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**PETROLEUM ENGINEERING**

**CHE 574**

**Question**
How much energy is being produced from the dams in Nigeria? Compare with the energy produced from crude.
**Answer**

**Nigeria statistics**

Population:

194,100,000

Installed hydropower capacity:

2,062 MW (2017)

Hydropower generation:

7,310 GWh (2017)

Nigeria is bestowed with large rivers and natural falls. The main water resources that provide rich hydropower potential are the Niger and Benue rivers as well as Lake Chad basin. With an estimated 1,800 m3 per capita per year of renewable water resources available, this is not a water poor country, yet it is ranked as an economically water scarce country due to a lack of investment and management to meet demand.

The total installed capacity is 12,522 MW, not including off-grid generation, of which 2,062 MW is hydropower. The total exploitable potential of hydropower is estimated at over 14,120 MW, amounting to more than 50,800 GWh of electricity annually. The roughly 85 per cent of hydropower yet to be developed therefore offers solutions to address existing power shortages.

Nigeria’s 2015 National Renewable Energy and Energy Efficiency Policy set out the government’s priority to “fully harness the hydropower potential in the country, promoting private sector and indigenous participation in hydropower development” . This involves extending electricity to rural and remote areas and pursuing hydropower production in an environmentally friendly and sustainable manner. These goals are aligned with the Sustainable Energy for All (SE4ALL) initiative, of which Nigeria was one of the first countries in the world to embrace. Towards this end, in 2016 a Memorandum of Understanding was signed with PowerChina International Group for the overall planning of Nigerian irrigation and hydropower resources.

Nigeria has envisioned growing its economy at a rate of 11 to 13 per cent in order to be among the 20 largest economies in the world by 2020. To meet this ambitious growth target, the government has hydropower development targets of 6,156 MW for 2020 and 12,801 MW for 2030. It has a target to reach 30 per cent renewable energy by 2030 as well as to have 70 per cent of the energy consumed produced on-grid, compared to the current 74 per cent self-generated. The Energy Commission of Nigeria aims to reach 20,000 MW of grid capacity by 2022.

Since 2005, a privatisation programme has been underway to boost electricity demand and supply, leading to the Transmission System Provider of Nigeria (TSP) being handed over to Manitoba Hydro International of Canada under a three to five year management agreement.

The African Development Bank has been investing USD 100 million in hydropower plant maintenance, repairs and investment. As a result, in 2017 the proportion of hydropower on the grid went up to 26 per cent from 15 per cent in 2015. Under this programme, the 760 MW Kainji and 578 MW Jebba projects were rehabilitated.

The Ministry of Power and Ministry of Water Resources have established a partnership for the development of several existing hydropower plants, including the 30 MW Gurara 1, the 10 MW Tiga, 10 MW Oyan, the 8 MW Challawa and the 6 MW Ikere plants. In addition, the 700 MW Zungeru and the 40 MW Kashimbila hydropower plants are currently under construction.

A consortium from China constructing the 3,050 MW Mambilla plant began preparations after an agreement between the Minister of Power, Works and Housing of Nigeria and the consortium was signed last November. Nigeria’s so-called ‘Three Gorges Project’ will include four RCC gravity dams (Nya dam, Sumsum dam, Nghu dam and Api weir) with over 700 km of transmission lines.

Crude oil

In common dialogue, the term fossil fuel also includes hydrocarbon-containing natural resources that are not derived from animal or plant sources.

These are sometimes known instead as mineral fuels.

The utilization of fossil fuels has enabled large-scale industrial development and largely supplanted water-driven mills, as well as the combustion of wood or peat for heat.

Fossil fuel is a general term for buried combustible geologic deposits of organic materials, formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.

The burning of fossil fuels by humans is the largest source of emissions of carbon dioxide, which is one of the greenhouse gases that allows radiative forcing and contributes to global warming.

A small portion of hydrocarbon-based fuels are biofuels derived from atmospheric carbon dioxide, and thus do not increase the net amount of carbon dioxide in the atmosphere.