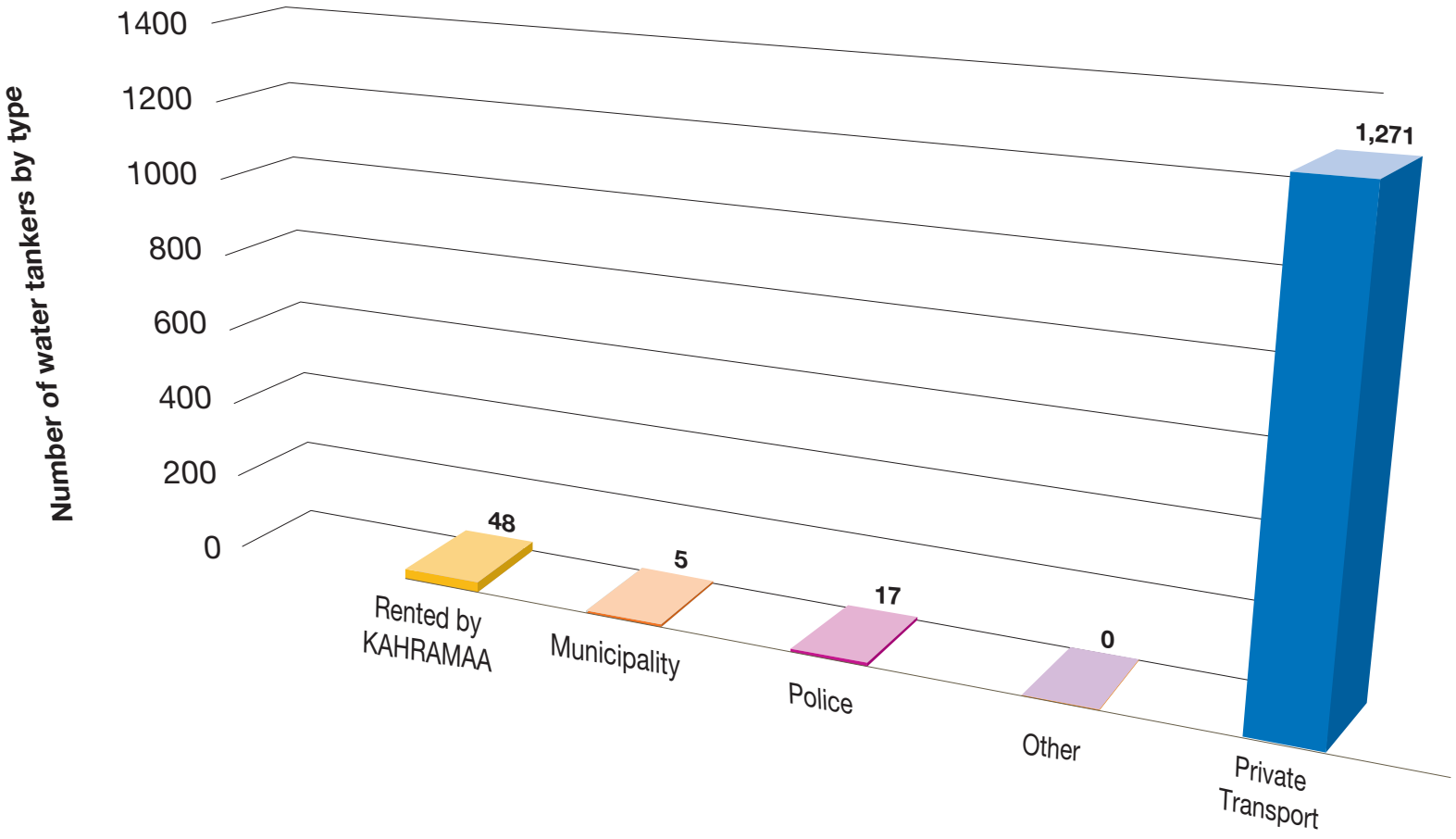
Service size from 80mm (3”) up to 400mm (16”) – Bulk

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	585.4	5	7.5	1	-	-	-	-	-	-	-	-	-	-	592.9	6
Reconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance or Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transpose	-	-	11.092	3	1	1	-	-	-	-	-	-	-	-	12.092	4
Size Increase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Water Meter Installation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Meter Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WT14 TANKER WATER SUPPLY IN 2020

Station	Rented by KAHRAMAA	Municipality	Education	Defence	Police	Other	Rural Tankers	Private Transport
AL SAILIYA	11	1	0	0	7	0	0	466
UMM SALAL	10	1	0	0	0	0	0	297
AL KHOR	1	0	0	0	3	0	0	108
AL WAKRAH	14	0	0	0	2	0	0	140
AL JAMELIYAH	7	0	0	0	2	0	0	34
AL SHAMAL	0	1	0	0	1	0	0	35
MESAIEED	0	0	0	0	2	0	0	62
AL SHAHANIYAH	5	1	0	0	0	0	0	81
AL GHUWARIYAH	0	1	0	0	0	0	0	22
SEA LINE	0	0	0	0	0	0	0	11
AL KARAANA	0	0	0	0	0	0	0	15
Total	**48**	**5**	**0**	**0**	**17**	**0**	**0**	**1271**

