

The statistics appearing in this chapter have been provided as register records by the Ministry of Energy on two topics of "water" and "electricity".

Water

This section includes information on "underground waters", "reservoir dams", and "length of networks and number of water and sewage extensions". The related statistics have been added to the Statistical Yearbook of Iran since the year 1346.

Statistics on underground waters and reservoir dams have been provided by the Water Resources Management Company and statistics on the length of networks and the number of water and sewage extensions has been obtained from the Water and Sewage Engineering Company.

It is noteworthy that the Central and Internal basin, Hamun basin, and Sarakhs basin were renamed by the Water Resources Management Organization as Central Plateau, Eastern Border and Qareh Qum, respectively, in the year .

Electricity

Data related to the electric power industry was first collected in the year 1343 by the then Ministry of Water and Power (renamed the Ministry of Energy in the year 1353). Since the year 1346, the Ministry has regularly provided the annual statistics on the power industry comprising power generation, transmission, distribution, and consumption. The statistics, a part of which appears in some tables of this yearbook, is presented in various annual.

Moreover, through two successive censuses of population and housing in the years 1365 and 1375, the Statistical Centre of Iran collected data on residential units and households benefiting from piped water and electricity, which are reflected in Chapter 10, "Construction and Housing," of the yearbook.

Definitions and concepts

Water basin: see Chapter 1, Land and climate, Definitions and concepts.

Aquatic year: see Chapter 1, Land and climate, Definitions and concepts.

Water produced: refers to the amount of water gained from various (surface and underground) water resources such as wells, springs, subterranean canals, dams and river basins.

Dam: is a structure built against the flow of water to reserve water or change the direction of flow or manage it for satisfying different needs such as drinking, industry, irrigation (agriculture), electricity generation and control of flood.

Reservoir dam: is a dam made for reserving, managing or controlling the flow of water to reserve it for procuring water for irrigation, drinking, industry, electricity generation and control of flood

Large reservoir dam: refers to all dams with a height of 15 metres or more as well as 10 to 15 metres high dams having a reservoir with a volume of 1 million cubic metres or more and/or a capacity of flood discharge of 2000 or more cubic metres per second.

Inflow: is the annual volume of water entered the reservoir of a dam through the river.

Outflow: is the total annual volume of water discharged from different outlets of a dam (weir, silt ejector channels, take-out gates, drainage channels) and evaporation.

Water extension: refers to the part of branched-off water pipes, containing pipe, related accessories, with a profile appropriate to the water meter and the extension capacity of public water, which connects a private water distribution line or public water distribution network from installation place of the extension valve to the delivery point (valve following the water meter).

Public water distribution network: is a collection of interconnected pipelines with needed pressure for distributing water for household, office, and industrial consumption in a region or in the city, all of which belong to the Water and Sewage Company.

Sewage extension: refers to the part of the minor sewage pipelines, including pipes and related accessories, with a profile appropriate to siphon or contractual capacity, which carries joint sewages away from the siphon to the private line or to the public network for collecting sewages.

Public network for collection and transmission of sewage: refers to all installations and equipment, such as main collectors, used for collection and transmission of sewage to water treatment house and pump houses of urban sewage and public side networks, all belonging to the Water and Sewage Company. The network is not responsible for the collection, transmission, and disposal of rainfall water flowing on passages, flood channels, and channels inside and outside cities located in the customers' estates.

Nominal capacity (registered nominal power): refers to the maximum expected output of an electricity generator in designing condition defined by the manufacturer. Nominal power is usually installed in KVA or KW for smaller generators on the generator.

Actual capacity or actual power (registered power): refers to the maximum amount of electricity that could be generated by a generator while regarding the environmental conditions (altitude, temperature, and relative moisture).

Maximum coincidental power generated: refers to the sum of electric power generated at the peak of network load during a certain period. The sum of the maximum coincidental power generated might be equal to or less than the total capacity of the plants.

Gross generation: refers to the amount of electricity generated by a generator or a plant during a certain period which is measured on output series of the main or supplementary generators and stated in kilowatt-hour (kWh) or megawatt-hour (MWh).

Net generation: refers to the electricity measured at the point of transmission to the power grid. During a certain period, the net generation may be calculated by subtracting the gross internal consumption from the gross generation in the same period.

Other institutions: are the institutions which generate electricity for their own consumption and also sell a part of their production to other institutions but are not affiliated to the Ministry of Energy; some examples are, Esfahan Steelworks, Mobarakheh Steel Industries, Petrochemical Industries, Tabriz Tractor Industries, and Sarcheshmeh Copper Industries.

National grid: refers to most of the production sites and regions of energy consumption around the country, which are connected together with a grid of transmission lines and high voltage stations. The grid lets electricity exchange between the covered regions and makes the export of electricity abroad possible

Isolated grid (generation and power consumption): refers to regional, provincial and island networks not connected to adjacent grid or national grid.

Load-demand: refers to the power consumed during a certain period in a certain part of the network.

Maximum coincidental load: in a full interconnected electricity system, the maximum coincidental load for a day, a week, a month, or a year refers to the sum of load at the peak of consumption in regions in megawatt. Where the interconnected system does not cover the total country, the maximum coincidental load may be calculated by adding up the maximum load of the interconnected network and load of separate regions in megawatt simultaneously. With regard to the difference between peak hours of consumption in different regions connected to the interconnected network, the maximum coincidental load is less than the sum of the maximum loads of the region. Maximum non-coincidental load: the sum of the peak of consumption in different regions of the country during a certain period, which are not necessarily simultaneous.

Power company: refers to the corporation, which is by law engaged in the generation, transmission and distribution of electricity or in a part of such activities and provide the customers with electricity. The definition covers water and power organizations as well.

Power plant: refers to the installation place of generators and related equipment.

Hydroelectric power plant: refers to a power plant in which the potential energy of water accumulated at dams or flowing energy of rivers water is used to drive the hydroelectric turbine for electricity generation.

Thermal power plant: refers to a power plant in which chemical energy inherent in solid, liquid, gaseous fuels is transformed into electricity. This

definition covers nuclear, steam, gas, combined-cycle and diesel power plants.

Steam power plant: refers to a kind of power plant in which thermal energy produced from liquid, solid and gaseous fuels is used for steam production and then driving the steam turbine to generate electricity.

Gas power plant: refers to a type of power plant in which hot gas produced from the thermal energy in gaseous and liquid fuels drives a gas turbine to generate electricity.

Combined-cycle power plant: refers to a kind of power plant in which, in addition to electric energy in gas turbines, the heat in gases off the gas turbine is used for the production of steam using a recycling steam kettle. The steam produced is transformed into electric energy in a steam turbo-generator set.

Diesel power plant: refers to a kind of power plant in which gas or liquid is used in cylinders to transform mechanical energy produced by coupled generator into electric energy.

Internal consumption: refers to the sum of electricity consumed internally by units and for non-technical cases, as well as consumption of the lights, etc. in a power plant in a certain period in kilowatt-hour (kWh).

Losses: refers to the energy lost in transmission and distribution lines in a network or a certain system. The energy lost by transformers is considered as losses of transmission and distribution.

Sale or consumption of electricity: refers to the amount of electricity sold to the consumers for various consumptions.

Energy produced by the fuel (thermal value): refers to the amount of heat (kilocalorie or B.T.U.) produced through the burning of the mass unit of a certain fuel.

Thermal output: considering that the thermal energy produced by 1 kWh is equal to 860 kcal, the output of thermal power plants (thermal output) is calculated through the following formula:

Output (%) = $(860/\text{thermal energy consumed for 1 kWh of power generated}) \times 100$

Line of power: the cables installed on poles to transmit the electric power from the production site (power plant) or substation to consumption places in different voltages.

Power transmission line: refers to a line composed of conductors, insulators and other subsidiary equipment used for the transmission of high amount of electricity, with high voltages in long distances between source points (power plants and receiving points).

Sub-transmission line: refers to a collection of transmission lines with voltages from 63 to 132 kV.

Electricity customers: refer to natural or legal persons whose specifications are registered by customers division, according to the regulation of the power company after submitting the required documents and payment of the related costs, and are offered a customer number.

Household uses: electricity used by households to operate common electric appliances and for lights in residential units.

Public uses: refers to the electricity used for public services.

Agricultural uses: refers to the electricity used for pumping surface and underground water or repumping water for the production of crops or carrying out agricultural activities. Agricultural activities are defined in ISIC Rev. 3.

Industrial uses: refers to the electricity used for doing jobs in establishments engaged in manufacturing and mining activities.

Distribution grid: refers to a collection consisting of ground and aerial medium voltage lines (20, 11 and 33 kv) and low voltage (220 and 380 v) and ground and aerial substations used for electricity distribution in a specific area.

Transmission and sub-transmission network: it consists of a series of substations, lines, cables, and other electrical equipment connected from power plants to final consumers for energy transmission.

A line circuit or electrical cable: it consists of a number of electrically inseparable conductors that form a three-phase cable or another system, and is able to transmit electrical energy from one place to another place.

Electrical substation or power station: refers to a site with a collection of installations and electrical equipment including transformers, switches, measurement instruments, inflow and outflow lines, a reactor, a capacitor and different grounds used for transmission and distribution of electricity. An electrical substation is part of an electrical network centralized in a given site used

for selective connection or disconnection of electrical circuits in a network. Also, it is possible to transmit electricity between networks used at different voltage levels.

Selected information

In the aquatic year 1396-1397, the amount of annual discharge of the underground water resources was about 58688 million cu m, which had a 3.1 percent decrease in comparison to the aquatic year 1395-1396. It should be noted that out of 6 main basins, the central plateau with 50.6% had the maximum annual discharge.

In the year 1397, the inflow of the large reservoir dams amounted to 46382 million cu m had a 37.2% increase in comparison to the last year. In this year, 29347 million cu m of large reservoir dams has been consumed, 48.5 percent of which belong to the agricultural consumptions.

In the same year, over 7675 million cu m of water is produced in the water and sewage companies of the country (urban and rural) out of which about 5579 million Cu m was sold. Sale of water decreased by 0.5 percent compared to the preceding year. This is while that the production of water grew by 0.9 percent compared to the previous year.

In the year 1397, there were over 22 million and 423 thousand urban and rural water extensions which had a 2.7 percent increase in comparison to the preceding year. Out of this number, over 16

million and 684 thousand extensions were in the urban areas which had a 2.5% increase compared to the previous year.

In the year 1397, the gross electricity generation of institutions affiliated to the Ministry of Energy was about 129921 million kilowatt-hours, of which about 46.2 percent has been produced in the steam power plants. Furthermore, the gross electricity generation amount had a 0.4 percent increase compared to the preceding year.

