

**T**he 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, Mobarakeh 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/thermal energy consumed for 1 kWh of power generated) × 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 1397-1398, the amount of annual discharge of the underground water resources was about 62684 million cu m, which had a 6.8 percent increase in comparison with the aquatic year 1396-1397. It should be noted that out of 6 main basins, the central plateau with 46.5% had the maximum annual discharge.

In the year 1398, the inflow of the large reservoir dams amounted to 80170 million cu m which had a 72.8% increase in comparison with the last year. In this year, 56358 million cu m of large reservoir dams has been consumed, 43.7 percent of which belong to the agricultural consumptions.

In the same year, over 7864 million cu m of water is produced in the water and sewage companies of the country (urban and rural) out of which about 5792 million cu/m was sold. Sale of water increased by 3.8 percent compared to the preceding year. This is while that the production of water grew by 2.5 percent compared to the previous year. In the year 1398, there were over 22 million and 947 thousand urban and rural water extensions which had a 2.3 percent increase in comparison with the preceding year. Out of this number, over

17 million and 74 thousand extensions were in the urban areas which had a 2.3% increase compared to the previous year.

In the year 1398, the gross electricity generation of institutions affiliated to the Ministry of Energy was 144069 million kilowatt-hours, of which about 42.1 percent has been produced in the steam power plants. Furthermore, the gross electricity generation amount had a 5.6 percent increase compared to the preceding year.

In this year, 275094 million kilowatt-hours of domestic sold electricity was consumed by 36 million and 644 thousand customers. In this respect, the amount of electricity sold and the number of electricity customers increased by about 5.9 and 2.7 percent respectively compared to the preceding year.

Among all electricity customers in the year 1398, the percentage of customers in the house, public, agricultural, and manufacturing sectors was 80.3, 4.7, 1.3, 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 32.2, 35.3, 14.1, 9.3, and 1.8 percent respectively.

At the end of the year 1398, a number of 57420 villages (over 4.5 million rural households) were electrified which increased by 0.4% in comparison with the previous year.

### 9.1. UNDERGROUND WATER RESOURCES AND THEIR ANNUAL DISCHARGE<sup>(1)</sup> 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                      |
| 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                       |
| <b>1397-98 .....</b>               | <b>62684</b>    | <b>221067</b> | <b>32157</b>     | <b>627269</b>  | <b>11946</b>     | <b>41457</b>                | <b>4405</b>      | <b>169048</b> | <b>14439<sup>(2)</sup></b> |
| Caspian Sea .....                  | 7347            | 32098         | 2505             | 260220         | 1882             | 2701                        | 295              | 65161         | 2667                       |
| Persian Gulf and<br>Oman Sea ..... | 20321           | 44025         | 6184             | 120526         | 4040             | 4996                        | 505              | 60657         | 9736                       |
| Lake Orumiyeh .....                | 2487            | 8048          | 927              | 100812         | 1114             | 1935                        | 210              | 10815         | 238                        |
| Central Plateau .....              | 29135           | 128850        | 20425            | 132833         | 4452             | 25723                       | 2825             | 28323         | 1553                       |
| Eastern Border .....               | 1301            | 1876          | 598              | 8707           | 346              | 3205                        | 301              | 1628          | 57                         |
| Qareh Qum.....                     | 2095            | 6170          | 1520             | 4171           | 114              | 2897                        | 271              | 2464          | 191                        |

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

2. Since the aquatic years 1396-97 and 1397-98 have been the years with abundant water, rainfall increase has been effective on spring discharge.

Source: Ministry of Energy.

**9.2. UNDERGROUND WATER RESOURCES AND THEIR ANNUAL DISCHARGE<sup>(1)</sup> BY REGIONAL WATER ORGANIZATIONS, AQUATIC YEAR 1397-1398 (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 |
| <b>Total .....</b>          | <b>62684</b>    | <b>221067</b> | <b>32157</b>     | <b>627269</b>  | <b>11946</b>     | <b>41457</b> | <b>4405</b>      | <b>169048</b> | <b>14439</b>     |
| East Azarbayejan.....       | 1767            | 5718          | 620              | 58043          | 616              | 2134         | 321              | 4614          | 212              |
| West Azarbayejan .....      | 1755            | 5111          | 742              | 58266          | 704              | 543          | 51               | 851           | 259              |
| Ardebil .....               | 409             | 1205          | 99               | 4493           | 122              | 246          | 19               | 4784          | 170              |
| Esfahan .....               | 3749            | 25653         | 1845             | 37724          | 589              | 4209         | 276              | 12537         | 1040             |
| Alborz .....                | 832             | 5290          | 663              | 10582          | 45               | 150          | 10               | 1738          | 115              |
| Ilam .....                  | 424             | 1338          | 283              | 812            | 31               | 4            | 1                | 744           | 110              |
| Bushehr .....               | 426             | 1999          | 120              | 13371          | 272              | 54           | 7                | 213           | 29               |
| Tehran .....                | 2723            | 31496         | 2255             | 11861          | 61               | 536          | 249              | 2503          | 160              |
| Chaharmahal&Bakhtiari ..... | 2187            | 2237          | 167              | 1767           | 158              | 1011         | 126              | 4760          | 1738             |
| South Khorasan .....        | 1207            | 2223          | 785              | 1076           | 92               | 6252         | 267              | 2189          | 65               |
| Khorasan-e-Razavi.....      | 5015            | 14074         | 3888             | 8592           | 202              | 6770         | 577              | 6337          | 351              |
| North Khorasan .....        | 875             | 1947          | 351              | 4841           | 87               | 648          | 84               | 3037          | 355              |
| Khuzestan .....             | 2793            | 5311          | 1164             | 8611           | 424              | 3            | 1                | 1405          | 1205             |
| Zanjan .....                | 1155            | 3948          | 670              | 13762          | 298              | 725          | 33               | 5834          | 156              |
| Semnan.....                 | 949             | 2951          | 699              | 1957           | 35               | 720          | 84               | 1695          | 115              |
| Sistan&Baluchestan .....    | 1983            | 1446          | 376              | 17530          | 1190             | 1282         | 377              | 897           | 42               |
| Fars .....                  | 8006            | 31924         | 4351             | 52384          | 2430             | 1756         | 403              | 2220          | 1031             |
| Qazvin .....                | 1491            | 5629          | 1361             | 4947           | 54               | 358          | 35               | 6959          | 42               |
| Qom .....                   | 623             | 1293          | 493              | 4939           | 36               | 733          | 81               | 1341          | 15               |
| Kordestan .....             | 1058            | 2754          | 357              | 15510          | 179              | 519          | 24               | 38728         | 499              |
| Kerman .....                | 6397            | 16046         | 4496             | 18539          | 1339             | 2394         | 457              | 1596          | 111              |
| Kermanshah .....            | 3218            | 3567          | 419              | 11585          | 431              | 402          | 48               | 11187         | 2321             |
| Kohgiluyeh&Boyerahmad       | 1840            | 1033          | 65               | 3162           | 65               | 87           | 7                | 6540          | 1771             |
| Golestan .....              | 1045            | 8871          | 391              | 26942          | 194              | 344          | 22               | 3766          | 440              |
| Gilan.....                  | 862             | 1161          | 191              | 54016          | 269              | 1            | 1                | 15782         | 403              |
| Lorestan.....               | 965             | 3330          | 484              | 3880           | 122              | 1176         | 31               | 5692          | 329              |
| Mazandaran.....             | 1816            | 12004         | 535              | 134963         | 605              | 34           | 1                | 14417         | 678              |
| Markazi .....               | 2924            | 7818          | 1908             | 7565           | 344              | 4254         | 497              | 3159          | 176              |
| Hormozgan.....              | 1232            | 2438          | 397              | 26950          | 675              | 195          | 33               | 750           | 129              |
| Hamedan .....               | 1983            | 8303          | 1298             | 7822           | 227              | 1287         | 113              | 2386          | 346              |
| Yazd .....                  | 990             | 2949          | 699              | 777            | 68               | 2630         | 184              | 387           | 41               |

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<sup>(1)</sup> BY REGIONAL WATER ORGANIZATIONS

(mln cu m)

| Year and reservoir dams          | Inflow <sup>(2)</sup> | Outflow <sup>(2)</sup>     |                                                |                      | Water consumption <sup>(3)</sup> |              |             |                    |                      |
|----------------------------------|-----------------------|----------------------------|------------------------------------------------|----------------------|----------------------------------|--------------|-------------|--------------------|----------------------|
|                                  |                       | Total                      | From turbines ducts for electricity generation | Other <sup>(4)</sup> | Total                            | Agriculture  | Drinking    | Manu-<br>facturing | Other <sup>(5)</sup> |
| 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                 |
| 1394 .....                       | 36155                 | 30567                      | 43461                                          | -                    | 25585                            | 16703        | 3043        | 739                | 5099                 |
| 1395 .....                       | 40695                 | 39816                      | 49268                                          | -                    | 30301                            | 19694        | 3182        | 700                | 6724                 |
| 1396 .....                       | 33796                 | 37251                      | 46994                                          | -                    | 28608                            | 19655        | 3202        | 698                | 5106                 |
| 1397 .....                       | 46382                 | 37888                      | 48051                                          | 17558                | 29347                            | 14236        | 3086        | 676                | 11349                |
| <b>1398 .....</b>                | <b>80170</b>          | <b>80527<sup>(6)</sup></b> | <b>89157</b>                                   | <b>47385</b>         | <b>56358<sup>(6)</sup></b>       | <b>24632</b> | <b>3442</b> | <b>713</b>         | <b>27571</b>         |
| <b>East Azarbayejan..</b>        | <b>5648</b>           | <b>5684</b>                | <b>3724</b>                                    | <b>5860</b>          | <b>2322</b>                      | <b>1659</b>  | <b>49</b>   | <b>10</b>          | <b>604</b>           |
| Aras <sup>(2,7)</sup> .....      | 4020                  | 4055                       | 3724                                           | 332                  | 1902                             | 1475         | 0           | 0                  | 427                  |
| Sattarkhanahar .....             | 59                    | 39                         | 0                                              | 39                   | 35                               | 21           | 7           | 5                  | 2                    |
| Sahand <sup>(8)</sup> .....      | 192                   | 196                        | 0                                              | 196                  | 52                               | 17           | 4           | 0                  | 31                   |
| Zonuz .....                      | 10                    | 9                          | 0                                              | 9                    | 5                                | 4            | 0           | 0                  | 0                    |
| Aydoghamush .....                | 122                   | 123                        | 0                                              | 123                  | 61                               | 45           | 0           | 0                  | 16                   |
| Arasbaran .....                  | 11                    | 13                         | 0                                              | 13                   | 11                               | 11           | 0           | 0                  | 0                    |
| Khodaafarin <sup>(2)</sup> ..... | 4863                  | 4882                       | 0                                              | 4882                 | 0                                | 0            | 0           | 0                  | 0                    |
| Alavian .....                    | 130                   | 125                        | 0                                              | 125                  | 122                              | 51           | 14          | 6                  | 51                   |
| Nahand .....                     | 50                    | 46                         | 0                                              | 46                   | 44                               | 0            | 23          | 0                  | 21                   |
| Tajyar-e-Sarab .....             | 1                     | 2                          | 0                                              | 2                    | 2                                | 2            | 0           | 0                  | 0                    |
| Kord Kandi .....                 | 5                     | 7                          | 0                                              | 7                    | 4                                | 4            | 0           | 0                  | 0                    |
| Ghale chai .....                 | 83                    | 87                         | 0                                              | 87                   | 85                               | 29           | 0           | 0                  | 56                   |
| <b>West Azarbayejan.</b>         | <b>5509</b>           | <b>5825</b>                | <b>819</b>                                     | <b>5006</b>          | <b>3420</b>                      | <b>760</b>   | <b>281</b>  | <b>9</b>           | <b>2370</b>          |
| Barun .....                      | 89                    | 97                         | 0                                              | 97                   | 88                               | 77           | 11          | 0                  | 0                    |
| Shahid Ghanbari ....             | 25                    | 28                         | 0                                              | 28                   | 23                               | 23           | 0           | 0                  | 0                    |
| Aras2 .....                      | 6                     | 3                          | 0                                              | 3                    | 2                                | 2            | 0           | 0                  | 0                    |

