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

Annual Statistics Report 2021

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Annual Statistic Report 2021

Qatar General Electricity & Water Corporation “KAHRAMAA”

Prepared by: Planning & Quality Department
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KAHRAMAA Publications

His Highness

Sheikh Tameem Bin Hamad Al-Thani

Emir of the State of Qatar

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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, 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. The Qatar National Development Strategy-II (QNDS2) 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 2021 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 2021 was 8,875 MW, grew by 3.2% vs last year. Total energy transmitted in 2021 was 48,329 GWh, 5.5% more in comparison to last year. In case of water system maximum demand was 422 MIGD, decrease by 4.7% as compared to the last year. The total water production in 2021 was 671 Mm3 , 2.9% less as compared to last year.

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 2022 and beyond.

H.E. Saad Bin Sherida Al-Kaabi
Minister of State for Energy Affairs

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, Kahramaa launched "Tarsheed", the National Conservation Program is in progress to create sustainable culture and lifestyle among its residents, the public and private sector in cooperating towards conservation & efficiency to ensure optimal use of electricity and water. 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 is developing 700 MW of electricity from solar energy, and has implemented alternative potable water production techniques such as reverse osmosis.

To align with Qatar National Vision (QNV 2030), Qatar National Development Strategy-II (QNDS2 2018-2022) and Qatar Water Strategy (QWS), Kahramaa has updated its long term strategy road map towards its vision to become world class utility via the following 15 Corporate objectives: Build on environmental and conservation efforts including water security in Qatar, Excel at financial performance through optimizing cost & revenues, Build on asset management capabilities to optimize asset performance, Build on corporate governance, risk management, legal and compliance, Optimize processes and systems and align target operating model to Kahramaa's mandate, Strengthen Qatarization & accelerate development of future leaders and Build on attracting, motivating, developing and retaining talent to provide high quality and sustainable electricity and water for better living in Qatar. Kahramaa pursues its long term strategy up to 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.

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. Despite the global pandemic situation, the State of Qatar has maintained adequate supply of electricity and water, reinforced by reliable and efficient transmission and distribution network across the country. 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.

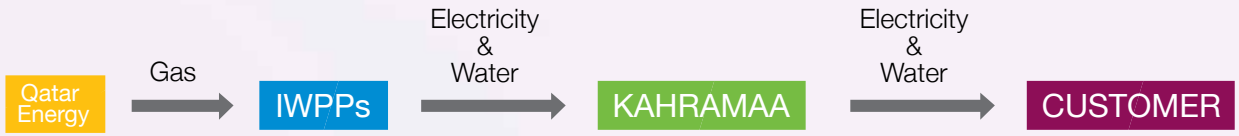
H.E. Essa Bin Hilal Al-Kuwari
KAHRAMAA President

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.
(Qatar Energy) 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 Qatar Energy.

EWT1 KEY GROWTH INDICATORS

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

	2017	2018	2019	2020	2021	Average % Change
A. ELECTRICITY						
Generated, GWh	45,555	47,913	49,873	49,259	51,641	**4.1%**
% Change	7.6%	5.2%	4.1%	-1.2%	4.8%	
Sent Out, GWh	42,806	44,655	46,435	45,826	48,329	**4.1%**
% Change	7.9%	4.3%	4.0%	-1.3%	5.5%	
Maximum Demand, MW	7,855	7,875	8,475	8,600	8,875	**3.6%**
% Change	5.6%	0.3%	7.6%	1.5%	3.2%	
No. of customers (billed & non-billed, based on number of meters)	364,597	376,636	410,661	433,751	454,765	**5.7%**
% Change	5.9%	3.3%	9.0%	5.6%	4.8%	
B. WATER						
Water Production Mm3	606	637	671	691	671	3.6%
% Change	7.7%	**5.1%**	**5.3%**	**3.0%**	**-2.9%**	
Maximum Production, Mm3/Day	1.78	1.84	1.98	2.06	2.0	**3.7%**
% Change	8.5%	3.4%	7.6%	4.0%	-4.9%	
No. of Water customers (billed & non-billed, metered plus served by water tankers)	317,215	329,832	363,338	382,932	406,745	**6.5%**
% Change	**6.7%**	**4.0%**	**10.2%**	**5.4%**	**6.2%**	

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

* The water production is including Pearl Qatar RO plant

EWT2 STRATEGIC ELECTRICITY & WATER INFRASTRUCTURE PROJECTS

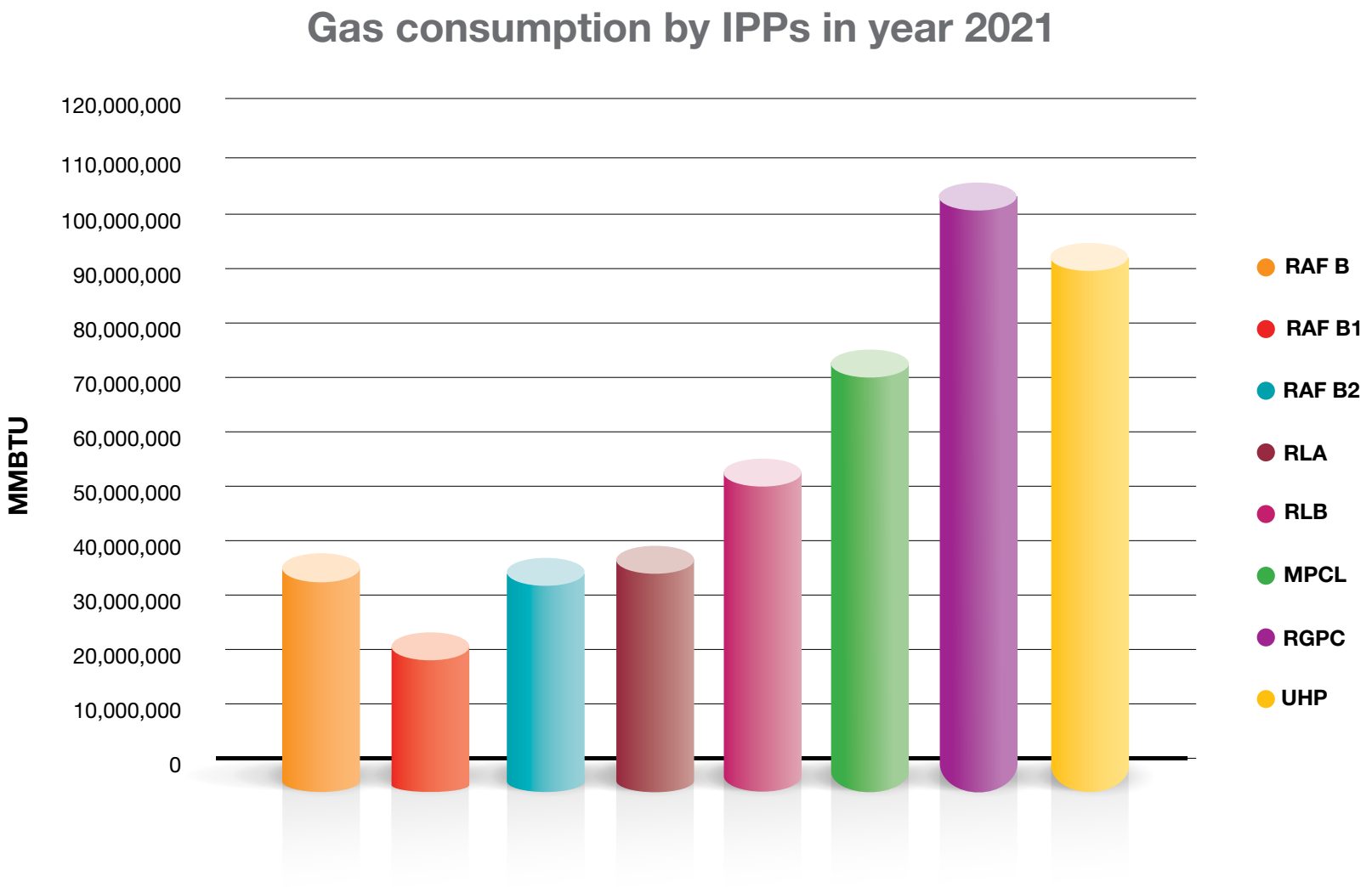
KAHRAMAA has initiated various projects for the construction of production, transmission, distribution and storage capacities to meet the escalating electricity and water demand and meet customer satisfaction.

Some of the key projects are given below.

- Advanced Metering Infrastructure- AMI (In Progress)
- Billing and Customer Relationship Management Project (In Progress)
- Installation of Electricity & Water SMART Meters (In Progress)
- Solar Power project of 700 MW (In Progress)
- Additional Capacity from IWPPs – Facility E (In Progress)
- Qatar Power Network Expansion- Phase 12, 13 & additional projects (In Progress)
- Extension of Water Distribution Network – Phase 6
- Facility E Associated Water Transmission Pipelines
- Afjat Muaither Water RPS & Associated Pipelines
- Reconstruction & Upgrading of Old Salwa RPS with Underground Water Reservoirs
- Installation of Emergency Water TFSs & Internal Piping Improvement in selected RPSs

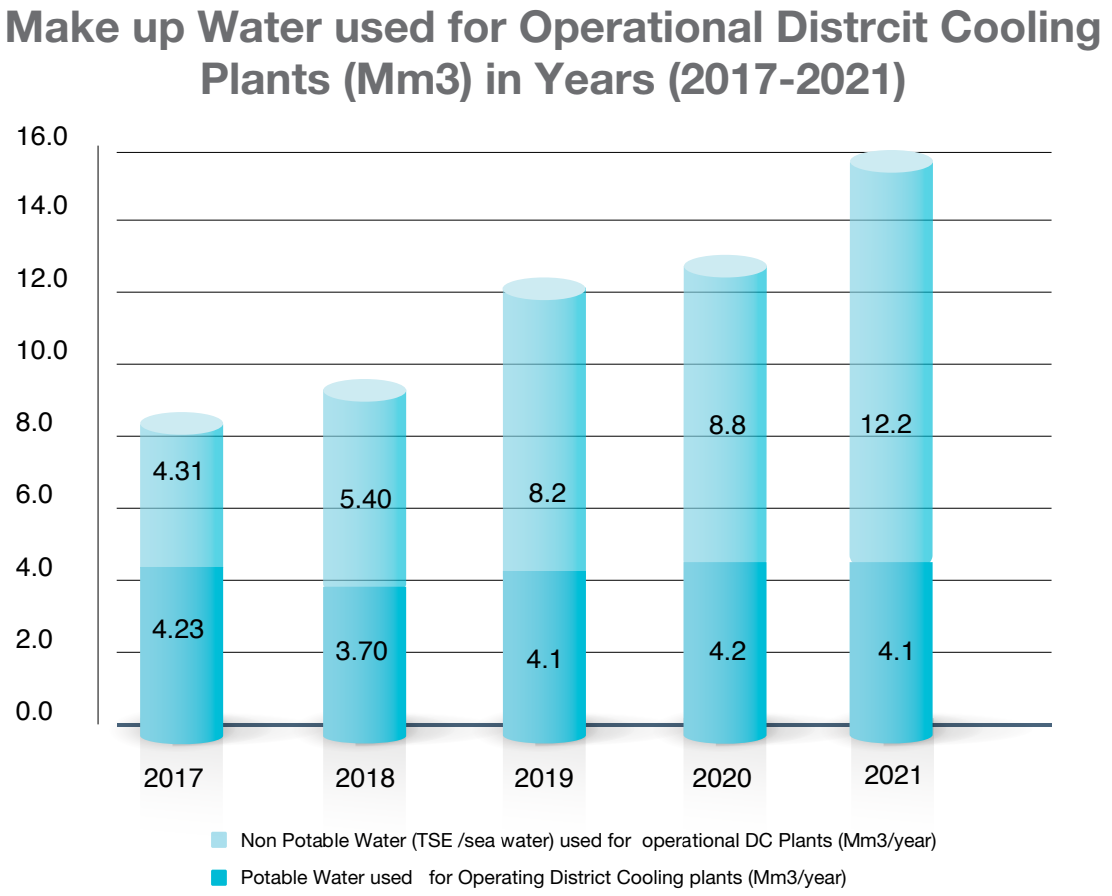
EWT3 GAS CONSUMPTION BY IWPP (MMBTU) IN 2021

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	2,851,570	2,499,094	3,040,356	2,968,154	3,818,206	1,646,286	5,518,154	4,815,862	**27,157,682**
Feb	2,721,946	1,809,548	2,746,324	2,728,231	3,408,067	1,489,514	4,678,460	5,202,597	**24,784,687**
Mar	3,070,696	1,815,935	2,919,848	3,204,400	3,934,147	2,674,993	5,979,520	6,419,929	**30,019,468**
Apr	2,426,764	1,032,966	3,041,935	3,389,528	3,740,482	4,032,318	7,900,994	7,249,389	**32,814,376**
May	2,554,856	1,079,977	3,118,449	3,527,942	3,823,602	7,151,579	10,648,296	8,572,310	**40,477,011**
Jun	3,266,376	1,245,271	3,009,340	3,119,053	4,882,785	8,270,151	10,769,290	9,244,022	**43,806,288**
Jul	3,405,466	1,575,490	3,467,938	3,235,724	5,753,787	8,982,612	12,030,440	9,950,042	**48,401,499**
Aug	3,976,118	1,989,515	3,172,333	3,380,094	5,813,518	8,908,873	12,296,512	10,444,384	**49,981,347**
Sep	3,484,073	1,277,657	3,094,979	3,227,943	5,576,341	8,584,758	11,010,629	9,155,256	**45,411,636**
Oct	3,220,612	1,271,587	3,282,003	3,245,264	5,370,753	7,657,357	9,925,294	7,635,034	**41,607,904**
Nov	2,160,486	994,660	3,254,083	3,206,872	3,872,022	5,436,783	7,601,895	6,946,238	**33,473,039**
Dec	2,268,509	1,707,467	2,274,357	3,689,333	4,025,587	3,737,002	5,389,492	6,142,478	**29,234,225**
Total	**35,407,472**	**18,299,167**	**36,421,945**	**38,922,538**	**54,019,297**	**68,572,226**	**103,748,976**	**91,777,540**	**447,169,161**


Gas consumption by IPPs in year 2021
MMBTU
120,000,000
110,000,000
100,000,000
90,000,000
80,000,000
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
RAF B
RAF B1
RAF B2
RLA
RLB
MPCL
RGPC
UHP

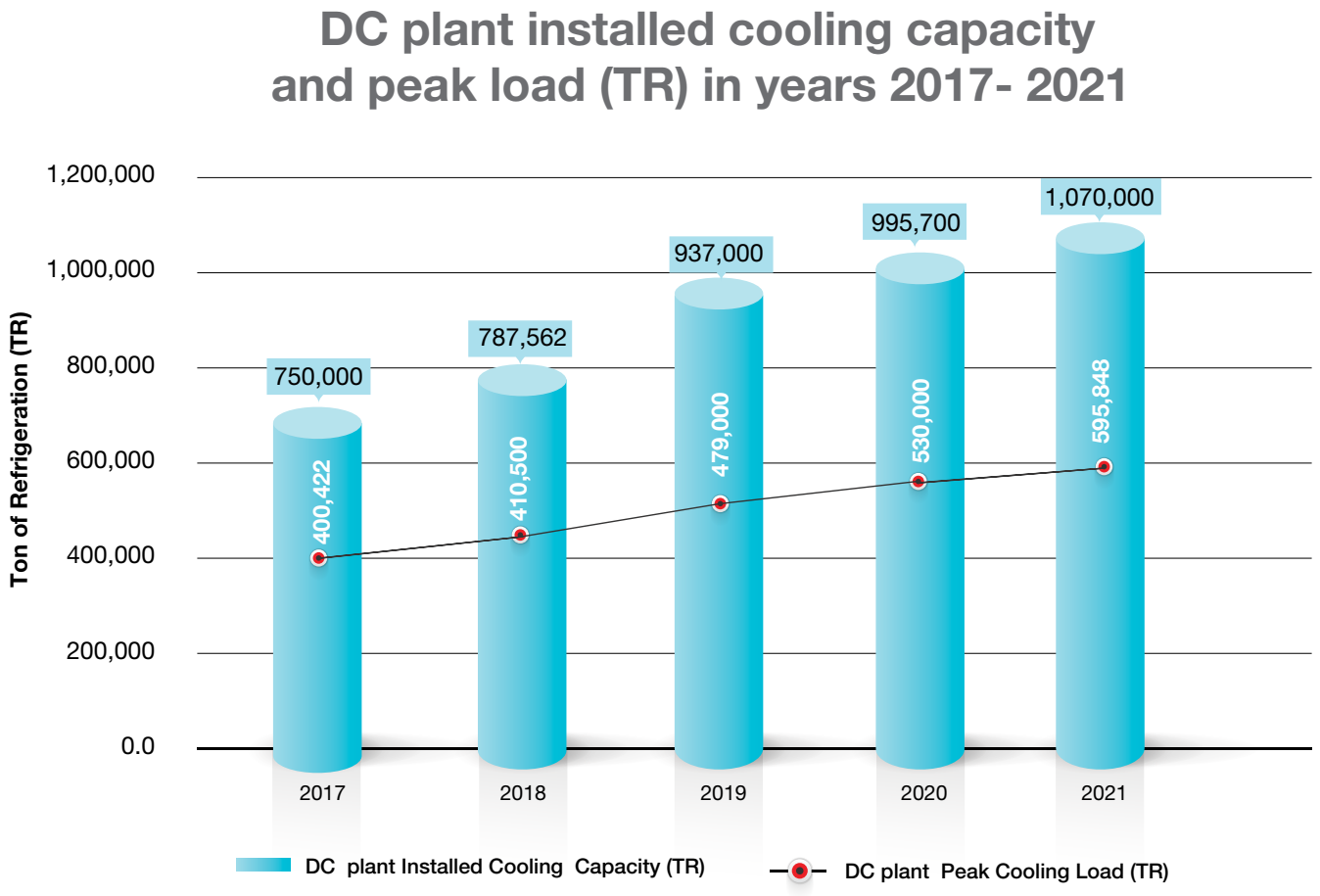
EWT4 NON-POTABLE WATER USED IN DISTRICT COOLING

Year	2017	2018	2019	2020	2021
Potable Water used for Operating District Cooling plants (Mm3/year)	4.23	3.70	4.1	4.2	4.1
Non Potable Water (TSE /sea water) Used for operational DC Plants (Mm3/year)	4.31	5.40	8.2	8.8	12.2
Total Makeup Water demand for Cooling (Mm3/year)	8.54	9.1	12.3	13.0	16.3



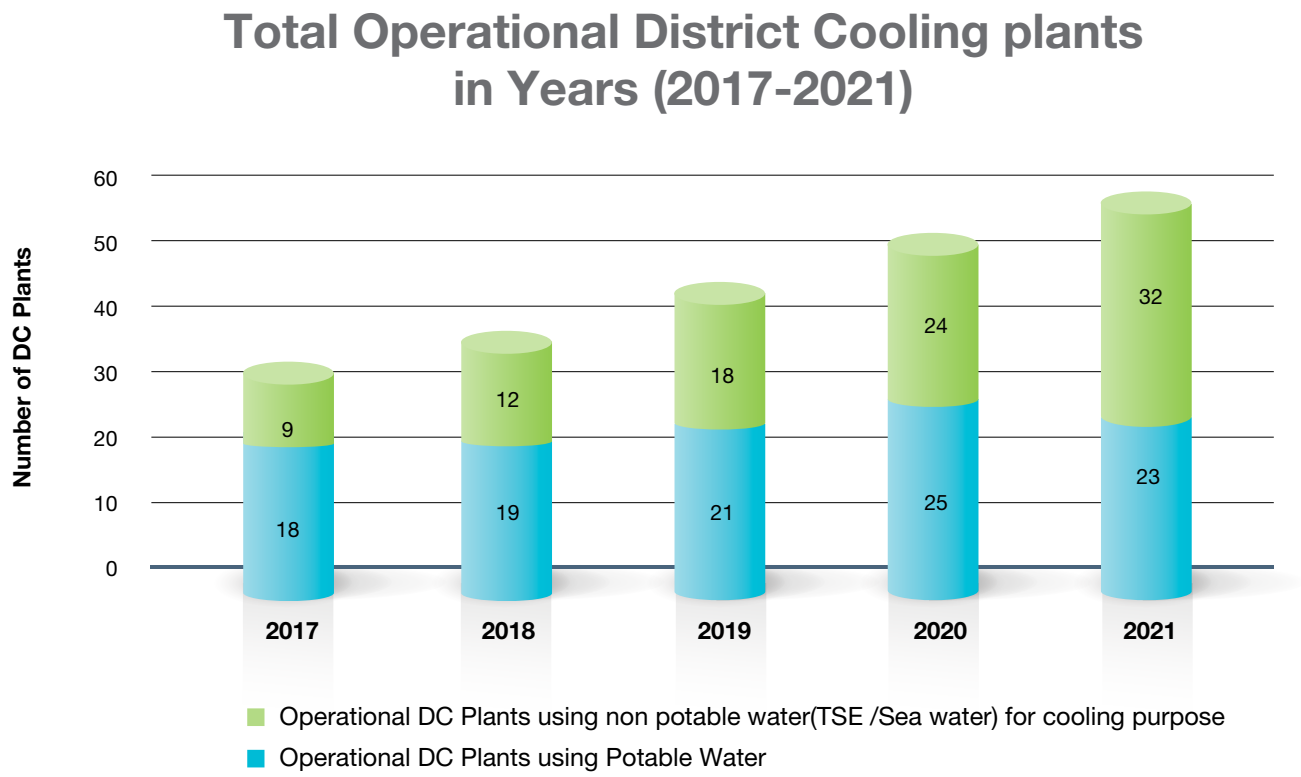
EWT5 OPERATIONAL PEAK DISTRICT COOLING LOAD IN YEARS 2017-2021

Year	2017	2018	2019	2020	2021
DC plant Peak Cooling Load (TR)	400,422	410,500	479,000	530,000	595,848
DC plant Installed Cooling Capacity (TR)	750,000	787,562	937,000	995,700	1,070,000



