PLUGGING INTO THE FUTURE : AN EXPLORATION OF ELECTRICITY CONSUMPTION PATTERNS

1.INTRODUCTION :

The electricity energy consumption is energy consumption in the form of electrical energy. India is the fourth largest energy consumer in the world. The present energy use is mostly in the areas of domestic cooking and lighting, agriculture, transport and industrial sectors. Indian energy basket has a mix of all the resources available including renewable. The largest energy source is coal, followed by the petroleum and transitional biomass. India is the world's third largest producer. The national electric grid in India has an installed capacity of 370.106 GW as of 31 March 2020.Renewable power plants, which also include large hydroelectric plants, constitute 35.86% of India total installed capacity. During the fiscal year (FY)2019-2020,The electricity generation in the country was 1,598TWh,of which 1,383.5TWh generated by utilizes. The gross electricity consumption per capita in FY2019 was 1,208kwh.In 2015 to 2016 electric energy consumption in agriculture was recorded as being the highest(17.89%) world wide. The per capita electricity consumption is low compared to most other countries despite India having a low electricity tariff .In light of the recent COVID -19 Situation, when everyone has been under lockdown for the months of March and June the impacts of the lockdown on economic activities have been faced by every sector in a positive or a negative way. Electrical energy about a fifth of global energy is consumed as electricity for residential, industrial, commercial, transportation and other processes. Quickly increasing this share by further electrification is extremely important to limit climate change, because most other energy is consumed by burning fossil fuels thus emitting greenhouse gases which trap heat. global electricity consumption in 2022 was 24,398 terawatt hour nearly three times the amount of consumption in 1981 (8,133TWh).China ,the united states, India and Japan accounted for more than half of the global share of electricity consumption.

1.1OVERVIEW:

Electric energy is most often measured either in joules (J), or in watt hours Electric and electronic devices consume electric energy to generate desired output (light, heat, motion, etc.). During operation, some part of the energy is lost depending on the electrical efficiency Electricity has been generated in power stations since 1882. The invention of the steam turbine in 1884 to drive the electric generator led to an increase

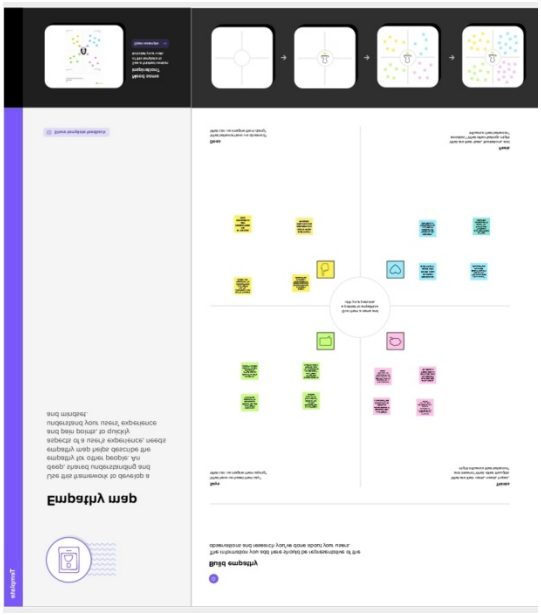
in worldwide electricity consumption. In 2019, total worldwide electricity production was nearly 27,044 TWh. Total primary energy is converted into numerous forms, including, but not limited to, electricity, heat and motion. Some primary energy is lost during the conversion to electricity, as seen in the United States, where 61% was lost in 2019.Electricity accounted for 19.7% of worldwide final energy consumption in 2019, while oil was 40.4%, coal was 9.5%, natural gas was 16.4%, bio fuels and waste were 10.4%, and other sources (i.e., heat, solar thermal, and geothermal) were 3.6%.Total final electricity consumption in 2019 was split unevenly between the following sectors: industry (41.9%), residential (26.6%), commercial and public services (21.2%), transport (1.8%), and other (8.5%; i.e., agriculture and fishing). Since 1973, final electricity consumption has decreased in the industrial sector and increased in the residential, commercial and public services sectors. A sensitivity analysis on an adaptive neuro-fuzzy network model for electric demand estimation shows that employment is the most critical factor influencing electrical consumption. The study used six parameters as input data, employment, GDP, dwelling, population, heating degree day and cooling degree day, with electricity demand as output variable.

