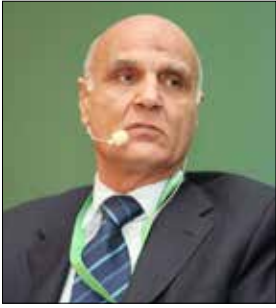


Turkish electricity

production and distribution equipment and cable industry stands out with its performance in world's market and increases its export rate on steady growth. Estimated export profit until the end of 2012 is 7,5 billion \$. This estimate which was 5.30 billion \$ in 2009 was 5.80 billion \$ in 2010 and 6.60 billion \$ in 2011.



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ARTI ENERJİ AŞ CHAIRMAN OF THE
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Electrical energy from renewable sources and Turkey's hydroelectric sources profile

The rise of the “Environmental Consciousness” [for reasons such as Climate Change] in world during 1990s, has increased the strategies and the efforts to Generate Electricity Energy from Renewable Sources and to Utilize Electricity Energy Efficiently in all the countries, especially in Europe. By the end of 20th century, Turkey has started to enhance the utilization rate of Renewable Sources more for conjectural reasons rather than strategical reasons. In the beginning of 21st century, the restructuring efforts on the concept and legislation of Free Market Model for Electrical Energy Generation and Distribution have played an important role, on this enhancement as well. Most of the studies in the World, have been concentrated on Hydroelectric and Wind Energy in terms of Electricity Generation from

Renewable Resources, although Geothermal-Wave-Tidal-Biomass and Solar resources are also important. In this study, Hydroelectrical Resources which is one of the two main sources will be analyzed.

HYDROELECTRICAL ENERGY

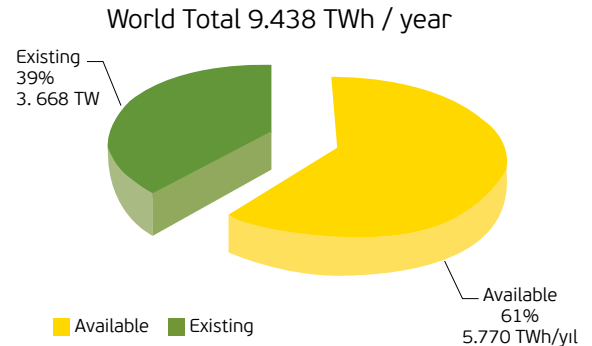
To give an idea on the Hydroelectricity in Europe and the World, IHA [International Hydropower Association], and for Turkey, in addition IHA, DSI [Water State Works] and other relevant institutes' studies [University-Institute of NGO etc.] can be employed. It can be argued that Total Economical Capacity in the World is around 9,500 TWh / year, of which about 39% was used. The ratio of Economic Capacity to Technical Capacity is around 60%. A capacity of 5,800 TWh/year is [planned but] currently unutilized.

We can start with the World Status;

| CONTINENT | Technical Capacity | | Economical Capacity | | Tec.Capacity Usage Rates | Eco.Capacity Usage Rates | CONTINENT | Existing Capacity | | Re. Eco. Capacity | |
|---------------|--------------------|-----------|---------------------|-----------|--------------------------|--------------------------|---------------|-------------------|-----------|-------------------|-----------|
| | GWh / year | Dis. Rate | GWh / year | Dis. Rate | | | | GWh / year | Dis. Rate | GWh / year | Dis. Rate |
| Asia | 8151699 | 51.54% | 4736137 | 50.18% | 58.10% | 33.56% | Asia | 1589581 | 43.33% | 3146556 | 54.54% |
| Europe | 1204999 | 7.62% | 888057 | 9.41% | 73.70% | 59.97% | Europe | 532609 | 14.52% | 355448 | 6.16% |
| North America | 1886151 | 11.93% | 1054358 | 11.17% | 55.90% | 64.58% | North America | 680900 | 18.56% | 373458 | 6.47% |
| South America | 2806526 | 17.74% | 1675496 | 17.75% | 59.70% | 42.21% | South America | 707244 | 19.28% | 968252 | 16.78% |
| Oceania | 185012 | 1.17% | 88700 | 1.34% | 47.94% | 47.97% | Oceania | 42552 | 1.34% | 46148 | 1.34% |
| Africa | 1581496 | 10.00% | 994760 | 10.54% | 62.90% | 11.61% | Africa | 115449 | 3.15% | 879311 | 15.24% |
| TOTAL | 15815883 | | 9.437.508 | | 59.67% | 38.87% | TOTAL | 3668335 | | 5769173 | |



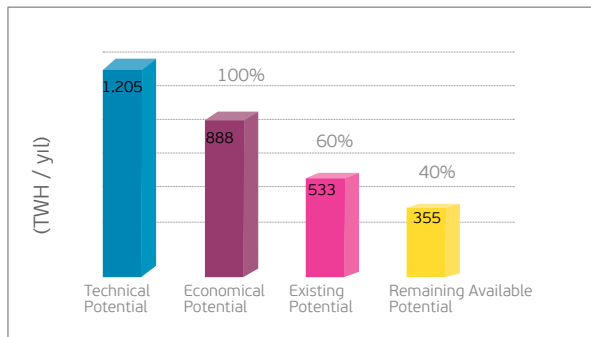
| WORLD | 2013 | | |
|-----------------------------|------|-------|-------|
| | GW | TWh/y | % |
| THEORETICAL CAPACITY | | | |
| TECHNICAL CAPACITY | | 15816 | |
| ECONOMICAL CAPACITY | | 9438 | 59.67 |
| EXISTING CAPACITY | 1011 | | |
| Capacity Under Construction | 224 | 3668 | 38.87 |
| Planned Capacity | 459 | | |
| AVAILABLE CAPACITY | | 5769 | |