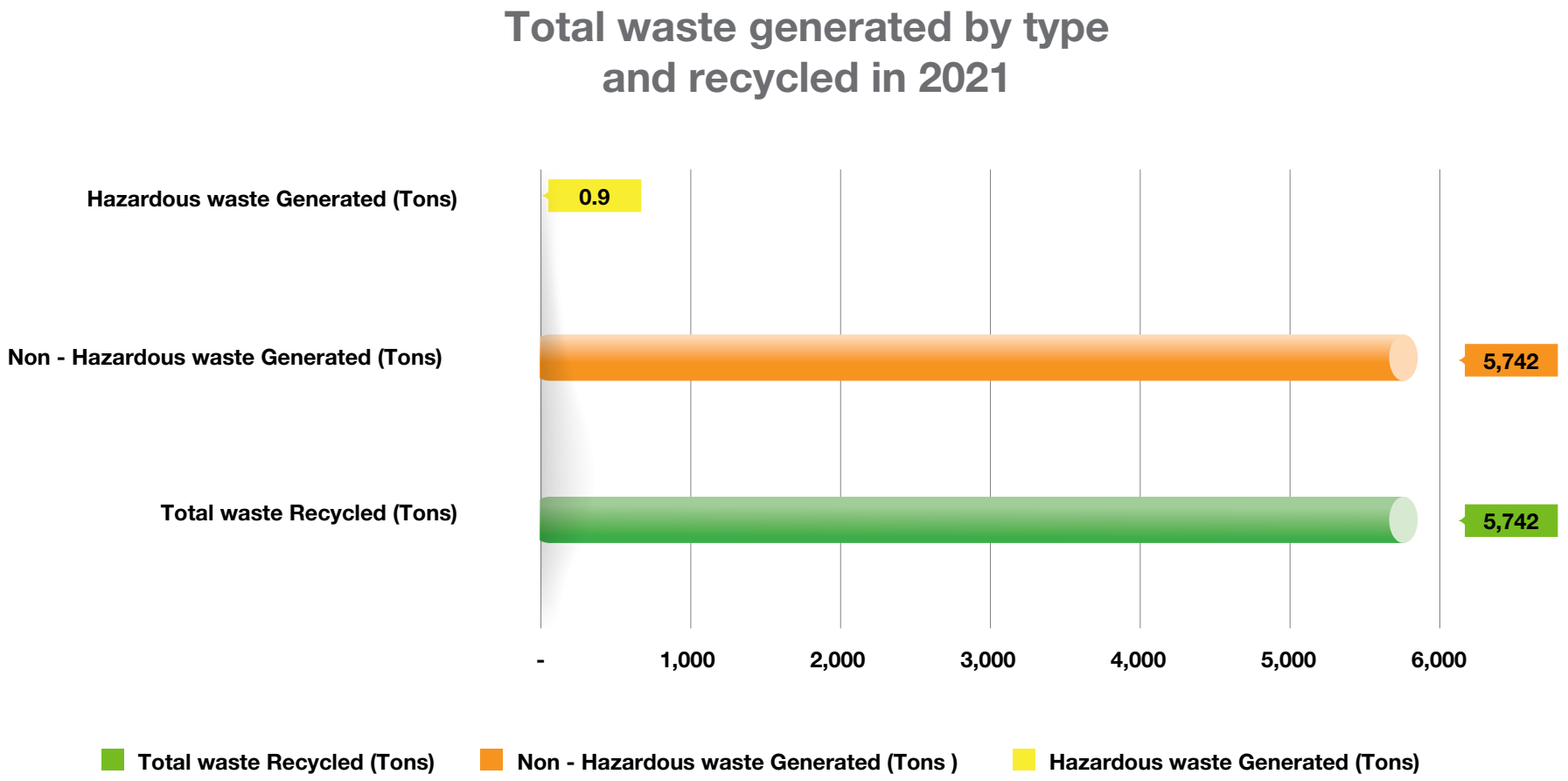
EWT6 OPERATIONAL DISTRICT COOLING PLANTS IN YEARS 2017-2021

Year	2017	2018	2019	2020	2021
Total Operational District Cooling plants	27	31	39	49	55
Number of operational DC Plants using non potable water(TSE /Sea water) for cooling purpose	9	12	18	24	32
Operational DC Plants using Potable Water	18	19	21	25	23



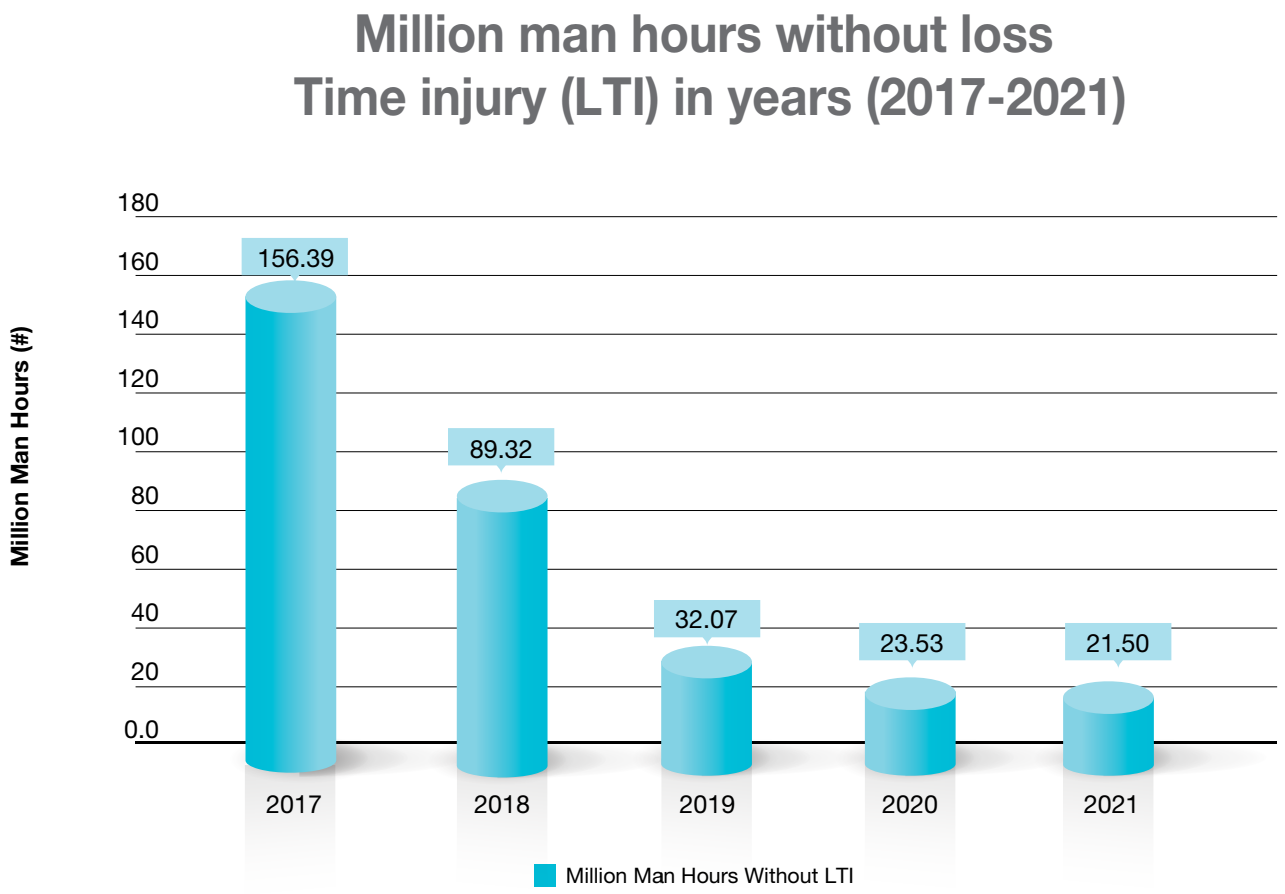
EWT7 TOTAL WASTE GENERATED BY TYPE AND RECYCLED IN 2021

Year 2021	Total waste Recycled* (Tons)	Non - Hazardous waste Generated (Tons)	Hazardous waste Generated (Tons)
	5,742	5,742	0.9



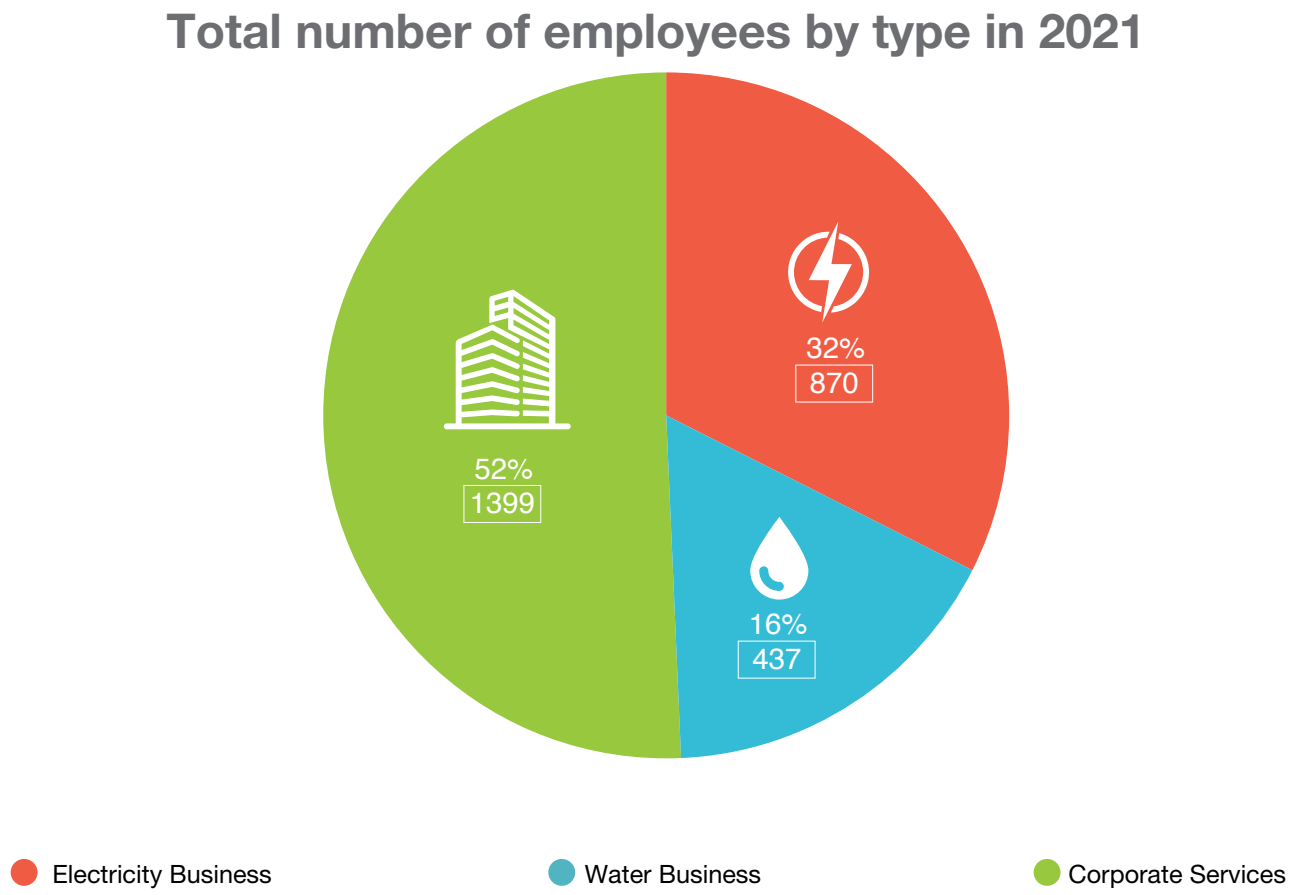
EWT8 MILLION MAN HOURS WITHOUT LTI IN YEARS (2017-2021)

Year	2017	2018	2019	2020	2021
Million Man Hours without LTI	156.39	89.32	32.07	23.53	21.50



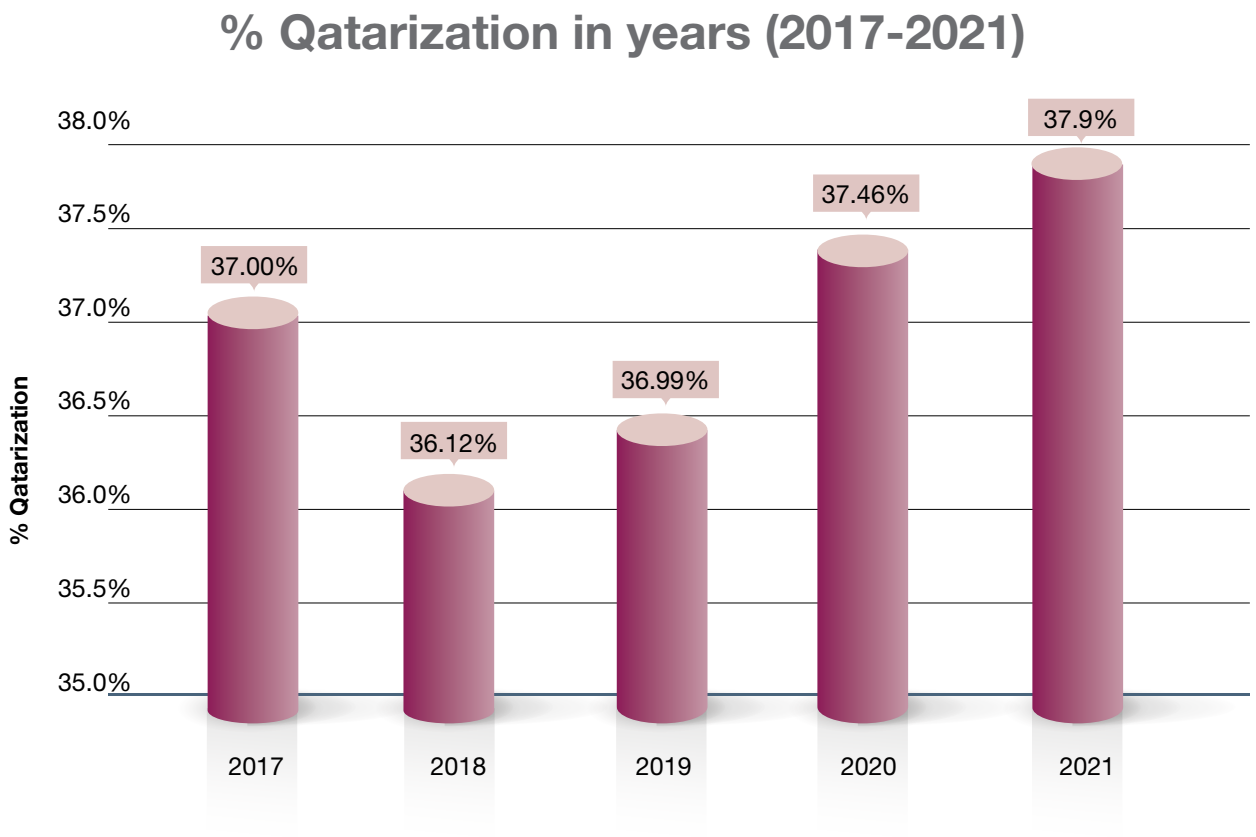
EWT9 TOTAL NUMBER OF EMPLOYEES BY TYPE IN 2021

Total Number of Employees by Type in 2021	Electricity Business	Water Business	Corporate Services
	870	437	1,399

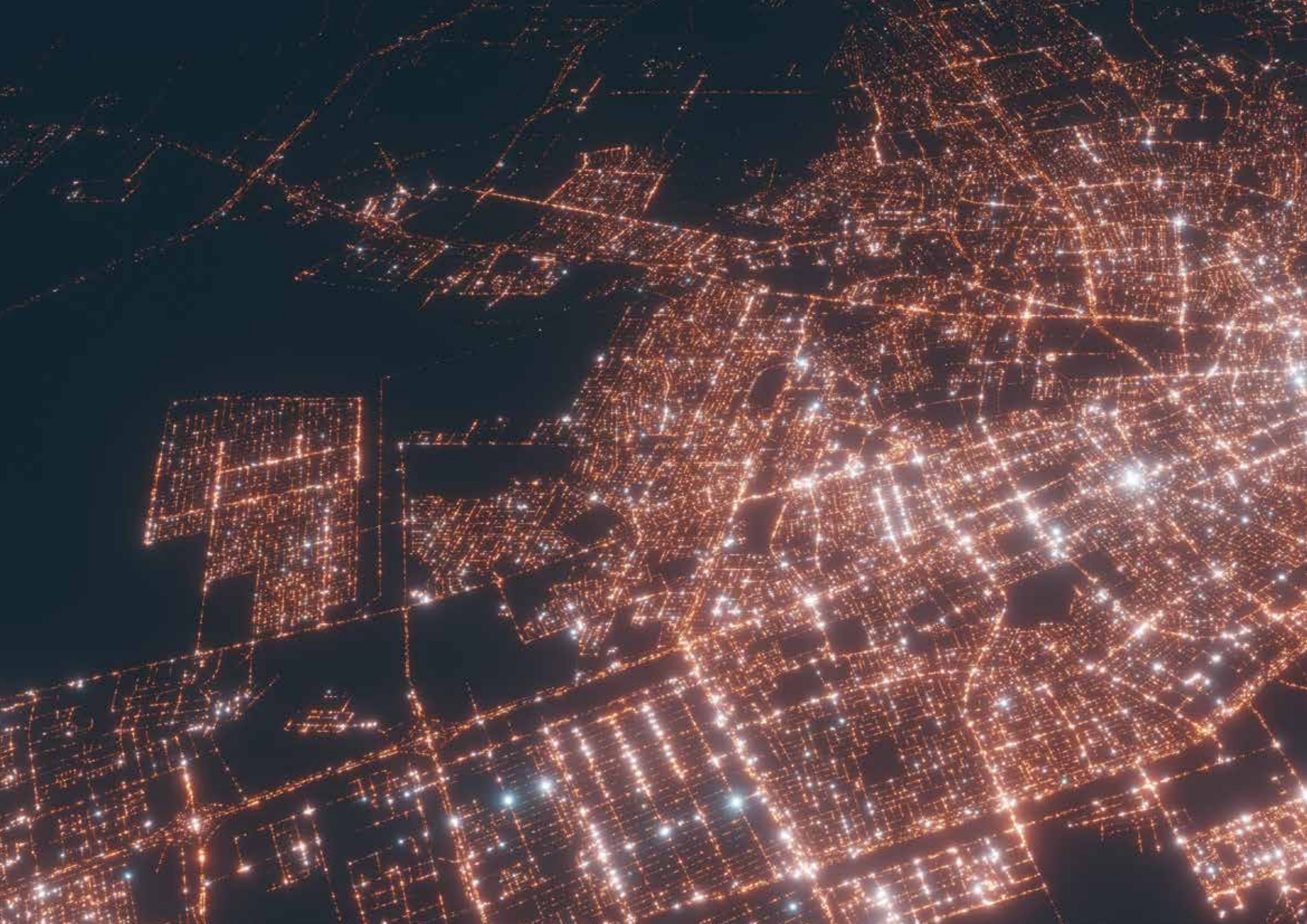


EWT10 QATARIZATION IN LAST FIVE YEARS

% Qatarization	2017	2018	2019	2020	2021
	37.00%	36.12%	36.99%	37.46%	37.90%



Electricity Statistics 2021

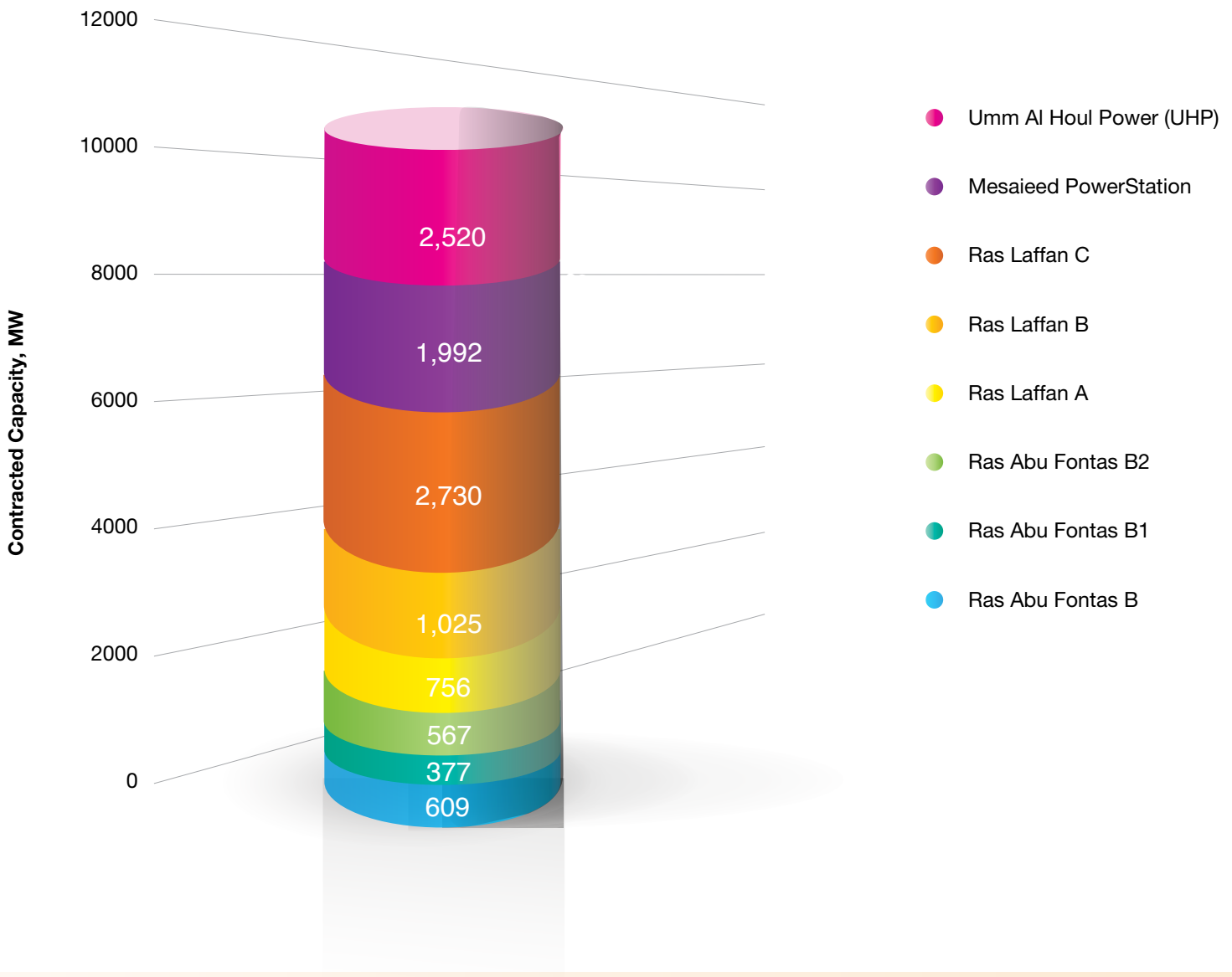


Doha at Night

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	1,992
Umm Al Houl Power Company	
Umm Al Houl Power (UHP)	2,520
Total Capacity	**10,576**