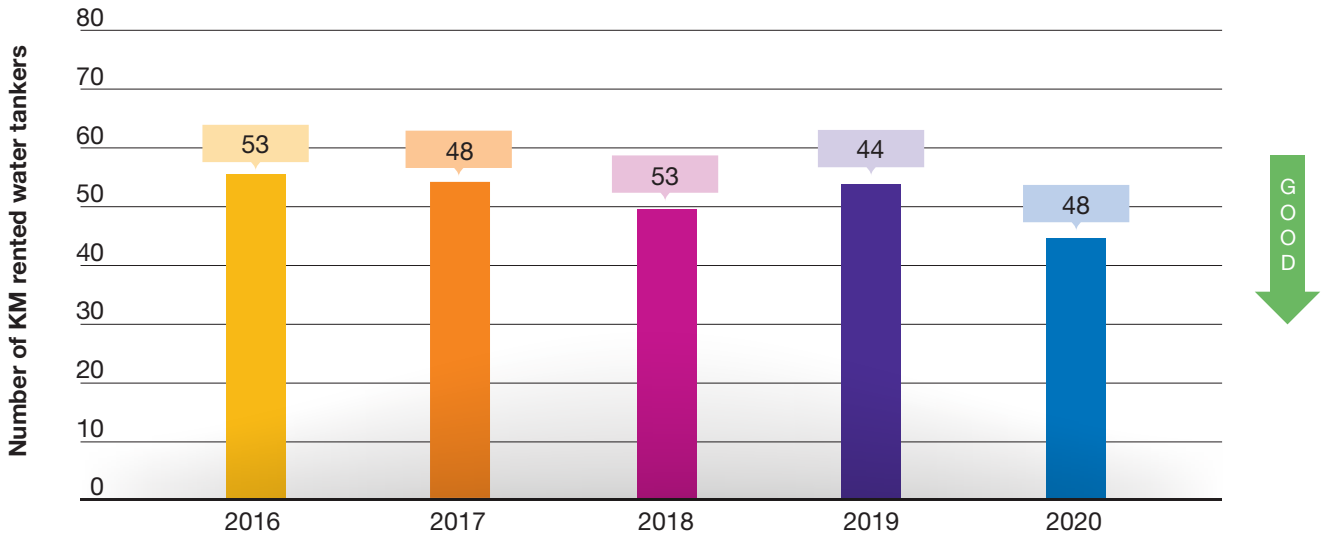
Water Tankers Served in 2020 by Type



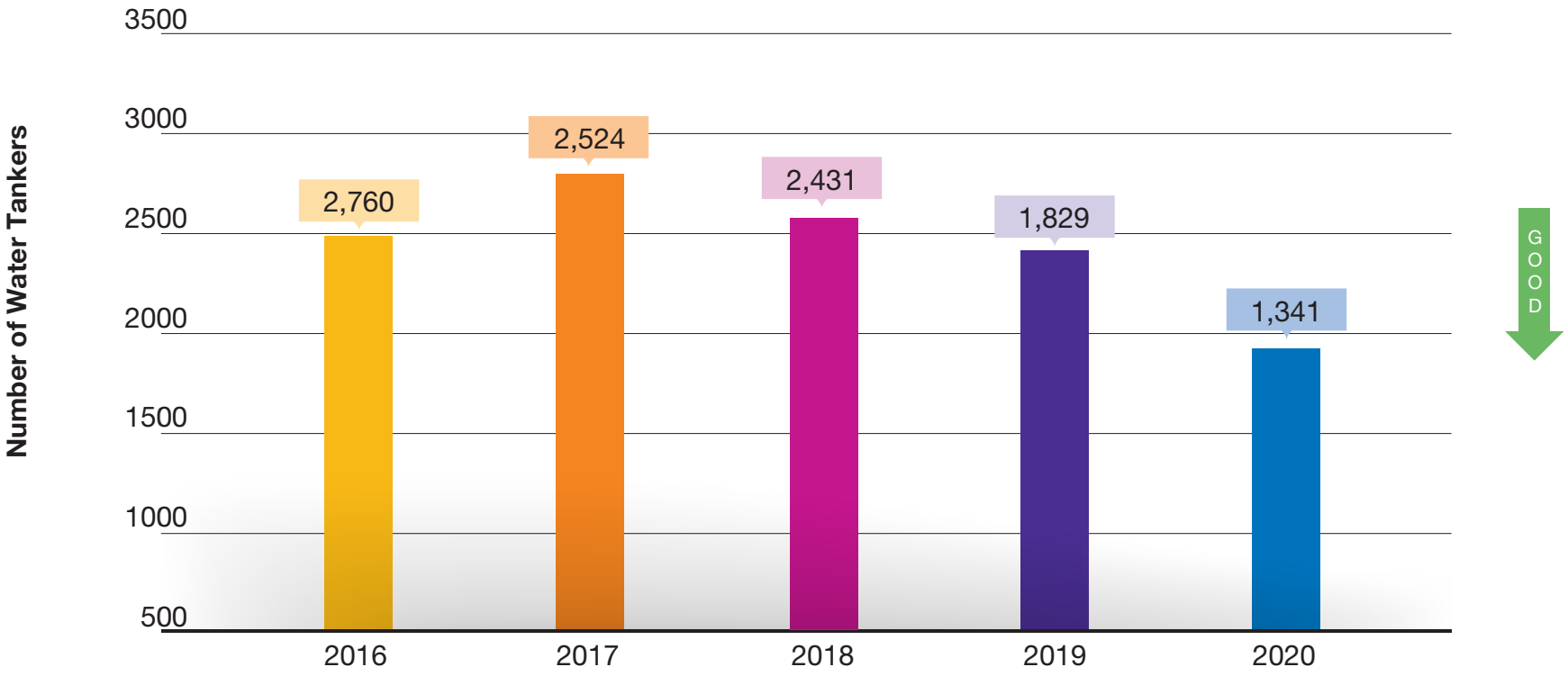
WT15 WATER TANKER SERVICES LAST 5 YEARS

Water Production	2016	2017	2018	2019	2020
No of Water Tankers	2,760	2,524	2,431	1,829	1,341
No of KM Rented Water Tankers	53	48	53	44	48
Total Reduction	-273	236	93	602	488