9.3. STATISTICS ON LARGE RESERVOIR DAMS<sup>(1)</sup> BY REGIONAL WATER

## ORGANIZATIONS (continued)

(mln cu m)

| Year and reservoir dams          | Inflow <sup>(2)</sup> | Outflow <sup>(2)</sup> |                                                |                      | Water consumption <sup>(3)</sup> |             |            |                |                      |
|----------------------------------|-----------------------|------------------------|------------------------------------------------|----------------------|----------------------------------|-------------|------------|----------------|----------------------|
|                                  |                       | Total                  | From turbines ducts for electricity generation | Other <sup>(4)</sup> | Total                            | Agriculture | Drinking   | Manu-facturing | Other <sup>(5)</sup> |
| Aghchai .....                    | 153                   | 175                    | 0                                              | 175                  | 93                               | 71          | 0          | 0              | 21                   |
| Bukan .....                      | 2242                  | 2371                   | 0                                              | 2371                 | 2316                             | 336         | 182        | 3              | 1795                 |
| Shahrchay .....                  | 241                   | 259                    | 0                                              | 259                  | 252                              | 53          | 57         | 0              | 141                  |
| Mahabad .....                    | 316                   | 353                    | 202                                            | 151                  | 343                              | 97          | 19         | 1              | 227                  |
| Hasanlu .....                    | 25                    | 42                     | 0                                              | 42                   | 31                               | 24          | 0          | 0              | 6                    |
| Deriq Salmas .....               | 28                    | 27                     | 0                                              | 27                   | 26                               | 9           | 0          | 0              | 17                   |
| Zola .....                       | 187                   | 167                    | 0                                              | 167                  | 163                              | 41          | 2          | 0              | 120                  |
| Qiqaj .....                      | 19                    | 19                     | 0                                              | 19                   | 18                               | 18          | 0          | 0              | 0                    |
| Saruq .....                      | 69                    | 57                     | 0                                              | 57                   | 50                               | 3           | 6          | 0              | 40                   |
| Silveh .....                     | 225                   | 238                    | 0                                              | 238                  | 12                               | 4           | 0          | 5              | 2                    |
| Sardasht .....                   | 1884                  | 1989                   | 616                                            | 1372                 | 4                                | 0           | 4          | 0              | 0                    |
| <b>Ardebil .....</b>             | <b>176</b>            | <b>170</b>             | <b>0</b>                                       | <b>170</b>           | <b>154</b>                       | <b>58</b>   | <b>39</b>  | <b>0</b>       | <b>58</b>            |
| Qurichay .....                   | 11                    | 8                      | 0                                              | 8                    | 8                                | 8           | 0          | 0              | 0                    |
| Gilarlu .....                    | 1                     | 2                      | 0                                              | 2                    | 1                                | 1           | 0          | 0              | 0                    |
| Moghadasardebili .....           | 7                     | 7                      | 0                                              | 7                    | 6                                | 2           | 0          | 0              | 4                    |
| Saqizchi .....                   | 8                     | 8                      | 0                                              | 8                    | 5                                | 4           | 0          | 0              | 1                    |
| Yamchi .....                     | 74                    | 70                     | 0                                              | 70                   | 68                               | 24          | 39         | 0              | 6                    |
| Sabalan .....                    | 53                    | 53                     | 0                                              | 53                   | 49                               | 19          | 0          | 0              | 30                   |
| Giwi .....                       | 22                    | 23                     | 0                                              | 23                   | 18                               | 0           | 0          | 0              | 18                   |
| <b>Esfahan .....</b>             | <b>2550</b>           | <b>2317</b>            | <b>1724</b>                                    | <b>593</b>           | <b>1850</b>                      | <b>1227</b> | <b>390</b> | <b>58</b>      | <b>175</b>           |
| Hana .....                       | 16                    | 13                     | 0                                              | 13                   | 10                               | 10          | 0          | 0              | 0                    |
| Qareh Aqach .....                | 15                    | 5                      | 0                                              | 5                    | 2                                | 2           | 0          | 0              | 0                    |
| Zayandehrud .....                | 2069                  | 1870                   | 1724                                           | 147                  | 1826                             | 1207        | 390        | 58             | 172                  |
| Golpayegan <sup>(9)</sup> .....  | 425                   | 410                    | 0                                              | 410                  | 2                                | 0           | 0          | 0              | 2                    |
| Khamiran .....                   | 14                    | 14                     | 0                                              | 14                   | 7                                | 7           | 0          | 0              | 0                    |
| Aghcheh .....                    | 2                     | 0                      | 0                                              | 0                    | 0                                | 0           | 0          | 0              | 0                    |
| Kamaneh .....                    | 4                     | 0                      | 0                                              | 0                    | 0                                | 0           | 0          | 0              | 0                    |
| Baghkal-e-Khansar .....          | 7                     | 5                      | 0                                              | 5                    | 3                                | 1           | 0          | 0              | 1                    |
| <b>Ilam .....</b>                | <b>750</b>            | <b>773</b>             | <b>0</b>                                       | <b>773</b>           | <b>222</b>                       | <b>75</b>   | <b>20</b>  | <b>0</b>       | <b>127</b>           |
| Ilam .....                       | 219                   | 224                    | 0                                              | 224                  | 61                               | 21          | 20         | 0              | 20                   |
| Doborj .....                     | 468                   | 483                    | 0                                              | 483                  | 144                              | 54          | 0          | 0              | 90                   |
| Kangir .....                     | 64                    | 66                     | 0                                              | 66                   | 17                               | 0           | 0          | 0              | 17                   |
| <b>Bushehr .....</b>             | <b>267</b>            | <b>187</b>             | <b>0</b>                                       | <b>187</b>           | <b>152</b>                       | <b>124</b>  | <b>0</b>   | <b>0</b>       | <b>28</b>            |
| Reis Ali delvari .....           | 267                   | 187                    | 0                                              | 187                  | 152                              | 124         | 0          | 0              | 28                   |
| <b>Tehran .....</b>              | <b>2538</b>           | <b>2277</b>            | <b>1703</b>                                    | <b>953</b>           | <b>2043</b>                      | <b>623</b>  | <b>911</b> | <b>5</b>       | <b>504</b>           |
| Lar .....                        | 520                   | 505                    | 243                                            | 266                  | 500                              | 95          | 243        | 0              | 162                  |
| Taleghan .....                   | 657                   | 653                    | 402                                            | 252                  | 475                              | 243         | 141        | 0              | 91                   |
| Karaj .....                      | 573                   | 557                    | 549                                            | 7                    | 555                              | 52          | 266        | 0              | 237                  |
| Latiyan <sup>(2)</sup> .....     | 525                   | 517                    | 508                                            | 9                    | 183                              | 0           | 168        | 1              | 13                   |
| Mamlo <sup>(2)</sup> .....       | 462                   | 420                    | 0                                              | 420                  | 331                              | 234         | 92         | 4              | 0                    |
| <b>Chaharmahal&amp;Bakhtiari</b> | <b>55</b>             | <b>33</b>              | <b>0</b>                                       | <b>33</b>            | <b>23</b>                        | <b>22</b>   | <b>0</b>   | <b>1</b>       | <b>0</b>             |
| Choghakhor .....                 | 42                    | 24                     | 0                                              | 24                   | 15                               | 15          | 0          | 1              | 0                    |
| Naghan .....                     | 6                     | 2                      | 0                                              | 2                    | 1                                | 1           | 0          | 0              | 0                    |
| Surak .....                      | 7                     | 7                      | 0                                              | 7                    | 6                                | 6           | 0          | 0              | 0                    |



**9.3. STATISTICS ON LARGE RESERVOIR DAMS<sup>(1)</sup> BY REGIONAL WATER ORGANIZATIONS (continued)**

(mln cu m)

| Year and reservoir<br>Dams              | Inflow <sup>(2)</sup> | Outflow <sup>(2)</sup> |                                                            |                      | Water consumption <sup>(3)</sup> |              |            |                    |                      |
|-----------------------------------------|-----------------------|------------------------|------------------------------------------------------------|----------------------|----------------------------------|--------------|------------|--------------------|----------------------|
|                                         |                       | Total                  | From<br>turbines<br>ducts for<br>electricity<br>generation | Other <sup>(4)</sup> | Total                            | Agriculture  | Drinking   | Manu-<br>facturing | Other <sup>(5)</sup> |
| <b>South Khorasan.....</b>              | <b>25</b>             | <b>26</b>              | <b>0</b>                                                   | <b>26</b>            | <b>13</b>                        | <b>9</b>     | <b>3</b>   | <b>0</b>           | <b>1</b>             |
| Kerit .....                             | 4                     | 5                      | 0                                                          | 5                    | 1                                | 1            | 0          | 0                  | 0                    |
| Darreh Bid.....                         | 3                     | 2                      | 0                                                          | 2                    | 1                                | 1            | 0          | 0                  | 0                    |
| Parsa .....                             | 1                     | 1                      | 0                                                          | 1                    | 1                                | 1            | 0          | 0                  | 0                    |
| Farrokhi .....                          | 2                     | 1                      | 0                                                          | 1                    | 1                                | 1            | 0          | 0                  | 0                    |
| Nahrain.....                            | 11                    | 13                     | 0                                                          | 13                   | 7                                | 4            | 3          | 0                  | 0                    |
| Haji Abad .....                         | 1                     | 2                      | 0                                                          | 2                    | 1                                | 1            | 0          | 0                  | 0                    |
| Asadyieh .....                          | 3                     | 2                      | 0                                                          | 2                    | 0                                | 0            | 0          | 0                  | 0                    |
| <b>Khorasan -e-Razavi.....</b>          | <b>941</b>            | <b>538</b>             | <b>0</b>                                                   | <b>538</b>           | <b>266</b>                       | <b>136</b>   | <b>108</b> | <b>0</b>           | <b>22</b>            |
| Tabarak Abad.....                       | 21                    | 11                     | 0                                                          | 11                   | 8                                | 4            | 1          | 0                  | 3                    |
| Shahid Yaghobi.....                     | 2                     | 1                      | 0                                                          | 1                    | 0                                | 0            | 0          | 0                  | 0                    |
| Sangerd .....                           | 18                    | 6                      | 0                                                          | 6                    | 6                                | 6            | 0          | 0                  | 0                    |
| Komayestan.....                         | 14                    | 12                     | 0                                                          | 12                   | 1                                | 1            | 0          | 0                  | 0                    |
| Yam.....                                | 11                    | 10                     | 0                                                          | 10                   | 2                                | 2            | 0          | 0                  | 0                    |
| Dusti <sup>(6)</sup> .....              | 641                   | 331                    | 0                                                          | 331                  | 130                              | 46           | 83         | 0                  | 0                    |
| Toroq.....                              | 24                    | 11                     | 0                                                          | 11                   | 11                               | 1            | 10         | 0                  | 0                    |
| Kardeh.....                             | 12                    | 7                      | 0                                                          | 7                    | 7                                | 5            | 0          | 0                  | 2                    |
| Dehqan-e-Taybad .....                   | 4                     | 3                      | 0                                                          | 3                    | 2                                | 2            | 0          | 0                  | 0                    |
| Fariman .....                           | 21                    | 21                     | 0                                                          | 21                   | 13                               | 13           | 0          | 0                  | 0                    |
| Zavin Kalat.....                        | 3                     | 3                      | 0                                                          | 3                    | 1                                | 1            | 0          | 0                  | 0                    |
| Chali Darreh.....                       | 1                     | 1                      | 0                                                          | 1                    | 1                                | 1            | 0          | 0                  | 0                    |
| Dolatabad .....                         | 13                    | 14                     | 0                                                          | 14                   | 6                                | 2            | 0          | 0                  | 4                    |
| Daroungar .....                         | 16                    | 1                      | 0                                                          | 1                    | 1                                | 1            | 0          | 0                  | 0                    |
| Sad-e- Khaf .....                       | 13                    | 9                      | 0                                                          | 9                    | 7                                | 7            | 0          | 0                  | 0                    |
| Ardak Chenaran .....                    | 38                    | 24                     | 0                                                          | 24                   | 24                               | 10           | 13         | 0                  | 0                    |
| Qareh Tikan .....                       | 47                    | 40                     | 0                                                          | 40                   | 30                               | 20           | 0          | 0                  | 10                   |
| Chahchahe.....                          | 22                    | 20                     | 0                                                          | 20                   | 15                               | 15           | 0          | 0                  | 0                    |
| Bar.....                                | 21                    | 13                     | 0                                                          | 13                   | 3                                | 0            | 0          | 0                  | 3                    |
| <b>North Khorasan.....</b>              | <b>261</b>            | <b>231</b>             | <b>0</b>                                                   | <b>231</b>           | <b>101</b>                       | <b>46</b>    | <b>23</b>  | <b>0</b>           | <b>31</b>            |
| Bidvaz .....                            | 65                    | 59                     | 0                                                          | 59                   | 26                               | 14           | 6          | 0                  | 6                    |
| Barzu .....                             | 46                    | 25                     | 0                                                          | 25                   | 21                               | 17           | 4          | 0                  | 0                    |
| Shirin Darreh.....                      | 131                   | 138                    | 0                                                          | 138                  | 50                               | 12           | 13         | 0                  | 25                   |
| Chary .....                             | 5                     | 3                      | 0                                                          | 3                    | 2                                | 2            | 0          | 0                  | 0                    |
| Gelul.....                              | 2                     | 1                      | 0                                                          | 1                    | 0                                | 0            | 0          | 0                  | 0                    |
| Sumbar .....                            | 12                    | 5                      | 0                                                          | 5                    | 2                                | 2            | 0          | 0                  | 0                    |
| <b>Khuzestan .....</b>                  | <b>41989</b>          | <b>44478</b>           | <b>75093</b>                                               | <b>19430</b>         | <b>36881</b>                     | <b>15806</b> | <b>725</b> | <b>572</b>         | <b>19778</b>         |
| Karkheh <sup>(2)</sup> .....            | 12511                 | 13211                  | 7065                                                       | 6146                 | 10940                            | 4476         | 240        | 24                 | 6200                 |
| Dez <sup>(10)</sup> .....               | 12544                 | 12660                  | 6878                                                       | 5783                 | 10495                            | 4128         | 10         | 49                 | 6308                 |
| Shahid Abbaspour <sup>(8,2)</sup> ..... | 12883                 | 13413                  | 12192                                                      | 1220                 | 0                                | 0            | 0          | 0                  | 0                    |
| Karun 3 <sup>(2, 9)</sup> .....         | 10204                 | 10337                  | 9669                                                       | 668                  | 0                                | 0            | 0          | 0                  | 0                    |
| Marun.....                              | 1615                  | 2114                   | 1467                                                       | 647                  | 2079                             | 1322         | 24         | 22                 | 711                  |
| Masjed-Soleyman <sup>(2)</sup> .....    | 15204                 | 15186                  | 14634                                                      | 553                  | 0                                | 0            | 0          | 0                  | 0                    |