1.2PURPOSE :

Annual electricity consumption per capita serves as an important measure of a country's electric power development. Generally speaking, electricity consumption grows faster when the industrialization process develops quickly and goes down rapidly when industrialization is completed or near completion The percentage use of different sources of energy is referred to as pattern of energy consumption. It can only be analyzed when different sources of energy are converted into a common unit, which is termed as MTOE (Million Tones of Oil Equivalent) in India. Reducing energy use in your home saves you money, increases our energy security, and reduces the pollution that is emitted from non-renewable sources of energy. If you are planning to install a small renewable energy system to make your own electricity, such as a solar electric system or small wind turbine, reducing your electricity loads is the first step because it allows you to purchase a smaller and less expensive system. First look at your utility bill. The national average electricity consumption is about 1000 kWh/month. If you use more, even greater savings may be possible

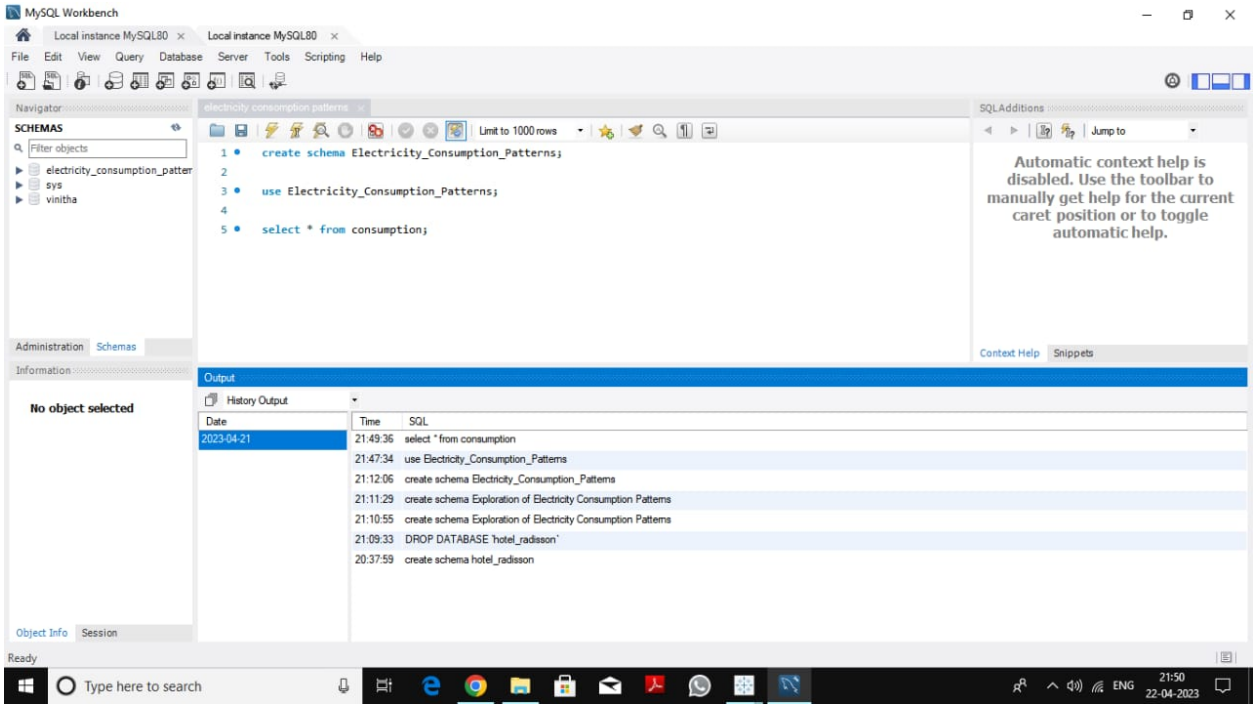
2. 2 .PROBLEM DEFINITION & DESIGN THINKING