In this year, 259723 million kilowatt-hours of domestic sold electricity was consumed by 35 million and 688 thousand customers. In this respect, the amount of electricity sold and the number of electricity customers increased by about 1.8 and 2.4 percent respectively compared to the preceding year.

Among all electricity customers in the year 1397, the percentage of customers in the house, public, agricultural, and manufacturing sectors was 80.6, 4.7, 1.2, and 0.7 percent, respectively. Also in this year, the percentage of the sold electricity which was consumed in the house, manufacturing, agricultural, public sectors and for the streets lighting was 32.8, 34.1, 14.6, 9.3, and 1.9 percent respectively.

At the end of the year 1397, a number of 57280 villages (over 4.5 million rural households) were electrified which increased by 0.4% in comparison to the previous year.

9.1. UNDERGROUND WATER RESOURCES AND THEIR ANNUAL DISCHARGE⁽¹⁾ BY MAIN BASINS (mln cu m)

Aquatic year and main basins	Total discharge	Deep well		Semi-deep well		Subterranean canals (Qanat)		Spring	
		Number	Annual discharge	Number	Annual discharge	Number	Annual discharge	Number	Annual discharge
1379-80	69549	118986	30757	314405	13263	33036	7962	49785	17566
1384-85	79837	155800	35843	432943	12778	36307	7527	112787	23690
1389-90	70482	191261	34367	497579	12479	39531	6259	159454	17378
1392-93	61407	199087	33729	582426	12241	41149	4739	174148	10691
1393-94	61094	196010	33125	593164	12204	41154	4718	173283	11041
1394-95	61262	194822	33139	599178	12263	41169	4661	174228	11192
1395-96	60592	210689	32998	594968	12485	41011	4515	173452	10595
1396-97	58688	209935	32403	604455	12104	41261	4485	175244	9696
Caspian Sea	6794	32537	2608	257968	1803	2746	211	77641	2172
Persian Gulf and Oman Sea	16343	43868	6327	105345	4019	4834	477	56536	5520
Lake Orumiyeh	2326	7877	898	99603	1165	1807	88	10517	175
Central Plateau	29725	117729	20360	128054	4648	25769	3136	26456	1581
Eastern Border	1314	1916	624	8661	332	3208	301	1630	57
Qareh Qum.....	2186	6008	1587	4824	138	2897	271	2464	191

1. Annual discharge for wells, subterranean canals and springs are updated annually based on selected sources.

Source: Ministry of Energy.

9.2. UNDERGROUND WATER RESOURCES AND THEIR ANNUAL DISCHARGE⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS, AQUATIC YEAR 1396-1397 (mln cu m)

Ostan	Total discharge	Deep well		Semi-deep well		Subterranean		Spring	
		Number	Annual discharge	Number	Annual discharge	Number	Annual discharge	Number	Annual discharge
Total	58688	209935	32403	604455	12104	41261	4485	175244	9696
East Azarbayejan....	1368	5493	545	53914	583	1968	132	3129	108
West Azarbayejan ..	1791	5093	804	58183	749	543	39	851	199
Ardebil	404	1813	170	5011	90	221	19	3354	125
Esfahan	4035	15775	1440	33334	752	4203	650	8686	1193
Alborz	827	5290	665	10582	46	157	9	1738	107
Ilam	422	1332	282	805	30	4	1	744	109
Bushehr	514	1352	133	11800	328	49	13	180	40
Tehran	2722	31496	2255	11861	60	536	248	2503	159
Chaharmahal&Bakhtiyari	1558	2237	326	1767	142	1011	66	4760	1024
South Khorasan	1210	2425	841	849	37	6251	266	2196	66
Khorasan-e-Razavi ..	5180	13796	4009	9731	245	6770	576	6337	350
North Khorasan	921	1885	354	4841	76	724	97	3450	394
Khuzestan	1717	4416	808	6452	359	4	0	1289	550
Zanjan	1151	3869	666	13550	297	725	32	5834	156
Semnan.....	936	2958	701	2003	35	738	81	1873	119
Sistan&Baluchestan	1982	1446	375	17530	1189	1282	377	897	41
Fars	8254	31882	4344	52357	2477	1756	402	2220	1031
Qazvin	1997	4251	1664	4240	148	312	59	13841	126
Qom	633	1323	499	5068	38	753	81	1397	15
Kordestan	1055	2748	356	15367	178	519	24	38592	497
Kerman	6397	16039	4494	18517	1337	2389	456	1593	110
Kermanshah	1319	3567	379	11585	394	402	28	11187	518
Kohgiluyeh&Boyerahmad	912	702	96	1653	118	49	3	5014	695
Golestan	722	8871	425	26942	191	344	17	3766	89
Gilan.....	860	1156	189	53952	268	1	0	15782	403
Lorestan.....	965	3318	483	3862	122	1176	31	5692	329
Mazandaran.....	1694	12004	534	134963	604	34	0	21768	556
Markazi	2924	7818	1908	7565	343	4254	497	3159	176
Hormozgan.....	1534	4328	737	17573	617	169	33	639	147
Hamedan	1661	8303	1154	7822	175	1287	92	2386	240
Yazd	1023	2949	767	776	76	2630	156	387	24

1. Annual discharge for wells, subterranean canals and springs are updated annually based on selected sources.

Source: Ministry of Energy.

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS

(mln cu m)

Year and reservoir dams	Inflow ⁽²⁾	Outflow ⁽²⁾			Water consumption ⁽³⁾				
		Total	From turbines ducts for electricity generation	Other ⁽⁴⁾	Total	Agriculture	Drinking	Manu-facturing	Other ⁽⁵⁾
1380	30400	27311	18386	8925	11467	8819	1209	382	1058
1385	50873	54716	44913	9803	17157	13233	2276	589	1059
1390	33740	32822	17122	15700	25675	16175	2226	855	6419
1393	28223	30409	41233	-	26313	17880	2859	761	4813
1394	36155	30567	43461	-	25585	16703	3043	739	5099
1395	40695	39816	49268	-	30301	19694	3182	700	6724
1396	33796	37251 ⁽⁶⁾	46994	-	28608 ⁽⁶⁾	19655	3202	698	5106
1397	46382	37888	48051	17558	29347	14236	3086	676	11349
East Azarbayejan ..	4475	4477	3418	4477	1991	1662	43	11	275
Aras ^(2,7)	3555	3583	3418	165	1701	1492	0	0	209
Sattarkhanahar	29	27	0	27	25	10	8	4	2
Sahand ⁽⁸⁾	108	102	0	102	50	20	4	0	27
Zonuz	5	5	0	5	5	2	0	0	3
Aydoghamush	81	74	0	74	65	51	0	0	14
Arasbaran	11	12	0	12	10	10	0	0	0
Khodaafarin ⁽²⁾	3947	3950	0	3950	0	0	0	0	0
Alavian	77	73	0	73	71	44	14	7	7
Nahand	19	21	0	21	19	0	17	0	2
Tajyar-e-Sarab	4	3	0	3	2	2	0	0	0
Kord Kandi	6	5	0	5	4	4	0	0	0
Ghale chai	49	40	0	40	39	27	0	0	11
West Azarbayejan.	2511	2191	157	2034	1924	714	255	4	951
Barun	99	56	0	56	49	43	6	0	0
Shahid Ghanbari	26	26	0	26	22	22	0	0	0
Aras2	6	5	0	5	5	4	0	0	0

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

Year and reservoir dams	Inflow ⁽²⁾	Outflow ⁽²⁾			Water consumption ⁽³⁾				
		Total	From turbine s ducts for electric ity generat ion	Other ⁽⁴⁾	Total	Agricultu re	Drinking	Manu- facturing	Other ⁽⁵⁾
Aghchai	126	106	0	106	70	58	0	0	12
Bukan	1438	1277	0	1277	1226	355	168	3	700
Shahrchay	176	179	0	179	173	55	53	0	65
Mahabad.....	243	218	157	61	206	94	22	1	89
Hasanlu	56	37	0	37	27	18	0	0	8
Deriq Salmas	21	19	0	19	13	9	0	0	4
Zola	112	99	0	99	85	41	0	0	44
Qiqaj.....	13	13	0	13	12	11	0	0	0
Saruq	46	58	0	58	37	4	6	0	27
Silveh	150	100	0	100	0	0	0	0	0
Ardebil	115	139	0	139	124	43	38	0	44
Qurichay.....	1	6	0	6	5	5	0	0	0
Gilarlu	0	1	0	1	0	0	0	0	0
Moghadasardebili.....	8	7	0	7	6	2	0	0	4
Saqizchi.....	9	9	0	9	4	3	0	0	0
Yamchi	48	59	0	59	57	18	38	0	1
Sabalan	32	41	0	41	36	14	0	0	22
Giwi.....	17	17	0	17	17	0	0	0	17
Esfahan.....	905	877	417	460	662	260	338	37	26
Hana.....	5	3	0	3	2	2	0	0	0
Qareh Aqach.....	3	2	0	2	1	1	0	0	0
Zayandehrud.....	713	678	417	261	654	254	338	37	24
Golpayegan ⁽⁹⁾	175	188	0	188	1	0	0	0	1
Khamiran.....	6	3	0	3	2	2	0	0	0
Baghkal-e-Khansar	3	3	0	3	2	1	0	0	1
Ilam	817	769	0	769	246	36	22	0	188
Ilam.....	199	202	0	202	85	13	22	0	51
Doborj.....	546	491	0	491	131	23	0	0	108
Kangir.....	73	75	0	75	29	0	0	0	29
Bushehr.....	232	125	0	125	107	81	0	0	25
Reis Ali delvari.....	232	125	0	125	107	81	0	0	25
Tehran.....	1287	1237	923	410	1259	345	779	6	129
Lar	293	295	129	166	289	66	129	0	95
Taleghan	349	326	244	81	317	180	137	0	0
Karaj	329	326	322	4	321	42	259	0	21
Latiyan ⁽²⁾	242	231	227	4	190	0	176	1	13
Mamlo ⁽²⁾	110	155	0	155	141	57	79	5	0
Chaharmahal&Bakhtiyari	27	13	0	13	3	3	0	0	0
Choghakhor	24	13	0	13	3	3	0	0	0
Naghan.....	2	0	0	0	0	0	0	0	0
Surak.....	1	0	0	0	0	0	0	0	0