Total Reduction (%)	-11.0%	8.6%	3.68%	24.76%	26.68%
KM - Rented Reduction	2	5	-5	9	-4
KM - Rented Reduction (%)	3.6%	9.4%	-10.42%	16.98%	-9.09%

Total number of water tankers Rented by kahramaa in years (2016-2020)

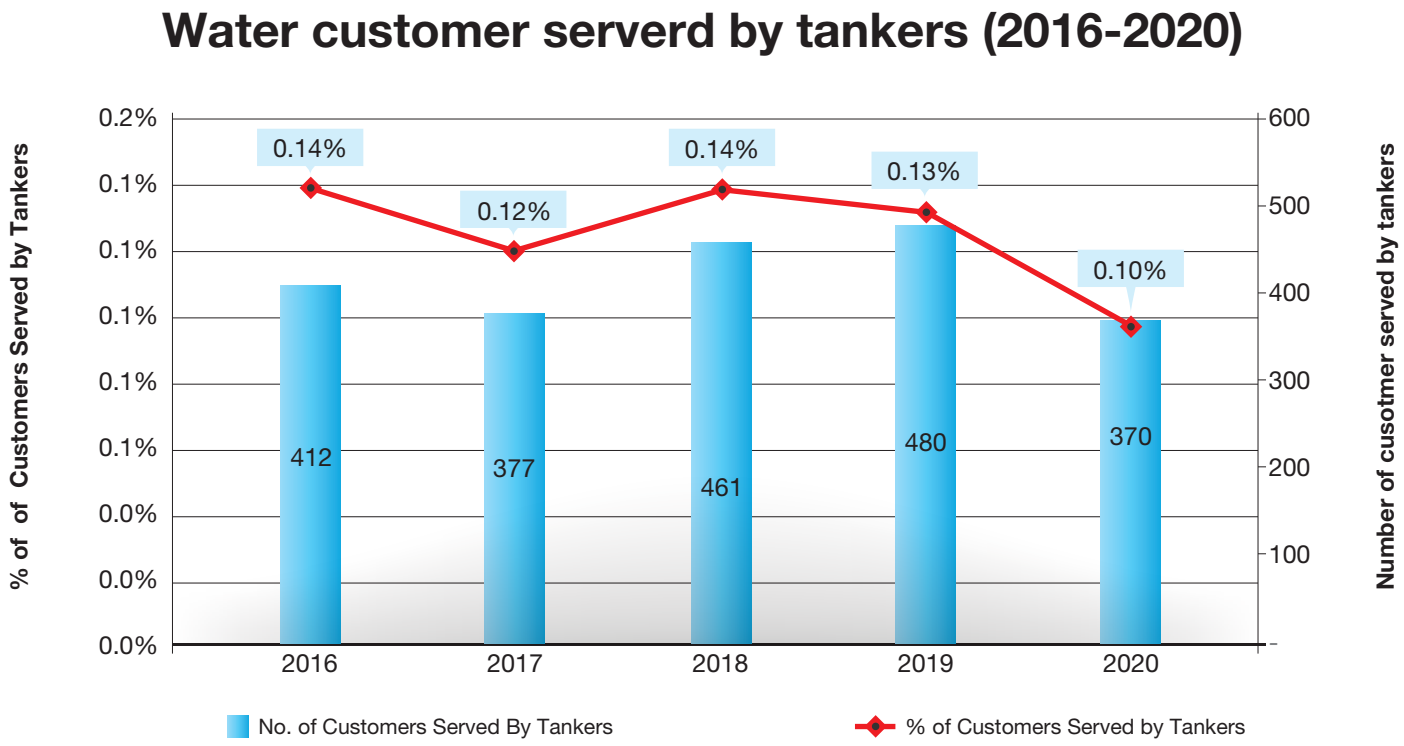


Total number of water tankers
In years (2016-2020)



