Team ID: 591312

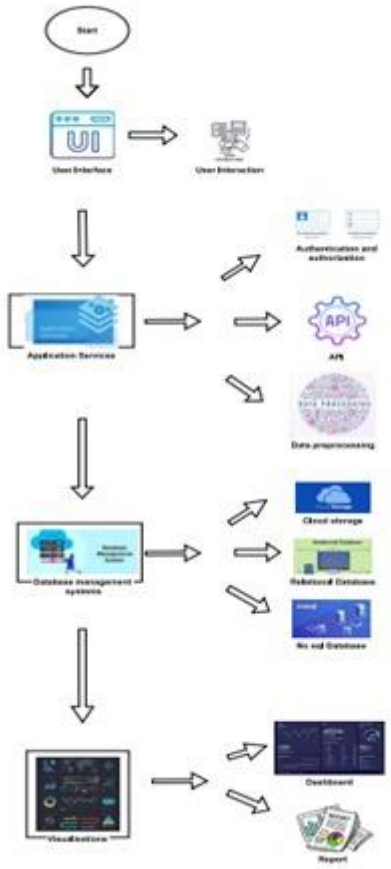
Solar Panel Forecasting

Sun based power works by changing over energy from the sun into power. There are two types of energy produced from the sun for our utilization - power and intensity. Sun based power determining is the course of assembling and examining information to anticipate sun based power age on different time skylines. Sun based power gauges are utilized for effective administration of the electric network and for power exchanging. Sun powered chargers are normally produced using silicon introduced in a metal board outline with a glass packaging. When photons, or particles of light, hit the slight layer of silicon on the highest point of a sun powered charger, they thump electrons off the silicon particles.

This PV charge makes an electric flow (explicitly, direct flow or DC), which is caught by the wiring in sun powered chargers. This DC power is then switched over completely to rotating current (AC) by an inverter. AC is the kind of electrical flow utilized when you plug apparatuses into typical wall attachments.

We should investigate the given information, draw a few bits of knowledge, attempt to address our difficulties and foresee/figure the power result to the degree conceivable which can be utilized for figuring out future necessities.

Technical Architecture:



Project Flow :

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding

  o Specify the business problem

o Business requirements o Literature Survey

o Social or Business Impact.

● Data Collection & Extraction from Database

o Collect the dataset

o Storing Data in DB2

o Perform SQL Operations

o Connect DB2 with Cognos

● Data Preparation

o Prepare the Data for Visualization

● Data Visualizations

o No of Unique Visualizations

● Dashboard

o Responsive and Design of Dashboard

● Story

o No of Scenes of Story

● Report

o No of Visualization with detail information

● Performance Testing

o Amount of Data Rendered to DB2

o Utilization of Data Filters

o No of Calculation Fields

o No of Visualizations/ Graphs

● Web Integration

o Dashboard, Report and Story embed with UI With Flask

● Project Demonstration & Documentation

o Record explanation Video for project end to end solution

o Project Documentation-Step by step project development procedure

Milestone 1: Define Problem / Problem Understanding

Solar power works by converting energy from the sun into power. There are two forms of energy generated from the sun for our use – electricity and heat. Solar power forecasting is the process of gathering and analysing data in order to predict solar power generation on various time horizons. Solar power forecasts are used for efficient management of the electric grid and for power trading.

Activity 2: Business requirements

Solar panel forecasting is an important tool for manufacturing companies or distribution of solar energy. Accurately predicts the amount of incoming energy produced solar panels help companies optimize and plan their operations future growth and make informed pricing and capacity decisions .The goal is to gain insights and predict performance through data visualization techniques. By providing accurate energy production forecasts, companies can optimize their forecasting functions, reduce costs and increase revenues while delivering better customer experience and competitive advantage in the market.