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

Year and reservoir Dams	Inflow ⁽²⁾	Outflow ⁽²⁾			Water consumption ⁽³⁾				
		Total	From turbines ducts for electricity generation	Other ⁽⁴⁾	Total	Agriculture	Drinking	Manu-facturing	Other ⁽⁵⁾
South Khorasan.....	23	18	0	18	12	8	2	0	3
Kerit	4	4	0	4	1	1	0	0	0
Darreh Bid.....	1	0	0	0	0	0	0	0	0
Parsa.....	2	1	0	1	1	1	0	0	0
Farrokhi.....	1	1	0	1	1	1	0	0	0
Nahrain.....	9	7	0	7	6	3	2	0	2
Haji Abad.....	4	3	0	3	3	2	0	0	0
Asadyieh.....	3	2	0	2	1	0	0	0	0
Khorasan -e-Razavi.....	231	221	0	221	117	44	67	0	6
Tabarak Abad.....	7	11	0	11	9	3	2	0	4
Shahid Yaghobi.....	2	1	0	1	1	1	0	0	0
Sangerd.....	5	2	0	2	2	2	0	0	0
Komayestan.....	6	4	0	4	1	1	0	0	0
Yam.....	9	8	0	8	2	2	0	0	0
Dusti ⁽⁷⁾	141	135	0	135	48	0	48	0	0
Toroq.....	7	8	0	8	7	1	7	0	0
Kardeh.....	5	8	0	8	8	5	3	0	0
Dehqan-e-Taybad	2	1	0	1	1	1	0	0	0
Fariman	6	5	0	5	5	5	0	0	0
Zavin Kalat.....	1	1	0	1	1	1	0	0	0
Chali Darreh.....	1	1	0	1	1	1	0	0	0
Dolatabad	2	2	0	2	1	1	0	0	0
Daroungar.....	5	4	0	4	4	4	0	0	0
Sad-e- Khaf	8	3	0	3	3	3	0	0	0
Ardak Chenaran	12	15	0	15	15	7	8	0	0
Qareh Tikan	6	5	0	5	5	5	0	0	0
Chahchahe.....	5	4	0	4	3	3	0	0	0
Bar.....	4	4	0	4	2	0	0	0	2
North Khorasan.....	72	57	0	57	45	30	14	0	1
Bidvaz	5	5	0	5	5	3	1	0	1
Barzu	15	9	0	9	8	7	1	0	0
Shirin Darreh.....	51	42	0	42	32	19	13	0	0
Chary	1	0	0	0	0	0	0	0	0
Gelul.....	0	0	0	0	0	0	0	0	0
Sumbar	1	0	0	0	0	0	0	0	0
Khuzestan	26595	19687	39394	4314	18854	9155	730	563	8407
Karkheh ^(2,10)	7082	5073	4380	693	4857	1952	240	24	2641
Dez ⁽¹⁰⁾	7674	6938	4626	2311	6745	2805	12	48	3880
Shahid Abbaspour ^(2, 11) ...	6984	6007	5951	56	0	0	0	0	0
Karun 3 ^(2, 11)	5913	4922	4866	56	0	0	0	0	0
Marun.....	1366	693	316	377	673	264	24	24	361
Masjed-Soleyman ⁽²⁾	6582	6587	6574	12	0	0	0	0	0

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

Year and reservoir Dams	Inflow ⁽²⁾	Outflow ⁽³⁾			Water consumption ⁽⁴⁾				
		Total	From turbines ducts for electricity generation	Other ⁽⁵⁾	Total	Agriculture	Drinking	Manu-facturing	Other ⁽⁵⁾
Gotvand-e-Olia ^(2,10,11)	8169	6628	6312	316	6480	4080	454	467	1480
Jareh	175	112	0	112	99	54	0	0	46
Seymareh ^(2,6)	3259	3271	2944	327	0	0	0	0	0
Karun 4 ^(2,11,12)	3410	3477	3424	53	0	0	0	0	0
Zanjan	82	49	0	49	23	4	14	0	5
Tahem	16	19	0	19	14	0	14	0	0
Golabar	6	7	0	7	2	2	0	0	0
Kineh Vers	16	16	0	16	6	1	0	0	5
Talevar	44	7	0	7	1	1	0	0	0
Semnan	14	11	0	11	9	5	3	0	1
Kalpush	3	0	0	0	0	0	0	0	0
Damghan	11	10	0	10	9	5	3	0	1
Sistan&Baluchestan	388	392	0	394	112	4	102	0	6
Chahehnimeh 1, 2,3 ⁽²⁾	176	168	0	168	65	0	65	0	0
Mashkid-e-Olia	3	5	0	5	5	0	5	0	0
Chahehnimeh 4 ⁽²⁾	0	162	0	162	2	2	0	0	0
Pishin	129	15	0	15	7	0	7	0	0
Shai Kelk	14	5	0	5	0	0	0	0	0
Zirdan.....	44	34	0	34	30	0	24	0	6
Kheirabad.....	6	4	0	4	3	2	1	0	0
Fars	452	446	8	493	281	75	82	14	109
Salman Farsi	136	198	0	198	117	72	27	0	19
Tangab	19	37	0	37	12	1	0	0	11
Rudbal Darab.....	47	73	0	73	67	0	0	0	67
Dorudzan ⁽²⁾	222	115	0	115	71	0	55	14	2
Izadkhast	1	0	0	0	0	0	0	0	0
Mollasadra ⁽²⁾	76	60	8	52	1	0	0	0	1
Sivand	3	3	0	3	3	3	0	0	0
Cheshmeh Ashegh	4	14	0	14	10	0	0	0	10
Qom	192	161	0	161	145	22	120	0	3
Panzdah Khordad.....	14	22	0	22	15	3	10	0	2
Kucheri	178	139	0	139	130	19	110	0	1
Kordestan	1344	1199	191	1007	533	65	55	6	406
Sural.....	9	9	0	9	4	0	0	0	4
Sang siyah.....	10	8	0	8	5	1	0	0	5
Qeshleq	138	113	0	113	98	10	51	1	36
Zarivar.....	34	27	0	27	13	0	0	0	13
Baneh	7	6	0	6	6	0	5	0	1
Azad.....	365	253	191	62	246	52	0	5	188

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

Year and reservoir Dams	Inflow ⁽²⁾	Outflow ⁽³⁾			Water consumption ⁽⁴⁾				
		Total	From turbines ducts for electricity generation	Other ⁽⁵⁾	Total	Agriculture	Drinking	Manu- facturing	Other ⁽⁵⁾
Garan.....	185	181	0	181	37	0	0	0	37
Zivieh	26	26	0	26	4	2	0	0	2
Siazakh.....	352	355	0	355	70	0	0	0	70
Cheragh Veis.....	217	220	0	220	50	0	0	0	50
Kerman	144	208	68	140	175	108	20	0	47
Jiroft.....	64	103	68	35	85	59	0	0	25
Tanguiyeh	4	21	0	21	18	3	15	0	0
Nesa.....	69	71	0	71	64	44	0	0	20
Baft	7	13	0	13	9	2	5	0	2
Kermanshah	2704	2700	2018	726	408	105	34	0	269
Gavshan ⁽²⁾	249	265	0	265	244	56	32	0	156
Soleymanshah ⁽²⁾	67	67	0	67	17	15	2	0	0
Gilangharb	10	2	0	2	1	1	0	0	0
Shiyan	5	2	0	2	1	0	0	0	1
Azadi.....	103	93	0	93	78	1	0	0	77
Zagros	26	25	0	25	16	14	0	0	3
Tang-e-Hammam	55	54	0	54	41	9	0	0	32
Darian	2222	2225	2018	207	0	0	0	0	0
Sarab- e- Gilangharb.....	12	11	0	11	10	9	0	0	0
Kohgiluyeh&Boyerahmad	473	228	0	228	204	22	117	3	62
Kosar.....	464	227	0	227	204	22	117	3	62
Shah Qasem	9	1	0	1	1	1	0	0	0
Golestan.....	390	192	0	275	139	70	0	12	57
Voshmgir ⁽²⁾	129	88	0	88	71	37	0	11	22
Golestan ⁽²⁾	173	119	0	119	43	18	0	0	25
Alagol	68	13	0	13	0	0	0	0	0
Bustan ⁽²⁾	53	24	0	24	10	6	0	0	4
Nomel(Kosar)	3	1	0	1	0	0	0	0	0
Daneshmand	27	12	0	12	1	1	0	0	0
Negarestan	20	18	0	18	13	7	0	1	6
Gilan.....	1645	1494	1060	434	1444	1134	126	10	174
Sefidrud	1493	1347	967	380	1301	1126	16	10	149
Shahr-e-Bijar.....	152	147	93	53	143	8	110	0	25
Lorestan.....	483	439	356	83	132	54	0	0	78
Maruk.....	63	30	0	30	26	25	0	0	1
Tanghaleh	2	1	0	1	1	1	0	0	0
Kaznar.....	1	0	0	0	0	0	0	0	0
Khanabad	7	2	0	2	2	2	0	0	0
Eyvashan.....	61	31	0	31	30	23	0	0	7
Hozian.....	5	5	0	5	4	3	0	0	1
Rudbar.....	343	369	356	13	68	0	0	0	68
Mazandaran	345	255	40	214	234	129	37	0	69
Shahid Rajaei	133	89	40	49	88	53	13	0	22
Shiyadeh	5	3	0	3	2	2	0	0	0
Berenjestanak.....	10	9	0	9	9	3	0	0	6

9.3. STATISTICS ON LARGE RESERVOIR DAMS⁽¹⁾ BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

Year and reservoir Dams	Inflow ⁽²⁾	Outflow ⁽³⁾			Water consumption ⁽⁴⁾				
		Total	From	Other ⁽⁵⁾	Total	Agricult	Drinking	Manu-	Other ⁽⁵⁾
Meijeran	29	29	0	29	21	5	11	0	5
Salaheddinkola.....	1	0	0	0	0	0	0	0	0
Farimsahra.....	1	0	0	0	0	0	0	0	0
Sonbolrud.....	7	7	0	7	2	1	0	0	1
Alimalat.....	3	3	0	3	1	1	0	0	0
Alborz	156	115	0	115	111	65	13	0	34
Markazi.....	140	110	0	110	75	20	39	9	7
Kamal Saleh.....	96	71	0	71	40	0	31	9	0
Saveh.....	44	39	0	39	35	20	8	0	7
Hormozgan.....	207	114	0	114	45	25	19	0	0
Esteqlal	85	21	0	21	14	7	7	0	0
Jegin.....	46	50	0	50	23	18	4	0	0
Shamil & Nian	76	44	0	44	8	0	8	0	0
Hamedan	88	79	0	79	43	11	32	0	1
Ekbatan ⁽²⁾	41	34	0	34	31	2	28	0	1
Abshineh ⁽²⁾	1	2	0	2	1	0	1	0	0
Shirinsu	0	0	0	0	0	0	0	0	0
Kalan-e-Malayer	39	36	0	36	7	7	0	0	0
Sarabi	6	7	0	7	5	2	3	0	0
Shanjur.....	0	0	0	0	0	0	0	0	0

1. For the 176 large reservoir dams (based on the ICOLD definition) with the capacity of 49.2 bln.cu.m, almost equaling 95% of the total volume of the dams under use.

