

REVIEW of TURKEY’S ELECTRICITY GENERATION POLICIES from EU PERSPECTIVE

Turkey is not a rich country as far as primary energy sources such as petroleum and natural gas reserves are concerned, but has an abundant hydroelectric potential which can be used for generation of electricity. Despite this, it is observed clearly that inappropriate energy strategies are adopted and such an abundant natural resource is not being sufficiently utilized. Turkey, by letting its waters flow without utilization, as our famous proverb “**water flows, idiot stares**” implies, deprives itself from billions of kWhours of cheap electricity each year. Turkey is being pushed into a position of a country which is unaware of and cannot defend its interests by giving priority to thermal power plants using imported fuel, thus increasing external dependence in energy, instead of developing its own natural resources first. **Turkey must base its energy strategy on developing the whole hydroelectric potential at the earliest possible time.**

Directive 2001/77/EC of the European Parliament and the Council of 27 September 2001 on “**The Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market**” was published in the Official Journal of the European Communities on 27 October 2001 and came into force (see http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf).

In this directive, an indicative target of 22.1 % is set for the year 2010 as the share of renewable energy sources in the whole electricity consumption of all EU countries, and “**renewable energy sources**” are defined to be wind, solar, geothermal, wave, tidal, **hydropower**, biomass, landfill gas, sewage treatment plant gas, and biogasses.

EU countries, for the purpose of achieving the indicated targets for the share of renewable energy, have been implementing various promotions and support policies to increase investment in the supply side (such as green certificates, investment grants, tax exemption or reduction, tax refunds, direct price supports), as well as tax exemptions and subsidies in the demand side for more widespread use of renewable energy by the consumers. Some examples are given below for such promotions and supports, types and mechanisms of which differ in each country.

Germany’s “Act on Granting Priority to Renewable Energy Sources” which came into force in the year 2000 arranges the purchase, transmission and distribution of electricity produced by the renewable energy sources such as small hydroelectric (<5MW), wind, solar, geothermal, biogas, etc. as well as the minimum prices to be paid for each kWh produced by these, with the purpose of doubling the share of renewable energy sources in the total power consumption by the year 2010. According to this Act, for example, the compensation to be paid for electricity produced by hydroelectric plants will be at least 7.5 cents/kWh corresponding to the first 500 kW of installed power, and 6.5 cents/kWh for the rest. The compensation to be paid for electricity generated from wind shall be at least 8.9 cents/kWh for the first five years. **In the explanatory memorandum of the Act, it is indicated clearly that the hydroelectric potential in Germany is largely exhausted and therefore what is left to be promoted is small hydro and other new renewable sources such as wind, solar, etc.** The reasons for the promotion of wind energy are explained clearly in this memorandum and it is stated that wind turbines are cutting-edge technology, and promotion of renewable energy helps this technology develop in Germany and create jobs for additional 20,000 people, in addition to its contribution to the manufacturing sector and exports. Germany, by such promotions and support policies, is targeting to cut CO₂ emissions in 2005 by 25% (compared to the value in 1990), and reduce the emission of all green house gasses by 21% in 2010.

The Netherlands taxes (as of 2001) electricity consumption by 5.2 cents/kWh for the first 10,000 kWh, and 1.7 cents/kWh for the consumption above, but exempts the green energy from this tax.

The subsidy paid (in the supply side) for the electricity produced by the wind and small hydroelectric plants in Sweden is 1.54 cents/kWh. Additionally, there is an “investment grant” of 15% provided to the investments in wind and small hydroelectric plants (<1.5 MW), as well as an “environmental discount” of 2.77 cent/kWh in the price of electricity for the wind energy consumers, in Sweden. (see <http://www.swedenvironment.environ.se/no0004/0004.html>)

Electricity traders will in the near future be forced to use “green energy quota” in Denmark, Sweden and some other countries, which will mean a certain portion of the electricity sold must be from renewable energy sources. The same will apply to consumers importing electricity directly from another country.

All such information emphasises the fact that there is a great deal of activity, effort and support for the promotion of green energy throughout Europe within EU.

Whereas in Turkey, only those hydroelectric power plants which are to be transferred to TETTAŞ (Public company for electricity trade) and the details of how and when these plants will be privatized are mentioned in the “Electricity Market Implementation Handbook” which is intended to be the basis for the directives to be prepared for the implementation of the “Electricity Market Law” no 4628. But, there is no mention of hydroelectric power plants to be constructed by the private sector in this “Handbook”. Actually, the Ministry of Energy and Natural Resources had in their BOT and Autoproducer portfolios, offers by the private sector for the development of hydroelectric power plants with capacities totaling 10,000 MW installed power and above 40 billion kWh/year electricity generation.