Activity 3: Literature Survey (Student Will Write)

The literature review on Solar Panel Forecasting includes academic articles, books and other sources related to solar forecasting techniques, including statistics, physical and hybrid models. Various factors affecting accuracy are also discussed divination of the sun. A survey can provide a comprehensive overview meanings, challenges and opportunities related to solar energy.

Activity 4: Social or Business Impact

Social impact: enabling more effective and efficient use of solar energy, it can help solve some of the world's most pressing social and environmental challenges our time.

Business Model/Impact: Through analytics, it can help businesses evolve products and services that better meet needs and help businesses develop profitability and competitiveness in the market.

Milestone 2: Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Activity 1:

Collect the dataset Please use the link to download the dataset: Link-BigML_Dataset.csv - Google Drive

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files. We have provided CSV file:

Column Description for BigML_Dataset.csv:

The file BigML_Dataset.csv contains 2921 rows and 17 columns. Each row corresponds to a record of Power generated with respect to given conditions

The columns are:

- Day of the Year- Day of the year out of 365 days
- Date- Date of Year
- Year- 2008/2009
- Month - Months from 1-12
- Day: Day from 1-31/30 accept for Feb (2)
- First Hour of Period: Time -1,4,7,10,13,16,19,22 (24hrs Format)
- Is Day Light- Whether Daylight presence or not
- Distance to Solar Noon- Distance left until the sun reaches its highest point in the sky
- Average Temperature(Day)- Average Temperature of that Day
- Average Wind Direction(Day)- Average of Wind Direction of that Day
- Average Wind Speed (Day)- Average of the Wind Speed of that Day
- Sky Cover- Proportion of the sky that is covered by clouds
- Visibility- distance at which objects can be clearly seen in the atmosphere
- Relative Humidity- Amount of moisture in the air

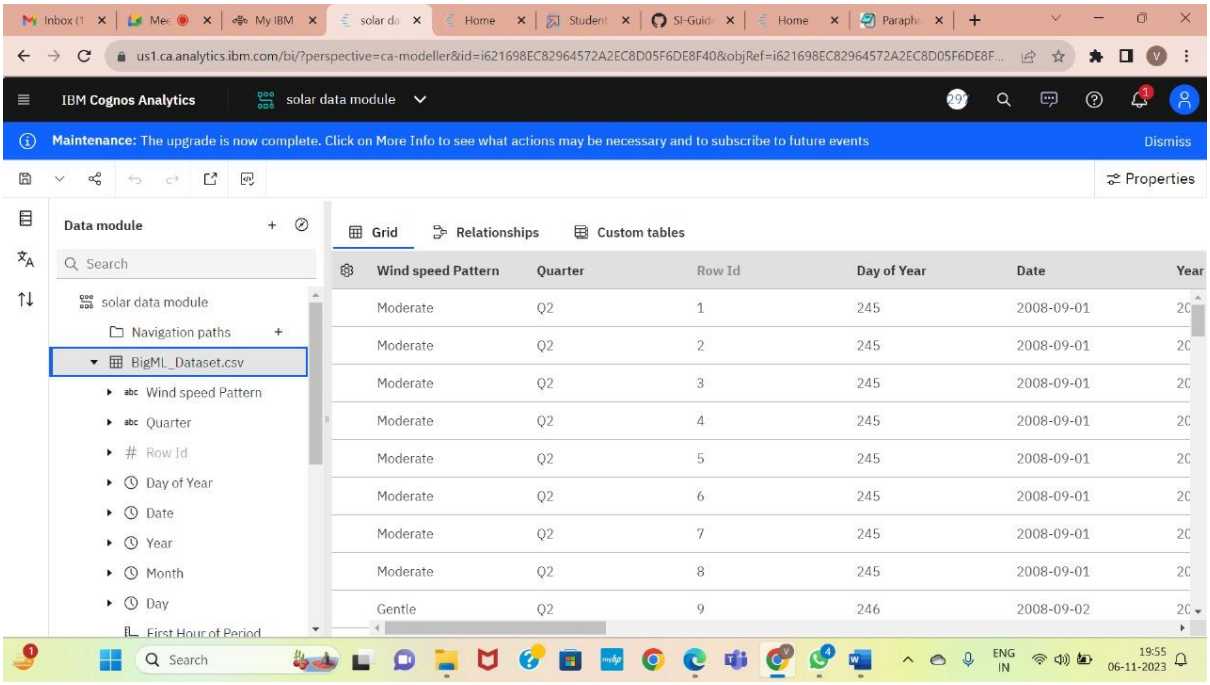
● Average Wind Speed- Average Wind Speed for set period

