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RESEARCH ON ELECTRICAL PRODUCTION OF MULTI-PURPOSE SUSTAINABLE DAMS IN THE WORLD

Oğuzhan Yavuz BAYRAKTAR
Kastamonu University, Faculty of Engineering and Architecture, Department of Civil Engineering, Kastamonu

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ABSTRACT
Dams a facility that stores water in the and uses water in a sustainable way. The high use of imported energy resources, which is composed entirely of fossil fuels and which has negative impacts in terms of economic and political aspects, clearly shows that the use and potential of domestic and renewable energy resources is inevitable. Increasing the domestic and renewable primary energy source of hydroelectric energy production to the highest values is only possible with the development of the right tank management policies. Dams also had been built to produce motive power and electricity since the industrial revolution. Development priorities changed, experience accumulated with the construction and operation of dams. Although the importance of water is well known in the human life and civilization around the world, still various groups argue that expected economic benefits are not being produced and that major environmental, economic and social costs are not being taken into account.

KEYWORDS: Dams, Environmental, Hydroelectric energy, Multi-purpose, Sustainable.

1. INTRODUCTION
Today, rapid increases in population, the rapid consumption of energy resources problems have led scientists to seek new solutions [1, 2]. The infrastructure of industrialization and energy, which is an indispensable element of daily life, have a very important place in the national and international agenda. As a result of the technologies developed together with the population growth, industrialization and scientific activities in the world, the need for energy is increasing day by day. The energy requirement, which is as important as the environment, water and food, the indispensable element of societies, is still largely met by fossil sources. the most significant in terms of oil and gas in these sources, have been among the main causes of political crises in the world, the price increases experienced with this crisis has affected negatively the economy of the country depends on foreign energy [3]. Due to the exhaustion of energy resources, presence of external dependency, costliness and environmental impacts; producing safe, adequate, cheap and clean energy for countries is one of the basic problems of economic and social life. Thus, the development of domestic and renewable energy sources, it is important to ensure sustainable development.

Considering the financial, political ramifications of reliance on outside sources, the significance of the utilization of household and sustainable power source resources and the improvement of these resources is obvious, given the way that petroleum products are both depleted and have negative natural effects and absence of value [4]. Notwithstanding the primary targets, for example, water system, energy generation and flood control, it is unavoidable that the dams, which have numerous advantages which can be assessed furthermore, have an imperative spot in water resources ventures. Additionally, contrasted with other power age offices, the hindrance can be assessed as the most reduced option. Nonetheless, the high development costs and the length of their life expectancy require cautious and exact anticipating and ideal activity in these structures [5]. So as to deliver hydroelectric power in a nation, as a matter of first importance, the nation must have the specialized and financial hydroelectric potential. Two strategies are generally used to decide the hydroelectric potential; stream congruity bend strategy and continuous flow uprooting technique. The premise of the stream progression bend strategy depends on the stream coherence bend acquired from the authentic records of the stream. This bend is changed over to control coherence bend by utilizing water control condition and hydroelectric potential is controlled by utilizing this bend [6]. The consecutive stream interpretation technique depends on the coherence condition and

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created to assess the collection ventures. Congruity condition is connected to each time interim sequentially so as to acquire a nonstop undertaking task record. The energy potential is dictated by applying the container yield esteems to the water control condition [7].

The assurance of the water compel potential as a hydroelectric power save is vital as far as the conceivable outcomes and breaking points of use of this asset. Be that as it may, when water control offices and different dams, which can be abused monetarily, are appeared on the down-stream charts and the states of being monetary change, it is essential to utilize the technique for low-stream graphs in which new water-constrain offices might be fitting to build up in which parts of the bowl. Stream coherence bends; the authentic stream information are orchestrated in plummeting request to draw the present in the level of time. The greatest favorable position of this strategy is to ascertain energy potential; this is on the grounds that it is less difficult, quicker and prudent than different strategies. The detriments are; the way that it doesn't speak to flows in authentic request and can't examine multi-chamber ventures [8]. Consecutive momentum interpretation technique; The tasks of waterway control plants, gathering and aggregation without amassing, stockpiling and flood control activities can be connected to practically a wide range of hydroelectric power plant ventures, including power age, ventures with various destinations, top hydroelectric power plant extends and siphoned capacity hydroelectric power plant ventures. This strategy depends on progression condition [9].