2.1 EMPATHY MAP:

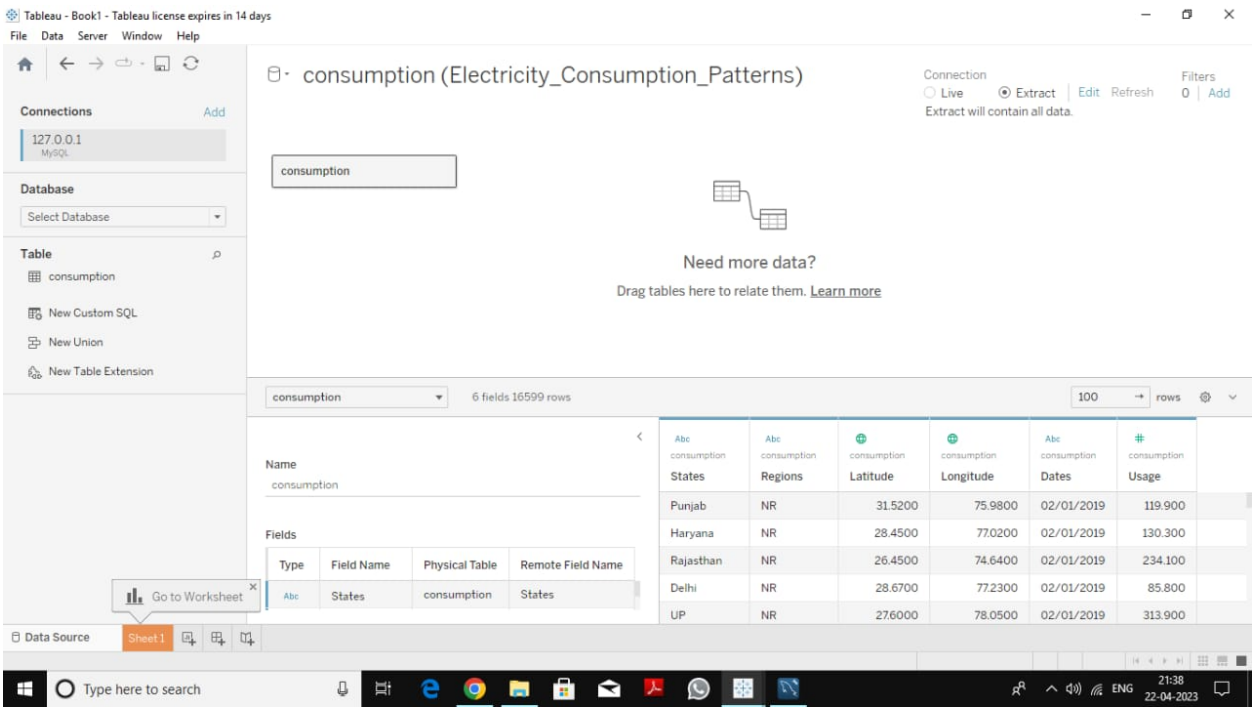


2.2IDEATION AND BRAINSTROMING MAP

3.RESULT:



First we installed the MySQL to stored the data. In MySQL we register using user name and password after that we entered into the home. Using the root we imported the data into Mysql which we stored the data in excel sheet. After we imported we can see the output data which we see in the above screenshot.



To make the data table first we register in tableau and the we got the link in mail to download the tableau using the link we downloaded after that we connect the tableau server with MySQL after that we connect the sever with sever code and password. next we can see the stored data in tableau the we drag the data and formed the data table.