● Average Barometric Pressure(Period)- Pressure within the atmosphere

● Power Generated- Total Power Produced

Activity 2: Connect DB2 with Cognos :

We uploaded the data set into IBM Cognos and created data module called solar data module.

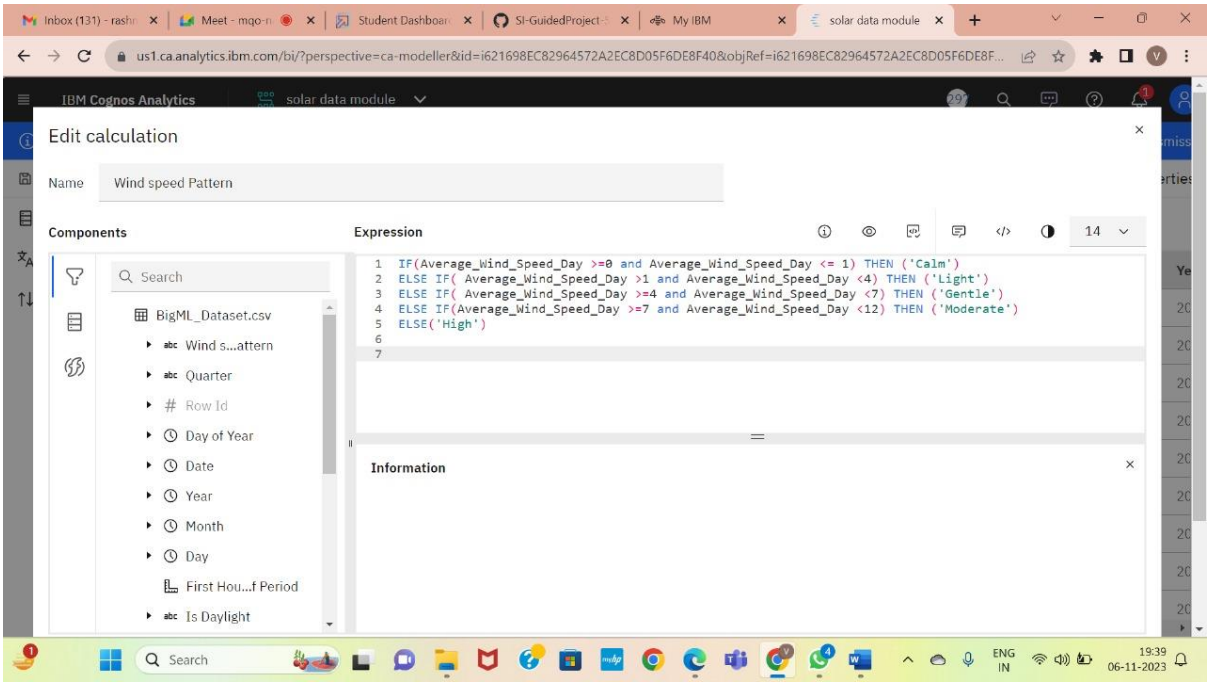


