The Effect of Hydropower Plant Units Policies to the Environment

Azize Serap Tunçer

***Abstract*—The relationship between energy and economic growth is a very important indicator for policy makers and researchers while formulating energy policies. On the other hand the rapid increase of energy consumption creates an economic order in which countries are more dependent on each other every passing day, which diversifies their risks. In fact Turkey has significant hydro power potential making it the second richest country after Norway in Europe and hydropower plays a major role in reducing greenhouse gas emissions in terms of avoiding the generation of fossil fuels. Being one of the renewable energy sources par excellence, non-exhaustible, non-polluting and economically more attractive than other renewable sources, hydro power has turned out to be an important contributor to the future energy mix of every country. But there are some policy problems. The aim of this study is; to investigate the effects of hydro-power plant units and their building policies especially with regards to the physical environment in Turkish settlements which is important with its nature, climate, history and cultural values and sensitive zones. Within this context, the study emphasizes the present and future configuration of energy production policies for water sources and effects on the environment in the country, along with suggestions for the true analysis of the problem.**

***Index Terms*—Hydro power plant units, environment, energy, renewable sources.**

I. Introduction

Nowadays, countries struggle for dominance to increase their economic potential. To achieve this goal, the capacity for energy production and its use has gained great importance. One of the most important problems of developed and developing countries is the problem of energy. The relationship between energy and economic growth is a very important indicator for policy makers and researchers while formulating energy policies [1]. On the other hand the rapid increase of energy consumption creates an economic order in which countries are more dependent on each other every passing day, which diversifies their risks. The progressively widening gap between the consumption and supply of energy, as well as the severe economic changes created by large oil price increases, caused serious concern to most countries of the world in the 1970' s. The developing countries were particularly hard hit by the high oil prices, and faced great difficulties in obtaining enough energy for their needs.

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While mechanization is increasing the speed of production, it gives humans diminished roles, and in turn makes them a stranger to nature. The increase and densification of human activities, especially in the last 2 or 3 decades in the world, resulted in the diversification and subsequent vanishing of some habitats, especially by activities related to agriculture, silviculture, industrialization, energy production, urbanization, transportation and tourism.

The majority of people in modern societies live in cities. Cities are the largest consumers of energy and resources and the largest concentrations of pollution, etc. Therefore, they have an important impact on the natural environment far beyond their boundaries. Especially urbanization and its modernization projects that transform environment with irrigation canals, plantation, and human settlements create "second nature". In Bookchin's words, "People change first nature by virtue of their naturally endowed capacities to think conceptually, to create extra biological tools and machines, and to do this with a high degree of collective organization and intentionally that is profoundly different from the behavior and abilities of nonhuman beings. Not only are these unprecedented human survival capacities a product of natural evaluation, they open a still newer realm of potentiality –the potentiality to evolve along social lines and produce a second nature that profounly affects the evolution and life-forms of first nature [2],"

But this eemrging "second nature" requires high levels of human inputs (both labor and financial) to maintain. As urban populations have grown and the consumption and production of goods has become increasingly concentrated in or driven by urban industrial centers, we have become more aware of the role of cities as engines for transforming the environment.

In addition that the rise and fall of the welfare state in the twentieth century is one more cycle in this spiral of public and private appropriations. The crisis of the welfare state has meant primarily that the structures of public assistance and distribution, which were constructed through public funds, were being privatized and expropriated for private gain. The current neo-liberal trend toward the privatization of energy and communication services is another turn in this spiral. This consists of granting to private business the networks of energy and communication that were built through enormous expenditures of public monies [3].