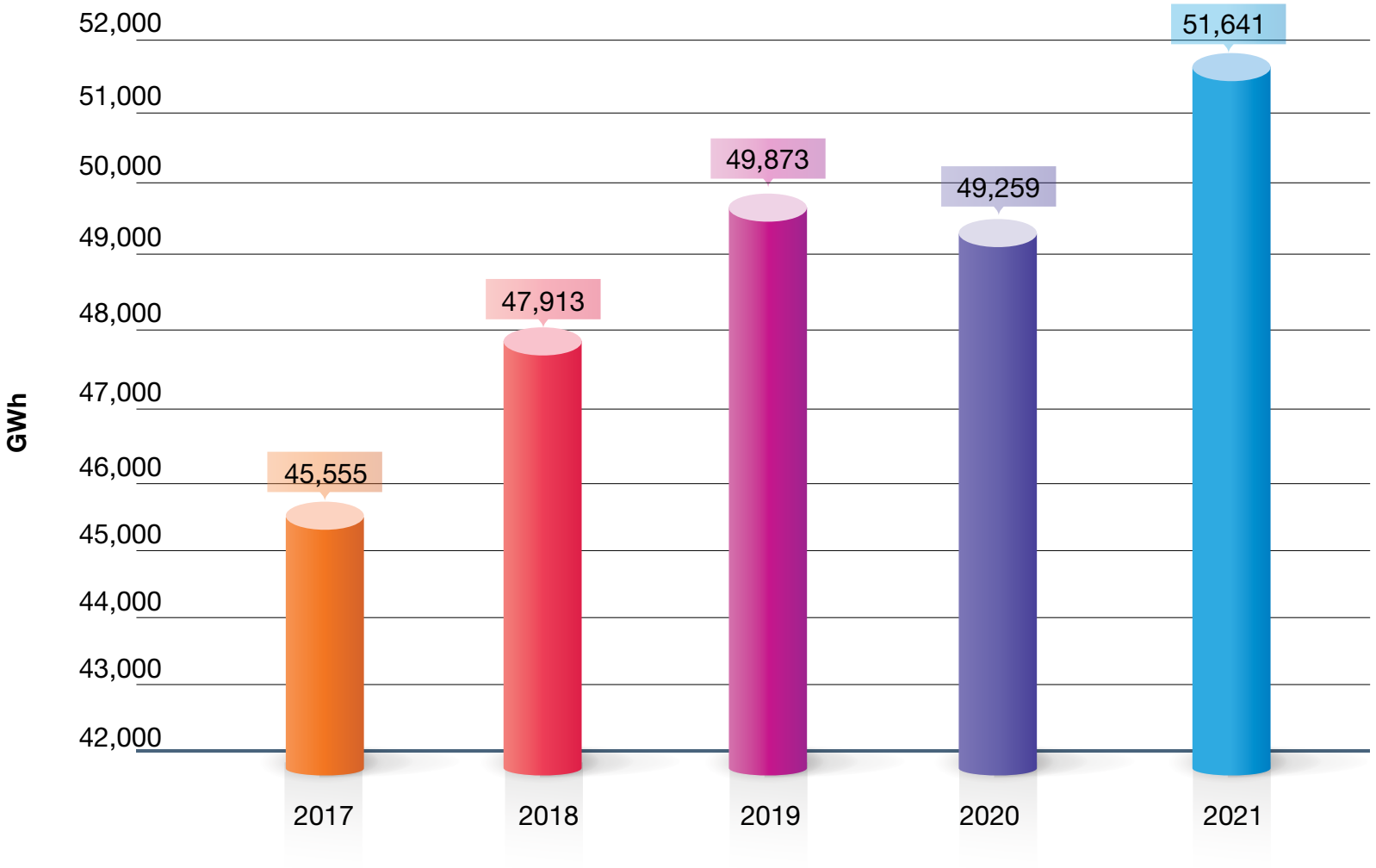
Electricity contracted capacity by IWPPs in 2021



ET2 ANNUAL ELECTRICITY GENERATION (2017 – 2021)

Year	Annual Increase, %	GWh
2017	7.7%	45,555
2018	5.2%	47,913
2019	4.1%	49,873
2020	-1.2 %	49,259
2021	4.8%	51,641

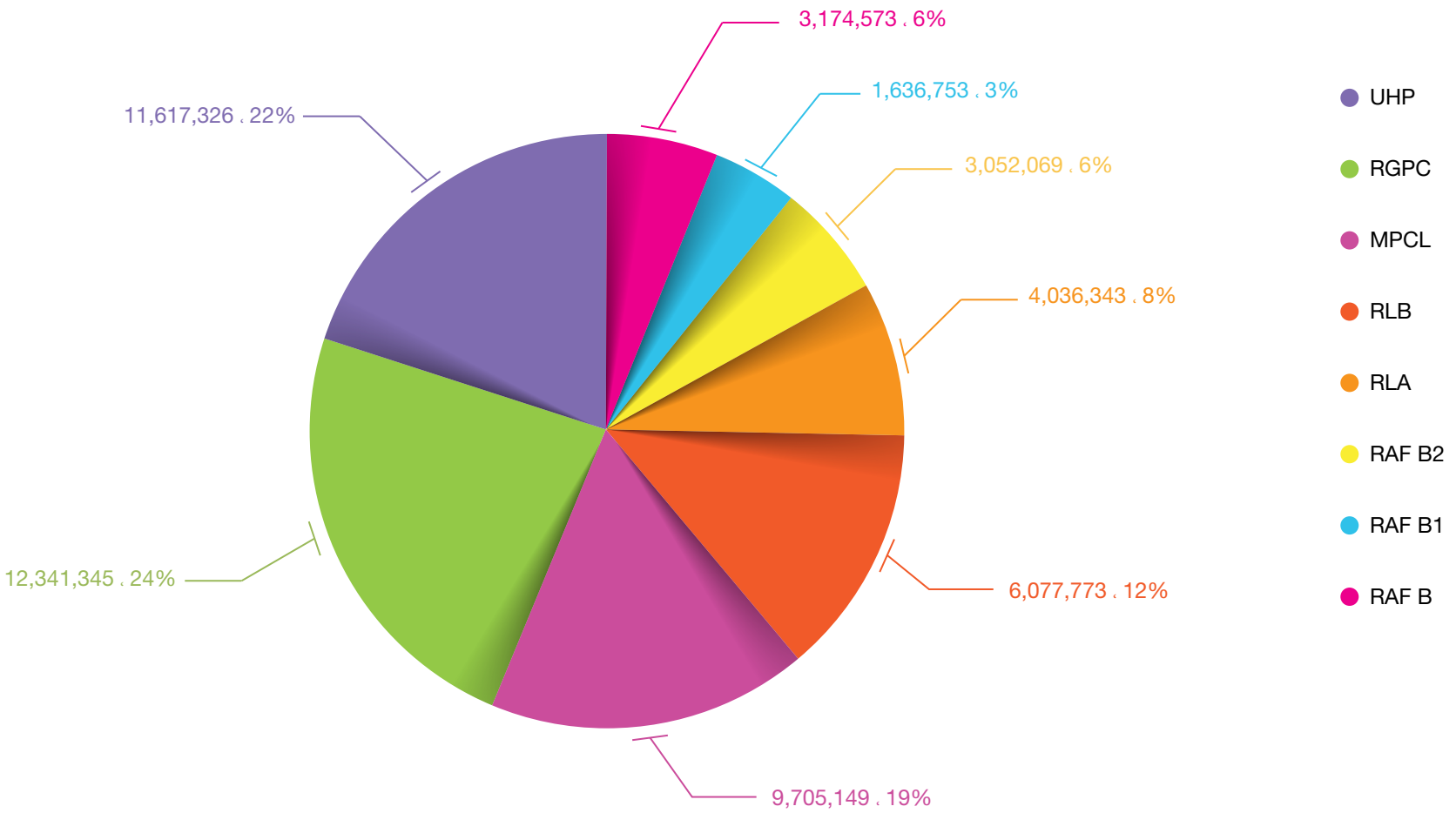
Electrcity generation (GWh) in years (2017-2021)



ET3 MONTHLY ELECTRICITY GENERATION IN 2021, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	251,175	219,020	248,961	340,145	415,099	226,057	551,659	551,269	**2,803,385**
Feb	246,702	161,302	229,307	311,077	385,304	207,219	496,448	583,430	**2,620,789**
Mar	272,207	162,368	239,015	329,459	442,746	371,036	654,172	794,320	**3,265,323**
Apr	219,040	88,478	255,358	345,247	433,053	564,099	948,342	922,773	**3,776,390**
May	231,386	94,306	267,623	352,045	448,051	1,014,790	1,310,026	1,124,944	**4,843,171**
Jun	292,989	112,912	253,132	319,428	543,078	1,176,261	1,339,186	1,207,820	**5,244,806**
Jul	307,820	144,778	292,461	331,797	651,232	1,277,003	1,502,736	1,318,347	**5,826,174**
Aug	355,291	181,614	269,368	337,123	657,820	1,265,073	1,527,808	1,375,582	**5,969,679**
Sep	310,988	116,086	262,986	324,265	627,727	1,218,323	1,349,039	1,194,306	**5,403,720**
Oct	285,195	112,831	271,662	339,096	597,751	1,088,798	1,200,913	967,091	**4,863,337**
Nov	193,979	89,955	260,571	328,113	435,958	770,796	860,910	859,997	**3,800,279**
Dec	207,801	153,103	201,625	378,548	439,954	525,694	600,106	717,447	**3,224,278**
Total	**3,174,573**	**1,636,753**	**3,052,069**	**4,036,343**	**6,077,773**	**9,705,149**	**12,341,345**	**11,617,326**	**51,641,331**

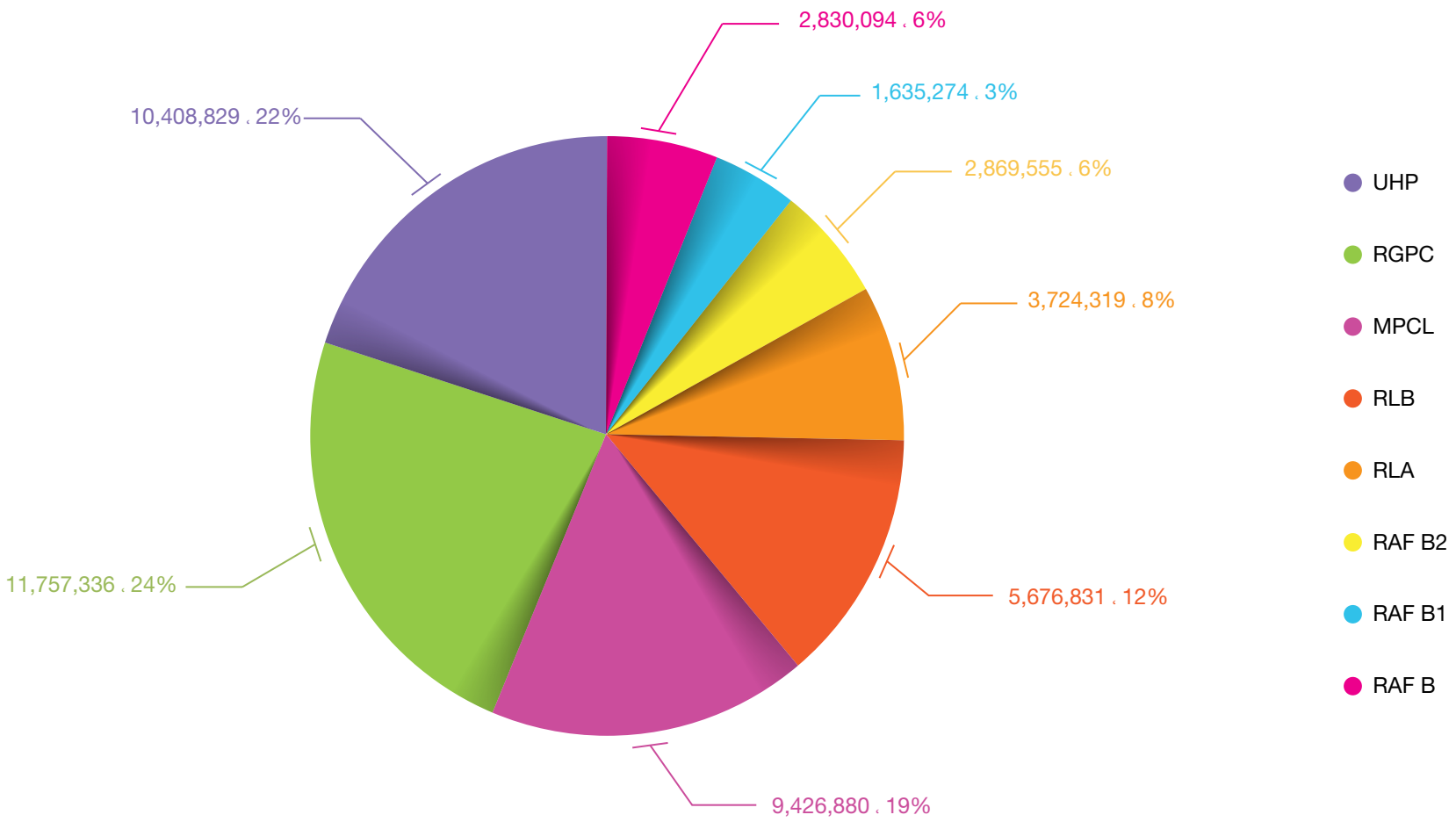
Electricity generation by IWPPs in 2021 (MWh)



ET4 ENERGY TRANSMITTED IN 2021, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	224,680	218,816	233,381	313,888	384,083	217,517	512,220	457,577	**2,562,162**
Feb	219,676	161,155	217,039	287,298	357,903	199,112	463,190	497,385	**2,402,758**
Mar	242,738	162,223	226,139	305,139	413,915	359,578	614,642	698,238	**3,022,612**
Apr	192,278	88,394	240,783	318,191	403,591	546,993	903,330	822,906	**3,516,466**
May	203,326	94,221	252,542	325,034	418,898	985,712	1,255,439	1,012,466	**4,547,638**
Jun	261,039	112,811	237,750	294,005	507,584	1,143,791	1,282,436	1,101,911	**4,941,327**
Jul	274,160	144,649	275,347	305,388	610,401	1,242,316	1,442,462	1,216,191	**5,510,914**
Aug	321,860	181,450	252,801	310,574	616,845	1,230,414	1,465,281	1,265,213	**5,644,438**
Sep	280,465	115,981	246,677	299,050	588,359	1,184,903	1,291,347	1,087,604	**5,094,386**
Oct	255,548	112,729	256,011	312,584	559,979	1,058,577	1,147,624	867,513	**4,570,565**
Nov	170,904	89,877	245,183	302,870	406,945	748,666	814,642	764,106	**3,543,193**
Dec	183,420	152,968	185,902	350,298	408,328	509,301	564,723	617,719	**2,972,659**
Total	**2,830,094**	**1,635,274**	**2,869,555**	**3,724,319**	**5,676,831**	**9,426,880**	**11,757,336**	**10,408,829**	**48,329,118**

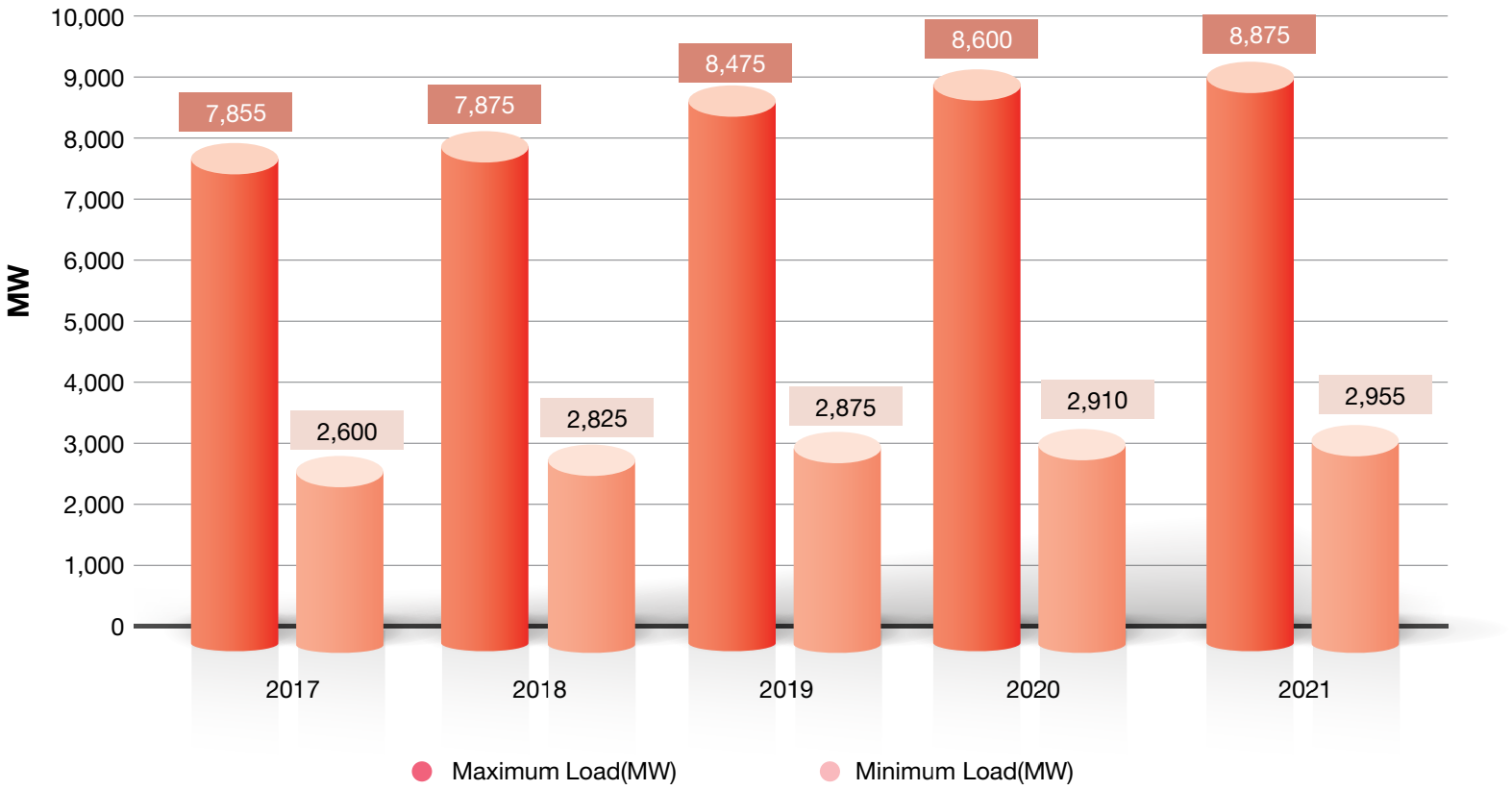
Electricity transmitted by IWPPs in 2021 (MWh)



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)
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
2021	8,875	07/28/2021	2,955	01/15/2021

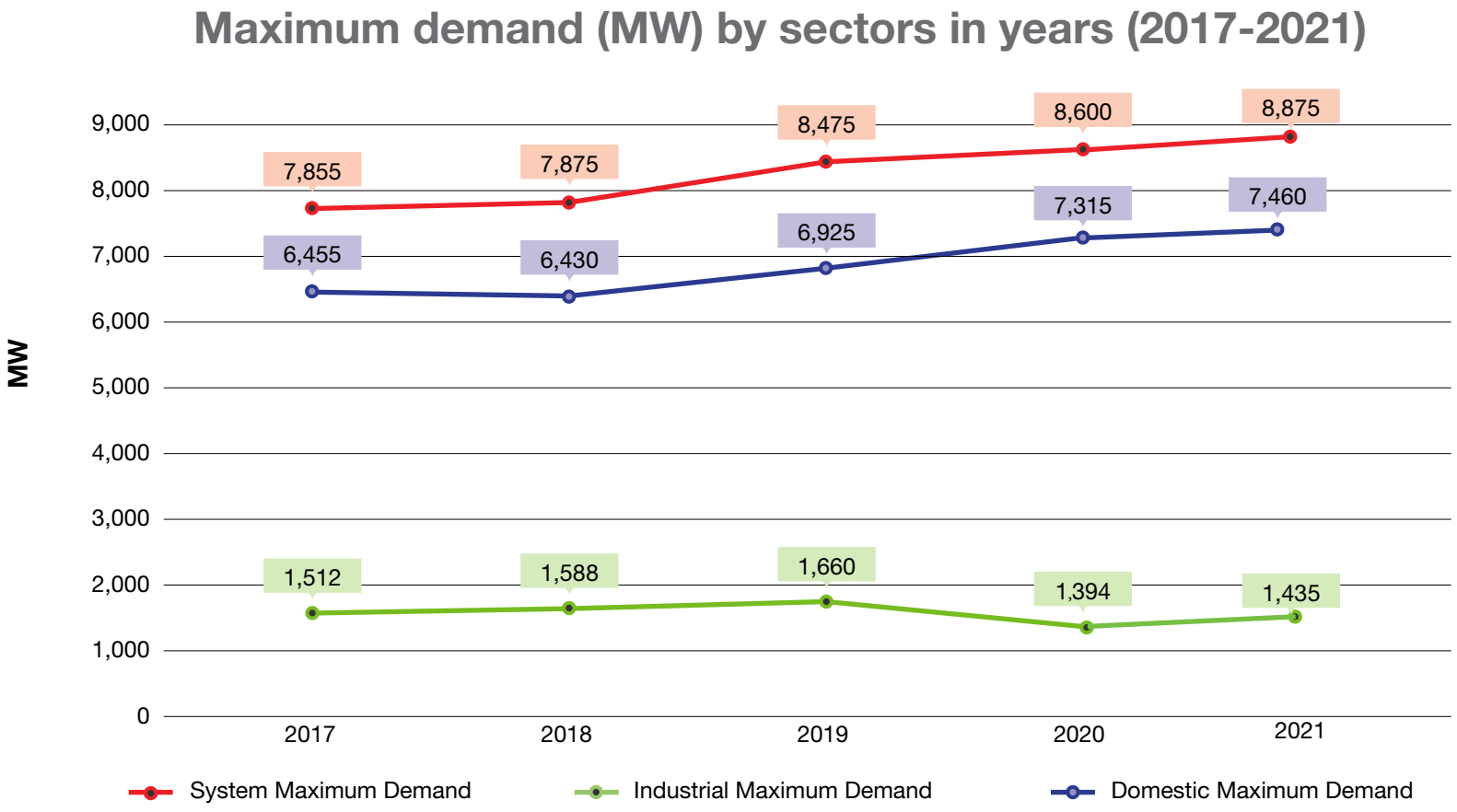
Maximum and minimum system load In years (2017-2021)



ET6 MAXIMUM DEMAND BY SECTORS FROM 2017 TO 2021

Demand Type	2017	2018	2019	2020	2021
System Maximum Demand	7,855	7,875	8,475	8,600	8,875
Industrial Maximum Demand	1,512	1,588	1,660	1,530	1,435
Domestic Maximum Demand	6,455	6,430	6,925	7,315	7,460

Note: * Industrial Maximum Demand figure is excluding Qatalum



ET7 SECTORAL MAXIMUM DEMANDS IN 2021, MW

Demand Type	Magnitude (MW)	Demand Date (mm/dd/yyyy)
System Maximum	8,875	07/28/2021
Industrial Maximum	*1,435	08/26/2021
Domestic Maximum	7,460	07/28/2021

* Maximum industrial demand excluding Qatalum. The maximum industrial demand including Qatalum is 1717 MW recorded on 24th Nov 2021.