Milestone 3: Data Preparation

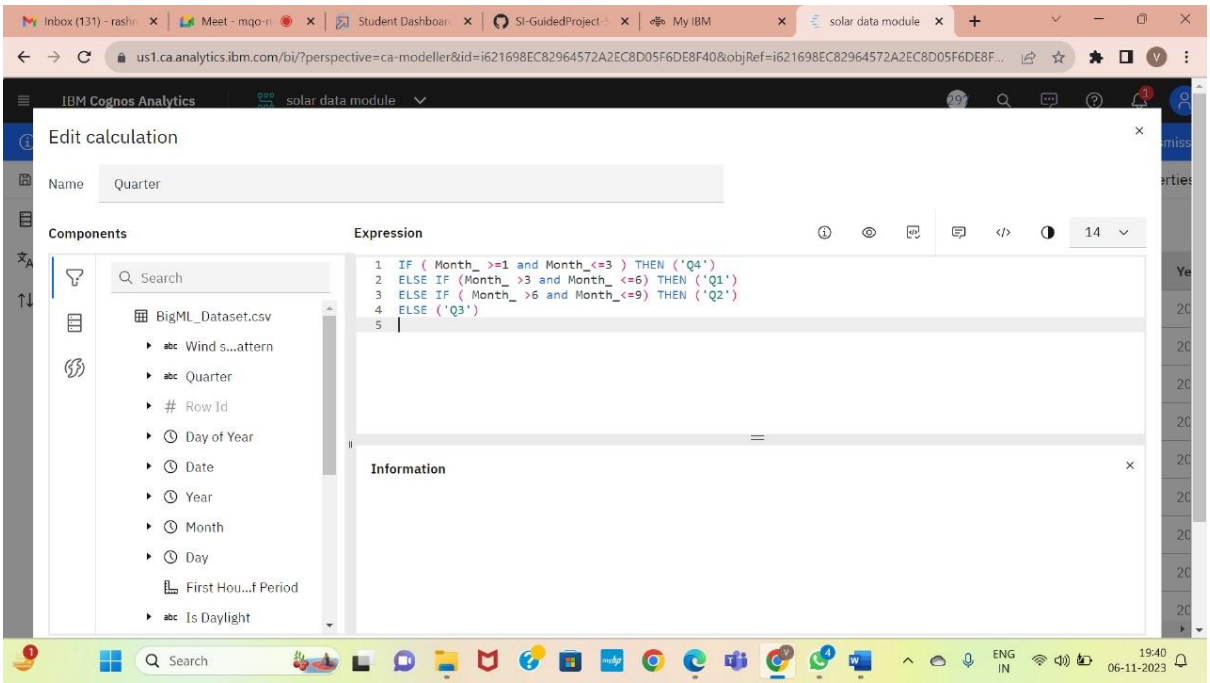
Activity 1:

Prepare the Data for Visualization:

We used sql queries to create new fields called wind speed pattern:



We used sql queries to create new fields called quarter.



