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

2023 ANNUAL STATISTICS REPORT
التقرير الإحصائي السنوي 2023

Annual Statistics Report 2023

Qatar General Electricity & Water Corporation “KAHRAMAA”

Prepared by: Planning & Quality Department
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KAHRAMAA Publications

His Highness

Sheikh Tamim Bin Hamad Al-Thani

Emir of the State of Qatar

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MINISTER'S FOREWORD

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

Qatar maintains its position 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 of Qatar is committed to creating a dynamic, competitive and broad-based economy by increasing economic diversification through the re-investment of Qatar's significant energy revenues. The outcome is evident with rapid 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 development is driving the population growth, resulting investments in transport, communications, tourism, sports facilities and other services are in progress. The development has generated increased demand for continuous improvements and expansion of basic infrastructure and services most notably electricity and water. This was reflected in 2023 by an increase of customer base by 2.7% for electricity and 3.4% for water customer.

The Qatar National Development Strategy-III (NDS3) 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. Despite global economic challenges the strength and diversity of Qatar's economy is evident by the admirable performance of economic indicators, which is also reflected in the energy and water sectors. Peak electricity demand in 2023 was 9,805 MW, grew by 4.3% vs last year. Total energy transmitted in 2023 was 52,899 GWh, 3.1% more in comparison to last year. In case of water system maximum demand was 425 MIGD, almost same as compared to the last year. The total water production in 2022 was 669 Mm3 and total water storage in 2023 was 2418 MIG.

As part of its long term strategy and vision 2030, KAHRAMAA is implementing various strategic initiatives 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 2023 and beyond.

PRESIDENT'S FOREWORD

Essa Bin Hilal Al-Kuwari
KAHRAMAA President

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.

Development plan by State of Qatar gives the highest priority to the provision of services for all its residents and targets the promotion of the national economy and enhancement of productivity and organizational efficiency at all state authorities. We serve a 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,"Tarsheed" program in Kahramaa which is 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.

Kahramaa has aligned its long term strategy with Qatar National Vision (QNV 2030) and the phase-II of its strategy is under implementation with following 15 corporate objectives to achieve: Accelerate community and social change, Build on environmental and conservation efforts, including water security, Build on becoming a customer centric organization, Excel in providing reliable, available and high quality supply of electricity and water, Promote regulatory changes, Excel at financial performance through optimizing cost & revenues, Build on asset management capabilities to optimize asset performance, Build on corporate governance, legal, risk management and compliance, Optimize processes and systems and align target operating model to Kahramaa's mandate, Promote and deploy smart technologies, Promote innovation and R&D and exploring new commercial opportunities, Excel in creating a safe and healthy working environment, Promote and implement integration of renewable resources, Strengthen Qatarization & accelerate development of future leaders and Build on attracting, motivating, developing and retaining talent.

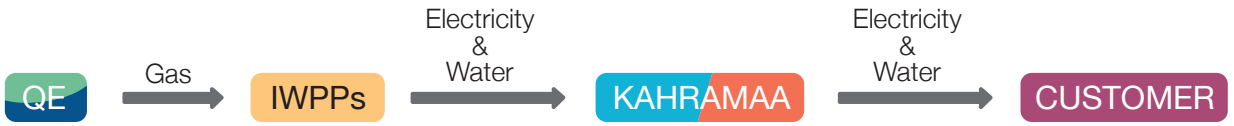
Kahramaa pursues its long term strategy upto 2030 to become a customer centric organization by adopting leading global practices for customer services in the utility sector. It also seeks financial sustainability, which will be achieved with increased revenues and reduction in financial support from 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. 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 its 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 electricity and water services provider in the country. Despite the challenges in the recent past 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 and 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 IWPP's (Independent Power and Water Providers), adopting global trends of deregulation.
QE (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 (QE).

EWT1 KEY GROWTH INDICATORS

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

	2019	2020	2021	2022	2023	Average % Change
A. ELECTRICITY						
Generated, GWh	49,873	49,259	51,641	54,623	56,250	**3.3 %**
% Change	4.1%	-1.2%	4.8%	5.8%	3.0%	
Sent Out, GWh	46,435	45,826	48,329	51,325	52,899	**3.5 %**
% Change	4.0%	-1.3%	5.5%	6.2%	3.1%	
Maximum Demand, MW	8,475	8,600	8,875	9,400	9,805	**4.5 %**
% Change	7.6%	1.5%	3.2%	5.9%	4.3%	
No. of customers (billed & non-billed, based on number of meters)	410,661	433,751	454,765	491,308	504,685	**6.1 %**
% Change	9.0%	5.6%	4.8%	8.0%	2.7%	
B. WATER						
Water Production Mm3	671	691	671	672	669	**1.0 %**
% Change	5.3%	3.0%	-2.9%	0.1%	-0.4%	
Maximum Production, Mm3/Day	1.98	2.06	2	1.97	1.97	**1.4 %**
% Change	7.6%	4.0%	-2.9%	-1.5 %	0.0%	
No. of Water customers (billed & non-billed, metered plus served by water tankers)	363,338	382,932	406,745	426,738	441,202	**6.0 %**
% Change	**10.2%**	**5.4%**	**6.2%**	**4.9%**	**3.4%**	

The average growth of peak demand for electricity and water are growing at between 2-4% 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.

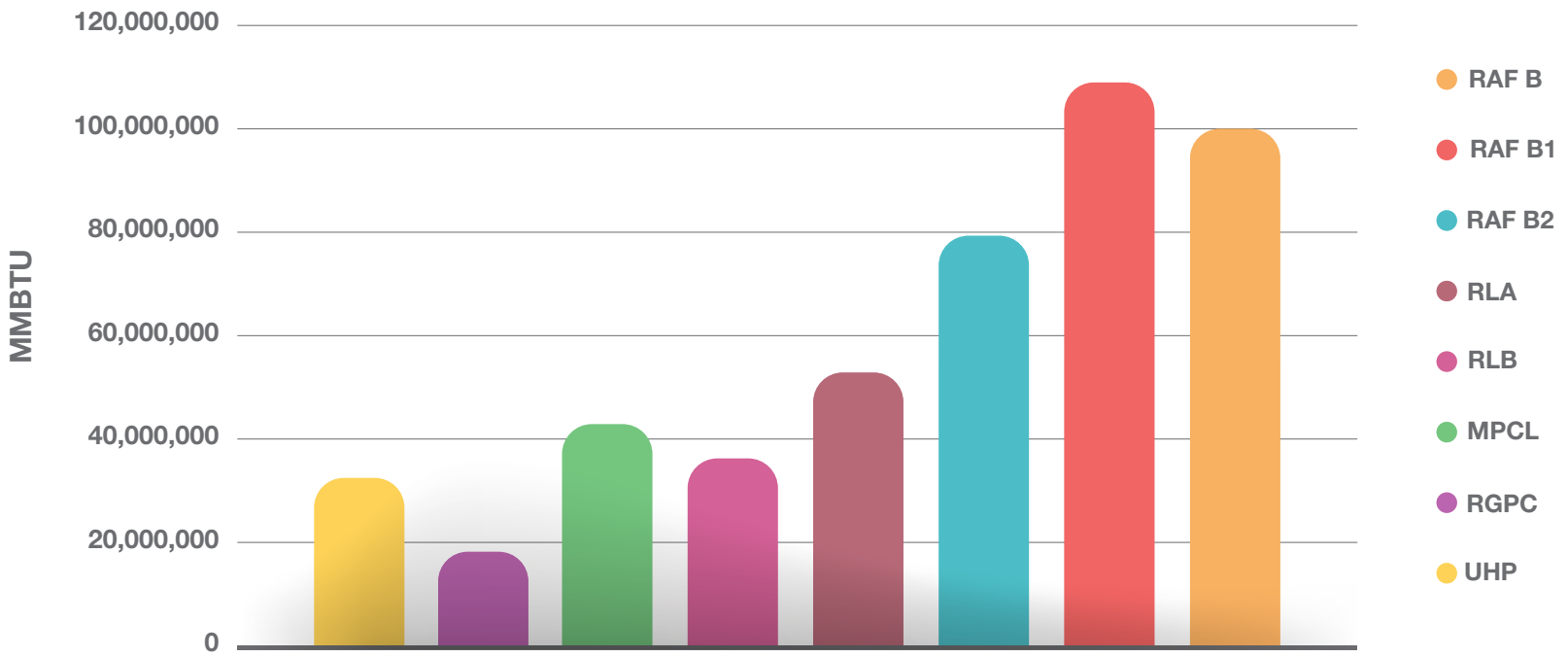
Some of the key projects are given below:

- Advanced Metering Infrastructure- AMI
- Installation of Electricity & Water SMART Meters
- Billing and Customer Relationship Management
- Solar Power Production Facility
- Additional Capacity from IWPPs – Facility E
- Qatar Power Network Expansion- Phase 12, 13 & additional projects
- Extension of Water Distribution Network – Phase 6
- Facility E Associated Water Transmission Pipelines
- Reconstruction & Upgrading of Water RPS & Associated Pipelines
- Reconstruction & Upgrading of Underground Water Reservoirs

EWT3 GAS CONSUMPTION BY IWPP (MMBTU) IN 2023

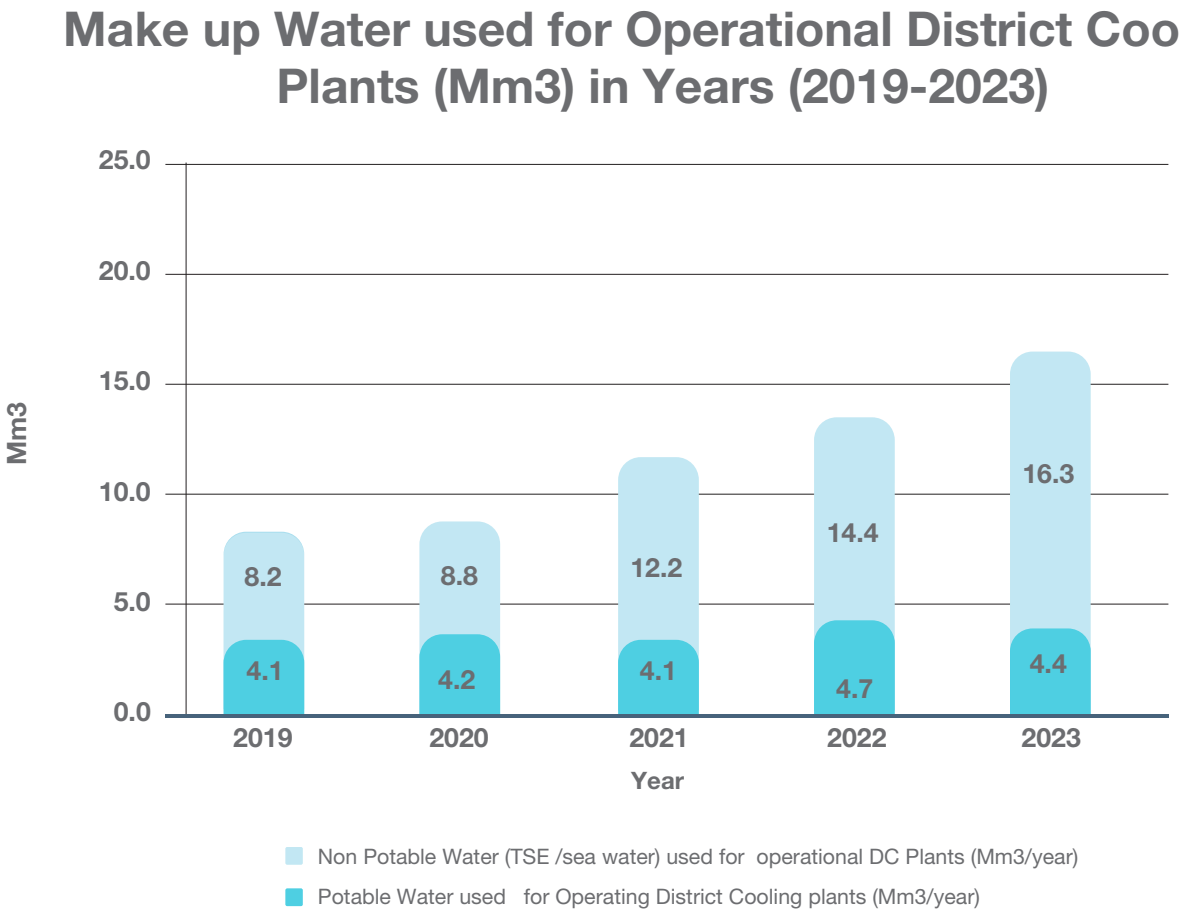
Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	Total
Jan	2,126,087	1,087,947	2,544,046	3,236,438	3,754,597	3,996,106	5,015,601	5,550,883	**27,311,706**
Feb	2,108,416	961,856	2,761,798	2,900,600	3,354,178	2,641,357	4,802,578	5,505,830	**25,036,613**
Mar	2,057,673	997,553	3,000,378	3,678,791	2,956,311	4,534,724	7,295,451	6,523,361	**31,044,242**
Apr	1,971,643	991,416	3,086,725	3,103,358	3,633,794	5,229,824	6,964,784	6,748,254	**31,729,798**
May	3,154,082	987,186	3,400,244	3,262,471	3,778,270	7,660,761	9,434,818	9,314,866	**40,992,697**
Jun	2,106,382	2,700,066	4,303,448	3,128,079	5,050,197	8,682,461	10,456,556	9,238,447	**45,665,635**
Jul	3,094,364	2,834,200	4,402,758	3,300,963	5,726,966	9,265,650	11,293,357	10,141,156	**50,059,415**
Aug	3,936,085	2,966,948	4,471,333	3,497,178	5,883,781	9,349,646	12,774,420	10,960,328	**53,839,719**
Sep	3,835,999	2,153,287	4,355,373	3,032,873	5,636,742	8,684,105	12,092,411	10,338,255	**50,129,046**
Oct	2,935,712	1,984,491	4,423,355	3,289,571	5,382,433	7,850,271	10,188,669	8,658,428	**44,712,928**
Nov	2,781,937	1,321,294	3,323,216	3,174,330	3,658,428	5,930,943	7,255,013	6,800,482	**34,245,642**
Dec	1,911,739	1,124,180	3,065,405	2,961,539	3,946,394	2,796,019	7,727,932	6,399,791	**29,932,998**
Total	**32,020,119**	**20,110,423**	**43,138,078**	**38,566,191**	**52,762,091**	**76,621,868**	**105,301,590**	**96,180,079**	**464,700,439**

Gas consumption by IPPs in year 2023



EWT4 NON-POTABLE WATER USED IN DISTRICT COOLING

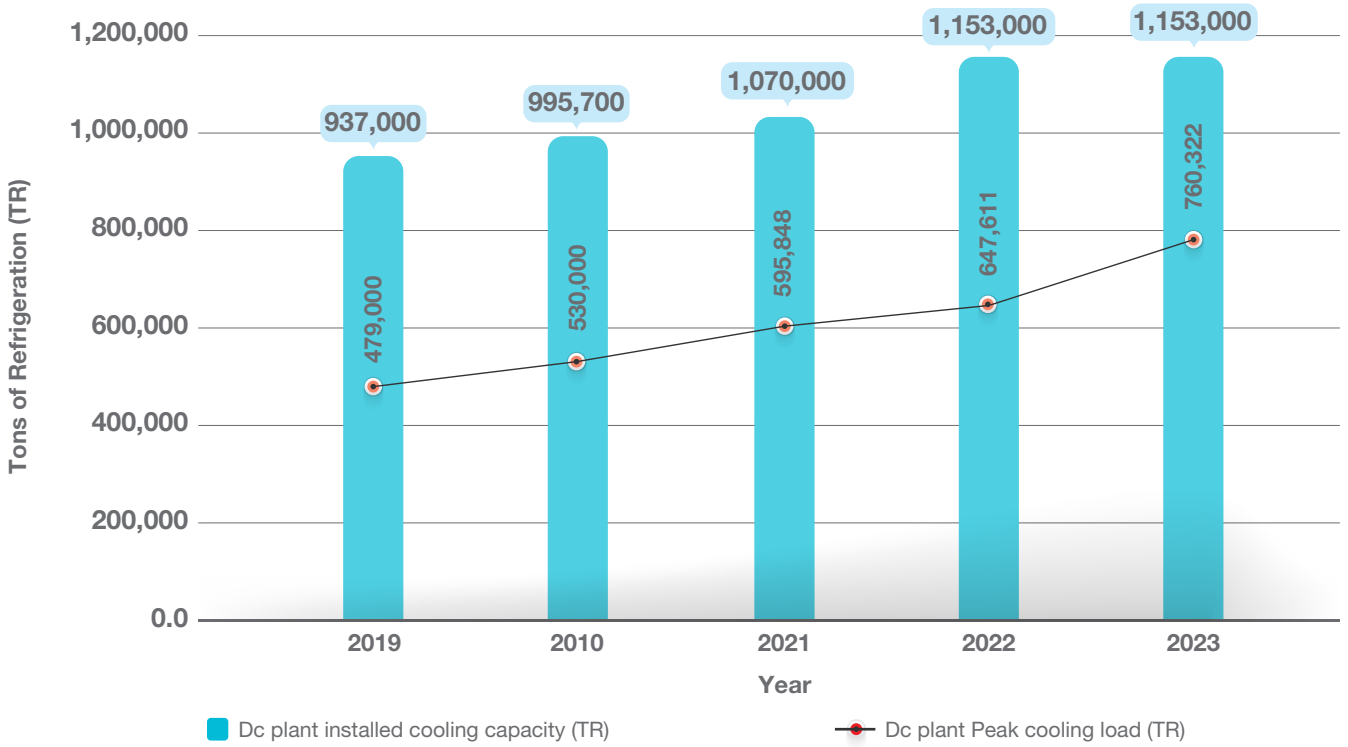
Year	2019	2020	2021	2022	2023
Potable Water used for Operating District Cooling plants (Mm3/year)	4.1	4.2	4.1	4.7	4.4
Non Potable Water (TSE /sea water) Used for operational DC Plants (Mm3/year)	8.2	8.8	12.2	14.4	16.3
Total Makeup Water demand for Cooling (Mm3/year)	12.3	13	16.3	19.1	20.7



EWT5 OPERATIONAL PEAK DISTRICT COOLING LOAD IN YEARS 2019-2023

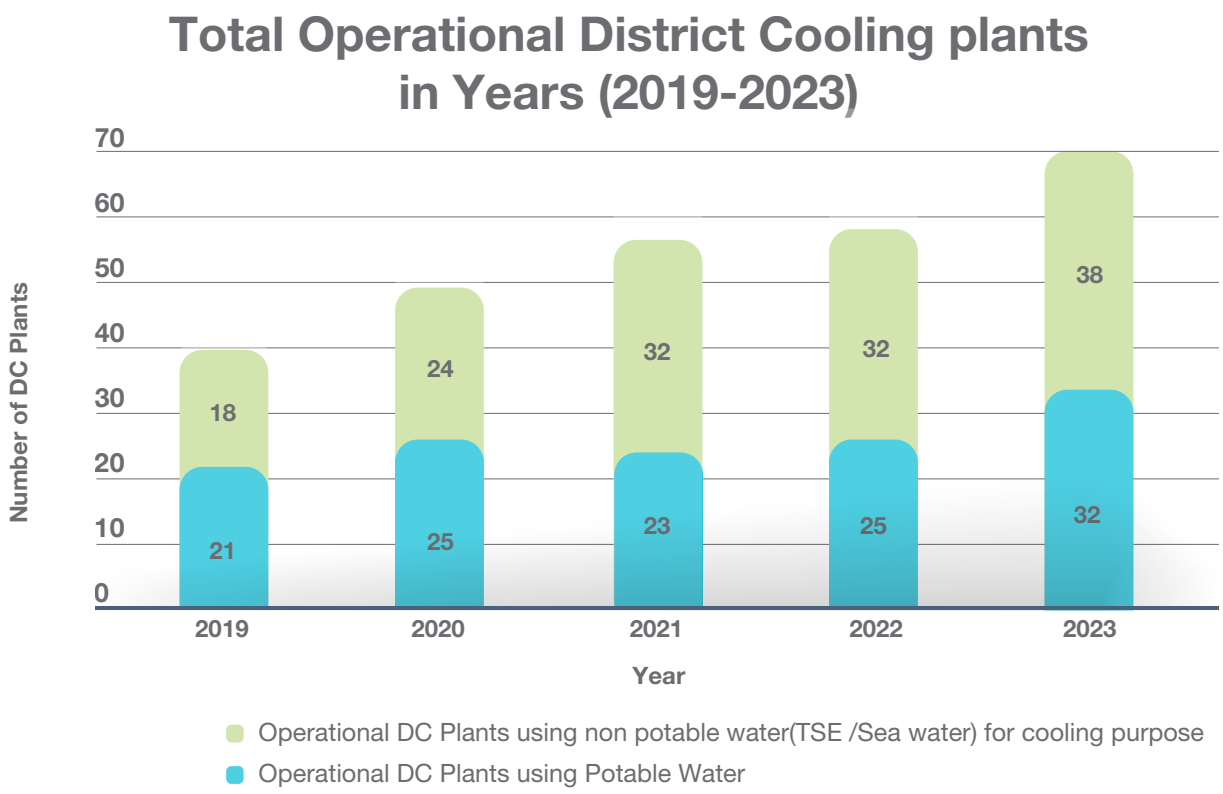
Year	2019	2020	2021	2022	2023
DC plant Peak Cooling Load (TR)	479,000	530,000	595,848	647,611	760,322
DC plant Installed Cooling Capacity (TR)	937,000	995,700	1,070,000	1,153,000	1,153,000

