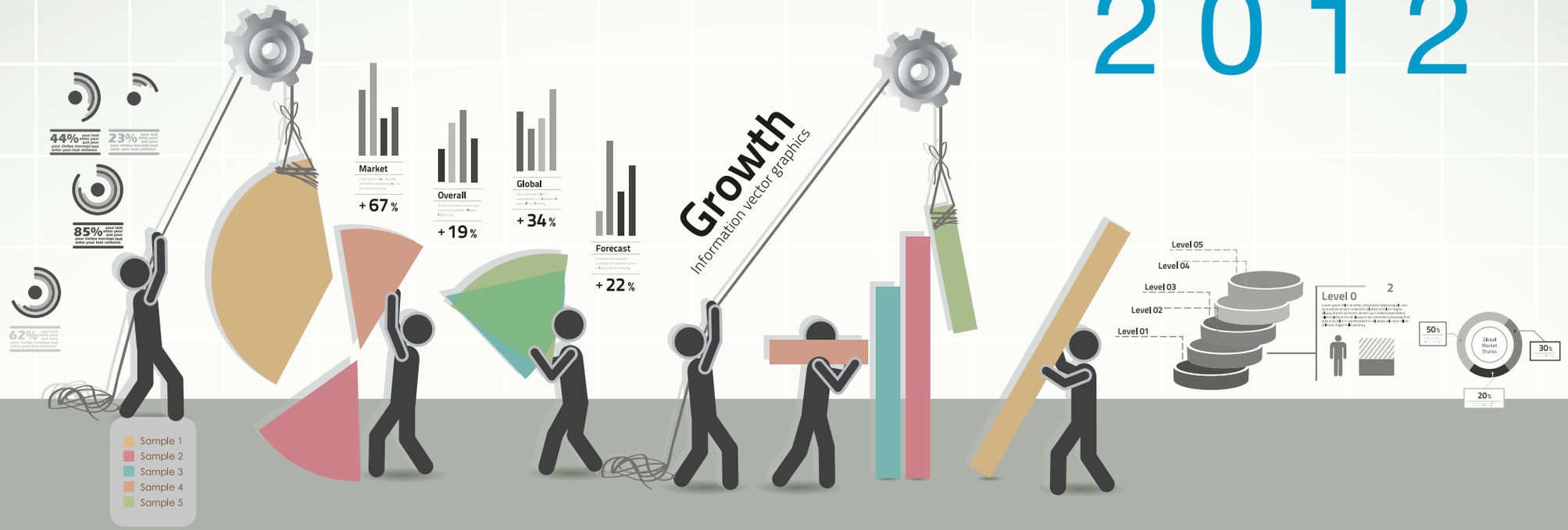
Statistics Report

2012



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

better living لحيـــــــاة أفضـــــــل

Statistics Report 2012
Qatar General Electricity & Water Corporation “KAHRAMAA”

Prepared by: Corporate Planning and Business Development Department in collaboration with KAHRAMAA Departments

Production: Public Relations & Communication Department

KAHRAMAA Publications

Statistics Report

2012

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, almost tripling in size from 2005 to achieve a nominal GDP of approximately US$173.3bn in 2011 (source: Qatar Statistics Authority or QSA). 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 few years, brought about by rising energy 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 - be it infrastructure creation or building of civic amenities. Large opportunities for investment and energy trade are present, coupled with continuing lifestyle improvement, development of telecommunications, information technology and business efficiency, etc. Qatar's rapid public infrastructure expansions and real estate development are driving the population to rise at phenomenal rate, primarily due to the need for more expatriate construction workers. Large scale investments in transport, communications, hotels and restaurants, sports facilities and other services are on-going, such as the development of the Pearl of the Gulf, Lusail City, Barwa's real estate projects and other major infrastructure developments. Continuing industrialization largely due to the oil and gas sector and rapid urbanization has generated increased demand for major improvements and expansion of basic services most notably electricity and water. Qatar's preparations to host the 2022 FIFA World Cup Football adds more challenges to the readiness of KAHRAMAA. The National Development Strategy launched in March 2010 which was approved in 2008 is providing the overarching framework and impetus for KAHRAMAA's efforts to ensure expanded services, whilst ensuring sustainability of electricity and water production and consumption.
Peak electricity demand in 2012 of 6,255 MW represented a 16.4% growth over 2011 with the Industrial sector peak demand of 1,772 MW growing by 31.3% over 2011. This high growth was partly due to an emergency demand from Qatar Aluminum. Highest monthly water production for 2012 was 40.176 million cubic meters in July. Water production grew from 2011 to 2012 by 9.0%.

KAHRAMAA continues to improve its strategic planning and implementation processes to enhance, inter alia, customer services, meet demand growth, improve business efficiency and strengthen its workforce. KAHRAMAA's continued vision is to transform itself into a profitable, self-sustaining business. At present Government subsidies continue to help fund KAHRAMAA's cash flow requirements which result from less than cost-reflective retail tariffs for power and water.

Thanks are due to His Highness, Sheikh Hamad Bin Khalifa Al Thani, The Emir of the State of Qatar as well as His Highness the Heir Apparent, Sheikh Tamim Bin Hamad Al Thani for their extensive support of KAHRAMAA Business Development, thus contributing towards the prosperity of the State of Qatar. Moreover, thanks are due to all KAHRAMAA employees for their efforts towards achieving KAHRAMAA's objectives and enabling KAHRAMAA to achieve much success in 2012 and beyond.

Dr. Mohamed bin Saleh Al-Sada
H.E. Minister of Energy and Industry

President's Foreword

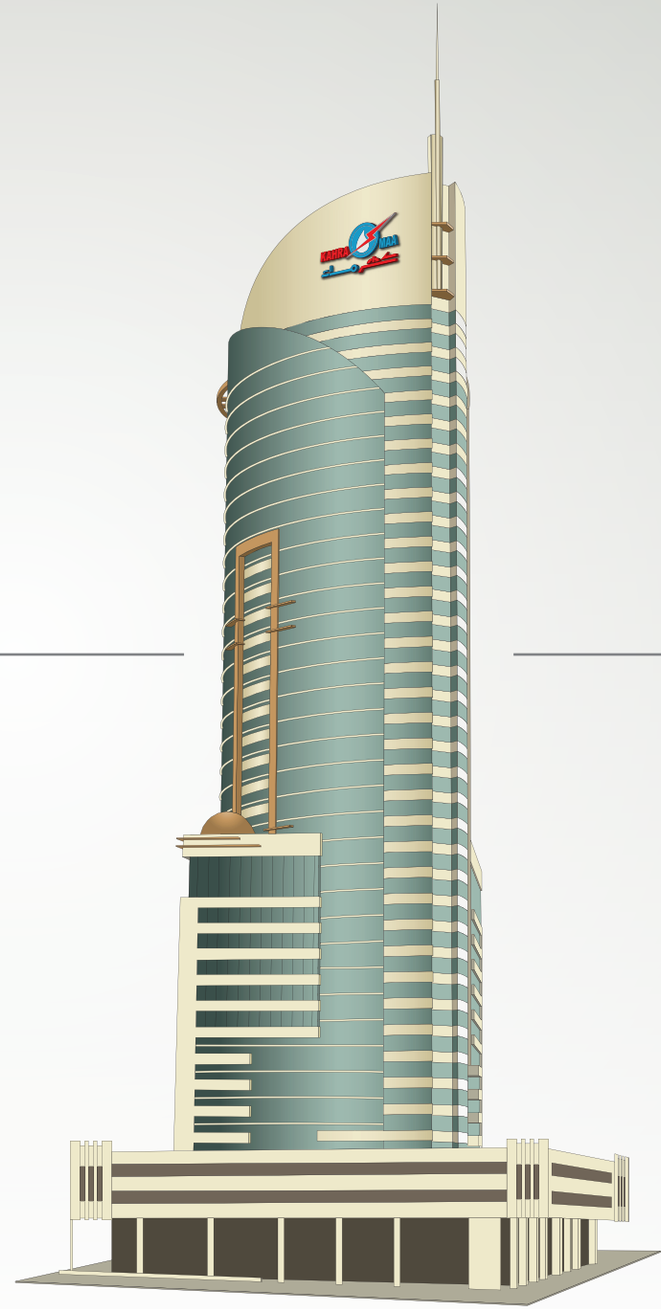
In compliance with the mandate from the government of Qatar, KAHRAMAA publishes this annual statistical report. The purpose is to provide other Qatari government institutions, investors, the academe and the general public with information relevant to their respective needs. The historical data provided in this report should provide the end-user an understanding and appreciation of the development of electricity and water infrastructure in Qatar.
KAHRAMAA's objectives are to efficiently meet our obligations to supply Qatar's needs of electricity and water in a sustainable manner, operate on a commercial basis, comply with local and international health, safety and environmental standards, and maximize the employment of capable Qatari nationals, developing them to the competence level of employees in leading international companies. This is done while setting out a concrete framework and action plan to align our strategic plans with Qatar National Vision 2030.
Tracing the development plan in the State of Qatar, one finds that the highest priorities goes to the provision of services for nationals and expatriates. It targets the promotion of the national economy and enhancement of productivity and organizational efficiency at all state authorities to cope with the international economic development. We serve a rapidly growing economy and population in a region with an abundance of fossil fuels, yet scarce in water sources. In this context, it is imperative that we use our resources and manage our growth wisely. To address this need in 2012 KAHRAMAA launched "Tarsheed", a nationwide campaign to create awareness among its residents, the public and private sector in cooperating towards conservation and to implement legislative measures to ensure efficient use of water as well as electrical energy. It aims to influence the lifestyle of Qatar's residents in domestic consumption, as well as implement water and electricity saving technologies. Along with this effort KAHRAMAA has plans in place to produce at least 2% of electricity from renewable sources such as solar energy, and explore further alternative potable water production techniques such as reverse osmosis.

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

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

Essa Hilal Al-Kuwari
KAHRAMAA President

KAHRAMAA'S BUSINESS MANDATE



Up to the year 1999 all electrical power generation, transmission and distribution services were carried out by the former Ministry of Electricity and Water (MEW). Likewise, up to that year production of potable and distillate water, forwarding and distribution were under 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, with Qatari interests owning in excess of 50% of the equity. Transmission and distribution of electricity and forwarding and distribution of water remained as a government service carried out by the new government corporation named KAHRAMAA (Qatar General Electricity and Water Corporation).

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

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

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

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

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

Table EWT1 Key Growth Indicators

Growth Indicators	2008	2009	2010	2011	2012	Average % Change
A. ELECTRICITY						
Generated, GWh	21,616	24,158	28,144	30,730	34,788	13.5%
% Change	11.1%	11.8%	16.5%	9.2%	13.2%	
Sent Out, GWh	19,747	22,258	26,385	28,383	32,352	13.8%
% Change	10.2%	12.7%	18.5%	7.6%	14.0%	
Maximum Demand, MW	3,990	4,535	5,090	5,375	6,255	12.6%
% Change	12.4%	13.7%	12.2%	5.6%	16.4%	
No. of customers (billed & non-billed, based on number of meters)	208,611	234,658	252,893	272,745	288,903	6.2%
% Change	7.9%	12.5%	7.8%	7.8%	5.9%	
B. WATER						
Water production, Mm3	312	341	374	401	437	12.4%
% Change	24.3%	9.2%	9.6%	7.4%	9.0%	
Maximum Production, MM3 (In 2012 month of July)	0.95	1.01	1.13	1.25	1.30	12.3%
% Change	29.3%	6.6%	11.9%	10.5%	3.7%	
No. of Water customers (billed & non-billed, metered plus served by water tankers)	167,540	187,949	210,475	225,027	241,204	9.3%
% Change	10.6%	12.2%	12.0%	6.9%	7.2%	

Meeting Growing Demand

KAHRAMAA has recently initiated the construction of additional production capacity to meet the escalating electricity and water demand, and much work was done on this during 2012 to further the implementation of several important and strategic projects. Some of the key projects are listed in the table below:

Table EW2 Strategic Electricity & Water Infrastructure Projects

Project	Description
GCC Electricity Interconnection	The GCCIA General Agreement was signed on 25.03.2009 and the ITC/MC is under final review. The first commissioning tests were carried out in March/April 2009. The PETA was signed on 7th July 2009. Different Committees are working hard to finalize related operational and planning issues for the implementation of the Agreements. On 13th April 2011, UAE was successfully synchronized to GCC Interconnection grid and OMAN is connected in 4Q'12.
GCC Water Grid Detailed Feasibility Study	Sogreah offer accepted and study under process.
Transmission System Expansion – Phase 9 &10	Transmission system expansion phase 9 is 96.47% complete. Phase 10 progress is 53.31%, it is delayed due to late plot handling over for substations and route approval for cable lines.
RAYYAN village & urgent upgrade to existing substations + additional works related to Doha land	The work is in progress on this project. 60.79% of the work is complete.
Water Security Mega Reservoirs	Detailed design and site supervision stage 1,started in 1Q'12 and 50% work is complete. Detailed design works expected to finish in 1Q'13. Tender preparation for construction works started in 4Q'12.
Al Shamal RPS Transmission Line	Project is 99.8% completed.
AMI (Advanced Metering Infrastructure)	AMI pilot project awarded. AMI pilot project completion: Jul- 2013 Evaluation for Qatar-Wide AMI project preparation: Feb 2014 Qatar-wide AMI tender award(depending on Consultancy assessment for the pilot project after completion) Mar - 2014 Wide Qatar completion by Dec– 2016
Nuclear Power Plant Investigation Gas Optimization in Qatar electricity and water sector	To explore possibility of using nuclear power. Study started in 4Q'12 and scheduled to complete is 4Q'13.