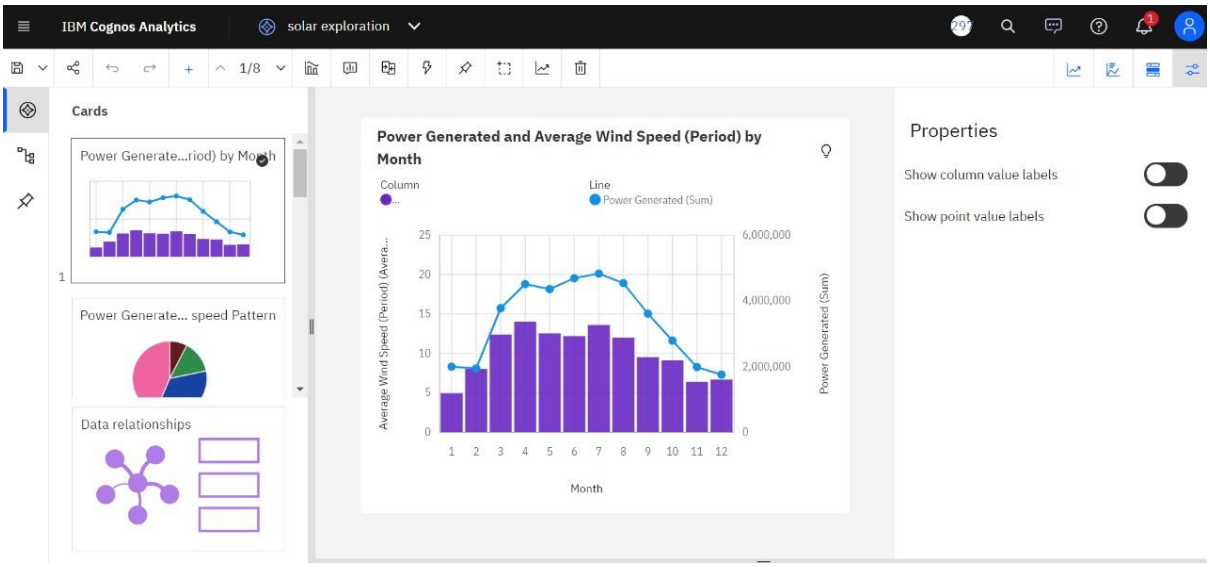
Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data to help people understand and research information. The purpose of data visualization is to make complex data sets easier to use, more intuitive and easier to interpret. Using visual elements such as charts, graphs, and maps, data visualization helps people quickly identify patterns, trends and anomalies information.

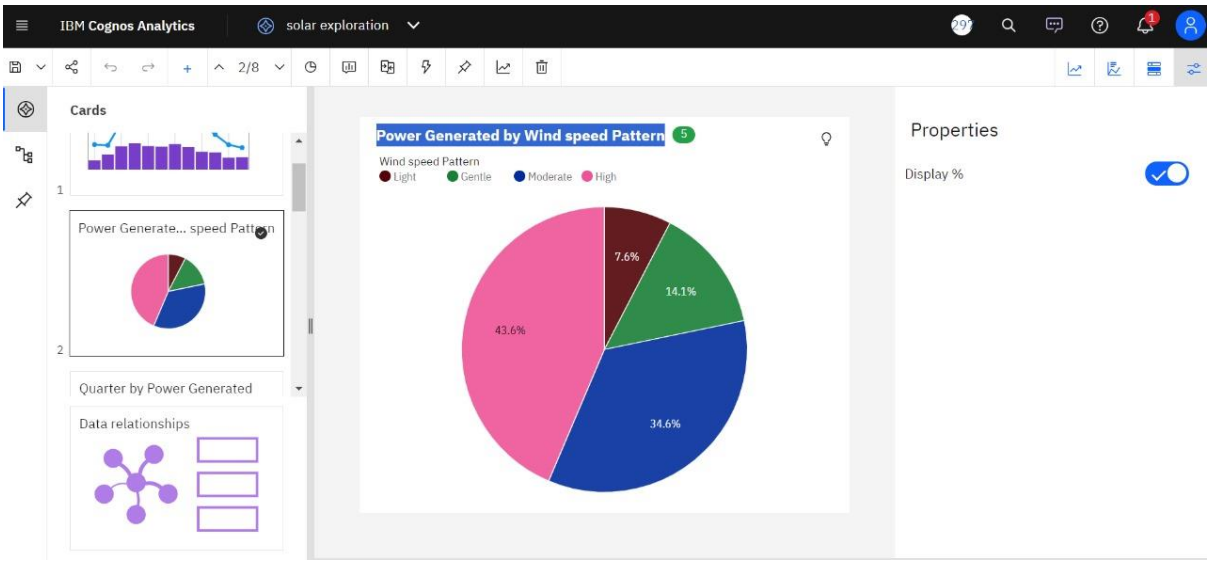
Activity 1: No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the performance and efficiency of project include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables.