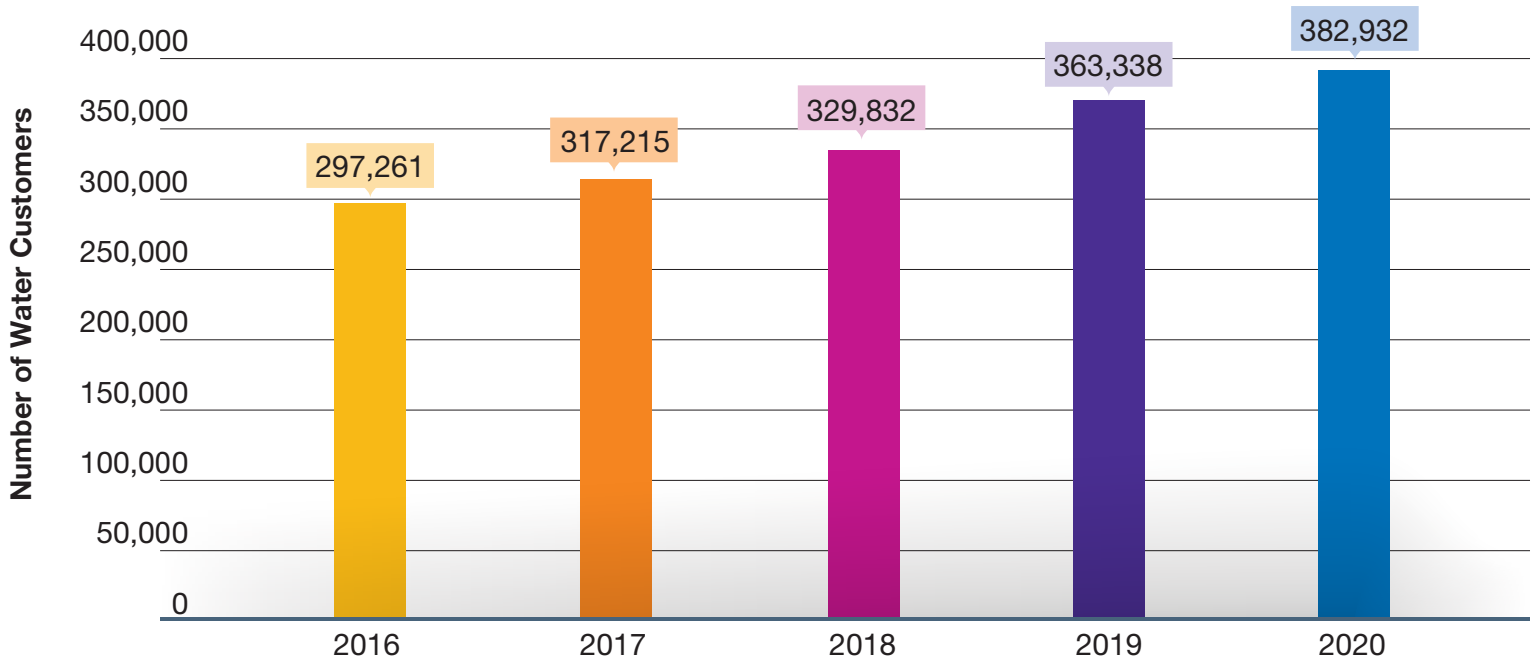
WT16 PERCENTAGE OF CUSTOMERS SERVED BY TANKERS

Water Production	2016	2017	2018	2019	2020
Total No. of Water Customers	296,846	316,838	329,832	363,338	382,932
No Of Customers Served By Tankers	412	377	461	480	370
Percentage of Customers Served by Tankers (%)	0.14%	0.12%	0.14%	0.13%	0.10%
Reduction	38	35	-84	-19	110
Percentage Reduction (%)	0.02%	0.02%	-0.02%	0.01%	0.03%



WT17 NUMBER OF WATER CUSTOMERS

Year	No Of Customers	Annual Growth
2016	297,261	7.1%
2017	317,215	6.7%
2018	329,832	4.0%
2019	363,338	10.2%
2020	382,932	5.4%