ELECTRICITY STATISTICS

Table ET1 Main Generating Plants (2012)

Independent Power & Water Producer	Contracted Capacity, MW
Qatar Electricity & Water Company	
Ras Abu Fontas - A	497
Satellites:	
Al Sailiyah	122
Doha Super South	61
Ras Abu Fontas B	609
Ras Abu Fontas B1	417
Ras Abu Fontas B2	567
Ras Abu Fontas Sub-Total	**2,273**
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
Ras Laffan Sub-Total	**4,511**
Mesaieed Power Company Limited	
Mesaieed Powerstation	2,002
Total Capacity	**8,786**

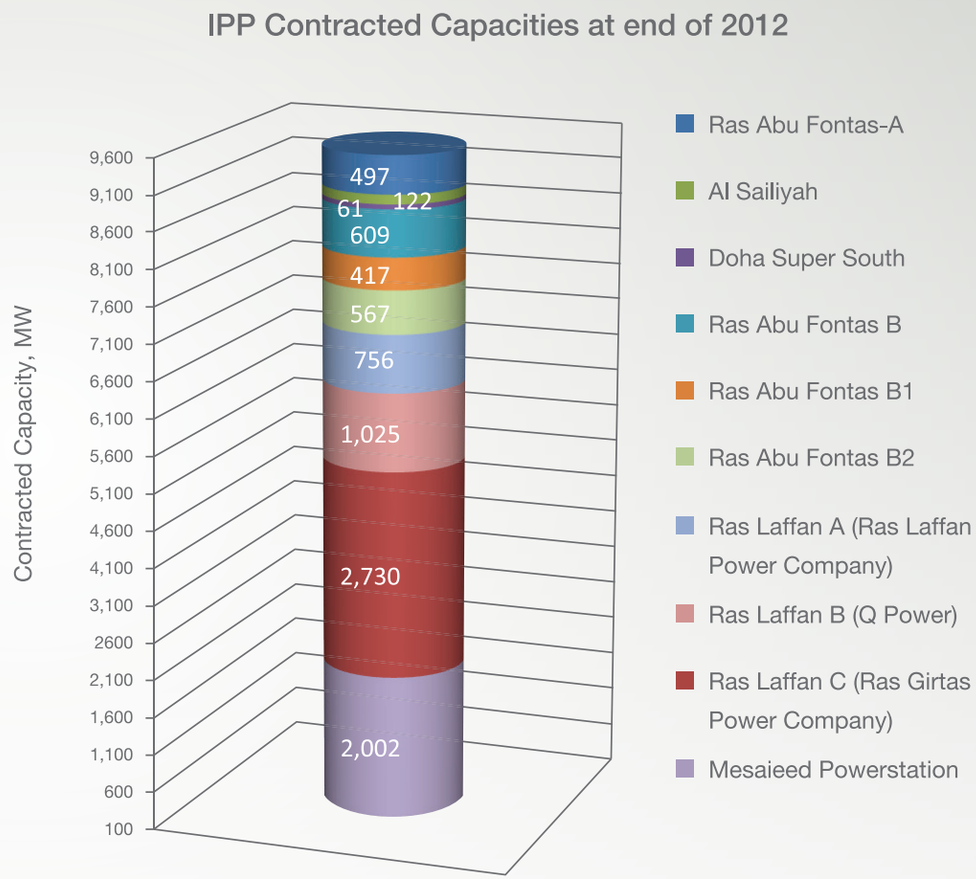


Table ET2 Annual Electricity Generation from 2008 to 2012

Year	GWh	Annual Increase, %
2008	21,616	11.1%
2009	24,158	11.8%
2010	28,144	16.5%
2011	30,730	9.2%
2012	34,788	13.2%

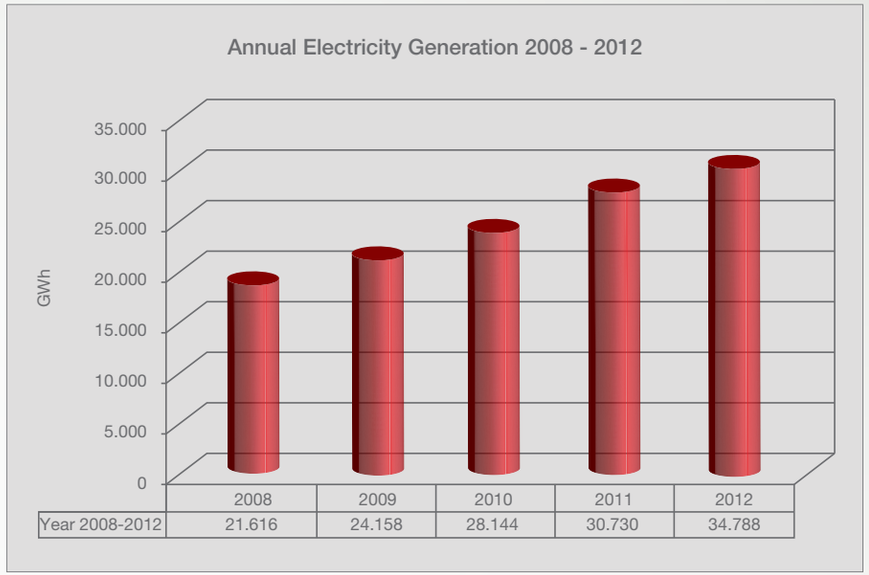


Table ET3 Monthly Electricity Generation in 2012, MWh

Month	RAF B	RAF B1	RAF B2	RAFA	SATELLITES	RLPC	RLB	MPCL	RGPC	Total
Jan	273,957	108,203	209,375	122,328	43,080	288,349	264,638	217,833	302,748	1,830,512
Feb	254,622	88,655	190,531	118,007	38,920	255,045	240,683	201,075	327,442	1,714,979
Mar	327,354	113,919	198,857	126,126	52,240	211,181	262,494	225,696	447,633	1,965,500
Apr	398,638	139,302	201,746	173,790	118,310	224,541	356,778	394,427	567,974	2,575,506
May	455,500	220,746	218,586	207,876	124,610	393,301	433,525	696,147	868,425	3,618,716
Jun	437,589	207,192	245,896	207,335	123,580	365,385	549,833	708,079	799,029	3,643,918
Jul	419,643	238,974	298,110	237,124	129,140	409,067	534,731	798,297	970,059	4,035,145
Aug	405,345	211,722	233,373	291,019	132,750	398,019	530,706	820,564	1,043,876	4,067,373
Sep	444,662	172,098	220,008	282,152	127,750	377,879	496,965	636,468	877,003	3,634,985
Oct	465,760	139,102	223,810	254,295	84,160	325,000	399,502	609,556	705,126	3,206,311
Nov	344,037	135,577	207,684	206,273	42,580	306,382	376,941	302,627	522,135	2,444,236
Dec	281,508	152,838	228,191	171,638	43,070	251,792	268,932	201,044	451,738	2,050,751
Total	**4,508,615**	**1,928,328**	**2,676,167**	**2,397,963**	**1,060,190**	**3,805,940**	**4,715,728**	**5,811,811**	**7,883,190**	**34,787,932**

Electricity Generated in 2012 by IPP , MWh

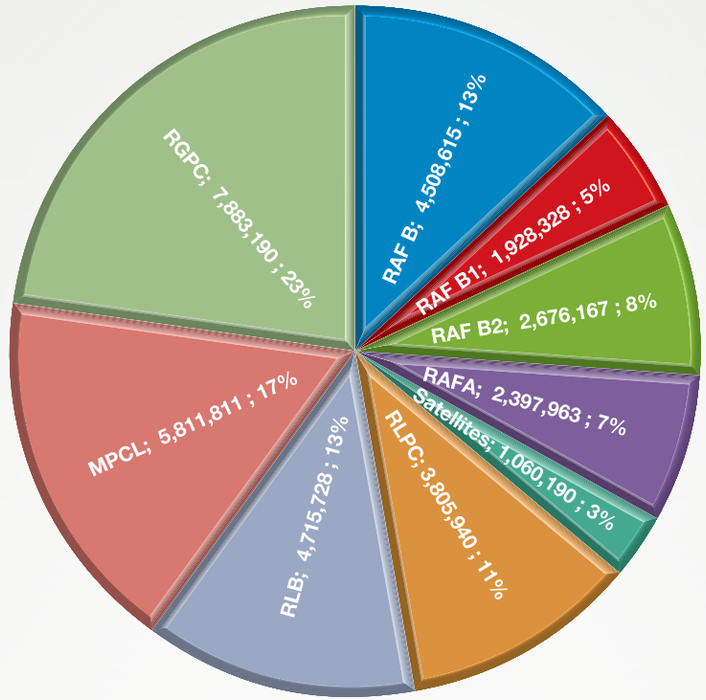


Table ET4 Energy Transmitted in 2012, MWh

Month	RAF B	RAF B1	RAF B2	RAFA	SATELLITES	RLPC	RLB	MPCL	RGPC	Total
Jan	247,341	108,044	187,768	97,518	42,432	261,890	231,202	209,024	270,442	1,655,662
Feb	230,595	88,501	170,672	96,608	38,326	230,228	208,880	193,011	293,904	1,550,724
Mar	298,038	113,759	178,436	98,089	51,434	190,347	228,126	216,877	409,378	1,784,483
Apr	368,365	139,138	180,960	146,689	116,521	200,119	320,805	382,584	527,542	2,382,723
May	421,365	220,493	197,137	180,284	122,657	365,837	395,246	679,278	818,645	3,400,942
Jun	404,469	206,953	225,773	178,938	121,646	338,034	510,501	689,879	750,452	3,426,645
Jul	384,724	238,721	278,881	204,654	127,138	376,851	494,461	779,676	914,566	3,799,673
Aug	370,840	211,500	212,155	260,015	130,727	365,892	490,380	801,061	987,791	3,830,360
Sep	411,814	171,904	200,172	253,607	125,823	347,557	457,516	619,896	826,285	3,414,574
Oct	433,566	138,900	202,623	224,859	82,839	293,533	361,950	593,509	659,515	2,991,293
Nov	313,558	135,422	187,519	178,748	41,882	278,065	340,635	292,540	482,258	2,250,628
Dec	255,151	152,676	208,546	143,659	42,390	225,611	232,912	190,845	412,843	1,864,633
Total	**4,139,826**	**1,926,011**	**2,430,642**	**2,063,668**	**1,043,816**	**3,473,963**	**4,272,614**	**5,648,180**	**7,353,620**	**32,352,340**

Energy Transmitted in 2012 by IPP, MWh

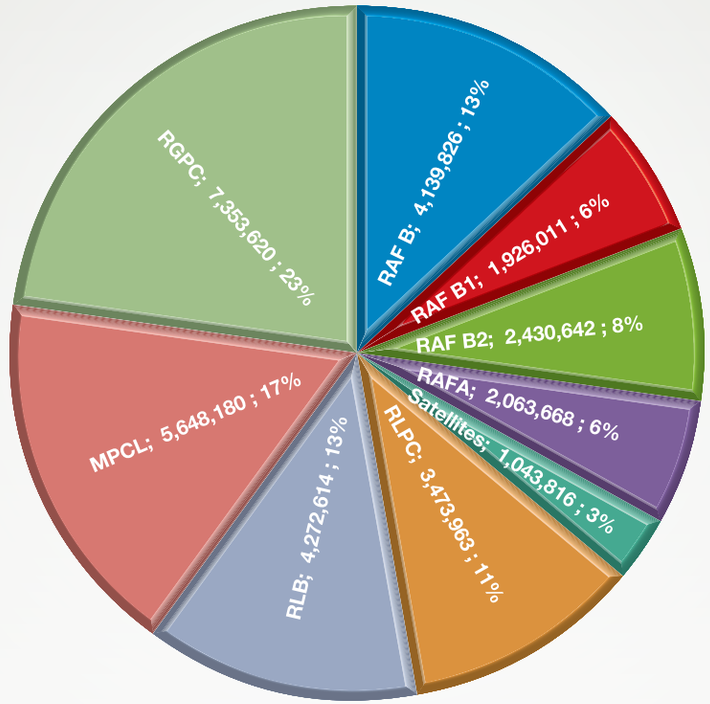


Table ET5 Maximum and Minimum Load Last Five Years, MW

Year	Max. Load (MW)	Date	Min. Load (MW)	Date
2008	3,990	30-Aug	1,115	23-Feb
2009	4,535	24-Aug	1,270	6-Feb
2010	5,090	14-Jul	1,570	8-Feb
2011	5,375	1-Aug	1,785	13-Jan
2012	6,255	6-Aug	1,840	26-Jan

Table ET6 Sectoral Maximum Demands for 2012, MW

Demand Type	Magnitude, MW	Date
System Maximum	6,255	6-Aug
Industrial Maximum	1,772	6-Aug
Domestic Maximum	4,630	2-Aug

Table ET7 Annual Load Factors for 2012

Demand Type	Load Factor, %
System with Assistance	59.0%
Industrial	63.1%
Domestic	55.6%

Table ET8 Annual Growth Rates from 2011 to 2012

Demand Type	Peak Demand (MW) Growth	Consumption (MWh) Growth
System	16.4%	14.0%
Domestic	8.9%	17.2%
Industrial	31.3%	7.8%

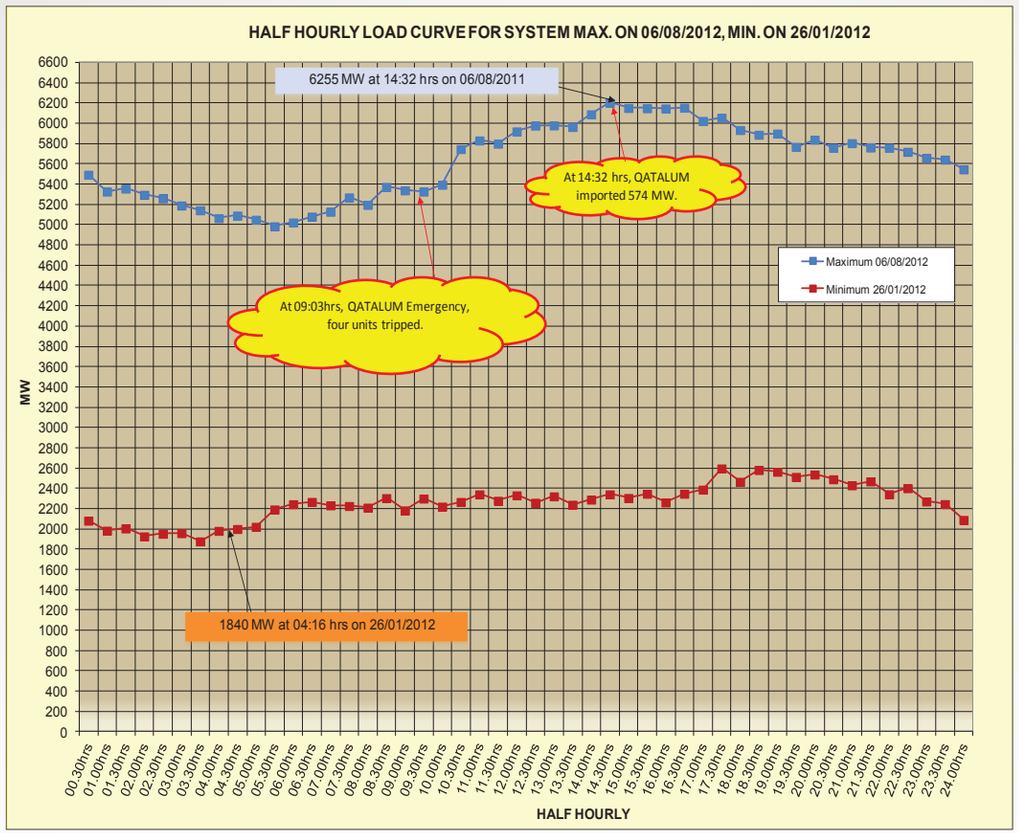


Table ET9 Sectoral Consumption 2012

Domestic Consumption (Residential + Commercial + Government), MWh

= (Energy Transmitted or Sent Out – Transmission & Distribution Losses – Bulk Industrial Consumption)

= 32,352,340 MWh - 2,167,607 MWh - 9,798,062 MWh

= 20,386,671 MWh

Auxiliary (power generation & water desalination facilities) MWh

= Total Electricity Generation - Energy Transmitted or Sent Out

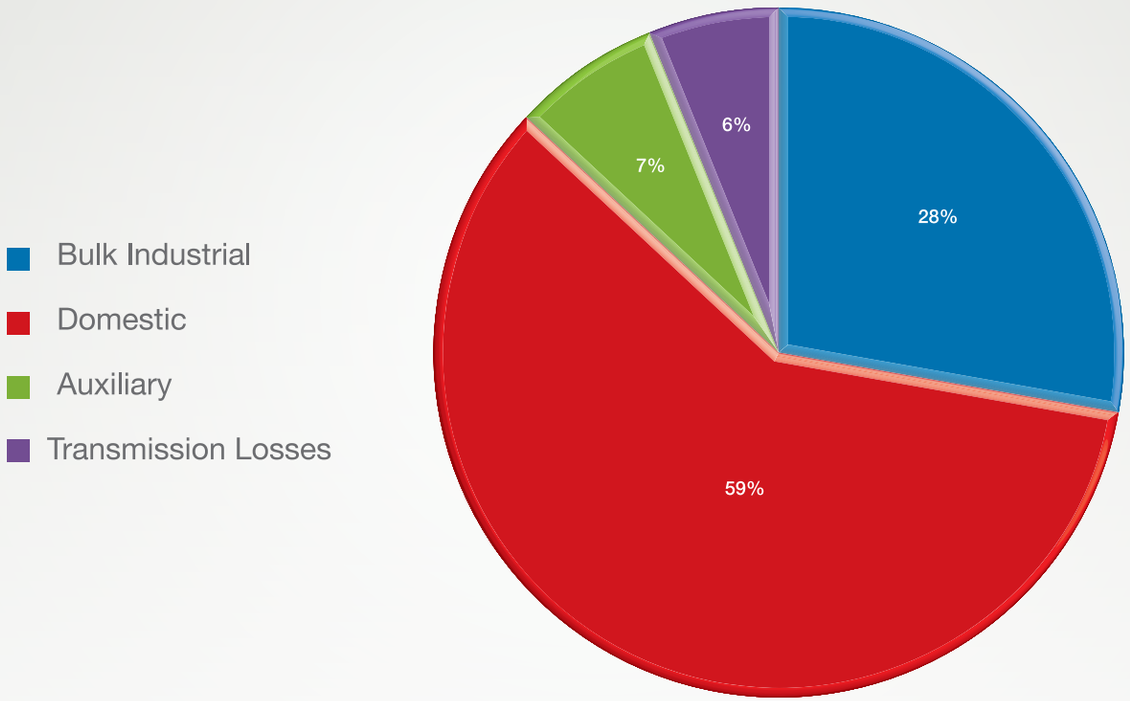
= 34,787,932 MWh - 32,352,340 MWh

= 2,435,593 MWh

Sector	Industrial	Domestic	Auxiliary	Transmission Losses	Total Electricity Generation
Consumption, MWh	9,798,062	20,386,671	2,435,593	2,167,607	34,787,932

Notes:
Small industries are not calculated in the industrial sector consumption of bulk customers.