ET8 ANNUAL LOAD FACTORS IN 2021

Demand Type	Load Factor, %
System Maximum	63.35%
Industrial Maximum	72.92%
Domestic Maximum	58.58%

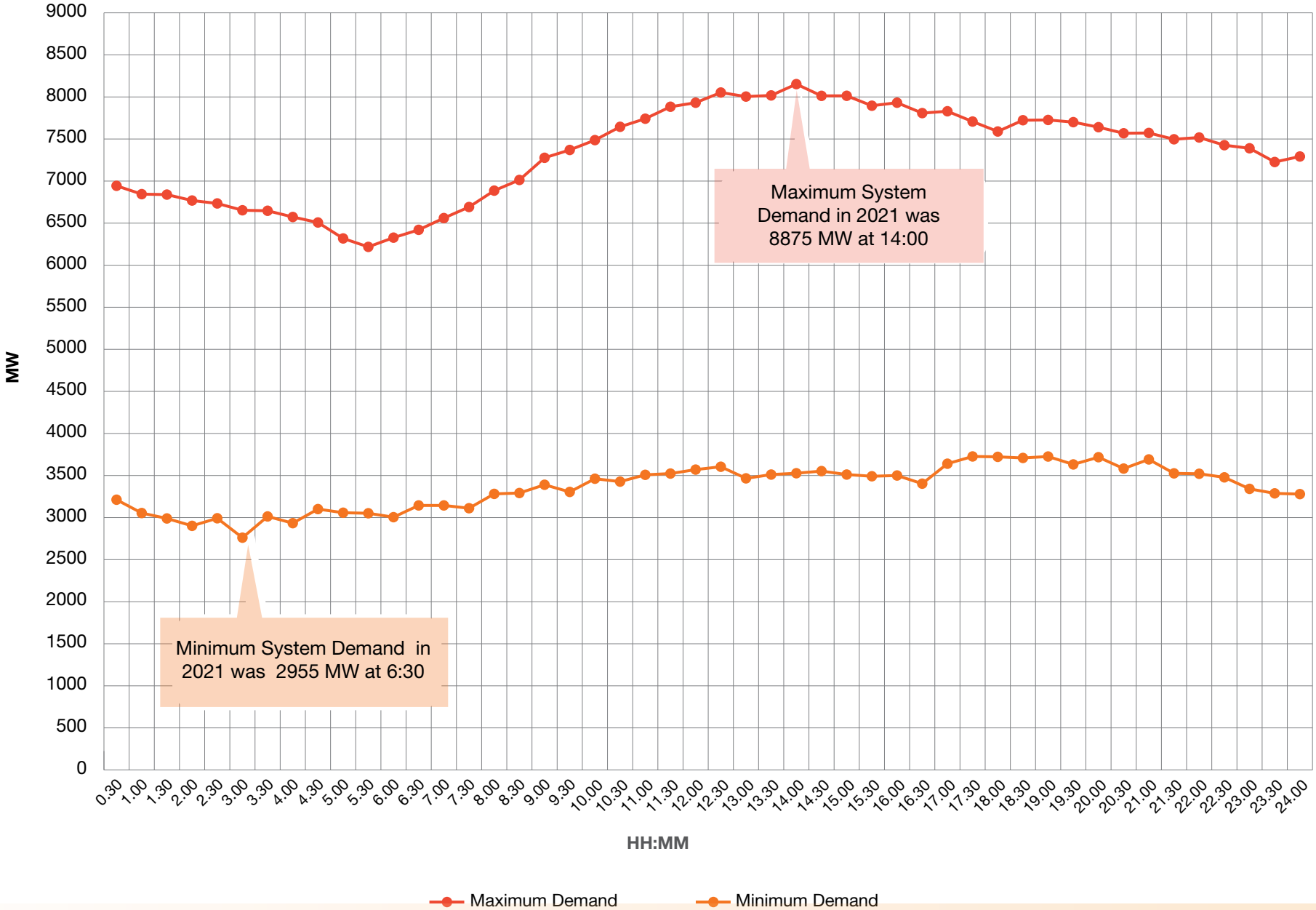
* Note: Starting 2020, Load factors calculations have been revised by including assist generation which is captive generation from some of the bulk customers and auxiliary power from QEWC stations and including Qalatlum tempoarary load.

ET9 ANNUAL GROWTH (%) FROM 2020 TO 2021

Demand Type	Peak Demand (MW) Growth
System Maximum	3.2%
Industrial Maximum	2.9%
Domestic Maximum	2.0%

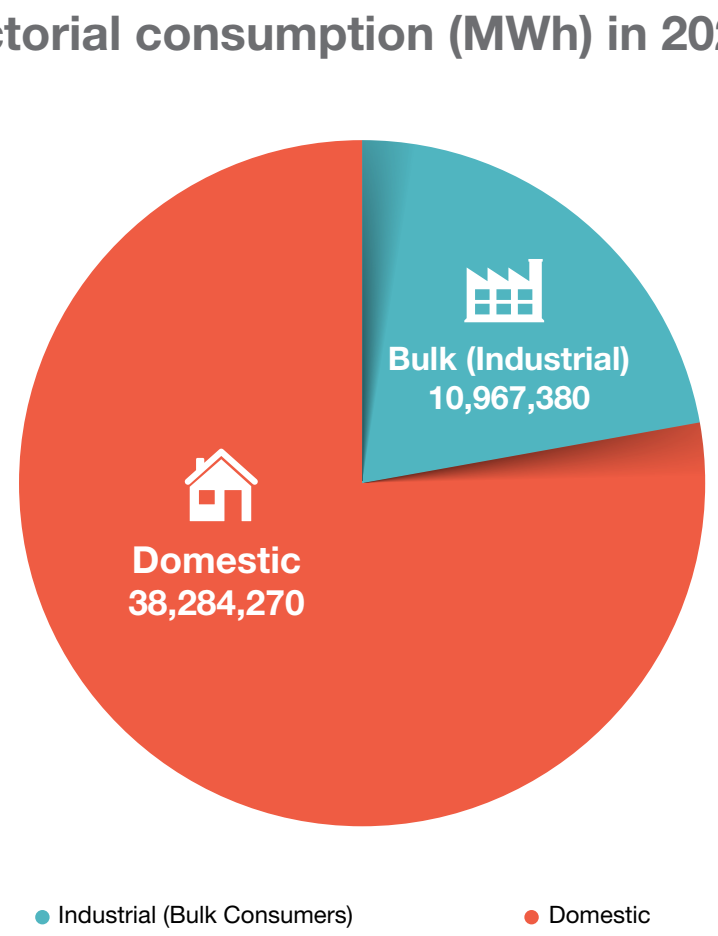
* Maximum industrial demand excluding Qatalum

System maximum and minimum demand (MW)
Half hourly load curve in 2021



ET10 SECTORAL CONSUMPTION IN 2021 MWH

Sector	Bulk (Industrial)	Domestic	Auxiliary	Transmission and Distribution Losses	Total Injected Generation	Total Electricity Generation
Consumption, MWh -2021	10,967,380	38,284,270	3,312,299	2,924,725	48,841,565	51,641,332

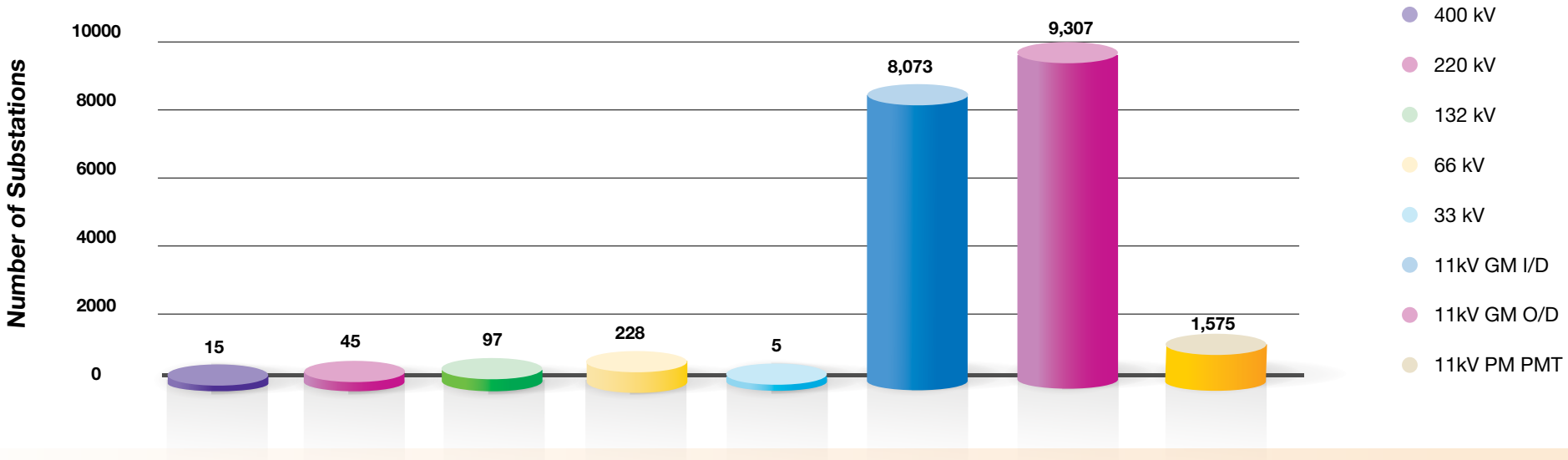


ET11 SUB-STATIONS

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 31/12/2016)	11	36	49	184	6	5,201	8,485	1,454
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
Commissioned -2021	0	3	4	6	0	419	312	70
***In service (as at 31/12/2021)**	**15**	**45**	**97**	**228**	**5**	**8,073**	**9,307**	**1,575**

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

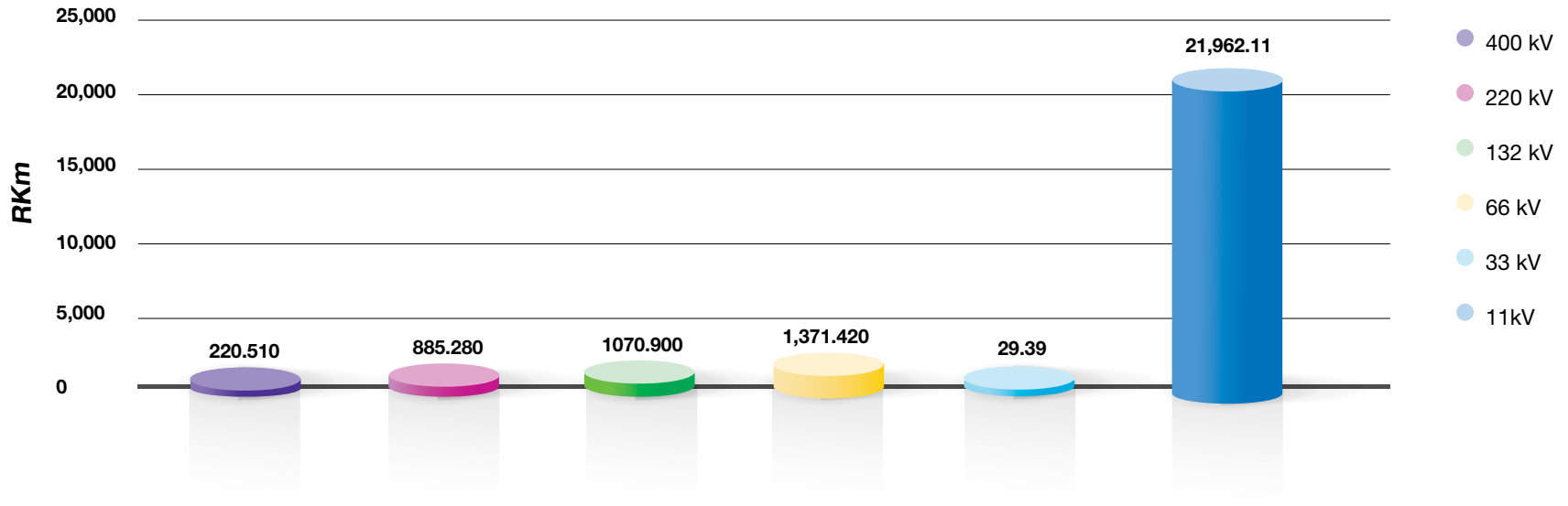
In Service Sub-Stations by end of 2021



ET12 CABLES LAID (RKM)

Period Commissioned	400 kV	220 kV	132 kV	66 kV	33 kV	11 kV
In service (as at 31/12/2016)	115.733	840.844	678.197	1,229.72	28.138	14,399.87
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
Commissioned -2021	0	5.41	19.02	21.41	0.17	1,125
In service (as at 31/12/2021)	**220.510**	**885.280**	**1070.900**	**1,371.420**	**29.39**	**21,962.11**

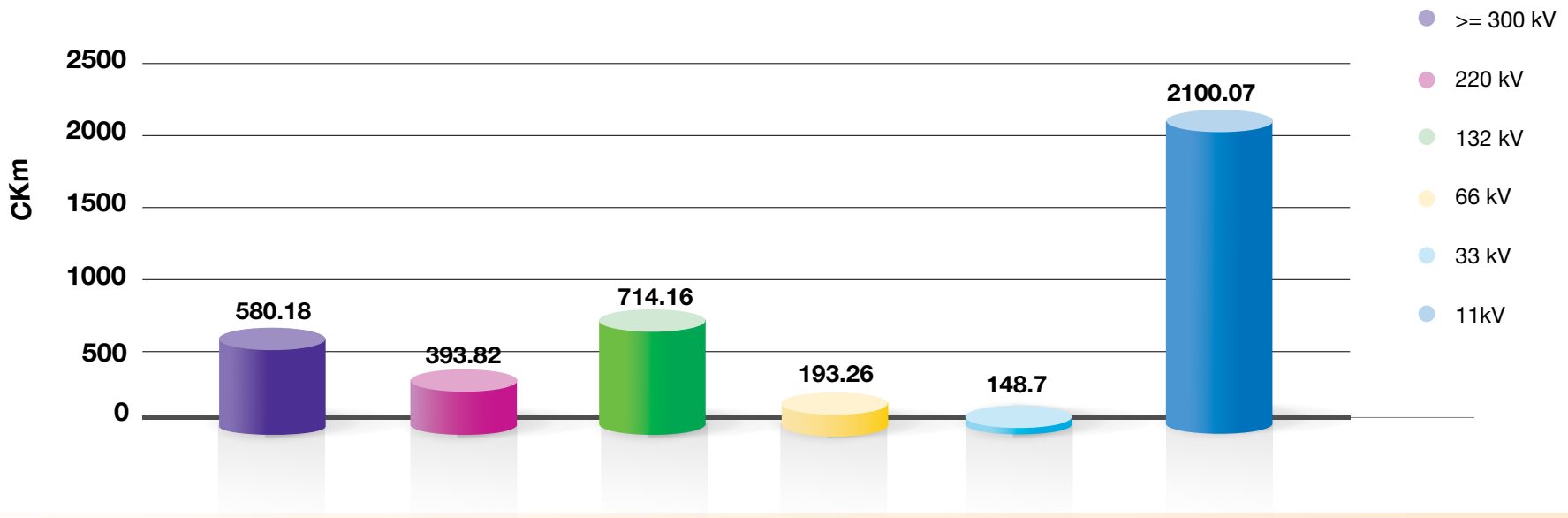
In Service Cables Laid (RKM) by end of 2021



ET13 HIGH VOLTAGE OVERHEAD LINES (CKM)

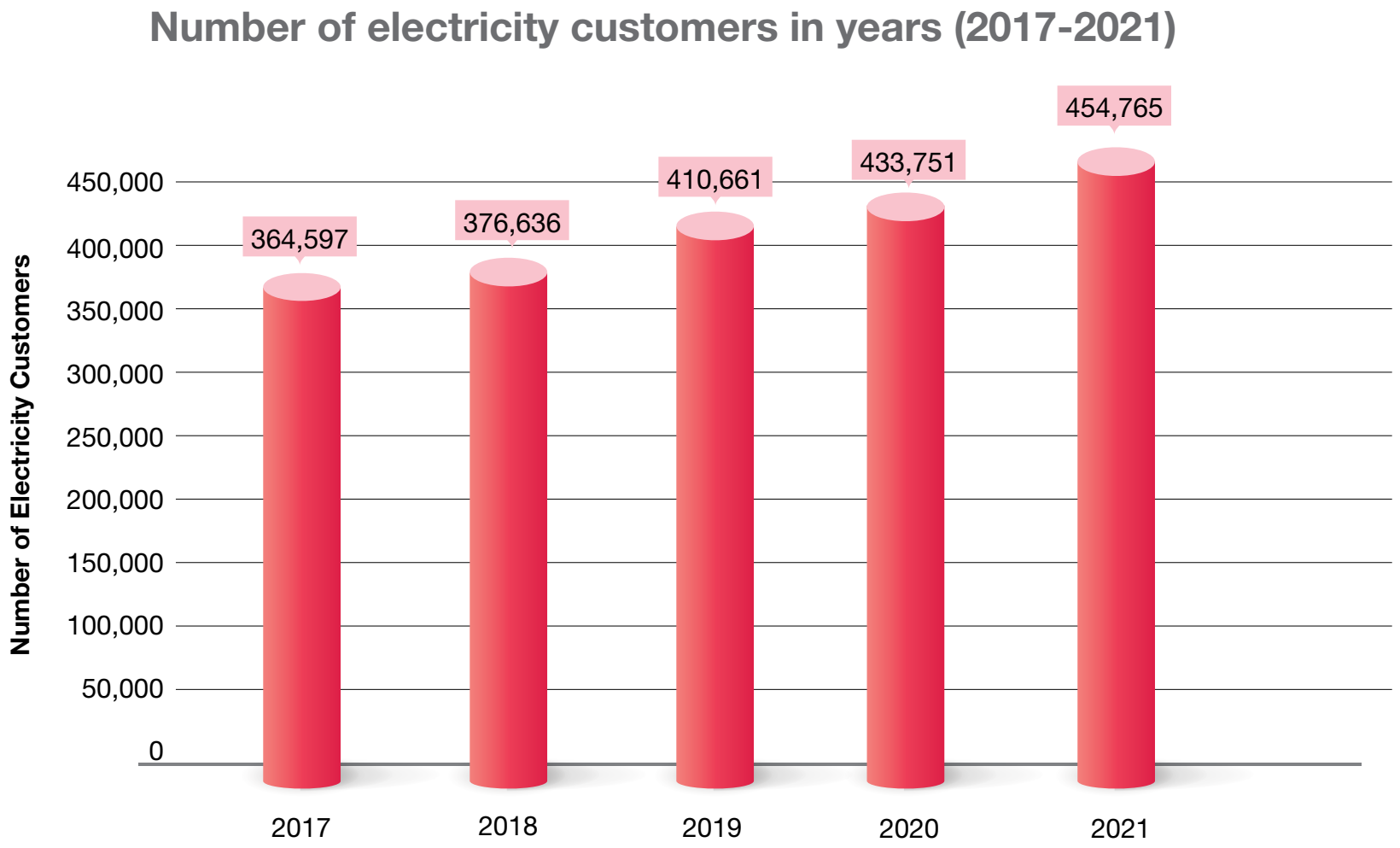
Period	>= 300 kV	220 kV	132 kV	66 kV	33 kV	11 kV
In service (as at 31/12/2016)	547.98	391.52	504.808	214.12	148.7	207.12
Commissioned -2017	0	0.85	121.16	0	0	58.69
Commissioned -2018	31.9	0	51.58	0	0	22.18
Commissioned -2019	0	0	0	0	0	39
Commissioned -2020	0	0	9.38	5.52	0	26.9
Commissioned -2021	0	0	27.24	0	0	18.17
In service (as at 31/12/2021)	**580.18**	**393.82**	**714.16**	**193.26**	**148.7**	**2100.07**

In service High Voltage Overhead Lines (CKM) by end of 2021



ET14 NUMBER OF ELECTRICITY CUSTOMERS FROM 2017 TO 2021

Year	2017	2018	2019	2020	2021
Number of Electricity Customers	364,597	376,636	410,661	433,751	454,765
Annual Growth (%)	5.9%	3.3%	9%	5.6 %	4.8%