**9.3. STATISTICS ON LARGE RESERVOIR DAMS<sup>(1)</sup> BY REGIONAL WATER****ORGANIZATIONS (continued)****(mln cu m)**

| Year and reservoir<br>Dams              | Inflow <sup>(2)</sup> | Outflow <sup>(3)</sup> |                                                            |                      | Water consumption <sup>(4)</sup> |             |            |                    |                      |
|-----------------------------------------|-----------------------|------------------------|------------------------------------------------------------|----------------------|----------------------------------|-------------|------------|--------------------|----------------------|
|                                         |                       | Total                  | From<br>turbines<br>ducts for<br>electricity<br>generation | Other <sup>(5)</sup> | Total                            | Agriculture | Drinking   | Manu-<br>facturing | Other <sup>(5)</sup> |
| Gotvand-e-Olia <sup>(2)</sup> .....     | 15519                 | 15961                  | 14239                                                      | 1721                 | 13149                            | 5702        | 451        | 477                | 6520                 |
| Jareh .....                             | 203                   | 233                    | 0                                                          | 233                  | 217                              | 178         | 0          | 0                  | 39                   |
| Seymareh <sup>(2)</sup> .....           | 5659                  | 5644                   | 3307                                                       | 2337                 | 0                                | 0           | 0          | 0                  | 0                    |
| Karun 4 <sup>(2, 9, 10)</sup> .....     | 5694                  | 5765                   | 5642                                                       | 123                  | 0                                | 0           | 0          | 0                  | 0                    |
| <b>Zanjan</b> .....                     | <b>323</b>            | <b>250</b>             | <b>0</b>                                                   | <b>250</b>           | <b>168</b>                       | <b>12</b>   | <b>27</b>  | <b>0</b>           | <b>129</b>           |
| Tahem .....                             | 41                    | 25                     | 0                                                          | 25                   | 23                               | 0           | 23         | 0                  | 0                    |
| Golabar .....                           | 25                    | 9                      | 0                                                          | 9                    | 4                                | 4           | 0          | 0                  | 0                    |
| Kineh Vers .....                        | 54                    | 55                     | 0                                                          | 55                   | 45                               | 1           | 4          | 0                  | 39                   |
| Talevar .....                           | 203                   | 160                    | 0                                                          | 160                  | 96                               | 6           | 0          | 0                  | 90                   |
| <b>Semnan</b> .....                     | <b>29</b>             | <b>25</b>              | <b>0</b>                                                   | <b>25</b>            | <b>15</b>                        | <b>11</b>   | <b>4</b>   | <b>0</b>           | <b>1</b>             |
| Kalpush .....                           | 1                     | 6                      | 0                                                          | 6                    | 0                                | 0           | 0          | 0                  | 0                    |
| Damghan .....                           | 28                    | 19                     | 0                                                          | 19                   | 15                               | 11          | 4          | 0                  | 1                    |
| <b>Sistan&amp;Baluchestan</b> .....     | <b>1719</b>           | <b>1276</b>            | <b>0</b>                                                   | <b>2171</b>          | <b>755</b>                       | <b>482</b>  | <b>78</b>  | <b>0</b>           | <b>195</b>           |
| Chahehnimeh 1, 2,3 <sup>(2)</sup> ..... | 1006                  | 952                    | 0                                                          | 952                  | 339                              | 259         | 66         | 0                  | 14                   |
| Mashkid-e-Olia .....                    | 58                    | 10                     | 0                                                          | 10                   | 0                                | 0           | 0          | 0                  | 0                    |
| Chahehnimeh 4 <sup>(2)</sup> .....      | 670                   | 476                    | 0                                                          | 476                  | 221                              | 208         | 2          | 0                  | 11                   |
| Pishin .....                            | 454                   | 449                    | 0                                                          | 449                  | 118                              | 15          | 3          | 0                  | 100                  |
| Shai Kelk .....                         | 13                    | 4                      | 0                                                          | 4                    | 0                                | 0           | 0          | 0                  | 0                    |
| Zirdan .....                            | 353                   | 260                    | 0                                                          | 260                  | 74                               | 0           | 4          | 0                  | 70                   |
| Kheirabad .....                         | 40                    | 20                     | 0                                                          | 20                   | 3                                | 0           | 3          | 0                  | 0                    |
| <b>Fars</b> .....                       | <b>1301</b>           | <b>891</b>             | <b>291</b>                                                 | <b>753</b>           | <b>642</b>                       | <b>393</b>  | <b>80</b>  | <b>14</b>          | <b>155</b>           |
| Salman Farsi .....                      | 468                   | 311                    | 0                                                          | 311                  | 156                              | 94          | 24         | 0                  | 38                   |
| Tangab .....                            | 46                    | 31                     | 0                                                          | 31                   | 9                                | 1           | 0          | 0                  | 8                    |
| Rudbal Darab .....                      | 118                   | 90                     | 0                                                          | 90                   | 45                               | 0           | 1          | 0                  | 45                   |
| Dorudzan <sup>(2)</sup> .....           | 612                   | 426                    | 185                                                        | 241                  | 374                              | 258         | 55         | 14                 | 46                   |
| Izadkhast .....                         | 7                     | 2                      | 0                                                          | 2                    | 0                                | 0           | 0          | 0                  | 0                    |
| Mollasadra <sup>(2)</sup> .....         | 181                   | 161                    | 106                                                        | 54                   | 44                               | 37          | 0          | 0                  | 7                    |
| Sivand .....                            | 12                    | 12                     | 0                                                          | 12                   | 11                               | 1           | 0          | 0                  | 10                   |
| Cheshmeh Ashegh .....                   | 9                     | 12                     | 0                                                          | 12                   | 3                                | 0           | 0          | 0                  | 3                    |
| <b>Qom</b> .....                        | <b>542</b>            | <b>410</b>             | <b>0</b>                                                   | <b>410</b>           | <b>383</b>                       | <b>63</b>   | <b>131</b> | <b>0</b>           | <b>188</b>           |
| Panzdah Khordad .....                   | 136                   | 78                     | 0                                                          | 78                   | 64                               | 0           | 5          | 0                  | 59                   |
| Kucheri .....                           | 406                   | 332                    | 0                                                          | 332                  | 319                              | 63          | 127        | 0                  | 129                  |
| <b>Kordestan</b> .....                  | <b>1717</b>           | <b>1788</b>            | <b>267</b>                                                 | <b>1521</b>          | <b>966</b>                       | <b>239</b>  | <b>63</b>  | <b>2</b>           | <b>662</b>           |
| Sural .....                             | 16                    | 16                     | 0                                                          | 16                   | 2                                | 0           | 0          | 0                  | 2                    |
| Sang siyah .....                        | 23                    | 13                     | 0                                                          | 13                   | 8                                | 2           | 0          | 0                  | 7                    |
| Qeshleq .....                           | 185                   | 212                    | 0                                                          | 212                  | 192                              | 6           | 58         | 2                  | 126                  |
| Zarivar .....                           | 46                    | 37                     | 0                                                          | 37                   | 12                               | 0           | 0          | 0                  | 12                   |
| Baneh .....                             | 7                     | 8                      | 0                                                          | 8                    | 8                                | 0           | 5          | 0                  | 2                    |
| Azad .....                              | 435                   | 500                    | 267                                                        | 233                  | 481                              | 217         | 0          | 0                  | 264                  |

9.3. STATISTICS ON LARGE RESERVOIR DAMS<sup>(1)</sup> BY REGIONAL WATER

## ORGANIZATIONS (continued)

(mln cu m)

| Year and reservoir<br>Dams        | Inflow <sup>(2)</sup> | Outflow <sup>(3)</sup> |                                                            |                      | Water consumption <sup>(4)</sup> |             |            |                    |                      |
|-----------------------------------|-----------------------|------------------------|------------------------------------------------------------|----------------------|----------------------------------|-------------|------------|--------------------|----------------------|
|                                   |                       | Total                  | From<br>turbines<br>ducts for<br>electricity<br>generation | Other <sup>(5)</sup> | Total                            | Agriculture | Drinking   | Manu-<br>facturing | Other <sup>(5)</sup> |
| Garan.....                        | 205                   | 215                    | 0                                                          | 215                  | 53                               | 8           | 0          | 0                  | 45                   |
| Zivieh .....                      | 34                    | 47                     | 0                                                          | 47                   | 18                               | 7           | 0          | 0                  | 11                   |
| Siazakh.....                      | 536                   | 515                    | 0                                                          | 515                  | 120                              | 0           | 0          | 0                  | 120                  |
| Cheragh Veis.....                 | 230                   | 225                    | 0                                                          | 225                  | 73                               | 0           | 0          | 0                  | 73                   |
| <b>Kerman .....</b>               | <b>615</b>            | <b>454</b>             | <b>173</b>                                                 | <b>282</b>           | <b>314</b>                       | <b>158</b>  | <b>12</b>  | <b>1</b>           | <b>142</b>           |
| Jiroft .....                      | 334                   | 201                    | 173                                                        | 29                   | 182                              | 106         | 0          | 0                  | 77                   |
| Tanguiyeh .....                   | 13                    | 11                     | 0                                                          | 11                   | 10                               | 2           | 7          | 0                  | 0                    |
| Nesa.....                         | 241                   | 219                    | 0                                                          | 219                  | 110                              | 47          | 0          | 0                  | 63                   |
| Baft .....                        | 27                    | 23                     | 0                                                          | 23                   | 11                               | 3           | 5          | 1                  | 2                    |
| <b>Kermanshah .....</b>           | <b>3600</b>           | <b>3849</b>            | <b>2171</b>                                                | <b>1835</b>          | <b>1074</b>                      | <b>157</b>  | <b>28</b>  | <b>0</b>           | <b>890</b>           |
| Gavshan <sup>(2)</sup> .....      | 366                   | 394                    | 0                                                          | 394                  | 214                              | 117         | 28         | 0                  | 70                   |
| Soleymanshah <sup>(2)</sup> ..... | 165                   | 173                    | 0                                                          | 173                  | 21                               | 18          | 0          | 0                  | 3                    |
| Gilangharb .....                  | 14                    | 14                     | 0                                                          | 14                   | 12                               | 0           | 0          | 0                  | 11                   |
| Shiyan .....                      | 5                     | 4                      | 0                                                          | 4                    | 4                                | 0           | 0          | 0                  | 4                    |
| Azadi.....                        | 142                   | 164                    | 0                                                          | 164                  | 156                              | 5           | 0          | 0                  | 151                  |
| Zagros .....                      | 37                    | 37                     | 0                                                          | 37                   | 17                               | 16          | 0          | 0                  | 1                    |
| Tang-e-Hammam .....               | 88                    | 100                    | 0                                                          | 100                  | 86                               | 1           | 0          | 0                  | 85                   |
| Darian .....                      | 2926                  | 3104                   | 2171                                                       | 933                  | 550                              | 0           | 0          | 0                  | 550                  |
| Sarab- e- Gilangharb.....         | 14                    | 14                     | 0                                                          | 14                   | 14                               | 0           | 0          | 0                  | 14                   |
| <b>Kohgiluyeh&amp;Boyerahmad</b>  | <b>582</b>            | <b>589</b>             | <b>0</b>                                                   | <b>589</b>           | <b>346</b>                       | <b>53</b>   | <b>181</b> | <b>3</b>           | <b>108</b>           |
| Kosar.....                        | 563                   | 566                    | 0                                                          | 566                  | 344                              | 53          | 181        | 3                  | 107                  |
| Shah Qasem .....                  | 19                    | 24                     | 0                                                          | 24                   | 2                                | 0           | 0          | 0                  | 2                    |
| <b>Golestan.....</b>              | <b>657</b>            | <b>793</b>             | <b>0</b>                                                   | <b>1279</b>          | <b>334</b>                       | <b>127</b>  | <b>0</b>   | <b>18</b>          | <b>188</b>           |
| Voshmgir <sup>(2)</sup> .....     | 541                   | 577                    | 0                                                          | 577                  | 211                              | 55          | 0          | 0                  | 156                  |
| Golestan <sup>(2)</sup> .....     | 438                   | 482                    | 0                                                          | 482                  | 61                               | 40          | 0          | 3                  | 18                   |
| Alagol .....                      | 53                    | 59                     | 0                                                          | 59                   | 15                               | 0           | 0          | 15                 | 0                    |
| Bustan <sup>(2)</sup> .....       | 73                    | 95                     | 0                                                          | 95                   | 18                               | 12          | 0          | 0                  | 6                    |
| Nomel(Kosar) .....                | 7                     | 6                      | 0                                                          | 6                    | 4                                | 4           | 0          | 0                  | 0                    |
| Daneshmand .....                  | 20                    | 24                     | 0                                                          | 24                   | 2                                | 1           | 0          | 0                  | 0                    |
| Negarestan .....                  | 21                    | 36                     | 0                                                          | 36                   | 22                               | 14          | 0          | 0                  | 8                    |
| <b>Gilan.....</b>                 | <b>4182</b>           | <b>3943</b>            | <b>1951</b>                                                | <b>1992</b>          | <b>2583</b>                      | <b>1919</b> | <b>126</b> | <b>10</b>          | <b>529</b>           |
| Sefidrud .....                    | 3947                  | 3743                   | 1791                                                       | 1953                 | 2418                             | 1902        | 16         | 10                 | 490                  |
| Shahr-e-Bijar.....                | 234                   | 200                    | 161                                                        | 39                   | 165                              | 17          | 110        | 0                  | 39                   |
| <b>Lorestan.....</b>              | <b>1751</b>           | <b>1751</b>            | <b>1007</b>                                                | <b>744</b>           | <b>655</b>                       | <b>131</b>  | <b>0</b>   | <b>0</b>           | <b>524</b>           |
| Maruk.....                        | 343                   | 345                    | 0                                                          | 345                  | 266                              | 46          | 0          | 0                  | 220                  |
| Tanghaleh .....                   | 3                     | 4                      | 0                                                          | 4                    | 2                                | 0           | 0          | 0                  | 1                    |
| Kaznar.....                       | 2                     | 3                      | 0                                                          | 3                    | 2                                | 1           | 0          | 0                  | 1                    |
| Khanabad .....                    | 44                    | 40                     | 0                                                          | 40                   | 38                               | 12          | 0          | 0                  | 26                   |
| Eyvashan.....                     | 104                   | 106                    | 0                                                          | 106                  | 94                               | 28          | 0          | 0                  | 65                   |
| Hozian.....                       | 122                   | 113                    | 0                                                          | 113                  | 43                               | 43          | 0          | 0                  | 0                    |
| Rudbar.....                       | 1132                  | 1141                   | 1007                                                       | 134                  | 210                              | 0           | 0          | 0                  | 210                  |
| <b>Mazandaran .....</b>           | <b>532</b>            | <b>464</b>             | <b>171</b>                                                 | <b>294</b>           | <b>342</b>                       | <b>209</b>  | <b>42</b>  | <b>0</b>           | <b>91</b>            |
| Shahid Rajaei .....               | 287                   | 233                    | 171                                                        | 62                   | 205                              | 144         | 16         | 0                  | 46                   |
| Shiyadeh .....                    | 4                     | 3                      | 0                                                          | 3                    | 2                                | 2           | 0          | 0                  | 0                    |
| Berenjestanak.....                | 12                    | 9                      | 0                                                          | 9                    | 9                                | 3           | 0          | 0                  | 6                    |