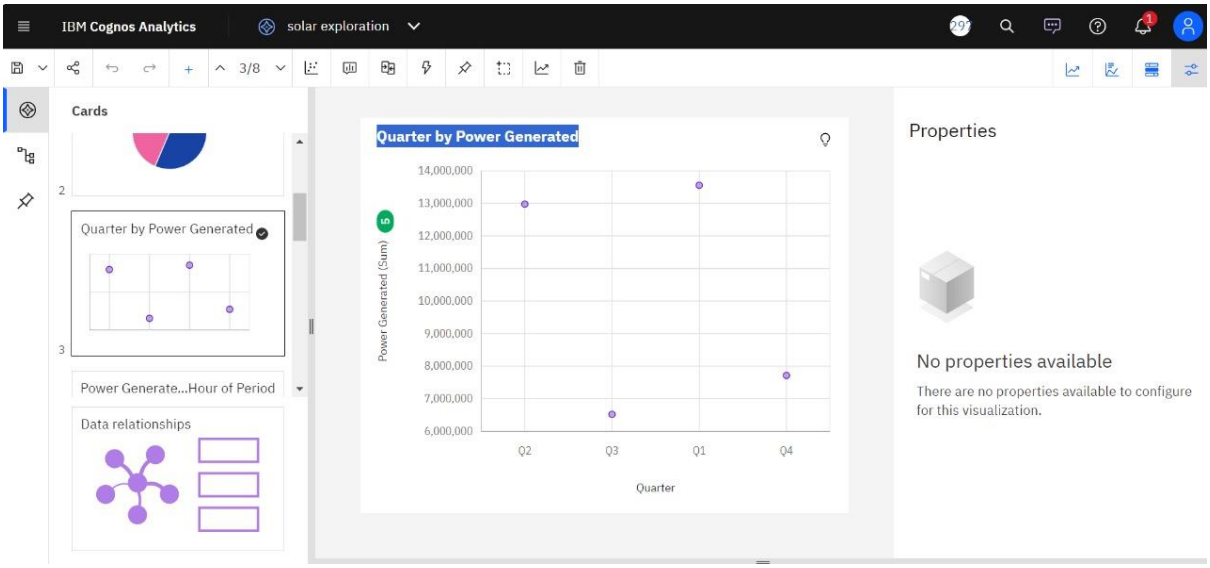
Activity 1.1: Power Generated w.r.t to Average Wind Speed Period



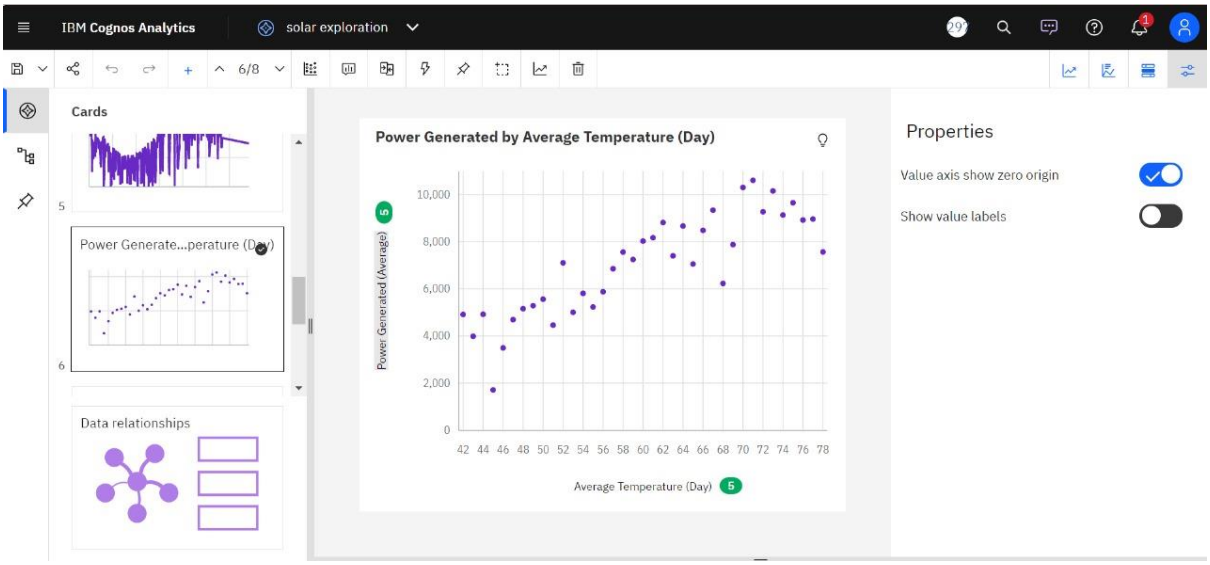
Activity 1.2: Power Generated w.r.t Wind Speed Pattern