But the two important intellectuals agree that the capitalist accumulation has arrived at its limit. Wallerstein argues that the spread of capitalist commodity production will soon meet its geographical limit, but according to the radical ecologist, Bookchin, "the importance of this parentage and maybe two future parentage, not concrete border of capitalism but structural border… Borders of capitalist diffusion are not

geologic, but ecologic [4]," This foresight is approved by Wallestein too. According to Wallerstein, nowadays, capitalist systems have some serious barriers. "There are three main mechanisms by which producers keep these costs low. They do not pay in large part for the costs of detoxification. They do not pay in large part for the costs of renewing the resources they use. And they do not pay in large part for the creation of the infrastructure they need both for obtaining their inputs and work force and for marketing their products. This failure to pay essential parts of the cost of inputs is called the "externalization" of the costs of production. But as the de-ruralization of the world's work force represents a limit on keeping the price of labor low, so the ecological damage to the biomass represents a limit on externalizing detoxification and resource replenishment [5],"

II. Environmental Effects

While discussions on the changing importance of energy sectors on modern life have been continued, implications of this development models' results have been problematic in terms of both environment and social structure.

Actually, every day the energy necessities are widening and being reached far higher than the present installed capacity of all fuel-operated and hydroelectric power plants in the world. Moreover, almost all countries generally use coal, natural gas, petroleum which are derived from fossil sources. [6] But the World Energy Committee has declared that there are no energy resources with zero-risk, therefore environmental effects have to be appreciated with financial factors for selection of an energy resource. Today, environmental pollution prevention and environmental protection has a dimension which goes beyond the national limits. The risks (air pollution, depletion of the ozone layer, acid rains, etc.) which are arising from the usage of fossil fuels (petroleum, coal, gas) have to be decreased. To decrease these risks it is necessary to prefer proper energy resources which emit less greenhouse gases (carbon dioxide etc.) in addition to increase the energy efficiency. On the contrary, the ecological balance will be disturbed and some catastrophes will occur in advance.

In addition to all these reasons, nowadays, renewable energy sources have become the proper alternative due to the probability of running out these fossil fuels. Being one of the renewable energy sources par excellence, non-exhaustible, non-polluting and economically more attractive than other renewable sources, hydro power has turned out to be an important contributor to the future energy mix of every country. But we mustn't forget: "most renewable resources like hydro power are part of a complex and interlinked ecosystem, and maximum sustainable yield must be defined after taking into account system-wide effects of exploitation." [7] This opinion stresses the concept of sustainability. These writers prefer to define sustainability in terms of preserving existing stocks of "ecological capital and "social capital". "This approach builds on the economic wisdom of living on the interest of an investment –in this case the earth's stock of natural resources- rather than the principal [8],"

On the other hand for some conservative philosophers, these risks generally hasn't had vital importance for humanity, because technology is still the most important tool for the fight against environmental crisis. Namely: "The mainstream of the environmental movement recognizes that the most realistic solutions to environmental problems are likely to lie in the creation of alternative technologies, or technologies to actively protect the environment. A healthy environment is a luxury best afforded by those with wealth and economic dynamism; the worst environmental offenders, whether in the disposal of toxic wastes or deforestation of tropical rain forests, are developing countries that feel their relative poverty does not give them any option but to exploit their own natural resources, or that they do not have the social discipline to enforce to environmental laws. Despite the depredations of acid rain the northeastern United States and many other parts of northern Europe are more heavily forested now then they were a hundred or even two hundred years ago [9].

On the other hand, "Political rhetoric these days is virtuous, even inspired, but neither politicians nor corporate managers have been willing or able to make resource conservation or ecological balance central political values. The result has been a bizarre sacrifice of what is needed to sustain life, beauty, and the natural order. Every day real wealth –breathable air, drinkable water, human imagination and energy, and the health and development of children are sacrificed for symbols of wealth, mostly pieces of paper and bits of electronic data that tell us how rich we are [10],"

III. HEPPS

Turkey, being advantageously positioned between Middle East, Turkic Nations and Europe, serves as an energy transfer link between these regions; which is why many authorities claim it will, or already has become a strategic center. But conversely this position, Turkey's energy consumption is steadily increasing. Nearly two-fifths of all the energy used in Turkey come from foreign sources beyond its borders. "Production from indigenous sources has been unable to keep pace with increasing energy consumption. From 1975 to 1982 total energy use in Turkey increased 30 per cent, while production from all Turkish sources increased only 24 per cent [11],"