### 9.3. STATISTICS ON LARGE RESERVOIR DAMS<sup>(1)</sup> BY REGIONAL WATER ORGANIZATIONS (continued)

(mln cu m)

| Year and reservoir Dams       | Inflow <sup>(2)</sup> | Outflow <sup>(3)</sup> |                                                |                      | Water consumption <sup>(4)</sup> |             |           |                    |                      |
|-------------------------------|-----------------------|------------------------|------------------------------------------------|----------------------|----------------------------------|-------------|-----------|--------------------|----------------------|
|                               |                       | Total                  | From turbines ducts for electricity generation | Other <sup>(5)</sup> | Total                            | Agriculture | Drinking  | Manu-<br>facturing | Other <sup>(5)</sup> |
| Meijeran .....                | 34                    | 34                     | 0                                              | 34                   | 26                               | 7           | 11        | 0                  | 7                    |
| Salaheddinkola .....          | 13                    | 1                      | 0                                              | 1                    | 0                                | 0           | 0         | 0                  | 0                    |
| Farimsahra .....              | 3                     | 1                      | 0                                              | 1                    | 1                                | 1           | 0         | 0                  | 0                    |
| Sonbolrud .....               | 8                     | 8                      | 0                                              | 8                    | 3                                | 2           | 0         | 0                  | 1                    |
| Alimalat .....                | 4                     | 3                      | 0                                              | 3                    | 0                                | 0           | 0         | 0                  | 0                    |
| Alborz .....                  | 166                   | 171                    | 0                                              | 171                  | 97                               | 50          | 16        | 0                  | 31                   |
| <b>Markazi</b> .....          | <b>738</b>            | <b>551</b>             | <b>65</b>                                      | <b>486</b>           | <b>191</b>                       | <b>82</b>   | <b>48</b> | <b>9</b>           | <b>52</b>            |
| Kamal Saleh .....             | 276                   | 292                    | 0                                              | 292                  | 44                               | 0           | 35        | 9                  | 1                    |
| Saveh .....                   | 461                   | 260                    | 65                                             | 194                  | 147                              | 82          | 13        | 0                  | 51                   |
| <b>Hormozgan</b> .....        | <b>877</b>            | <b>676</b>             | <b>0</b>                                       | <b>676</b>           | <b>81</b>                        | <b>46</b>   | <b>35</b> | <b>0</b>           | <b>0</b>             |
| Esteqlal .....                | 173                   | 94                     | 0                                              | 94                   | 43                               | 17          | 26        | 0                  | 0                    |
| Jegin .....                   | 564                   | 481                    | 0                                              | 481                  | 27                               | 23          | 4         | 0                  | 0                    |
| Shamil & Nian .....           | 140                   | 100                    | 0                                              | 100                  | 11                               | 6           | 5         | 0                  | 0                    |
| <b>Hamedan</b> .....          | <b>299</b>            | <b>278</b>             | <b>0</b>                                       | <b>278</b>           | <b>64</b>                        | <b>4</b>    | <b>40</b> | <b>0</b>           | <b>20</b>            |
| Ekbatan <sup>(2)</sup> .....  | 93                    | 86                     | 0                                              | 86                   | 37                               | 1           | 32        | 0                  | 4                    |
| Abshineh <sup>(2)</sup> ..... | 10                    | 7                      | 0                                              | 7                    | 5                                | 0           | 5         | 0                  | 0                    |
| Shirinsu .....                | 6                     | 2                      | 0                                              | 2                    | 0                                | 0           | 0         | 0                  | 0                    |
| Kalan-e-Malayer .....         | 156                   | 153                    | 0                                              | 153                  | 13                               | 1           | 0         | 0                  | 12                   |
| Sarabi .....                  | 21                    | 20                     | 0                                              | 20                   | 9                                | 2           | 3         | 0                  | 5                    |
| Shanjur .....                 | 12                    | 10                     | 0                                              | 10                   | 0                                | 0           | 0         | 0                  | 0                    |

1. For the 179 large reservoir dams (based on the ICOLD definition) with the capacity of 49.6 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, Masjed-Soleyman and Gotvand-e-Olia dams in Khuzestan Ostan), (Dorudzan and Mollasadra in Fars Ostan), (Seymareh in Ilam Ostan and Karkheh in Khuzestan Ostan), (Golestan1, Golestan2 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 (56.4 bln cu m) or net outflow (80.5 bln cu m) is related to outflow of border dams for neighboring countries, evaporation from all dams, weirs and other non-consumable outflows (Row 212).

a. Aras, Bukan, Zayanderud, Taleghani, Karaj, Karkheh, Golpayegan, Gavshan and Kusar dams supply water both for mentioned Ostans in above table and other Ostans.

b. 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.

c. 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.

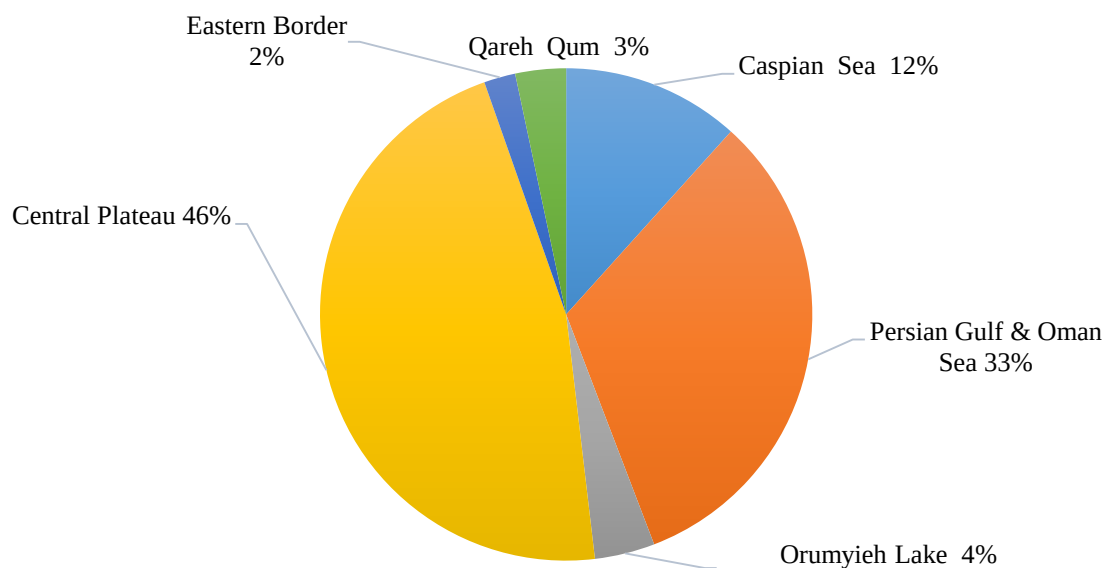
8. The net output of the turbine with the removal of series dams is 39375 million cubic meters. (Row 213).

9. 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.

10. 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.

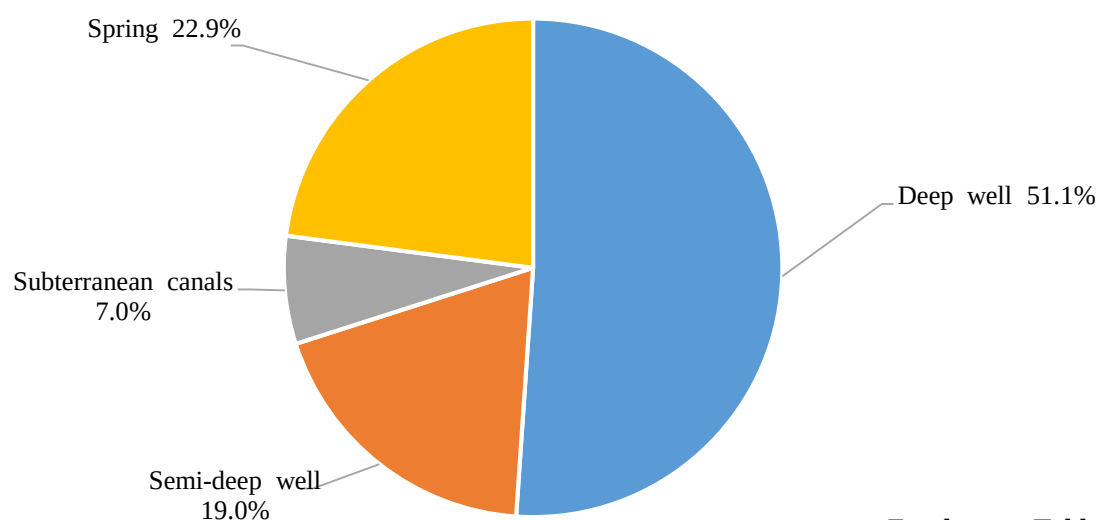
Source: Ministry of Energy.

### 9.1. ANNUAL DISCHARGE FROM UNDERGROUND WATER RESOURCES BY MAIN BASINS, THE AQUATIC YEAR 1397-98



For data see Table 9.1.

### 9.2. PERCENTAGE OF ANNUAL DISCHARGE FROM UNDERGROUND WATER RESOURCES, THE YEAR 1397-98



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                                      |
| 1394.....                    | 14550118                              | 146649                                       | 28222                                      |
| 1395.....                    | 14760389                              | 151108                                       | 28984                                      |
| 1396.....                    | 15000546                              | 154058                                       | 29379                                      |
| 1397.....                    | 15239714                              | 157120                                       | 29399 <sup>(1)</sup>                       |
| <b>1398.....</b>             | <b>15448925</b>                       | <b>162919</b>                                | <b>29725</b>                               |
| East Azarbayegan .....       | 907430                                | 9494                                         | 1171                                       |
| West Azarbayegan .....       | 398830                                | 4953                                         | 749                                        |
| Ardebil .....                | 235250                                | 2485                                         | 479                                        |
| Esfahan.....                 | 1092385                               | 13976                                        | 2931                                       |
| Alborz .....                 | 455070                                | 4366                                         | 572                                        |
| Ilam .....                   | 131900                                | 1338                                         | 524                                        |
| Bushehr .....                | 304950                                | 3289                                         | 878                                        |
| Tehran .....                 | 3156390                               | 15665                                        | 2445                                       |
| Chaharmahal&Bakhtiyari ..... | 172000                                | 2005                                         | 367                                        |
| South Khorasan.....          | 133950                                | 2293                                         | 580                                        |
| Khorasan-e-Razavi.....       | 1180510                               | 11736                                        | 2445                                       |
| North Khorasan.....          | 189050                                | 1583                                         | 359                                        |
| Khuzestan.....               | 752737                                | 10107                                        | 1796                                       |
| Zanjan. ....                 | 168670                                | 1663                                         | 299                                        |
| Semnan.....                  | 195866                                | 2483                                         | 571                                        |
| Sistan&Baluchestan .....     | 279140                                | 4594                                         | 1295                                       |
| Fars.....                    | 913275                                | 11014                                        | 2698                                       |
| Qazvin .....                 | 272400                                | 1928                                         | 283                                        |
| Qom.....                     | 350800                                | 2235                                         | 158                                        |
| Kordestan .....              | 214090                                | 4810                                         | 398                                        |
| Kerman.....                  | 699870                                | 10327                                        | 2080                                       |
| Kermanshah .....             | 307644                                | 3090                                         | 567                                        |
| Kohgiluyeh&Boyerahmad .....  | 112100                                | 1493                                         | 318                                        |
| Golestan .....               | 270070                                | 2816                                         | 537                                        |
| Gilan.....                   | 386018                                | 5706                                         | 682                                        |
| Lorestan.....                | 273900                                | 2707                                         | 591                                        |
| Mazandaran.....              | 422622                                | 7573                                         | 1101                                       |
| Markazi .....                | 280170                                | 3451                                         | 669                                        |
| Hormozgan.....               | 380226                                | 5348                                         | 1058                                       |
| Hamedan .....                | 298705                                | 2607                                         | 467                                        |
| Yazd .....                   | 512907                                | 5784                                         | 655                                        |

1. Revised figures.

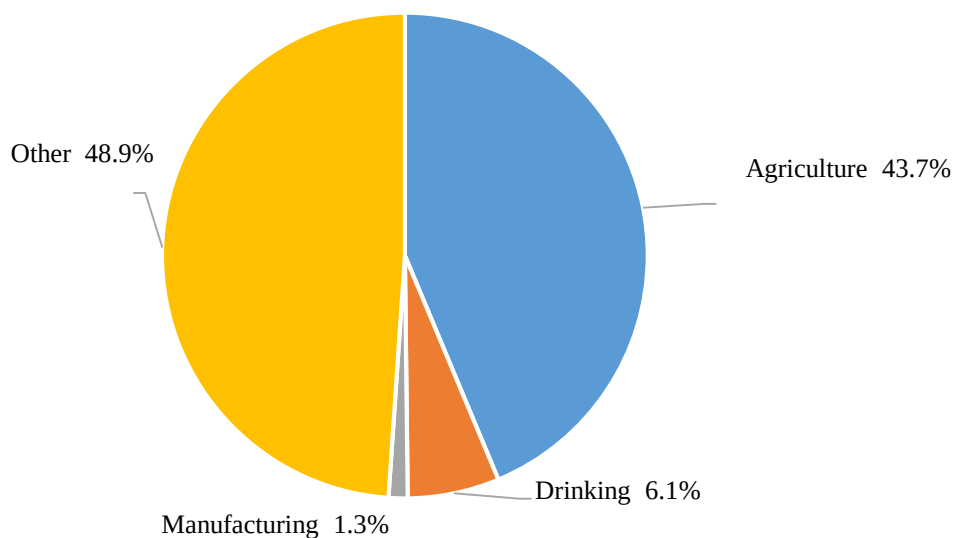
Source: Water and Sewage Engineering Company.