ET15 AVERAGE ELECTRICITY PER CAPITA CONSUMPTION

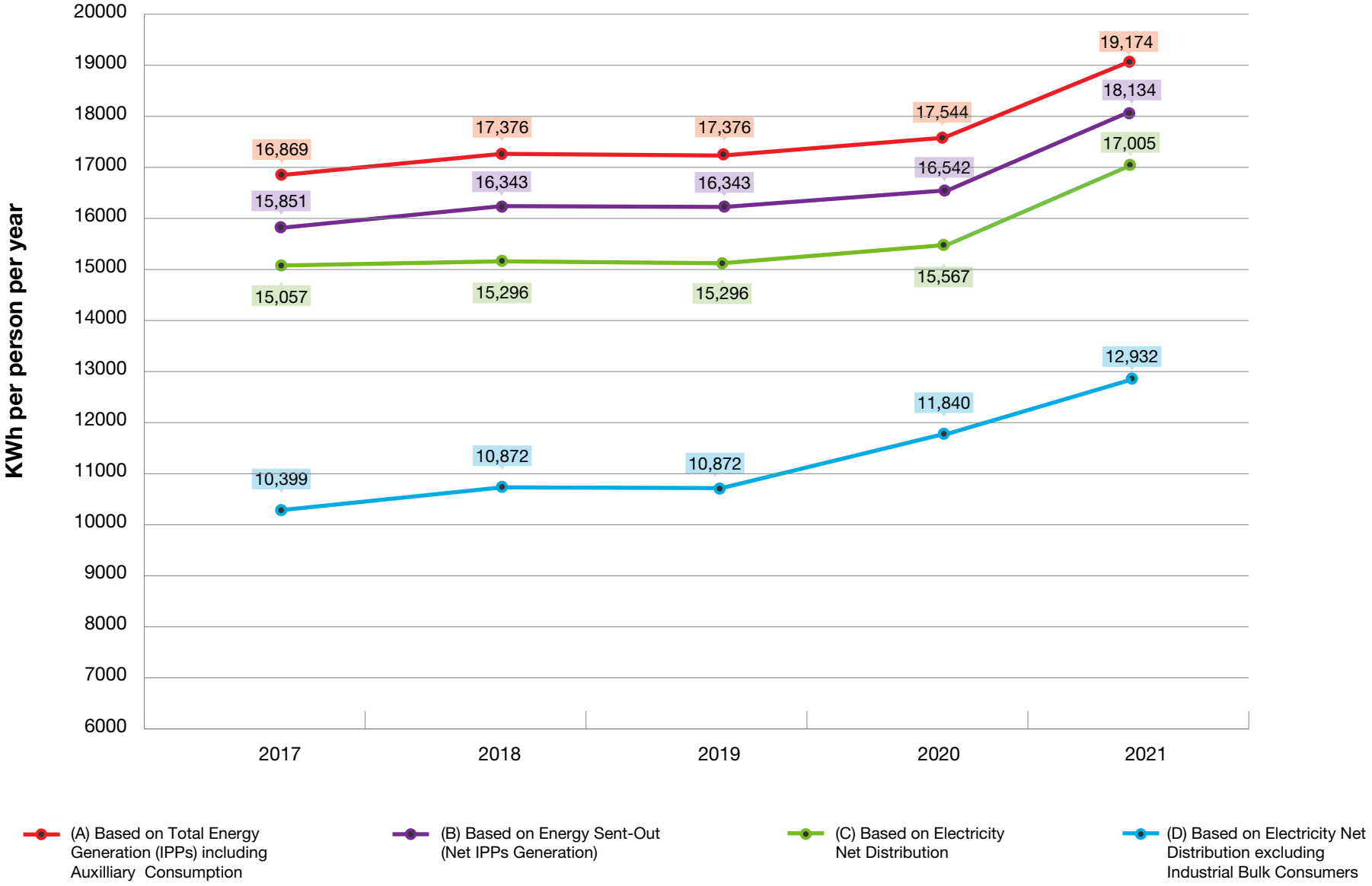
Year	2017	2018	2019	2020	2021
Population	2,700,539	2,757,437	2,773,885	2,807,805	2,693,301
Population Annual Increase(%)	4.00%	2.10%	0.60%	1.22%	-4.08%
Total Energy Generation inlcuding all auxilliary consumption GWh	45,555	47,913	49,873	49,259	51,641
Energy Transmitted (Sent out) GWh = Generation minus Auxilliary Consumption	42,806	44,654	46,435	45,825	48,329
Electricity Net Distribution GWh = Injected Generation minus Real losses	40,663	42,177	43,550	43,710	45,798
Electricity Consumption GWh (Excluding Bulk Industrial)	27,428	30,082	31,539	33,245	34,949
Average Electricity Per Capita Consumption: (KWh Per Person per Year)					
(A) Based on Total Energy Generation (IPPs) including Auxilliary Consumption	16,869	17,376	17,979	17,544	19,174
(B) Based on Energy Sent-Out (Net IPPs Generation)	15,851	16,343	16,918	16,542	18,134
(C) Based on Electricity Net Distribution	15,057	15,296	15,868	15,567	17,005
(D) Based on Electricity Net Distribution excluding Industrial Bulk Consumers	10,399	10,872	11,497	11,840	12,932

* 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)



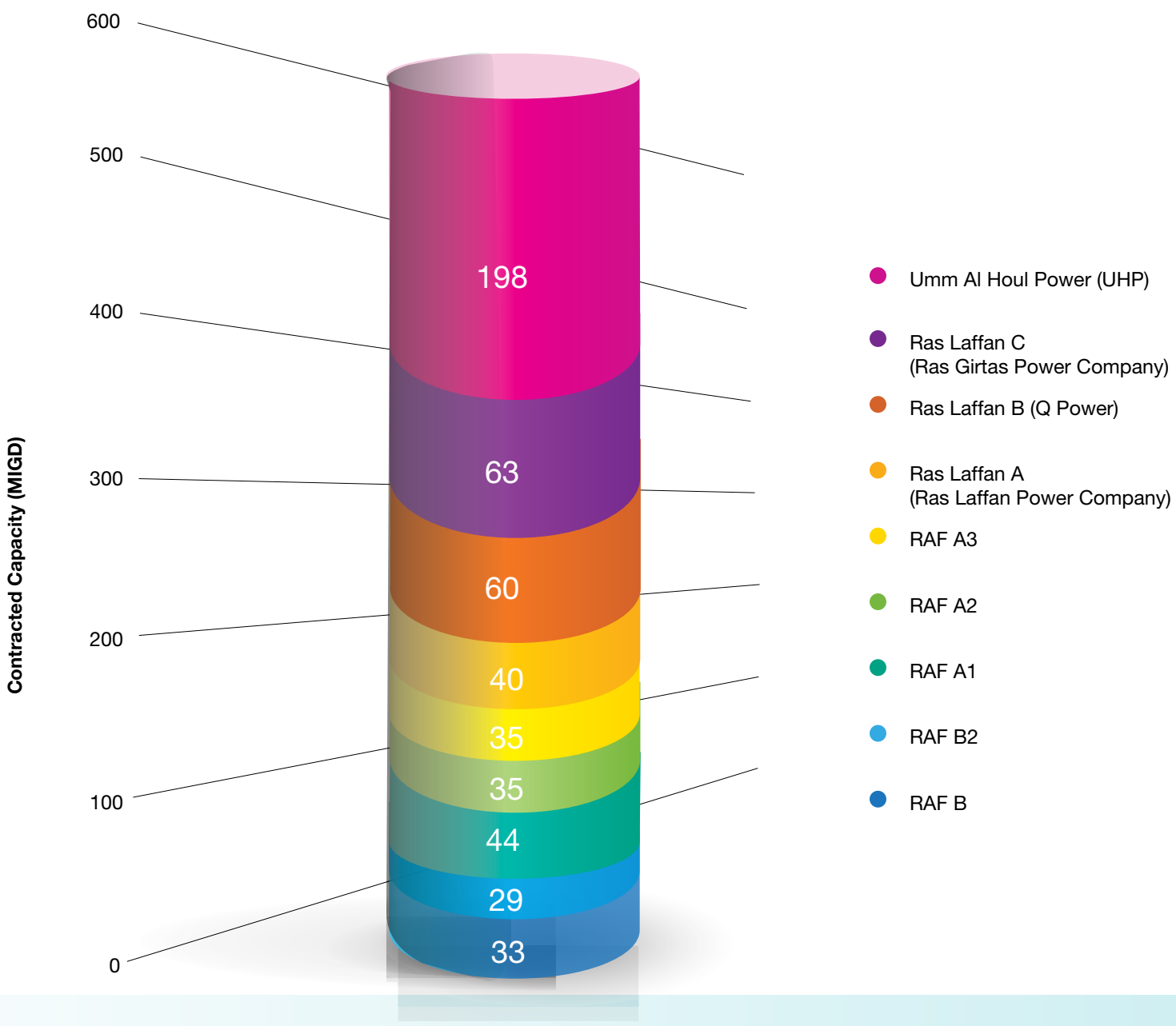
Water Statistics 2021


Aspire Park Doha

WT1 CONTRACTED CAPACITIES BY IPWP AT END OF 2021

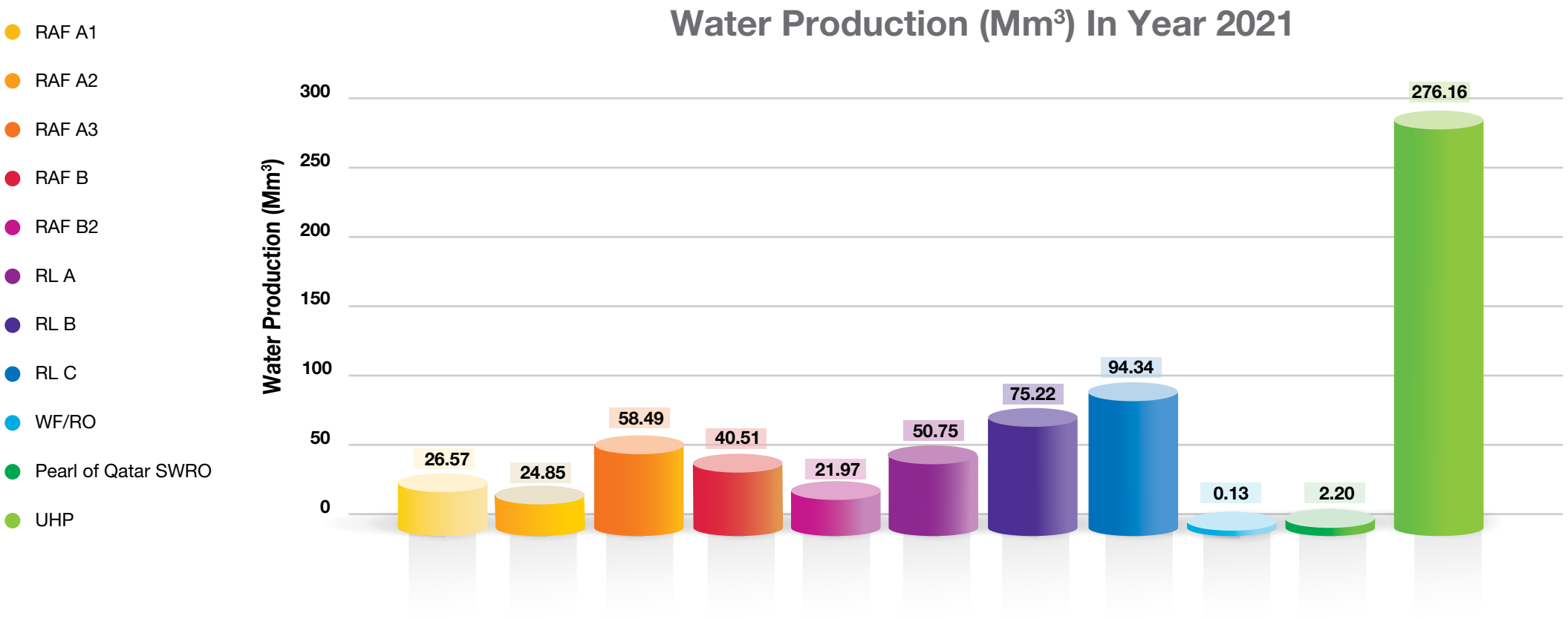
Independent Power & Water Producer	Contracted Capacity - Water (MIGD)	Mm3/Day
Qatar Electricity & Water Company		
Ras Abu Fontas RAF A1	44.31	0.20
Ras Abu Fontas RAF A2	35.14	0.16
Ras Abu Fontas RAF A3	35.14	0.16
Ras Abu Fontas RAF B	33.00	0.15
Ras Abu Fontas RAF B2	29.14	0.13
Sub-Total	**176.73**	**0.80**
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)	198.00	0.90
Total Capacity	**537.73**	**2.44**

Water contracted capacity by IWPPs in year 2021



WT2 WATER PRODUCTION IN 2021

IWPPs	Water Production (Million Cubic Meters)	Million Imperial Gallons (MIG)
RAF A1	26.57	5,846
RAF A2	24.85	5,467
RAF A3	58.49	12,868
RAF B	40.51	8,912
RAF B2	21.97	4,834
RL A	50.75	11,166
RL B	75.22	16,547
RL C	94.34	20,754
WF/RO	0.13	28
Pearl of Qatar SWRO	2.20	484
UHP	276.16	60,755
Total	**671.18**	**147,661**


Water Production (Mm³) In Year 2021
RAF A1
RAF A2
RAF A3
RAF B
RAF B2
RL A
RL B
RL C
WF/RO
Pearl of Qatar SWRO
UHP
Water Production (Mm³)
300
250
200
150
100
50
0
26.57
24.85
58.49
40.51
21.97
50.75
75.22
94.34
0.13
2.20
276.16

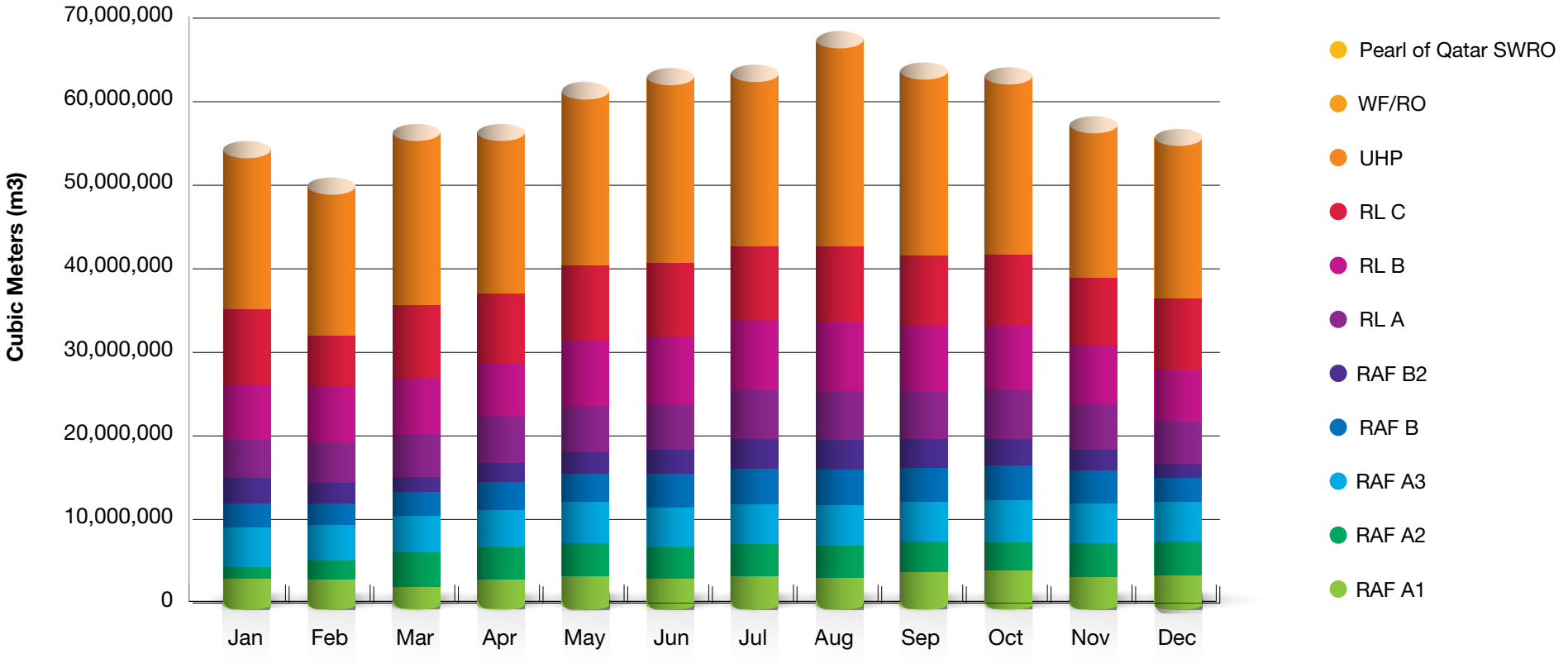
WT3 POTABLE WATER PRODUCTION CAPACITIES FROM WELLS AND REVERSE OSMOSIS (RO)

Well fields and RO	Total No. of Wells	Us-able Wells	Wells with Pumps	Designed Capacity, m3/Day	Actual Average Output, m3/Day	Remarks
Al Rushidiyah	84	84	84	24,192	0	All Wells has been rehabilitated and ready to use during emergency
Al Dibiyah	87	87	87	25,056	0	All Wells has been rehabilitated and ready to use during emergency
Al Judiyah	41	41	41	6,888	0	All Wells has been rehabilitated and ready to use during emergency
Al Otoriyah	80	80	80	23,040	0	All Wells has been rehabilitated and ready to use during emergency
Abu Thailah	30	30	30	8,640	0	All Wells has been rehabilitated and ready to use during emergency
Old Jemiliyah	0	0	0	0	0	All wells are not usable
Abu Samra RO Plant (Old)	5	4	4	680	5	Old RO Plant on standby for back-up incase direct supply from Doha to Abu Samra network is interrupted. Direct supply from Doha started on July 2020.
Abu Samra RO Plant (New)	5	5	5	2,000	21	New RO Plant was commissioned on Dec. 2019. Currently used as standby for back-up in-case direct supply from Doha is interrupted. Direct supply from Doha started on July 2020.
Army North Camp RO Plant	5	4	5	1,200	317	RO Plant is used as back-up in case there is shortage of water supply to the North Army Camp network.
Total	337	335	336	91,696	343	

WT4 MONTHLY WATER PRODUCTION, CUBIC METERS IN 2021

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	4,039,942	2,074,330	5,016,187	3,932,788	2,118,208	4,265,512	5,420,908	7,951,578	18,181,777	3,253	66,482	**53,070,965**
Feb	2,955,900	2,061,941	4,518,974	3,803,279	1,617,511	3,890,616	4,609,173	5,746,639	18,934,787	6,880	55,765	**48,201,465**
Mar	2,933,811	2,265,833	5,037,693	4,007,400	1,672,061	3,796,288	5,438,149	7,079,788	22,756,159	14,072	93,858	**55,095,112**
Apr	1,695,493	2,192,024	4,868,591	2,847,863	1,837,019	4,396,272	5,043,377	7,026,184	24,311,643	12,948	143,893	**54,375,307**
May	1,801,736	2,310,722	5,041,996	2,974,686	2,003,983	4,397,256	5,141,727	8,053,949	26,159,623	17,361	227,998	**58,131,037**
Jun	1,921,873	2,217,784	4,895,112	4,124,993	1,846,698	4,198,712	6,865,068	8,661,338	23,682,041	16,975	263,868	**58,694,462**
Jul	1,842,129	2,464,391	4,908,022	3,989,986	2,029,294	4,268,176	7,992,402	8,719,602	21,857,928	9,126	320,645	**58,401,701**
Aug	1,867,482	2,154,263	4,965,676	3,849,497	1,781,356	4,247,048	8,103,388	9,007,170	23,612,940	11,338	320,304	**59,920,462**
Sep	1,673,295	2,063,549	4,796,918	3,397,037	1,711,800	4,153,481	7,920,260	8,766,075	23,715,750	16,255	234,361	**58,448,781**
Oct	1,683,563	2,116,986	4,999,046	3,027,510	1,862,560	4,339,296	7,656,522	8,915,143	23,825,341	5,893	223,286	**58,655,146**
Nov	1,638,948	2,103,158	4,417,659	2,339,961	1,744,874	4,196,816	5,278,102	8,418,875	24,032,391	4,092	146,327	**54,321,203**
Dec	2,516,357	827,150	5,026,691	2,214,634	1,745,679	4,604,144	5,746,015	5,989,212	25,087,946	7,117	104,305	**53,869,250**
Total	**26,570,529**	**24,852,131**	**58,492,565**	**40,509,634**	**21,971,043**	**50,753,617**	**75,215,091**	**94,335,553**	**276,158,326**	**125,310**	**2,201,092**	**671,184,892**

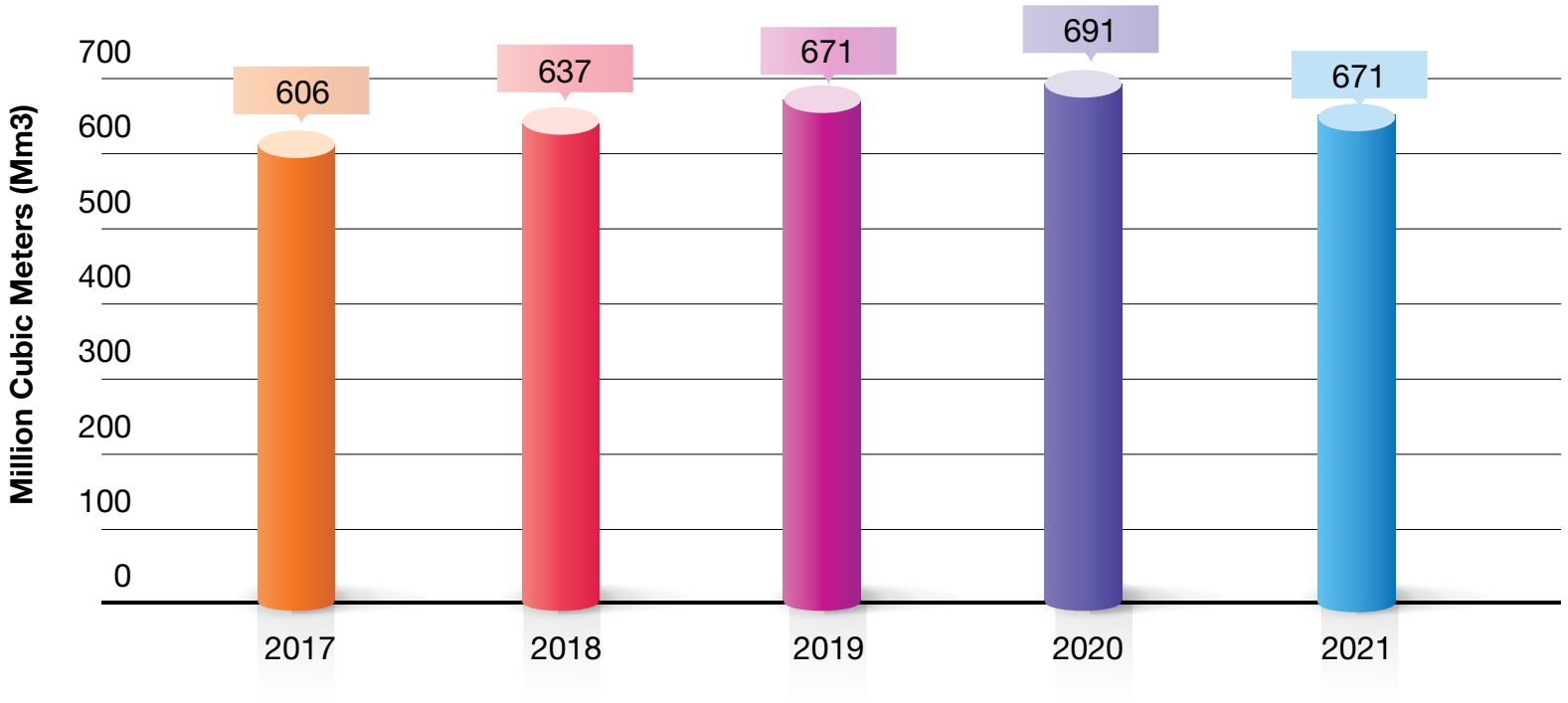
Monthly water production (m^3) in year 2021