The situation in Europe is more promising;

| EUROPE | 2013 | | |
|-----------------------------|------|-------|-------|
| | GW | TWh/y | % |
| THEORETICAL CAPACITY | | | |
| TECHNICAL CAPACITY | | 1205 | |
| ECONOMICAL CAPACITY | | 888 | 73.70 |
| EXISTING CAPACITY | 184 | 533 | 59.97 |
| Capacity Under Construction | 9 | | |
| Planned Capacity | 24 | | |
| AVAILABLE CAPACITY | | 355 | |

Europe Hydroelectrical Potential



About 890 TWh / year Economical Capacity, constitutes 73% of technical capacity. According to 2013 values, 60% of this Economical Capacity has been installed [183 GW Installed Capacity]

The installed capacity in Europe has been raised to 184 GW in 2013, from 172 GW in year 2002. The number of Big Dams has been increased from 3.492 to 4.164 [including Turkey]

In Europe, the share of Hydroelectricity in Electricity Generation has been decreased to 31% in 2013 from 34% in 2002 [The electricity consumption increase in East Europe plays an important role in this situation].

However, it is interesting to see that this share is 95% in Norway, 63% in Austria and 46% in Switzerland.

[The share of Hydroelectrical Resources in Electricity Energy Generation is 15% in Asia, Russia and China, 90-95% in Tajikistan, Georgia and Kyrgyzstan. Except Chile and Argentina, this share is between 85-95% in South America.]

Hydroelectrical Energy Potential of Turkey [The table dates 2002 but the cumulative figures are revised in 2013]:

| River Basin | AVERAGE FLOW billion m ³ / year | On Stochastic Basis [DSI] | | | | On NEW CRITERIA Basis | | |
|-------------------------|---|-----------------------------|----------------------|----------------------|---------------|-----------------------|----------------------|---------------|
| | | Technical Potential | Economical Potential | Installed Capacities | Usage Rates | Economical Potential | Installed Capacities | Usage Rates |
| | | GWh / yıl | GWh / year | MW | % | GWh / year | MW | % |
| FIRAT | 31.61 | 84122 | 37961 | 9648 | 45.13% | 46267 | 11713 | 55.00% |
| DICLE | 21.33 | 48706 | 16751 | 5051 | 34.39% | 24353 | 6165 | 50.00% |
| Doğu Karadeniz | 14.90 | 48478 | 11062 | 3037 | 22.82% | 24239 | 6136 | 50.00% |
| Doğu Akdeniz | 11.07 | 27445 | 5029 | 1390 | 18.32% | 12350 | 3127 | 45.00% |
| Antalya | 11.06 | 23079 | 5163 | 1433 | 22.37% | 9231 | 2337 | 40.00% |
| Batı Karadeniz | 9.93 | 17914 | 2176 | 624 | 12.15% | 7166 | 1814 | 40.00% |
| Batı Akdeniz | 8.93 | 13595 | 2534 | 674 | 18.64% | 6118 | 1550 | 45.00% |
| Marmara | 8.33 | 5177 | .... | .... | .... | .... | .... | .... |
| SEYHAN | 8.01 | 20875 | 7571 | 2001 | 36.27% | 9394 | 2378 | 45.00% |
| CEYHAN | 7.18 | 22163 | 4652 | 1413 | 20.99% | 9973 | 2525 | 45.00% |
| KIZILIRMAK | 6.48 | 19552 | 6320 | 2094 | 32.32% | 7821 | 1980 | 40.00% |
| SAKARYA | 6.40 | 11335 | 2373 | 1096 | 20.94% | 4534 | 1133 | 40.00% |
| ÇORUH | 6.30 | 22601 | 10540 | 3134 | 46.64% | 12431 | 3108 | 55.00% |
| YEŞİLIRMAK | 5.80 | 18685 | 5297 | 1259 | 28.35% | 8408 | 2129 | 45.00% |
| SUSURLUK | 5.43 | 10573 | 1602 | 507 | 15.15% | 2643 | 669 | 25.00% |
| ARAS | 4.63 | 13114 | 2287 | 588 | 17.44% | 5901 | 1494 | 45.00% |
| Konya Kapalı Havz. | 4.53 | 1218 | 104 | 32 | 8.54% | 104 | 32 | 8.54% |
| BÜYÜK MENDERES | 3.03 | 6263 | 831 | 221 | 13.27% | 831 | 221 | 13.27% |
| Van Gölü Kapalı Havz. | 2.39 | 2593 | 257 | 62 | 9.91% | 257 | 62 | 9.91% |
| Kuzey Ege | 2.09 | 2882 | 42 | 16 | 1.46% | 42 | 16 | 1.46% |
| GEDİZ | 1.95 | 3916 | 243 | 94 | 6.21% | 243 | 94 | 6.21% |
| MERİÇ - ERGENE | 1.33 | 1000 | .... | .... | .... | .... | .... | .... |
| KÜÇÜK MENDERES | 1.19 | 1375 | 143 | 48 | 10.40% | 143 | 48 | 10.40% |
| ASI | 1.17 | 4897 | 102 | 37 | 2.08% | 102 | 37 | 2.08% |
| Burdur Göller Böl.Havz. | 0.50 | 885 | .... | .... | .... | .... | .... | .... |
| AKARÇAY | 0.49 | 543 | .... | .... | .... | .... | .... | .... |
| TURKEY TOTAL | 186.06 | 432.986 | 123.040 | 34.729 | 28.42% | 192.551 | 48.768 | 44.47% |
| (Revised) Turkey Total | | | 165.000 | 61.985 | 38.1% | 2013 | | |