Sectoral Consumption of Energy (MWh) in 2012



TRANSMISSION & DISTRIBUTION SYSTEM CONTROL CENTRES

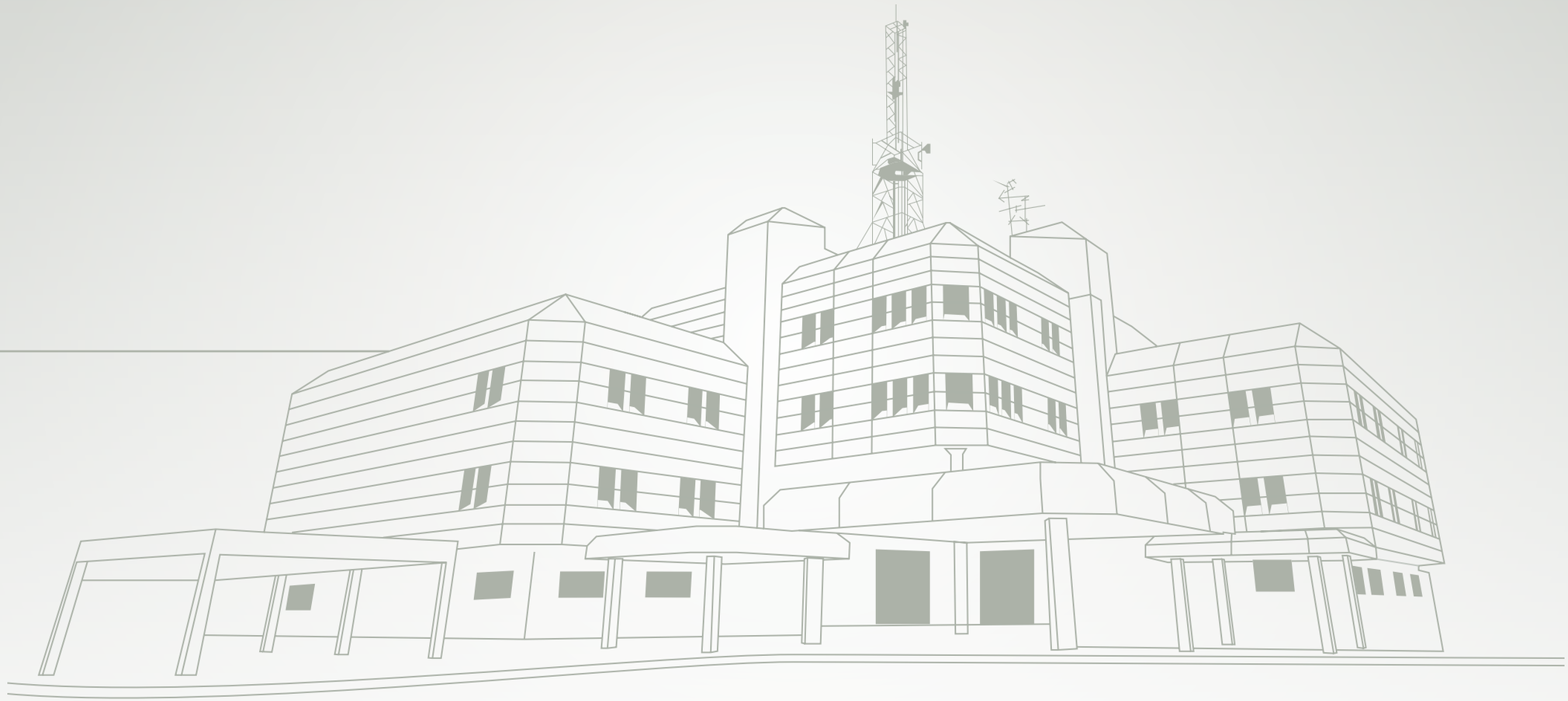


Table ET10 Sub-Stations

SUBSTATIONS	400 kV	220 kV	132 kV	66 kV	33 kV	11 kV		
						GM		PM
						I/D	O/D	PMT
In service (as at 31/12/2008)	2	15	21	137	4	2,142	4,075	1,042
Commissioned 2009	2	2	4	8	1	404	499	51
Commissioned 2010	1	4	-	1	-	436	403	51
Commissioned 2011	1	2	-	18	-	402	466	86
Commissioned 2012	1	2	8	7	2	302	518	59
De-Commissioned in 2012	-	-	-	(4)	-	-	-	-
In service (as at 31/12/2012)	7	25	33	167	7	3,686	5,961	1,289

GM - Ground Mounted Transformer
I/D - Indoor Sub-Station
O/D - Outdoor Sub-Station
PM - Pole Mounted
PMT - Pole Mounted Transformer

Table ET11 Cables Laid

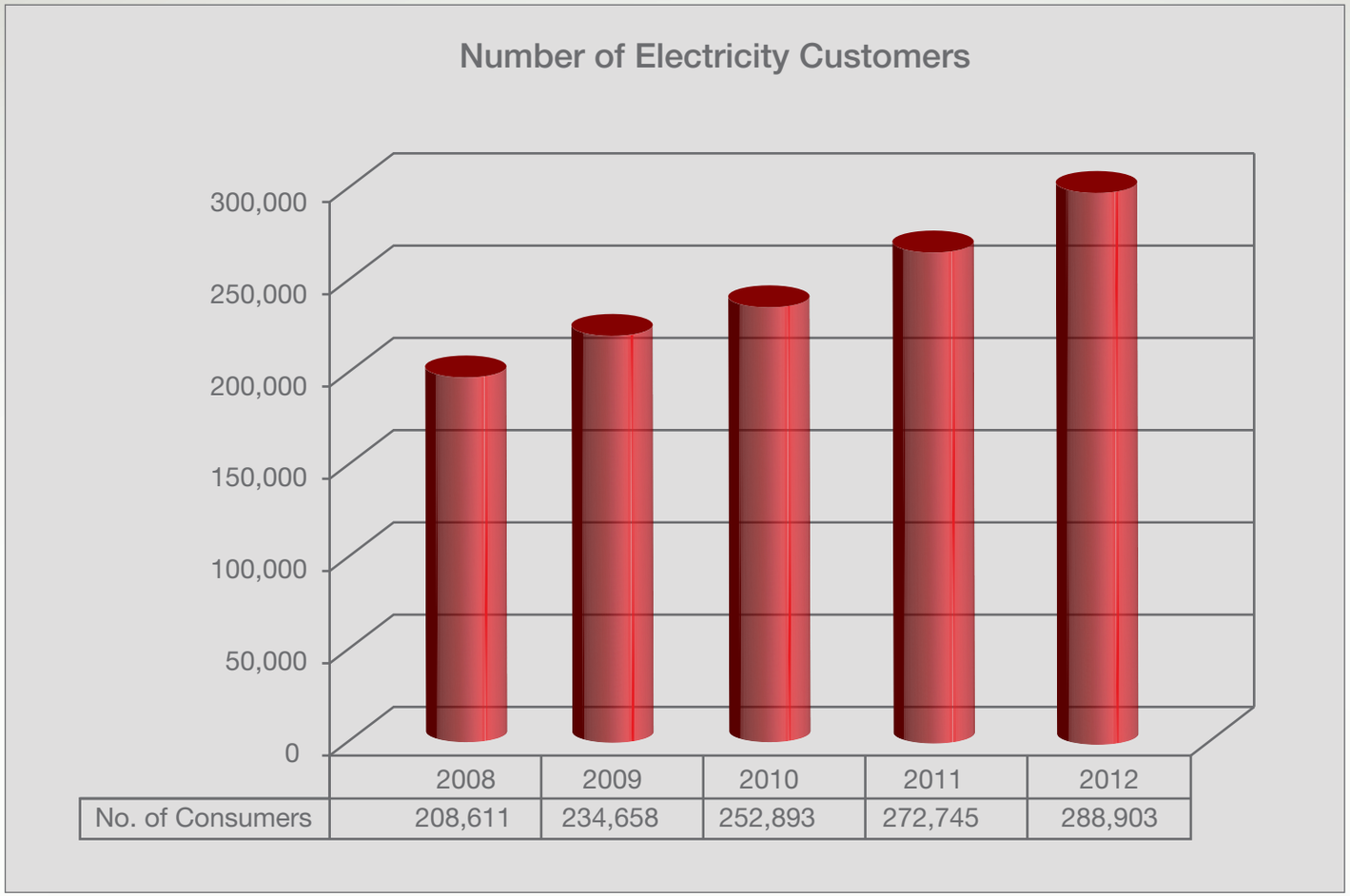
Period Commissioned	Cable Capacity					
	400 kV	220 kV	132 kV	66 kV	33 kV	11 kV
In service (as at 31/12/2008)	-	157.8	250.6	721.9	53.7	5,959.8
Commissioned 2009	16.0	45.4	23.2	158.7	1.2	859.3
Commissioned 2010	18.8	209.8	93.0	225.5	-	927.6
Commissioned in 2011	-	1.0	-	18.0	-	1,187.0
Commissioned in 2012	32.5	179.0	175.5	136.0	-	803.0
In service (as at 31/12/2012)	67.3	592.9	542.2	1,260.1	54.9	9,736.7

Table ET12 High Voltage Overhead Lines

Period	Capacity of Overhead Lines					
	>= 300kV	220 kV	132 kV	66 kV	33 kV	11 kV
	Length in Kilometers					
In service (as at 31/12/2008)	0.00	464.18	619.89	267.01	146.64	1551.70
Commissioned 2009	267.20	-	-16.00	-84.00	-	57.80
Commissioned 2010	125.60	-	-	-	-	30.70
Commissioned 2011	21.10	2.00	-	18.00	-	-77.20
Commissioned 2012	52.00	-	-	-	-	38.00
In service (as at 31/12/2012)	465.90	466.18	603.89	201.01	146.64	110.00

Note that negative values means part of the OHL circuit route length was either retired or configuration was changed due to new projects.

Table ET13 Number of Electricity Customers



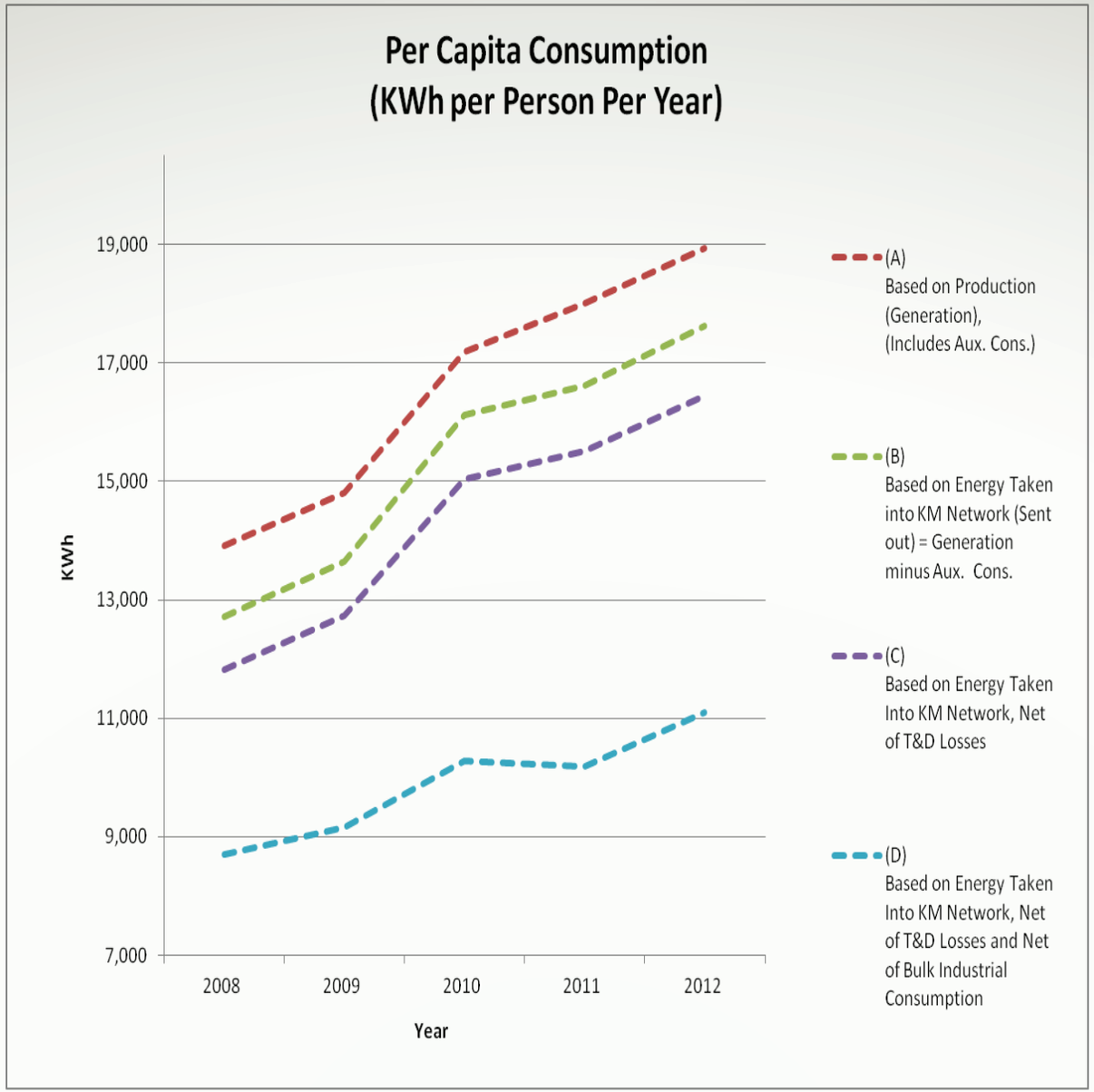
	2008	2009	2010	2011	2012
No. of Consumers	208,611	234,658	252,893	272,745	288,903

Note that "Consumers" as used in this context is the number of customers registered with KAHRAMAA, not Qatar's population.