WT5 TOTAL ANNUAL WATER PRODUCTION, MILLION CUBIC METERS

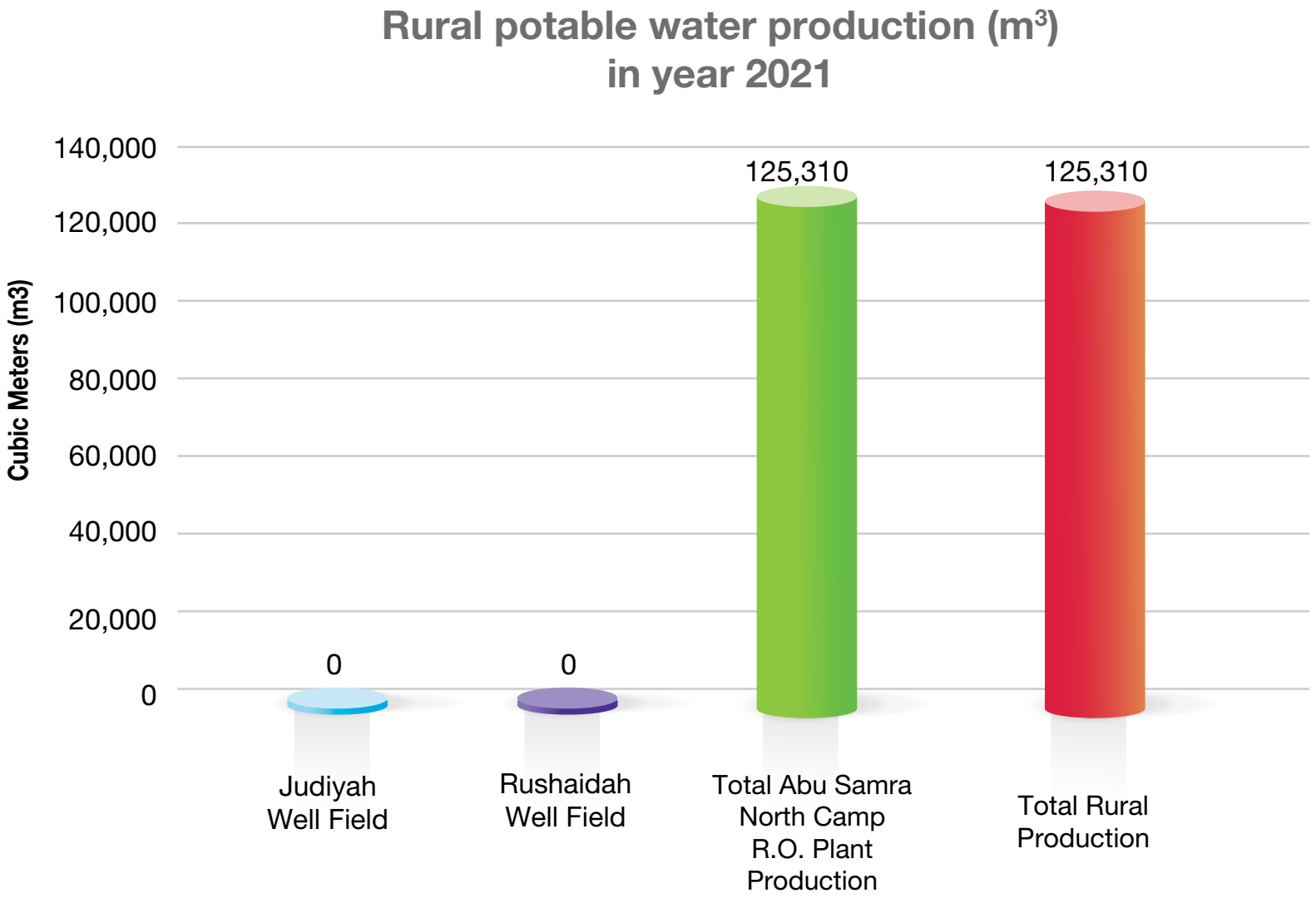
Water Production	2017	2018	2019	2020	2021
Production, MM3	606	637	671	691	671
Annual Growth (%)	7.7%	5.1%	5.4%	3.0%	-2.9%
Average Growth last five years (%)					2.6%

Total water production (Mm^3) in years (2017 -2021)



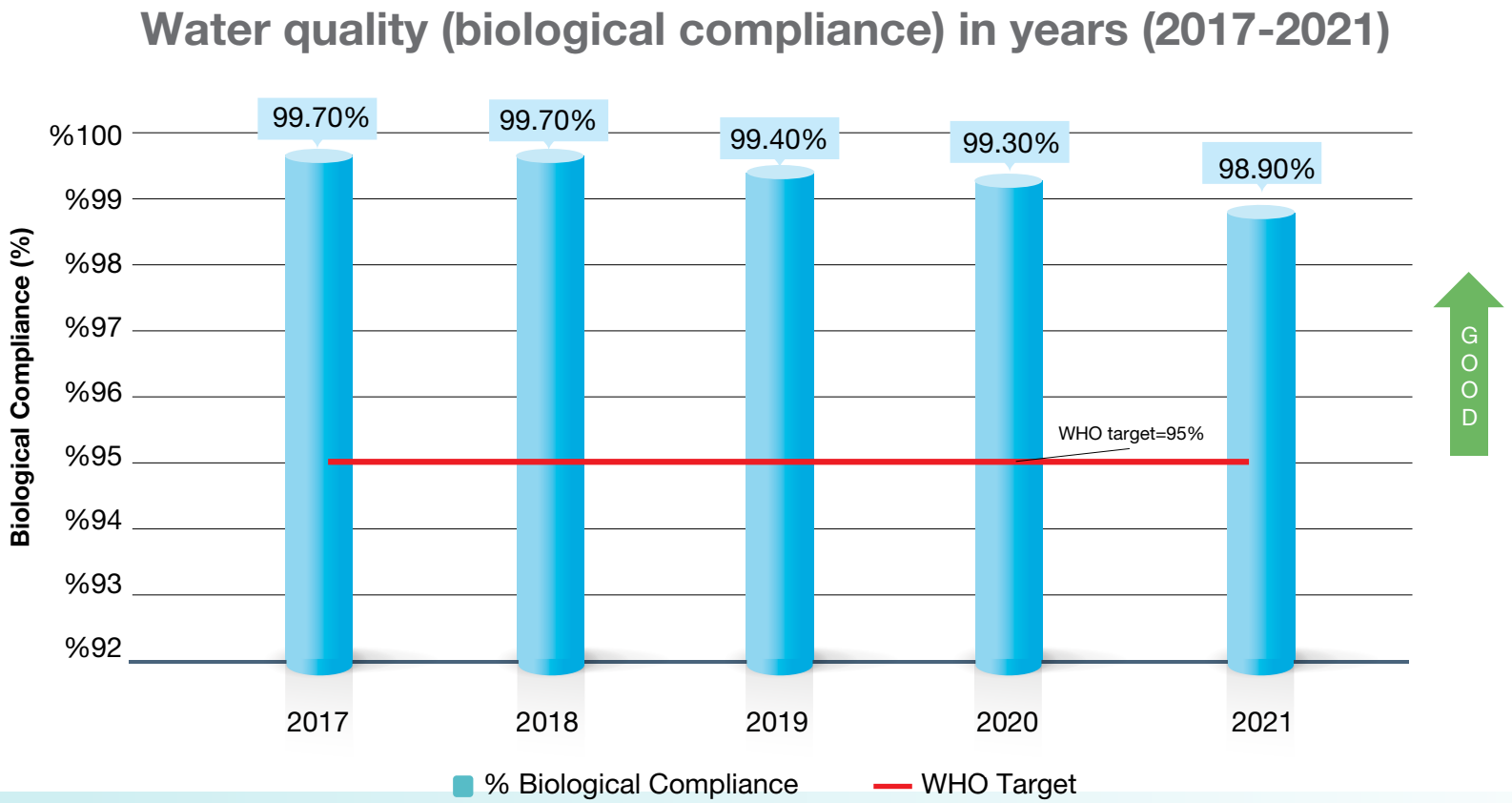
WT6 RURAL POTABLE WATER PRODUCTION, CUBIC METERS

Month	Judiyah Well Field	Rushaidah Well Field	Total Abu Samra North Camp R.O. Plant Production	Total Production
Jan	0	0	3,253	3,253
Feb	0	0	6,880	6,880
Mar	0	0	14,072	14,072
Apr	0	0	12,948	12,948
May	0	0	17,361	17,361
Jun	0	0	16,975	16,975
Jul	0	0	9,126	9,126
Aug	0	0	11,338	11,338
Sep	0	0	16,255	16,255
Oct	0	0	5,893	5,893
Nov	0	0	4,092	4,092
Dec	0	0	7,117	7,117
Total	**0**	**0**	**125,310**	**125,310**


Rural potable water production (m³) in year 2021
Cubic Meters (m3)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0
0
125,310
125,310
Judiyah Well Field
Rushaidah Well Field
Total Abu Samra North Camp R.O. Plant Production
Total Rural Production

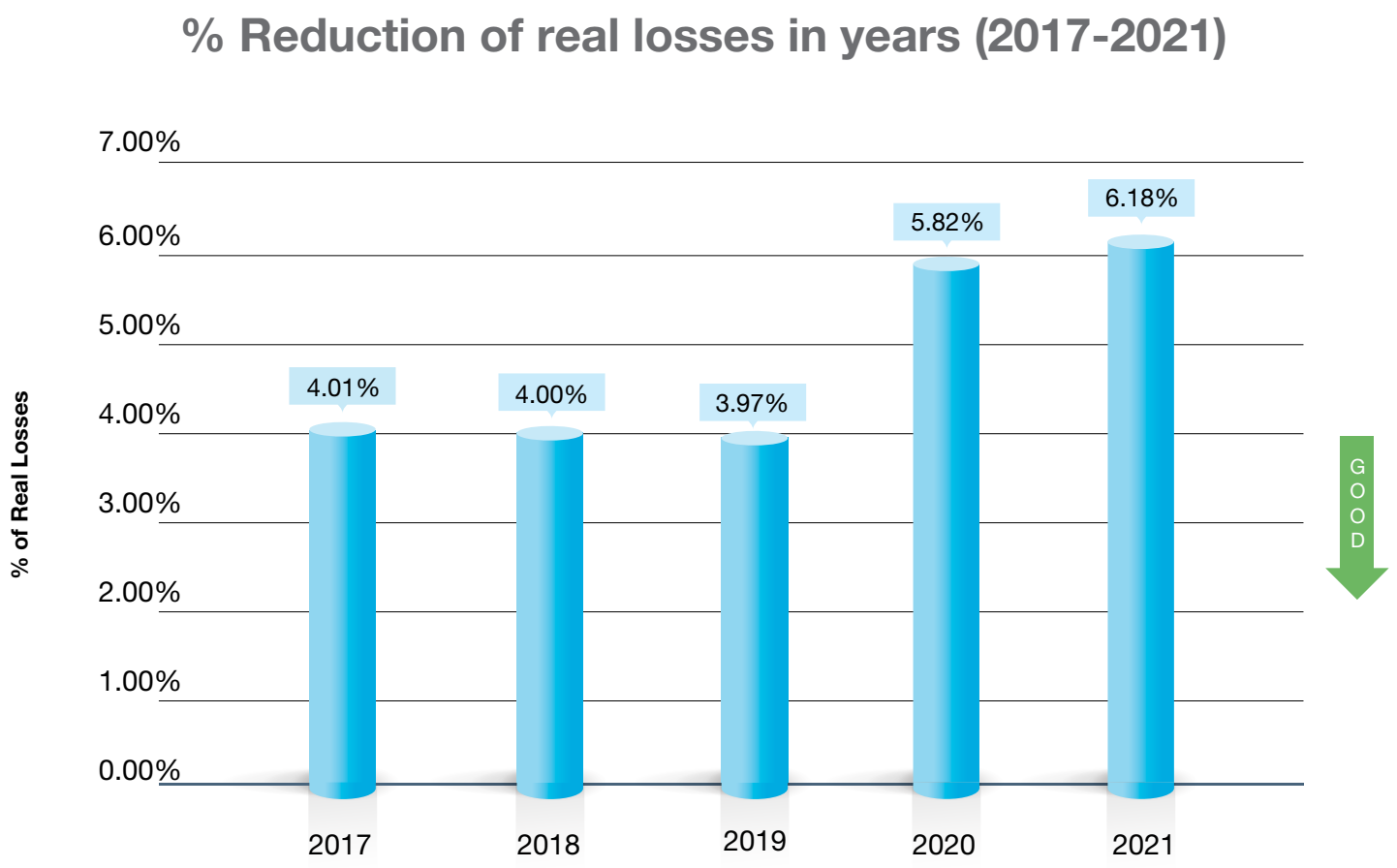
WT7 WATER QUALITY (BIOLOGICAL COMPLIANCE)

Year	% Biological Compliance	WHO Target
2017	99.70%	95%
2018	99.70%	95%
2019	99.40%	95%
2020	99.30%	95%
2021	98.90%	95%



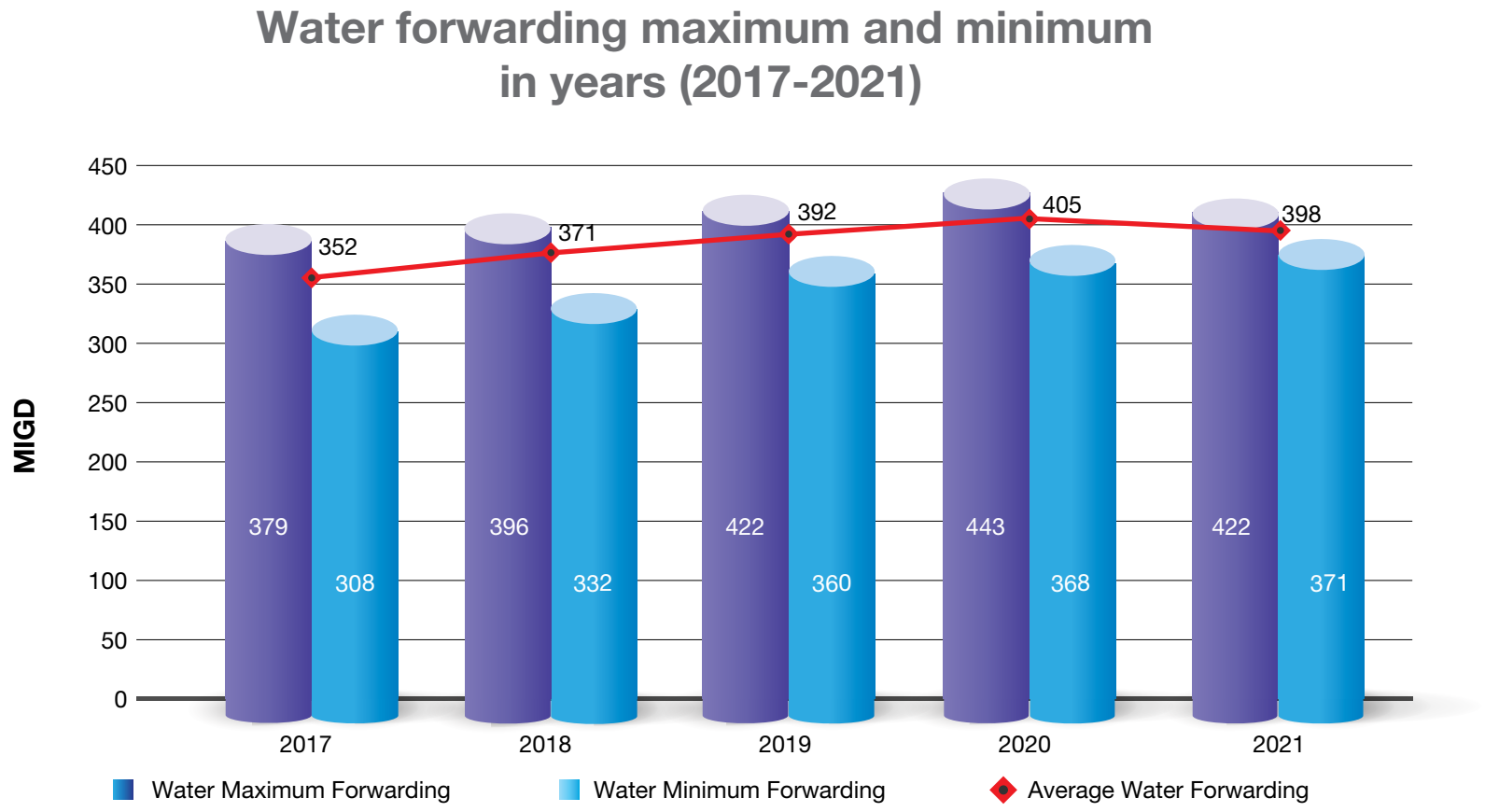
WT8 WATER REAL LOSSES REDUCTION

Year	% Real Losses
2017	4.01%
2018	4.00%
2019	3.97%
2020	5.82%
2021	6.18%



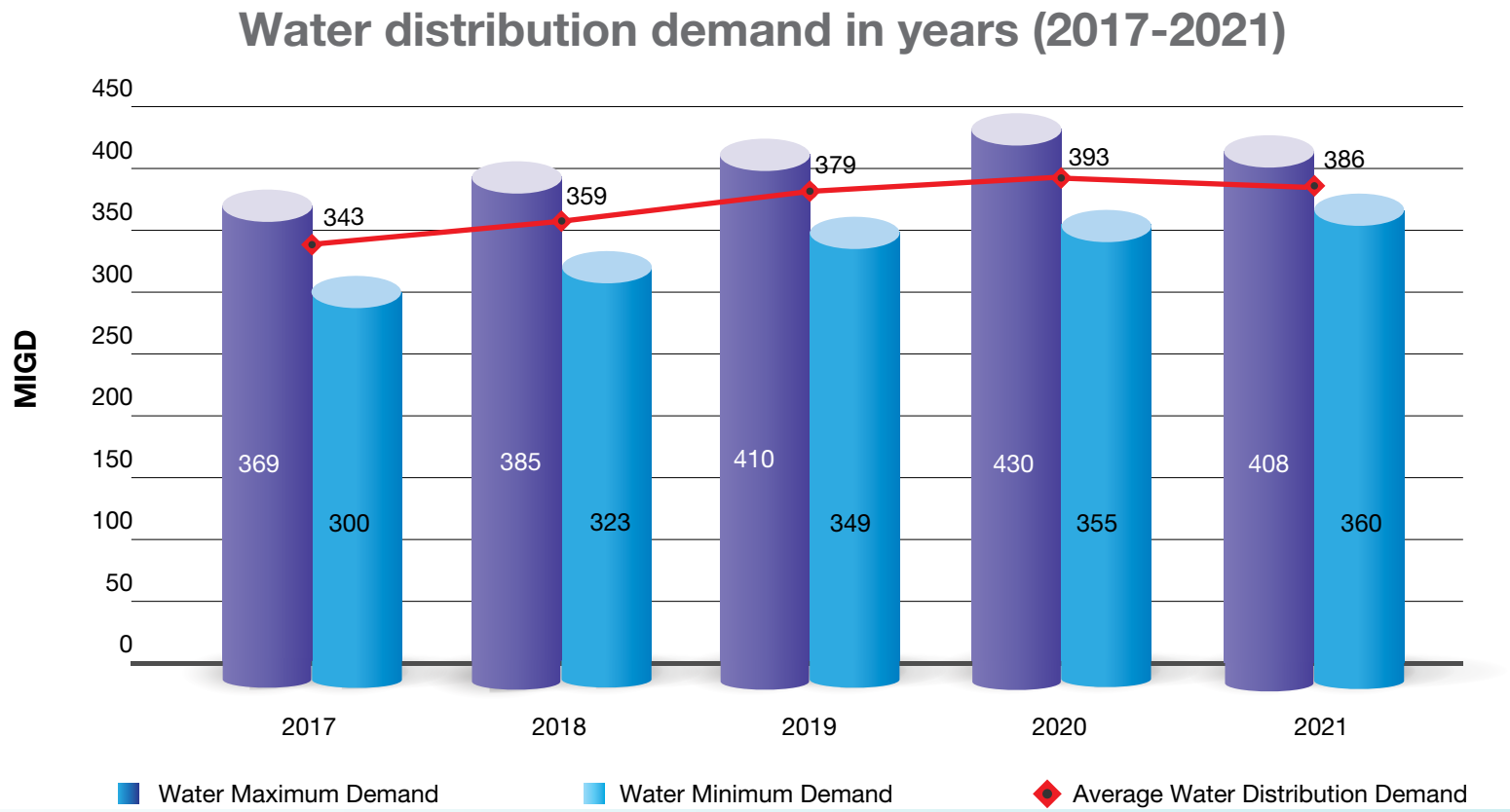
WT9 WATER FORWARDING MAXIMUM AND MINIMUM DEMAND IN YEARS (2017-2021)

Year	Average Forwarding, MIGD	Maximum Forwarding MIGD	Maximum Forwarding Month	Minimum Forwarding, MIGD	Minimum Forwarding Month
2017	352	379	August	308	February
2018	371	396	September	332	January
2019	392	422	September	360	February
2020	405	443	August	368	January
2021	398	422	June	371	January