It is stated in the proposals brought forward in this “Handbook” for the promotion of renewable energy sources that there is no need for the promotion of large hydroelectric plants to be constructed in future, because Turkey already generates big portion of its power needs from hydroelectric plants. **In fact, all sorts of promotions and support are definitely needed in order to develop full hydroelectric capacity in the shortest possible time, which is the most important national energy resource of Turkey.** It is normal for the individual European countries to exempt the big hydro from the promotions, because almost all their hydroelectric capacities are already developed. In spite of this, the term “**small hydro**”, which was used for the plants of 10 MW or smaller in the previous drafts, is removed and “**all hydroelectric plants**” are defined as renewable energy sources and therefore promoted in the EU Directive “**The Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market**”, which came into force on 27 October 2001 (see http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf). Whereas in Turkey, a large part of calculated capacity is still not utilized and waiting to be developed, and waters flow by with no use. Furthermore, a study made by our company showed that Turkey’s economically feasible hydroelectric capacity is about 190 billion kWh per year, which is 50% more than the figure known as the capacity currently. Developed portion of this capacity at the present is only 40 billion kWh per year. There is no proposal in the “Handbook” for the development of the remaining 150 billion kWh. **The monetary value of this unused capacity is at least 9 billion dollars, and the Turkish economy will be deprived of this income yearly so long as this capacity is not developed. Moreover, whole of this green energy, which is worth 9 billion dollars, can be exported to EU countries.**

Additionally, there is no mention of any specific measures for the promotion of small and/or run-of-river hydroelectric power plants in the “Handbook”. Implementation of “Green Energy Quota” is proposed in general terms for the promotion of renewable energy. In this case, electricity suppliers are obliged to obtain certain portion of electricity they supply from green energy sources. This can be implemented in Turkey’s electricity export to Europe. But, the method used by Germany is more convenient for Turkey to promote new green energy investments. Germany fixed the minimum prices to be paid for electricity produced by each kind of green energy sources, and thus provided a legal guarantee to the investors in the supply side, by the “Renewable Energy Sources Act” which came into force in 2000.

Turkey is and will be generating significant portion (at least 25%) of its electricity from hydroelectric power plants. In case sufficient connection capabilities are provided with EU countries, Turkey’s electricity production characteristics create an important opportunity for exporting electricity. Turkey should take advantage of being a significant producer of green energy, which is promoted by the EU countries both in the supply and demand side. Energy strategies of EU, demand forecasts, supply alternatives and basic principles of green energy promotions are reported in a striking manner in the “Green Paper” published by the European Commission. (see http://europa.eu.int/eur-lex/en/com/gpr/2000/com2000_0769en01.html). In the year 2020, 22% of estimated 800,000-900,000 MW installed power must be green energy, which will mean an additional 300 billion kWh/year green energy must either be produced by EU countries or bought from neighboring countries by that time. According to newly enacted EU Directive 2001/77/EC, additional 200 billion kWh/year green energy production is targeted until 2010. In case, Turkey’s currently unused capacity of 150 billion kWh/year is developed, the buyer will be ready –with a higher price of green energy- for this electricity produced; EU countries. Therefore, the aim in the local energy market must be to reach excess supply, especially in the green energy, and this must be adopted as a policy. This policy will require an active support for all green energy investments including hydroelectric.

Being green energy is not the only advantage of electricity produced in hydroelectric plants. The capability of storing and supplying electricity to meet peak demand is more important and far more valuable economically. The basic policy to be adopted in our country, for both the existing and newly constructed hydroelectric power plants with storage, must be to utilize them mainly to meet peak demands, and the goal must be exporting electricity to EU countries at peak periods. The electricity prices in Europe go up occasionally to very high levels at peak hours, since the hydroelectric power plants with dams in EU countries do not have sufficient capacity to meet the peak demands fully. In order to have an idea about the price level, we can say that there are many days during winter when prices often go up to **45 to 60 cent/kWh** level during peak hours in the Amsterdam Power Exchange (<http://www.apx.nl>). For example, the price of electricity traded reached **100 Euro cent/kWh** level at 6 p.m. on 17-Dec-2001, and stayed at that price level during the same hours in the following few days. (see http://www.apx.nl/marketresults/Historicaldata/historicaldata_dec01.htm).