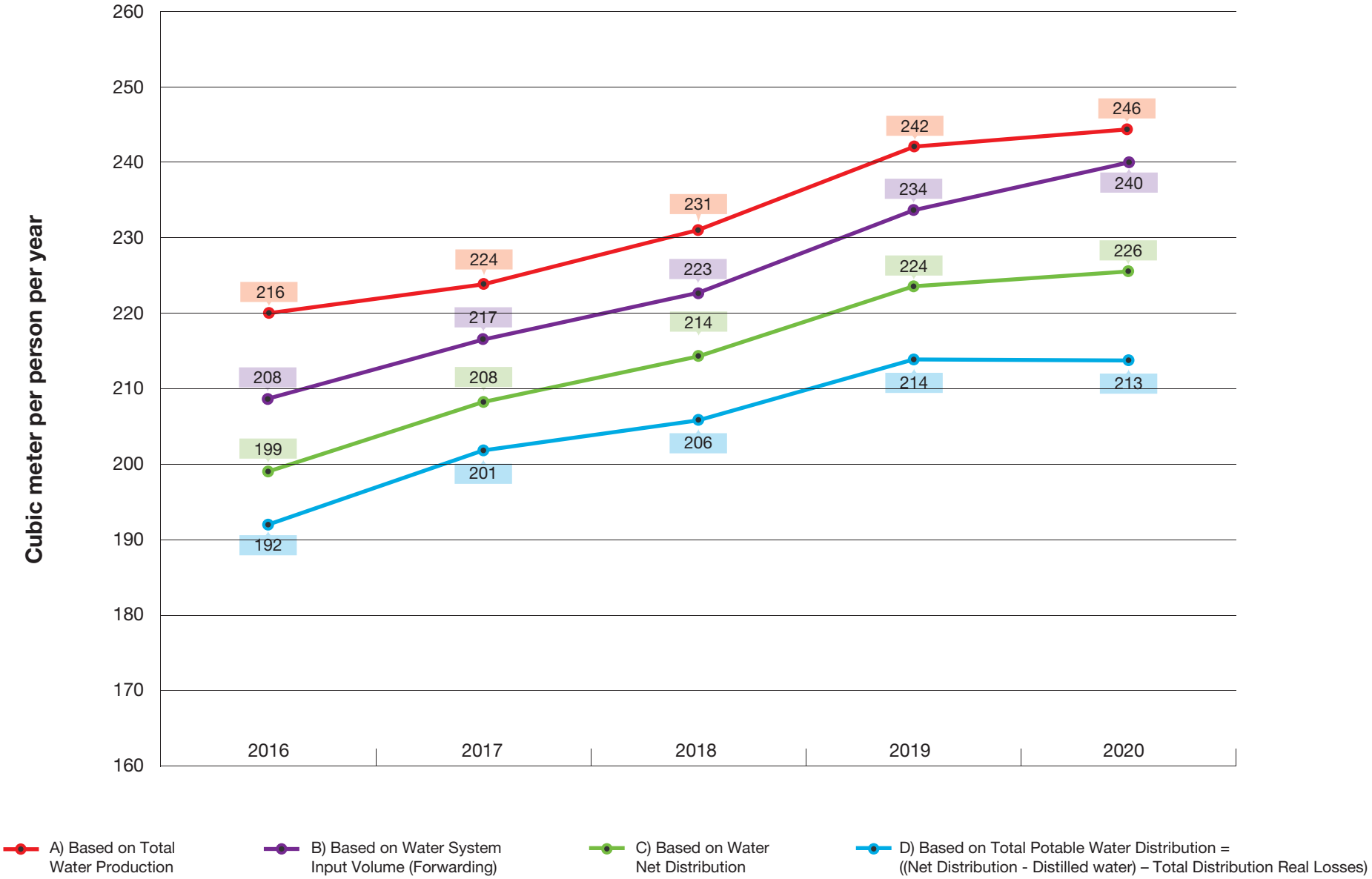


WT18 AVERAGE WATER PER CAPITA CONSUMPTION, LAST FIVE YEARS

Year	2016	2017	2018	2019	2020
Population	2,597,453	2,700,539	2,757,437	2,773,885	2,807,805
Population Annual Increase(%)	7.30%	4.00%	2.10%	0.60%	1.22%
Total Water Production Mm3	560	606	637	671	691
System Input Volume (Forwarding) Mm3	540	585	616	648	673
Water Net Distribution Mm3 = System Input Volume Mm3 (Forwarding) - Real Losses	518	562	591	622	634
Total Potable Water Distribution (Mm3)= ((Net Distribution - Distilled water) – Total Distribution Real Losses)	506	544	568	593	597
Average Water Per Capita Consumption: (Cubic meter per person per year)					
A) Based on Total Water Production	216	224	231	242	246
B) Based on Water System Input Volume (Forwarding)	208	217	223	234	240
C) Based on Water Net Distribution	199	208	214	224	226
D) Based on Total Potable Water Distribution = ((Net Distribution - Distilled water) – Total Distribution Real Losses)	192	201	206	214	213

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

WATER PER CAPITA CONSUMPTION
(Cubic meters Per Person per Year)



WT19 WATER STORAGE IN IWPP RESERVOIRS IN 2020

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3	Remarks
RAF A1	45	0	45	204,545	0	204,545	
RAF A2	36	0	36	163,636	0	163,636	
RAF A3	36	0	36	163,636	0	163,636	
RAF B	19.3	0	19.3	87,727	0	87,727	
RAF B2	29	0	29	131,818	0	131,818	
RL A	40	0	40	181,818	0	181,818	
RL B	60	30	30	272,727	136,364	136,364	RLB Reservoir No.1 (30 MIG) isolated since 17.10.2019 for the internal inspection.
RL C	63	0	63	286,364	0	286,364	
UHP	136	0	136	618,182	0	618,182	
Total	**464.3**	**30**	**434.3**	**2,110,455**	**136,364**	**1,974,091**	