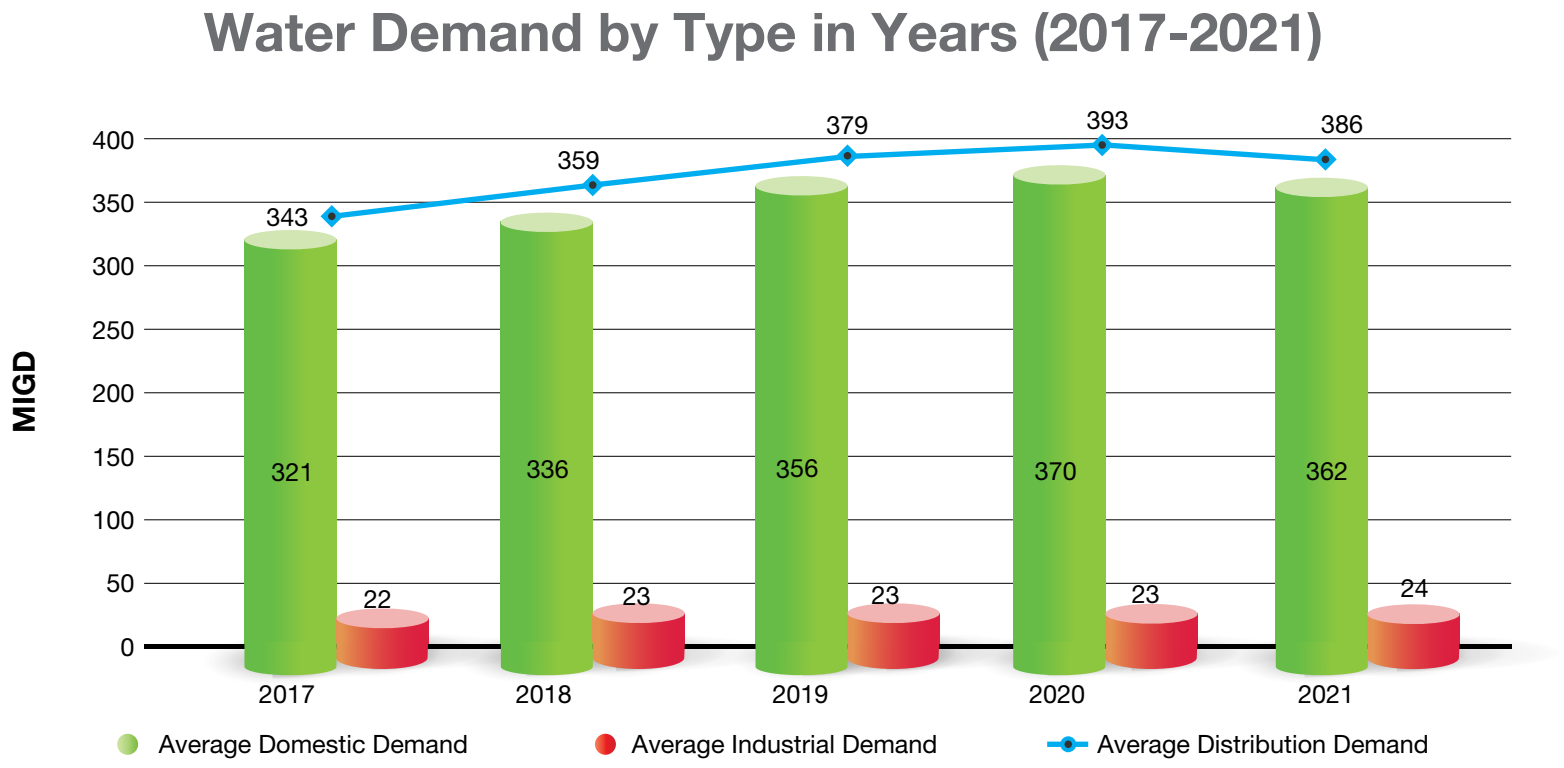
WT10 WATER DISTRIBUTION MAXIMUM AND MINIMUM DEMAND IN YEARS (2017-2021)

Year	Average Distribution Demand, MIGD	Growth (%)	Maximum Demand, MIGD	Maximum Demand Month	Minimum Demand, MIGD	Minimum Demand Month
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
2021	386	-1.7	408	June	360	February



WT11 WATER DEMAND BY TYPE IN YEARS (2017-2021)

Water Demand By Type, MIGD	2017	2018	2019	2020	2021
Average Distribution Demand	343	359	379	393	386
Average Industrial Demand	22	23	23	23	24
Average Domestic Demand	321	336	356	370	362



WT12 LENGTH OF MAINS LAID FROM 2017 TO 2021 IN METERS

Pipe Diameter, millimetres	2017	2018	2019	2020	2021
80	478	676	141	117	195.68
100	49,112	78,210	82,973	48,079	43,682
110	247	348	3	0.1	29.276
125	145	602	-	-	-
150	73,540	88,909	95,729	38,027	41,299
160	–	–	–	–	42.942
180	40	97	-	8	-
200	42,467	45,314	69,195	51,609	41,276
225	-	40	-	2	
250	316	974	25	61	583.56
280	-	-	-	-	-
300	62,082	55,613	63,125	36,711	26,756
315	13	60	-	4	97.646
355	492	3,591	13	2	29.076
400	35,410	17,862	11,142	10,597	5,450
450	4	5	1	-	-
500	257	933	199	2	105.18
600	36,069	29,608	22,664	9,550	5,814
630	–	–	–	–	113.22
700	-	30	1	2	0.737
800	3,755	1,631	455	3	-
900	27,400	21,818	11,585	8,620	3,531
1,000	362	712	31	352	232.68
1,200	15,544	10,727	6,458	2,163	1,032
1,400	8,850	8,509	5,343	274	78.93
1,600	35,855	17,198	10,470	1,477	7,732
2,000	-	-	158	-	-
2,200	-	-	1,941	69	-
2,400	1,249	2,583	1,097	31	-
Total	393,687	386,050	382,749	207,760	178,081

WT13 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2021, 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	-	-	42,472	3,153	14,671	215	1,466	39	5,083	58	63691.761	3465
Reconnection	-	-	-	-	-	-	-	-	-	-	0	0
Disconnection	-	-	901	-	-	-	-	-	-	-	901	0
Maintenance or Replacement	-	-	240,089	16,711	79,062	2,667	3,691	236	5,184	340	328,026	19954
Transpose	-	-	1,355	154	373	7	76	1	293	-	2097.32	161.5
Size Increase	-	-	100	-	7	-	1	-	4	-	112	0
New Water Meter Installation	-	-	-	11,614	-	128	-	58	-	56	0	11856
Water Meter Replacement	-	-	-	23,562	-	303	-	298	-	126	0	24289

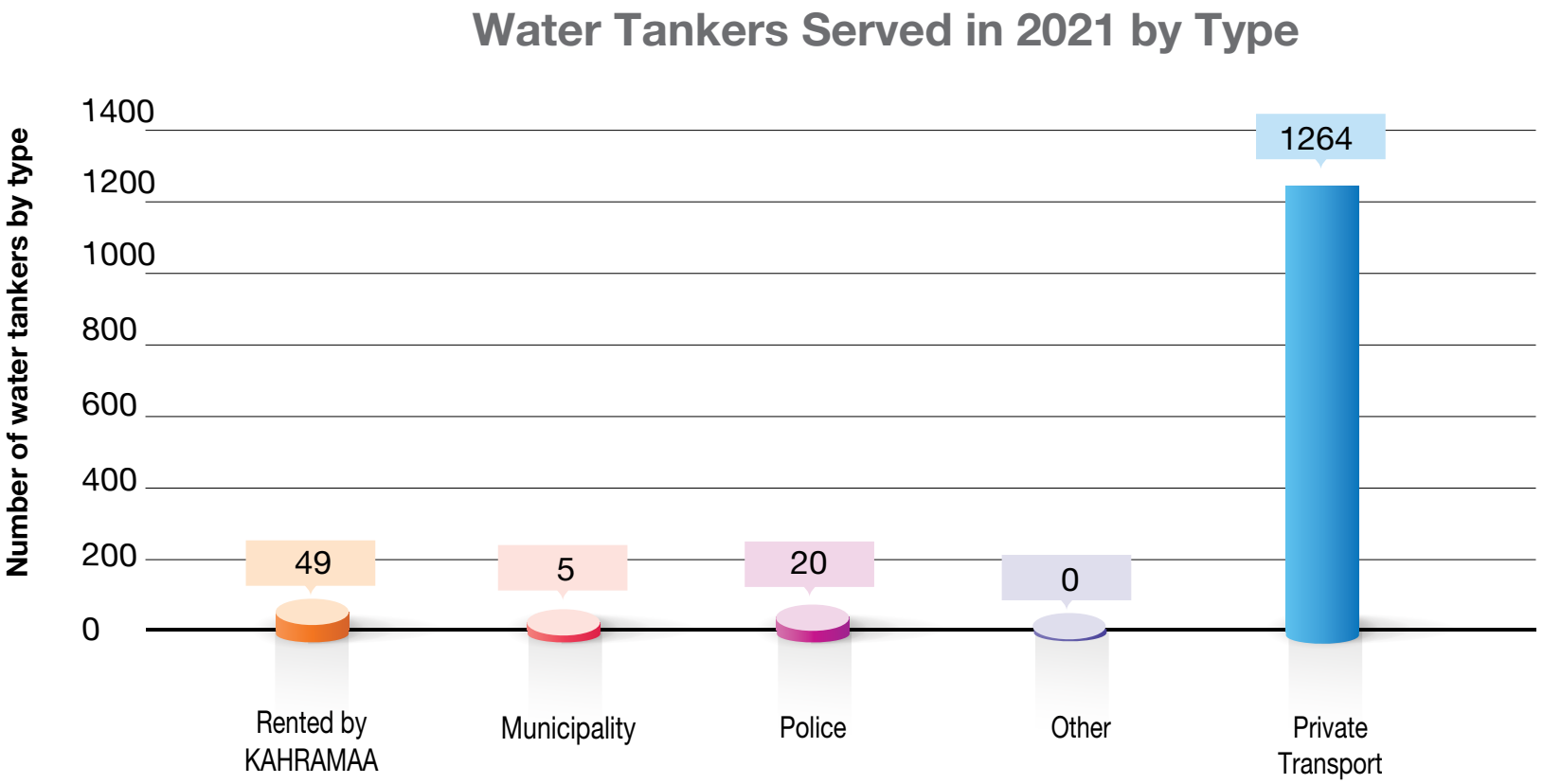
WT14 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2021, IN METERS

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	10	-	10	-	54	3	71	1	-	-	-	-	-	-	145	4
Reconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance or Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transpose	-	-	11	3	1	1	-	-	-	-	-	-	-	-	12	4
Size Increase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Water Meter Installation	-	6	-	9	-	2	-	2	-	-	-	1	-	2	-	22
Water Meter Replacement	-	8	-	8	-	5	-	4	-	-	-	1	-	-	-	26

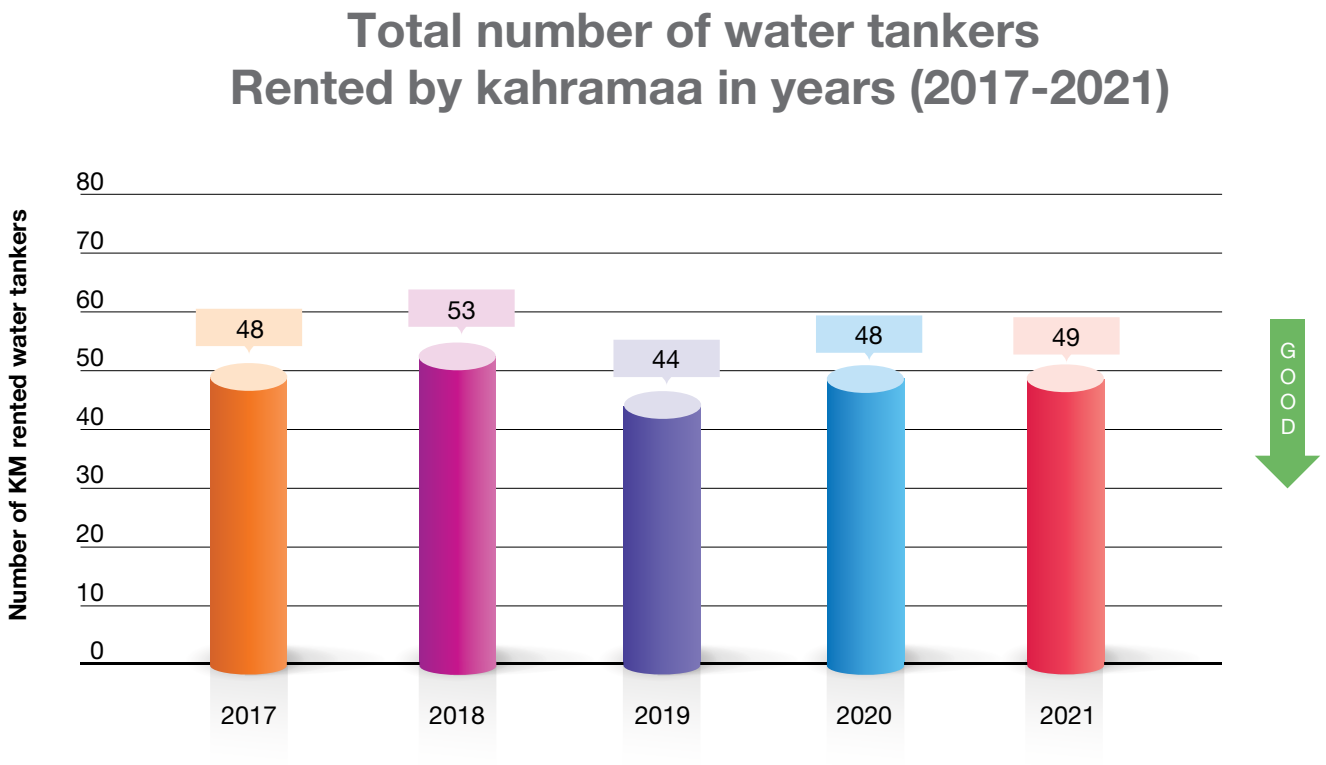
WT15 TANKER WATER SUPPLY IN 2021

Station	Rented by KAHRAMAA	Municipality	Education	Defence	Police	Other	Rural Tankers	Private Transport
AL SAILIYA	10	1	0	0	7	0	0	470
UMM SALAL	10	1	0	0	4	0	0	295
AL KHOR	2	0	0	0	2	0	0	88
AL SHAHANIYAH	6	1	0	0	0	0	0	80
AL WUKAIR	14	0	0	0	2	0	0	135
AL JAMELIYAH	7	0	0	0	2	0	0	30
AL SHAMAL	0	1	0	0	1	0	0	32
MESAIEED	0	0	0	0	2	0	0	65
AL MAZROUA	0	0	0	0	0	0	0	0
AL GHUWARIYAH	0	1	0	0	0	0	0	20
GHARAFFA	0	0	0	0	0	0	0	0
SEA LINE	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**
AL KARAANA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**
AL RAMZANIYA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**
AL NUKHZ	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**
Total	**49**	**5**	**0**	**0**	**20**	**0**	**0**	**1264**

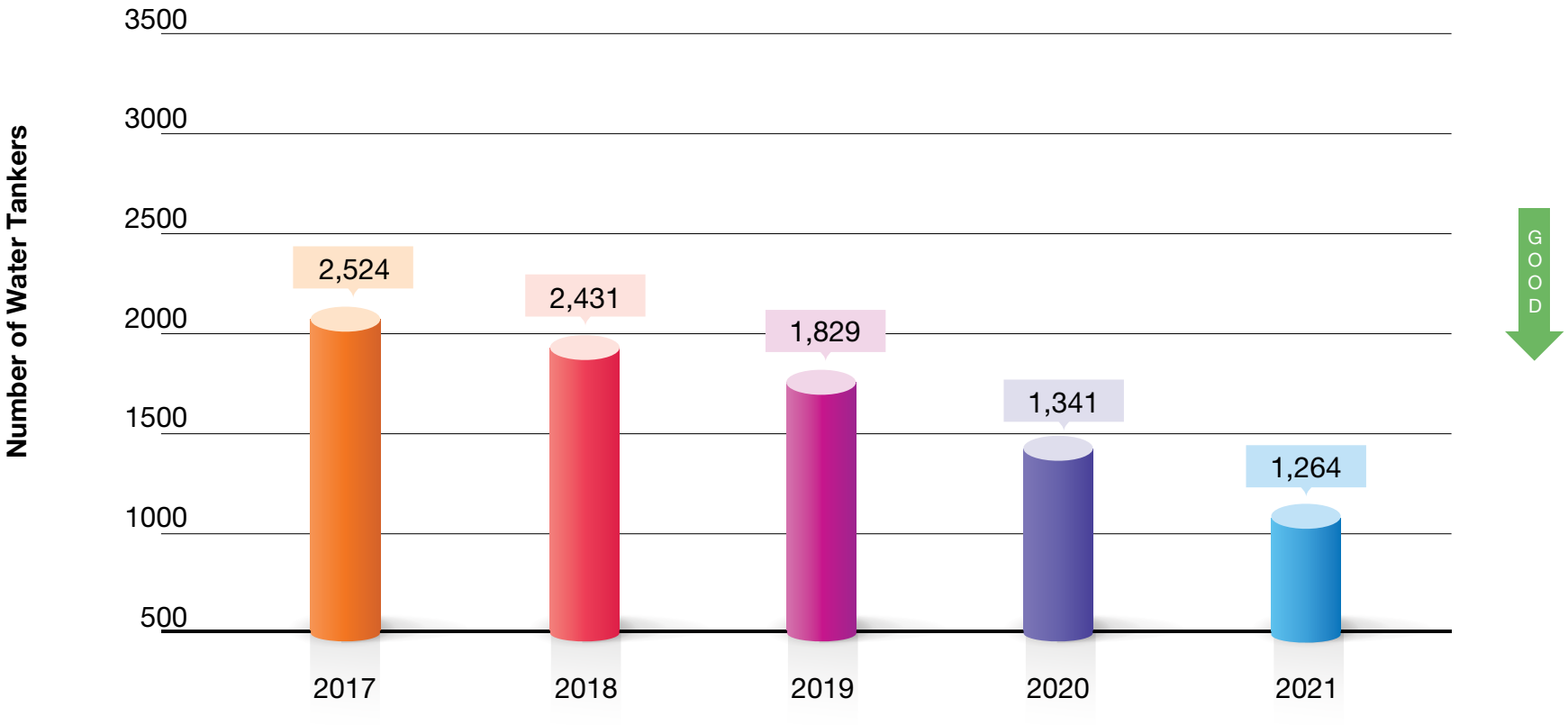

Water Tankers Served in 2021 by Type
Number of water tankers by type
1400
1200
1000
800
600
400
200
0
49
5
20
0
1264
Rented by KAHRAMAA
Municipality
Police
Other
Private Transport

WT16 WATER TANKER SERVICES LAST 5 YEARS

Water Production	2017	2018	2019	2020	2021
No of Water Tankers	2,524	2,431	1,829	1,341	1,264
No of KM Rented Water Tankers	48	53	44	48	49
Total Reduction	236	93	602	488	77
Total Reduction (%)	8.6%	3.68%	24.76%	26.68%	5.74%
KM - Rented Reduction	5	-5	9	-4	-1
KM - Rented Reduction (%)	9.4%	-10.42%	16.98%	-9.09%	-2.08%

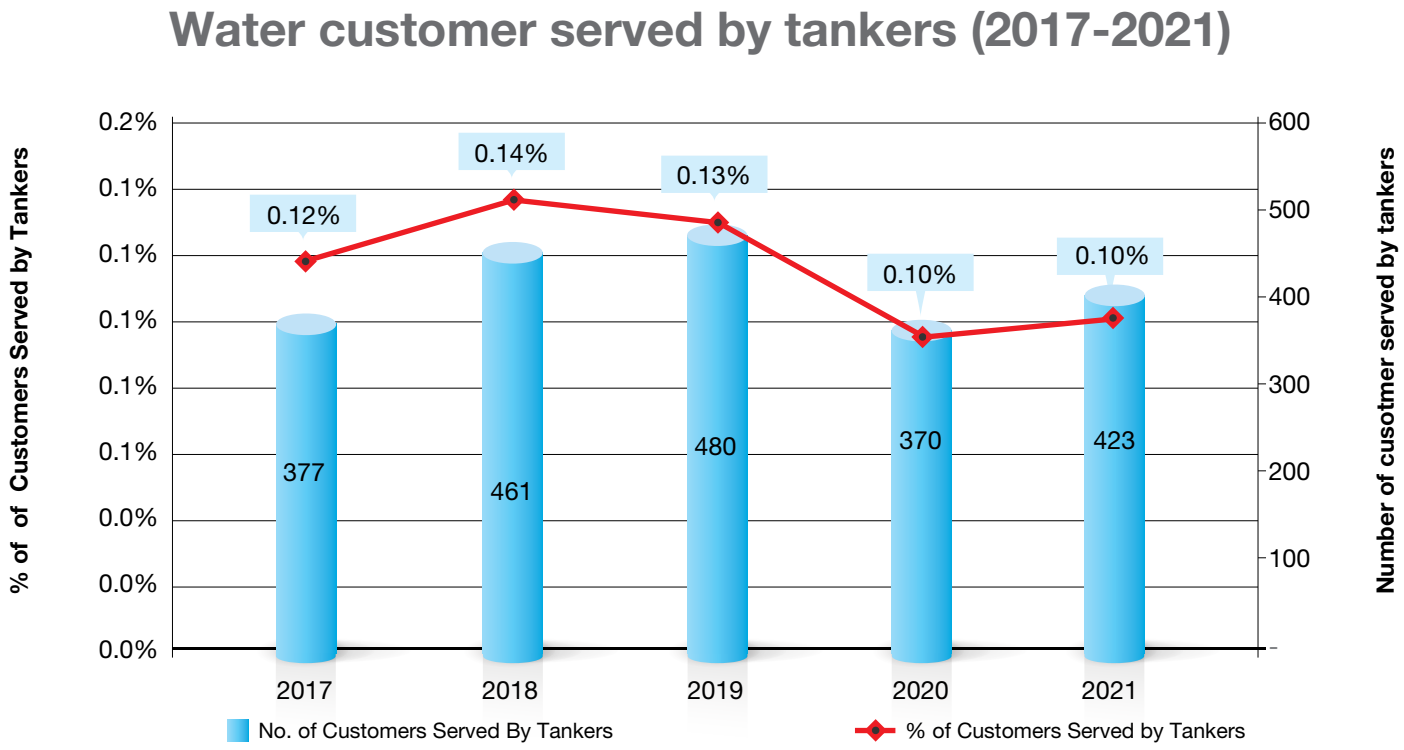


Total number of water tankers In years (2017-2021)