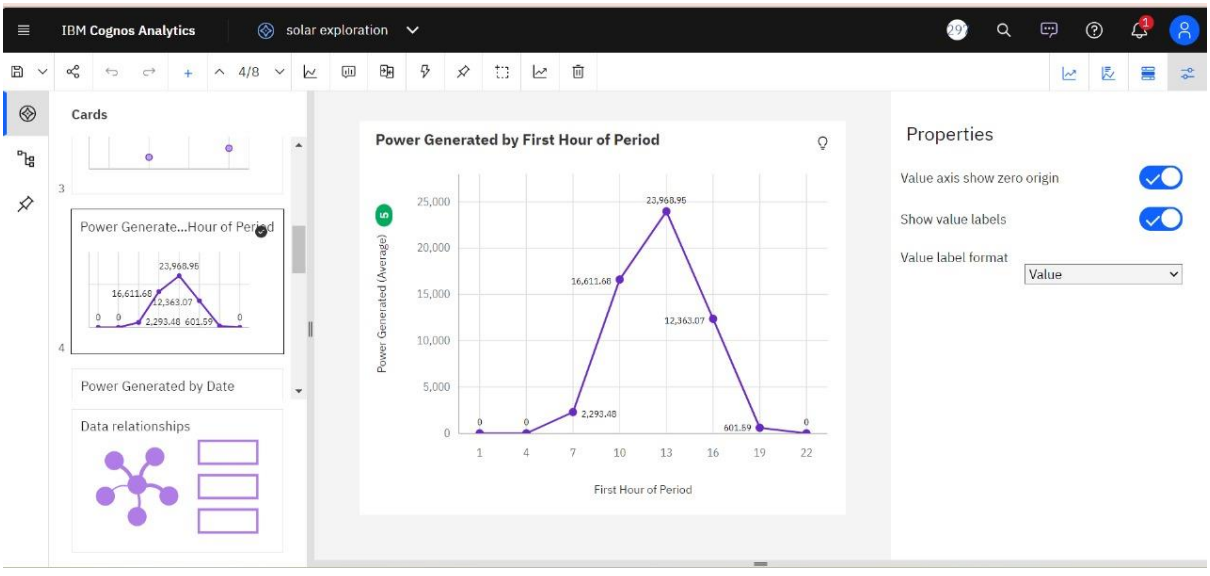
Activity 1.4: Power Generated by Quarter