Table ET14 Average Electricity Per Capita Consumption

Year	2008	2009	2010	2011	2012
Population	1,553,729	1,631,728	1,637,443	1,707,756	1,836,676
Population Annual Increase	26.7%	5.0%	0.4%	4.3%	7.5%
Total Energy Generation inlcuding all auxilliary consumption	21,616	24,158	28,144	30,730	34,788
Energy Taken into KM Network (Sent out) = Generation minus Auxilliary Consumption, kWh	19,747	22,258	26,385	28,383	32,352
Electricity Consumption, GWh (Excluding Bulk Industrial)	13,524	14,947	16,844	17,393	20,387
Per Capita Consumption (kWh per Person Per Year)					
(A) Based on Production (Generation), (Includes Aux. Cons.)	13,912	14,805	17,188	17,995	18,941
(B) Based on Energy Taken into KM Network (Sent out) = Generation minus Aux. Cons.	12,709	13,640	16,113	16,620	17,615
(C) Based on Energy Taken Into KM Network, Net of T&D Losses	11,820	12,727	15,034	15,507	16,434
(D) Based on Energy Taken Into KM Network, Net of T&D Losses and Net of Bulk Industrial Consumption	8,704	9,160	10,287	10,185	11,100

Note: International Energy Agency (IEA) and United Nations development Programme (UNDP) formula is: "Total Energy Sent into network, less transmission and distribution losses, plus imports, less exports, divided by total population". The resulting per capita consumption figures in the table above shows various bases for energy. For residential per capita end-user of electricity all other sectoral consumption (Industrial, Commercial, Government) must first be deducted, before dividing by total population.


Per Capita Consumption
(KWh per Person Per Year)
19,000
17,000
15,000
13,000
11,000
9,000
7,000
KWh
2008
2009
2010
2011
2012
Year
(A)
Based on Production (Generation), (Includes Aux. Cons.)
(B)
Based on Energy Taken into KM Network (Sent out) = Generation minus Aux. Cons.
(C)
Based on Energy Taken Into KM Network, Net of T&D Losses
(D)
Based on Energy Taken Into KM Network, Net of T&D Losses and Net of Bulk Industrial Consumption

WATER STATISTICS

Desalination Plants were introduced to Qatar in 1953 with the first plant having a capacity of 150,000 imperial gallons per day (680 cubic meters). The size of plants and their location have changed considerably during the years and there are now seven plants, namely:

- Ras Abu Fontas A (RAF A)
- Ras Abu Fontas B (RAF B)
- Ras Abu Fontas B2 (RAF B2)
- Ras Abu Fontas A1 (RAF A1)
- Ras Laffan A (RL A)
- Ras Laffan B (RL B)
- Ras Laffan C (RL C)

Water to the rural areas is supplied from potable station / well fields. In 2008 operation of the following wells for non-potable water production were transferred from KAHRAMAA to MMAA:

- Umm Quhab Dhakhira
- Al Khuraib
- Rawdat Al Faras
- Abu Arayan
- An Nasaraniyah
- Al Khubaib
- Al Kharrarah
- Rawdat Rashid
- Abu Samra (Brackish)

Total water production in 2012 amounted to 437 million cubic meters. Production increased by 9 % in the year 2012. The monthly average of the yearly total in 2012 is 36,423,705 cubic meters. Maximum monthly water production was in July at 40,176,662 cubic meters and the minimum was in the month of February at 30,026,564 cubic meters.

Table WT1 Contracted Capacities by IPWP at end of 2012

Independent Power & Water Producer	MIGD	M3/Day
Qatar Electricity & Water Company		
Ras Abu Fontas - A	55	250,000
Ras Abu Fontas B	33	150,000
Ras Abu Fontas B2	29	131,818
RAF A1	45	204,545
Ras Abu Fontas Sub-Total	**162**	**736,364**
Ras Laffan		
Ras Laffan A (Ras Laffan Power Company)	40	181,818
Ras Laffan B (Q Power)	60	272,727
Ras Laffan C (Ras Girtas Power Company)	63	286,364
Ras Laffan Sub-Total	163	740,909
Total Capacity	**325**	**1,447,273**

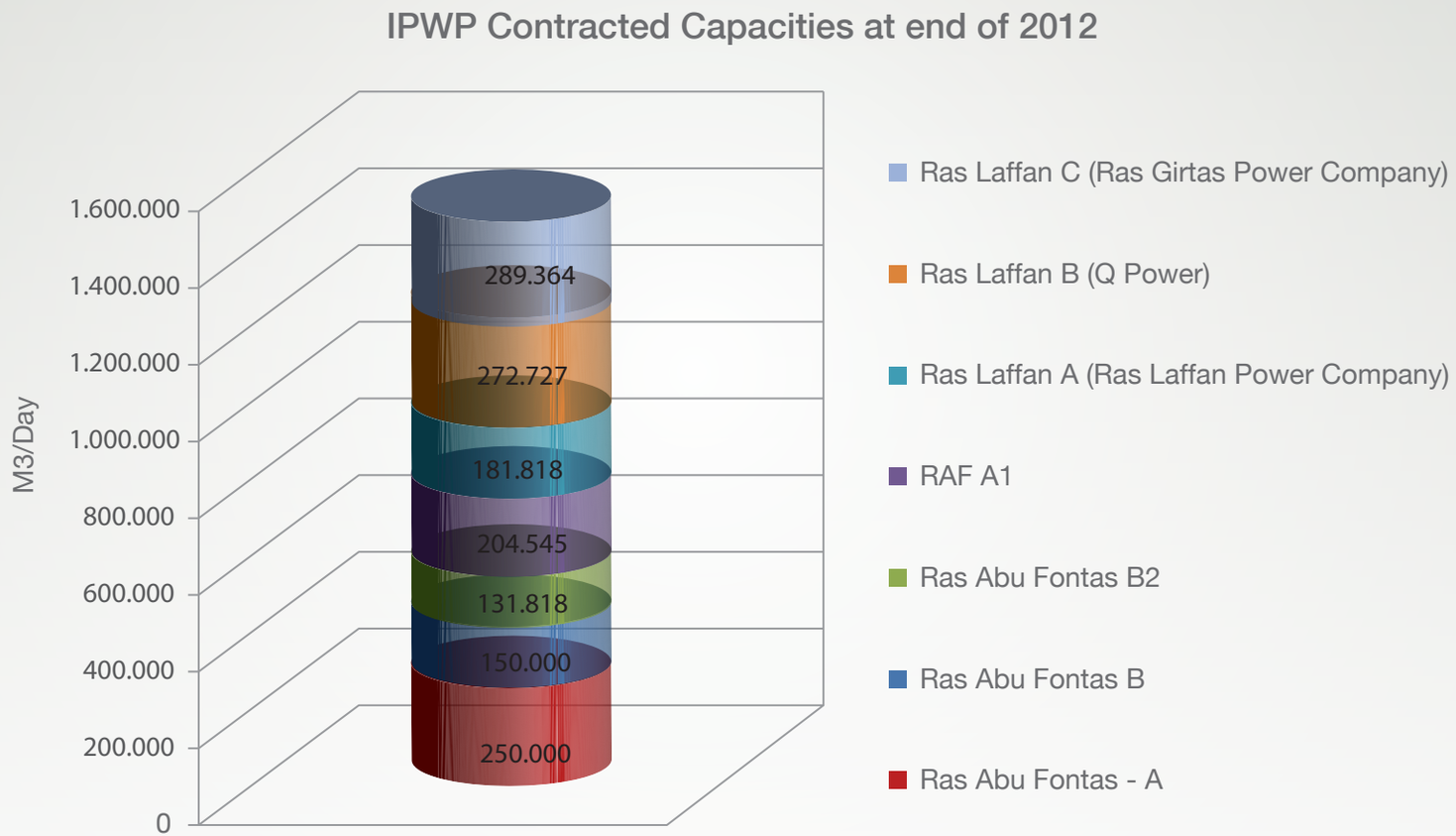
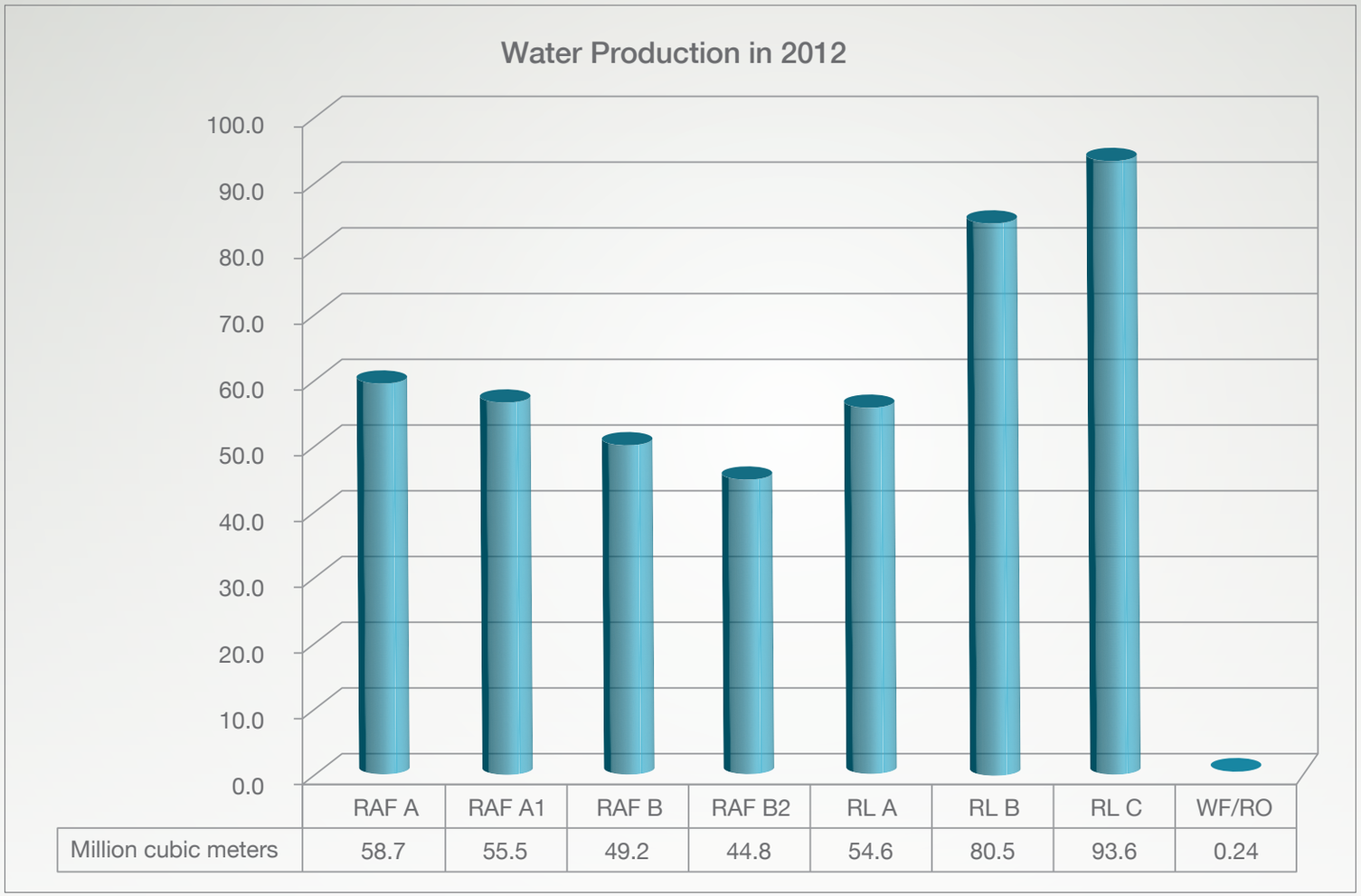

IPWP Contracted Capacities at end of 2012
M3/Day
1.600.000
1.400.000
1.200.000
1.000.000
800.000
600.000
400.000
200.000
0
289.364
272.727
181.818
204.545
131.818
150.000
250.000
Ras Laffan C (Ras Girtas Power Company)
Ras Laffan B (Q Power)
Ras Laffan A (Ras Laffan Power Company)
RAF A1
Ras Abu Fontas B2
Ras Abu Fontas B
Ras Abu Fontas - A

Table WT2 Water Production in 2012, Million Cubic Meters



	RAF A	RAF A1	RAF B	RAF B2	RL A	RL B	RL C	WF/RO
Million cubic meters	58.7	55.5	49.2	44.8	54.6	80.5	93.6	0.24

In 2012 the total water production reached 437.08 million cubic meters, increase of 9.0 % over 2011 water production.

Table WT3 Potable Water Production Capacities from Wells and RO in 2012

WELL FIELDS	Total No,. Of Wells	Usable Wells	Wells with Pumps	Designed Output, M3/ Day	Average Output, M3/ Day	Remarks
Al Rushaidah	87	80	34	8,100	-	Kept standby since 27.04.2005 due to the availability of Ras Laffan A water to old Al Khor Reservoir.
Adh Dhibiyah	59	56	6	2,700	-	Kept standby since 18.11.1998.
Al Judiyah	36	30	19	1,760	-	Kept standby (emergency supply) since 22.10.2005 due to the availability of Ras Laffan A water to Madinat Shamal Reservoir.
Al Otoriyah	71	71	3	4,363	-	Kept standby (emergency supply)
Abu Thailah	20	20	3	2,400	-	Kept standby (emergency supply)
Old Jemiliyah	9	9	NIL	850	-	Stopped operation since 15.10.2001 due to commissioning of the New Jemiliyah Station.
Abu Samra RO Plant	5	4	4	672	667	Supply to Immigration/ Customs & TFS.
Army North Camp RO PLANT	5	4	2	1,100		North Camp R.O. station is kept standby since 22.10.2005 due the commissioning of Ras Laffan A distillate main to Ghuwairiyah. North Camp Pumping Station supply is from Al Ghuwairiyah RPS
Total	**292**	**274**	**71**	**21,945**	**667**	

Table WT4 Monthly Water Production, cubic meters in 2012

Month	RAF A	RAF A1	RAF B	RAFB2	RL A	RL B	RL C	WF/RO*	Total
Jan	3,985,682	3,937,883	3,707,798	4,043,442	4,124,084	6,071,021	6,519,997	20,775	32,410,682
Feb	3,601,114	3,614,319	3,591,607	3,673,163	3,721,100	5,540,854	6,265,496	18,911	30,026,564
Mar	4,355,618	3,840,939	4,273,433	3,865,656	3,486,683	6,458,689	7,678,938	20,797	33,980,753
Apr	4,530,451	3,939,105	4,331,862	3,708,541	4,165,348	6,090,606	7,696,891	20,046	34,482,850
May	4,691,324	5,908,628	4,489,852	3,877,384	4,394,960	6,690,808	8,754,044	20,830	38,827,830
Jun	4,926,447	5,494,764	4,377,404	3,667,291	4,570,964	7,563,034	8,337,326	20,227	38,957,457
Jul	5,104,404	5,569,447	4,271,766	3,639,329	5,399,124	7,462,562	8,709,176	20,854	40,176,662
Aug	5,124,392	5,495,925	4,186,139	3,832,576	5,264,224	7,308,845	8,527,711	20,738	39,760,550
Sep	5,333,278	4,920,117	4,124,300	3,509,536	4,957,176	7,423,593	8,195,124	20,018	38,483,142
Oct	5,859,188	4,712,052	4,106,272	3,694,221	5,605,488	6,811,875	8,166,038	20,782	38,975,916
Nov	5,597,628	3,899,736	4,159,525	3,440,264	4,852,696	6,479,225	7,496,780	20,110	35,945,964
Dec	5,616,992	4,157,050	3,609,745	3,816,429	4,071,192	6,552,028	7,212,492	20,163	35,056,091
TOTAL	**58,726,518**	**55,489,965**	**49,229,703**	**44,767,832**	**54,613,039**	**80,453,140**	**93,560,013**	**244,251**	**437,084,461**