At the same time national urban policies couldn't stem urban sprawl [12]. Thereby the very issue of a metropolitan municipal system came on the agenda in 1984 (with the first metropolitan municipal law no. 3030) as a consequence of the spread of urban development beyond the municipal boundaries. Thus the municipal system changed in 1984, in a number of urban centres, metropolitan (two-tiered) municipal governments were established, and important powers were devolved to the these units.

The rapid increase in demand for energy in this region and around the world, the decrease in the existing energy resources and environmental problems caused by some energy sources, has brought to importance the rise energy production capacity and at the same time energy saving policies to the spotlight.

In the light of these realities, in recent years, the number of

hydroelectric power plant (HEPP) projects in Turkey has increased by leaps and bounds. In the country, hydro projects were initiated by the Ministry of Public Works in the early 1930s. The Electrical Power Resources Planning and Survey Administration (EIE) was established in 1935 to project Turkey's energy demand, carrying out surveys and studies to develop hydro-power potential of the country and other energy resources. But especially in this decade there are a series of legal regulations established between 2003 and 2010, underlying this situation. These regulations paved the way for the private sector to construct numerous hydroelectric power plants and dams for energy production and triggered a large number of new projects across Turkey.

When it is compared with the other energy sources, the importance of hydraulic power on production process, it doesn't have any negative effects on greenhouse conditions and its economical, renewable and clean. Hydropower is inexpensive, and like many other renewable energy sources (RES), it does not produce air pollution.

But like all power plants, hydroelectric plants are very expensive to build, and must be built to a very high standard. The high cost means that plants must operate for a long time to become profitable. "While renewable energy sources require no fuel and their operation and maintenance costs (O&M) are generally low, the initial capital costs are relatively high for per unit of capacity installed. High capital cost is considered to be one of the major barriers to greater use of renewable technologies. Higher generation costs of renewable energy might be attributed to two main aspects. Firstly, renewable energy has higher capital costs than fossil fueled systems. Secondly, external environmental and social costs of fossil fuels have been ignored by markets. These costs include pollution, greenhouse gas emissions, and even military expenditures to defend overseas oil supplies. Another vital factor in the development and use of hydropower is financing. Much of the cost of generating electricity with oil, coal and gas is the cost of fuel and therefore a thermal investment is made and recouped in a relatively short period of time. With renewable technologies, however, the initial capital outlay is large and must be recovered slowly over a period of many years, making it difficult to attract capital [13],"

On the other hand while building hydroelectric power plants, the water in rivers and streams can be captured and turned into hydroelectric power. This means natural environment and the natural habitat of animals separated by pipes which cover the habitats. Especially in our country's example, no legal measures were taken to protect the irreplaceable natural and socio-cultural assets of Anatolia, from the impacts of these hydroelectric power plant projects.

Special areas in terms of natural potential beauty etc. in Turkey are now under threat by HEPP's, are conserved in different status as is in all around the world. The untouched landscapes are some of the distinguished potential areas where recreational and nature tourism activities can be carried out. As a consequence, river ecosystems of Turkey, the associated natural ecosystems and local communities were left unprotected, while hydroelectric power plants (HEPP) and dams continue to be one of the most debated issues of the country's agenda.

Turkey is said "has a total gross hydropower potential of 433 TWh/year and 140 TWh/year of this capacity can be used economically, corresponding to the second largest economic potential in Europe. Currently only 35% of economic hydro potential of the country is utilized. After completion of hydropower plants under construction, this figure will increase to 49% [14]," As it currently stands, the government of Turkey plans to construct 1,738 dams and hydroelectric power plants by 2023. However, the nearly 2,000 irrigation and drinking-water dams are also underway totaling up to nearly 4,000. After completion of the hydropower plants under construction, this figure will increase to 49%. It is obvious that even after the construction of all projects there will still be a huge hydro potential in Turkey.