DC plant installed cooling capacity and peak load (TR) in years 2019- 2023



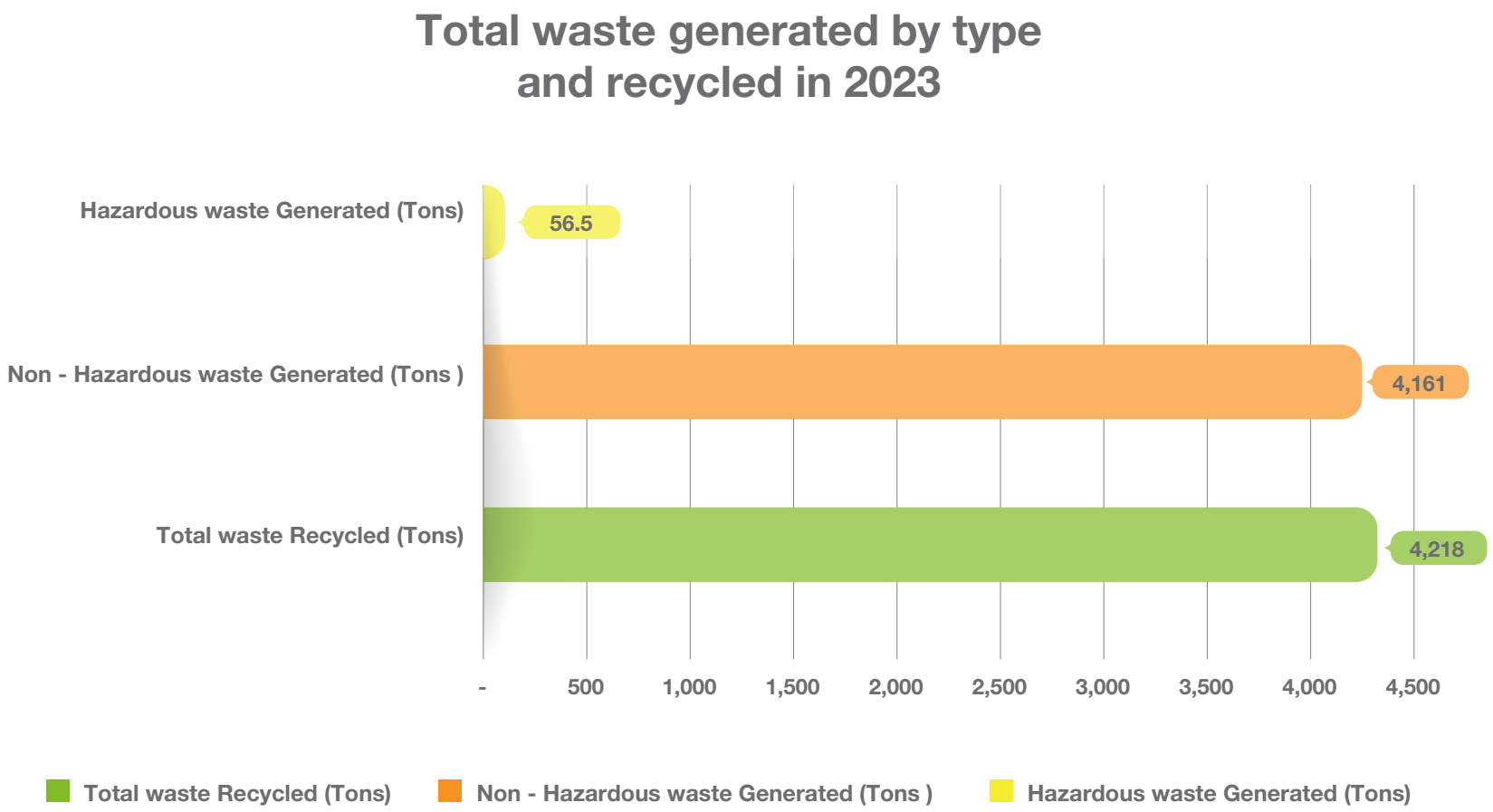
EWT6 OPERATIONAL DISTRICT COOLING PLANTS IN YEARS 2019-2023

Year	2019	2020	2021	2022	2023
Total Operational District Cooling plants	39	49	55	57	70
Number of operational DC Plants using non potable water(TSE /Sea water) for cooling purpose	18	24	32	32	38
Operational DC Plants using Potable Water	21	25	23	25	32



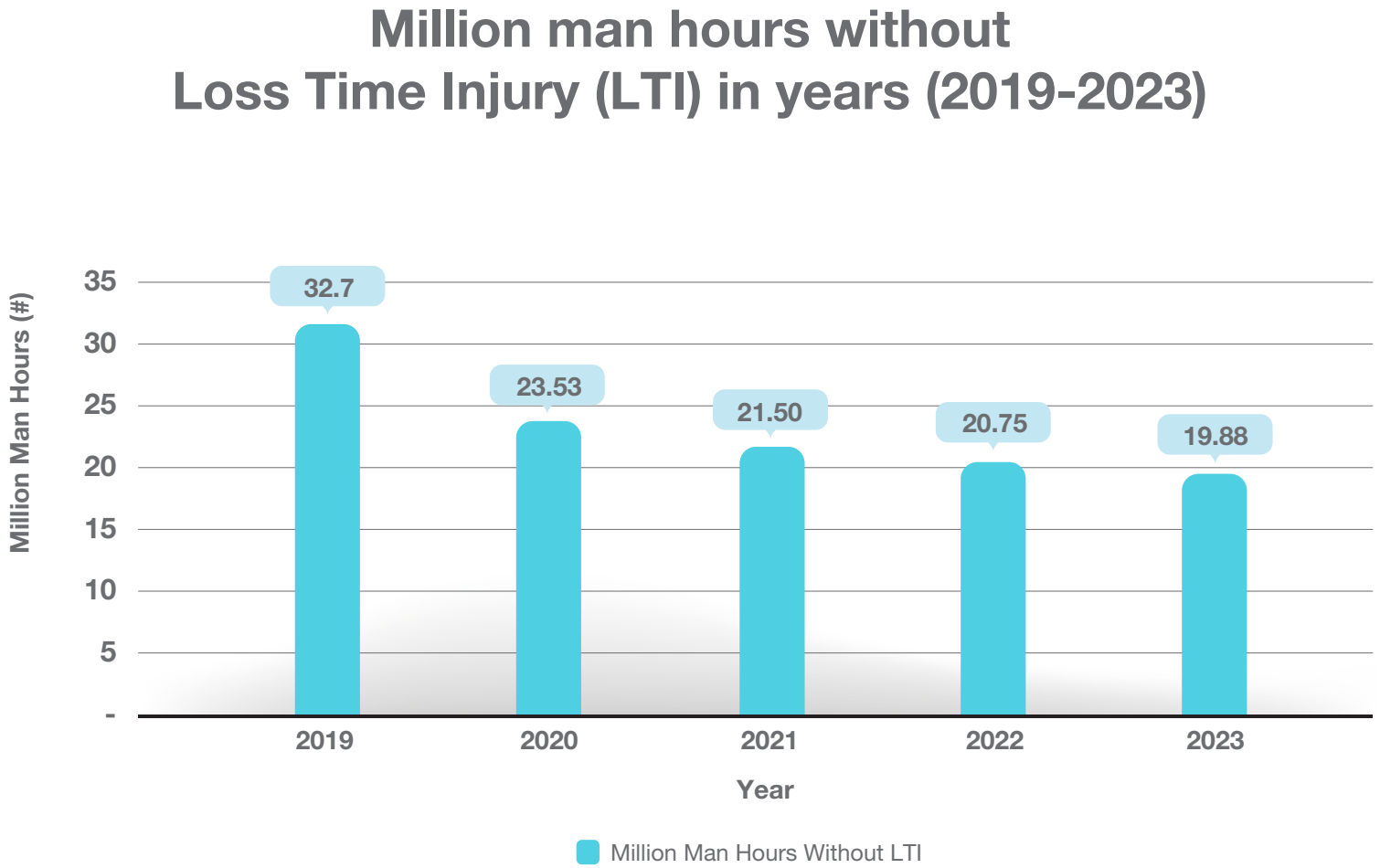
EWT7 TOTAL WASTE GENERATED BY TYPE AND RECYCLED IN 2023

Year 2023	Total waste Recycled* (Tons)	Non - Hazardous waste Generated (Tons)	Hazardous waste Generated (Tons)
	4217.74	4161.25	56.49



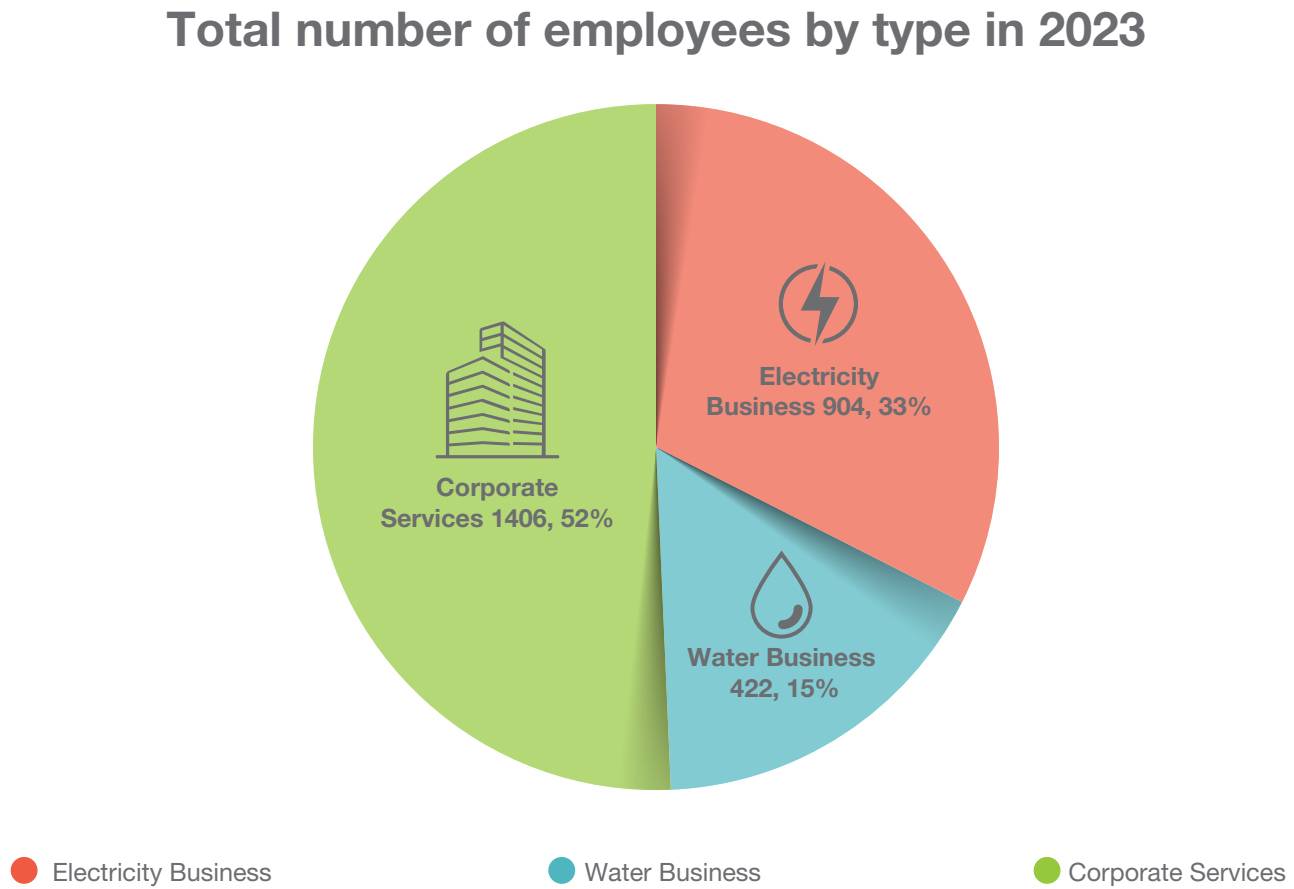
EWT8 MILLION MAN HOURS WITHOUT LTI IN YEARS (2019-2023)

Year	2019	2020	2021	2022	2023
Million Man Hours without LTI	32.07	23.53	21.50	20.75	19.88



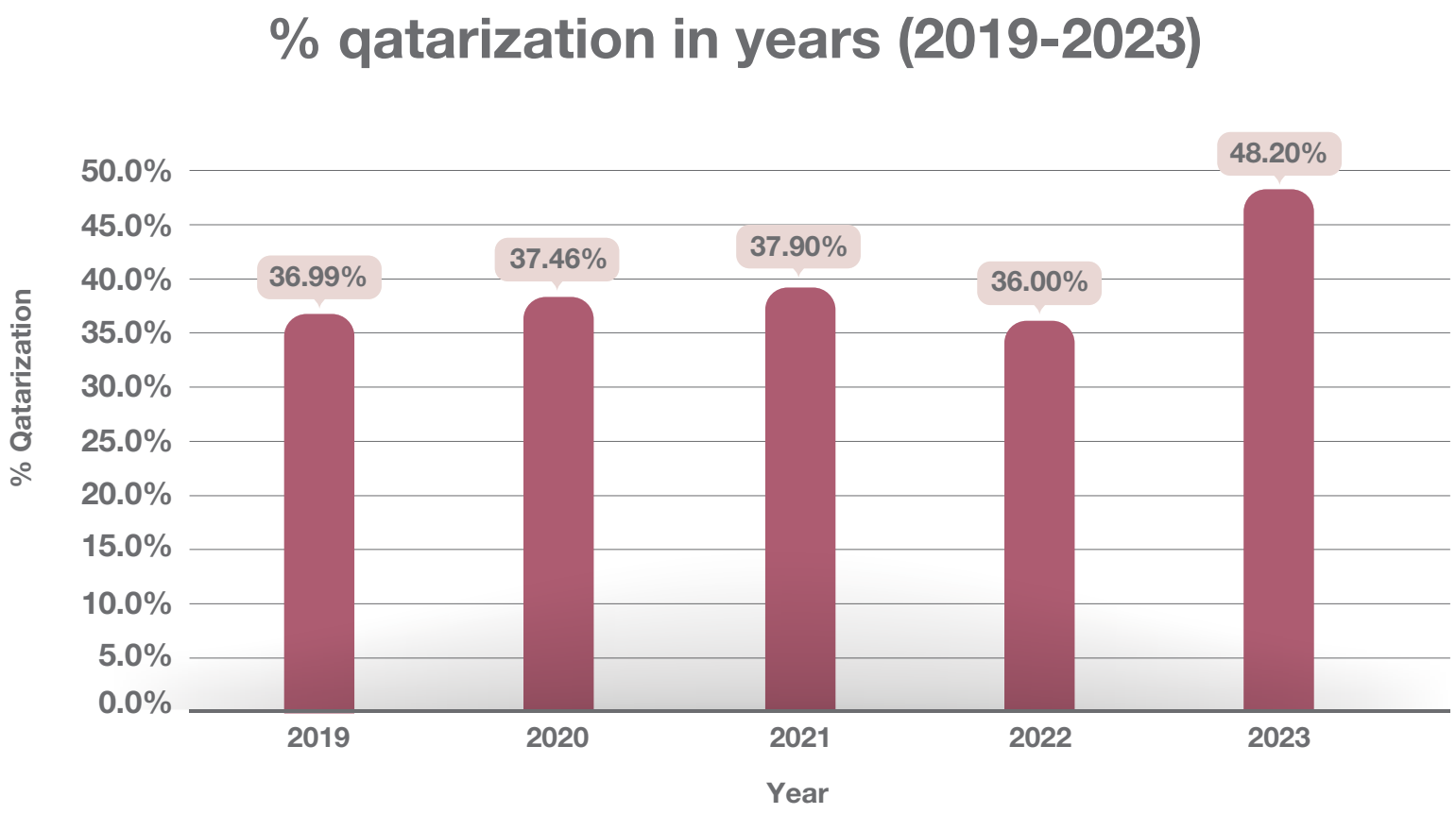
EWT9 TOTAL NUMBER OF EMPLOYEES BY TYPE IN 2023

Total Number of Employees by Type in 2023	Electricity Business	Water Business	Corporate Services
	904	422	1406



EWT10 QATARIZATION IN LAST FIVE YEARS

Year	2019	2020	2021	2022	2023
% Qatarization	36.99%	37.46%	37.90%	36.00%	48.20%



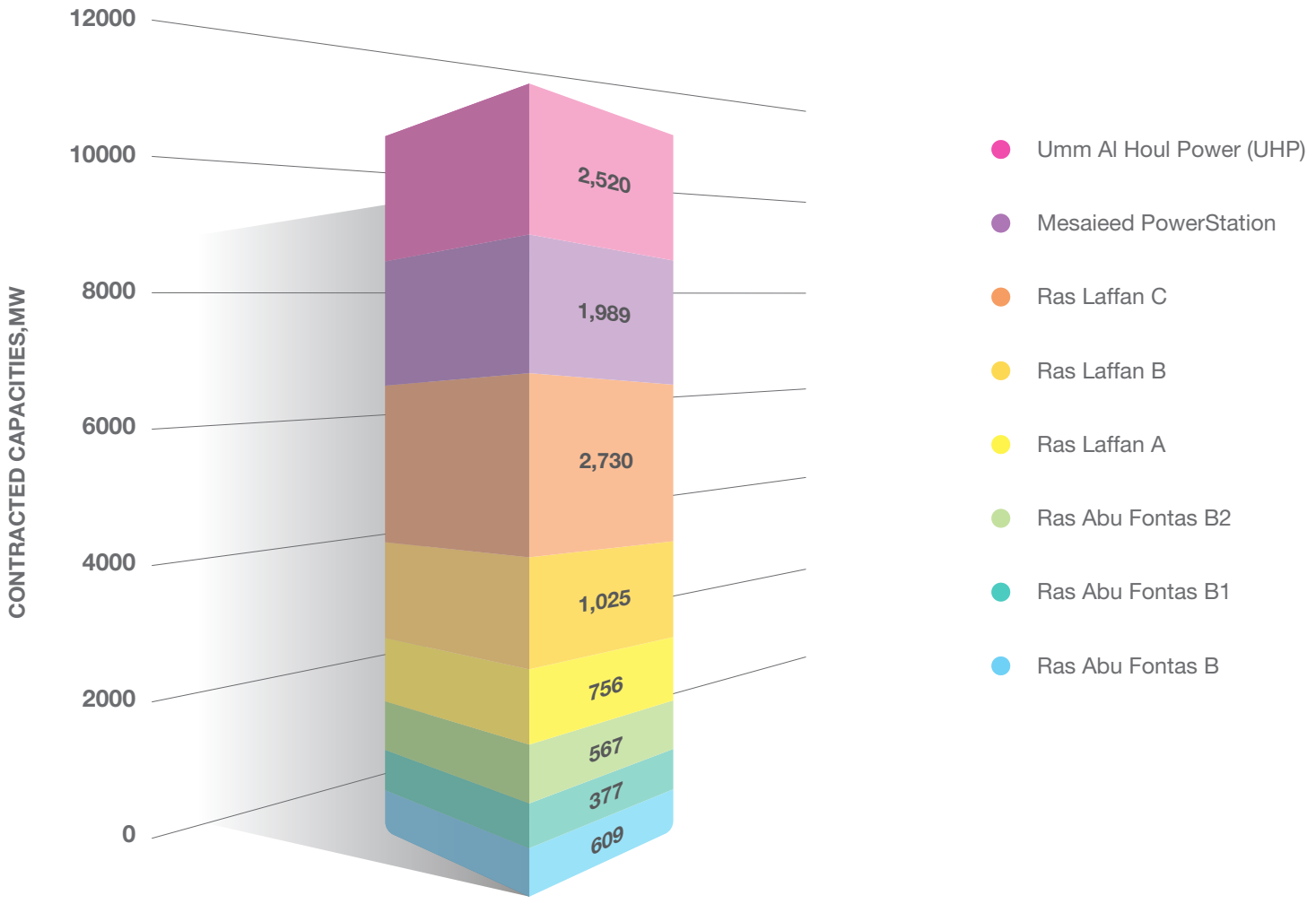
ELECTRICITY STATISTICS 2023

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	1553
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	4511
Mesaieed Power Company Limited	
Mesaieed PowerStation	1989
Umm Al Houl Power Company	
Umm Al Houl Power (UHP)	2520
Total Capacity	**10,573**

Phase-I with installed capacity of 350 MW PV generation at Al kharsaa (Siraj1) was commissioned in 2023.