WT20 WATER STORAGE IN KM RESERVOIRS IN 2020

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3	Remarks
Airport	30.00	1.50	28.50	136,364	6,818	129,545	Airport RPS - Res 2 A (1.5 MIG) isolated since 09.09.2020 due to structural leak.
Doha South	84.00		84.00	381,818	-	381,818	
Mesaimeer	108.00		108.00	490,909	-	490,909	
Wukair	36.00		36.00	163,636	-	163,636	
Old Salwa	0.00		0.00	-	-	-	All reservoirs demolished for upgrading
New Salwa	30.00		30.00	136,364	-	136,364	
Salwa Industrial	51.00		51.00	231,818	-	231,818	
Garrafa	50.00		50.00	227,273	-	227,273	
West Bay	56.00	3.00	53.00	254,545	13,636	240,909	West Bay RPS – Res 9 A (3 MIG) drained and isolated since 15.11.2020 for repair works of the damaged reservoir baffle wall
Bani Hajr	36.00		36.00	163,636	-	163,636	
Muaither	105.00		105.00	477,273	-	477,273	
Duhail	142.00		142.00	645,455	-	645,455	
Umm Qarn	71.00		71.00	322,727	-	322,727	
Wakrah	10.00		10.00	45,455	-	45,455	
Messaieed Town	24.00		24.00	109,091	-	109,091	
Messaieed Industrial	28.00		28.00	127,273	-	127,273	
Al Khor 1	4.00		4.00	18,182	-	18,182	

WT20 WATER STORAGE IN KM RESERVOIRS IN 2020

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3	Remarks
Al Khor 2	6.00		6.00	27,273	-	27,273	
Al Khor 3	18.00		18.00	81,818	-	81,818	
Umm Salal 1	6.00		6.00	27,273	-	27,273	
Umm Salal 2	18.00		18.00	81,818	-	81,818	
Shahaniyah 2	12.00		12.00	54,545	-	54,545	
Shahaniyah 3	12.00		12.00	54,545	-	54,545	
Madinat Shamal	10.00		10.00	45,455	-	45,455	
Guwairiyah	0.50		0.50	2,273	-	2,273	
Pearl of Qatar	4.00		4.00	18,182	-	18,182	
Small & Medium	7.90		7.90	35,909	-	35,909	
Labor City	6.60		6.60	30,000	-	30,000	
Lusail RPS4	6.60		6.60	30,000	-	30,000	New reservoir commissioned on 23.01.2020
Umm Birka PRPS	194.00		194.00	881,818	-	881,818	Mega RPS
Umm Salal PRPS	386.00		322.00	1,754,545	-	1,463,636	Mega RPS
Rawdat Rashed PRPS	194.00		33.00	881,818	-	150,000	Mega RPS
Abu Nakhla PRPS	194.00		33.00	881,818	-	150,000	Mega RPS
Thumama PRPS	261.00		160.00	1,186,364	-	727,273	Mega RPS
Total	**2,201.60**	**4.50**	**1,710.10**	**10,007,273**	**20,455**	**7,773,182**	

WT21 WATER STORAGE IN GROUND TANKS IN 2020

Location	Ground Tank Non-Operating (MIG)	Ground Tank Operating (MIG)	Ground Tank Non-Operating (M3)	Ground Tank Operating (M3)	Remarks
North Camp	0.00	0.68	0.00	3073.00	
Abu Samra	0.00	1.00	0.00	4545.00	Additional new storage (0.5 MIG) commissioned on 18.10.2019
Al Ghuwairiyah	0.00	0.50	0.00	2273.00	
Shahaniyah 1	1.50	0.00	6818.00	0.00	GST not in service since 27/11/2018 as ET not operational due to major roof defects.
Mazruah	1.50	0.00	6818.00	0.00	Station is not in service (On Standby)
New Jemiliyah	0.50	0.00	2273.00	0.00	GST not in service since 19/05/2014 as ET not operational due to leakage.
Dukhan	0.50	0.00	2273.00	0.00	Station is not in service (On Standby)
Total	**4.00**	**2.18**	**18182.00**	**9891.00**	