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

| Year and Ostan              | Max. capacity<br>of water supply<br>(litre/second) | Production<br>(1000 cu m) | Sale <sup>(1)</sup><br>(1000 cu m) | Extensions<br>(number) |
|-----------------------------|----------------------------------------------------|---------------------------|------------------------------------|------------------------|
| 1380.....                   | 165328                                             | 4008252                   | 2617518                            | 8060690                |
| 1385.....                   | 214154                                             | 5094428                   | 3464452                            | 10115430               |
| 1390.....                   | 247392                                             | 5323362                   | 3900727                            | 12891481               |
| 1394.....                   | 268138                                             | 6009000                   | 4445000                            | 15431590               |
| 1395.....                   | 261971                                             | 6045392                   | 4502617                            | 15827243               |
| 1396.....                   | 247786                                             | 6162225                   | 4633556                            | 16270684               |
| 1397.....                   | 251613                                             | 6186201                   | 4586475                            | 16684340               |
| <b>1398.....</b>            | <b>254836</b>                                      | <b>6262386</b>            | <b>4737186</b>                     | <b>17073629</b>        |
| East Azarbayejan .....      | 10130                                              | 255073                    | 208140                             | 1188399                |
| West Azarbayejan .....      | 10428                                              | 204979                    | 159587                             | 662069                 |
| Ardebil .....               | 3056                                               | 82682                     | 62449                              | 340836                 |
| Esfahan .....               | 20104                                              | 428544                    | 353464                             | 1305644                |
| Alborz .....                | 9397                                               | 253820                    | 194631                             | 422851                 |
| Ilam.....                   | 1398                                               | 41874                     | 32921                              | 150129                 |
| Bushehr .....               | 3623                                               | 114240                    | 77477                              | 287783                 |
| Tehran.....                 | 57794                                              | 1401998                   | 1108103                            | 1895666                |
| Chaharmahal&Bakhtiari ..... | 2347                                               | 51854                     | 40184                              | 240849                 |
| South Khorasan.....         | 2274                                               | 47882                     | 31065                              | 194601                 |
| Khorasan-e-Razavi.....      | 16299                                              | 401360                    | 299403                             | 1677608                |
| North Khorasan .....        | 1423                                               | 42594                     | 31457                              | 200202                 |
| Khuzestan.....              | 23846                                              | 545035                    | 381294                             | 1048546                |
| Zanjan .....                | 3657                                               | 67529                     | 51013                              | 243995                 |
| Semnan.....                 | 2433                                               | 59860                     | 44791                              | 254627                 |
| Sistan&Baluchestan .....    | 6763                                               | 136005                    | 100422                             | 356653                 |
| Fars.....                   | 12303                                              | 337130                    | 247325                             | 1168090                |
| Qazvin .....                | 3025                                               | 82600                     | 67364                              | 311434                 |
| Qom.....                    | 5852                                               | 125891                    | 103934                             | 329664                 |
| Kordestan .....             | 4805                                               | 117566                    | 80588                              | 383137                 |
| Kerman .....                | 6928                                               | 180589                    | 130744                             | 620765                 |
| Kermanshah .....            | 5909                                               | 152256                    | 100660                             | 395256                 |
| Kohgiluyeh&Boyerahmad ..... | 2061                                               | 59380                     | 30344                              | 176121                 |
| Golestan .....              | 3625                                               | 93124                     | 62127                              | 285778                 |
| Gilan .....                 | 6115                                               | 174624                    | 130356                             | 504356                 |
| Lorestan .....              | 3801                                               | 110991                    | 86486                              | 418157                 |
| Mazandaran.....             | 9829                                               | 269150                    | 186473                             | 631444                 |
| Markazi .....               | 4769                                               | 113652                    | 90240                              | 322667                 |
| Hormozgan.....              | 4106                                               | 112866                    | 88670                              | 249458                 |
| Hamedan .....               | 4059                                               | 95453                     | 73608                              | 390203                 |
| Yazd .....                  | 2677                                               | 101787                    | 81867                              | 416639                 |

1. Water sale refers to water consumption.

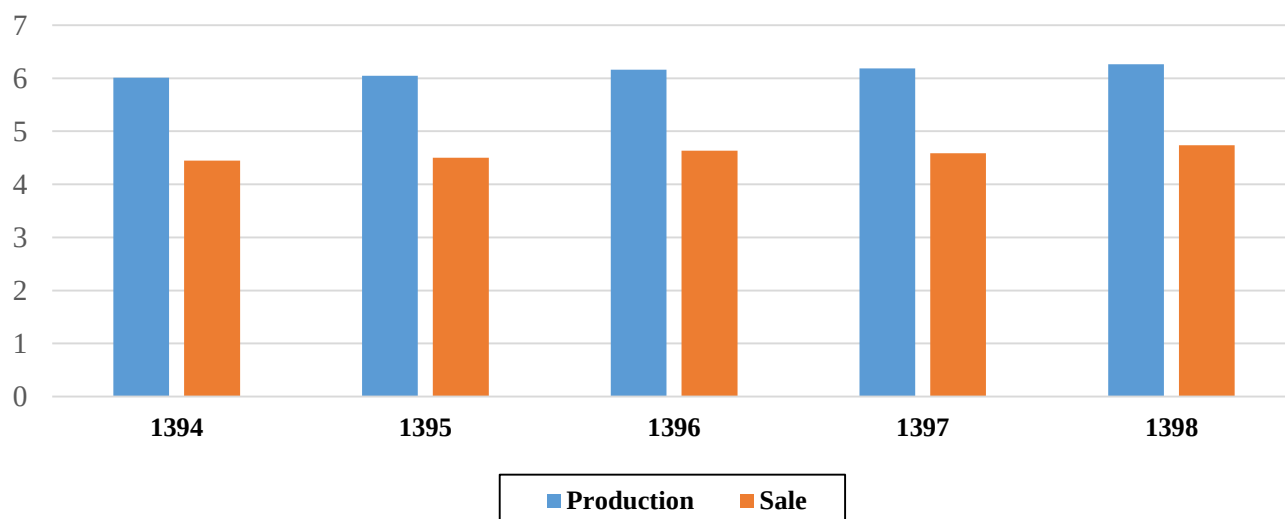
Source: Water and Sewage Engineering Company.

**9.3. WATER CONSUMPTION OF LARGE RESERVOIR DAMS BY TYPE OF USE, THE YEAR 1398**

For data see Table 9.3.

**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

| Year and Ostan                | Max. capacity<br>of water supply<br>(litre/second) | Production<br>(1000 cu m) | Sale <sup>(1)</sup><br>(1000 cu m) | Extensions<br>(number) |
|-------------------------------|----------------------------------------------------|---------------------------|------------------------------------|------------------------|
| 1385.....                     | 51242                                              | 1019180                   | 652929                             | 3200860                |
| 1390.....                     | 77038                                              | 1160295                   | 794211                             | 4415236                |
| 1394.....                     | 77095                                              | 1390976                   | 963604                             | 5280728                |
| 1395.....                     | 81054                                              | 1382449                   | 947807                             | 5392903                |
| 1396.....                     | 84306                                              | 1441038                   | 975704                             | 5564715                |
| 1397.....                     | 101178                                             | 1489105                   | 992694                             | 5739206                |
| <b>1398.....</b>              | <b>108058</b>                                      | <b>1601729</b>            | <b>1055400</b>                     | <b>5873870</b>         |
| East Azarbayejan .....        | 14622                                              | 75227                     | 56331                              | 328243                 |
| West Azarbayej an .....       | 3032                                               | 91700                     | 65807                              | 292208                 |
| Ardebil .....                 | 924                                                | 29452                     | 20831                              | 120535                 |
| Esfahan.....                  | 2336                                               | 61804                     | 42242                              | 252980                 |
| Alborz .....                  | 3680                                               | 17522                     | 10513                              | 65577                  |
| Ilam .....                    | 539                                                | 14731                     | 10479                              | 58008                  |
| Bushehr .....                 | 1258                                               | 34158                     | 23221                              | 98539                  |
| Tehran .....                  | 4393                                               | 51125                     | 33366                              | 160943                 |
| Chaharmahal&Bakhtiari .....   | 4135                                               | 31402                     | 15829                              | 92268                  |
| South Khorasan.....           | 990                                                | 28194                     | 18652                              | 140070                 |
| Khorasan-e-Razavi.....        | 4075                                               | 140893                    | 92140                              | 616819                 |
| North Khorasan.....           | 1041                                               | 28702                     | 19510                              | 123999                 |
| Khuzestan.....                | 3488                                               | 94070                     | 57030                              | 191248                 |
| Zanjan .....                  | 3159                                               | 36709                     | 20449                              | 109315                 |
| Semnan.....                   | 1423                                               | 15485                     | 9045                               | 61995                  |
| Sistan&Baluchestan .....      | 1689                                               | 49659                     | 35387                              | 181115                 |
| Fars.....                     | 6507                                               | 106698                    | 76929                              | 421233                 |
| Qazvin .....                  | 1523                                               | 35480                     | 22242                              | 119784                 |
| Qom.....                      | 1353                                               | 17390                     | 10784                              | 35595                  |
| Kordestan .....               | 5654                                               | 25859                     | 17936                              | 129029                 |
| Kerman.....                   | 2894                                               | 76719                     | 47733                              | 281534                 |
| Kermanshah .....              | 3818                                               | 48232                     | 29229                              | 141018                 |
| Kohgiluyeh & Boyerahmad ..... | 7472                                               | 24722                     | 11627                              | 64575                  |
| Golestan .....                | 3840                                               | 61796                     | 43445                              | 234217                 |
| Gilan.....                    | 2838                                               | 84739                     | 42575                              | 324492                 |
| Lorestan.....                 | 5076                                               | 36992                     | 28064                              | 136073                 |
| Mazandaran.....               | 4665                                               | 118826                    | 83502                              | 446856                 |
| Markazi .....                 | 4311                                               | 35750                     | 25411                              | 154482                 |
| Hormozgan.....                | 3238                                               | 59205                     | 38082                              | 203073                 |
| Hamedan .....                 | 3144                                               | 46267                     | 32490                              | 173228                 |
| Yazd .....                    | 941                                                | 22221                     | 14519                              | 114819                 |

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                                      |
| 1394.....                     | 3483849                               | 171609                                       | 100713                                     |
| 1395.....                     | 3628788                               | 172980                                       | 103705                                     |
| 1396.....                     | 3803553                               | 178848                                       | 105215 <sup>(1)</sup>                      |
| 1397.....                     | 3865387                               | 181638                                       | 107583 <sup>(1)</sup>                      |
| <b>1398.....</b>              | <b>3971542</b>                        | <b>194229</b>                                | <b>109708</b>                              |
| East Azarbayejan.....         | 212692                                | 8321                                         | 7367                                       |
| West Azarbayejan .....        | 158840                                | 7015                                         | 5145                                       |
| Ardebil .....                 | 107954                                | 3687                                         | 2494                                       |
| Esfahan .....                 | 140856                                | 5439                                         | 3019                                       |
| Alborz .....                  | 48575                                 | 1269                                         | 670                                        |
| Ilam .....                    | 68499                                 | 1414                                         | 1704                                       |
| Bushehr .....                 | 71380                                 | 3508                                         | 1997                                       |
| Tehran .....                  | 133740                                | 2719                                         | 1295                                       |
| Chaharmahal&Bakhtiari .....   | 84164                                 | 3408                                         | 1827                                       |
| South Khorasan.....           | 150182                                | 3932                                         | 4396                                       |
| Khorasan-e-Razavi.....        | 322552                                | 13263                                        | 9065                                       |
| North Khorasan.....           | 88611                                 | 2870                                         | 2106                                       |
| Khuzestan .....               | 157373                                | 12650                                        | 8514                                       |
| Zanjan .....                  | 94884                                 | 3347                                         | 2500                                       |
| Semnan.....                   | 39954                                 | 1188                                         | 806                                        |
| Sistan & Baluchestan .....    | 186101                                | 9439                                         | 6724                                       |
| Fars .....                    | 278218                                | 12483                                        | 7545                                       |
| Qazvin .....                  | 72218                                 | 2581                                         | 1768                                       |
| Qom .....                     | 49626                                 | 577                                          | 556                                        |
| Kordestan .....               | 88988                                 | 2694                                         | 3068                                       |
| Kerman .....                  | 224421                                | 13668                                        | 6291                                       |
| Kermanshah .....              | 126471                                | 5314                                         | 3417                                       |
| Kohgiluyeh & Boyerahmad ..... | 112362                                | 3739                                         | 2822                                       |
| Golestan .....                | 92630                                 | 5129                                         | 2930                                       |
| Gilan.....                    | 143605                                | 18142                                        | 4152                                       |
| Lorestan.....                 | 70508                                 | 4464                                         | 3856                                       |
| Mazandaran.....               | 198759                                | 21239                                        | 2425                                       |
| Markazi .....                 | 95545                                 | 4376                                         | 2286                                       |
| Hormozgan.....                | 126025                                | 7158                                         | 4850                                       |
| Hamedan .....                 | 121234                                | 4702                                         | 2330                                       |
| Yazd .....                    | 104575                                | 4491                                         | 1782                                       |

1. Revised figures.

Source: Water and Sewage Engineering Company.