There is only one transmission line connection between Turkey and Europe at present, that is the connection Turkey uses for importing electricity from Bulgaria. This connection consists of two 380 kV lines with a total capacity of 1,200 MW. Another connection to Greece with 1,000 MW capacity is already planned. There are some problems in the connection of currently used Bulgarian lines to Europe because of Yugoslavian transit route. Another important subject to be dealt with will be the transmission fee asked by the countries on the transit route. But, the problem more important and more difficult to resolve than these is to adopt the totally import oriented energy sector of Turkey –bureaucracy included- to exporting activities. Turkey can earn serious income from electricity exports. Even if the existing lines and capacity is used, 15-20 billion kWh electricity can be exported yearly. This will mean additional income of at least 750 million dollars per year. **Turkey is obliged to think about, plan and succeed exporting energy (electricity). The easiest and the most convenient way to achieve this is to develop the hydroelectric capacity fully in the shortest possible time, which is the country's own renewable energy source.**

The capacity and quality of connection to Europe must be increased urgently, in order to realize and promote exporting green energy in general and electricity at peak hours in particular to Europe. Increasing the capacity and quality of the connection is not sufficient by itself. Turkey is obliged to upgrade the operation standards of its own network to EU level. Membership to UCTE (Union for the Coordination of Transmission of Energy) must be actively sought after. Although TEAŞ applied to UCTE for membership in the past, our electricity network is not at the level such membership would require. In order to upgrade the network, an operation **system must be designed and implemented** urgently for the development of data base at TEAŞ (İletim A.Ş.), additional control and measuring systems, communication, data processing and accounting automation, etc. These two items must take place in the documents as the most important and highest priority duties of İletim A.Ş. (Transmission System Operator)

The connection of national network and its integration with the European network will be the biggest promotion and the guarantee for the investment in the energy sector in our country. When Turkey becomes UCTE member, any energy investor in Turkey will be able to sell freely the electricity he produces to any consumer in the EU countries. Since such sales agreements will be accepted as guarantee by the international banks, financing problems of energy investments in Turkey (green energy in particular) will totally be resolved. **This will help increase the investments in energy sector as well as flow of more international capital to Turkey.**

In conclusion, the directives to be prepared for the implementation of “Electricity Market Law” no. 4628 must contain articles encouraging and promoting investments in the hydroelectric plants. Following are the short list of what are required;

- License fees for hydroelectric plants must relatively be lower.
- License periods must be at least 49 years. Renewal of the license after the expiry of the first period must be part of the agreement. The Economical life of electromechanical parts of the hydroelectric plants is 75 years, and that of other parts consisting the major portion of the investment is hundreds of years. Licenses in developed countries are therefore granted for very long periods (see <http://www.ferc.gov/hydro/docs/waterpwr.htm>). Whereas in our country, the period of concession for BOT projects were mistakenly limited to only 15-20 years, which

effectively stopped the investments in the hydroelectric power plants. The same mistake must not be repeated again.

- Green energy promotion policies may be implemented for the electricity produced for the first 8-10 years, during which there are intense repayments of finance. There is no need for such promotion in the remaining period. A surcharge of 1.5-2 cents can be applied on each kWh of electricity produced by thermal power plants (against the external costs they cause) to compensate for the promotions to be provided to hydroelectric plants.
- A price/compensation guarantee must be devised in order to facilitate and promote investments to especially small and mini hydroelectric plants (European Union envisages promotion of all hydroelectric power plants as renewable energy sources by the Directive 2001/77/EC mentioned above, and it is both necessary and more beneficial for Turkey to take measures in compliance with this directive). Besides investments of plants, it is also necessary to promote the manufacturing of electromechanical parts and control systems used in these plants locally.
- An additional yearly fund of 700 million dollars can be created by applying a surcharge of 1.5-2 cents on each kWh of electricity produced by the existing hydroelectric power plants belonging to DSI or TETTAŞ, for the continuation of public investments in hydroelectric plants.
- The highest priority of Turkey's electricity generation strategies must be developing its full hydroelectric potential first, and the aim should be to attain excess supply especially in green energy and export of electricity. Excess supply will contribute to more competition, cheaper price and export of electricity.
- Turkey must upgrade the standards of its transmission and distribution network to European level and increase the capacity and the quality of connection to Europe in order to export green energy at good prices to EU countries.

Besides, there are many economically feasible hydroelectric plants in Turkey, which can be developed without any promotion or support. The only thing needed is not to put additional hurdles in front of the private sector that is willing to invest in these plants. The BOT model, which could have never been operated as envisaged, must be the last example for such hindrances, and "Energy Market Regulatory Commission" must take confidence building measures by removing or at least reducing such hurdles in order to encourage private sector to invest in the energy projects. For instance, all hydroelectric autoproducer investments, which is the only model available to private sector at present, should be pushed forward by ignoring the ratio of power provided to the partners, until the start of issuing licenses for independent power producers in compliance with "Electricity Market Law" no. 4628.

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