The measure of water tumbling to the outside of the earth is around 800 mm or roughly 119,000 km^3 every year, of which 72,000 km^3 swings to the air by vanishing, and 47,000 km^3 streams into the ocean through the waterways and achieve the lakes in the shut bowls. Just 9,000 km^3 of this sum is actually and financially usable. As indicated by the discoveries of the 2004 World Atlas and Industry Guide; [4, 10]

• Gross, hypothetical hydroelectric potential, around 40,000 TWh/year,
• Technical attainable hydroelectric potential, 14,368 TWh/year
• The monetarily possible hydroelectric potential is around 8,562 TWh/year.

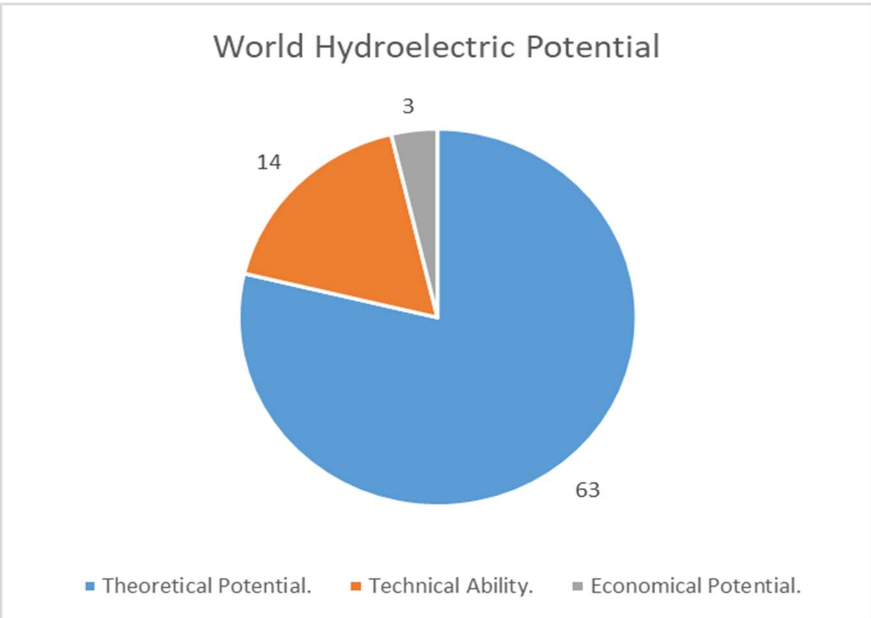

Figure 1. World Hydroelectric Potential

2. WORLD HYDROELECTRIC ENERGY POTENTIAL AND DEVELOPMENT STATUS

As of 2014, this potential is 741.12 GW (or 2794 TWh / year) installed capacity and 118.8 GW is under construction. The total capacity planned for construction in the future is 326.44-446 GW [11].

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According to the data, considering the annual production capacity of the hydroelectric power plants (HEPP) in operation, the technical and economic hydroelectric potential can be evaluated for today, 19.445% and 33.63% respectively. Most of the remaining potential is in Africa, Asia and Latin America [12].

AFRICA
• With an installed capacity of 21.23 GW, an average of 83,100 GWh of electricity is produced annually.
• In at least 17 countries, approximately 4.020 MW HEPPs are under construction.
• The technical and economical hydroelectric potential is 1.750 TWh / year and 1100 TWh / year, respectively.
• The planned hydroelectric capacity is approximately 82,000 MW [13].

ASIA (including Russian Fed., And Turkey)
• An average of 874.040 GWh of electricity is produced annually from the HEPPs with an installed capacity of 257.53 GW.
• HEPPs with an installed capacity of 93.047 MW are under construction in 23 countries.
• The technical and economical hydroelectric potential is 6.800 TWh / year and 4.000 TWh / year, respectively.
• The planned hydroelectric capacity is approximately 209,000-266,800 MW [14].