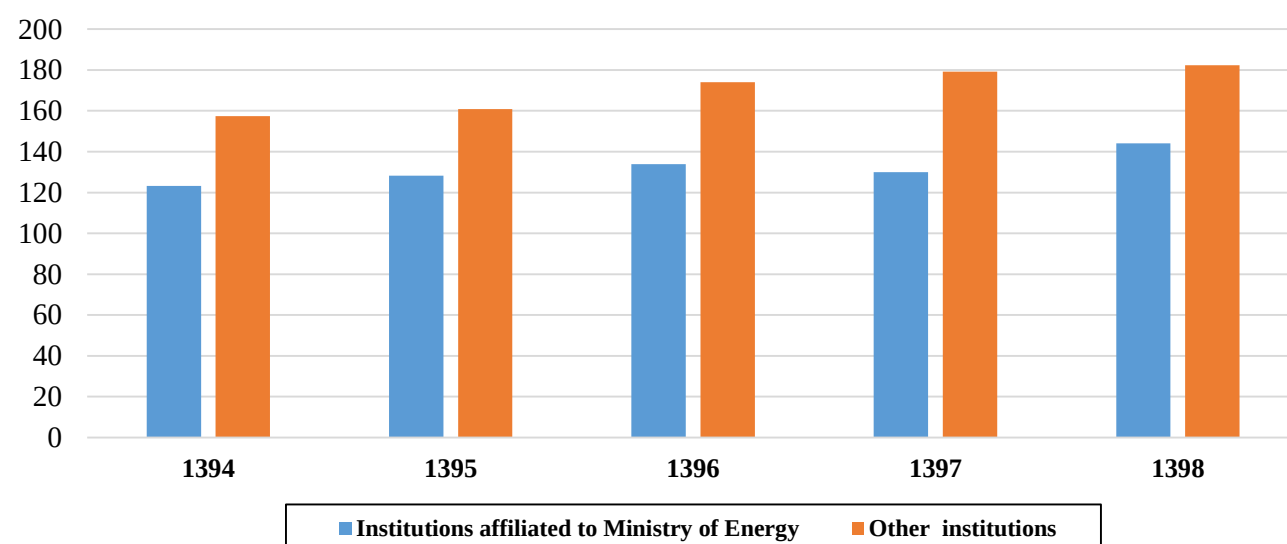
### 9.8. NOMINAL CAPACITY AND GROSS ELECTRICITY GENERATION OF INSTALLED GENERATORS

| 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              |
| 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             |
| <b>1398.....</b> | <b>83506</b>                 | <b>37276</b>                                      | <b>46230</b>       | <b>326431</b>                           | <b>144069</b>                                     | <b>182362</b>      |

Source: Ministry of Energy.

### 9.5. GROSS ELECTRICITY GENERATION IN THE COUNTRY

BlkW/h



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<br>(nominal power) | Actual capacity<br>(actual capacity) | Power generated at the<br>point of peak<br>consumption |
|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------------------------|
| 1380.....                           | 28944                               | 26496                                | 21853                                                  |
| 1385.....                           | 45288                               | 40985                                | 32997                                                  |
| 1390.....                           | 65212                               | 57522                                | 42245                                                  |
| 1394.....                           | 74103                               | 64707                                | 49116                                                  |
| 1395.....                           | 76428                               | 66598                                | 51579                                                  |
| 1396.....                           | 78794                               | 68321                                | 54016                                                  |
| 1397.....                           | 80467                               | 69864                                | 48831 <sup>(1)</sup>                                   |
| <b>1398.....</b>                    | <b>83506</b>                        | <b>72532</b>                         | <b>57017</b>                                           |
| <b>Ministry of energy.....</b>      | <b>37276</b>                        | <b>33912</b>                         | <b>28312</b>                                           |
| Hydroelectric.....                  | 12192                               | 12192                                | 9533                                                   |
| Steam .....                         | 11241                               | 10630                                | 9291                                                   |
| Gas .....                           | 6736                                | 5291                                 | 4321                                                   |
| Combined cycle.....                 | 5549                                | 4397                                 | 4158                                                   |
| Diesel .....                        | 439                                 | 284                                  | 31                                                     |
| Atomic .....                        | 1020                                | 1020                                 | 957                                                    |
| Renewable.....                      | 99                                  | 99                                   | 21                                                     |
| <b>Large scale industries .....</b> | <b>6065</b>                         | <b>5016</b>                          | <b>1371</b>                                            |
| Steam.....                          | 589                                 | 490                                  | 357                                                    |
| Gas .....                           | 5476                                | 4526                                 | 1014                                                   |
| <b>Private sector .....</b>         | <b>40165</b>                        | <b>33603</b>                         | <b>27334</b>                                           |
| Steam.....                          | 4000                                | 3772                                 | 3125                                                   |
| Gas .....                           | 13968                               | 11545                                | 9418                                                   |
| Combined cycle.....                 | 21581                               | 17670                                | 14677                                                  |
| Renewable.....                      | 617                                 | 617                                  | 114                                                    |

1. Revised figures.

Source: Ministry of Energy.

### 9. 10. CAPACITY OF INSTALLED GENERATORS AND GROSS ELECTRICITY GENERATION OF POWER PLANTS, THE YEAR 1398

| Ostan                         | Nominal<br>capacity(1000 kW) | Actual capacity<br>(1000 kW) | Gross generation<br>(mln kW h) |
|-------------------------------|------------------------------|------------------------------|--------------------------------|
| <b>Total .....</b>            | <b>83506</b>                 | <b>72532</b>                 | <b>326431</b>                  |
| East Azarbayejan .....        | 2114                         | 1908                         | 8611                           |
| West Azarbayejan .....        | 1657                         | 1380                         | 6916                           |
| Ardebil .....                 | 1024                         | 828                          | 2957                           |
| Esfahan .....                 | 5332                         | 4769                         | 25541                          |
| Alborz .....                  | 1799                         | 1521                         | 8593                           |
| Ilam .....                    | 675                          | 643                          | 973                            |
| Bushehr .....                 | 5718                         | 4931                         | 13849                          |
| Tehran .....                  | 6937                         | 5609                         | 27238                          |
| Chaharmahal&Bakhtiari .....   | 1056                         | 1055                         | 2570                           |
| South Khorasan.....           | 804                          | 604                          | 2869                           |
| Khorasan-e-Razavi.....        | 3661                         | 3120                         | 16146                          |
| North Khorasan.....           | 1309                         | 1039                         | 4590                           |
| Khuzestan .....               | 15665                        | 14490                        | 49214                          |
| Zanjan .....                  | 726                          | 578                          | 2927                           |
| Semnan.....                   | 679                          | 550                          | 2235                           |
| Sistan &Baluchestan .....     | 1564                         | 1248                         | 6078                           |
| Fars .....                    | 5239                         | 4074                         | 22350                          |
| Qazvin .....                  | 2243                         | 2035                         | 12595                          |
| Qom .....                     | 790                          | 671                          | 4558                           |
| Kordestan .....               | 981                          | 791                          | 4678                           |
| Kerman .....                  | 3854                         | 2979                         | 18647                          |
| Kermanshah .....              | 1921                         | 1713                         | 9134                           |
| Kohgiluyeh & Boyerahmad ..... | 17                           | 17                           | 55                             |
| Golestan .....                | 1026                         | 935                          | 3465                           |
| Gilan.....                    | 2863                         | 2649                         | 14134                          |
| Lorestan.....                 | 905                          | 801                          | 1457                           |
| Mazandaran.....               | 3886                         | 3720                         | 12585                          |
| Markazi .....                 | 1354                         | 1269                         | 7826                           |
| Hormozgan.....                | 3814                         | 3242                         | 13832                          |
| Hamedan .....                 | 1066                         | 1066                         | 6483                           |
| Yazd .....                    | 2828                         | 2298                         | 13324                          |

Source: Ministry of Energy.

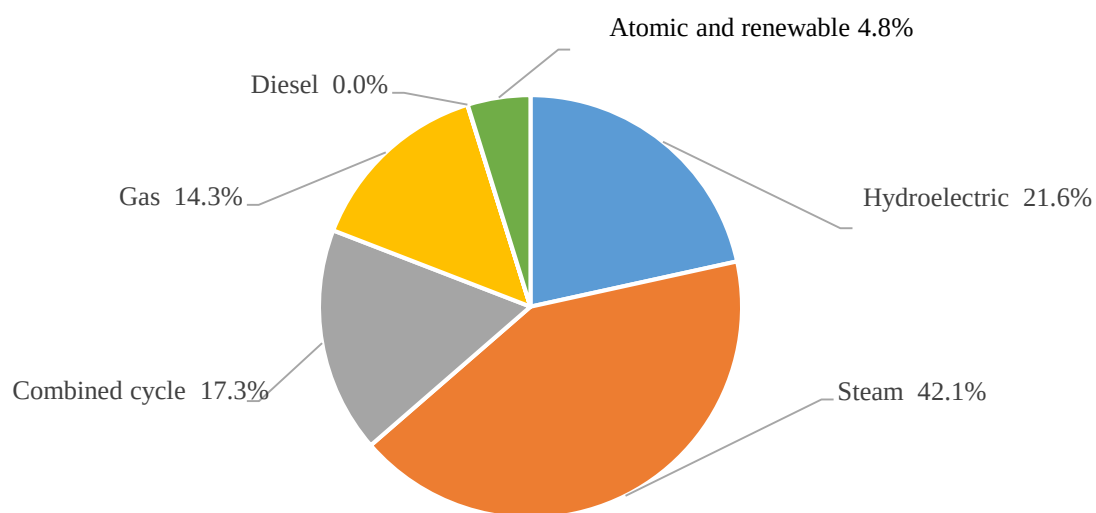
### 9. 11. ELECTRICITY GENERATION AND INTERNAL CONSUMPTION OF THE POWER PLANTS

(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         |
| 1394.....                           | 280689           | 7888                           | 272801         |
| 1395.....                           | 289196           | 8285                           | 280911         |
| 1396.....                           | 307968           | 8810                           | 299159         |
| 1397.....                           | 309182           | 8703                           | 300479         |
| <b>1398.....</b>                    | <b>326431</b>    | <b>8871</b>                    | <b>317559</b>  |
| <b>Ministry of energy .....</b>     | <b>144069</b>    | <b>4847</b>                    | <b>139221</b>  |
| Hydroelectric.....                  | 31082            | 88                             | 30994          |
| Steam .....                         | 60611            | 4219                           | 56392          |
| Combined cycle.....                 | 24861            | 421                            | 24441          |
| Gas .....                           | 20613            | 116                            | 20497          |
| Diesel .....                        | 39               | 3                              | 36             |
| Atomic .....                        | 6758             | 0                              | 6758           |
| Renewable.....                      | 103              | 0                              | 103            |
| <b>Large scale industries .....</b> | <b>5879</b>      | <b>228</b>                     | <b>5651</b>    |
| Steam.....                          | 2250             | 211                            | 2039           |
| Gas .....                           | 3629             | 17                             | 3612           |
| <b>Private sector .....</b>         | <b>176483</b>    | <b>3796</b>                    | <b>172687</b>  |
| Steam.....                          | 22255            | 1612                           | 20643          |
| Gas .....                           | 46974            | 249                            | 46725          |
| Combined cycle.....                 | 106287           | 1935                           | 104353         |
| Renewable.....                      | 967              | 0                              | 967            |

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 1398**



**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         |
| 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        |
| <b>1398.....</b>                     | <b>66</b> | <b>31081847</b> | <b>28</b>     | <b>15517630</b> | <b>16</b> | <b>15412177</b> | <b>22</b> | <b>152040</b> |
| East Azarbayejan.....                | 0         | 0               | 0             | 0               | 0         | 0               | 0         | 0             |
| West Azarbayejan .....               | 3         | 354195          | 0             | 0               | 3         | 354195          | 0         | 0             |
| Ardebil.....                         | 1         | 59504           | 0             | 0               | 0         | 0               | 1         | 59504         |
| Esfahan.....                         | 2         | 255120          | 2             | 255120          | 0         | 0               | 0         | 0             |
| Alborz.....                          | 2         | 258673          | 1             | 195944          | 1         | 62729           | 0         | 0             |
| Ilam .....                           | 1         | 908304          | 1             | 908304          | 0         | 0               | 0         | 0             |
| Tehran .....                         | 3         | 449608          | 2             | 240795          | 1         | 208813          | 0         | 0             |
| Chaharmahal & Bakhtiari..            | 3         | 2558478         | 2             | 2558478         | 0         | 0               | 1         | 0             |
| Khorasan-e-Razavi .....              | 3         | 0               | 2             | 0               | 0         | 0               | 1         | 0             |
| Khuzestan.....                       | 8         | 22673413        | 3             | 10861640        | 4         | 11811773        | 1         | 0             |
| Semnan.....                          | 1         | 25163           | 0             | 0               | 0         | 0               | 1         | 25163         |
| Fars.....                            | 3         | 87071           | 1             | 19550           | 2         | 67521           | 0         | 0             |
| Qom.....                             | 1         | 24035           | 0             | 0               | 0         | 0               | 1         | 24035         |
| Kordestan .....                      | 1         | 66062           | 0             | 0               | 1         | 66062           | 0         | 0             |
| Kerman.....                          | 1         | 61081           | 1             | 61081           | 0         | 0               | 0         | 0             |
| Kermanshah.....                      | 2         | 671161          | 1             | 0               | 1         | 671161          | 0         | 0             |
| Kohgiluyeh & Boyer-Ahmad..           | 5         | 54705           | 3             | 33062           | 0         | 0               | 2         | 21643         |
| Gilan.....                           | 7         | 355156          | 2             | 328908          | 1         | 24691           | 4         | 1557          |
| Lorestan.....                        | 5         | 1192439         | 3             | 1263            | 1         | 1190254         | 1         | 922           |
| Mazandaran .....                     | 9         | 1006051         | 3             | 43747           | 1         | 954978          | 5         | 7326          |
| Markazi .....                        | 4         | 16728           | 1             | 9738            | 0         | 0               | 3         | 6990          |
| Hamedan .....                        | 1         | 4900            | 0             | 0               | 0         | 0               | 1         | 4900          |

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<br>the power plant           | Gross<br>electricity<br>generation<br>(mln kw<br>hours) | Fuel consumed        |                       |                           | Energy<br>generated<br>from fuel<br>consumption<br>(bln kcal) | Thermal<br>energy<br>consumed to<br>generate one<br>kWh of<br>electricity<br>(kcal) | Output<br>(percent) |
|------------------------------------------------------------|---------------------------------------------------------|----------------------|-----------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|
|                                                            |                                                         | Gas oil<br>(mln lit) | Fuel oil<br>(mln lit) | Natural gas<br>(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                |
| 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                |
| <b>1398 .....</b>                                          | <b>287521</b>                                           | <b>10253</b>         | <b>5398</b>           | <b>60243</b>              | <b>641325</b>                                                 | <b>2231</b>                                                                         | <b>38.6</b>         |
| Power plants affiliated to the<br>Ministry of Energy ..... | 106126                                                  | 2339                 | 4766                  | 22341                     | 250537                                                        | 2361                                                                                | 36.4                |
| Large scale industries .....                               | 5879                                                    | 6                    | 0                     | 1756                      | 17418                                                         | 2963                                                                                | 29.0                |
| Private sector .....                                       | 175516                                                  | 7908                 | 632                   | 36147                     | 373370                                                        | 2127                                                                                | 40.4                |