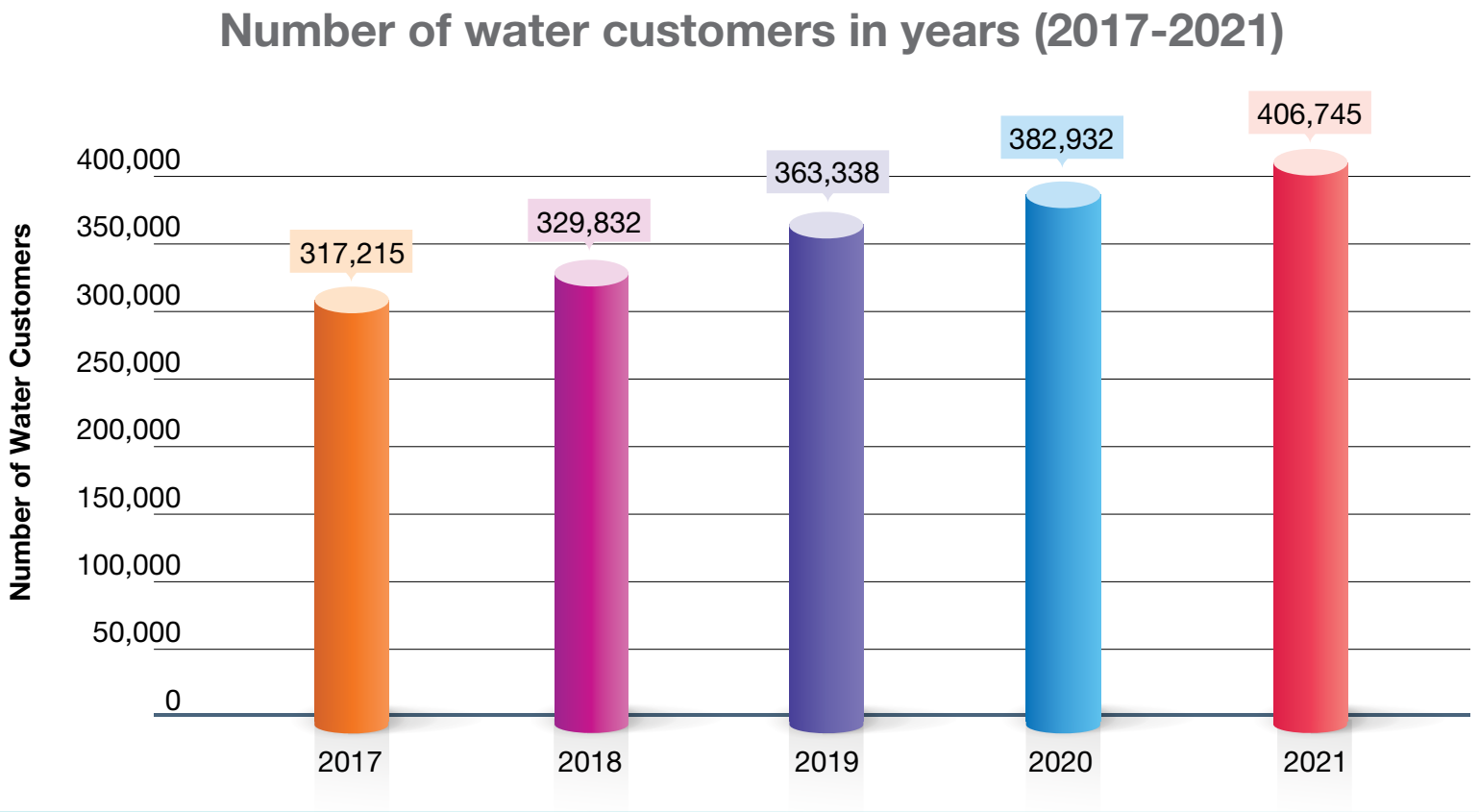
WT17 PERCENTAGE OF CUSTOMERS SERVED BY TANKERS

Water Production	2017	2018	2019	2020	2021
Total No. of Water Customers	316,838	329,832	363,338	382,932	406,745
No Of Customers Served By Tankers	377	461	480	370	423
Percentage of Customers Served by Tankers (%)	0.12%	0.14%	0.13%	0.10%	0.10%
Reduction	35	(84)	(19)	110	(53)
Percentage Reduction (%)	0.02%	-0.02%	0.01%	0.04%	-0.01%



WT18 NUMBER OF WATER CUSTOMERS

Year	No Of Customers	Annual Growth
2017	317,215	6.7%
2018	329,832	4.0%
2019	363,338	10.2%
2020	382,932	5.4%
2021	406,745	6.2%

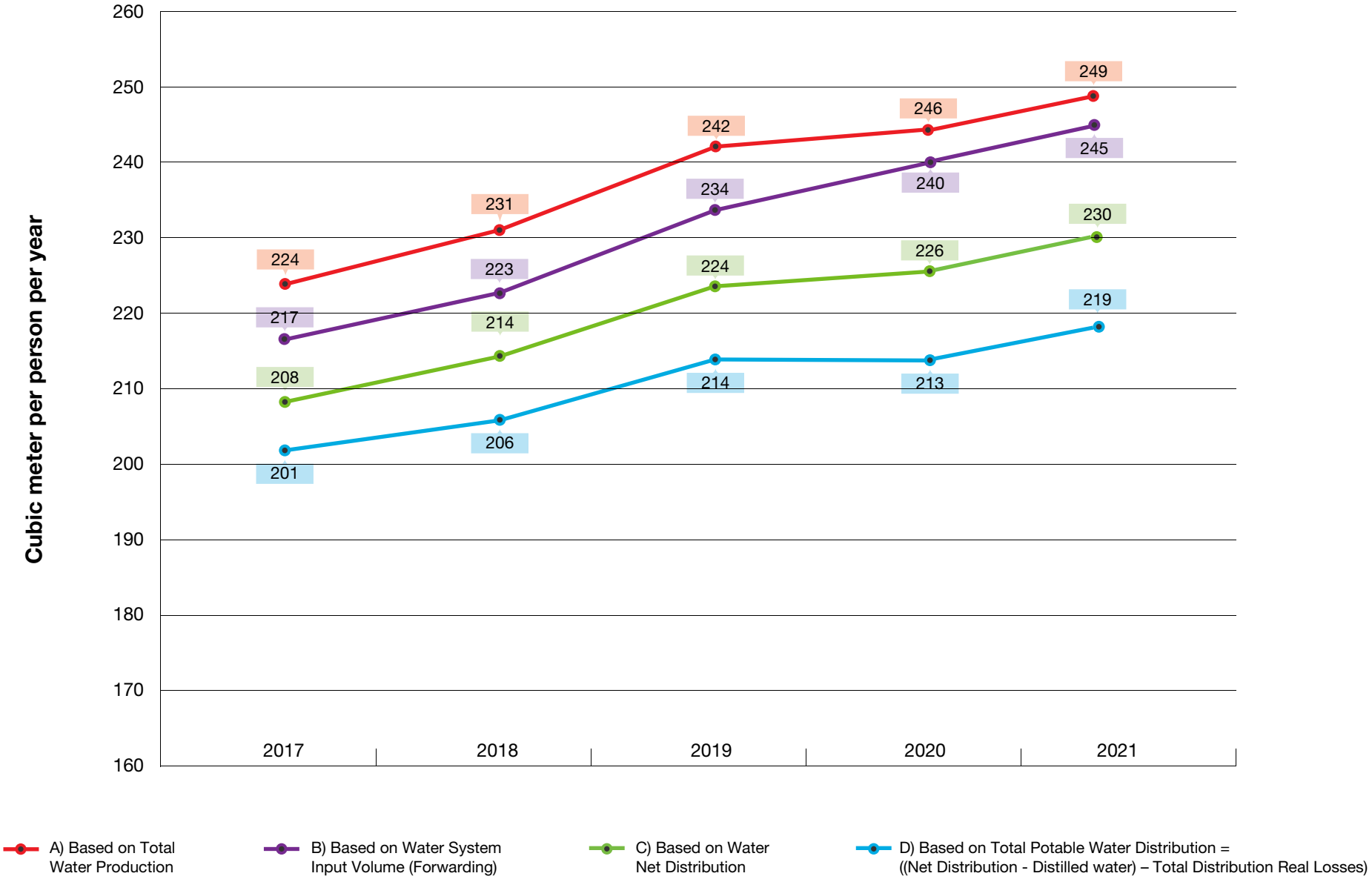


WT19 AVERAGE WATER PER CAPITA CONSUMPTION, LAST FIVE YEARS

Year	2017	2018	2019	2020	2021
Population	2,700,539	2,757,437	2,773,885	2,807,805	2,693,301
Population Annual Increase(%)	4.00%	2.10%	0.60%	1.22%	-4.08%
Total Water Production Mm3	606	637	671	691	671
System Input Volume (Forwarding) Mm3	585	616	648	673	660
Water Net Distribution Mm3 = System Input Volume Mm3 (Forwarding) - Real Losses	562	591	622	634	619
Total Potable Water Distribution (Mm3)= ((Net Distribution - Distilled water) – Total Distribution Real Losses)	544	568	593	597	590
Average Water Per Capita Consumption: (Cubic meter per person per year)					
A) Based on Total Water Production	224	231	242	246	249
B) Based on Water System Input Volume (Forwarding)	217	223	234	240	245
C) Based on Water Net Distribution	208	214	224	226	230
D) Based on Total Potable Water Distribution = ((Net Distribution - Distilled water) – Total Distribution Real Losses)	201	206	214	213	219

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)



WT20 WATER STORAGE IN IWPP RESERVOIRS IN 2021

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3
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
Total	**464.3**	**-**	**464.3**	**2,110,455**	**-**	**2,110,455**

WT21 WATER STORAGE IN KM RESERVOIRS IN 2021

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	21		21	95,455	-	95,455	
Doha South	84		84	381,818	-	381,818	
Mesaimeer	108		108	490,909	-	490,909	
Wukair	36		36	163,636	-	163,636	
Old Salwa	-		-	-	-	-	All reservoirs demolished for upgrading
New Salwa	30		30	136,364	-	136,364	
Salwa Industrial	51		51	231,818	-	231,818	
Garrafa	50		50	227,273	-	227,273	
West Bay	56		56	254,545	-	254,545	
Bani Hajr	36		36	163,636	-	163,636	
Muaither	105		105	477,273	-	477,273	
Duhail	142		142	645,455	-	645,455	
Umm Qarn	71		71	322,727	-	322,727	
Wakrah	10		10	45,455	-	45,455	
Messaieed Town	24		24	109,091	-	109,091	
Messaieed Industrial	28		28	127,273	-	127,273	
Al Khor 1	4		4	18,182	-	18,182	
Al Khor 2	6		6	27,273	-	27,273	
Al Khor 3	18		18	81,818	-	81,818	
Umm Salal 1	6		6	27,273	-	27,273	
Umm Salal 2	18		18	81,818	-	81,818	
Shahaniyah 2	12		12	54,545	-	54,545	
Shahaniyah 3	12		12	54,545	-	54,545	
Madinat Shamal	10		10	45,455	-	45,455	
Guwairiyah	1		1	2,273	-	2,273	
Pearl of Qatar	4		4	18,000	-	18,000	
Small & Medium	8		8	36,209	-	36,209	
Labor City	7		7	30,000	-	30,000	
Lusail RPS4	7		7	30,000	-	30,000	
Lusail RPS2	8		8	38,000	-	38,000	New RPS commissioned on 27.05.2021
Jeryan	1		1	4,545	-	4,545	New RPS commissioned on 05/07/2021
Umm Birka PRPS	194		194	881,818	-	881,818	Mega RPS
Umm Salal PRPS	386		386	1,754,545	-	1,754,545	Mega RPS
Rawdat Rashed PRPS	322		322	1,463,636	-	1,463,636	Mega RPS
Abu Nakhla PRPS	194		**194**	**881,818**	**-**	**881,818**	Mega RPS
Thumama PRPS	261		**261**	**1,186,364**	**-**	**1,186,364**	Mega RPS
TOTAL	**2,330**	**-**	**2,330**	**10,590,845**	**-**	**10,590,845**	

WT22 WATER STORAGE IN GROUND TANKS IN 2021

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	-	3,073	
Abu Samra	0.00	1.00	-	4,545	Additional new storage (0.5 MIG) commissioned on 18.10.2019
Al Ghuwairiyah	0.00	0.50	-	2,273	
Shahaniyah 1	1.50	0.00	6,818	-	GST not in service since 27/11/2018 as ET not operational due to major roof defects.
Mazruah	1.50	0.00	6,818	-	Station is not in service (On Standby)
New Jemiliyah	0.50	0.00	2,273	-	GST not in service since 19/05/2014 as ET not operational due to leakage.
Dukhan	0.50	0.00	2,273	-	Station is not in service (On Standby)
Total	**4.00**	**2.18**	**18,182**	**9,891**	

WT23 WATER STORAGE IN ELEVATED TANKS IN 2021

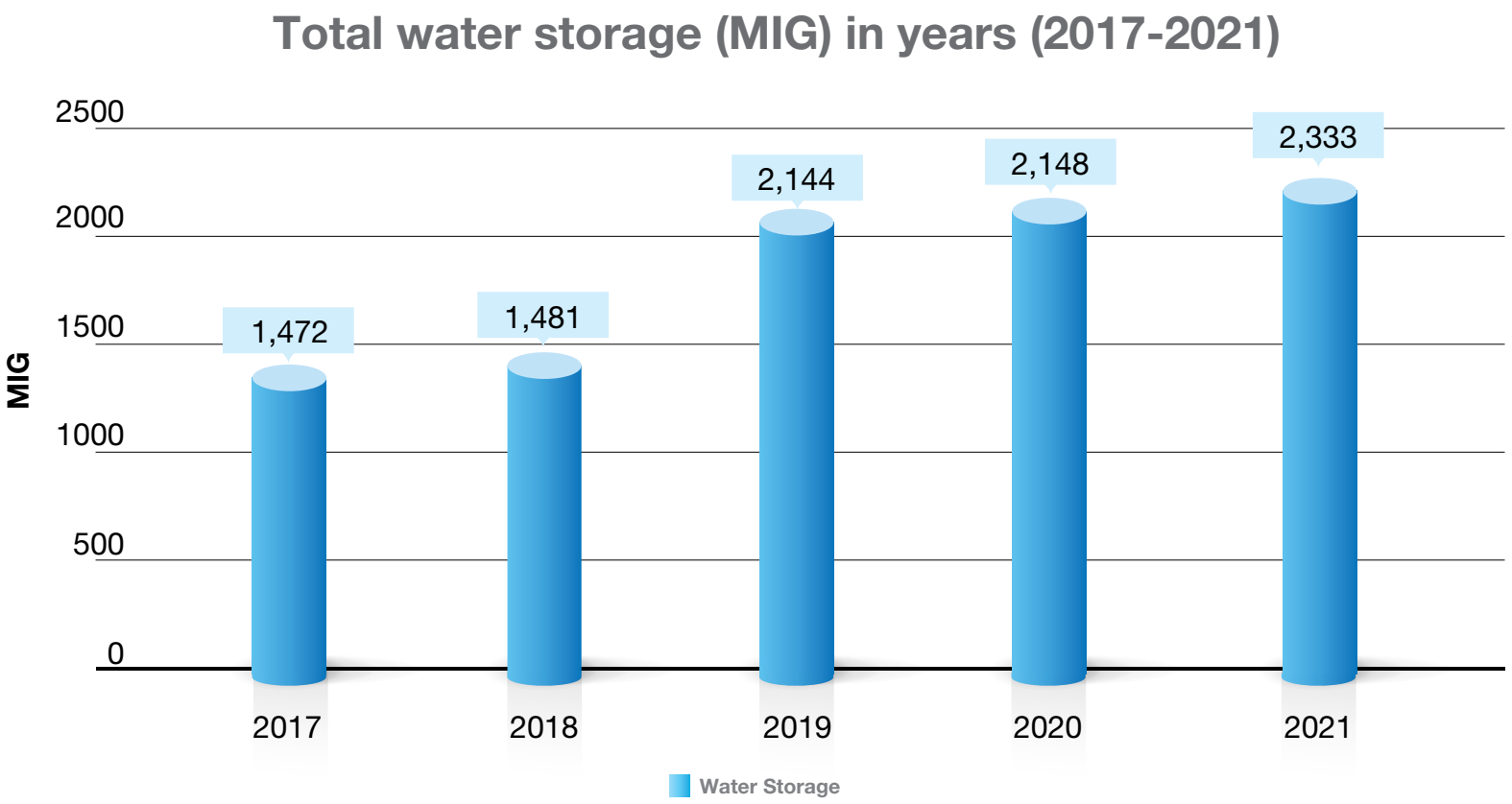
Location	Elevated Tank Capacity (Imperial Gallons)	Elevated Tank Operating Capacity (Imperial Gallons)	Capacity (M3)	Operating Capacity (M3)	Remarks
Madinat Shamal	55,000	-	250	-	Demolished
Al Ghuwairiyah	55,000	-	250	-	Bypassed
Al Khor 1	55,000	55,000	250	250	In Service
Mazruah	200,000	-	909	-	Standby
Shahaniyah 1	69,000	-	314	-	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	-	364	-	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**	

WT24 WATER STORAGE IN TOWERS IN 2021

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**	

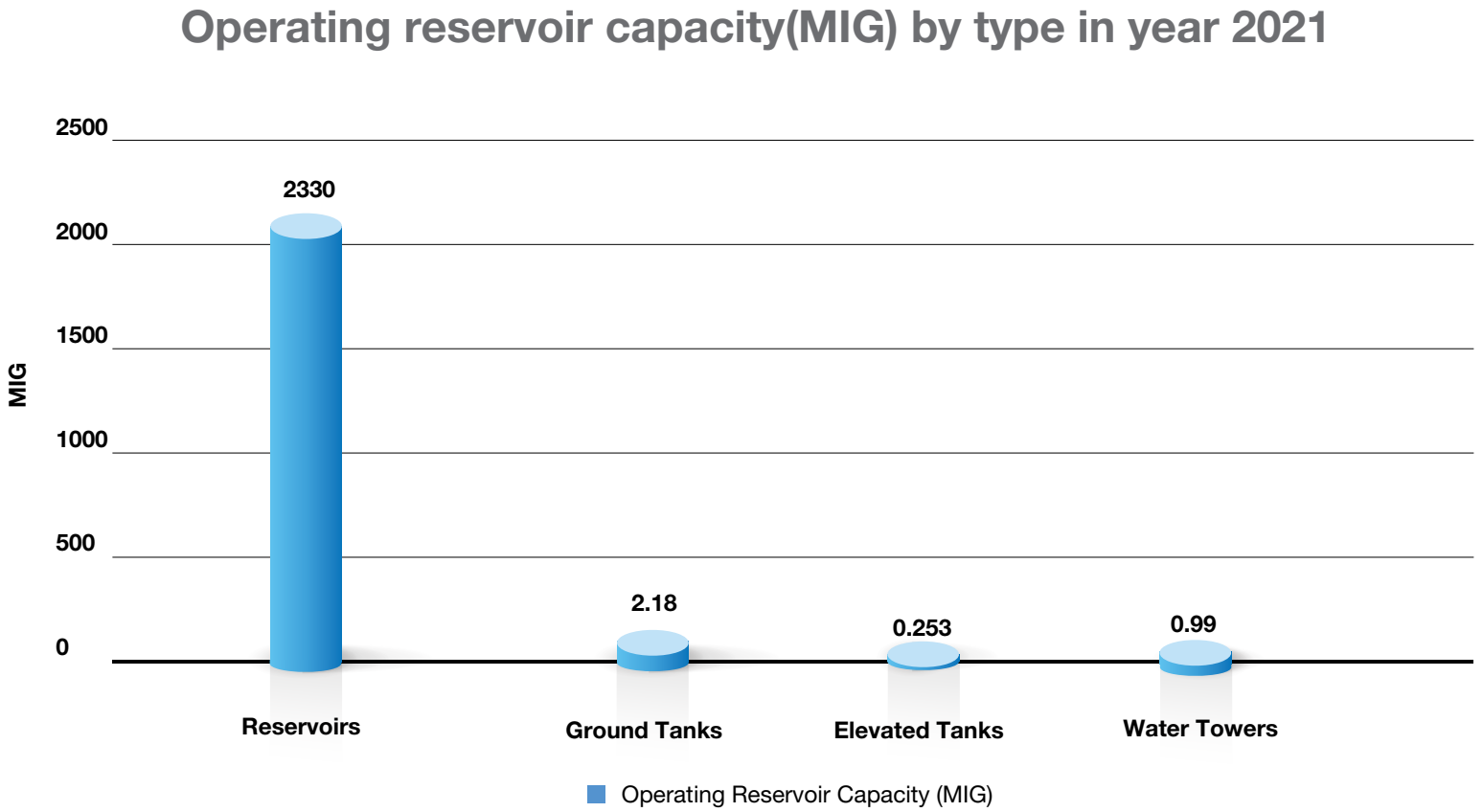
WT25 TOTAL WATER STORAGE 2017-2021

Water Storage	2017	2018	2019	2020	2021
Imperial Gallons (IG)	1,472,170,000	1,481,170,000	2,143,670,000	2,147,823,000	2,333,423,000
Meter Cube(M3)	6,691,682	6,732,591	9,743,955	9,762,832	10,606,468
Million Meter Cube (MM3)	6.7	6.7	9.74	9.76	10.61
Million Imperial Gallons (MIG)	1,472	1,481	2,144	2,148	2,333



WT26 TOTAL WATER STORAGE BY TYPE IN 2021

Type	Operating Reservoir Capacity (MIG)	%	Remarks
Reservoirs	2330	99.85%	-
Ground Tanks	2.18	0.09%	-
Elevated Tanks	0.253	0.01%	-
Water Towers	0.99	0.04%	Water Towers in Service are considered
Grand Total	2333.423	100.00%	-



WT27 TOTAL ABSTRACTION FROM GROUND WATER 2017-2021

	2017	2018	2019	2020	2021
Ground Water Abstraction (Mm3)	250	250	250	250	250 *

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

WT28 TOTAL WATER STORAGE IN YEAR 2021

	Agricultural Wells	Municipal Wells	Domestic Wells	Industrial Wells	Other Wells	Total
Abstraction from Ground Water by Types (Mm3)	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.
*** In the coming 3 years, flowmeter will be installed in each wells.

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
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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 .


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