High Level Design (HLD)

Global Energy Trade Analysis (1990-2014)

Autor: Dibyendu Biswas

Version: 1.0

Contents:

◆ Abstract

Taking place primarily in the fossil fuels sector, global energy trading is rising steadily on a total volume basis. The distribution of fossil energy production and consumption is highly imbalanced, requiring the capability to optimize allocations of energy resources across the world. Transnational and intercontinental energy trade flows have been expanding increasingly along with the development and improvement of energy transport networks, including ocean transport, railway, and oil/gas transmission networks. In 2013, transcontinental fossil energy trade flows globally amounted to 6.3 billion tons of standard coal, with oil, gas, and coal accounting for 63, 22, and 15%, respectively. Fig. 1.1 shows the change in the trade volume of different fossil energies as a percentage of global consumption between 2002 and 2013.
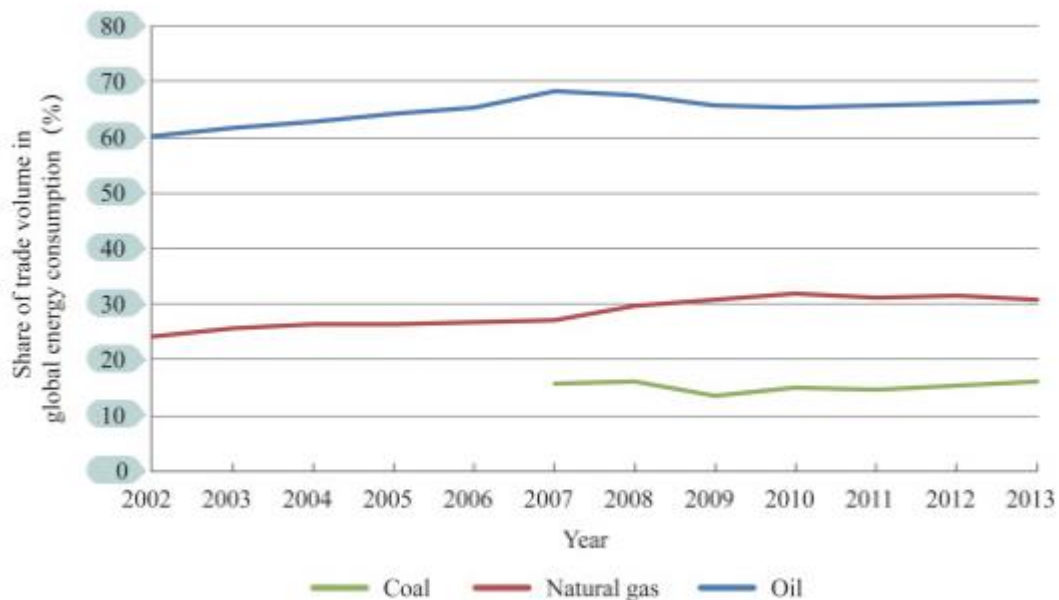
As shown, the trade volumes of oil, gas, and coal accounted for 66.4, 31.9, and 17.1% of global consumption, respectively. Due to grid transmission capacity constraints, electric power is geared mainly toward achieving a balance at the local and regional levels, while transnational and transcontinental trade operates on a small scale. In terms of calorific value equivalents, transnational and transcontinental electricity trade accounted for only 1.3% of global fossil energy trade.

In the world rising and developing new technology and infrastructure, the demanding of energy is rising rapidly. In this scenario Data Analysis can help them to understand their (energy sectors) business in a quite different manner, like- helps to improve the quality of services (import, export, etc.) and helps to reduce/minimize the uses of coal & oil, helps to protect the environment, helps to more focus on solar & wind energy etc.

This study demonstrates how different analysis help to make better business decisions and help to end user and help to produce less carbon in our environment. Different analysis performed such as Exploratory Data Analysis & Descriptive Analysis on variety of use cases to get the key insights from this data and based on data business decisions will take.

Scope

The HLD documentation present the structure of the system, such as the database architecture, application architecture (layers), application flow (navigations), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

Problem Statement

One of the most unique power bi projects ideas is the Global Energy Trade Analysis. This project concept includes various topics concerning global energy exchange and production. It addresses several topics, such as the expansion of wind energy, energy consumption as a different basis for comparing national economies, etc.

The resulting dashboard could display total energy statistics on production, commodity exchange, and usage of primary and secondary energy, conventional and non-conventional energy sources, and new and renewable energy sources. For the dashboard, you can use Power BI visualization types such as Bar Charts, Flow Maps, Cards for the overview page, Ribbon Charts, Treemaps, Bar Charts for the energy production and exchange pages, etc.

Do ETL: Extract-Transform-Load the dataset, and find for me some information from this large data. This is form data mining.

Create Power BI dashboard as well as reports.

Do your own research and come up with your findings.

Architecture
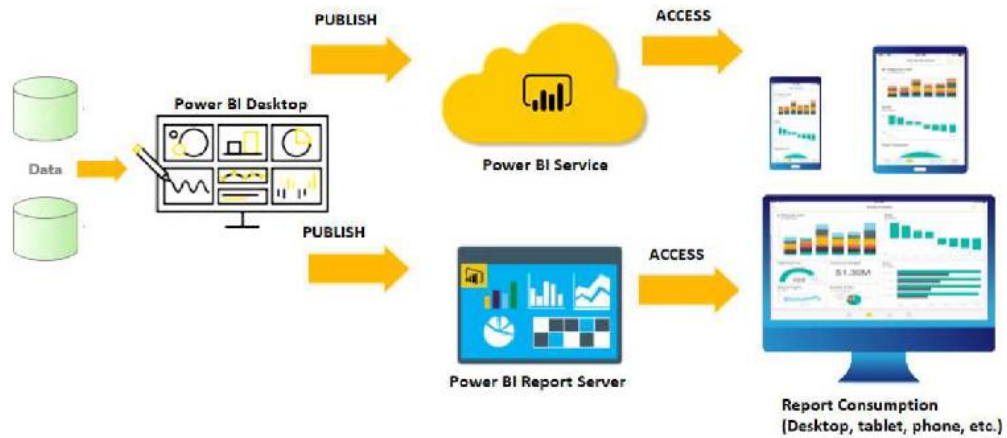
Tools Used

- I have used Business Intelligence tools like MS Excel and Power BI.

- MS Excel is used for data.

- Power Bi is used for creating dashboard, reports, charts according to selected data and make dashboard using charts.

KPIs (Key Performance Indicators)

- Dashboard will be implemented to display and indicate certain KPIs and relevant indicators.

- As and when, the system starts to capture the historical/periodic data for the user, the dashboard will be included to display charts over time with progress on various indicators or factors.

Deployment

Any company or organization wants to analyze data and visualize data for better understanding. For that, companies are already using the best business intelligence technologies for better data analysis and visualization, Power BI is one of them.

Power BI has its various services. One can use Power BI for making good visuals because Power BI desktop is free of cost, anyone can use it and it will deploy on its own Power BI services, from there anyone can see your work (reports, dashboard, etc.). You can also shareable link for those who want to see your work.

--- Thank You ---