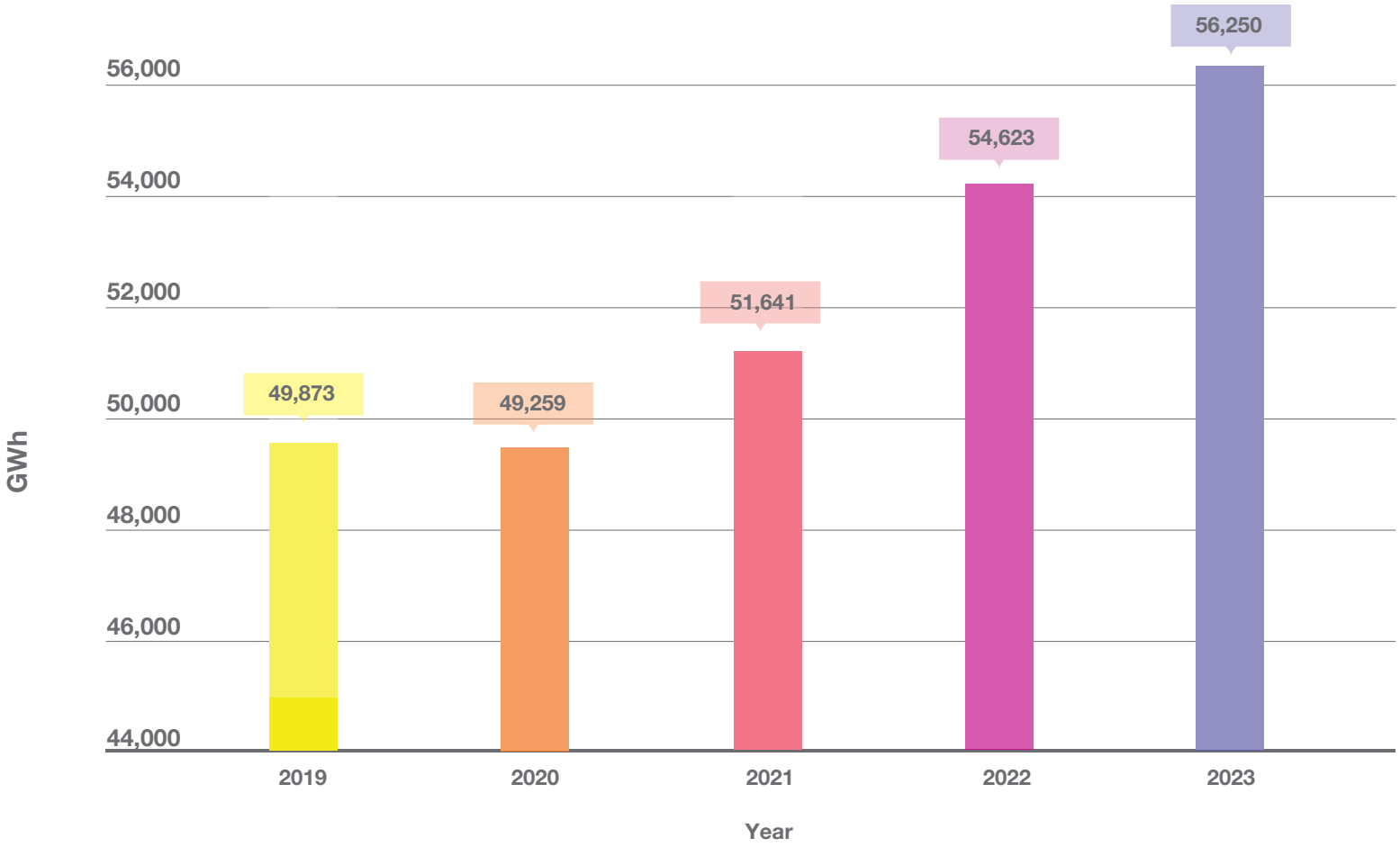
Electricity contracted capacity by IWPPs in 2023



ET2 ANNUAL ELECTRICITY GENERATION (2019 – 2023)

Year	Annual Increase, %	GWh
2019	4.1%	49,873
2020	-1.2 %	49,259
2021	4.8%	51,641
2022	5.8 %	54,623
2023	3.0%	56,250

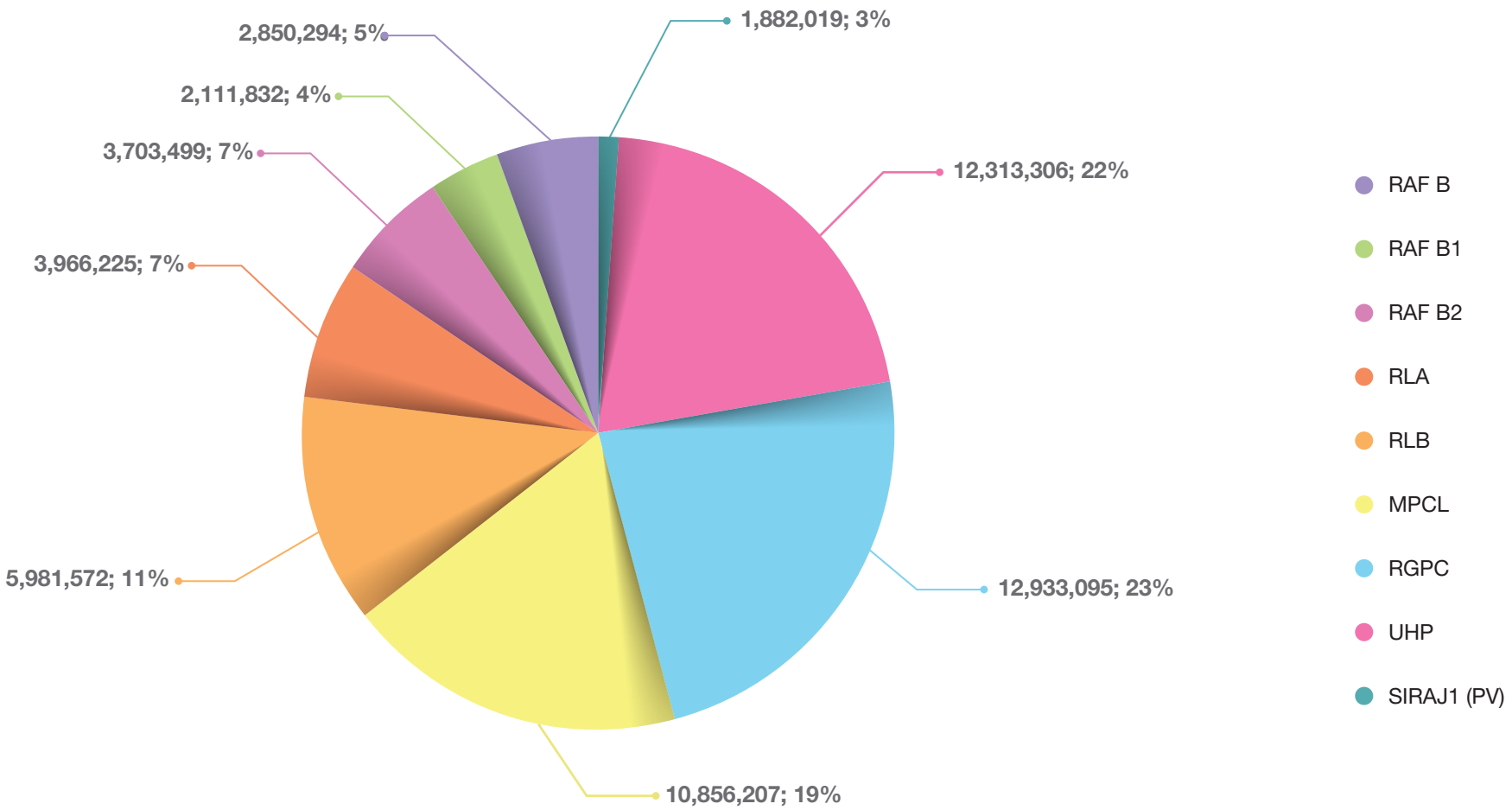
Electricity generation (GWh) in years (2019-2023)



ET3 MONTHLY ELECTRICITY GENERATION IN 2023, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	SIRAJ1 (PV)	Total
Jan	193,165	94,045	219,439	327,148	421,279	559,523	564,087	658,281	85191	**3,122,158**
Feb	189,659	83,590	239,954	289,621	376,897	369,467	527,806	667,856	132366	**2,877,216**
Mar	187,807	89,984	259,125	378,537	322,240	636,860	798,957	800,067	164917	**3,638,494**
Apr	178,904	89,809	271,366	314,204	419,693	739,897	811,714	833,443	165307	**3,824,337**
May	283,908	90,454	297,157	330,943	433,974	1,088,314	1,167,486	1,213,460	192993	**5,098,689**
Jun	188,398	239,323	370,664	320,171	563,864	1,237,185	1,326,733	1,227,914	204,073	**5,678,325**
Jul	274,014	249,184	376,124	331,484	652,171	1,324,710	1,467,758	1,332,751	197,965	**6,206,161**
Aug	347,253	260,466	378,930	377,047	669,283	1,333,477	1,648,025	1,466,128	183,547	**6,664,156**
Sep	336,585	187,899	372,016	324,181	642,216	1,235,675	1,555,114	1,360,520	170,559	**6,184,765**
Oct	255,773	172,401	372,408	329,928	607,598	1,106,556	1,288,392	1,124,923	154,092	**5,412,071**
Nov	243,614	111,027	281,715	317,915	419,922	837,095	859,817	869,203	114,033	**4,054,341**
Dec	171,214	95,977	264,601	325,046	452,435	387,448	917,206	758,760	116,976	**3,489,663**
Total	**2,850,294**	**1,764,159**	**3,703,499**	**3,966,225**	**5,981,572**	**10,856,207**	**12,933,095**	**12,313,306**	**1,882,019**	**56,250,376**

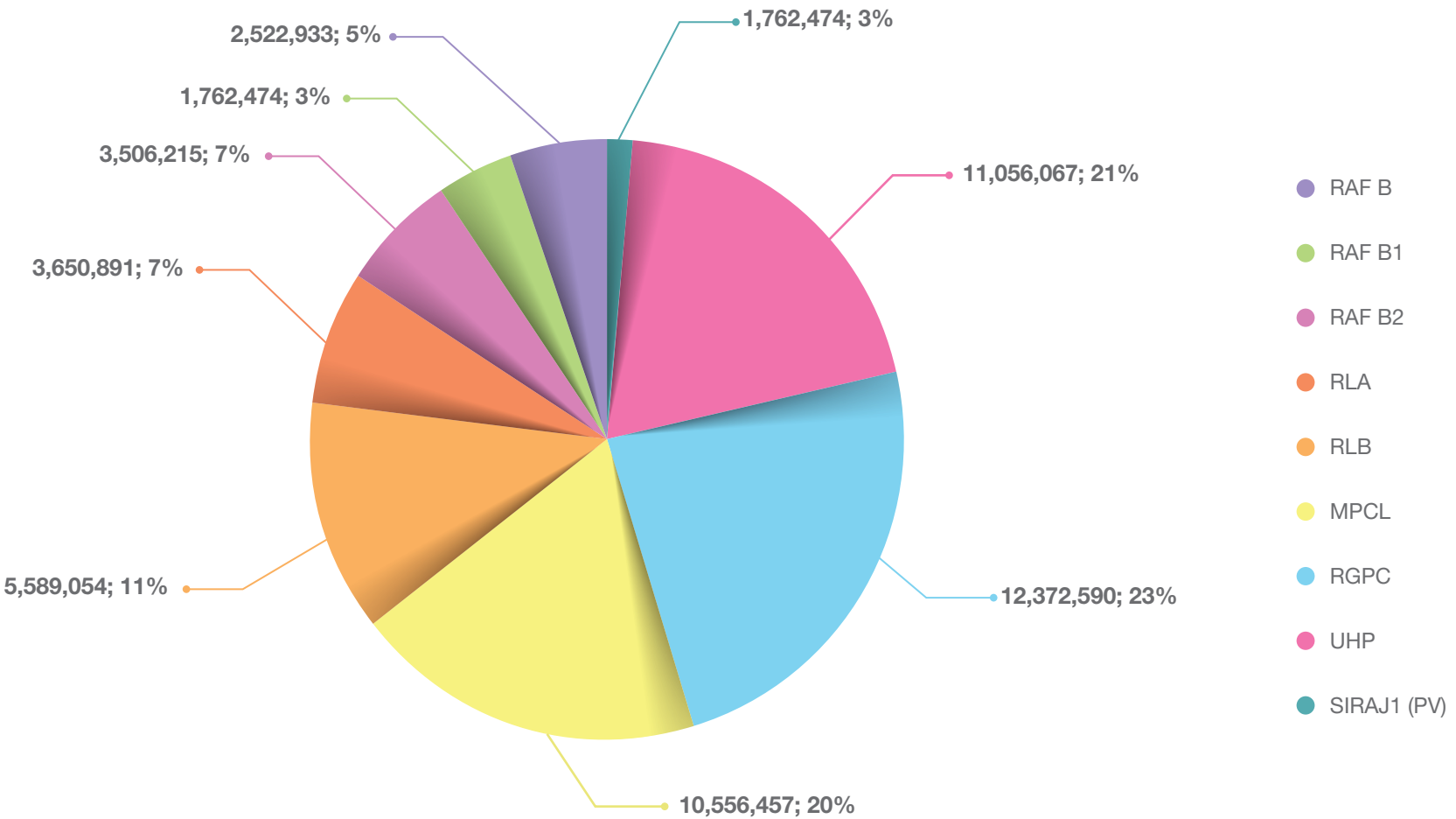
Electricity generation by IWPPs in 2023 (MWh)



ET4 ENERGY TRANSMITTED IN 2023, MWh

Month	RAF B	RAF B1	RAF B2	RLA	RLB	MPCL	RGPC	UHP	SIRAJ1 (PV)	Total
Jan	169,872	93,960	204,492	301,043	391,066	542,645	530,763	562,331	85,191	**2,881,363**
Feb	167,477	83,515	228,415	266,038	349,710	358,105	495,685	582,715	132,366	**2,664,026**
Mar	163,266	89,907	245,005	350,021	295,053	618,433	758,717	702,252	164,917	**3,387,571**
Apr	154,049	89,730	256,704	288,519	390,031	719,184	772,348	733,753	165,307	**3,569,625**
May	255,829	90,375	283,640	304,430	404,375	1,058,910	1,118,668	1,097,488	192,993	**4,806,708**
Jun	161,980	239,092	351,427	294,993	528,714	1,204,027	1,274,027	1,119,023	204,073	**5,377,356**
Jul	243,523	248,940	356,008	305,140	612,595	1,289,538	1,411,421	1,222,997	197,965	**5,888,127**
Aug	313,227	260,208	360,114	348,603	629,129	1,298,196	1,587,967	1,347,958	183,547	**6,328,949**
Sep	305,091	187,712	352,989	298,210	603,952	1,202,680	1,496,995	1,245,247	170,559	**5,863,435**
Oct	226,902	172,235	352,143	303,150	570,701	1,075,750	1,235,111	1,018,975	154,092	**5,109,059**
Nov	215,550	110,914	265,460	292,124	391,705	813,666	817,301	770,507	114,033	**3,791,260**
Dec	146,227	95,886	249,818	298,620	422,023	375,323	873,587	652,821	116,976	**3,231,281**
Total	**2,522,993**	**1,762,474**	**3,506,215**	**3,650,891**	**5,589,054**	**10,556,457**	**12,372,590**	**11,056,067**	**1,882,019**	**52,898,760**

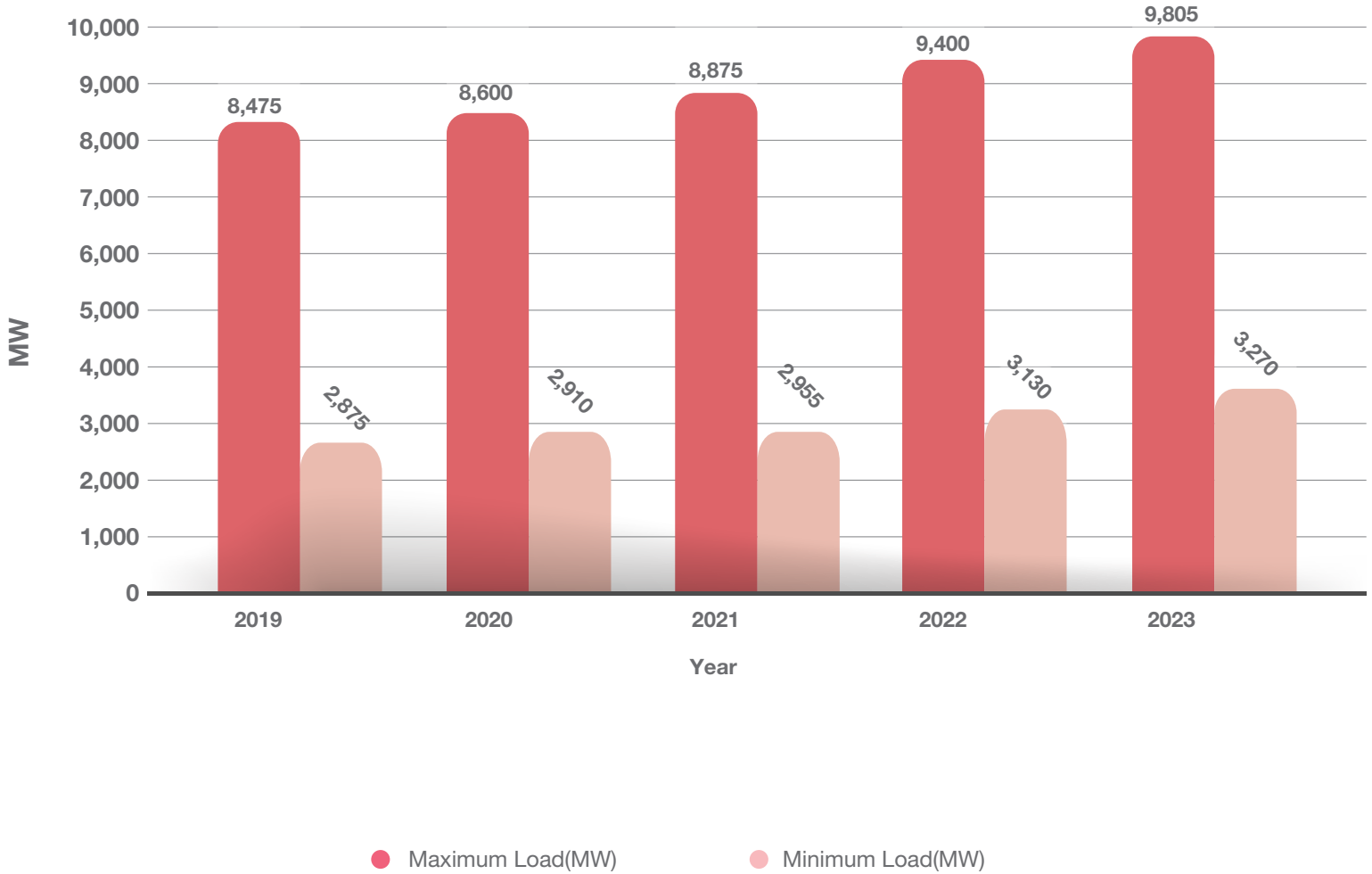
Electricity transmitted by IWPPs in 2023 (MWh)



ET5 MAXIMUM AND MINIMUM SYSTEM LOAD LAST FIVE YEARS, MW

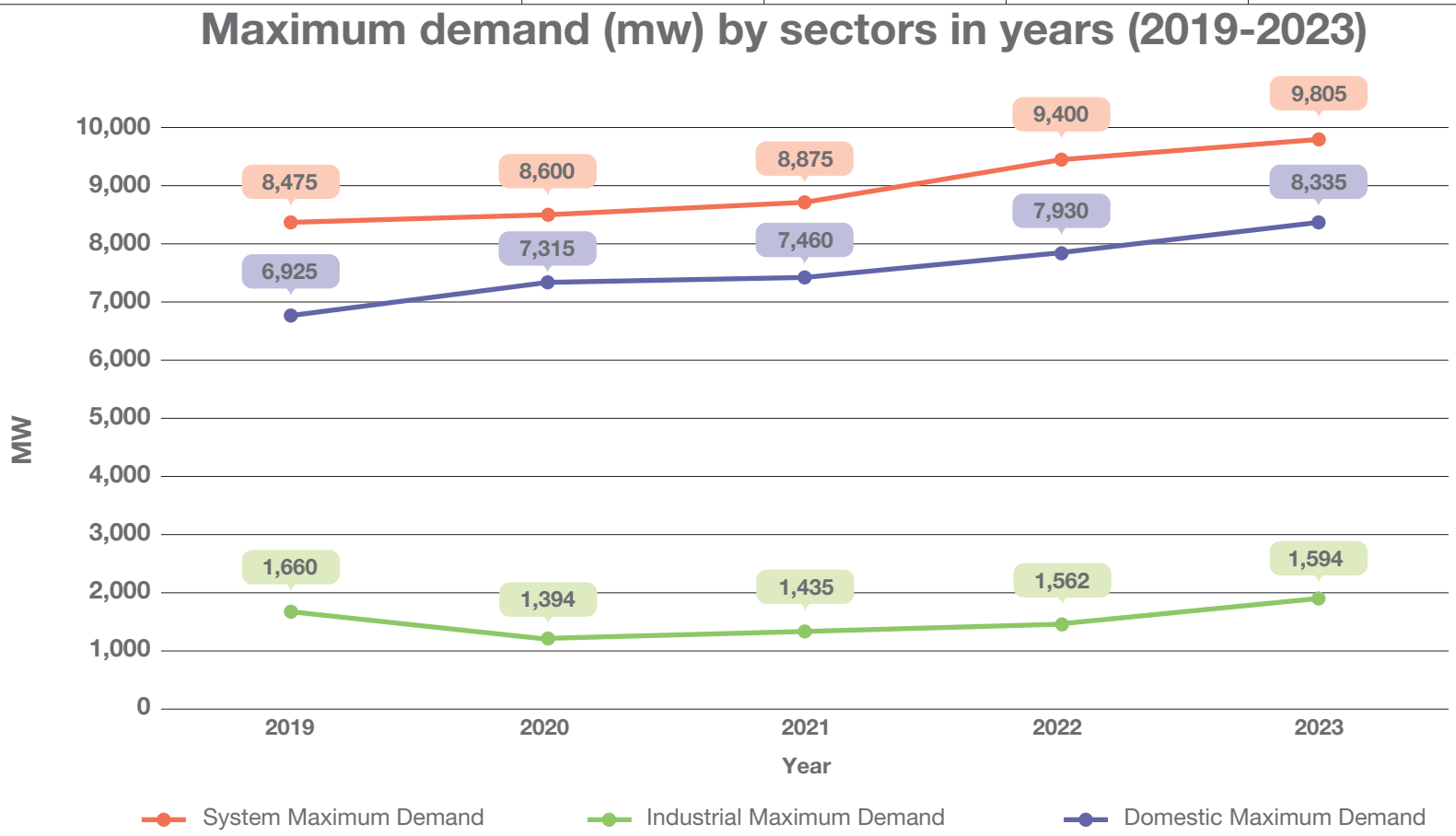
Year	Maximum Load (MW)	Maximum Load Date (mm/dd/yyyy)	Minimum Load (MW)	Minimum Load Date (mm/dd/yyyy)
2019	8,475	09/02/2019	2,875	01/20/2019
2020	8,600	07/30/2020	2,910	02/15/2020
2021	8,875	07/28/2021	2,955	01/15/2021
2022	9,400	08/21/2022	3,130	01/07/2022
2023	9,805	08/26/2023	3,270	01/28/2023

Maximum and minimum system load
In years (2019-2023)



ET6 MAXIMUM DEMAND BY SECTORS FROM 2019 TO 2023

Demand Type	2019	2020	2021	2022	2023
System Maximum Demand	8,475	8,600	8,875	9,400	9,805
* Industrial Maximum Demand	1,660	1,394	1,435	1,562	1,594
Domestic Maximum Demand	6,925	7,315	7,460	7,930	8,335



Note: * Industrial Maximum Demand figure is excluding Qatalum

ET7 SECTORAL MAXIMUM DEMANDS IN 2023, MW

Demand Type	Magnitude (MW)	Demand Date (mm/dd/yyyy)
System Maximum	9,805	08-26-23
* Industrial Maximum	1,594	07-29-23
Domestic Maximum	8,335	08-26-23

* Maximum industrial demand excluding Qatalum. The maximum industrial demand including Qatalum is 1687 MW.

ET8 ANNUAL LOAD FACTORS IN 2023

Demand Type	Load Factor, %
System Maximum	62.87%
Industrial Maximum	82.00%
Domestic Maximum	57.37%

* 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 Qatalum Temporary load.