Note:

WF/RO = Well Field + Reverse Osmosis Plant

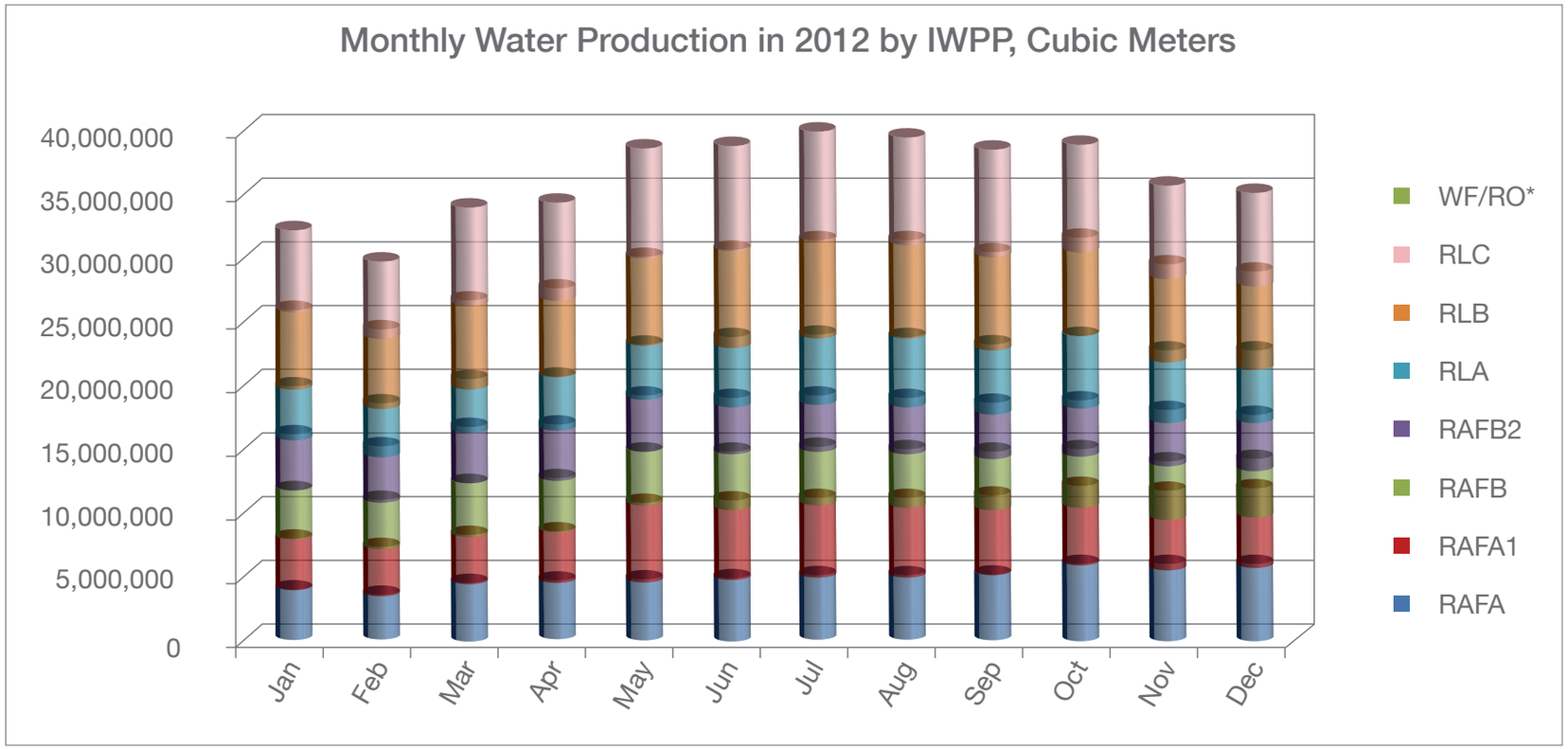
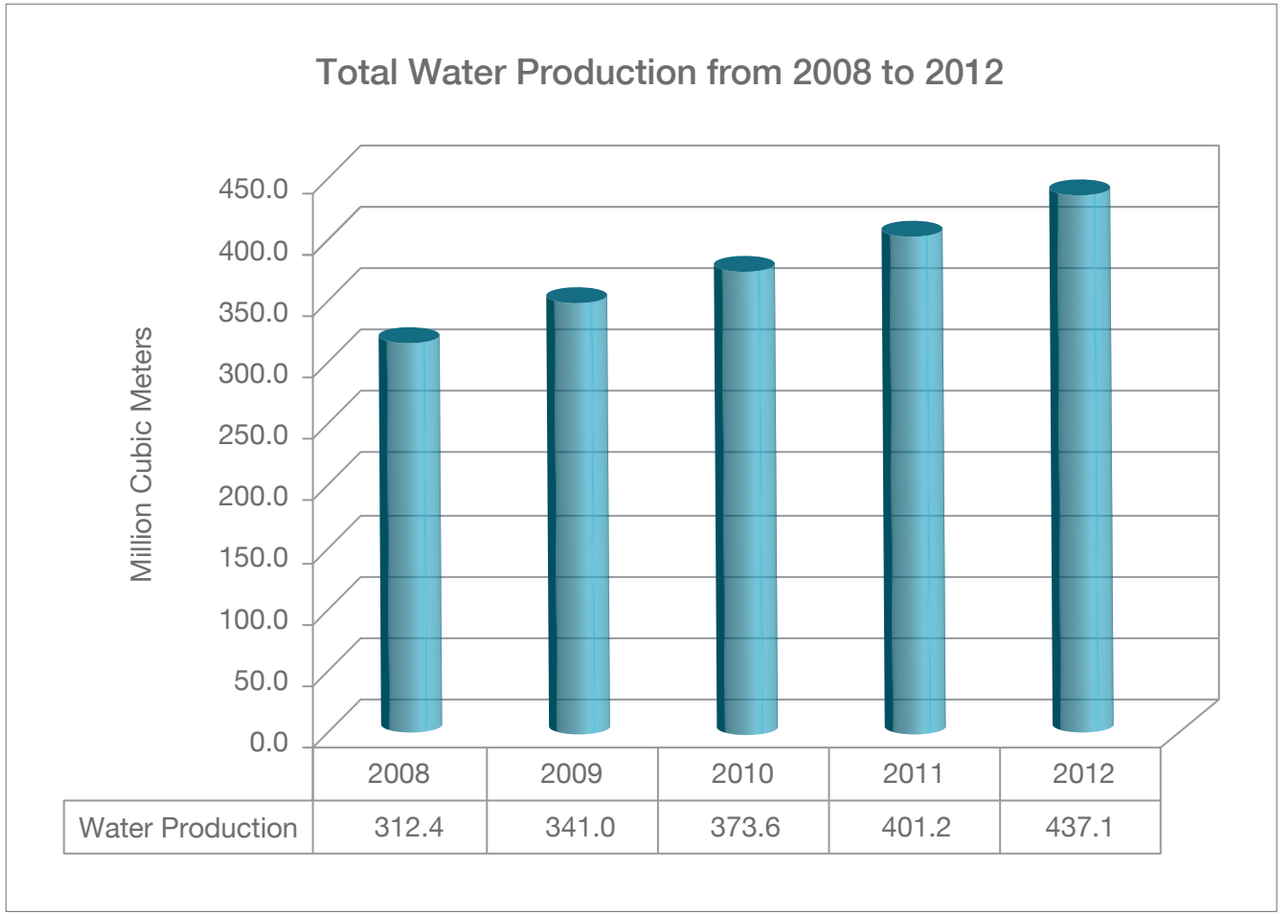


Table WT5 Total Water Production from 2008 to 2012

Water Production	2008	2009	2010	2011	2012
Production, MM3	312.4	341.0	373.6	401.2	437.1
Annual Growth	24.3%	9.2%	9.6%	7.4%	9.0%
Average Growth from 2008 -2012 =12.3%					

Water production from 2011 to 2012 posted an increase of 9.0%, compared to previous year's slightly lower growth of 7.4% Average annual growth from 2008 to 2012 is 12.3%, indicating sustained increase in water demands, but generally slowing down from since 2009.

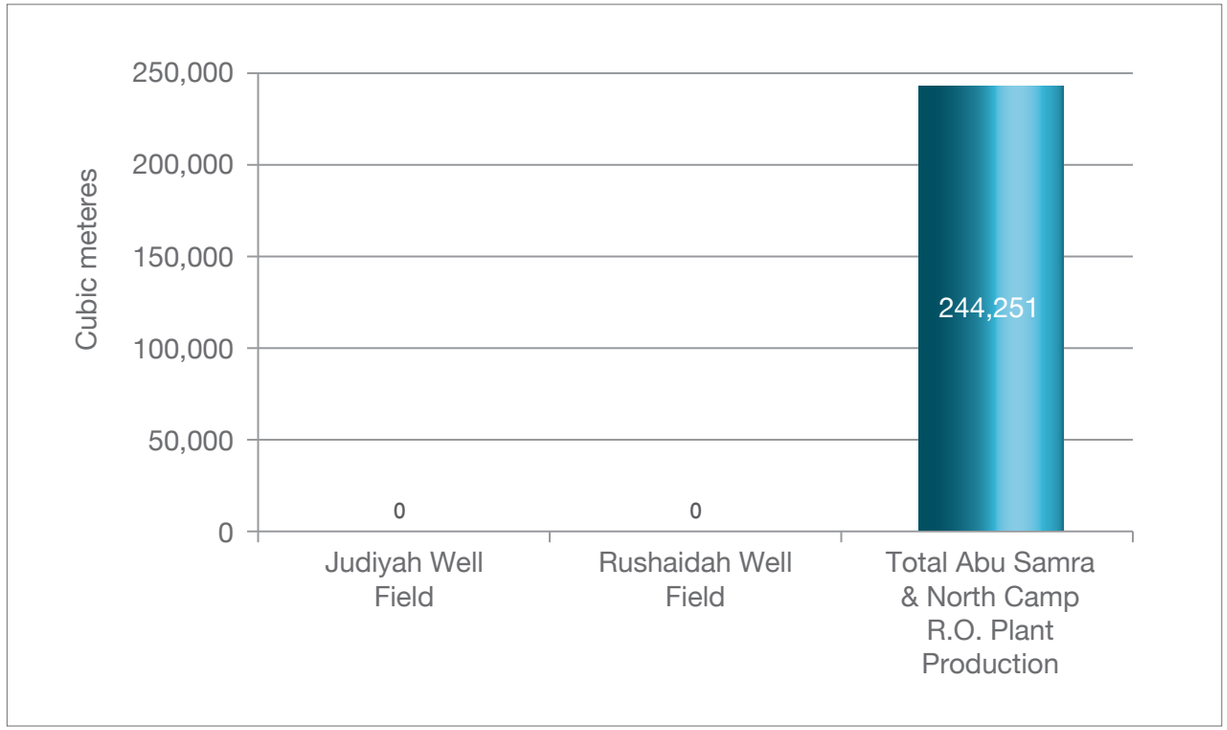


Production figures above are from the viewpoint of independent water producers (IWP's).

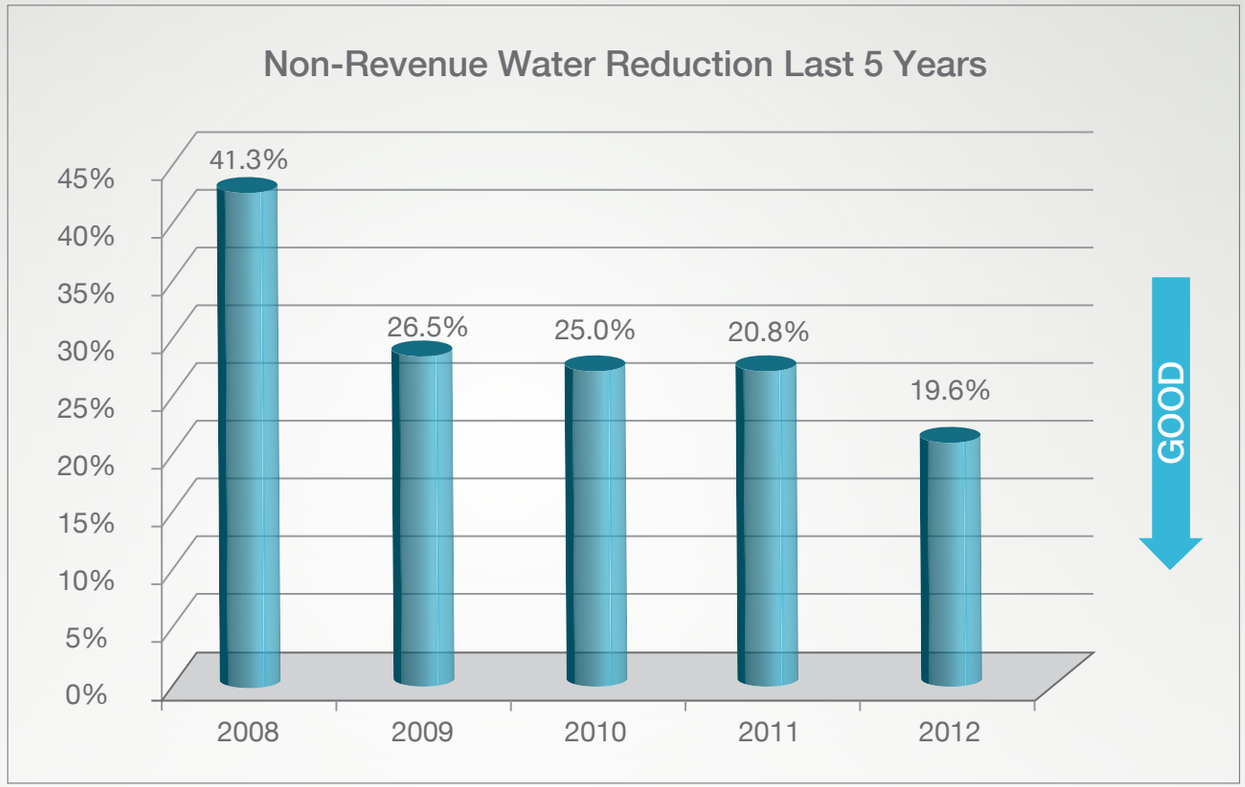
"Production" from the viewpoint of KAHRAMAA is the total volume of water forwarded from IWP's to KAHRAMAA's reservoirs. Auxiliary consumption at IWP's are not considered part of KAHRAMAA production.