2. Total inflow and outflow are calculated through omission of the influence of being chain of(Latiyan and Mamlo dams in Tehran Ostan), (Shahid Abbaspur, Karun3, Karun 4, Karkheh, Masjed-Soleyman and Gotvand-e-Oliadams in Khuzestan Ostan), (Dorudzan and Mollasadra in Fars Ostan),(Golestan, Bustan and Voshmgir in Golestan Ostan),(Chahehnimeh 1,2,3 and 4 in Sistan&Baluchestan Ostan), (Ekbatan and Abshineh in Hamedan Ostan), (Soleymanshah and Gavshan in Kermanshah Ostan) and (Aras and Khoda Afarin in East-Azarbayejan Ostan).Moreover, inflow volume is calculated through balance of volume changes in reservoir and amount of outflows.

3. The amount of water included for different consumption is the volume of water released for different consumption. With respect to the location of dams and the distance between them and consumption place, specially in agricultural sector, the water released for the agriculture is different from the volume of the water delivered to this sector. The difference is due to different reasons including middle basin, midway offtake, penetration, evaporation , etc.. Moreover, drinking water is the volume of water discharged from the dam.

4. Other outflows include evaporation, weir, dam take-out gates, slit ejection, direct pumping from reservoir, drainage and leaking.Moreover, difference between total and sum of parts is due to existence of some chain dams.

5. Other consumption includes the water at the time of stability of flow of the river.

6. Main difference between consumption (29.3 bln cu m) or net outflow(37.9 bln cu m) is related to outflow of border dams for neighboring countries, evaporation from all dams, weirs and other non-consumable outflows. Aras, Bukan, Zayanderud, Taleghan, Karaj, Karkheh, Golpayegan, Gavshan and Kusar dams supply water both for mentioned Ostans in above table and other Ostans.

Seymareh dam is located in Ilam Ostan and Company for Development of Water Resources and Energy of Iran is responsible for this dam but due to its aquatic relationship with Karkheh dam, it is classified in Khuzestan Ostan. Kucheri dam is located in Esfahan Ostan and Tehran Regional Company is responsible for this dam; however, due to supplying drinking water for Qom city accounting for the major consumption of the dam, the related statistics is included in Qom Ostan.

7. Outflow of Aras dam and Dusti dam is equal to total outflow of the dam, and consumptions only include I.R Iran consumption.

8. In Sahand dam, 41 mln cu m was released without use due to the lack of water need as well as not finishing the downward network.

9. Major part of 174 mln cu m of inflow to the Golpayegan reservoir dam in the year 1397 relates to the transferring of the water from Dez branches to Qomrud.

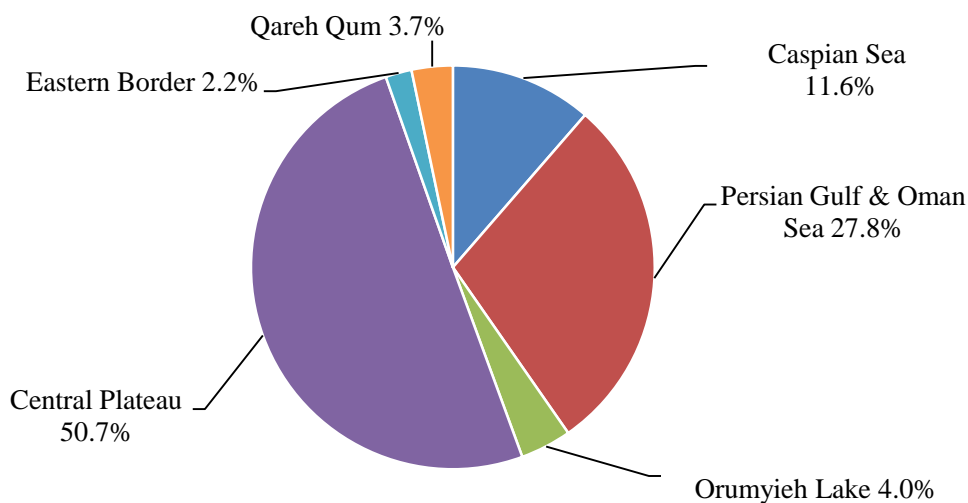
10.Major part of other consumption in dams of Dez, Karkheh and Gotvand-e-Olya were due to the improvement of drinking water.

11.The consumption from the chain dams of Shahid Abbaspour, Karun 3, Karun 4 and Gotvand-e-Olya is included in the consumption of Gotvand- e-Olya dam.

12. Karun 4 reservoir dam is located in Chaharmahal&Bakhtiari Ostan. However, since it is located on the Karun river, it is classified in Khuzestan Ostan.

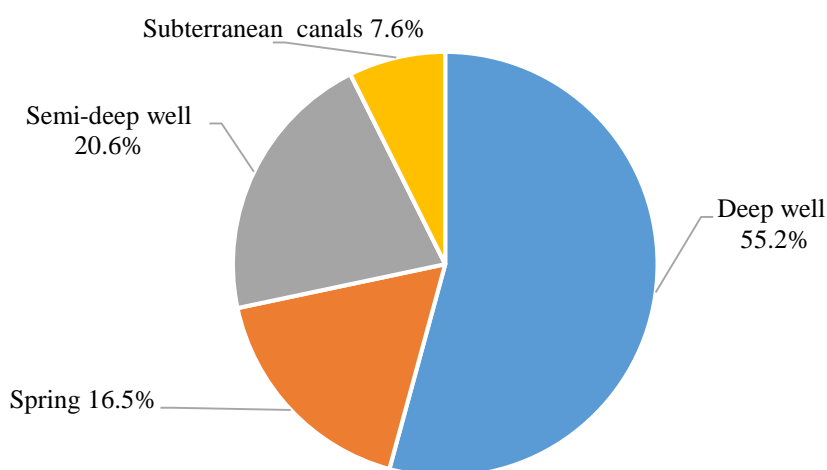
Source: Ministry of Energy.

9.1. ANNUAL DISCHARGE FROM UNDERGROUND WATER RESOURCES BY MAIN BASINS, THE AQUATIC YEAR 1396-97



For data see Table 9.1.

9.2. PERCENTAGE OF ANNUAL DISCHARGE FROM UNDERGROUND WATER RESOURCES, THE YEAR 1396-97



For data see Table 9.1.

9. 4. DATA FOR CAPACITY OF RESERVOIRS, URBAN WATER DISTRIBUTION AND TRANSMISSION NETWORK

(cu m / km)

Year and Ostan	Capacity of Reservoirs in the network	Length of the network for water distribution	Length of pipelines for water transmission
1380.....	8402485	77955	13458
1385.....	10914721	119059	18500
1390.....	13101344	133163	25475
1393.....	14136572	144084	27671
1394.....	14550118	146649	28222
1395.....	14760389	151108	28984
1396.....	15000546	154058	29379
1397.....	15239714	157120	29559
East Azarbayejan	905580	9401	1166
West Azarbayejan	390230	4911	735
Ardebil	234580	2437	477
Esfahan.....	1085255	13817	2879
Alborz	485059	2917	734
Ilam	136900	1313	510
Bushehr	307650	3251	875
Tehran	3026495	15700	2591
Chaharmahal&Bakhtiyari	172000	1984	367
South Khorasan.....	140150	2267	599
Khorasan-e-Razavi.....	1150110	10266	2431
North Khorasan.....	188250	1540	351
Khuzestan.....	752737	10038	1786
Zanjan.	164420	1647	294
Semnan.....	192966	2468	546
Sistan&Baluchestan	273840	4253	1174
Fars.....	913425	10122	2606
Qazvin	252400	1918	279
Qom.....	350800	2224	237
Kordestan	177950	4767	401
Kerman.....	697010	10179	2023
Kermanshah	307644	3083	563
Kohgiluyeh&Boyerahmad	118710	1485	307
Golestan	259220	2773	534
Gilan.....	383978	5096	679
Lorestan.....	273900	2688	570
Mazandaran.....	423922	7490	1066
Markazi	284095	3432	665
Hormozgan.....	382426	5333	1000
Hamedan	295105	2608	463
Yazd	512907	5712	651

Source: Water and Sewage Engineering Company.

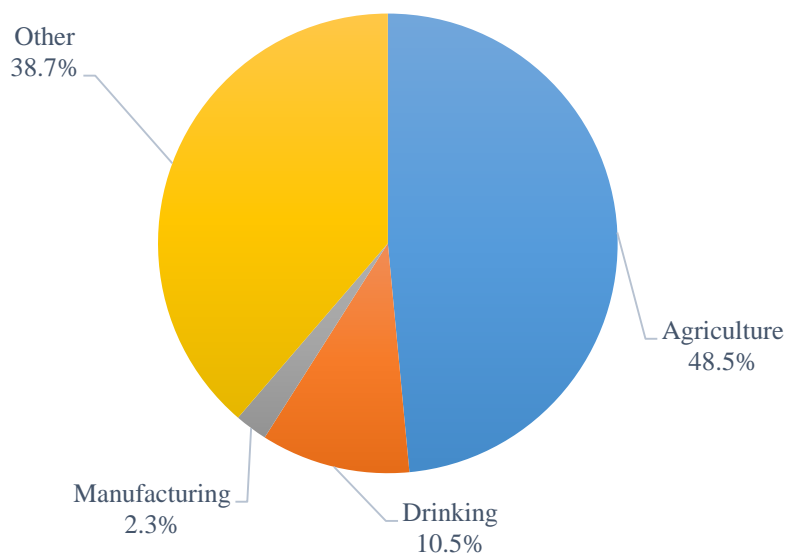
9. 5. DATA FOR WATER SUPPLY, PRODUCTION AND SALE CAPACITIES AND NUMBER OF EXTENTIONS OF URBAN WATER