ET9 ANNUAL GROWTH (%) FROM 2022 TO 2023

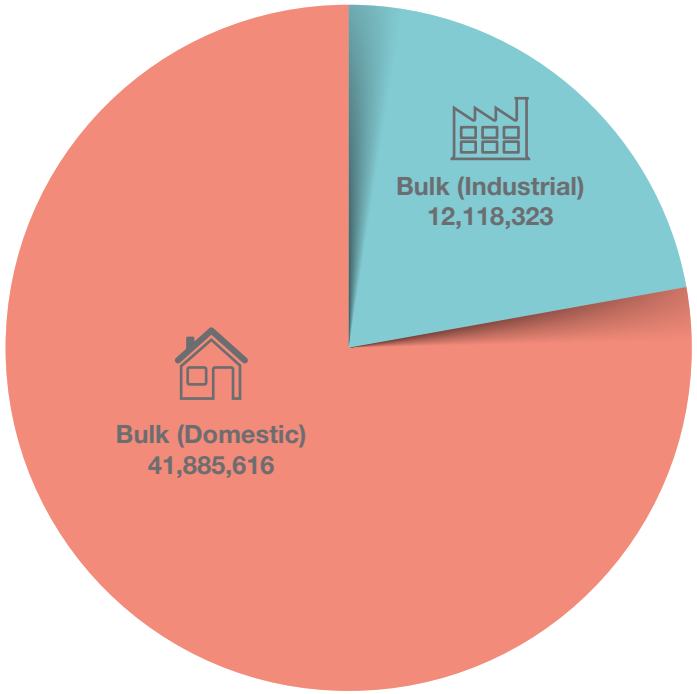
Demand Type	Peak Demand (MW) Growth
System Maximum	4.3%
*Industrial Maximum	2.0%
Domestic Maximum	5.1%

* Maximum industrial demand excluding Qatalum

ET10 SECTORAL CONSUMPTION IN 2023, MWh

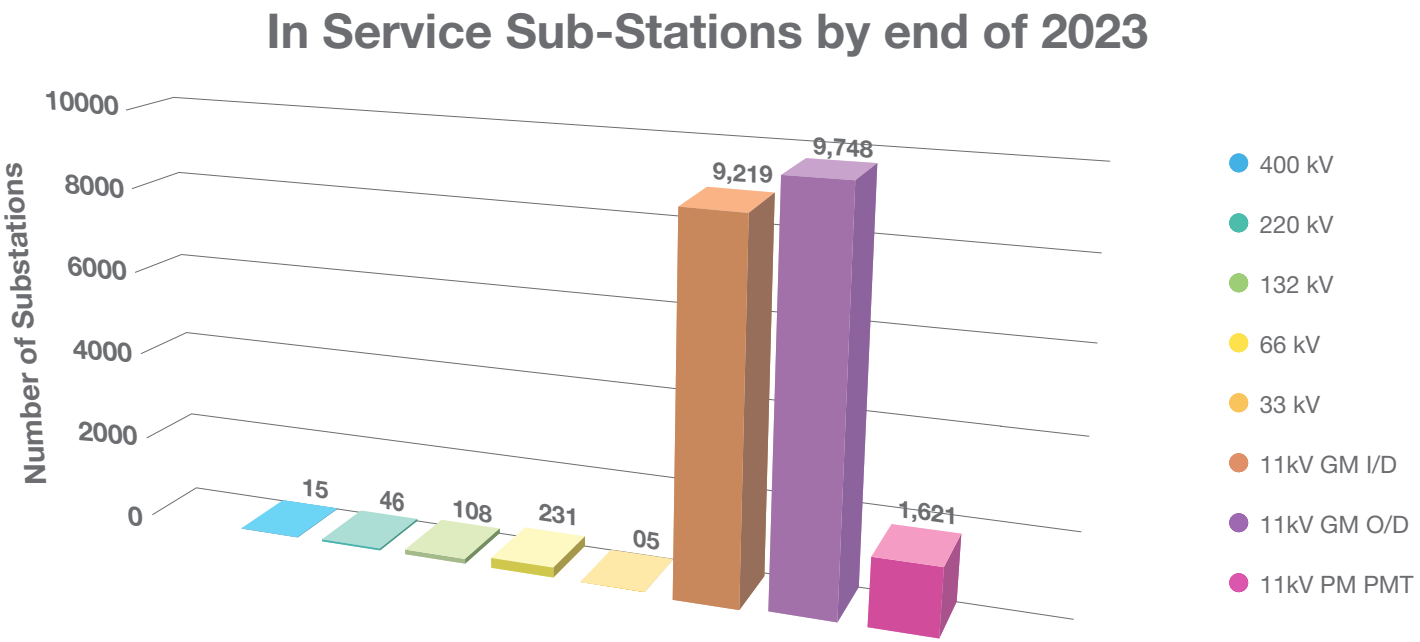
Sector	Bulk (Industrial)	Domestic	Auxiliary	Transmission and Distribution Losses	Total Injected Generation	Total Electricity Generation
Consumption, MWh -2023	12,118,323	41,885,616	3,351,821	3,226,264	53,613,901	56,250,375

Sectorial consumption (MWh) in 2023



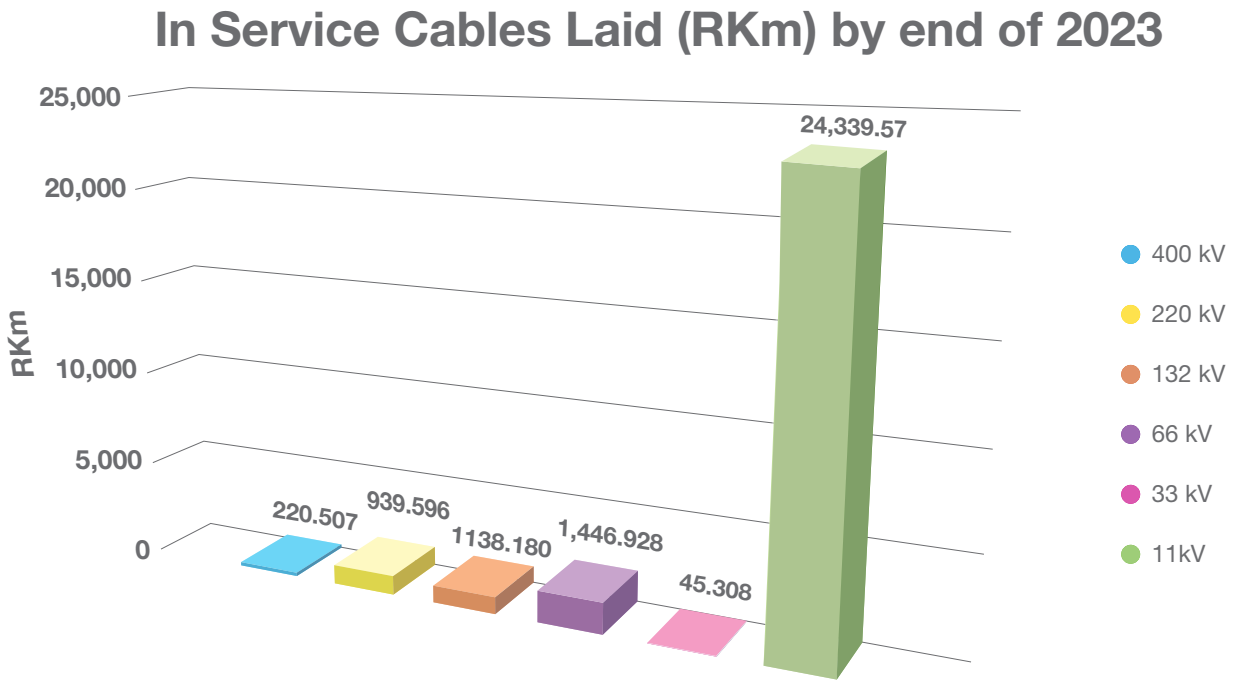
ET11 SUB-STATIONS

Period Commissioned	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 31/12/2018)	14	39	69	215	06	6,460	8,064	1,472
Commissioned -2019	0	01	09	12	0	706	701	42
Commissioned -2020	01	02	18	07	01	558	424	71
Commissioned -2021	0	03	04	06	0	419	312	70
Commissioned -2022	0	01	08	05	0	683	300	46
Commissioned -2023	0	0	05	01	0	484	176	12
In service (as at 31/12/2023)	15	46	108	231	05	9,219	9,748	1,621



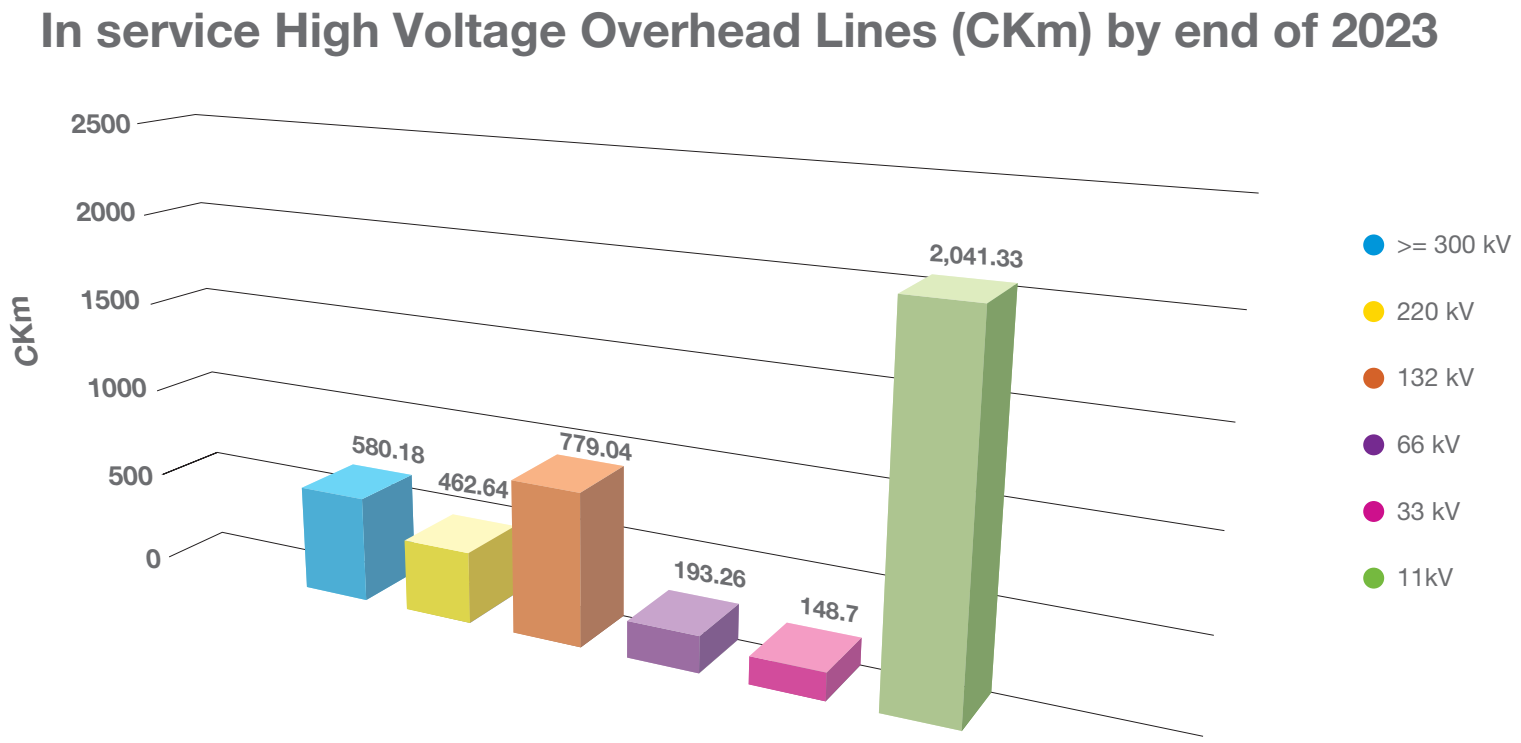
ET12 CABLES LAID (RKM)

SUBSTATIONS	400 kV	220 kV	132 kV	66 kV	33 kV	11kV
In service (as at 31/12/2018)	159.985	883.486	789.963	1,462.713	28.138	17,943.75
Commissioned -2019	01.147	15.7	86.08	54.83	01.08	1,713
Commissioned -2020	32.395	46.249	156.422	18.336	0	1,180.48
Commissioned -2021	0	05.41	19.02	21.41	00.17	1,124.63
Commissioned -2022	0	23.52	20.8	20.56	00.322	01.959
Commissioned -2023	0	18.9	21.009	18.294	00.566	1,080.3
In service (as at 31/12/2023)	220.507	939.596	1,138.18	1,446.928	45.308	24,339.57



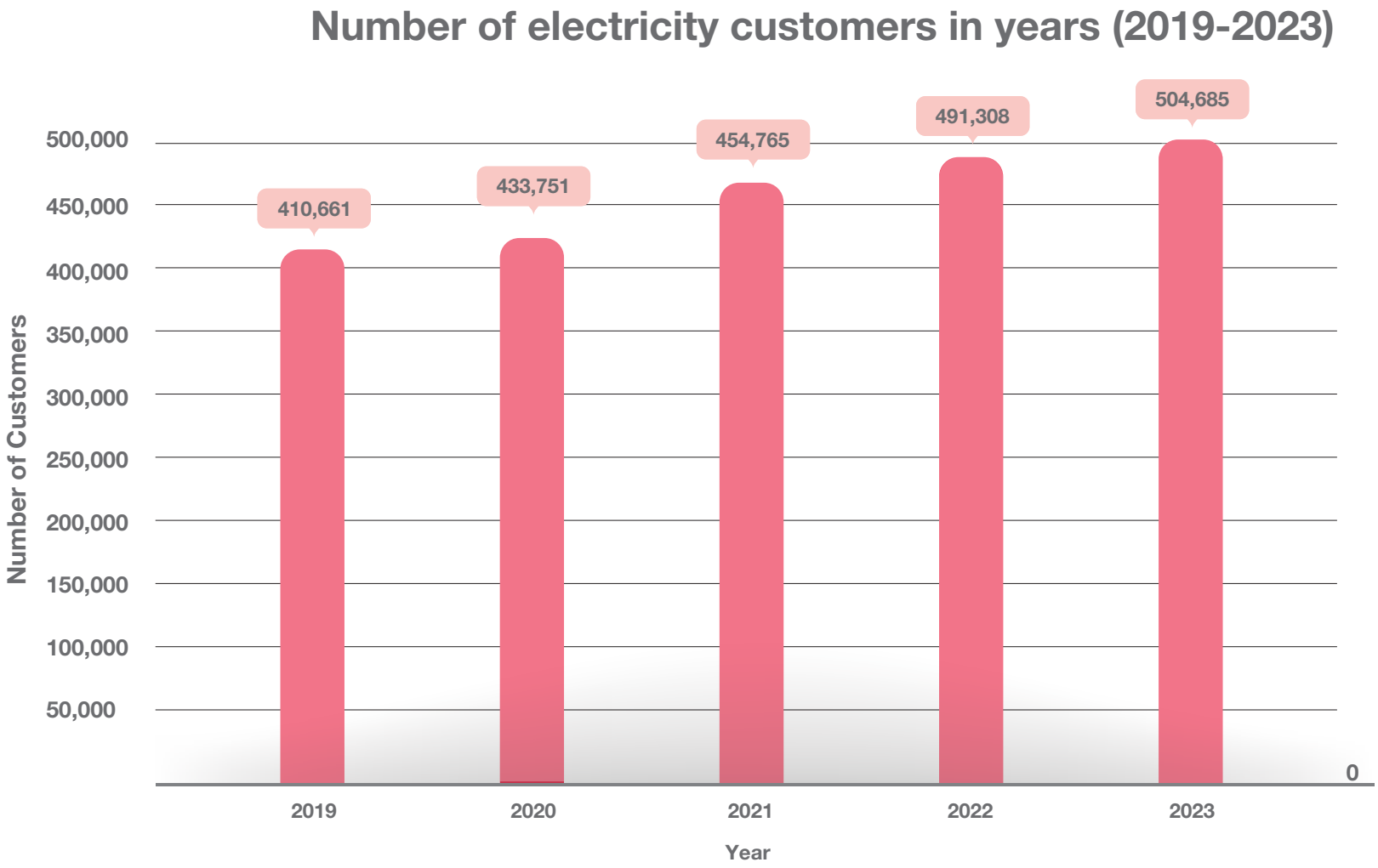
ET13 HIGH VOLTAGE OVERHEAD LINES (CKM)

Period	>= 300 kV	220 kV	132 kV	66 kV	33 kV	11kV
In service (as at 31/12/2018)	580.18	392.37	677.55	198.77	148.7	2,016.02
Commissioned -2019	0	0	0	0	0	39
Commissioned -2020	0	0	09.38	05.52	0	26.9
Commissioned -2021	0	0	27.24	0	0	18.17
Commissioned -2022	0	69	21	0	0	26.101
Commissioned -2023	0	0	42.46	0	0	0
In service (as at 31/12/2023)	580.18	462.64	779.04	193.26	148.7	2,041.33



ET14 NUMBER OF ELECTRICITY CUSTOMERS FROM 2019 TO 2023

Year	2019	2020	2021	2022	2023
No Of Customers	410,661	433,751	454,765	491,308	504,685
Annual Growth (%)	9%	5.6 %	4.8%	7.4%	2.7%



ET15 AVERAGE ELECTRICITY PER CAPITA CONSUMPTION

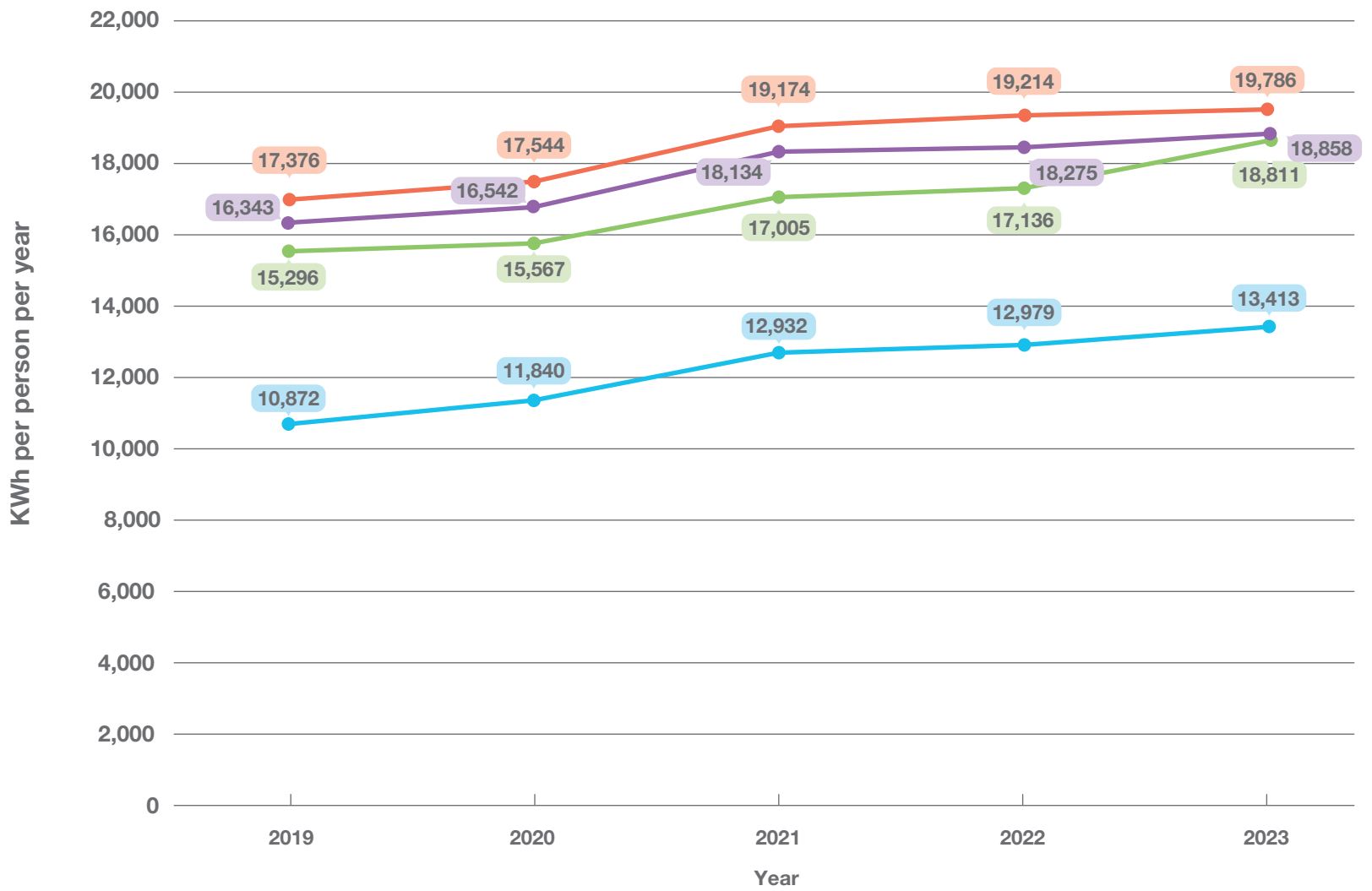
Year	2019	2020	2021	2022	2023
Population	2,773,885	2,807,805	2,693,301	2,842,958	3,085,087
Population Annual Increase(%)	0.60%	1.22%	-4.08%	5.56%	8.52%
Total Energy Generation Including all auxiliary consumption GWh	49,873	49,259	51,641	54,623	56,250
Energy Transmitted (Sent out) GWh = Generation minus auxiliary Consumption	46,435	45,825	48,329	51,325	53,614
Electricity Net Distribution GWh = Injected Generation minus Real losses	43,550	43,710	45,798	48,716	50,251
Electricity Consumption GWh (Excluding Bulk Industrial)	31,539	33,245	34,949	37,016	38,133
Average Electricity Per Capita Consumption: (KWh Per Person per Year)					
(A) Based on Total Energy Generation (IPPs) including auxiliary Consumption	17,979	17,544	19,174	19,214	19,786
(B) Based on Energy Sent-Out (Net IPPs Generation)	16,918	16,542	18,134	18,275	18,858
(C) Based on Electricity Net Distribution	15,868	15,567	17,005	17,136	18,811
(D) Based on Electricity Net Distribution excluding Industrial Bulk Consumers	11,497	11,840	12,932	12,979	13,413