4.ADVANTAGES:

Electric power has many advantages domestically and industrially, as most of the equipment run by electric power. Brightness in the night is only possible by the use of electricity .Almost all the factories and industries are running due to electric power. The advantages of electric power is its reliable the uninterrupted supply runs the equipment efficiently and continuously. The transportation of electricity is easy once the transmission lines are functional. They work for years and need no or very less maintenance.

Environmental:

Increased efficiency can lower greenhouse gas (GHG) emissions and other pollutants, as well as decrease water use.

Economic: Improving energy efficiency can lower individual utility bills, create jobs, and help stabilize electricity prices and volatility.

Electric power is very easy to distribute and transport. thanks to electricity we can improve our performance due to the wide range of devices that facilitate our activities in

the office or home. This may be the most accessible source of energy in urban areas that are far from cities. With electric power you can illuminate the avenues and / or streets.It is also very useful to improve communicating around the world through the use of devices.

DISADVANTAGES

In the conditional system to generate electric power, coal is burnt to generate heat which boil the water to produce stem .The stem produced is used to run the turbines which in turn generate the electricity. This is a very old method. Due to burning of coal, carbon monoxide carbon dioxide different oxides of sulphur and nitrogen are pumped into the atmosphere which pollutes it badly. The environmental problems directly related to energy production and consumption include air pollution, climate change, water pollution, thermal pollution, and solid waste disposal. The emission of air pollutants from fossil fuel combustion is the major cause of urban air pollution.

5.APPLICATION:

In India electricity consumption during 2021 to 2022 the per capita India is 945.98 kilowatt-hour. According to the official data the total installed capacity of the country stood at 4,12,212 MW as on Feb 2023.Thermal power plants constitute 57.4% of the installed capacity and hydropower about 11.4.There are 21 nuclear power reactors in the country with a total installed capacity of 6780 MW .Amount the house holds living in houses about 48.3 percent of the households in the rural areas and about 86.6 percent of the households in the urban areas used LPG as fuel for cooking. People use electricity for lighting, heating, cooling, and refrigeration and for operating appliances, computers, electronics, machinery, and public transportation systems. electric power, energy generated through the conversion of other forms of energy, such as mechanical, thermal, or chemical energy.

6.CONCLUSION:

Electric energy consumption is the form of energy consumption that uses electrical energy. Electric energy consumption is the actual energy demand made on existing electricity supply for transportation, residential, industrial, commercial and other miscellaneous purpose. Energy efficiency is the wave of the future. An energy efficient home is a personal step toward the direction of renewable energy, environmental protection, and sustainable living. Electricity is something that we all live by whether we notice it or not, some of us wouldn’t be able to survive without it because it is a must needed source to our everyday lives. It is used to help save people, in education, hospitals, cities, etc., we live by this incredible creation that mother nature has given us and we have been able to control it with our very own hands throughout centuries. Especially in this crazy changing world where things are being invented and

created everyday, it would not be possible without "Electricity". Electricity is the backbone of modern society. Our life will go back to the primitive age without electricity. There is a need for rational use of electricity, as it is largely produced from non-renewable sources like coal and water.

7.FUTURE SCOPE:

This raises electricity 's share in total final energy consumption from 19%in 2018 to 24%in 2040.Electricity demand growth is set to be particularly strong in developing economies. Global electricity demand grows at 2.1%per year to 2040 twice the rate of primary energy demand. Accelerated efforts on renewable nuclear power and carbon capture technologies rapidly decarbonizes electricity supply, of coal fired power generation and reducing power sector CO2 emissions by 2040.In development economic, future growth linked to increasing digital and electrification is largely by energy efficiency improvement. global electricity demand grows at 2.1% per year to 2040, twice the rate of primary energy demand. This raises electricity's share in total final energy consumption from 19% in 2018 to 24% in 2040. Electricity demand growth is set to be particularly strong in developing economies.

8. APPENDIX: Trailhead link

Team leader: https://trailblazer.me/id/evinip12

Group member 1: https://trailblazer.me/id/evinip12

Group member 2: https://trailblazer.me/id/evinip12

Group member 3: https://trailblazer.me/id/evinip12