Year and Ostan	Max. capacity of water supply (litre/second)	Production (1000 cu m)	Sale ⁽¹⁾ (1000 cu m)	Extensions (number)
1380.....	165328	4008252	2617518	8060690
1385.....	214154	5094428	3464452	10115430
1390.....	247392	5323362	3900727	12891481
1393.....	263019	5847738	4330157	14963718
1394.....	268138	6009000	4445000	15431590
1395.....	261971	6045392	4502617	15827243
1396.....	247786	6162225	4633556	16270684
1397.....	251613	6186201	4586475	16684340
East Azarbayejan	10576	245781	199378	1156550
West Azarbayejan	9051	196100	151902	643109
Ardebil	3112	80103	59759	329904
Esfahan	20300	406589	339428	1285625
Alborz	9035	248782	193292	414612
Ilam.....	1391	41714	32648	147589
Bushehr	3173	100076	73910	279635
Tehran.....	57093	1430470	1088078	1886973
Chaharmahal&Bakhtiyari	2249	50250	38320	235690
South Khorasan	2189	43494	29820	190935
Khorasan-e-Razavi.....	15727	377986	287332	1628247
North Khorasan	1307	41227	30482	189139
Khuzestan.....	22921	636551	370177	1032436
Zanjan	3437	67393	50402	239522
Semnan.....	2092	60202	44501	249376
Sistan&Baluchestan	6308	132731	97151	346270
Fars.....	12490	326652	241826	1132759
Qazvin	3441	81257	66358	305967
Qom.....	6362	117230	96622	321102
Kordestan	4817	113811	77959	367735
Kerman	6986	179133	129159	605031
Kermanshah	8273	151866	93114	388273
Kohgiluyeh&Boyerahmad	1342	40890	29087	168929
Golestan	3512	87883	61588	279479
Gilan	5766	161774	120636	480151
Lorestan	3843	112610	83260	406713
Mazandaran.....	9878	251581	181235	619009
Markazi	4755	110170	86282	319137
Hormozgan.....	3663	104975	85660	246943
Hamedan	3487	94965	70385	379981
Yazd	3036	91955	76723	407519

1. Water sale refers to water consumption.

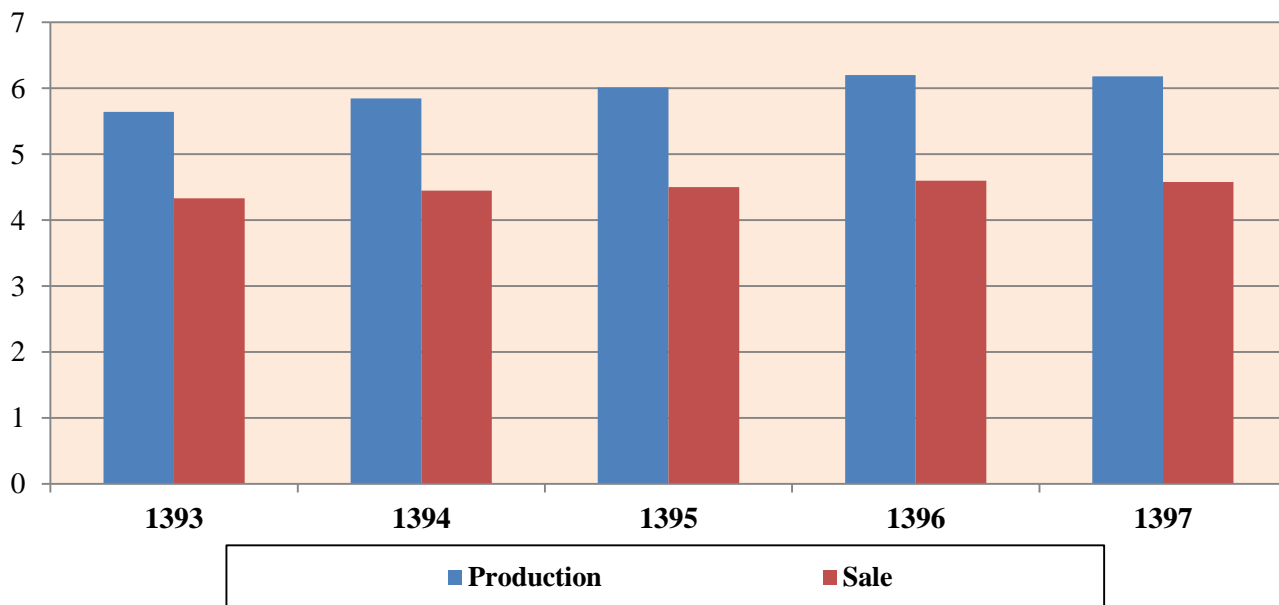
Source: Water and Sewage Engineering Company.

9.3. WATER CONSUMPTION OF LARGE RESERVOIR DAMS BY TYPE OF USE, THE YEAR 1397



9.4. PRODUCTION AND SALE OF WATER IN URBAN AREAS BY URBAN WATER AND SEWAGE COMPANIES

Billion cu/m



For data see Table 9.5.

**9.6. DATA FOR WATER SUPPLY, PRODUCTION AND SALE CAPACITIES AND
NUMBER OF EXTENTIONS OF RURAL WATER**
(1000 cu m/number)

Year and Ostan	Max. capacity of water supply (litre/second)	Production (1000 cu m)	Sale ⁽¹⁾ (1000 cu m)	Extensions (number)
1385.....	51242	1019180	652929	3200860
1390.....	77038	1160295	794211	4415236
1393.....	75623	1396408	964205	5155136
1394.....	77095	1390976	963604	5280728
1395.....	81054	1382449	947807	5392903
1396.....	84306	1441038	975704	5564715
1397.....	101178	1489105	992694	5739206
East Azarbayejan	12221	70281	44894	335116
West Azarbayej an	3019	85274	61134	283671
Ardebil	1794	27426	19361	120114
Esfahan.....	2263	54949	38684	248055
Alborz	3080	18463	9993	61417
Ilam	539	14018	9783	56212
Bushehr	1143	32650	21309	95473
Tehran	4204	50064	31265	155468
Chaharmahal&Bakhtiari	4130	28330	15472	89231
South Khorasan.....	990	27865	17638	137436
Khorasan-e-Razavi.....	4045	125010	88032	602517
North Khorasan.....	991	27489	18611	120517
Khuzestan.....	4620	83300	47487	187216
Zanjan	3159	33878	18989	106637
Semnan.....	1404	15860	8690	60639
Sistan&Baluchestan	1645	45532	32287	174910
Fars.....	6334	113171	81370	423725
Qazvin	1359	33027	21012	116994
Qom.....	630	15373	9827	33332
Kordestan	3849	29405	19753	126613
Kerman.....	2793	61880	45928	273931
Kermanshah	1917	38931	26043	137550
Kohgiluyeh & Boyerahmad	7472	24610	10903	62434
Golestan	3840	54461	39539	228690
Gilan.....	2803	79480	42245	311092
Lorestan.....	4865	35554	25443	130618
Mazandaran.....	4550	116626	82000	433335
Markazi.....	4263	34525	25649	149804
Hormozgan.....	3235	50101	35512	196063
Hamedan	2982	41842	29992	168975
Yazd	1040	19730	13849	111421

1. Water sale refers to water consumption.

Source: Water and Sewage Engineering Company.

9.7. DATA FOR CAPACITY OF RESERVOIRS, RURAL WATER DISTRIBUTION AND TRANSMISSION NETWORK
(cu m / km)

Year and Ostan	Capacity of Reservoirs in the network	Length of the network for water distribution	Length of pipelines for water transmission
1385.....	2914866	116474	64500
1390.....	3292684	155248	87848
1393.....	3332951	167234	95094
1394.....	3483849	171609	100713
1395.....	3628788	172980	103705
1396.....	3803553	178848	107610
1397.....	3865387	181638	110185
East Azarbayejan.....	212692	8290	7330
West Azarbayejan	153770	6950	5077
Ardebil	99920	3622	2468
Esfahan	127185	5399	2950
Alborz	46485	1197	652
Ilam	60699	1384	1669
Bushehr	71380	3468	1973
Tehran	139090	2605	1256
Chaharmahal&Bakhtiari	84164	3380	1797
South Khorasan.....	121598	3238	4309
Khorasan-e-Razavi.....	321112	13222	9026
North Khorasan.....	88461	2843	2064
Khuzestan	157373	12498	8343
Zanjan	88140	3235	2458
Semnan.....	39954	1188	807
Sistan &Baluchestan	185151	9221	6552
Fars	274724	12398	7373
Qazvin	67863	2523	1704
Qom	49601	907	755
Kordestan	87903	2639	3023
Kerman	225271	13507	6186
Kermanshah	125688	5189	3182
Kohgiluyeh & Boyerahmad	109102	3684	2791
Golestan	93480	5203	3157
Gilan.....	143285	17874	4053
Lorestan.....	63668	4377	3762
Mazandaran.....	183664	11124	4601
Markazi	95345	4357	2199
Hormozgan.....	124645	7030	4667
Hamedan	121234	4617	2270
Yazd	102740	4469	1733

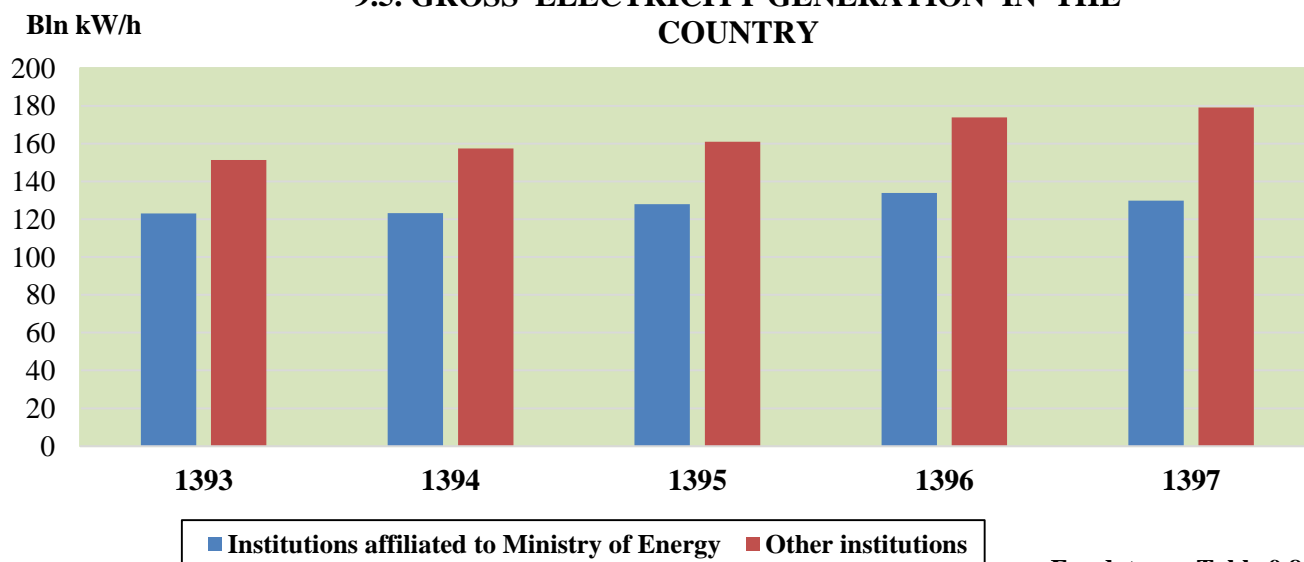
Source: Water and Sewage Engineering Company.