But with this perspective, the total length of river systems in Turkey that will be converted to HEPP's or dams is around 10,000 kilometers, leaving very little of no room for natural ecosystems to function. Hence, there is a serious concern that by the year 2023, there will be virtually no healthy rivers systems left in Turkey. There are neither environmental nor sociological impacts assessments of these projects at the basin or country level. Therefore, no one has a projection on how these large numbers of projects will, in total, affect Turkey's biodiversity and people living in the countryside, while the constructions of hundreds of new dams goes on.

Despite the financial difficulties, so far 83 lawsuits have been filed against dams and HEPP's, and another 13 lawsuits are about to be filed. Of the aforementioned 83 cases, courts have given decisions for 41 cases until now, and they have decided the stay of execution and cancellation of 39 of them. Only 2 cases were concluded in favor of the continuation of the HEPP project, as it stands. Overwhelming majority of these cases have resulted in the cancellation of hydroelectric power plant projects on the grounds that the submitted Environmental Impact Assessment (EIA) reports were inadequate or misleading or the HEPP projects were associated with protected areas. Meanwhile, various groups active in the struggle against HEPP's and dams in Turkey unified under the so-called "Turkey Water Assembly" and at the beginning of 2011 they initiated the campaign "We Won't Give Anatolia [15],"

"In attempting to understand state responses and reactions to movements, we should consider the goals and strategies of social movements, one the one hand, and the structure of the state and the dispersion of the state power, on the other. As far as the goals and strategies of social movements are concerned, the reaction of states would be harsher the greater the challenge that a social movement poses to state [16],"

"New alliances between state and climate change community and the involvement of transnational companies imply "a more diffuse, opaque form of governance, with important political and technical consequences, namely a loss of transparency and accountability, and an incomplete assessment of the future economic returns and the environmental and social impacts of proposed projects". Nevertheless, profits derived from hydropower are transferred to the private entities. Rural communities have benefited from hydropower depending on the relations of social and material power. This has also shaped the

perceptions to privatized hydropower, whether it is an opportunity or destruction [17],"

Another facet of the problem is the ethical barriers that are forming beyond the discussions that are not taken via inclusive methods have resulted in the negligence of the environmental factor, and have caused discussions of social wellbeing. Along with this, a policy of collusion between local authorities and private sector caused many unethical practices to be carried out: [18] the hardships of "compability-compromise" process [19], have allowed many illegal activities to take place.

IV. Conclusion

In fact Turkey has significant hydro power potential making it the second richest country after Norway in Europe and hydropower plays a major role in reducing greenhouse gas emissions in terms of avoiding the generation of fossil fuels. But there are a lot of policy problems. Most important barrier preventing widespread use of hydropower in Turkey is the lack of a coherent national energy plan. Therefore, first of all, Turkey must develop and publicize a rational and coherent energy policy and an action plan.

Because this policy not sustainable; such practices constitute a loss in the public use of these waters, given that the rights of people and nature are dismissed with the private transfers. There are approximately 2000 licensed projects, or projects that are in the process of gaining licenses. On the contrary hundreds of people from the four corners of Turkey resisted from their villages towards Ankara's policies to protect their water rights and keep their roots alive. There is urgent need for comprehensive society groups and peaceful policies.

On the other hand energy saving policies are maybe the most important topics. Bookchin proposed that, a lot of energy sources to grow out of the sun including water power. "It is not that we lack energy per se, but we are only just beginning to learn how to use energy sources that are available in almost limitless quantity. The gross radiant energy striking the earth's surfaces from the sun is estimated to be more than three thousand times the annual energy consumption of mankind today." [20] Consequently, this problems must be criticized from all sides.

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