* 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)

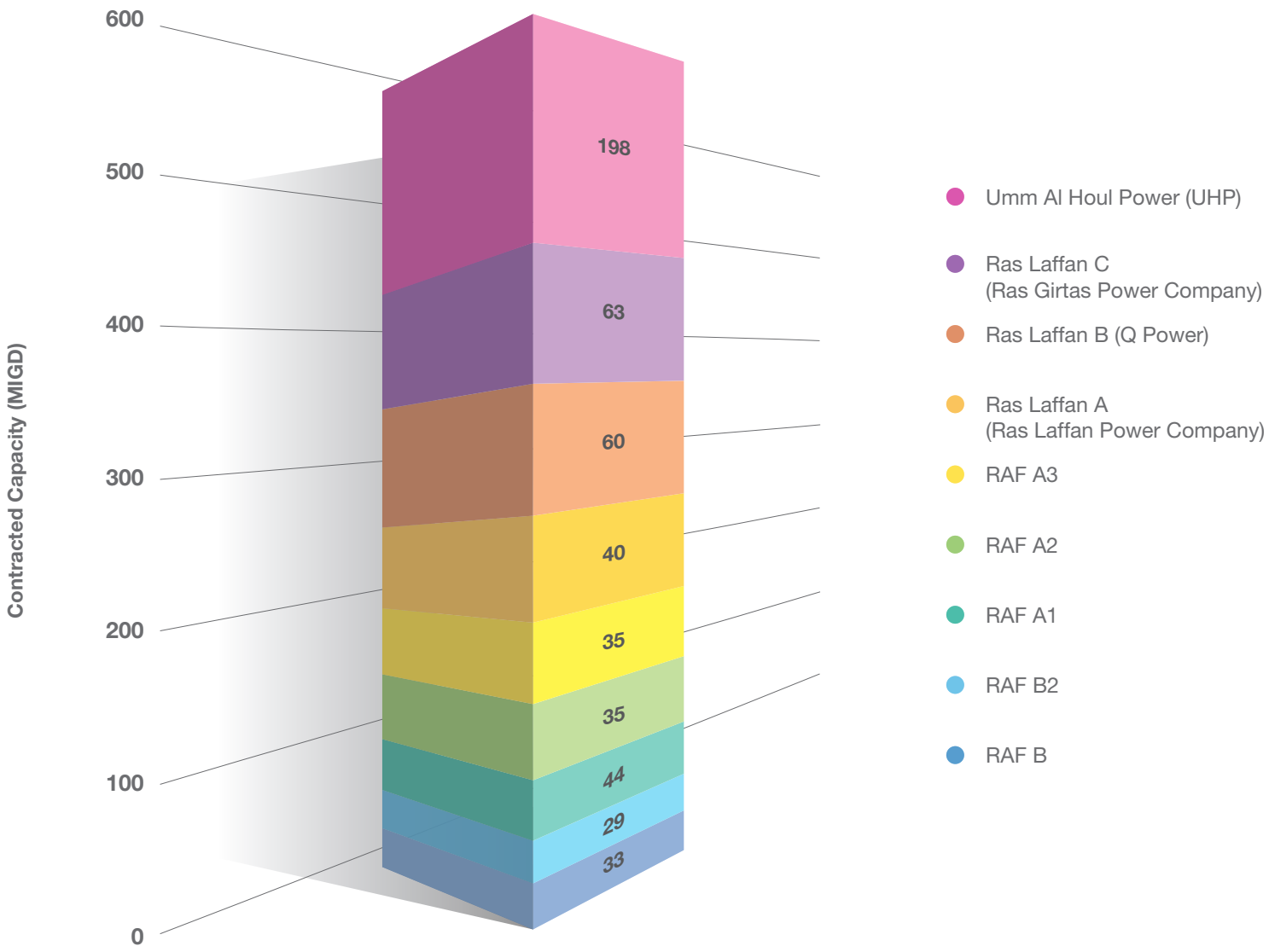


WATER STATISTICS 20223

WT1 CONTRACTED CAPACITIES BY IPWP AT END OF 2023

Independent Power & Water Producer	Contracted Capacity - Water (MIGD)	Mm3/Day
Qatar Electricity & Water Company		
Ras Abu Fontas RAF A1	44	00.2
Ras Abu Fontas RAF A2	35	00.16
Ras Abu Fontas RAF A3	35	00.16
Ras Abu Fontas RAF B	33	00.15
Ras Abu Fontas RAF B2	29	00.13
Sub-Total	**176**	**0.8**
Ras Laffan		
Ras Laffan A (Ras Laffan Power Company)	40	00.18
Ras Laffan B (Q Power)	60	00.27
Ras Laffan C (Ras Girtas Power Company)	63	00.29
Sub-Total	**163**	**0.74**
Umm Al Houl Power Company		
Umm Al Houl Power (UHP)	198	00.9
Total Capacity	**537**	**2.44**

Water contracted capacity by iwpps in year 2023

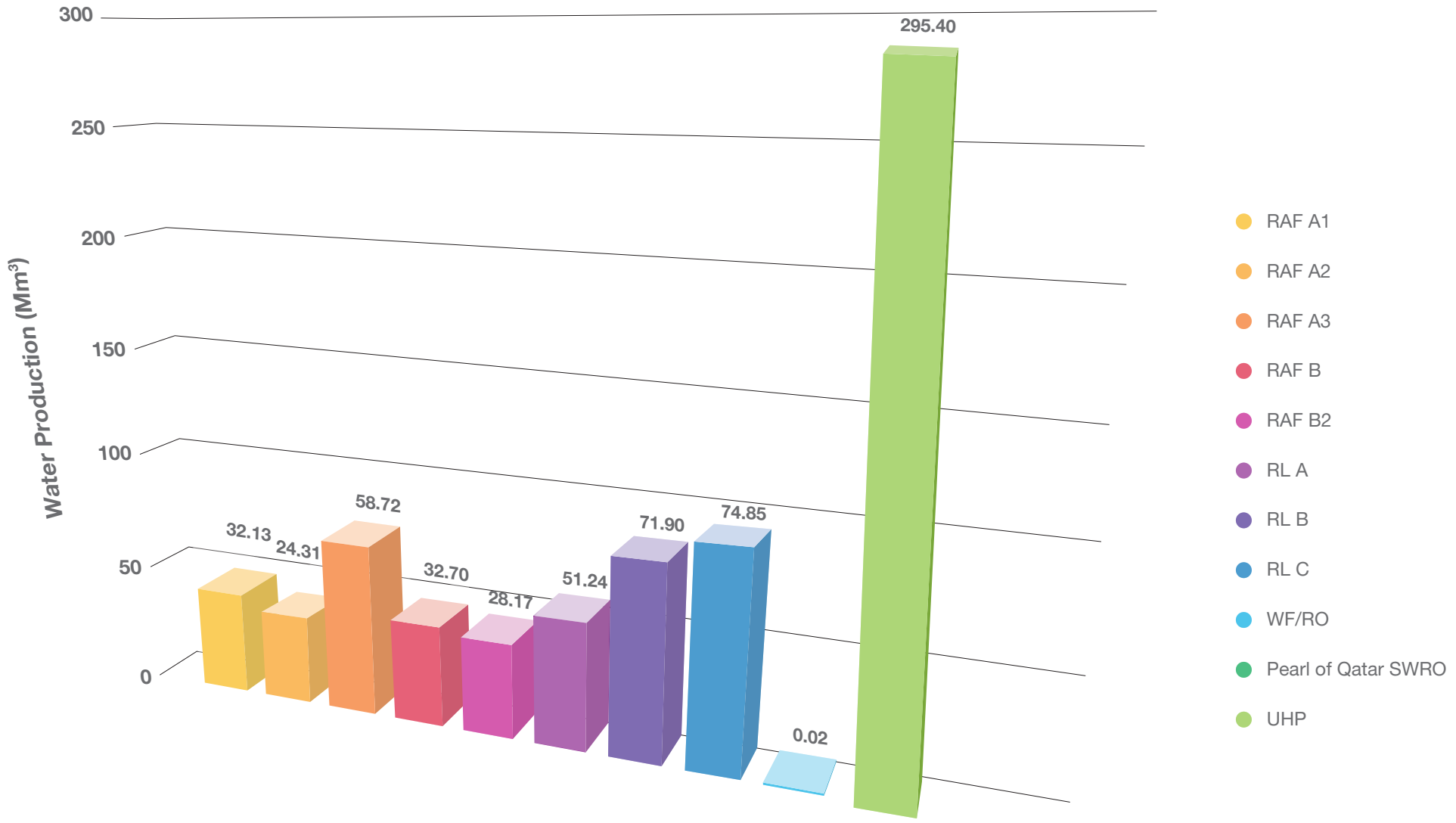


WT2 WATER PRODUCTION IN 2023

IWPPs	Water Production (Million Cubic Meters)	Million Imperial Gallons (MIG)
RAF A1	32.13	7,068
RAF A2	24.31	5,348
RAF A3	58.72	12,918
RAF B	32.70	7,193
RAF B2	28.17	6,197
RL A	51.24	11,272
RL B	71.90	15,819
RL C	74.85	16,467
RO Abu Samra & North Camp	0.02	4
UHP	295.40	64,988
Total	**669.42**	**147,272.47**

Note: Pearl of Qatar SWRO is supplying Pearl Qatar area for cooling water and irrigation purposes. It is not part of water production in Kahramaa and not supplying potable water to Kahramaa distribution network.

Water Production (Mm^3) In Year 2023



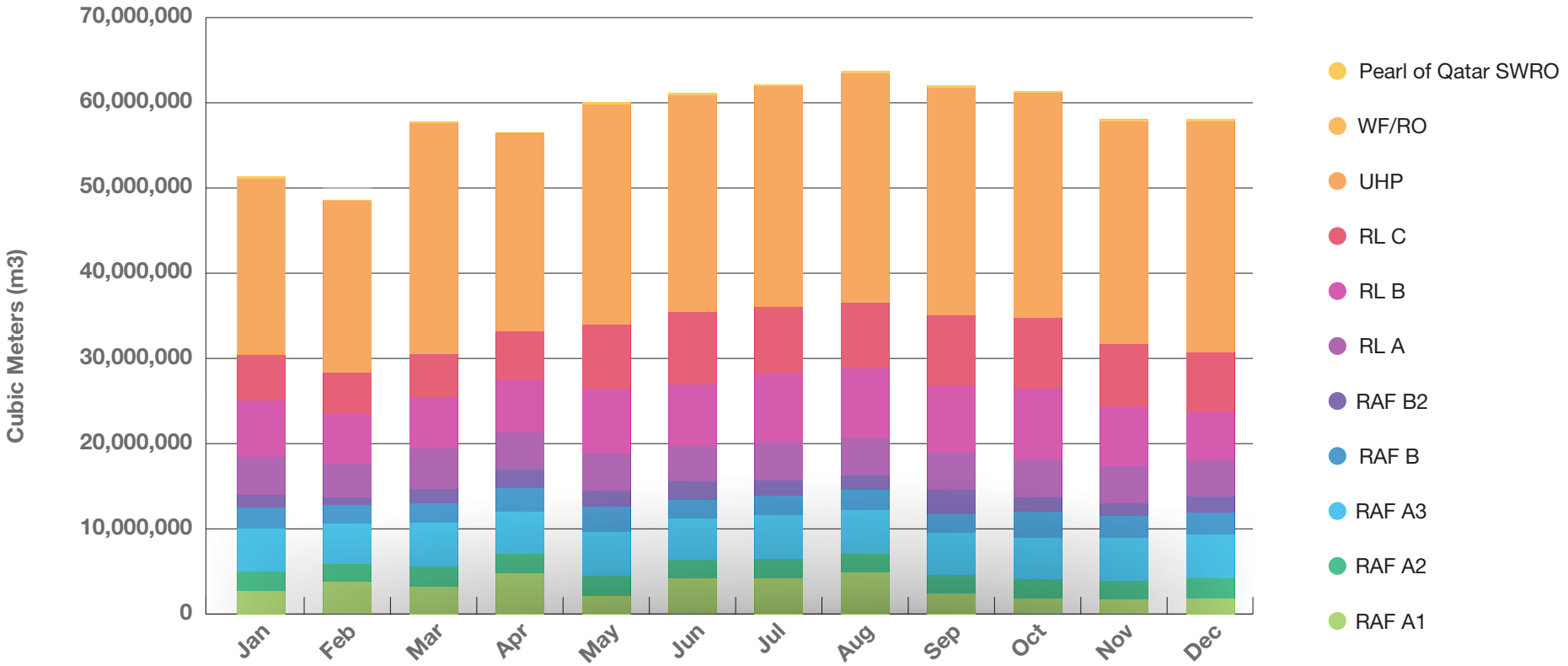
WT3 POTABLE WATER PRODUCTION CAPACITIES FROM WELLS AND REVERSE OSMOSIS (RO)

Well fields and RO	Total No. of Wells	Usable Wells	Wells with Pumps	Designed Capacity, m3/Day	Actual Average Output, m3/Day	Remarks
Al Rushidiyah	84	84	84	24,192	0	All Wells have been rehabilitated and ready to use during emergency
Al Dibiyah	87	87	87	25,056	0	All Wells have been rehabilitated and ready to use during emergency
Al Judiyah	41	41	41	6,888	0	All Wells have been rehabilitated and ready to use during emergency
Al Otoriyah	80	80	80	23,040	0	All wells have been rehabilitated and ready to use during emergency.
Abu Thailah	30	30	30	8,640	0	All wells have 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	0	Old RO Plant decommissioned
Abu Samra RO Plant (new)	5	5	5	2000	495	New RO Plant on standby as back-up and weekly routine operation is done to maintain its healthiness. The actual average output whenever plant is put into operation is 495 cu.m/day.
Army North Camp RO Plant	5	4	5	1,200	385	RO Plant is used as back-up in case there is shortage of water supply to the North Army Camp network. The actual average output whenever plant is put into operation is 485 cu.m per day.
Total	**337**	**335**	**336**	**91696**	**880**	

WT4 MONTHLY WATER PRODUCTION, CUBIC METERS IN 2023

Month	RAF A1	RAF A2	RAF A3	RAF B	RAF B2	RL A	RL B	RL C	UHP	RO Abu Samra & North Camp	Total
Jan	1,600,768	1,500,442	4,943,624	2,422,117	1,708,925	4,271,300	4973139.44	4734253.6	24,553,671	1,691	**50,709,931**
Feb	1,434,880	2,040,267	4,443,388	2,152,715	1,523,673	3,848,656	4510146.44	5,410,214	21,463,495	1,137	**46,828,571**
Mar	1,555,734	2,024,499	4,791,686	2,591,407	1,694,483	4,661,615	3915494.61	8,072,195	24823851.84	1,500	**54,132,465**
Apr	1,569,179	2,163,338	4,824,208	2,252,465	1,780,801	4,173,842	5097432.11	6,356,104	24,918,407	308	**53,136,084**
May	1,562,858	2,396,809	5,056,884	2,746,136	1,830,746	4,292,556	5257907.68	7,352,436	27,151,354	644	**57,648,331**
Jun	4,393,619	2,102,339	4,919,984	2,529,469	3,122,901	4,143,057	6774799.04	6,417,739	24,060,737	1,070	**58,465,714**
Jul	4,564,887	2,090,987	5,077,422	2,852,728	3,190,845	4,229,414	7893415.29	5,517,527	23,916,075	2,024	**59,335,324**
Aug	4,710,825	1,889,754	5,071,673	2,988,928	3,360,343	4,679,416	8,078,849	5289573.5	24,947,485	4,814	**61,021,661**
Sep	3,406,702	1,909,808	4,889,049	2,925,759	3,072,792	4,235,610	7671883.3	5920815.2	24743859.85	1,012	**58,777,290**
Oct	3,389,498	2,112,501	4,776,546	3,361,924	3,323,644	4,297,828	7215914.93	6444268.2	24481809.23	1,224	**59,405,157**
Nov	2,229,470	2,031,176	4,875,214	3,664,322	1,909,510	4,164,138	5148080.85	6,734,433	24082424.55	1,424	**54,840,192**
Dec	1,707,477	2,045,263	5,048,481	2,207,563	1,647,732	4,239,431	5367293.19	6,598,737	26,255,414	2,185	**55,119,576**
Total	**32,125,897**	**24,307,183**	**58,718,159**	**32,695,533**	**28,166,395**	**51,236,863**	**71,904,356**	**74,848,296**	**295,398,583**	**19,033**	**669,420,298**

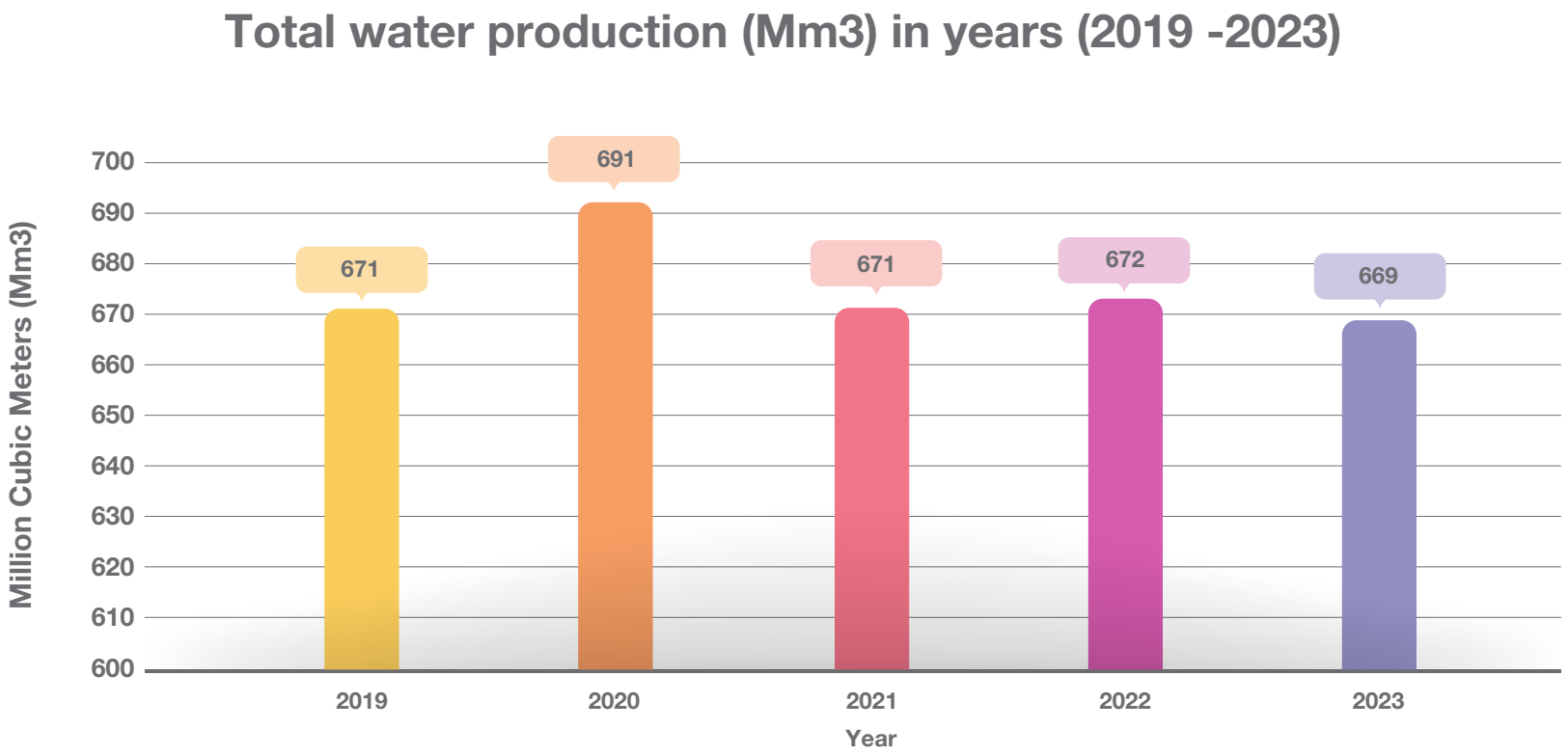
Monthly water production (m3) in year 2023



WT5 TOTAL ANNUAL WATER PRODUCTION, MILLION CUBIC METERS

Water Production	2019	2020	2021	2022	2023
Production, Mm3 *	671	691	671	672	669
Annual Growth (%)	5.4%	3.0%	-2.9%	0.1%	-0.4%
Average Growth last five years (%)					1.0%