Table WT6 Rural Potable Monthly Water Production in Cubic Meters

MONTH	Judiyah Well Field	Rushaidah Well Field	Total Abu Samra & North Camp R.O. Plant Production	TOTAL WELL WATER & RO PRODUCTION
Jan	0	0	20,775	20,775
Feb	0	0	18,911	18,911
Mar	0	0	20,797	20,797
Apr	0	0	20,046	20,046
May	0	0	20,830	20,830
Jun	0	0	20,227	20,227
Jul	0	0	20,854	20,854
Aug	0	0	20,738	20,738
Sep	0	0	20,018	20,018
Oct	0	0	20,782	20,782
Nov	0	0	20,110	20,110
Dec	0	0	20,163	20,163
Total	**0**	**0**	**244,251**	**244,251**

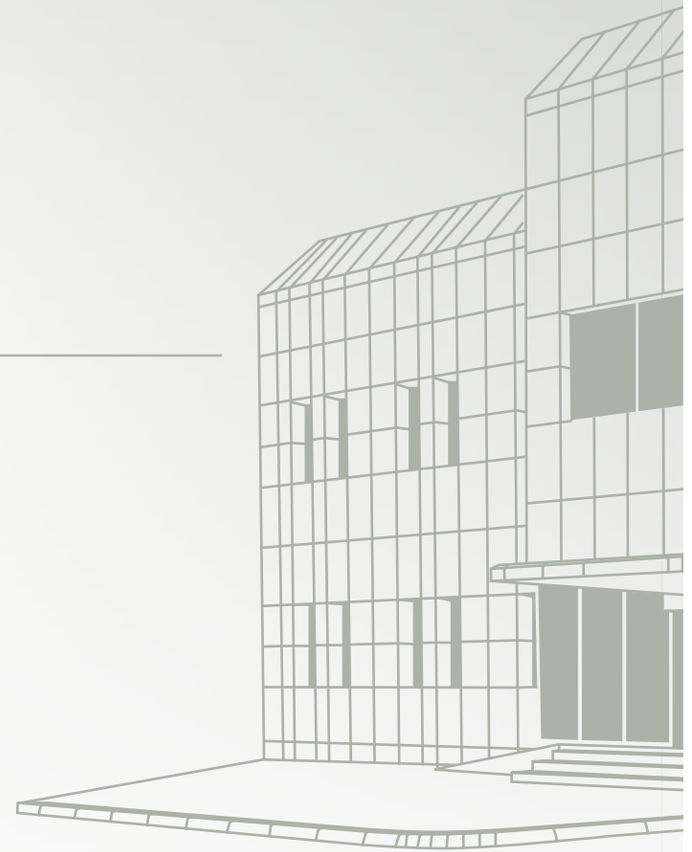

250,000
200,000
150,000
100,000
50,000
0
Cubic meteres
0
0
244,251
Judiyah Well Field
Rushaidah Well Field
Total Abu Samra & North Camp R.O. Plant Production

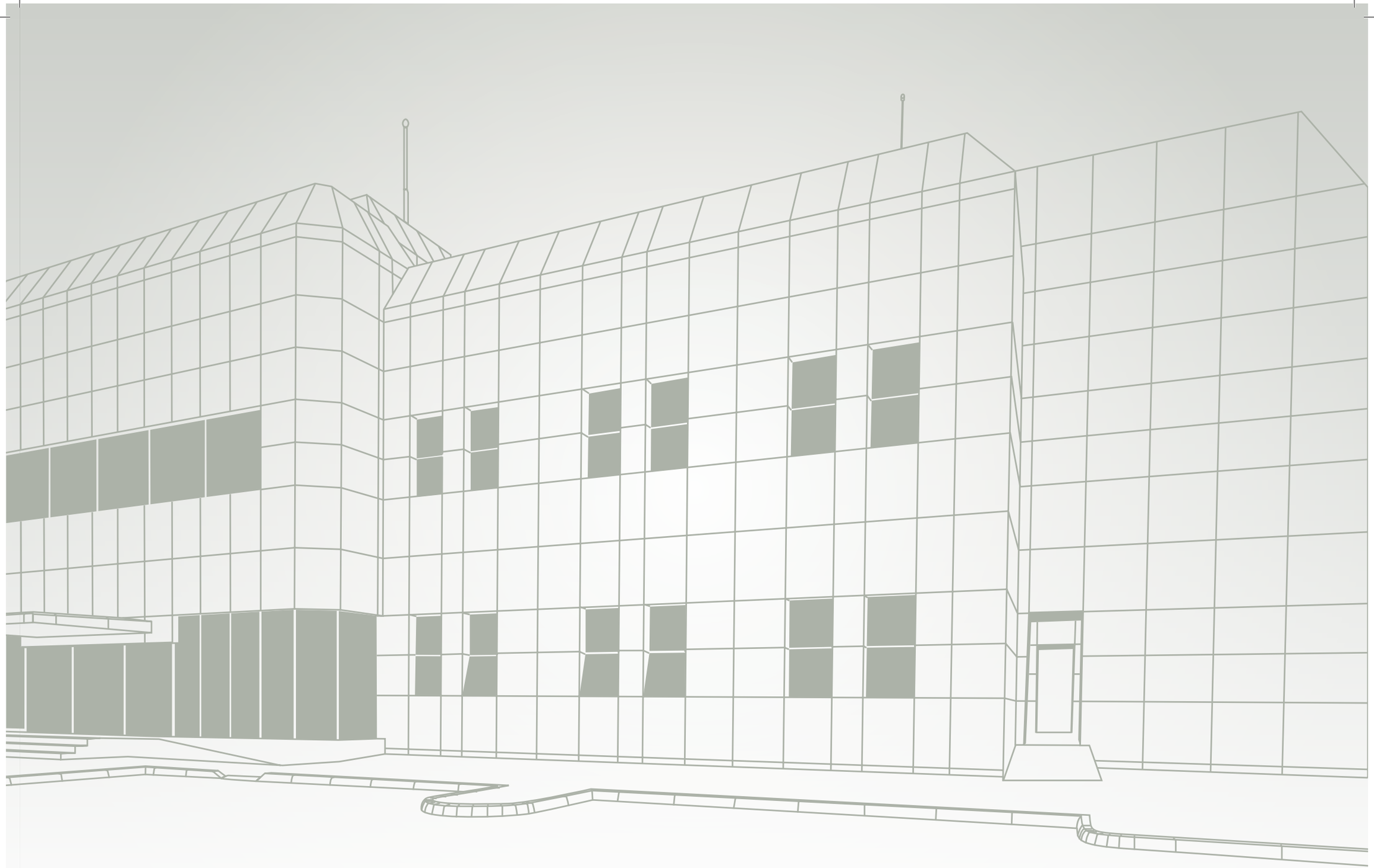
WT7 Non-Revenue Water Reduction



Non Revenue Water (NRW) is the difference between the System Input Volume and Water Sold to Customers. KAHRAMAA has been intensifying its efforts to reduce the NRW and Water Loss to international best standards in the last 5 years. NRW was reduced from a high of 41.3% in 2008 to the current low of 19.6% in 2012 as shown in the above chart.

WATER DISTRIBUTION NETWORK





PRIMARY & SECONDARY DISTRIBUTION SYSTEM

The primary and secondary distribution mains are being developed continuously and have grown from a total of 390 kilometers in 1971 to 6789 kilometers in 2012. This excludes abandoned pipes due to necessary water network modifications, including replacements and modernization efforts.

The number of consumers receiving a piped water supply has increased with the development of the mains network. In 1971, there were 9,500 customers and by the end of 2012, this number had increased to 241,204 .

The water distribution system is controlled from the Telemetry Control Center in Doha. The Operations personnel at reservoirs also control part of it locally. Production, pumping, storage and flows are controlled from the center through wireless links and telephone lines.

Water production including wells in 2012 amounted to 437 million cubic meters. Total production increased by 9.0% in the year 2012. The monthly average of the yearly total in 2012 is 36,423,705 cubic meters. Maximum monthly water production was in July at 40,176,662 cubic meters and the minimum was in the month of February at 30,026,564 cubic meters.

The growth of the distribution mains system has meant a reduction in the need for water to be delivered by tanker to the urban areas. There were 340 tankers rented by KAHRAMAA in 2008, this number is steadily reduced to 80 in 2012. The percentage of customers served by tankers has reduced considerably in the recent years. The average reduction year-on-year from 2008 to 2012 is 0.9%.

It is KAHRAMAA policy to keep tankers outside Greater Doha built-up area wherever possible and to serve customers through the network, rather than through tankers.

Table WT8 Length of Mains Laid from 2008 to 2012, meters

Year		2008	2009	2010	2011	2012
Pipe Diameter, millimeters	80	557	-	-	-	33
	100	204,026	285,081	170,645	46,337	95,741
	125	-	-	-	-	-
	150	124,575	176,906	96,055	63,719	84,622
	200	71,421	79,234	52,627	33,160	77,483
	250	1,203	-	503	4	519
	300	42,321	75,977	43,701	40,481	47,822
	400	22,838	23,611	16,977	17,188	20,057
	450	-	-	-	-	-
	500	3	-	-	-	281
	600	46,367	63,637	30,025	30,479	13,443
	700	1,433	-	-	2	-
	800	13	16	-	-	163
	900	29,275	34,539	75,928	67,547	23,158
	1000	16	-	-	-	260
	1200	891	15,625	10,678	27,495	14,406
	1400	2,988	5,250	-	235	5,960
	1600	7,211	53,155	-	317	11
	Totals	**555,137**	**813,031**	**497,138**	**326,964**	**383,959**

Table WT9 Number & Length of Service Connections in 2012, in meters

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

Size of Service in mm (MDPE)	20 mm		25mm		32 mm		50 mm		63 mm		Total	
Type of Service	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.
New Service	-	-	42,096.7	3,849.0	13,368.2	227.0	5,803.0	99.0	13,304.8	187.0	74,572.7	4,362.0
Reconnection	-	-	-	-	-	-	-	-	-	-	-	-
Disconnection	-	2.0	-	722.0	-	4.0	-	2.0	-	-	-	730.0
Maintenance / Replacement	-	-	23,707.5	4,779.0	5,074.8	493.0	1,031.3	97.0	1,086.0	81.0	30,899.6	5,450.0
Transpose	-	-	413.4	44.0	126.1	10.0	62.5	3.0	61.0	2.0	663.0	59.0
Size Increase	-	-	33.4	7.0	77.5	26.0	210.9	13.0	766.0	16.0	1,087.8	62.0
New Water Meter Installa-tion	-	-	-	290.0	-	15.0	-	18.0	-	9.0	-	332.0
Water Meter Replacement	-	-	-	8,047.0	-	214.0	-	72.0	-	46.0	-	8,379.0

Table WT10 Number & Length of Service Connections in 2012, in meters

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

Size of Service in mm (inch)	80 (3”)		100 (4”)		150 (6”)		200 (8”)		250 (10”)		300 (12”)		400(16")		Total	
Type of Service	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.	Length	Nos.
New Service	38.0	5.0	124.5	3.0	3.5	1.0	64.0	1.0	-	-	-	-	-	-	230.0	10.0
Reconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transpose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Size Increase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Water Meter Installation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Meter Replacement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table WT11 Tanker Water Supply in 2012

Station Name	Rented by KAHRAMAA	Municipality	Education	Defense	Police	Other	Rural Tankers	Private Transport	Total
AL SAILIYA	36	8	0	13	14	11	0	630	676
UMM SALAL	6	3	1	1	1	2	0	390	398
AL KHOR	2	5	4	3	4	8	0	308	332
AL SHAHANIYAH	11	2	0	12	1	25	0	112	152
AL WAKRAH	9	6	0	3	5	12	0	210	236
AL JAMELIYAH	9	1	2	11	1	11	0	40	66
AL SHAMAL	7	35	4	3	1	3	0	70	116
MESAIEED	0	2	0	2	1	2	0	80	87
AL MAZROUA	0	0	0	0	0	0	0	0	0
Total	80	62	11	48	28	74	0	1,840	2,063