AUSTRALIA / OCEANIA
• An average of 43,628 GWh of electricity is produced annually from the HEPPs with an installed capacity of 13.44 GW.
• The technical and economical hydroelectric potential is 200 TWh year and 90 TWh / year respectively.
• The planned hydroelectric capacity is approximately 104 MW.

EUROPEAN (except Russian Fed., And Turkey)
• An average of 507.317 GWh of electricity is generated annually from the HEPPs with an installed capacity of 170 GW.
• HEPPs with an installed capacity of approximately 2,717 MW in 20 countries are under construction.
• The technical and economical hydroelectric potential is 1.140 TWh / year and 772 TWh / year, respectively.
• The planned hydroelectric capacity is approximately 12,817 MW [15].

NORTH and CENTRAL AMERICA
• An average of 695,200 GWh / year of electricity is produced annually from HEPPs with an installed capacity of 161.17 GW.
• Hydroelectric power plants with an installed capacity of 3.590 MW in 8 countries are under construction.
• The technical and economic feasible hydroelectric potential is 1.663 TWh / year and 1,000 TWh / year, respectively.
• Hydroelectricity provides more than 40% of the national electricity of 7 countries.
• The planned hydroelectric capacity is approximately 19,157 MW [16].

SOUTH AMERICA
• An average of 590,600 GWh of electricity is produced annually from the HEPPs with an installed capacity of 120.75 GW.
• HEPPs with an installed capacity of 15.406 MW in 9 countries are under construction.
• The technical and economic feasible hydroelectric potential is 2.815 TWh / year and 1.600 TWh / year respectively.
• Hydroelectricity provides more than 50% of the national electricity of 11 countries. Paraguay meets 100% of the electricity demand (51,761 GWh / year) from hydropower.
• The planned hydroelectric capacity is approximately 64,947 MW [17].

The all out introduced limit of HEPPs worked in 2014 is 118,803 MW, of which 78.3% is situated in Asia (93.047 MW). Around 53.74% of this is worked in the People's Republic of China (50.000 MW). The intercontinental dispersion of the introduced power is Africa (3,38%), Asia (78,3%), Australia/Oceania (0,2%), Europe (2,2%), North and Central America (3%). 02) and South America (12.97%). The venture cost of hydroelectric power plants on the planet is roughly 150-200 billion USD [18].

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The complete introduced limit of the HEPPs intended to be developed on the planet is 445.975 MW and the speculation cost for the area is around 500-700 billion USD. In this specific circumstance, the greatest financing needs are heard in creating Asian, African and Latin American nations. The intercontinental appropriation of the arranged introduced control is Africa (18,38%), Asia (59,8%), Australia/Oceania (0,2%), Europe (2,8%), North and Central America (4,3%) and South America (14.6%). The yearly power utilization per capita in numerous nations of Africa with a hydroelectric capability of 1.100.000 GWh/year is beneath 100 kWh. For instance, the monetary doable hydroelectric capability of Utopia, which devours 22 kWh/year of power per capita, would be 260,000 GWh/year, and if this potential had been evaluated, the per capita utilization would be 4,300 kWh/year [19]. The aggregate of the main 10 nations giving the most astounding hydroelectric age has an offer of 66% on the planet hydroelectric power generation. On the planet, Canada is the first in hydropower creation, and this generation is furnished by 450 HEPPs with vast and medium limit and more than 200 MW from 10 MW. Development of dams and hydroelectric Canadian economy has been one of the cornerstones Turkey 45300 GWh/year with normal generation positions fourteenth on the planet [20].

3. EU COUNTRIES HYDROELECTRIC ENERGY POTENTIAL DEVELOPMENT STATUS

The quantity of hydroelectric energy possibilities and improvement status of 27 EU nations with Bulgaria and Romania, which are individuals from the European Union (EU) and 2007. Turkey 45,300 GWh/year with normal generation, Norway, Europe, France, after Sweden and Italy is positioned [21]. Among the EU nations, nations with over half offer of the national power creation of hydroelectricity are Latvia (70%), Austria (58.8%), and Sweden (53%), trailed by Romania (28%), Portugal (25%), and Slovenia. (22%). Thus, Finland, Spain and Italy give about 20% of their creation by hydroelectricity. Then again, non-EU Norway has an offer of 99.3% and 55.9% in national power creation with 106 100 GWh/year and Swiss 35 076 GWh/year hydroelectric generation. In Norway, 336 of the dam's huge dam class is situated in the activity of 2500 dams [22].