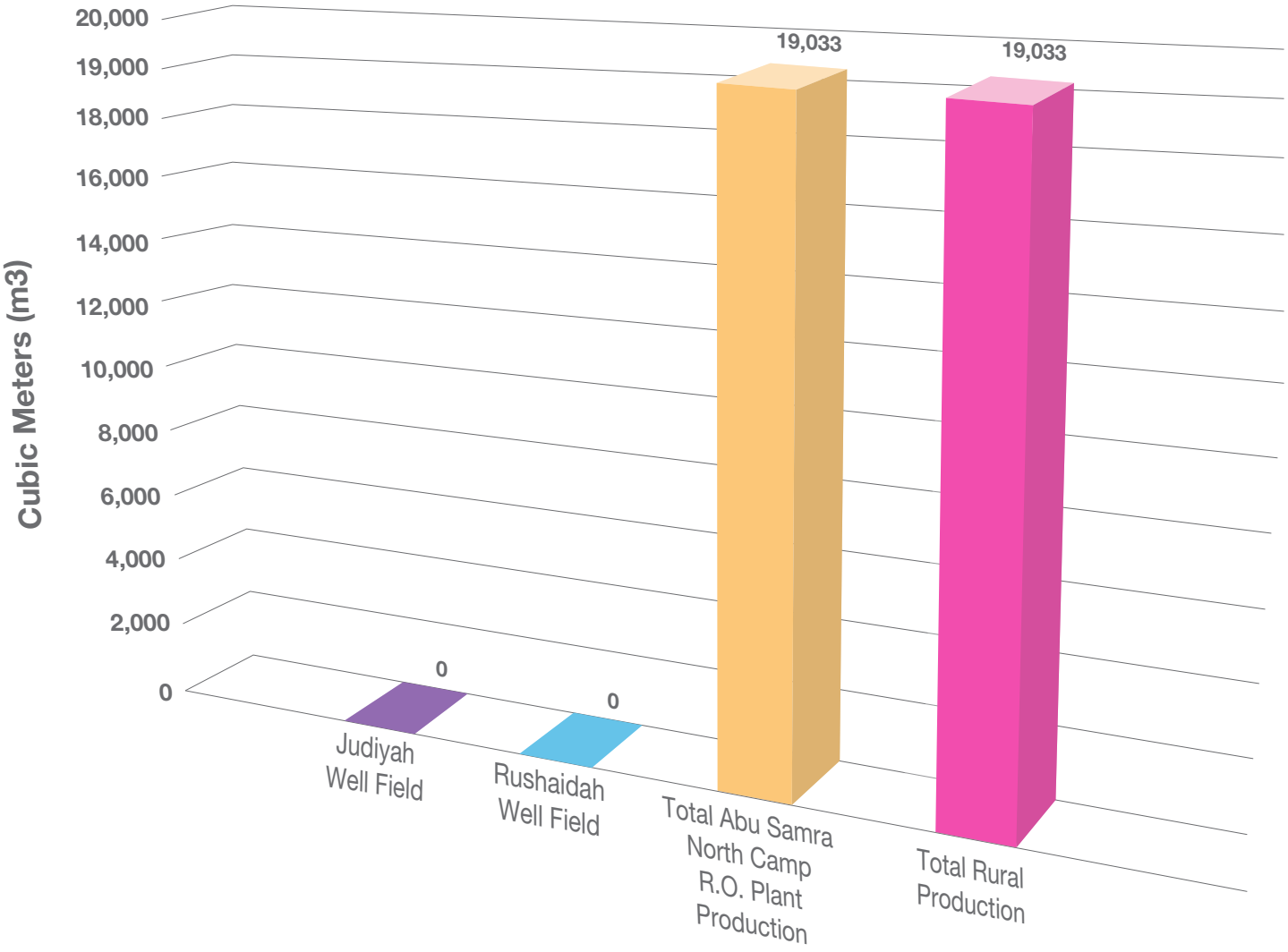
* Note: From 2023, the water production is not including Pearl Qatar RO plant



WT6 RURAL POTABLE WATER PRODUCTION, CUBIC METERS

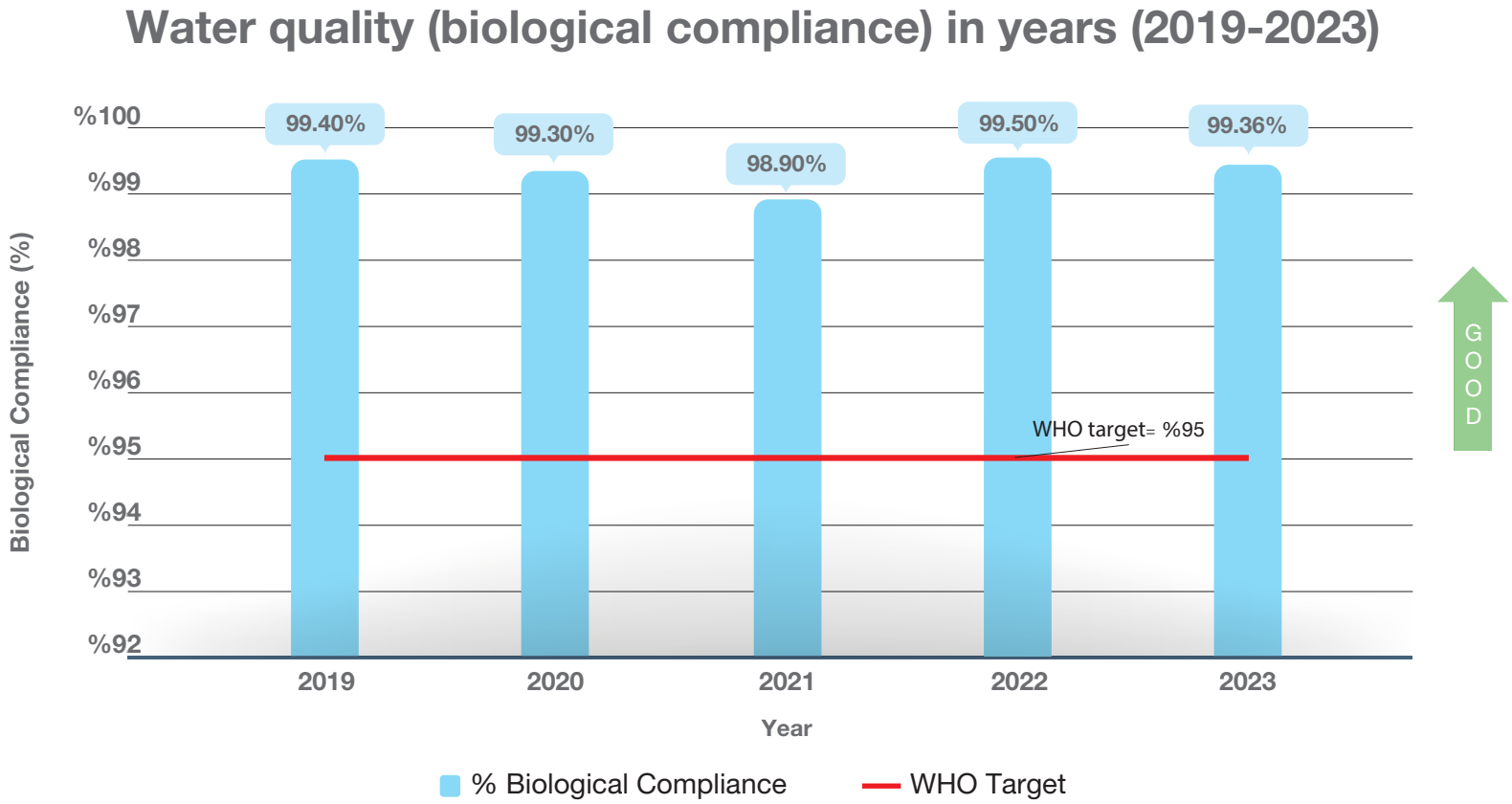
Month	Judiyah Well Field	Rushaidah Well Field	Total Abu Samra North Camp R.O. Plant Production	Total Production
Jan	0	0	1,691	1,691
Feb	0	0	1,137	1,137
Mar	0	0	1,500	1,500
Apr	0	0	308	308
May	0	0	644	644
Jun	0	0	1,070	1,070
Jul	0	0	2,024	2,024
Aug	0	0	4,814	4,814
Sep	0	0	1,012	1,012
Oct	0	0	1,224	1,224
Nov	0	0	1,424	1,424
Dec	0	0	2,185	2,185
Total	**0**	**0**	**19,033**	**19,033**

Rural potable water production (m3) in year 2023



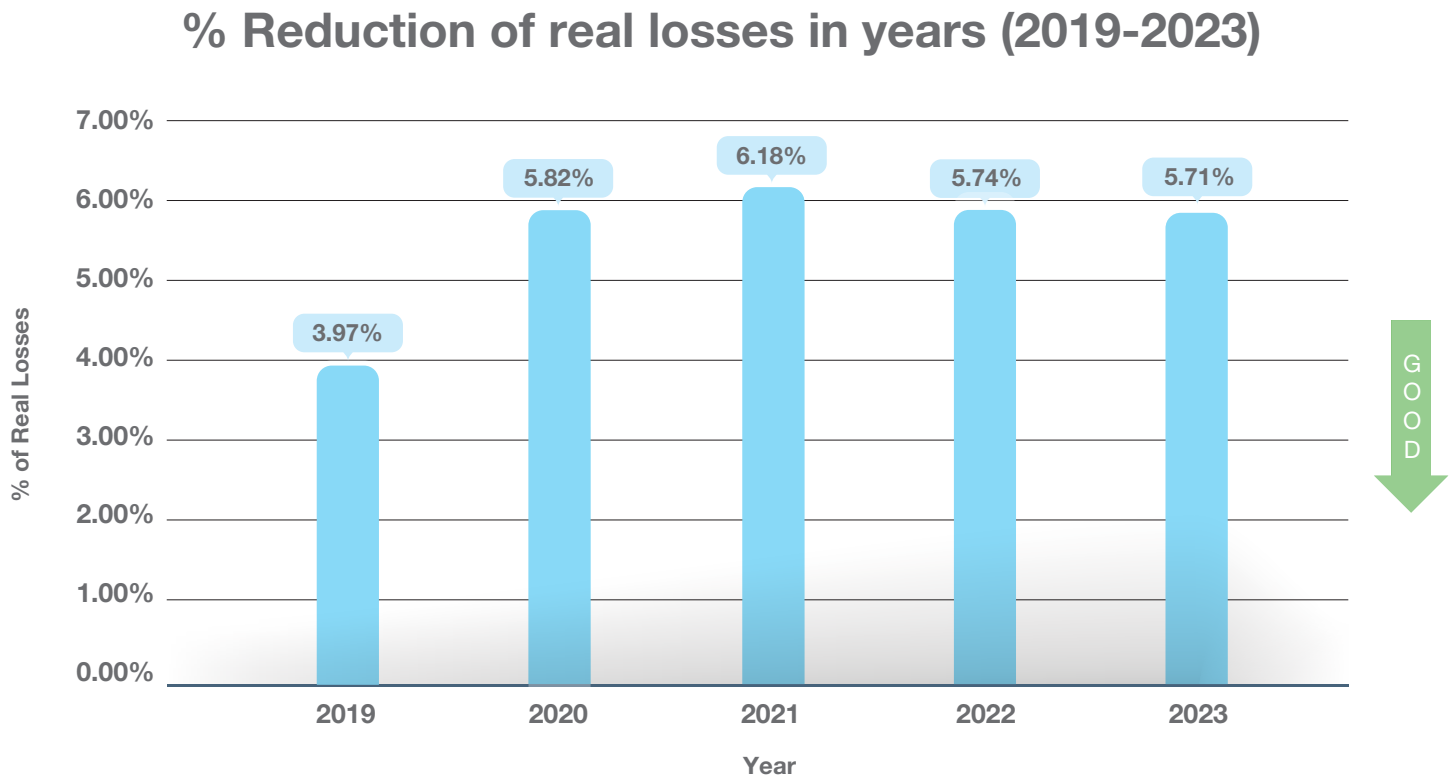
WT7 WATER QUALITY (BIOLOGICAL COMPLIANCE)

Year	% Biological Compliance	WHO Target
2019	99.40%	95%
2020	99.30%	95%
2021	98.90%	95%
2022	99.50%	95%
2023	99.36%	95%



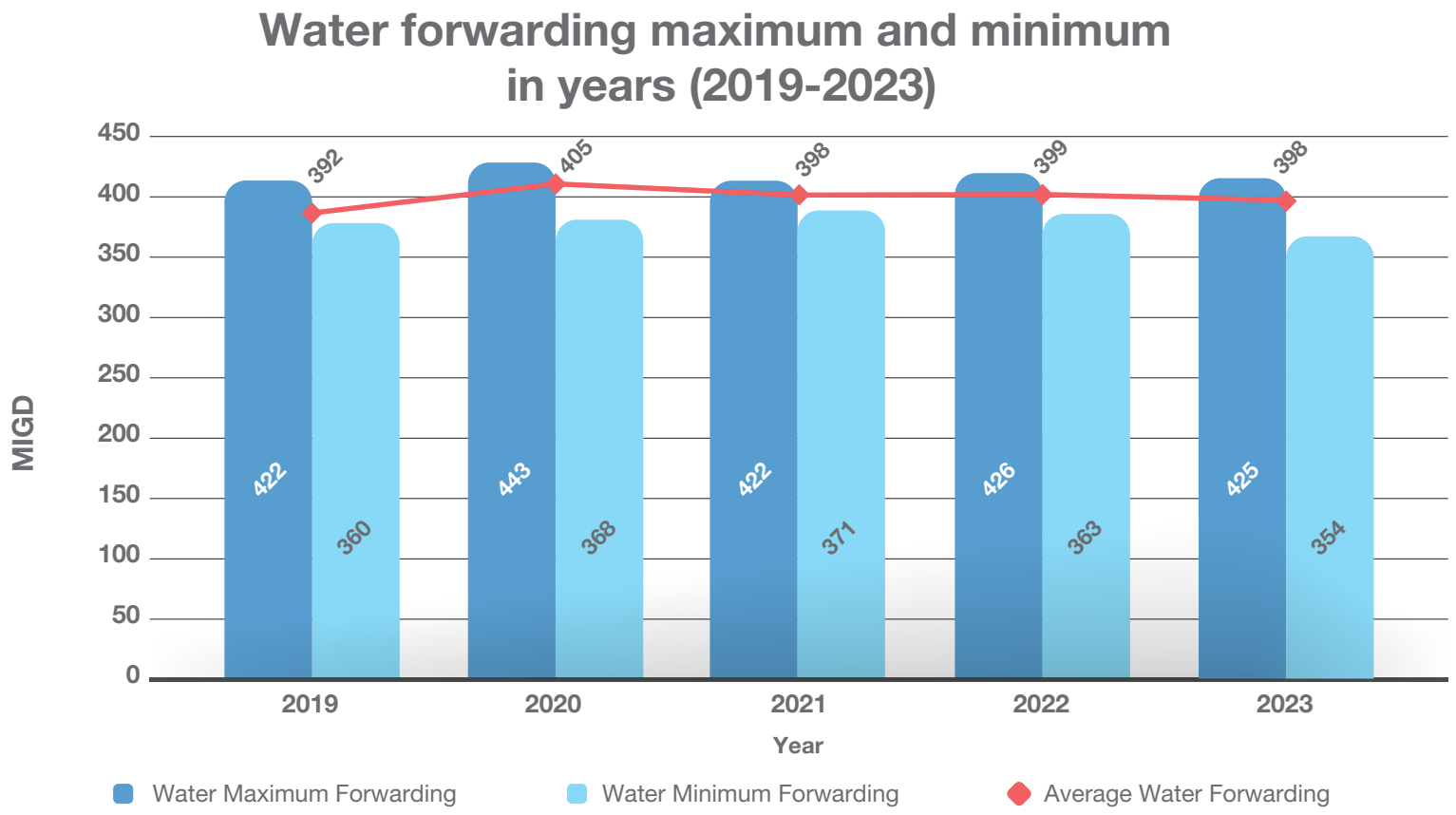
WT8 WATER REAL LOSSES REDUCTION

Year	% Real Losses
2019	3.97%
2020	5.82%
2021	6.18%
2022	5.74%
2023	5.71%



WT9 WATER FORWARDING MAXIMUM AND MINIMUM DEMAND IN YEARS (2019-2023)

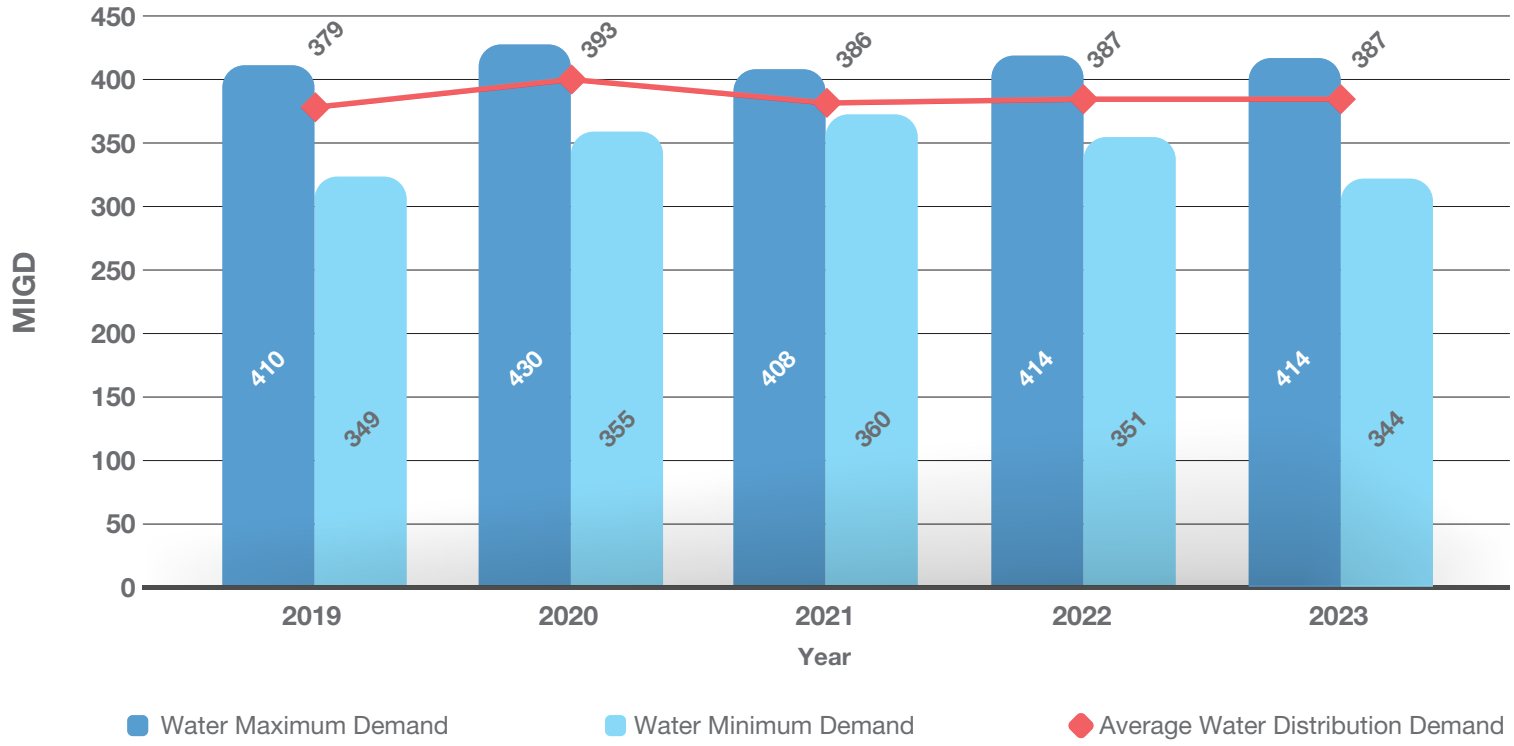
Year	Average Forwarding, MIGD	Maximum Forwarding MIGD	Maximum Forwarding Month	Minimum Forwarding, MIGD	Minimum Forwarding Month
2019	392	422	September	360	February
2020	405	443	August	368	January
2021	398	422	June	371	January
2022	399	426	September	363	January
2023	398	425	August	354	January



WT10 WATER DISTRIBUTION MAXIMUM AND MINIMUM DEMAND IN YEARS (2019-2023)

Year	Average Distribution Demand, MIGD	Growth (%)	Maximum Demand, MIGD	Maximum Demand Month	Minimum Demand, MIGD	Minimum Demand Month
2019	379	5.5	410	September	349	February
2020	393	3.7	430	August	355	January
2021	386	-1.7	408	June	360	February
2022	387	0.25	414	September	351	January
2023	387	-0.15	414	September	344	January

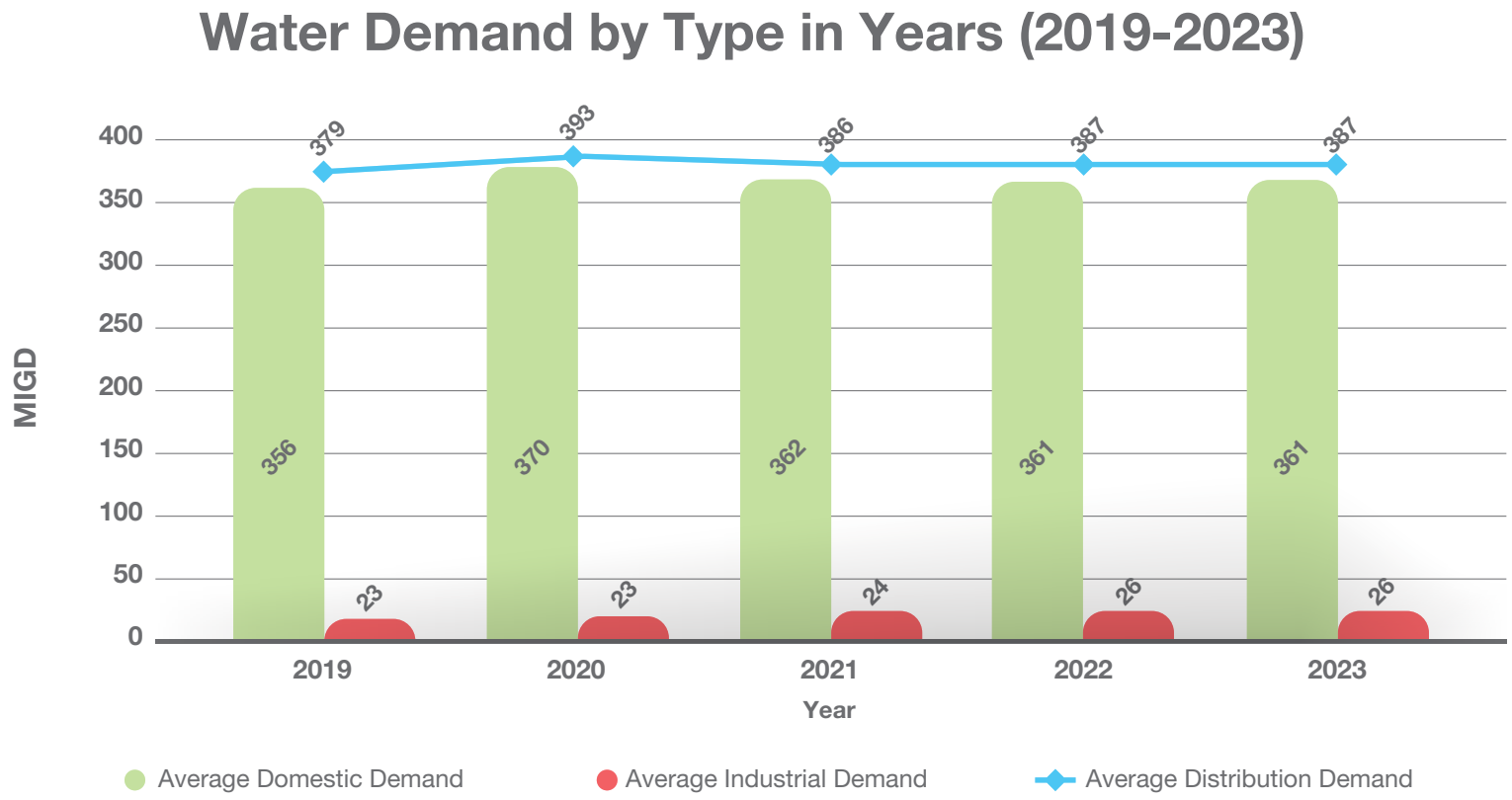
Water distribution demand in years (2019-2023)



WT11 WATER DEMAND BY TYPE IN YEARS (2019-2023)

Water Demand By Type, MIGD	2019	2020	2021	2022	2023
Average Distribution Demand	379	393	386	387	387
Average Industrial Demand	23	23	24	26	26
Average Domestic Demand	356	370	362	361	361

Demand by type (Industrial/Domestic) are estimate only by NWCC. CSD can provide more accurate data according to customer type.