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   | 1394   | 1395   | 1396   | 1397   | 1398   |
| Gross generation .....                                                      | 124275 | 181538 | 208414 | 123215 | 128292 | 133934 | 129920 | 144069 |
| Less: Internal consumption of plants ....                                   | 5942   | 7064   | 7985   | 4548   | 4520   | 4887   | 4777   | 4848   |
| Net generation.....                                                         | 118333 | 174474 | 200429 | 118667 | 123772 | 129047 | 125143 | 139219 |
| Plus:Electricity purchased from large-scale industries <sup>(1)</sup> ..... | 5721   | 10997  | 23637  | 147920 | 149743 | 164071 | 171406 | 174776 |
| Less: Distribution and transmission networks losses .....                   | 20857  | 35566  | 34102  | 33297  | 33513  | 33772  | 32853  | 32550  |
| Net sales .....                                                             | 97476  | 144831 | 188917 | 233043 | 239903 | 259346 | 263696 | 281959 |
| Net exports .....                                                           | 305    | 233    | 5012   | 5732   | 2467   | 4320   | 3708   | 6865   |
| Domestic sales.....                                                         | 97171  | 144598 | 183905 | 227311 | 237436 | 255026 | 259723 | 275094 |

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                     |
| 1394.....                                       | 48462                     |
| 1395.....                                       | 50926                     |
| 1396.....                                       | 53414                     |
| 1397.....                                       | 48999                     |
| <b>1398 .....</b>                               | <b>55839</b>              |
| Azarbajejan Regional Power Company .....        | 3083                      |
| Esfahan Regional Power Company .....            | 3832                      |
| Bakhtar Regional Power Company .....            | 2706                      |
| Tehran Regional Power Company .....             | 10347                     |
| Khorasan Regional Power Company .....           | 3825                      |
| Khuzestan Regional Power Company .....          | 7466                      |
| Zanjan Regional Power Company .....             | 1430                      |
| Semnan Regional Power Company .....             | 484                       |
| Sistan&Baluchestan Regional Power Company ..... | 1324                      |
| Gharb Regional Power Company .....              | 1674                      |
| Fars Regional Power Company .....               | 4907                      |
| Kerman Regional Power Company .....             | 2118                      |
| Gilan Regional Power Company .....              | 1543                      |
| Mazandaran Regional Power Company .....         | 3614                      |
| Hormozgan Regional Power Company .....          | 2338                      |
| Yazd Regional Power Company .....               | 1072                      |
| Kish Water and Power Company.....               | 161                       |
| Large scale industries.....                     | 3916                      |

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 <sup>(1)</sup> ..... | 18625              | 29158        | 22092                  | 44956        |
| 1394.....                 | 20205              | 30869        | 23046                  | 47506        |
| 1395.....                 | 20477              | 31324        | 23413                  | 48063        |
| 1396.....                 | 20617              | 31589        | 23504                  | 48295        |
| 1397.....                 | 20893              | 32411        | 23821                  | 49524        |
| <b>1398.....</b>          | <b>21329</b>       | <b>32571</b> | <b>23939</b>           | <b>50205</b> |

*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        |
| 1394 .....                  | 59273                     | 76532        | 29829                         | 67080        |
| 1395 .....                  | 62183                     | 80470        | 30865                         | 69456        |
| 1396 .....                  | 64093                     | 82045        | 32251                         | 72794        |
| 1397 .....                  | 67523                     | 84876        | 33321                         | 75619        |
| <b>1398 .....</b>           | <b>75008</b>              | <b>88535</b> | <b>36227</b>                  | <b>78306</b> |
| East-Azarbayejan .....      | 1715                      | 3440         | 3125                          | 1060         |
| West-Azarbayejan .....      | 630                       | 1805         | 2799                          | 15           |
| Ardebil .....               | 500                       | 1125         | 0                             | 887          |
| Esfahan .....               | 6460                      | 5575         | 0                             | 7686         |
| Alborz .....                | 1000                      | 2236         | 0                             | 2975         |
| Ilam .....                  | 0                         | 1240         | 559                           | 770          |
| Bushehr .....               | 3745                      | 1896         | 1732                          | 2067         |
| Tehran .....                | 10900                     | 11620        | 0                             | 13878        |
| Chaharmahal&Bakhtiari ..... | 1550                      | 0            | 0                             | 1193         |
| South Khorasan .....        | 1000                      | 0            | 850                           | 0            |
| Khorasan-e-Razavi .....     | 4758                      | 160          | 6685                          | 1036         |
| North Khorasan .....        | 1200                      | 0            | 1008                          | 0            |
| Khuzestan .....             | 9480                      | 8257         | 12228                         | 0            |
| Zanjan .....                | 2030                      | 1250         | 0                             | 2142         |
| Semnan .....                | 2000                      | 2010         | 0                             | 1543         |
| Sistan&Baluchestan .....    | 945                       | 3156         | 30                            | 2935         |
| Fars .....                  | 6040                      | 4615         | 675                           | 7207         |
| Qazvin .....                | 800                       | 1555         | 0                             | 2300         |
| Qom .....                   | 0                         | 1490         | 0                             | 1775         |
| Kordestan .....             | 0                         | 1725         | 80                            | 1160         |
| Kerman .....                | 4120                      | 5640         | 4402                          | 360          |
| Kermanshah .....            | 1230                      | 2345         | 0                             | 2266         |
| Kohgiluyeh&Boyerahmad ..... | 400                       | 540          | 639                           | 0            |
| Golestan .....              | 700                       | 1980         | 0                             | 1943         |
| Gilan .....                 | 1000                      | 3280         | 120                           | 3145         |
| Lorestan .....              | 1000                      | 2030         | 0                             | 2022         |
| Mazandaran .....            | 2830                      | 4345         | 0                             | 4783         |
| Markazi .....               | 2000                      | 2925         | 0                             | 3233         |
| Hormozgan .....             | 3490                      | 7436         | 960                           | 5443         |
| Hamedan .....               | 600                       | 1815         | 0                             | 2071         |
| Yazd .....                  | 2885                      | 3044         | 335                           | 2411         |

Source: Ministry of Energy.

### 9.18. NUMBER OF CUSTOMERS OF THE NATION'S OSTANS BY TYPE OF CONSUMPTION (consumer)

| Year and Ostan              | Total           | Household       | Public         | Agricultural  | Industrial    | Other          |
|-----------------------------|-----------------|-----------------|----------------|---------------|---------------|----------------|
| 1380.....                   | 16345450        | 13682563        | 523505         | 77556         | 91468         | 1970358        |
| 1385.....                   | 20559946        | 16989284        | 748964         | 138137        | 152202        | 2531359        |
| 1390.....                   | 27164768        | 22224100        | 1082528        | 284781        | 174255        | 3399104        |
| 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        |
| <b>1398.....</b>            | <b>36643985</b> | <b>29426885</b> | <b>1732289</b> | <b>463718</b> | <b>254807</b> | <b>4766286</b> |
| East Azarbayejan .....      | 1879818         | 1461455         | 83037          | 21212         | 16510         | 297604         |
| West Azarbayejan .....      | 1270485         | 1029796         | 34467          | 21364         | 6225          | 178633         |
| Ardebil .....               | 562835          | 462954          | 25473          | 4447          | 3436          | 66525          |
| Esfahan.....                | 2673509         | 2095911         | 103166         | 47435         | 33696         | 393301         |
| Alborz .....                | 1364260         | 1102399         | 87665          | 5280          | 7008          | 161908         |
| Ilam .....                  | 229920          | 191436          | 8703           | 3083          | 1114          | 25584          |
| Bushehr .....               | 475816          | 385138          | 18368          | 5342          | 2713          | 64255          |
| Tehran .....                | 6848105         | 5231001         | 535225         | 12282         | 45797         | 1023800        |
| Chaharmahal&Bakhtiari ..... | 372600          | 311053          | 12320          | 6937          | 2825          | 39465          |
| South Khorasan.....         | 373503          | 312450          | 15908          | 5400          | 2593          | 37152          |
| Khorasan-e-Razavi.....      | 2880546         | 2377479         | 110569         | 22601         | 20583         | 349314         |
| North Khorasan.....         | 361945          | 306126          | 13126          | 3663          | 1798          | 37232          |
| Khuzestan.....              | 1663369         | 1374176         | 57055          | 10505         | 4717          | 216916         |
| Zanjan .....                | 455396          | 367353          | 16694          | 8701          | 3372          | 59276          |
| Semnan.....                 | 382007          | 294228          | 22910          | 6537          | 5277          | 53055          |
| Sistan&Baluchestan .....    | 849466          | 711064          | 31693          | 13311         | 2844          | 90554          |
| Fars.....                   | 2094674         | 1716444         | 73787          | 45489         | 14323         | 244631         |
| Qazvin .....                | 610886          | 487265          | 39952          | 6438          | 4751          | 72480          |
| Qom.....                    | 572233          | 461846          | 21436          | 3975          | 6563          | 78413          |
| Kordestan .....             | 658334          | 548444          | 22616          | 10376         | 2981          | 73917          |
| Kerman.....                 | 1210588         | 1026374         | 35094          | 16636         | 5960          | 126524         |
| Kermanshah .....            | 775373          | 649026          | 27331          | 7787          | 3090          | 88139          |
| Kohgiluyeh&Boyerahmad ..... | 259486          | 217778          | 9098           | 3015          | 1345          | 28250          |
| Golestan .....              | 741480          | 609697          | 29379          | 11477         | 3110          | 87817          |
| Gilan.....                  | 1466018         | 1148607         | 73306          | 22630         | 6087          | 215388         |
| Lorestan.....               | 651488          | 554979          | 17801          | 8681          | 2812          | 67215          |
| Mazandaran.....             | 2037019         | 1610443         | 93232          | 86490         | 14119         | 232735         |
| Markazi .....               | 734381          | 603710          | 29743          | 10359         | 7693          | 82876          |
| Hormozgan.....              | 748658          | 610460          | 36347          | 9428          | 3565          | 88858          |
| Hamedan .....               | 753663          | 612233          | 30561          | 12748         | 6231          | 91890          |
| Yazd .....                  | 686126          | 555560          | 16227          | 10089         | 11670         | 92580          |

Source: Ministry of Energy.

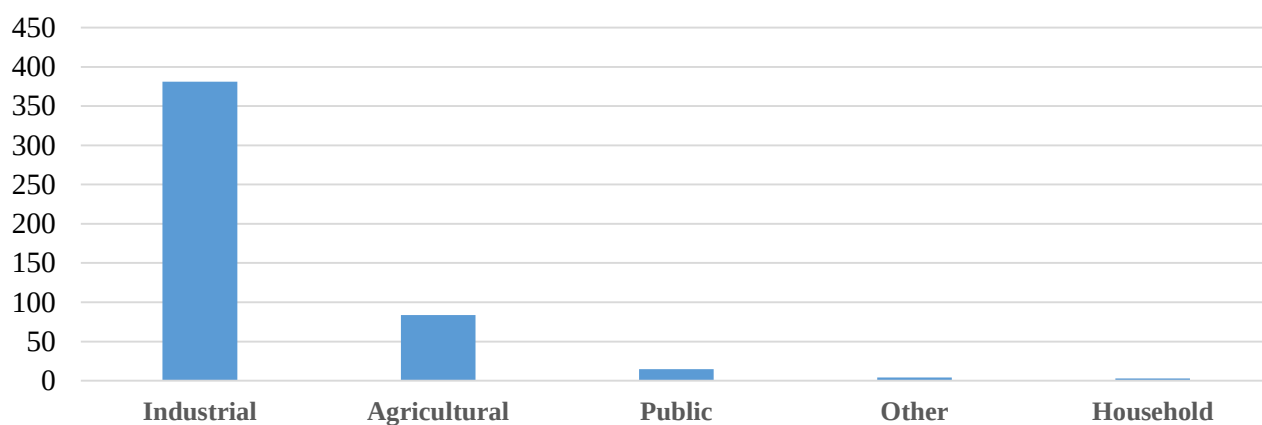
**9.19. DOMESTIC SALE OF ELECTRICITY OF THE NATION'S OSTANS BY TYPE OF CONSUMPTION**