9.8. NOMINAL CAPACITY AND GROSS ELECTRICITY GENERATION OF INSTALLED GENERATORS

Year	Nominal capacity (1000 kW h)			Gross electricity generation (mln kW h)		
	Total	Institutions affiliated to the Ministry of Energy	Other institutions	Total	Institutions affiliated to the Ministry of Energy	Other institutions
1380.....	34233	28043	6190	129996	124275	5721
1385.....	45151	40909	4242	192534	181538	10996
1390.....	65212	52252	12960	240063	208413	31650
1393.....	73160	35075	38085	274480	123151	151329
1394.....	74103	34945	39158	280688	123215	157473
1395.....	76428	35764	40664	289196	128291	160905
1396.....	78794	36511	42283	307968	133934	174034
1397.....	80467	36625	43842	309182	129920	179262

Source: Ministry of Energy.

9.5. GROSS ELECTRICITY GENERATION IN THE COUNTRY



For data see Table 9.8.

**9.9. CAPACITY OF INSTALLED GENERATORS AND MAXIMUM POWER GENERATED
AT THE POINT OF PEAK CONSUMPTION OF THE POWER PLANTS (1000 kW)**

Year and type of generator	Nominal capacity (nominal power)	Actual capacity (actual capacity)	Power generated at the point of peak consumption
1380.....	28944	26496	21853
1385.....	45288	40985	32997
1390.....	65212	57522	42245
1393.....	73160	63987	46696
1394.....	74103	64707	49116
1395.....	76428	66598	51579
1396.....	78794	68321	54016
1397.....	80467	69864	309182
Ministry of energy.....	36625	33325	129920
Hydroelectric.....	12026	12026	15765
Steam	11241	10630	60028
Gas	6404	5002	20620
Combined cycle.....	5389	4257	26031
Diesel	439	284	81
Atomic	1020	1020	7329
Renewable.....	107	107	65
Large scale industries.....	6065	5015	4967
Steam.....	589	490	1616
Gas	5476	4525	3351
Private sector.....	37777	31524	174295
Steam.....	4000	3772	24011
Gas	13672	11245	46349
Combined cycle.....	19607	16008	103169
Renewable.....	499	499	766

Source: Ministry of Energy.

9. 10. CAPACITY OF INSTALLED GENERATORS AND GROSS ELECTRICITY GENERATION OF POWER PLANTS, THE YEAR 1397

Ostan	Nominal capacity(1000 kW)	Actual capacity (1000 kW)	Gross generation (mln kW h)
Total	80467	69864	309182
East Azarbayejan	1765	1621	8327
West Azarbayejan	1507	1230	6087
Ardebil	1023	827	3066
Esfahan	5310	4747	23874
Alborz	1801	1523	9115
Ilam	675	643	864
Bushehr	5553	4786	15508
Tehran	6711	5402	26638
Chaharmahal&Bakhtiari	1052	1051	1531
South Khorasan.....	797	597	2880
Khorasan-e-Razavi.....	3636	3096	16917
North Khorasan.....	1147	897	4538
Khuzestan	15294	14186	37298
Zanjan	755	607	2683
Semnan.....	676	548	2509
Sistan &Baluchestan.....	1539	1229	5475
Fars	5036	3892	22489
Qazvin	2184	1976	12104
Qom	762	643	4342
Kordestan	981	791	4625
Kerman	3631	2775	17320
Kermanshah	1614	1444	7835
Kohgiluyeh & Boyerahmad	17	17	34
Golestan	1026	935	3407
Gilan.....	2840	2626	14994
Lorestan.....	581	541	709
Mazandaran.....	3841	3669	13010
Markazi	1341	1256	7179
Hormozgan.....	3507	2973	13708
Hamedan	1060	1060	6355
Yazd	2806	2275	13759

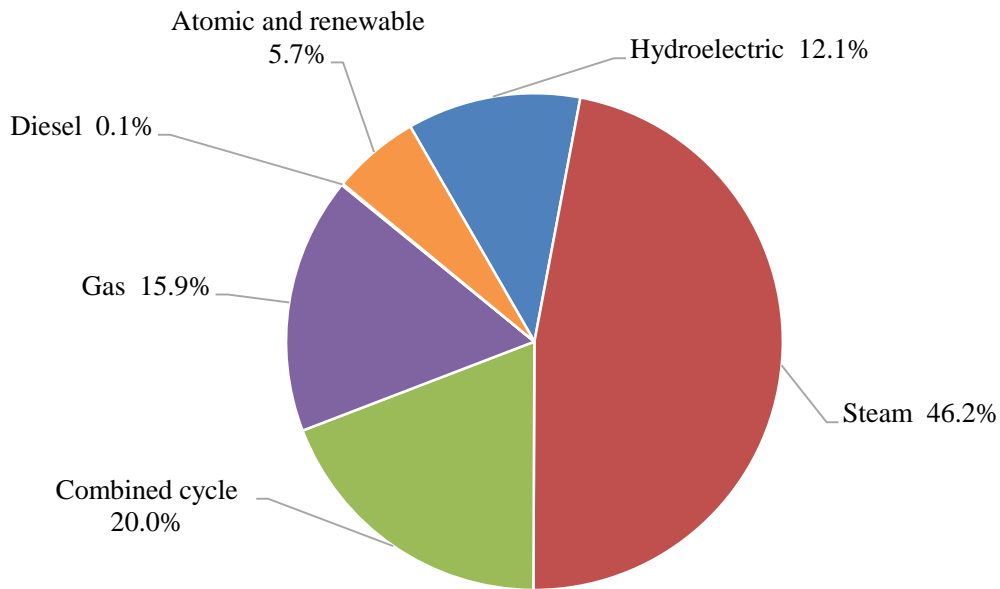
Source: Ministry of Energy.

9. 11. ELECTRICITY GENERATION AND INTERNAL CONSUMPTION OF THE POWER PLANTS
(mln kWh)

Year and type of generator	Gross generation	Internal consumption of plants	Net generation
1380.....	127169	6123	121046
1385.....	192535	7773	184762
1390.....	240063	8442	231621
1393.....	274480	8426	266054
1394.....	280689	7888	272801
1395.....	289196	8285	280911
1396.....	307968	8810	299159
1397.....	309182	8703	300479
Ministry of energy.....	129921	4778	125143
Hydroelectric.....	15765	87	15678
Steam.....	60028	4133	55895
Combined cycle.....	26031	444	25587
Gas.....	20620	108	20512
Diesel.....	81	6	75
Atomic.....	7329	0	7329
Renewable.....	65	0	65
Large scale industries.....	4967	148	4819
Steam.....	1616	130	1486
Gas.....	3351	18	3333
Private sector.....	174295	3778	170517
Steam.....	24011	1717	22294
Gas.....	46349	247	46102
Combined cycle.....	103169	1814	101355
Renewable.....	766	0	766

Source: Ministry of Energy

9.6. SHARE OF ELECTRICITY GENERATORS TYPES OF THE POWER PLANTS AFFILIATED TO THE MINISTRY OF ENERGY FROM GROSS GENERATION OF POWER , THE YEAR 1397



For data see Table 9.11.

9. 12. GROSS ELECTRICITY GENERATION OF HYDROELECTRIC POWER PLANTS BY REGIONAL WATER ORGANIZATION AND TYPE OF DAM (1000 kW hours)

Year and regional water organization	Total		Concrete arch		Earth		Other	
	Number	Generation	Number	Generation	Number	Generation	Number	Generation
1380.....	13	5056652	8	4902159	5	154493	-	-
1385.....	29	18168964	13	12634896	18	5550129	12	182164
1390.....	46	13287425	26	8489912	9	4707067	11	90446
1393.....	48	13862370	26	8003593	11	5842814	11	15960
1394.....	51	14086848	28	8518422	12	5523407	11	45019
1395.....	52	16419181	28	9412166	13	6945188	11	61827
1396.....	58	15051012	28	7946516	15	7020383	15	84113
1397.....	59	15765098	28	8120216	15	7530619	16	114263
East Azarbayejan.....	0	0	0	0	0	0	0	0
West Azarbayejan	2	81222	0	0	2	81222	0	0
Ardebil.....	1	57874	0	0	0	0	1	57874
Esfahan.....	2	44016	2	44016	0	0	0	0
Alborz.....	2	143654	1	108459	1	35195	0	0
Ilam	1	804073	1	804073	0	0	0	0
Tehran	3	135671	2	75561	1	60110	0	0
Chaharmahal & Bakhtiyari..	3	1519730	2	1518055	0	0	1	1675
Khorasan-e-Razavi.....	3	6	2	0	0	0	1	6
Khuzestan.....	7	10666917	3	5348022	4	5318895	0	0
Fars.....	1	7534	0	0	0	0	1	7534
Qom.....	3	5573	1	4076	2	1497	0	0
Kordestan	1	22362	0	0	0	0	1	22362
Kerman.....	1	43748	0	0	1	43748	0	0
Kermanshah.....	1	22854	1	22854	0	0	0	0
Kohgiluyeh & Boyer-Ahmad	2	661975	1	0	1	661975	0	0
Gilan.....	5	34453	3	18979	0	0	2	15474
Lorestan.....	5	178728	2	168652	1	10076	2	0
Mazandaran.....	5	434134	3	1251	1	431942	1	941
Markazi	7	892177	3	6218	1	885959	3	0
Hamedan	3	1925	1	0	0	0	2	1925

Source: Ministry of Energy.

9. 13. GROSS ELECTRICITY GENERATION, FUEL CONSUMPTION, ENERGY GENERATION AND OUTPUT OF THERMAL POWER PLANTS AFFILIATED TO THE MINISTRY OF ENERGY, LARGE SCALE INDUSTRIES AND PRIVATE SECTOR

Year and type of ownership of the power plant	Gross electricity generation (mln kw hours)	Fuel consumed			Energy generated from fuel consumption (bln kcal)	Thermal energy consumed to generate one kWh of electricity (kcal)	Output (percent)
		Gas oil (mln lit)	Fuel oil (mln lit)	Natural gas (mln cu m)			
1380	122081	1618	6799	24012	295114	2414	35.6
1385	174280	4362	7587	32168	393246	2403	35.8
1390	227428	9406	12019	38901	530623	2333	36.9
1393	255869	8872	10273	50172	606707	2371	36.3
1394	263392	6084	6946	58424	606045	2301	37.4
1395	265774	5867	4483	61782	604856	2276	37.8
1396	284988	4841	3687	69382	651960	2288	37.6
1397	285256	5970	3451	67356	644067	2258	38.1
Power plants affiliated to the Ministry of Energy	106760	1284	2974	25598	251660	2357	36.5
Large scale industries	4967	2	0	1568	15351	3091	27.8
Private sector	173529	4685	477	40190	377057	2173	39.6

Source: Ministry of Energy.