Little hydroelectric offices, characterized as hardware with a limit of under 10 MW, are a fundamental piece of the European Union's power age framework. Little hydropower plants, which are perfect for the charge of disengaged destinations, additionally contribute additional to the largest amounts of utilization. Despite the fact that there are numerous motivating forces to guarantee the improvement of the hydroelectric part in Europe, there are various snags that limit the advancement of administrative and natural requirements. The most clear model is the water system order and its undeniably unique national enactment. This order permits Member States to protect the fundamental natural status of waterways and may antagonistically influence the power age of little hydropower plants. In the meantime, in any case, the European Union ought to likewise think about the European order, which expects them to build their wellsprings of inexhaustible power age. In this way, the fate of little hydroelectric power plants relies upon the balance to be set up in the usage of these two orders [23]. For instance, in 2015, the absolute operational limit achieved 11601 MW, an expansion of 320.9 MW contrasted with 2004. In contrast to different areas, the hydropower segment is firmly connected to the geology of a nation. In this specific situation, 84.5% of the complete limit in Europe is in six nations: the first in Italy (2405.5 MW) France (2060 MW), Spain (1788 MW), Germany (1584 MW), Austria (1062) MW) and Sweden (905 MW) [24].

The expansion underway limits in numerous EU nations did not prompt an expansion in power creation, and power generation diminished by 3.4% in 2005 to - 4279 TWh contrasted with 2004 (41925 TWh). Due to the diminishing in the measure of precipitation, it was seen that generation diminished in five of the six principle makers. This decrease is especially clear in France (- 0.8 TWh) and in Spain (0.937 TWh) [25].

There is a logical inconsistency between the nations (Spain, Italy and France) that have reassessed the buy costs and the circumstance of little hydropower offices among the nations (Austria and Sweden) who are looking to survey turn around motivating force frameworks. The positive point is that part states' commitment to execute these two European mandates has empowered States to shape more clear administrative systems and to reevaluate national hydroelectric possibilities to dispatch new examinations [26]. As per our gauge of 2% yearly increment, complete creation in the European Union in 2020 will be roughly 12,786 MW. Besides, it would not be anything but difficult to meet the destinations of the "Manageable Energy Europe' battle, which goes for 2,000 MW of new gear in 25 European Union part nations somewhere in the range of 2015 and 2018. Our transitional gauge for 2018 is that the limit that is outfitted with an expansion of 1,030 MW will achieve 12,290 MW on that date [27].

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4. CONCLUSION

Dams used to create hydropower for quite a long time. After some time, the limit of hydropower plants kept on developing and improve, bringing about marvelous dimensions of power age. Obviously, not all dams are equivalent, and a few dams are more compelling than others with regards to control age. For multi-reason dams, cautiously considering and organizing the worries of various clients are extra prerequisites to keep away from clashes. Despite the fact that hydropower more often than not produces most extreme come back from greatest capacity levels in the supply, it is basic that flood security ensure the water level at depressed spots at specific occasions of the year. Further concessions may emerge among proficiency and efficiency if water system or water supply is joined with hydropower when water levels are low.

Multi-reason dams, if legitimately arranged and oversaw, give a critical choice to address a portion of the significant advancement difficulties existing apart from everything else. By giving perfect and solid energy, the volume of capacity to improve drinking water supplies or farming nourishment generation, and improve flood control, adds to energy, water, sustenance security and human security by and large. In high-hazard zones, multi-reason dams can be a satisfactory reaction to the effects of environmental change. Be that as it may, the same number of new multi-use ventures are relied upon to be actualized later on, the maintainability of expansive dams and stores will remain a noteworthy issue.

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