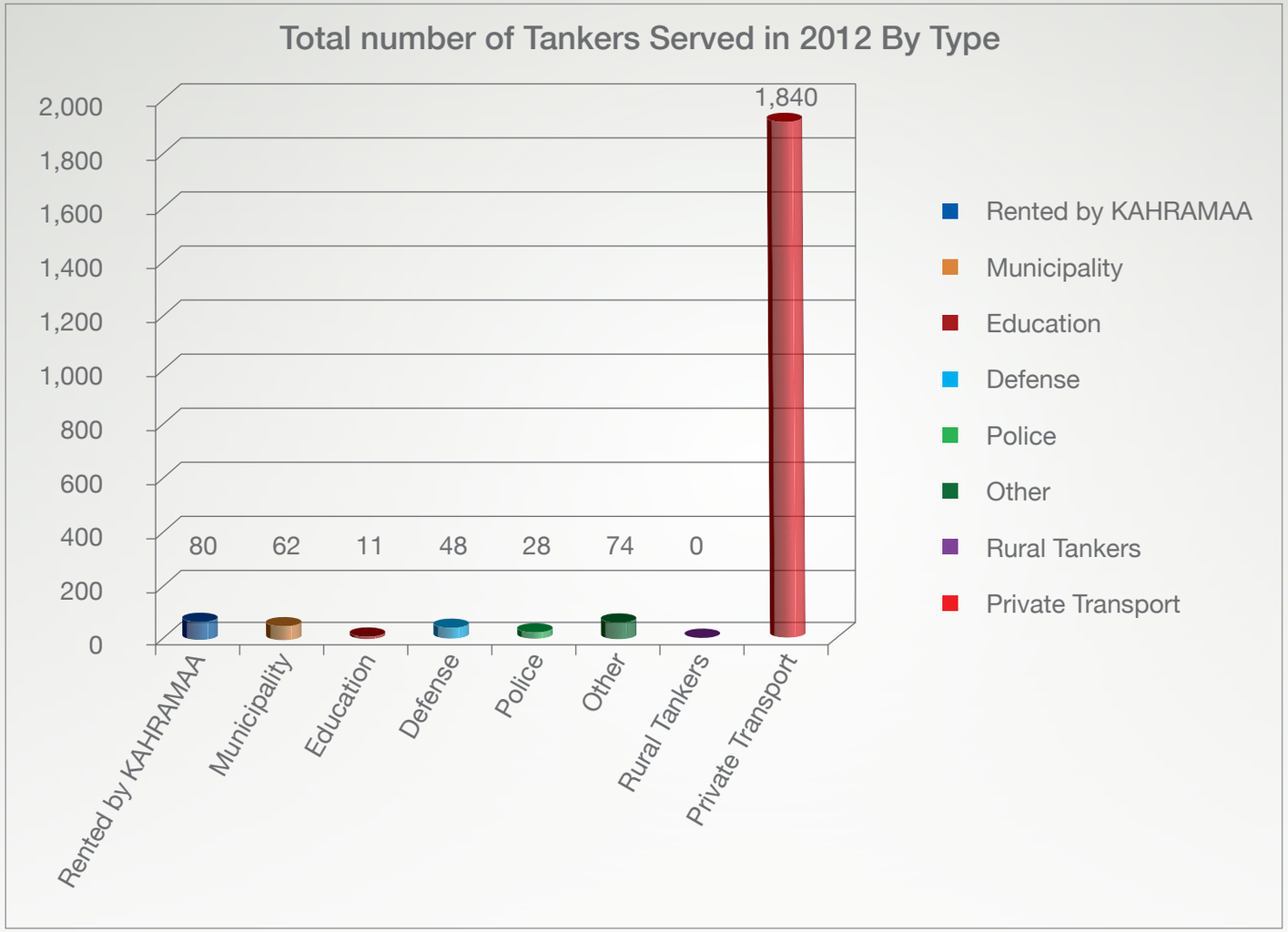
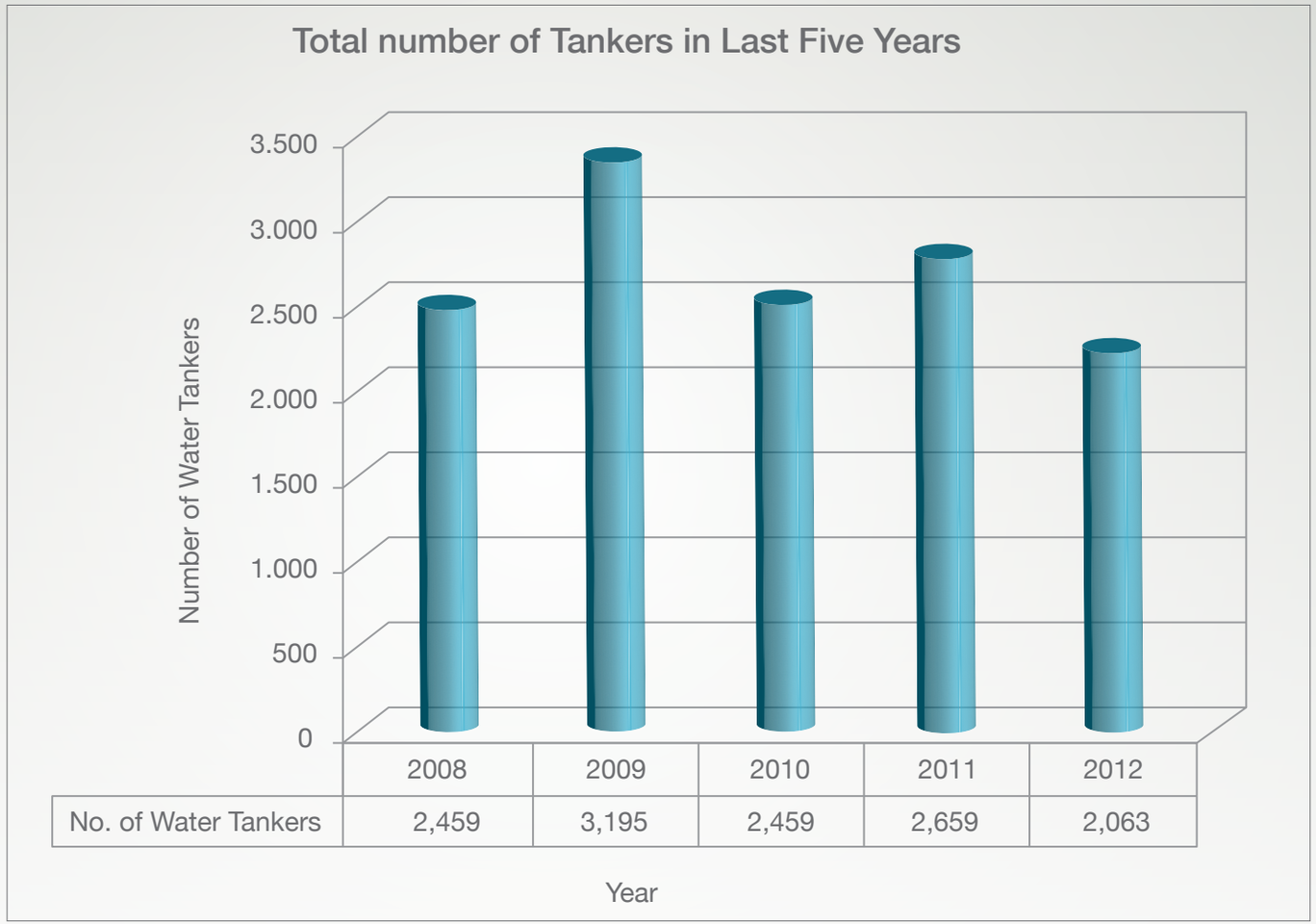
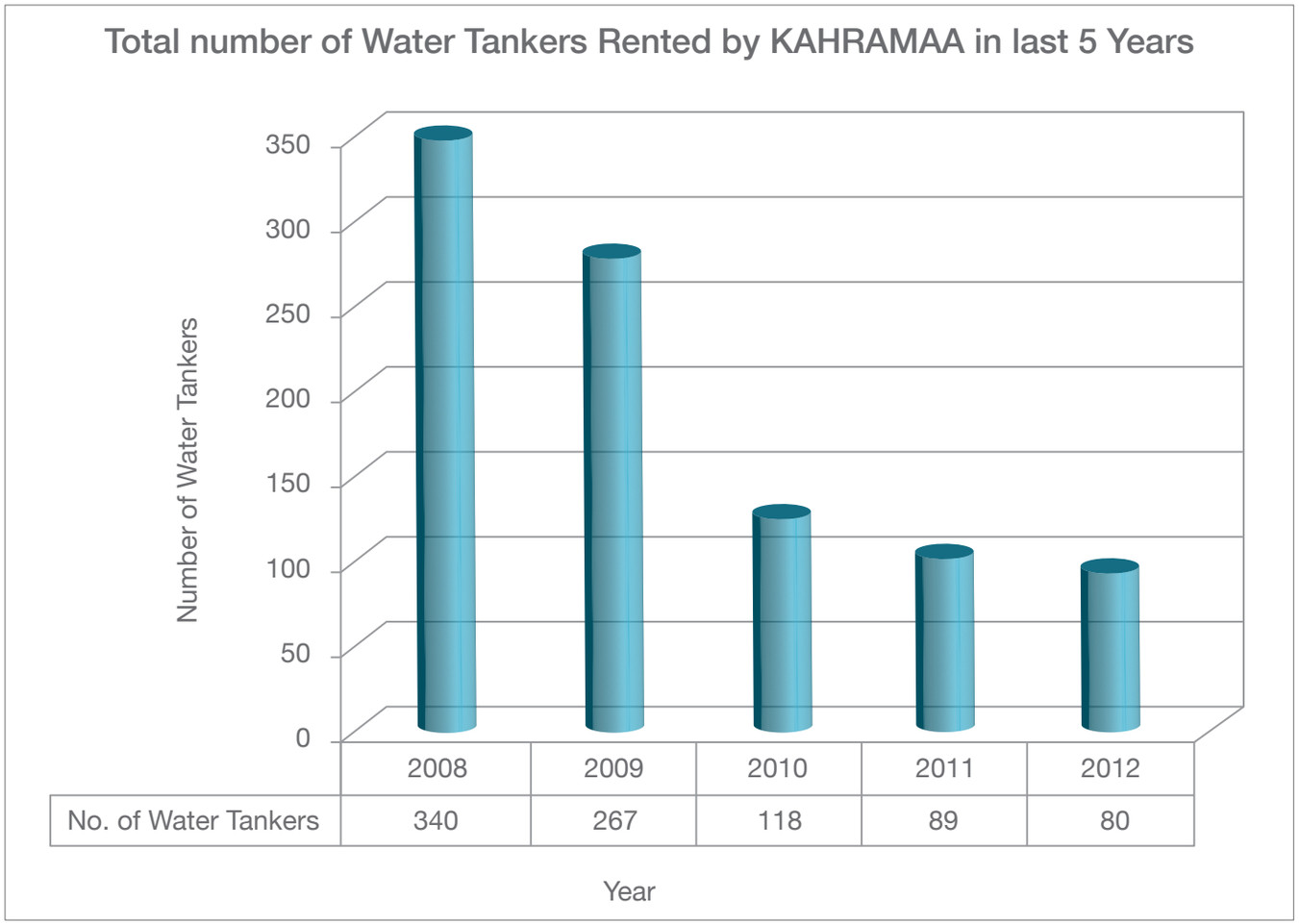

Total number of Tankers Served in 2012 By Type
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
80
62
11
48
28
74
0
1,840
Rented by KAHRAMAA
Municipality
Education
Defense
Police
Other
Rural Tankers
Private Transport

Table WT12 Water Tanker Services Last 5 Years



	2008	2009	2010	2011	2012
No. of Water Tankers	2,459	3,195	2,459	2,659	2,063

Total water tankers reduced by 16.1 % from 2008 to 2012.



KAHRAMAA rented tankers reduced by 76,5% from 2008 to 2012.

Table WT13 Percentage of Customers Served by Tankers

The following graph indicates that increasingly more areas are covered by KAHRAMAA's water network. This is observable by the fact that in 2008 there were 5,328 customers (3.1%) served by tankers, then by 2012 reduced to only 870 customers (0.36%). Average year-on-year reduction of 0.9%. If this trend continues it is expected therefore that by end of 2013 there will be close to zero customers served by tankers.

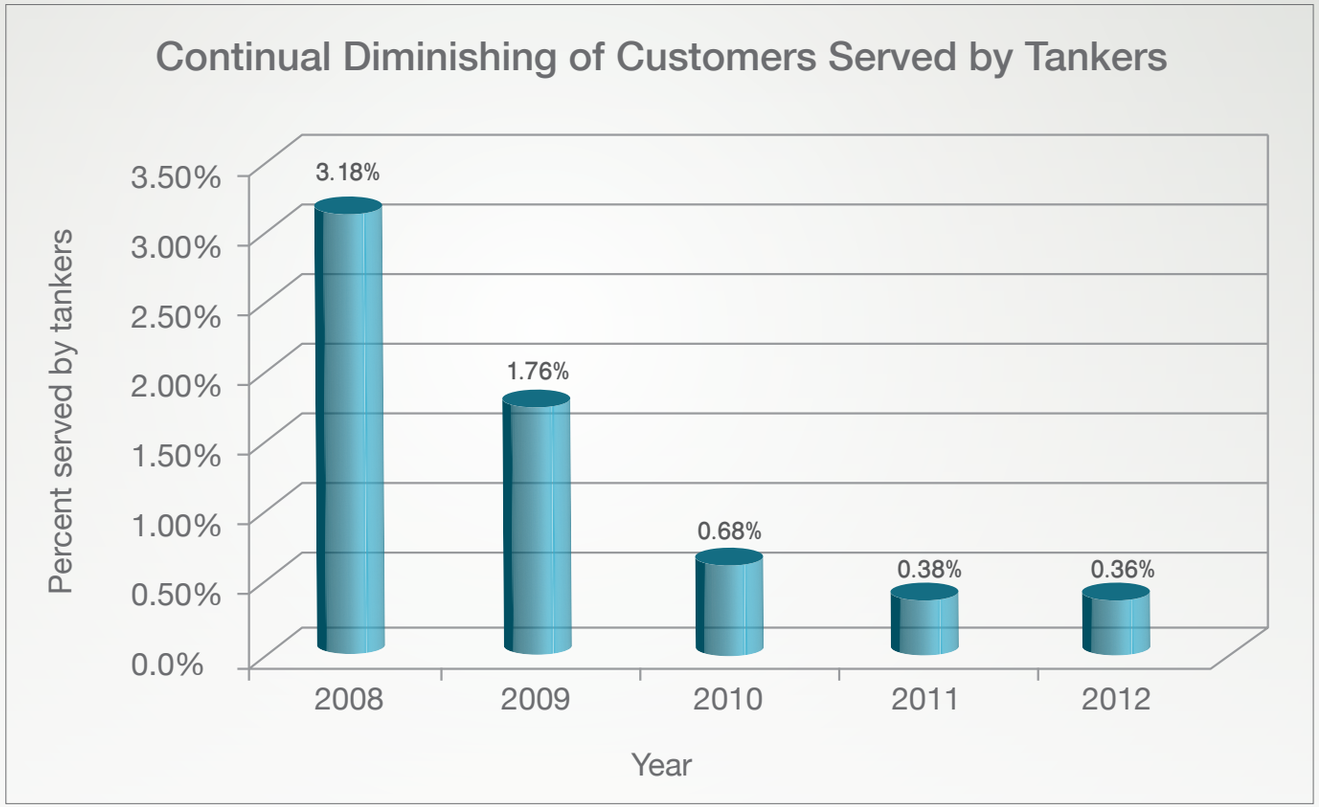
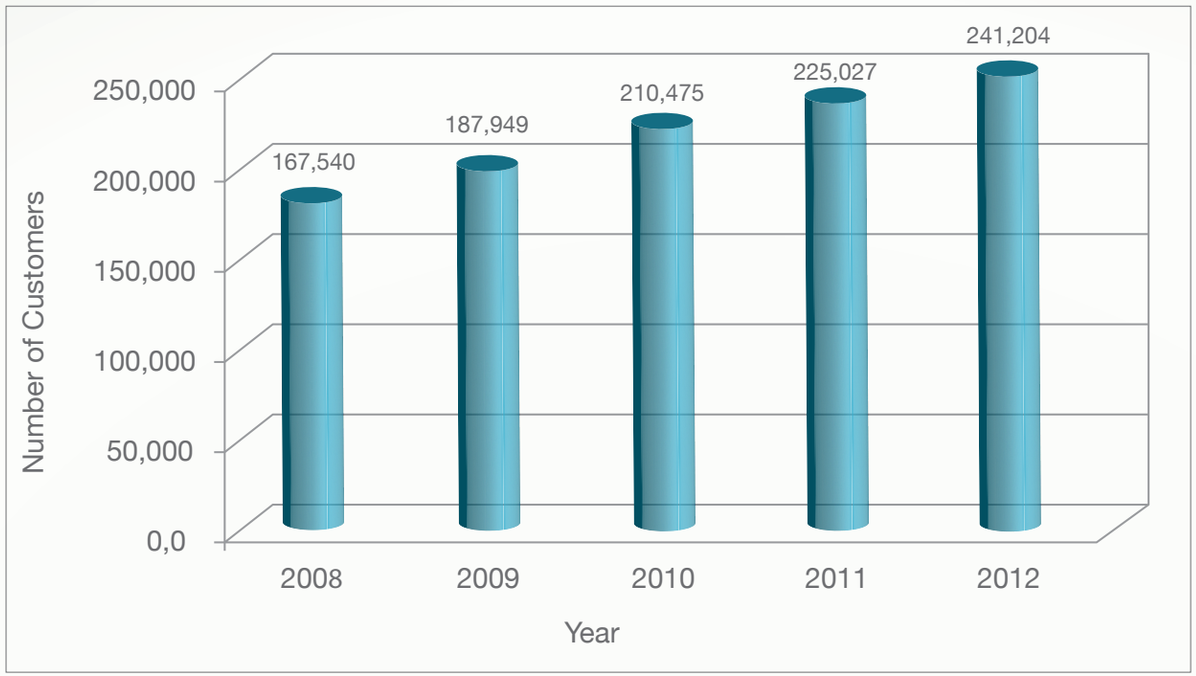