WT22 WATER STORAGE IN ELEVATED TANKS IN 2020

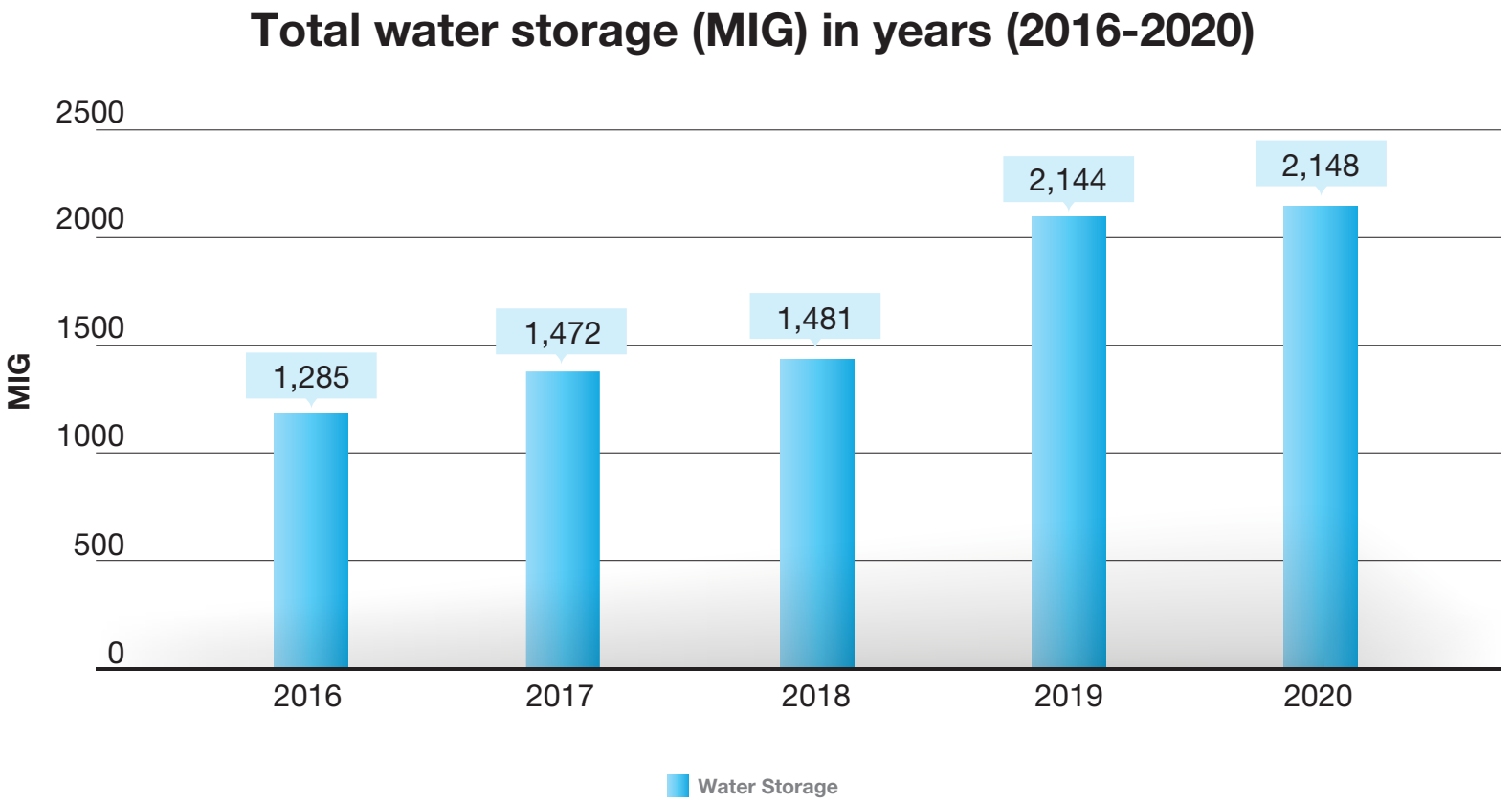
Location	Elevated Tank Capacity (Imperial Gallons)	Elevated Tank Operating Capacity (Imperial Gallons)	Capacity (M3)	Operating Capacity (M3)	Remarks
Madinat Shamal	55,000	0	250	0	Demolished
Al Ghuwairiyah	55,000	0	250	0	Bypassed
Al Khor 1	55,000	55,000	250	250	In Service
Mazruah	200,000	0	909	0	Standby
Shahaniyah 1	69,000	0	314	0	ET not operational since 29/09/2013 due to major roof defects.
Abu Samra	110,000	110,000	500	500	In Service. Includes new Elevated Tank commissioned on Oct 2019
New Jemiliyah	80,000	0	364	0	ET not operational since 19/05/2014 due to leakage.
North Camp	88,000	88,000	400	400	In Service
Total	**712,000**	**253,000**	**3,236**	**1,150**	

WT23 WATER STORAGE IN TOWERS IN 2020

Location	Capacity (Imperial Gallons)	Capacity (M3)	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	Demolished on Nov. 2017
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 (Standby)
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**	