WT12 LENGTH OF MAINS LAID FROM 2019 TO 2023 IN METERS

Pipe Diameter, millimetres	2019	2020	2021	2022	2023
80	141	117	195.68	00	13
100	82,973	48,079	43,682	27	16,371
110	3	0.1	29.276	00	12
125	-	-	-	0	01
150	95,729	38,027	41,299	34	17,591
160	-	-	42.942		-
180	-	8	-	00	0
200	69,195	51,609	41,276	16	13,100
225	-	2		00	20
250	25	61	583.56	00	04
280	-	-	-	0	0
300	63,125	36,711	26,756	13	12,083
315	-	4	97.646	00	275
355	13	2	29.076	00	0
400	11,142	10,597	5,450	02	6,369
450	1	-	-	0	0
500	199	2	105.18	00	0
600	22,664	9,550	5,814	02	2,909
630	-	-	113.22	-	-
700	1	2	0.737	0	0
800	455	3	-	0	0
900	11,585	8,620	3,531	01	68
1,000	31	352	232.68	0	0
1,200	6,458	2,163	1,032	01	54
1,400	5,343	274	78.93	00	06
1,600	10,470	1,477	7,732	02	144
2,000	158	-	-	-	-
2,200	1,941	69	-	-	-
2,400	1,097	31	-	0	0
Total	**382,749**	**207,760**	**178,081**	**89**	**69,020**

WT13 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2023, 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	0	0	49931.93	2962	13977.6	165	718.5	37	3508.8	45	68136.83	3209
Reconnection	0	0	0	0	0	0	0	0	0	0	0	0
Disconnection	0	0	0	1323	32	0	0	0	0	0	32	1323
Maintenance or Replacement	0	0	66,543.90	4,982.00	28,370.90	1,011.00	987.80	84.00	1,605.65	133.00	97,508.25	6,210.00
Transpose	0	0	2014.6	159	1426.5	35	0	0	0	0	3441.1	194
Size Increase	0	0	0	0	0	0	0	0	0	0	0	0
New Water Meter Installation	0	0	0	16732	0	301	0	113	0	124	0	0
Water Meter Replacement	0	0	0	4185	0	82	0	123	0	472	0	0

WT14 NUMBER AND LENGTH OF SERVICE CONNECTIONS IN 2023, IN METERS

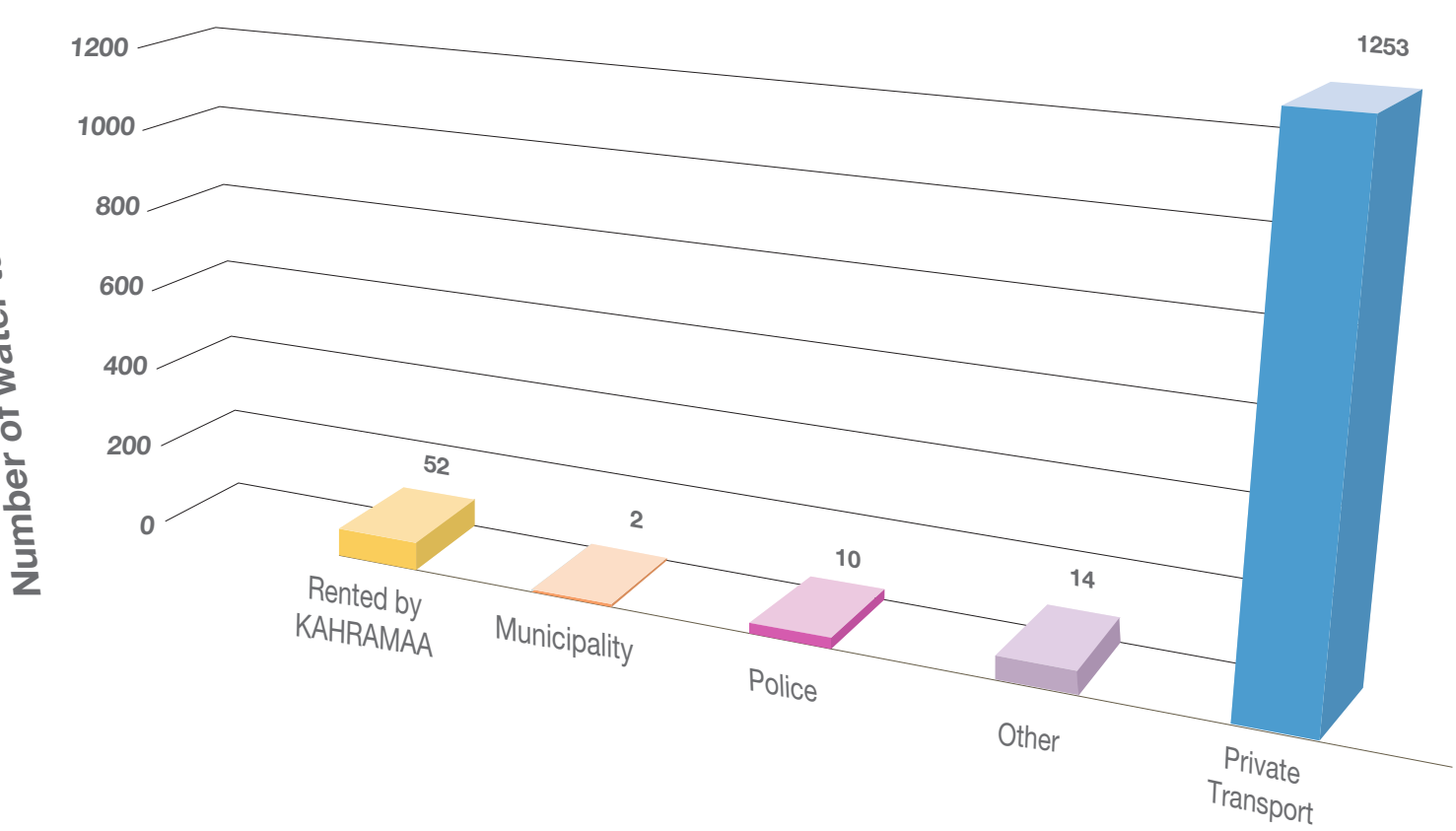
Service size from 80mm (3”) up to 400mm (16”) – Bulk

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reconnection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disconnection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maintenance or Replacement	0	0														
Transpose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Size Increase	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Water Meter Installation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WT15 TANKER WATER SUPPLY IN 2023

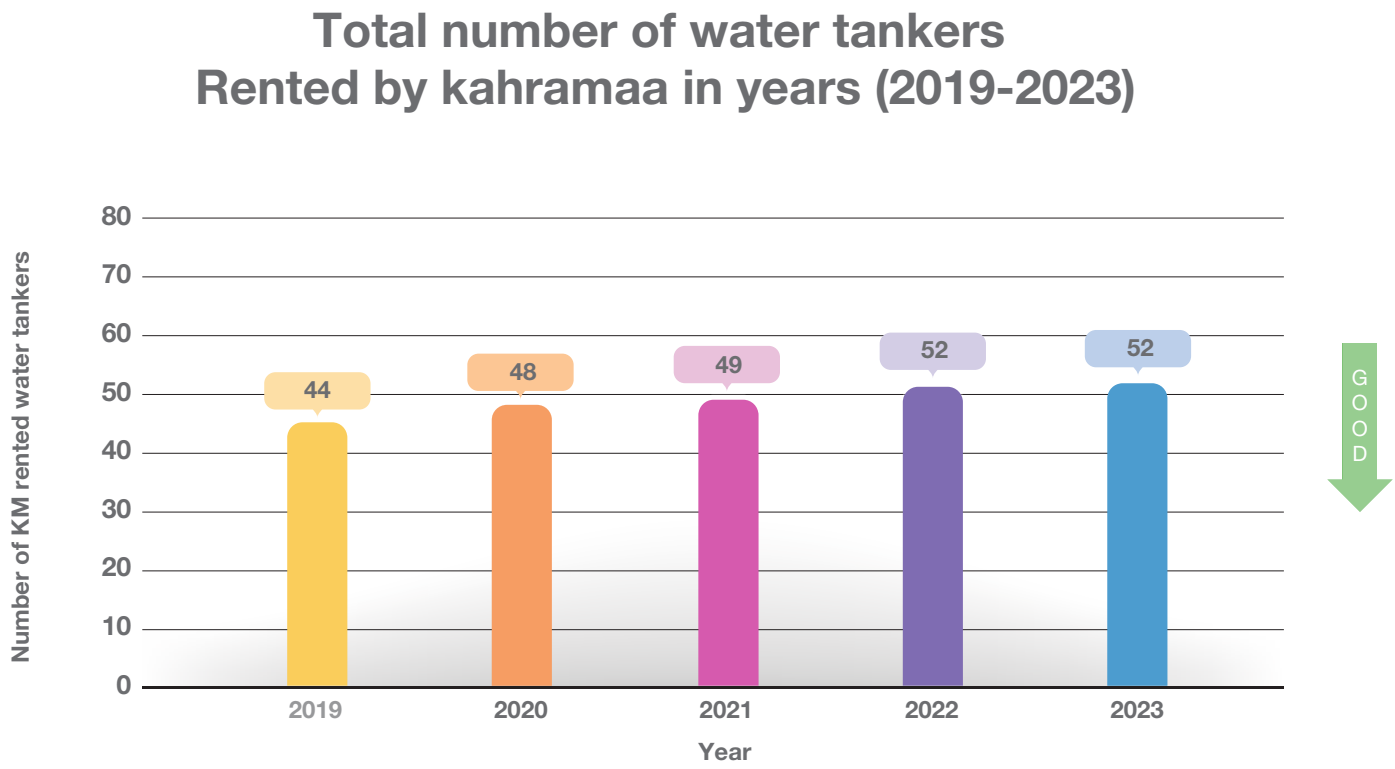
Station	Rented by KAHRAMAA	Municipality	Education	Defence	Police	Other	Rural Tankers	Private Transport
AL SAILIYA	14	1	0	0	6	6	0	475
UMM SALAL	6	1	0	1	1	2	0	295
AL KHOR	2	0	0	0	3	0	0	85
AL SHAHANIYAH	6	0	0	0	0	6	0	78
AL WUKAIR	18	0	0	0	0	0	0	95
AL JAMELIYAH	6	0	0	1	0	0	0	32
AL GHUWARIYAH	0	0	0	0	0	0	0	20
AL SHAMAL	0	0	0	1	0	0	0	34
MESAIEED	0	0	0	0	0	0	0	75
SEA LINE	0	0	0	0	0	0	0	18
AL KARAANA	0	0	0	0	0	0	0	20
AL RAMZANIYA	0	0	0	0	0	0	0	18
AL NUKHZ	0	0	0	0	0	0	0	8
Total	**52**	**2**	**0**	**3**	**10**	**14**	**0**	**1253**

WATER TANKERS SERVED IN 2023 BY TYPE

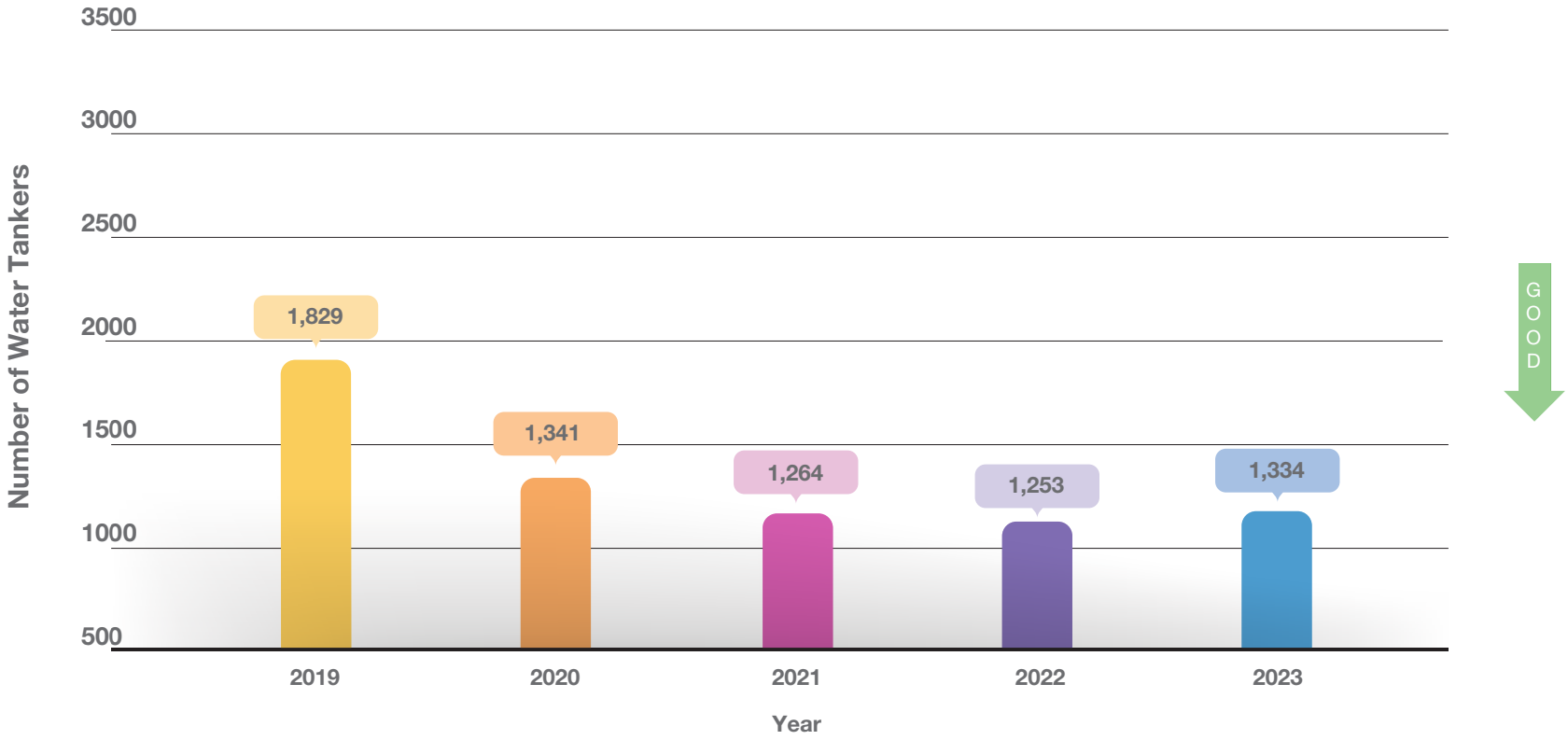


WT16 WATER TANKER SERVICES LAST 5 YEARS

Water Production	2019	2020	2021	2022	2023
No of Water Tankers	1,829	1,341	1,338	1,253	1,334
No of KM Rented Water Tankers	44	48	49	52	52
Total Reduction	602	488	3	85	-81
Total Reduction (%)	24.76%	26.68%	0.22%	6.35%	-6.46%
KM - Rented Reduction	9	-4	-1	-3	0
KM - Rented Reduction (%)	16.98%	-9.09%	-2.08%	-6.12%	0.00%

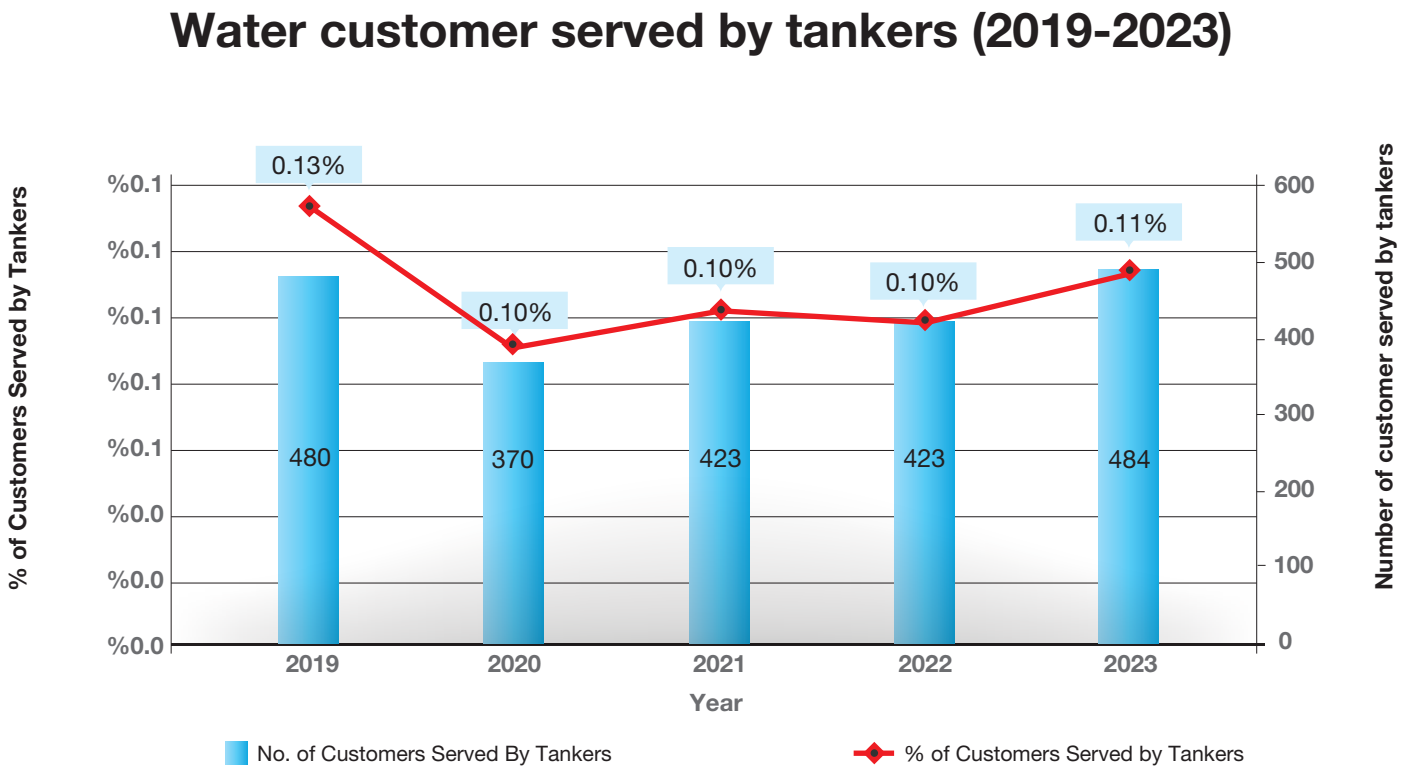


Total number of water tankers
In years (2019-2023)



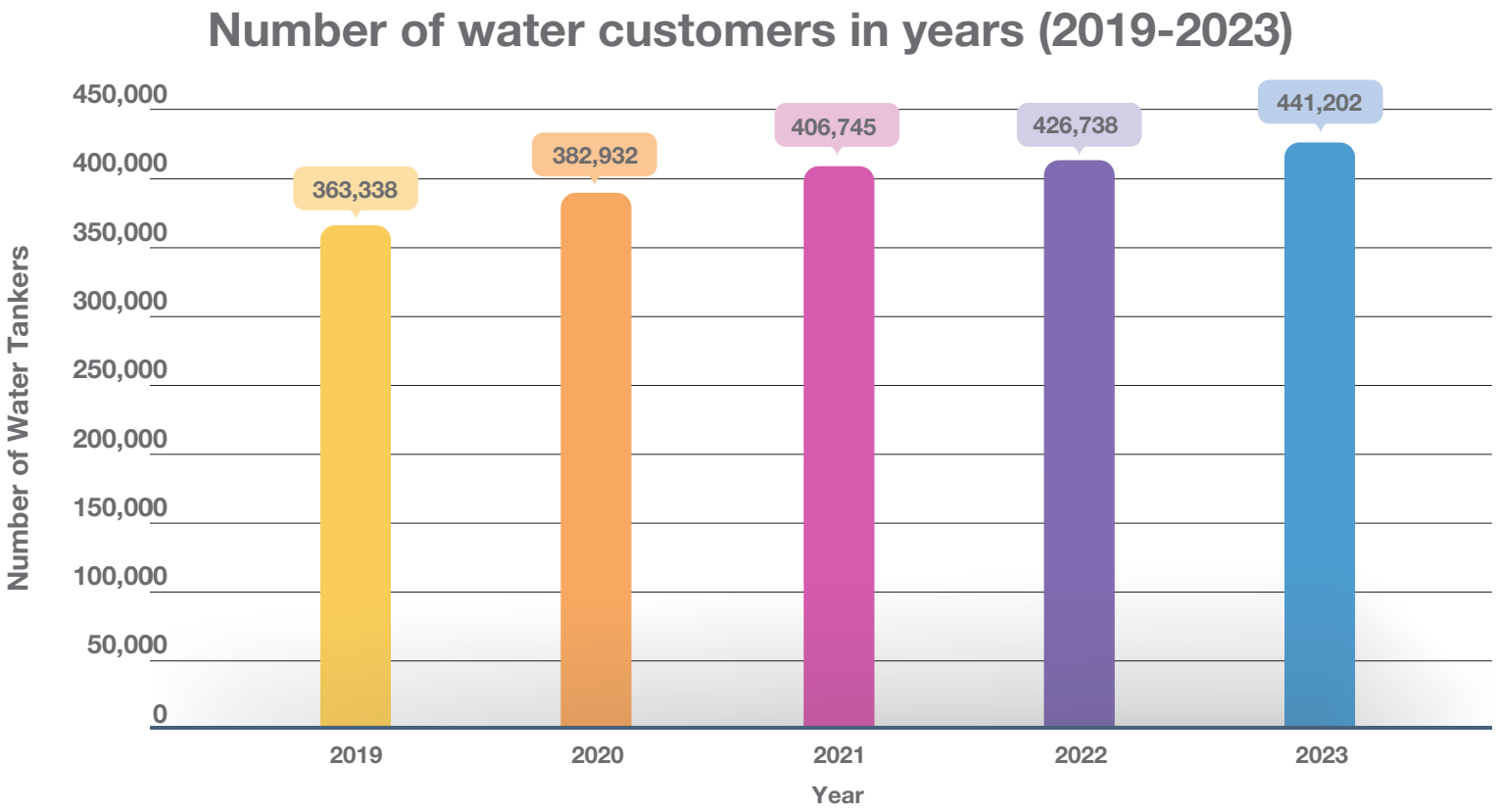
WT17 PERCENTAGE OF CUSTOMERS SERVED BY TANKERS