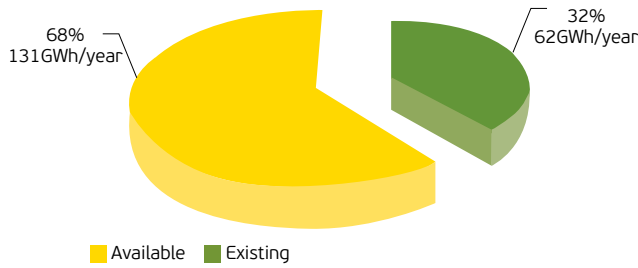
The Capacity values obtained from DSI and other resources are presented below:

| TURKEY | 2012 DSI | | | TURKEY | 2012 New Criteria | | |
|-------------------------------|----------|--------------|--------------|-------------------------------|-------------------|--------------|--------------|
| | GW | GWh/y | % | | GW | TWh/y | % |
| THEORETICAL CAPACITY | | 433.0 | | THEORETICAL CAPACITY | | 433.0 | |
| TECHNICAL CAPACITY | | 216.0 | 49.9% | TECHNICAL CAPACITY | | 250.0 | 57.7% |
| ECONOMICAL CAPACITY | | 165.0 | 70.1% | ECONOMICAL CAPACITY | | 193.0 | 77.2% |
| EXISTING CAPACITY | 19.9 | 62.0 | 40.7% | EXISTING CAPACITY | 19.9 | 62.0 | 32.1% |
| (Capacity Under Construction) | 8.6 | 35.0 | | (Capacity Under Construction) | 8.6 | 35.0 | |
| (Planned Capacity) | 18.8 | 67.0 | | (Planned Capacity) | 18.8 | 67.0 | |
| AVAILABLE CAPACITY | | 103.0 | 59.2% | (Capacity to be Utilized) | | 29.0 | |
| | | | | AVAILABLE CAPACITY | | 131.0 | 67.9% |





Turkey Economical Hydroelectrical Capacity Utilization
(New Criteria) (Turkey Total 193 GWh/yaer)



DSI, has determined Turkey's Economic Potential Hydroelectric during its studies in the last half of 20th century, as 123 TWh / year, but with its last decade revisions, this figures is raised to 165 TWh / year gradually. In more advanced studies, this figure is calculated as 193 TWh/year [in some 216 TWh/year].

The Energy Generation Planning in Turkey has been based on TEİAŞ studies. This Institution's Projections' (for all scenarios) plan that Turkey's Hydroelectrical Capacity will be expanded to amounts such as 33.815 MW Installed Capacity in 2012 with 116.518 GWh/year Electricity Energy Generation [Without doubt, this amount is not satisfactory from Clean Energy point of view]. Thus, in 2021, approximately 26% of Electricity Energy in Turkey will be obtained from Hydroelectrical Sources. When Cost and Price Formation in Electrical Energy [although they are very important, they will not be handled in this study because of a need of detailed and long analysis.] are considered, it is clear that Electricity Generation from Renewable Resources' should usually needs to be supported from economical and financial aspects. The world and countries especially in Europe, in 1990s, have developed a series of legislation which is updated and revised regularly for the Support of Electricity Generation from Renewable Energy Resources with their

consciousness on Environmental Awareness - Climate Change and Clean Energy. As a result of these efforts, particularly Electricity Generation from Wind [mostly in Europe] has experienced a leap. The recent Economic Crisis has lead to an application problem in Incentives - Supports, it can be argued that this situation is temporary. Turkey, in the beginning of 2000s, following Electricity Market Law, has implemented YEK [Renewable Energy Law] Legislation, although it was not enough. In the revised law of 2005, the application modeling deficiencies were not eliminated however, Local Equipment Manufacturing Incentive was added. Unfortunately, the Financing of this local manufacturing was not considered in full detail, thus this Incentive has been providing benefits lower than what is expected. Introduction of an implementation parallel to similar European countries [such as Exim Bank and Euler Hermes etc.] can accelerate the Local Equipment Manufacturing which is very crucial for the economy.