9.14.GENERATION, INTERNAL CONSUMPTION OF POWER PLANTS, PURCHASE,LOSSES AND SALES OF ELECTRIC POWER OF INSTITUTIONS AFFILIATED TO THE MINISTRY OF ENERGY
(mln kWh)

Description	Year							
	1380	1385	1390	1393	1394	1395	1396	1397
Gross generation	124275	181538	208414	123150	123215	128292	133934	129920
Less: Internal consumption of plants....	5942	7064	7985	4583	4548	4520	4887	4777
Net generation.....	118333	174474	200429	118567	118667	123772	129047	125143
Plus:Electricity purchased from large-scale industries ⁽¹⁾	5721	10997	23637	141834	147920	149743	164071	171406
Less: Distribution and transmission networks losses	20857	35566	34102	34610	33297	33513	33772	32853
Net sales	97476	144831	188917	225541	233043	239903	259346	263696
Net exports	305	233	5012	5888	5732	2467	4320	3708
Domestic sales.....	97171	144598	183905	219653	227311	237436	255026	259723

1. Other institutions include large scale industries and private plants.

Source: Ministry of Energy.

9.15. MAXIMUM COINCIDENTAL AND NON-COINCIDENTAL LOADS OF REGIONAL POWER COMPANIES
(1000 kW h)

Description	Maximum coincidental load
1380.....	23220
1385.....	33453
1390.....	41481
1393.....	46204
1394.....	48462
1395.....	50926
1396.....	53414
1397	48999
Azarbajejan Regional Power Company	2591
Esfahan Regional Power Company	3210
Bakhtar Regional Power Company	2105
Tehran Regional Power Company	8307
Khorasan Regional Power Company	3333
Khuzestan Regional Power Company	7250
Zanjan Regional Power Company	1164
Semnan Regional Power Company	355
Sistan&Baluchestan Regional Power Company	1239
Gharb Regional Power Company	1383
Fars Regional Power Company	4186
Kerman Regional Power Company	1703
Gilan Regional Power Company	1555
Mazandaran Regional Power Company	3591
Hormozgan Regional Power Company	2185
Yazd Regional Power Company	1002
Kish Water and Power Company.....	156
Large scale industries.....	3688

Source: Ministry of Energy.

9.16. ELECTRIC POWER TRANSMISSION LINES**(km circuits)**

Year	Transmission lines		Sub-transmission lines	
	400 kV	230 kV	132 kV	63 and 66 kV
1380.....	9924	20731	13857	29400
1385.....	12404	25634	18582	37974
1390.....	18625	29158	22092	44956
1393.....	19995	30732	22919	47105
1394.....	20205	30869	23046	47506
1395.....	20477	31324	23413	48063
1396.....	20617	31589	23504	48295
1397.....	20893	32411	23821	49524

1. In the year 1390, statistical data for power transmission lines of the country were revised and decreased in some cases.

Source: Ministry of Energy.

9.17. CAPACITY OF POWER TRANSMISSION SUB-STATIONS OF THE COUNTRY**(MVA)**

Year and Ostan	Transmission sub-stations		Sub-transmission sub-stations	
	400 kV	230 kV	132 kV	63 and 66 kV
1380	22458	37287	12762	31265
1385	29633	53816	18489	43987
1390	46708	67412	25352	59759
1393	57143	75024	29269	65061
1394	59273	76532	29829	67080
1395	62183	80470	30865	69456
1396	64093	82045	32251	72794
1397	67523	84876	33321	75619
East-Azarbayejan	1715	3120	2720	767
West-Azarbayejan.....	630	1805	2148	15
Ardebil	500	960	0	832
Esfahan.....	6460	5530	0	7706
Alborz	1000	2236	0	2795
Ilam	0	1240	559	770
Bushehr	2995	2056	1762	2057
Tehran	10700	11440	0	13554
Chaharmahal&Bakhtiyari	1250	0	0	1025
South Khorasan.....	1000	0	850	0
Khorasan-e-Razavi.....	3957	160	6570	1012
North Khorasan.....	1000	0	958	0
Khuzestan.....	7895	7902	10863	0
Zanjan	2030	1250	0	2102
Semnan.....	1600	2010	0	1543
Sistan&Baluchestan	945	3151	30	2855
Fars	4840	4565	660	6992
Qazvin.....	800	1555	0	2275
Qom	0	1490	0	1715
Kordestan	0	1725	80	1130
Kerman.....	2670	4830	4177	360
Kermanshah	1230	2265	0	2266
Kohgiluyeh&Boyerahmad	400	490	618	0
Golestan	700	1730	0	1853
Gilan	1000	3210	120	3000
Lorestan	1000	1945	0	1907
Mazandaran.....	2630	4005	0	4518
Markazi	2000	2925	0	3130
Hormozgan.....	3090	6947	870	5202
Hamedan	600	1815	0	2007
Yazd.....	2885	2519	335	2228

Source: Ministry of Energy.

9.18. NUMBER OF CUSTOMERS OF OSTANS NATIONWIDE BY TYPE OF CONSUMPTION (consumer)

Year and Ostan	Total	Household	Public	Agricultura	Industrial	Other
1380.....	16345450	13682563	523505	77556	91468	1970358
1385.....	20559946	16989284	748964	138137	152202	2531359
1390.....	27164768	22224100	1082528	284781	174255	3399104
1393.....	31671635	25739069	1382124	352628	206088	3991726
1394.....	32831066	26619546	1465251	378147	216515	4151607
1395.....	33824208	27354153	1543440	400257	225296	4301062
1396.....	34835756	28100586	1611382	422260	236372	4465156
1397.....	35688115	28749257	1665987	444212	245939	4582720
East Azarbayejan	1834210	1433491	79942	20440	16108	284229
West Azarbayejan	1241419	1007785	33238	20707	5959	173730
Ardebil	547875	451711	24253	4235	3305	64371
Esfahan	2608877	2054690	98529	46106	32456	377096
Alborz	1318364	1068560	83889	5162	6907	153846
Ilam	222262	185661	8377	3000	1090	24134
Bushehr	459978	373206	17243	5079	2548	61902
Tehran	6701216	5128392	519693	11817	44849	996465
Chaharmahal&Bakhtiyari	362412	303483	11760	6666	2688	37815
South Khorasan.....	364841	306030	15531	5123	2610	35547
Khorasan-e-Razavi.....	2805117	2321282	106459	21824	19718	335834
North Khorasan.....	351086	298007	12423	3490	1720	35446
Khuzestan	1630098	1349850	54994	10224	4502	210528
Zanjan	443236	359923	15902	8456	3125	55830
Semnan.....	374857	289895	22171	6128	5016	51647
Sistan&Baluchestan	811482	683955	27732	12723	2672	84400
Fars	2037371	1676940	70704	44551	13855	231321
Qazvin	596086	477911	38275	6140	4543	69217
Qom	557381	451106	19963	3850	6382	76080
Kordestan	640610	535131	21434	9923	2860	71262
Kerman	1173126	995722	33874	16051	5676	121803
Kermanshah	758388	635776	26346	7535	2902	85829
Kohgiluyeh&Boyerahmad	251192	217354	7944	2582	1056	22256
Golestan	723540	595925	29680	10887	2974	84074
Gilan.....	1425429	1119718	70593	21300	5841	207977
Lorestan.....	632717	539977	17085	8428	2976	64251
Mazandaran.....	1970003	1564322	89357	80608	13806	221910
Markazi	716444	590660	28373	10064	7313	80034
Hormozgan.....	723456	589950	34917	9088	3469	86032
Hamedan	738222	602409	29669	12443	5833	87868
Yazd	666820	540435	15637	9582	11180	89986

Source: Ministry of Energy.

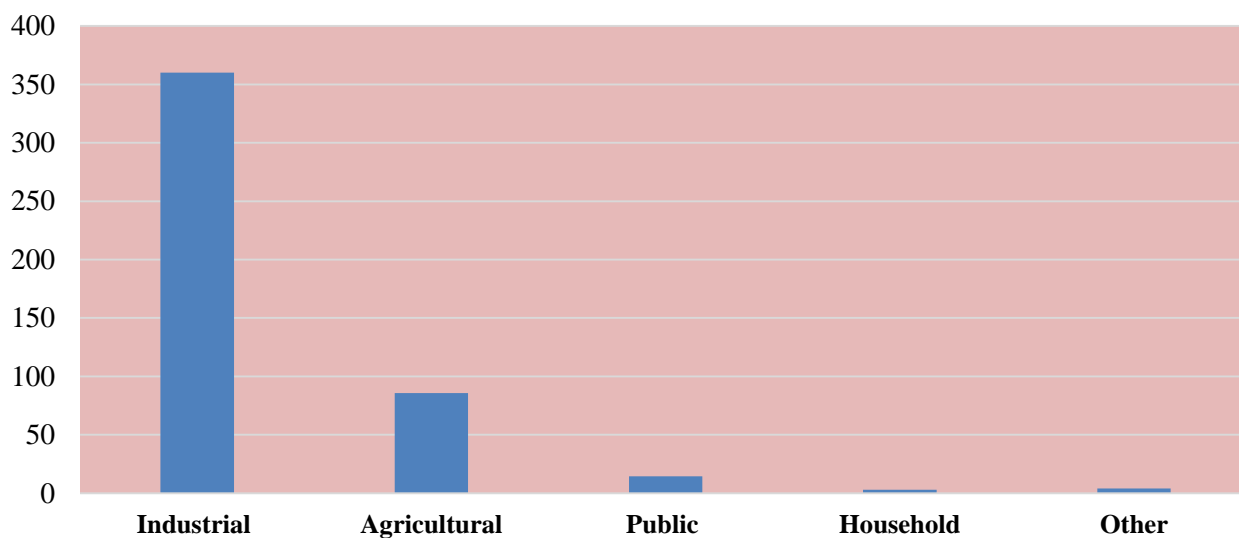
9.19. DOMESTIC SALE OF ELECTRICITY OF IRAN'S OSTANS BY TYPE OF CONSUMPTION**(mln KW/h)**