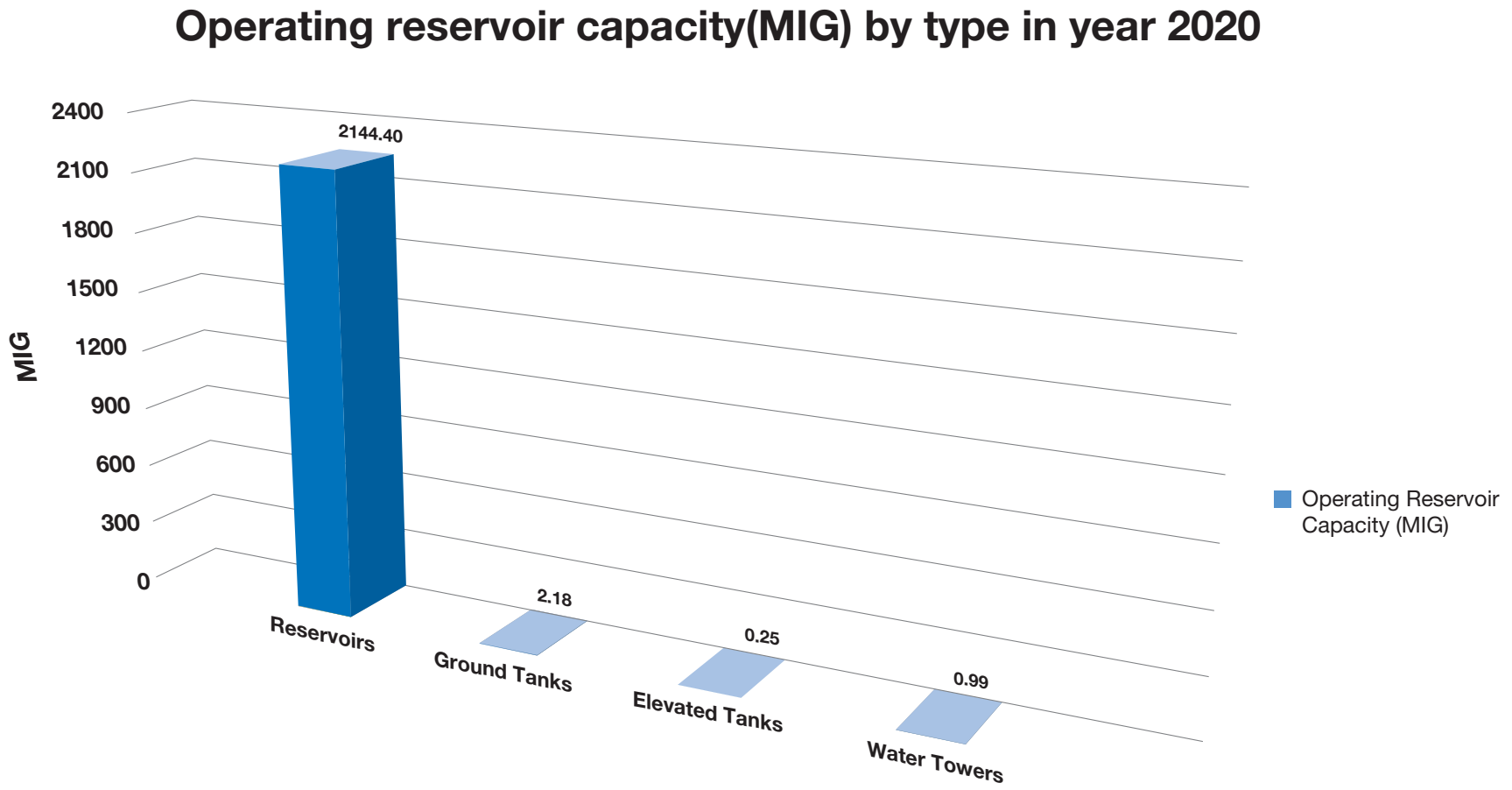
WT24 TOTAL WATER STORAGE 2016-2020

Water Storage	2016	2017	2018	2019	2020
Imperial Gallons (IG)	1,285,274,000	1,472,170,000	1,481,170,000	2,143,670,000	2,147,823,000
Meter Cube(M3)	5,842,155	6,691,682	6,732,591	9,743,955	9,762,832
Million Meter Cube (MM3)	6.0	6.7	6.7	9.7	9.8
Million Imperial Gallons (MIG)	1,285	1,472	1,481	2,144	2,148



WT25 TOTAL WATER STORAGE BY TYPE IN 2020

Type	Operating Reservoir Capacity (MIG)	%	Remarks
Reservoirs	2144.40	99.84%	-
Ground Tanks	2.18	0.10%	-
Elevated Tanks	0.25	0.01%	-
Water Towers	0.99	0.05%	Water Towers in Service are considered
Grand Total	2147.82	100.00%	-



WT26 TOTAL ABSTRACTION FROM GROUND WATER 2016-2020

	2016	2017	2018	2019	2020
Ground Water Abstraction (Mm3)	250	250	250	250	250 *

* Note: 250 million m3 based on estimation of previous studies.

WT27 TOTAL WATER STORAGE IN YEAR 2020

Abstraction from Ground Water by Types (Mm3)	Agricultural Wells	Municipal Wells	Domestic Wells	Industrial Wells	Other Wells	Total
	250	20 *			N/A	270.0

* Note: All value are estimated in million cubic meter based on estimation of previous studies.
** Municipal, Domestic and Industrial Wells has been combined due to no available specific data for each type.

GLOSSARY OF TERMS & ABBREVIATIONS

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.

Abbreviation	Description
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
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)

Abbreviation	Description
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.
m3	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
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.

Abbreviation	Description
Power Factor	The cos Ψ, where Ψ 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
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

Abbreviation	Description
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).
Waste heat	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.
Well field	Multiple borings into the ground 30 meters deep or deeper to extract water deposits.
WNA	Water Network Affairs: Directorate level business unit in KAHRAMAA that takes care of water reservoirs & network expansion and maintenance.
WPA	Water Purchase Agreement

Abbreviation	Description
Air Conditioning	“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
District Cooling	“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
DC Plant	“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
DC Provider	“DC Provider” means an entity which generates and distributes Cooling Energy by means of Chilled Water using a DC System.
Ton of Refrigeration “(TR)”	“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).
Treated Sewage Effluent”(TSE)	“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.
GST	Ground Storage Tank. Used for water storage.
Air Conditioning	“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
District Cooling	“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
DC Plant	“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
Cooling Load	“Cooling Load “ means rate of removal of heat energy expressed in Tons of Refrigeration .
Peak Cooling Load	“Peak Cooling Load ”means The maximum instantaneous cooling load occurred during the year expressed in Tons of Refrigeration .