Table WT14 Number of Water Customers

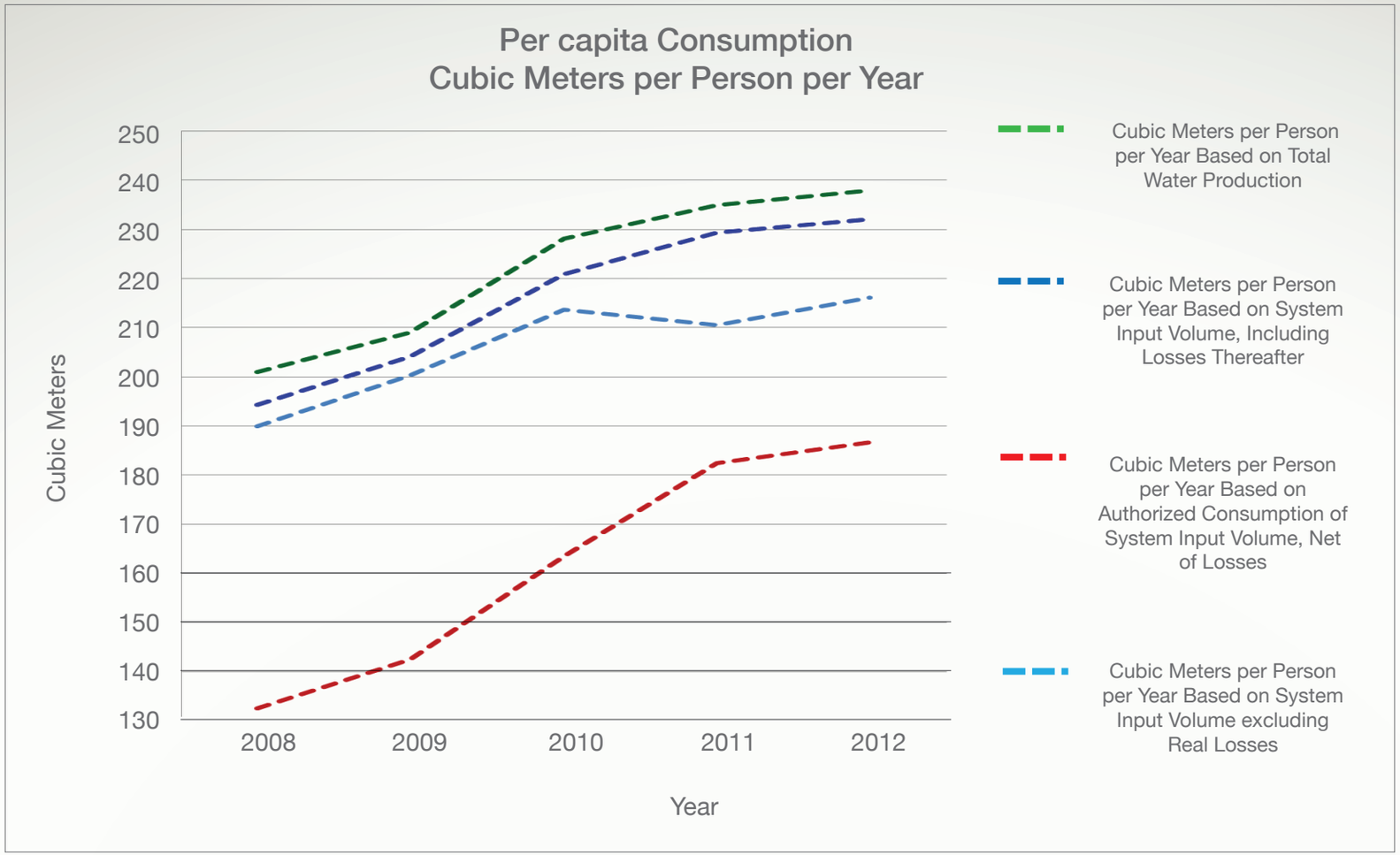
Year	No. of Customers	Annual Growth
2008	167,540	12.4%
2009	187,949	12.2%
2010	210,475	12.0%
2011	225,027	6.9%
2012	241,204	7.2%



The average growth on the number of water customers from 2008 to 2012 is 10.1%.
For 2012 issue the number of customers for water has been. Revised to consistently include tanker customers.

Table WT15 Average Water Per Capita Consumption, Last 5 Years

Year	Cubic Meters per Person per Year				Year-to-Year Variance, %		
	Based on Total Water Production	Based on System Input Volume, Including Losses Thereafter	Based on Authorized Consumption of System Input Volume, Net of Losses	Based on System Input Volume excluding Real Losses	Based on Total Water Production	Based on System Input Volume, Including Losses Thereafter	Based on Authorized Consumption of System Input Volume, Net of Losses
2008	201	194	132	190	-2%	-2%	-2%
2009	209	204	142	200	4%	5%	7%
2010	228	221	164	214	9%	8%	15%
2011	235	229	182	211	3%	4%	12%
2012	238	232	187	216	1%	1%	2%



Calculation is net of forwarding and distribution losses. For more details, see Glossary on how water per capita consumption is calculated.

Table WT16 Water Storage in Reservoirs in 2012

IWPP Reservoirs

SN	Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3
1	RAF A	38		38	172,727	-	172,727
2	RAF A1	45		45	204,545	-	204,545
3	RAF B	19.3		19.3	87,727	-	87,727
4	RAF B2	29		29	131,818	-	131,818
5	RL A	40		40	181,818	-	181,818
6	RL B	60		60	272,727	-	272,727
7	RL C	63		63	286,364	-	286,364
	TOTAL	**294.3**	**0**	**294.3**	**1,337,727**	**-**	**1,337,727**

KM Reservoirs

SN	Station	Total Installed Capacity, MIG	Non-Operating Capacity, MIG	Operating Capacity, MIG	Total Installed Capacity, M3	Non-Operating Capacity, M3	Operating Capacity, M3
1	Airport	33		33	150,000	-	150,000
2	Old Salwa	4		4	18,182	-	18,182
3	New Salwa	36		36	163,636	-	163,636
4	Salwa Industrial	51		51	231,818	-	231,818
5	Doha South	36		36	163,636	-	163,636
6	Mesaimeer	36		36	163,636	-	163,636
7	Wakrah	10		10	45,455	-	45,455
8	Mes Town	12		12	54,545	-	54,545
9	Mes Industrial	28		28	127,273	-	127,273
10	Garrafa	54	6	48	245,455	27,273	218,182
11	Westbay	54	6	48	245,455	27,273	218,182
12	Duhail	104.5		104.5	475,000	-	475,000
13	Umm Qarn	21		21	95,455	-	95,455
14	Bani Hajr	36		36	163,636	-	163,636
15	Muaither	42		42	190,909	-	190,909
16	New Alkhor 1	6		6	27,273	-	27,273
17	New Alkhor 2	18		18	81,818	-	81,818
18	Old Alkhor	4		4	18,182	-	18,182
19	Umm Salal	24		24	109,091	-	109,091
20	New Shahaniyah 1	12		12	54,545	-	54,545
21	New Shahaniyah 2	12		12	54,545	-	54,545
22	Guwairiyah	0.5		0.5	2,273	-	2,273
23	M. Shamal	10		10	45,455	-	45,455
24	Pearl of Qatar	4		4	18,182	-	18,182
25	Small & Medium	1.3		1.3	5,909	-	5,909
TOTAL		649.3	12	637.3	2,951,364	54,545	2,896,818

Table WT17 Water Storage in Ground Tanks in 2012

Location	Non operating (MIG)	Operating (MIG)	Non operating (M3)	Operating (M3)
North Camp	-	0.68	-	3,073
Abu Samra	-	0.50	-	2,273
Al Ghuwairiyah	-	0.50	-	2,273
Old Shahaniyah	-	1.50	-	6,818
Mazruah	1.50	0.00	6,818	-
New Jemiliyah	-	0.50	-	2,273
Dukhan	-	0.50	-	2,273
Total	**1.50**	**4.18**	**6,818**	**18,982**

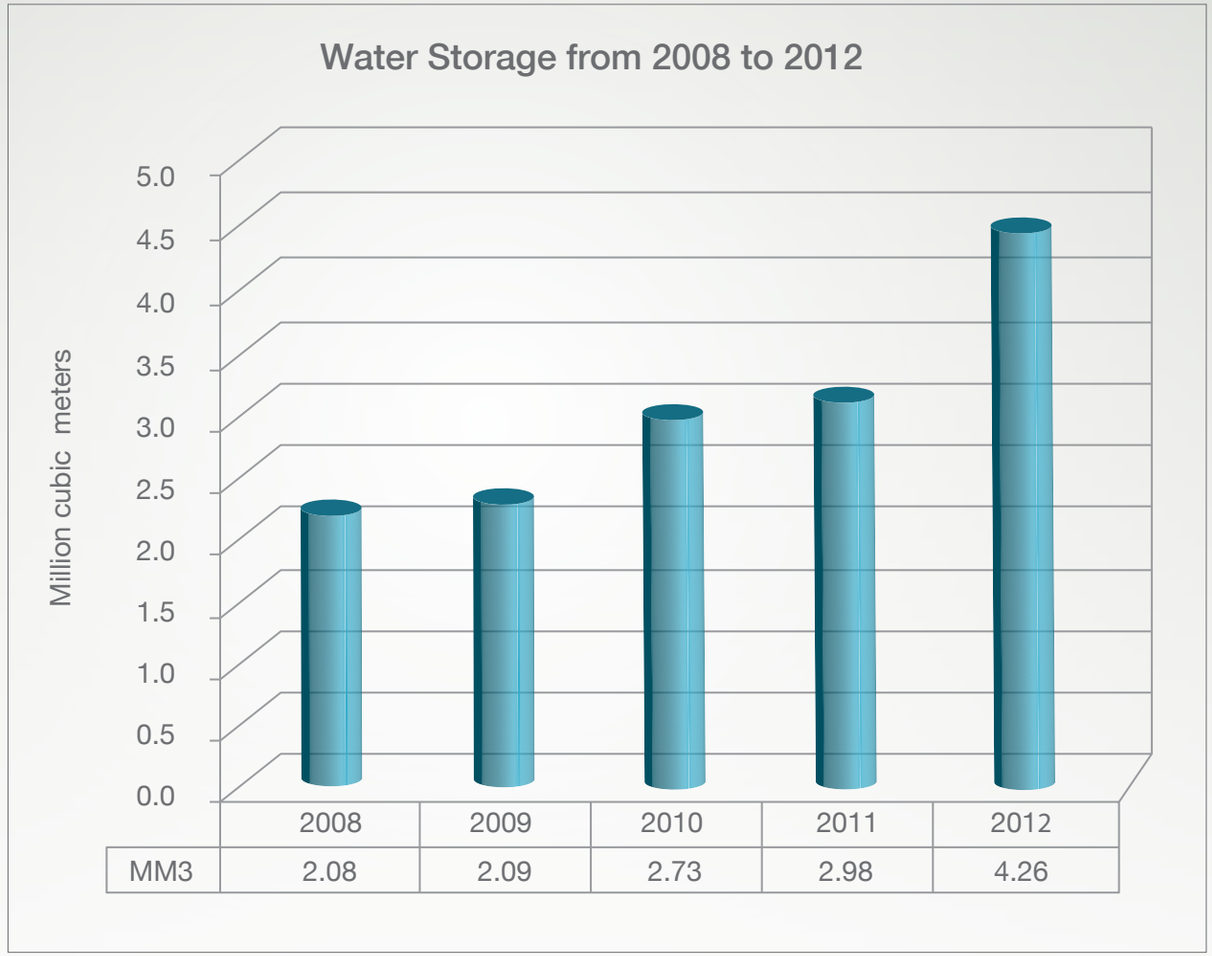
Table WT18 Water Storage in Elevated Tanks in 2012

Location	Capacity (Imperial Gallons)	Operating Capacity (Imperial Gallons)	Capacity (M3)	Operating Capacity (M3)
Madinat Shamal	55,000	55,000	250	250
Al Ghuwairiyah	55,000	55,000	250	250
Al Khor	55,000	55,000	250	250
Mazruah	200,000	0.000	909	0
Old Shahaniyah	69,000	69,000	314	314
Abu Samra	55,000	55,000	250	250
New Jemiliyah	80,000	80,000	364	364
North Camp	88,000	88,000	400	400
Total	**657,000**	**457,000.000**	**2,986**	**2,077**

Table WT19 Water Storage in Towers in 2012

Location	Capacity (Imperial Gallons)	Capacity (M3)
WT-1 (Airport)	495,000	2,250
WT-3 (Luqta)	275,000	1,250
WT-12 (Naeeja)	250,000	1,136
WT-14 (Museum)	495,000	2,250
WT-15 (Asiri)	495,000	2,250
WT-17 (Ghanim Jadeed)	275,000	1,250
WT-18 (Rumaillah)	495,000	2,250
WT-19 (Hitmi)	275,000	1,250
WT-20 (Garrafa)	275,000	1,250
WT-21 (Khalifa Town)	275,000	1,250
WT-22 (Messai'eed Town)	495,000	2,250
WT-23 (Muraykh)	495,000	2,250
WT-24 (Wakrah)	495,000	2,250
WT-25 (Salwa Industrial)	495,000	2,250
WT-26 (Bani Hajr)	495,000	2,250
Total	**6,080,000**	**27,636**

Table WT20 Total Water Storage in 2012



Excludes non-operating reservoirs under refurbishment or maintenance.

GLOSSARY OF TERMS & ABBREVIATIONS

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 analyzing. 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 powerline 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.

CPBD Corporate Planning & Business Development
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.

Customer Public and private entities registered with KAHRAMAA for the supply of electricity and water. The count is based on customer services department billing master data. The number of water customers includes customers connected to the water network and those served by tankers.

Distribution substation A distribution substation's purpose is to transfer power from the transmission system to the distribution system of some area. It is uneconomical to directly connect electricity consumers to the main transmission network (unless they use large amounts of energy); so the distribution station reduces voltage to a value suitable for connection to local loads.

Domestic Refers to consumption of electricity or water that are not industrial in nature. In KARAMAA the National Control Center tracks Qatar's entire electrical loads at two levels: industrial and domestic. Domestic loads cover residential, commercial and government demand.

DSM Demand Side Management

E Electricity

ENA Electricity Network Affairs
Directorate level business unit in KAHRAMAA that takes care of electricity network expansion and maintenance.

Electricity per capita consumption Calculation is based on the following methodology as recommended by International Energy Agency suggested formulas

- Per capita consumption of energy = gross production + imports – exports - transmission and distribution losses and divided by population.
- Gross production same as generation (and includes auxiliary)
- Import includes assistance from other producers
- Export is 0
- Typical electrical transmission losses is taken as 3.25% and distribution losses as 4.75% (excluding final connection), so a total losses is assumed as 8% of gross production

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, 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 center, 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)

IT Information Technology

IWPP Independent Water and Power Producers

KAH S/S KAHRAMAA substation

KAHRAMAA KAHRAMAA

KM KAHRAMAA

kV Kilovolt = 1,000 volts (capacity)

kW Kilowatt = 1,000 watts (capacity)

kWh Kilowatt-Hour = 1,000 watts in 1 hour (electrical energy)

Loading desk Refers to a desk at NCC (National Control Centre) equipped with the required and hardware, software and connectivity used in tracking loads on the electricity grid and managing the loads in real-time.

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 Millimeter, 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 feedwater.

MW Megawatt = 1 million watts (capacity)

MWh Megawatt Hour, 1 million watts in 1 hour (electrical energy)

n-1 policy or criteria The supply system must be maintained stable during and after the disturbance in the system resulting in the loss of one generating unit or one circuit of transmission lines, as well as no loss of load is allowed.

NGL Natural Gas Liquid(s)

NODCO Qatar's National Oil Distribution Company

NWRMDS National Water Resources Management and Development Strategy, a study sponsored by PWRC

PASS-OUT Pass-Out: Refers to the steam passed out from combined-cycle gas turbines (CCGT). The pass-out steam from the steam turbine can be used to meet on-site heat requirements increasing overall efficiencies. This lowers electricity production, but improves overall economics.

Power Factor The cos □, where □ 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 center 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 byproduct 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

RAF Ras Abu Fontas, an area south of Doha

RL Ras Laffan, an area north of Doha

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.

W Water

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, voltage and current transformers).

Water Per Capita Consumption Per capita consumption is based on the following methodology:

- Per capita consumption of water = forwarding + import - export - transmission and distribution losses and divided by population (*see below for forwarding)
- Forwarding as per KAHRAMAA meter (i.e.. generation less auxiliary) plus well head and RO production (forwarding)
- Import is 0
- Export is 0

Per capita consumption = {System Input Volume - Transmission Losses} / Population

Where,
System Input Volume (SIV) = {KAHRAMAA Production} + {Import} – {Export}
= {R.O. Production + Wells Production} + {Forwarding Flow from IWPP} – {0}
And
Transmission Losses = {SIV} – {Distribution Figure}, where Distribution Figure is the sum of all Flows coming out of the Reservoir & Pumping Stations

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

SI multiples

Multiple	Name	Symbol
10^0	watt	W
10^1	decawatt	daW
10^2	hectowatt	hW
10^3	kilowatt	kW
10^6	megawatt	MW
10^9	gigawatt	GW
10^{12}	terawatt	TW

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