Water Production	2019	2020	2021	2022	2023
Total No. of Water Customers	363,338	382,932	406,745	426,738	441,202
No Of Customers Served By Tankers	480	370	423	423	484
Percentage of Customers Served by Tankers (%)	0.13%	0.10%	0.10%	0.10%	0.11
Reduction	(19)	110	(53)	0	(61)
Percentage Reduction (%)	0.01%	0.04%	-0.01%	0.00%	-0.01%



WT18 NUMBER OF WATER CUSTOMERS

Year	No Of Customers	Annual Growth
2019	363,338	10.2%
2020	382,932	5.4%
2021	406,745	6.2%
2022	426,738	4.9 %
2023	441,202	3.4 %

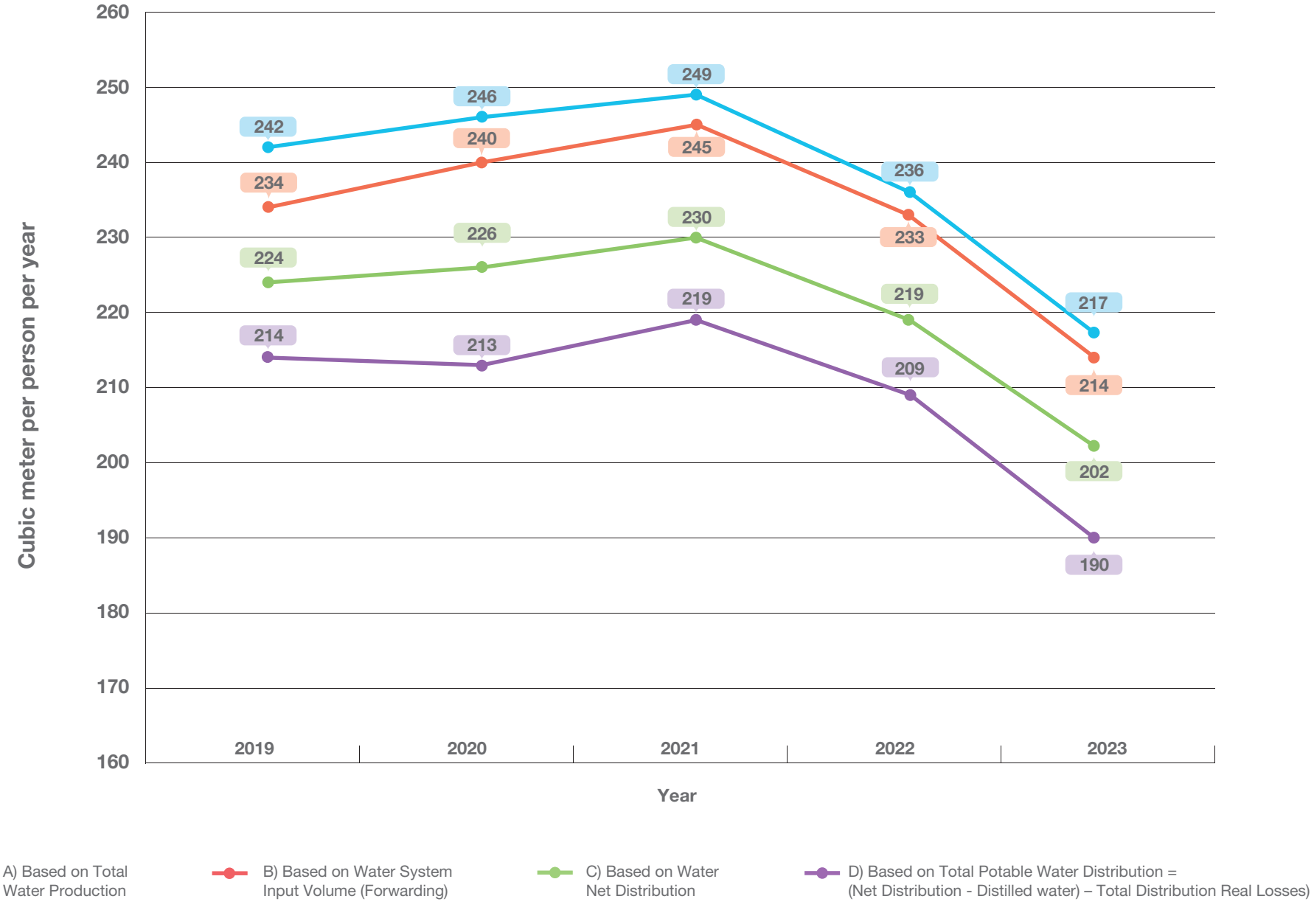


WT19 AVERAGE WATER PER CAPITA CONSUMPTION, LAST FIVE YEARS

Year	2019	2020	2021	2022	2023
Population	2,773,885	2,807,805	2,693,301	2,842,958	3,085,087
Population Annual Increase(%)	0.60%	1.22%	-4.08%	5.56%	8.52%
Total Water Production Mm3	671	691	671	672	669
System Input Volume (Forwarding) Mm3	648	673	660	662	659
Water Net Distribution Mm3 = System Input Volume Mm3 (Forwarding) - Real Losses	622	634	619	624	622
Total Potable Water Distribution (Mm3)= ((Net Distribution - Distilled water) – Total Distribution Real Losses)	593	597	590	596	587
A) Based on Total Water Production	242	246	249	236	217
B) Based on Water System Input Volume (Forwarding)	234	240	245	233	214
C) Based on Water Net Distribution	224	226	230	219	202
D) Based on Total Potable Water Distribution = ((Net Distribution - Distilled water) – Total Distribution Real Losses)	214	213	219	209	190

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 2023

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3
RAF A	0	00	0	-	00	-
RAF A1	45	00	45	204,545	00	204,545
RAF A2	36	00	36	163,636	00	163,636
RAF A3	36	00	36	163,636	00	163,636
RAF B	19.3	00	19.3	87,727	00	87,727
UHP	136.5	00	136.5	620,455	00	620,455
RL A	40	00	40	181,818	00	181,818
RL B	60	00	60	272,727	00	272,727
RL C	63	00	63	286,364		286,364
UHP	136.5	00	136.5	620,455	00	620,455
Total	**464.8**	**00**	**464.8**	**2,112,727**	**00**	**2,112,727**

Note: RAF A not in service since 1/1/2018

WT21 WATER STORAGE IN KM RESERVOIRS IN 2023

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	0	21	95,455	0	95,455	
Doha South	84	0	84	381,818	0	381,818	
Mesaimeer	108	0	108	490,909	0	490,909	
Wukair	36	0	36	163,636	0	163,636	
Old Salwa	0	0	0	-	0	-	All reservoirs demolished for upgrading
New Salwa	30	0	30	136,364	0	136,364	
Salwa Industrial	51	0	51	231,818	0	231,818	
Garrafa	50	0	50	227,273	0	227,273	
West Bay	56	0	56	254,545	0	254,545	
Bani Hajr	36	0	36	163,636	0	163,636	
Muaither	105	0	105	477,273	0	477,273	
Duhail	142	0	142	645,455	0	645,455	
Umm Qarn	71	0	71	322,727	0	322,727	
Wakrah	10	0	10	45,455	0	45,455	
Messaieed Town	24	0	24	109,091	0	109,091	
Messaieed Industrial	28	0	28	127,273	0	127,273	
Al Khor 1	4	0	4	18,182	0	18,182	
Al Khor 2	6	0	6	27,273	0	27,273	
Umm Salal 1	6	0	6	27,273	0	27,273	

WT21 WATER STORAGE IN KM RESERVOIRS IN 2023

Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3	Remarks
Umm Salal 2	18	0	18	81,818	0	81,818	
Shahaniyah 2	12	0	12	54,545	0	54,545	
Shahaniyah 3	12	0	12	54,545	0	54,545	
Madinat Shamal	10	0	10	45,455	0	45,455	
Guwairiyah	1	0	1	4,545	0	4,545	
Pearl of Qatar	4	0	4	18,182	0	18,182	
Small & Medium	7.97	0	7.97	36,209	0	36,209	
Peninsula	1.0	0	1.0	4,545	0	4,545	
Labor City	6.6	0	6.6	30,000	0	30,000	
Kaaban	6.0	0	6	27,273	0	27,273	New RPS commissioned on 25.10.2023
Lusail RPS1	14.0	0	14	63,636	0	63,636	New RPS commissioned on 05.12.2023
Lusail RPS4	6.6	0	6.6	30,000	0	30,000	
Lusail RPS2	8.36	0	8.36	38,000	0	38,000	
Jeryan	1.0	0	1.0	4,545	0	4,545	
Umm Birka PRPS	194	0	194	881,818	0	881,818	Mega RPS
Umm Salal PRPS	386	0	386	1,754,545	0	1,754,545	Mega RPS
Rawdat Rashed PRPS	386	0	386	1,754,545	0	1,754,545	Mega RPS
Abu Nakhla PRPS	194	0	194	881,818	0	881,818	Mega RPS
Thumama PRPS	261	0	261	1,186,364	0	1,186,364	Mega RPS
TOTAL	**2415.5**	**0.0**	**2415.5**	**10,979,664**	**0.0**	**10,979,664**	

WT22 WATER STORAGE IN GROUND TANKS IN 2023

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	3090.91	
Abu Samra	0.00	0.50	0.00	2272.73	
Al Ghuwairiyah	0.00	0.50	0.00	2272.73	
Shahaniyah 1	1.50	0.00	6818.18	0.00	Station is not in service (Decommissioned)
Mazruah	1.50	0.00	6818.18	0.00	Station is not in service (Decommissioned)
New Jemiliyah	0.50	0.00	2272.73	0.00	Station is not in service (Decommissioned)
Dukhan	0.50	0.00	2272.73	0.00	Station is not in service (Decommissioned)
Total	**4.00**	**1.68**	**18,182**	**7,636**	

WT23 WATER STORAGE IN ELEVATED TANKS IN 2023

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	Decommissioned
Shahaniyah 1	34,500	0	157	0	Bypassed
Abu Samra	55,000	55,000	250	250	Old ET decommissioned and subject for demolition
New Jemiliyah	80,000	0	364	0	Bypassed
North Camp	88,000	88,000	400	400	In Service
Total	**622,500**	**198,000**	**2,830**	**900**	

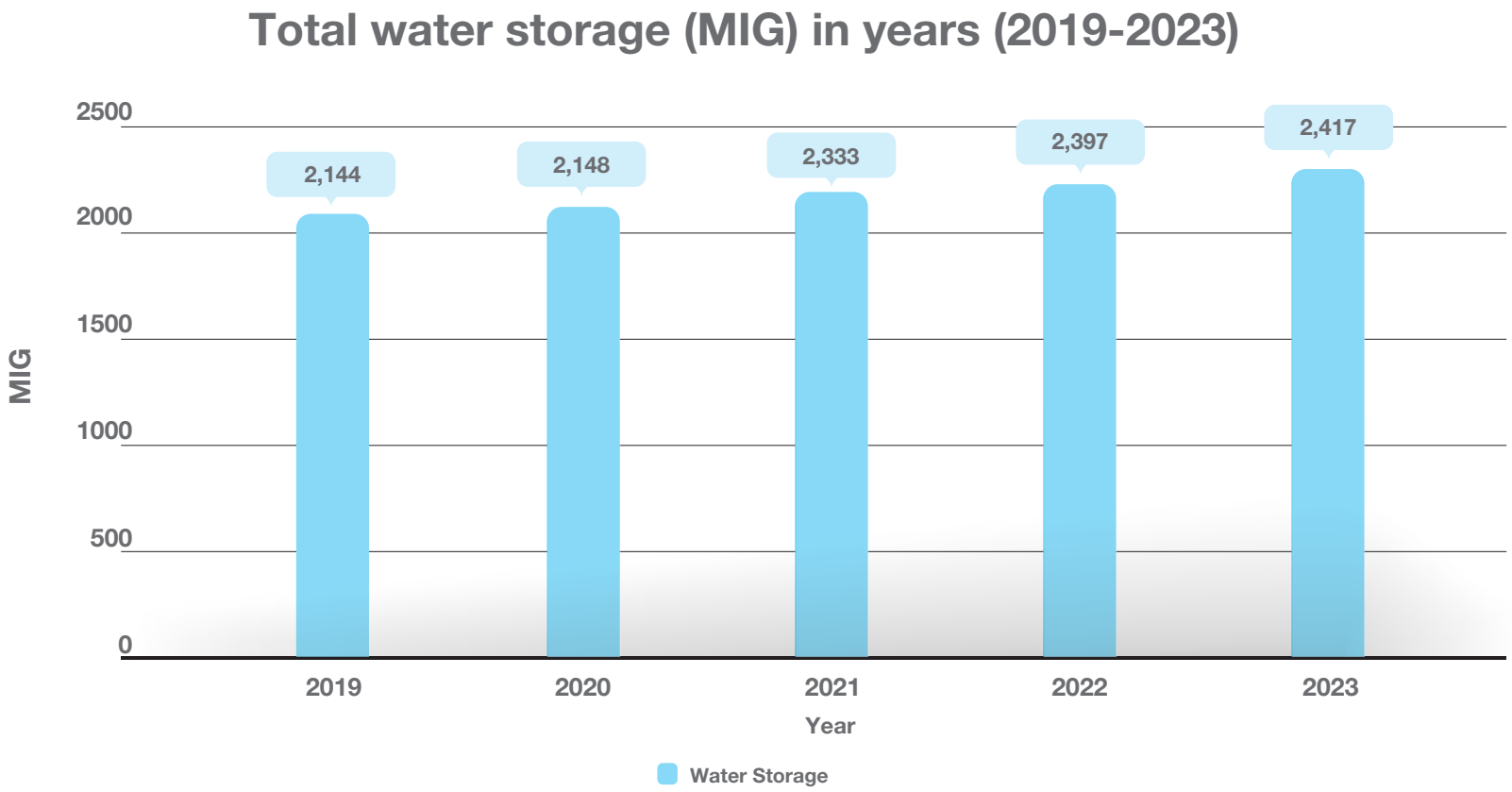
WT24 WATER STORAGE IN TOWERS IN 2023

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 (Messai'eed 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 (By-passed)
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 2019-2023

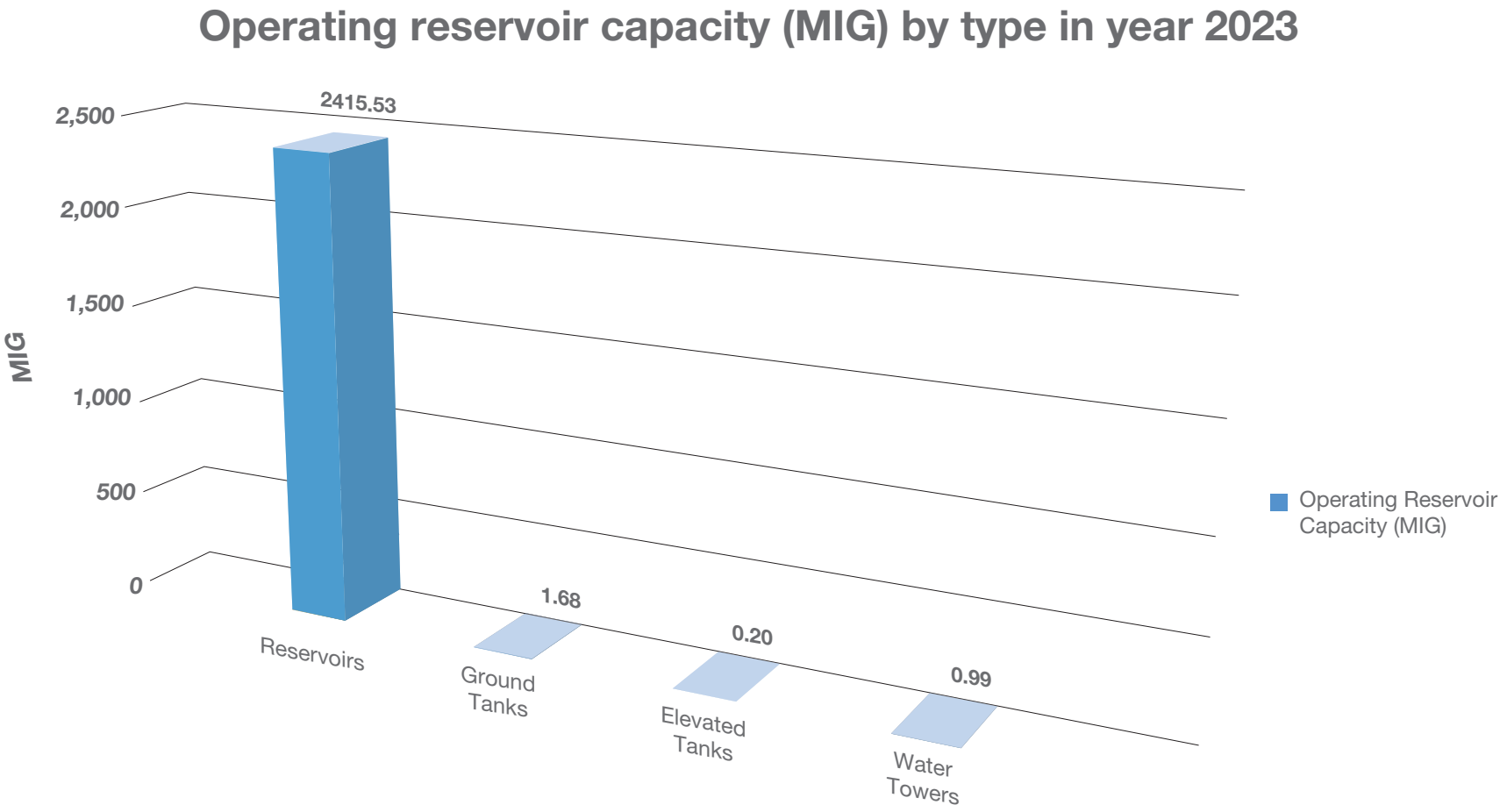
Water Storage	2019	2020	2021	2022	2023
Imperial Gallons (IG)	2,143,670,000	2,147,823,000	2,333,423,000	2,396,868,000	2,417,200,000
Meter Cube(M3)	9,743,955	9,762,832	10,606,468	10,894,855	10,987,273
Million Meter Cube (MM3)	9.74	9.76	10.61	10.89	10.99
Million Imperial Gallons (MIG)	2,144	2,148	2,333	2,397	2,417

Note: Starting 2023, only KM storage the operating capacity for KM reservoirs and ground tanks are considered.



WT26 TOTAL WATER STORAGE BY TYPE IN 2023

Type	Operating Reservoir Capacity (MIG)	%	Remarks
Reservoirs	2415.53	99.88%	-
Ground Tanks	1.68	0.07%	-
Elevated Tanks	0.20	0.01%	-
Water Towers	0.99	0.04%	Water Towers in Service are considered
Grand Total	**2418.39**	**100.00%**	**-**



WT27 TOTAL ABSTRACTION FROM GROUND WATER 2019-2023

	2019	2020	2021	2022	2023
Ground Water Abstraction (Mm3)	250	250	250	250	200

* Note: 250 million m3 based on estimation of previous studies. It is reduced in 2023 from 250Mm3 to 200Mm3 based on groundwater modeling results.

WT28 TOTAL WATER STORAGE IN YEAR 2023

Abstraction from Ground Water by Types (Mm3)	Agricultural Wells	Municipal Wells	Domestic Wells	Industrial Wells	Other Wells	Total
	180	20			N/A	200

* Note:
- All values 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.
- It is reduced in 2023 from 250Mm3 to 200Mm3 based on groundwater modeling results.

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 φ, where φ is the angle between the current and voltage. Rated Power Factor = The minimum power factor at which a generator can supply the rated active power. The ratio of Active over Apparent Power (a typical value is around 0.9). The power factor can vary from customer to customer, as it depends on the electrical characteristics of the customer's installed equipment.
PPA	Power Purchase Agreement
PWPA	Power & Water Purchase Agreement
P/S or PS	PowerStation: A power station (also referred to as generating station or power plant) is a facility for the generation of electric power. 'Power plant' is also used to refer to the engine in ships, aircraft and other large vehicles. Some prefer to use the term energy centre because it more accurately describes what the plants do, which is the conversion of other forms of energy, like chemical energy, gravitational potential energy or heat energy into electrical energy. Not all thermal energy can be transformed to mechanical power, according to the second law of thermodynamics. Therefore, there is always heat lost to the environment. If this loss is employed as useful heat, for industrial processes or district heating, the power plant is referred to as a cogeneration power plant or CHP (combined heat-and-power) plant. In countries where district heating is common, there are dedicated heat plants called heat-only boiler stations. An important class of power stations in the Middle East uses by-product heat for desalination of water.
PWRC	Permanent Water Resources Committee, an organization that plans and oversees security & sustainability of water supply in Qatar
QAFAC	Qatar Fuel Additives Company Limited
QAFCO	Qatar Fertilizer Company
QAPCO	Qatar Petrochemicals Company
QASCO	Qatar Steel Company
Q-Chem	Qatar Chemical Company, Ltd.
QNCC	Qatar National Cement Company
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 .