Year and Ostan	Total	Household	Public	Agricultural	Industrial	Streets lighting	Other
1380.....	96811	32891	11951	11079	30379	4117	6394
1385.....	144598	48085	18329	17666	46590	4608	9320
1390.....	183905	56771	16808	29965	63945	3752	12664
1393.....	219653	71163	19767	35188	74294	3837	15404
1394.....	227790	76103	22196	36089	72705	4017	16680
1395.....	237436	78378	22914	36222	77603	4699	17620
1396.....	255026	83403	24328	39379	84218	5017	18681
1397.....	259723	85098	24073	38033	88540	4987	18990
East Azarbayejan.....	8548	2469	651	1098	3472	200	658
West Azarbayejan	5284	1964	407	1098	1276	129	411
Ardebil	1824	680	191	259	484	64	147
Esfahan	24281	4259	1141	2930	14425	388	1137
Alborz	6675	2235	672	712	2227	123	706
Ilam	1465	664	130	293	243	34	102
Bushehr	6562	4075	884	311	669	117	507
Tehran	34847	12058	6215	2766	7291	577	5939
Chaharmahal&Bakhtiyari	2256	501	114	578	886	82	94
South Khorasan	1654	442	160	465	415	80	91
Khorasan-e-Razavi.....	16903	4540	1078	4321	5391	391	1181
North Khorasan	1537	463	115	361	477	36	85
Khuzestan	30451	15108	2494	2413	8534	466	1435
Zanjan	4120	610	172	640	2504	53	140
Semnan.....	3272	522	224	621	1710	60	135
Sistan&Baluchestan	6214	3233	1071	952	414	178	365
Fars	15527	4852	1309	4810	3186	322	1047
Qazvin	4357	867	266	963	1985	72	206
Qom	3671	1230	350	422	1278	62	329
Kordestan	2594	999	193	492	695	56	159
Kerman	13250	3220	673	4040	4652	207	458
Kermanshah	3766	1395	582	455	998	113	223
Kohgiluyeh&Boyerahmad	1660	779	266	137	298	67	114
Golestan	3503	1647	295	641	589	75	256
Gilan.....	6025	2442	533	575	1682	167	627
Lorestan.....	3767	1020	547	738	1199	102	160
Mazandaran.....	8610	3740	810	1046	1939	248	826
Markazi	7948	1068	275	1160	5098	128	219
Hormozgan.....	15333	5833	1654	948	5971	151	776
Hamedan	4230	1118	332	1074	1386	126	194
Yazd	9590	1069	268	713	7163	114	263

Source: Ministry of Energy.

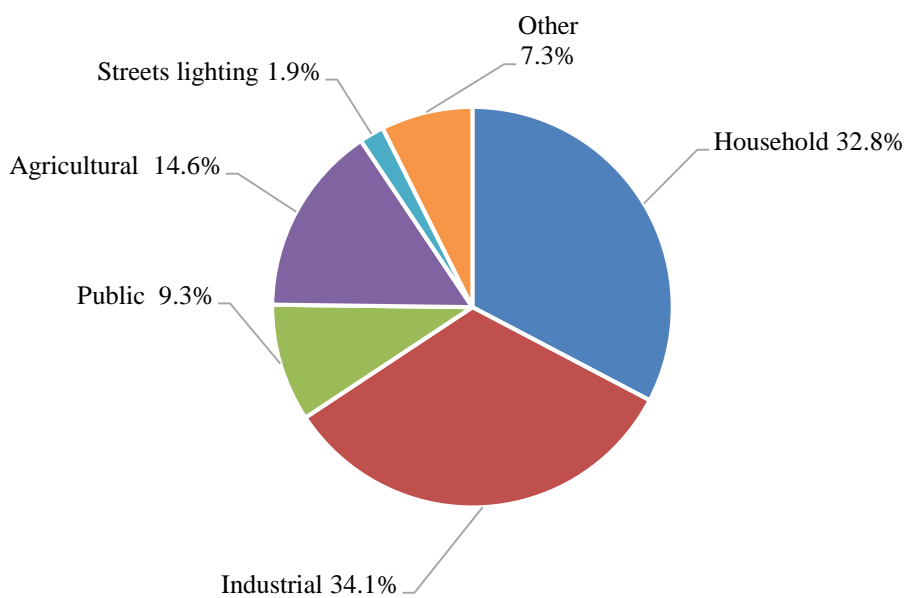
9.7. AVERAGE ELECTRICITY CONSUMPTION BY TYPE OF CUSTOMERS, THE YEAR 1397

1000 kW/h



For data see Tables 9.18. and 9.19.

9.8. DOMESTIC SALE OF ELECTRICITY BY TYPE OF USE, THE YEAR 1397



For data see Table 9.19.

9.20. NUMBER OF VILLAGES, RURAL HOUSEHOLDS ENJOYING ELECTRICITY AND CHARACTERISRICS OF ELECTRICITY TRANSMITING INSTALLATIONS TO VILLAGES

Year and Ostan	Village	Household enjoying electricity	Length of power disribution lines with medium pressure(km)	Length of power disribution lines with low pressure(km)	Number of distribution transformers	Capacity of distribution transformers (MVA)
1380.....	45359	4056072	120580	89359	54162	5688
1385.....	50985	4427849	138330	93464	64718	6812
1390.....	54116	4452795	139429	98390	72186	7283
1393.....	55664	4476786	142096	99299	74228	7389
1394.....	56170	4484170	143292	99618	7417	74866
1395.....	56793	4492752	145049	99958	76735	7687
1396.....	57030	4496797	145421	100091	77003	7698
1397.....	57280	4500250	145895	100224	77316	7713
East Azarbayejan.....	2873	297431	8485	5651	3043	318
West Azarbayejan	2901	210247	5683	4078	2999	289
Ardebil	1610	70408	4538	3587	1607	117
Esfahan	1763	296867	4817	4535	3035	274
Alborz	224	21841	512	489	237	30
Ilam	630	44778	1462	809	697	72
Bushehr	515	39898	1495	1229	830	113
Tehran	601	152961	1276	1629	1093	153
Chaharmahal&Bakhtiyari	753	85630	582	986	530	59
South Khorasan.....	1489	124900	3496	2309	1748	129
Khorasan-e-Razavi.....	3267	327294	7233	4610	3568	310
North Khorasan.....	943	94113	3300	1906	1144	85
Khuzestan	3762	207089	7945	3520	7786	1132
Zanjan	923	91502	3826	2039	1020	118
Semnan.....	501	35938	2814	953	477	51
Sistan&Baluchestan	4542	244802	15496	6308	6515	586
Fars	3228	283651	9109	5921	4643	433
Qazvin	859	72988	2630	2241	1124	169
Qom	189	18234	410	248	189	16
Kordestan	1778	127329	5339	2160	1860	188
Kerman	5155	239915	12781	7836	8083	658
Kermanshah	2523	127402	4356	2552	2607	258
Kohgiluyeh&Boyerahmad	1650	54783	3337	1407	2136	230
Golestan	897	106278	1631	1198	1018	69
Gilan.....	3028	287618	4547	10202	4798	422
Lorestan.....	2723	102991	5585	2707	2563	191
Mazandaran.....	3004	262165	4662	5947	3070	221
Markazi	1190	124312	4700	4086	1387	173
Hormozgan.....	1710	126989	8147	5017	4417	581
Hamedan	1128	165032	3403	2982	2075	195
Yazd	921	54864	2298	1082	1017	73

Source: Ministry of Energy.

9.21. EXCHANGE OF ELECTRICITY WITH NEIGHBORING COUNTRIES

Year	Exports					
	Total	Nakhjavan	Turkey	Armenia	Azerbaijan	Turkminestan
1380.....	1049	389	251	224	185	0
1385.....	2774	561	576	316	11	2
1390.....	8668	56	1118	57	0	8
1393.....	9660	66	2179	86	0	1
1394.....	9880	50	1723	45	0	0
1395.....	6688	48	297	105	1	0
1396.....	8130	40	0	51	3	0
1397.....	6295	28	0	58	1	0

Year	Exports		
	Pakistan	Afghanistan	Iraq
1380.....	0	0	0
1385.....	172	134	1002
1390.....	271	557	6601
1393.....	446	819	6063
1394.....	457	782	6822
1395.....	482	731	5024
1396.....	570	662	6803
1397.....	511	756	4942

Year	Energy exchange	Imports					
		Total	Nakhjavan	Turkey	Armenia	Azerbaijan	Turkminestan
1380.....	305	745	0	0	315	430	0
1385.....	233	2541	0	0	428	536	1576
1390.....	5012	3656	57	0	1508	2	2089
1393.....	5888	3772	65	0	1051	3	2653
1394.....	5732	4148	50	0	1344	4	2751
1395.....	2467	4221	51	0	1133	4	3033
1396.....	4278	3852	38	0	1412	2	2399
1397.....	3708	2587	27	0	1241	49	1270

Year	Imports		
	Pakistan	Afghanistan	Iraq
1380.....	0	0	0
1385.....	0	0	0
1390.....	0	0	0
1393.....	0	0	0
1394.....	0	0	0
1395.....	0	0	0
1396.....	0	0	0
1397.....	0	0	0

Source: Ministry of Energy.

9.22. ELECTRICITY DISTRIBUTION NETWORK OF THE COUNTRY BY OSTAN BY OSTAN, THE YEAR 1397

Ostan	Length of power distribution network lines with medium voltage(km)	Length of power distribution network lines with low voltage (km)	Number of distribution network transformers	Capacity of distribution network transformers (MVA)
Total	431923	368703	725121	125543
East Azarbayejan	17923	15680	25275	3919
West Azarbayejan	15185	12162	19187	2541
Ardebil	7419	6192	6795	944
Esfahan	26127	27827	46254	8744
Alborz	4991	7751	16817	4171
Ilam	4926	2491	6151	1010
Bushehr	8405	6929	17179	3987
Tehran	25397	42023	69401	21719
Chaharmahal&Bakhtiari	6560	5028	8518	1080
South Khorasan.....	12617	5700	9475	1026
Khorasan-e-Razavi.....	33435	24344	41539	7099
North Khorasan.....	6887	4583	7220	842
Khuzestan	22381	19800	56828	13654
Zanjan	8302	5816	9821	1507
Semnan.....	7389	4031	8092	1379
Sistan&Baluchestan	24375	13386	24242	2930
Fars	37130	25424	72380	9187
Qazvin	7123	5272	12215	1947
Qom	4041	3797	7682	1925
Kordestan	10588	6039	13313	1491
Kerman	31784	22095	43938	5300
Kermanshah	11682	6923	17344	2099
Kohgiluyeh&Boyerahmad	4989	3587	7831	1204
Golestan	7723	7713	18066	2424
Gilan.....	9155	19657	21709	3515
Lorestan.....	10193	5853	16294	1881
Mazandaran.....	16631	23814	46229	6002
Markazi	11747	8470	16610	2433
Hormozgan.....	15813	9826	26408	5297
Hamedan	10398	8146	16599	2275
Yazd	10608	8346	15709	2008

Source: Ministry of Energy.