|                              |               | <b>(mln KW/h)</b> |              |              |              |                  |              |
|------------------------------|---------------|-------------------|--------------|--------------|--------------|------------------|--------------|
| 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        |
| 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        |
| <b>1398.....</b>             | <b>275094</b> | <b>88500</b>      | <b>25589</b> | <b>38764</b> | <b>97081</b> | <b>5017</b>      | <b>20143</b> |
| East Azarbayejan.....        | 9490          | 2496              | 690          | 1178         | 4211         | 202              | 713          |
| West Azarbayejan .....       | 5899          | 2008              | 445          | 1186         | 1677         | 135              | 448          |
| Ardebil .....                | 1955          | 697               | 198          | 295          | 549          | 64               | 152          |
| Esfahan .....                | 25848         | 4467              | 1211         | 3026         | 15542        | 377              | 1225         |
| Alborz .....                 | 7127          | 2304              | 703          | 795          | 2415         | 139              | 772          |
| Ilam .....                   | 1567          | 750               | 129          | 339          | 211          | 33               | 104          |
| Bushehr .....                | 6946          | 4316              | 958          | 357          | 712          | 119              | 484          |
| Tehran .....                 | 37533         | 12809             | 6852         | 2905         | 8006         | 500              | 6462         |
| Chaharmahal&Bakhtiyari ..... | 2138          | 523               | 121          | 646          | 661          | 86               | 101          |
| South Khorasan.....          | 1725          | 468               | 168          | 460          | 431          | 101              | 97           |
| Khorasan-e-Razavi.....       | 17740         | 4752              | 1186         | 4267         | 5932         | 388              | 1215         |
| North Khorasan.....          | 1814          | 467               | 114          | 355          | 754          | 35               | 88           |
| Khuzestan .....              | 31139         | 15457             | 2593         | 2580         | 8517         | 501              | 1490         |
| Zanjan .....                 | 4314          | 628               | 171          | 663          | 2631         | 56               | 165          |
| Semnan.....                  | 3463          | 553               | 229          | 587          | 1891         | 58               | 145          |
| Sistan&Baluchestan .....     | 6543          | 3417              | 1125         | 990          | 443          | 180              | 389          |
| Fars .....                   | 16259         | 5138              | 1292         | 4689         | 3751         | 326              | 1062         |
| Qazvin .....                 | 4764          | 905               | 280          | 968          | 2302         | 77               | 233          |
| Qom .....                    | 3975          | 1317              | 371          | 442          | 1434         | 59               | 351          |
| Kordestan .....              | 2645          | 1019              | 196          | 574          | 635          | 58               | 164          |
| Kerman .....                 | 14548         | 3495              | 730          | 3895         | 5737         | 215              | 476          |
| Kermanshah .....             | 3849          | 1403              | 592          | 471          | 1009         | 121              | 252          |
| Kohgiluyeh&Boyerahmad .....  | 1694          | 833               | 314          | 157          | 208          | 69               | 114          |
| Golestan .....               | 3463          | 1551              | 291          | 631          | 653          | 77               | 262          |
| Gilan.....                   | 6191          | 2455              | 541          | 560          | 1813         | 169              | 654          |
| Lorestan.....                | 3823          | 1075              | 454          | 827          | 1172         | 126              | 169          |
| Mazandaran.....              | 8816          | 3786              | 801          | 1050         | 2086         | 243              | 849          |
| Markazi .....                | 8539          | 1135              | 288          | 1123         | 5620         | 132              | 240          |
| Hormozgan.....               | 15260         | 5995              | 1957         | 891          | 5513         | 144              | 762          |
| Hamedan .....                | 4400          | 1161              | 304          | 1136         | 1465         | 113              | 222          |
| Yazd .....                   | 11627         | 1119              | 286          | 720          | 9100         | 117              | 284          |

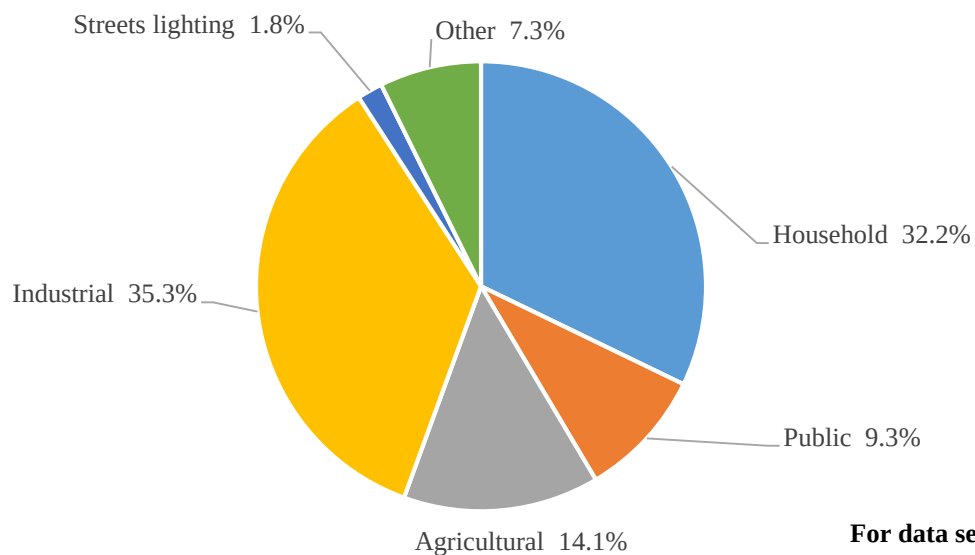
Source: Ministry of Energy.

**9.7. AVERAGE ELECTRICITY CONSUMPTION BY TYPE OF CUSTOMERS, THE YEAR 1398**

1000 Kw/h



For data see Tables 9.18 &amp; 9.19.

**9.8. DOMESTIC SALE OF ELECTRICITY BY TYPE OF USE, THE YEAR 1398**

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<br>enjoying<br>electricity | Length of<br>power<br>disribution<br>lines with<br>medium<br>pressure(km) | Length of<br>power<br>disribution<br>lines with<br>low<br>pressure(km) | Number of<br>distribution<br>transformers | Capacity of<br>distribution<br>transformers<br>(MVA) |
|------------------------------|--------------|--------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------|
| 1380.....                    | 45359        | 4056072                              | 120580                                                                    | 89359                                                                  | 54162                                     | 5688                                                 |
| 1385.....                    | 50985        | 4427849                              | 138330                                                                    | 93464                                                                  | 64718                                     | 6812                                                 |
| 1390.....                    | 54116        | 4452795                              | 139429                                                                    | 98390                                                                  | 72186                                     | 7283                                                 |
| 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                                                 |
| <b>1398.....</b>             | <b>57420</b> | <b>4502045</b>                       | <b>146172</b>                                                             | <b>100305</b>                                                          | <b>77503</b>                              | <b>7717</b>                                          |
| East Azarbayejan .....       | 2877         | 297455                               | 8500                                                                      | 5653                                                                   | 3047                                      | 318                                                  |
| West Azarbayejan .....       | 2911         | 210557                               | 5711                                                                      | 4085                                                                   | 3011                                      | 289                                                  |
| Ardebil .....                | 1611         | 70411                                | 4538                                                                      | 3587                                                                   | 1608                                      | 117                                                  |
| Esfahan .....                | 1765         | 296892                               | 4829                                                                      | 4538                                                                   | 3040                                      | 274                                                  |
| Alborz .....                 | 224          | 21841                                | 512                                                                       | 489                                                                    | 237                                       | 30                                                   |
| Ilam .....                   | 630          | 44778                                | 1462                                                                      | 809                                                                    | 697                                       | 72                                                   |
| Bushehr .....                | 517          | 39922                                | 1499                                                                      | 1230                                                                   | 833                                       | 113                                                  |
| Tehran .....                 | 601          | 152961                               | 1276                                                                      | 1629                                                                   | 1093                                      | 153                                                  |
| Chaharmahal&Bakhtiyari ..... | 759          | 85689                                | 596                                                                       | 989                                                                    | 537                                       | 60                                                   |
| South Khorasan.....          | 1497         | 124995                               | 3504                                                                      | 2311                                                                   | 1755                                      | 129                                                  |
| Khorasan-e-Razavi.....       | 3269         | 327323                               | 7238                                                                      | 4611                                                                   | 3570                                      | 310                                                  |
| North Khorasan.....          | 948          | 94173                                | 3302                                                                      | 1910                                                                   | 1150                                      | 85                                                   |
| Khuzestan .....              | 3762         | 207089                               | 7945                                                                      | 3520                                                                   | 7786                                      | 1132                                                 |
| Zanjan .....                 | 923          | 91502                                | 3826                                                                      | 2039                                                                   | 1020                                      | 118                                                  |
| Semnan.....                  | 501          | 35938                                | 2814                                                                      | 953                                                                    | 477                                       | 51                                                   |
| Sistan&Baluchestan .....     | 4554         | 244999                               | 15520                                                                     | 6313                                                                   | 6532                                      | 586                                                  |
| Fars .....                   | 3242         | 283796                               | 9123                                                                      | 5929                                                                   | 4659                                      | 433                                                  |
| Qazvin .....                 | 859          | 72988                                | 2630                                                                      | 2241                                                                   | 1124                                      | 169                                                  |
| Qom .....                    | 191          | 18252                                | 412                                                                       | 249                                                                    | 191                                       | 17                                                   |
| Kordestan .....              | 1786         | 127467                               | 5348                                                                      | 2163                                                                   | 1868                                      | 188                                                  |
| Kerman .....                 | 5194         | 240363                               | 12871                                                                     | 7867                                                                   | 8146                                      | 660                                                  |
| Kermanshah .....             | 2530         | 127472                               | 4365                                                                      | 2555                                                                   | 2614                                      | 258                                                  |
| Kohgiluyeh&Boyerahmad .....  | 1650         | 54783                                | 3337                                                                      | 1407                                                                   | 2136                                      | 230                                                  |
| Golestan .....               | 897          | 106278                               | 1631                                                                      | 1198                                                                   | 1018                                      | 69                                                   |
| Gilan.....                   | 3029         | 287630                               | 4547                                                                      | 10202                                                                  | 4799                                      | 422                                                  |
| Lorestan.....                | 2737         | 103096                               | 5612                                                                      | 2713                                                                   | 2583                                      | 192                                                  |
| Mazandaran.....              | 3004         | 262165                               | 4662                                                                      | 5947                                                                   | 3070                                      | 221                                                  |
| Markazi .....                | 1191         | 124321                               | 4700                                                                      | 4087                                                                   | 1388                                      | 173                                                  |
| Hormozgan.....               | 1712         | 127013                               | 8164                                                                      | 5018                                                                   | 4422                                      | 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 (mln Kw/h)**

| 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            |
| 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            |
| <b>1398.....</b> | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b>   |

| Year             | Exports    |             |            |
|------------------|------------|-------------|------------|
|                  | Pakistan   | Afghanistan | Iraq       |
| 1380.....        | 0          | 0           | 0          |
| 1385.....        | 172        | 134         | 1002       |
| 1390.....        | 271        | 557         | 6601       |
| 1394.....        | 457        | 782         | 6822       |
| 1395.....        | 482        | 731         | 5024       |
| 1396.....        | 570        | 662         | 6803       |
| 1397.....        | 511        | 756         | 4942       |
| <b>1398.....</b> | <b>000</b> | <b>000</b>  | <b>000</b> |

| 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         |
| 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         |
| <b>1398.....</b> | <b>000</b>      | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b> | <b>000</b>   |

| Year             | Imports    |             |            |
|------------------|------------|-------------|------------|
|                  | Pakistan   | Afghanistan | Iraq       |
| 1380.....        | 0          | 0           | 0          |
| 1385.....        | 0          | 0           | 0          |
| 1390.....        | 0          | 0           | 0          |
| 1394.....        | 0          | 0           | 0          |
| 1395.....        | 0          | 0           | 0          |
| 1396.....        | 0          | 0           | 0          |
| 1397.....        | 0          | 0           | 0          |
| <b>1398.....</b> | <b>000</b> | <b>000</b>  | <b>000</b> |

Source: Ministry of Energy.

## 9.22. ELECTRICITY DISTRIBUTION NETWORK OF THE COUNTRY BY OSTAN THE YEAR 1398

| 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) |
|-----------------------------|--------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------|
| <b>Total .....</b>          | <b>439308</b>                                                      | <b>373124</b>                                                    | <b>747341</b>                               | <b>128380</b>                                       |
| East Azarbayejan .....      | 18200                                                              | 15923                                                            | 26234                                       | 4059                                                |
| West Azarbayejan .....      | 15397                                                              | 12370                                                            | 19817                                       | 2607                                                |
| Ardebil .....               | 7463                                                               | 6249                                                             | 7024                                        | 967                                                 |
| Esfahan .....               | 26605                                                              | 27242                                                            | 46915                                       | 8739                                                |
| Alborz .....                | 5107                                                               | 6840                                                             | 17541                                       | 4279                                                |
| Ilam .....                  | 4993                                                               | 2568                                                             | 6225                                        | 1020                                                |
| Bushehr .....               | 8651                                                               | 6857                                                             | 17741                                       | 4103                                                |
| Tehran .....                | 26078                                                              | 41949                                                            | 71635                                       | 22072                                               |
| Chaharmahal&Bakhtiari ..... | 6613                                                               | 5111                                                             | 8744                                        | 1103                                                |
| South Khorasan.....         | 12734                                                              | 5781                                                             | 9647                                        | 1039                                                |
| Khorasan-e-Razavi.....      | 33850                                                              | 24796                                                            | 43261                                       | 7313                                                |
| North Khorasan.....         | 6916                                                               | 4671                                                             | 7425                                        | 862                                                 |
| Khuzestan .....             | 22691                                                              | 20226                                                            | 57862                                       | 13890                                               |
| Zanjan .....                | 8430                                                               | 5883                                                             | 10143                                       | 1548                                                |
| Semnan.....                 | 7537                                                               | 4075                                                             | 8328                                        | 1418                                                |
| Sistan&Baluchestan .....    | 25129                                                              | 14189                                                            | 25408                                       | 3032                                                |
| Fars .....                  | 37617                                                              | 25849                                                            | 74203                                       | 9472                                                |
| Qazvin .....                | 7215                                                               | 5313                                                             | 12547                                       | 1985                                                |
| Qom .....                   | 4101                                                               | 3851                                                             | 7920                                        | 1978                                                |
| Kordestan .....             | 10718                                                              | 6123                                                             | 13775                                       | 1480                                                |
| Kerman .....                | 32086                                                              | 22502                                                            | 45140                                       | 5397                                                |
| Kermanshah .....            | 11844                                                              | 7022                                                             | 17856                                       | 2145                                                |
| Kohgiluyeh&Boyerahmad ..... | 5033                                                               | 3648                                                             | 8003                                        | 1222                                                |
| Golestan .....              | 7837                                                               | 7855                                                             | 18920                                       | 2511                                                |
| Gilan.....                  | 9325                                                               | 19867                                                            | 22540                                       | 3602                                                |
| Lorestan.....               | 10356                                                              | 5940                                                             | 16803                                       | 1923                                                |
| Mazandaran.....             | 17544                                                              | 25081                                                            | 48183                                       | 6293                                                |
| Markazi .....               | 11842                                                              | 8557                                                             | 17059                                       | 2481                                                |
| Hormozgan.....              | 16081                                                              | 10016                                                            | 27295                                       | 5467                                                |
| Hamedan .....               | 10519                                                              | 8235                                                             | 16997                                       | 2312                                                |
| Yazd .....                  | 10799                                                              | 8535                                                             | 16150                                       | 2063                                                |

Source: Ministry of Energy.