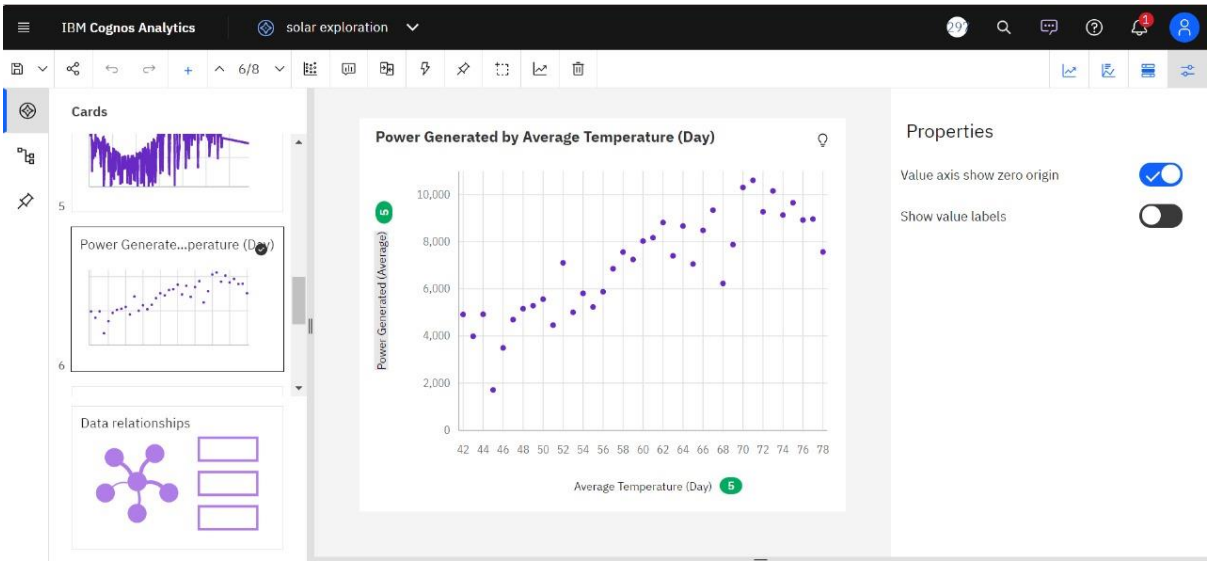
Activity 1.5: Power Generated by Average Temperature



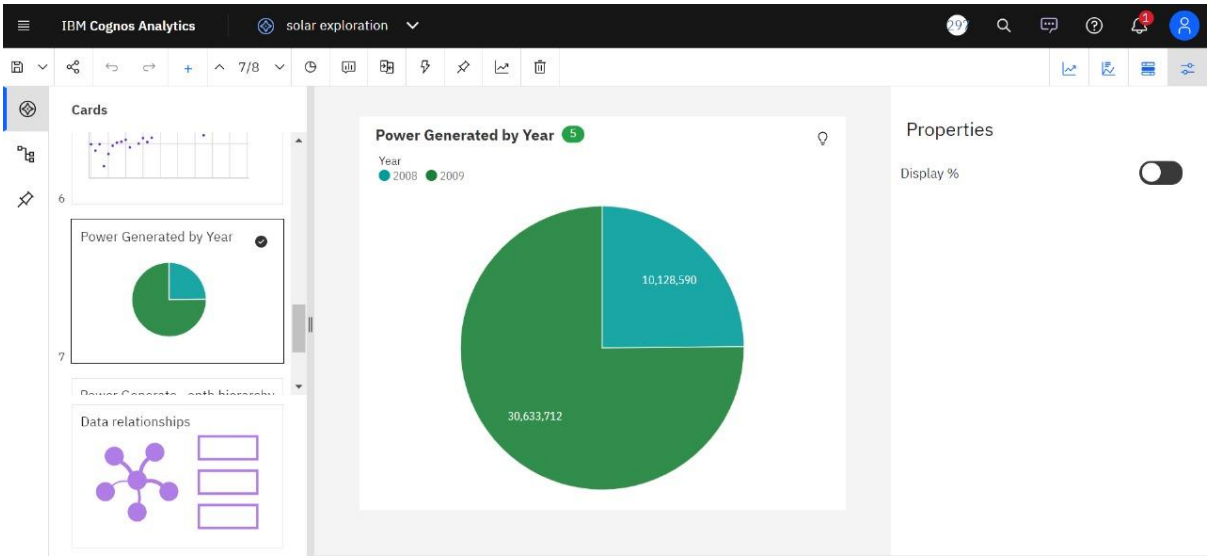
Activity 1.6: Power Generated by First Hour Of Period



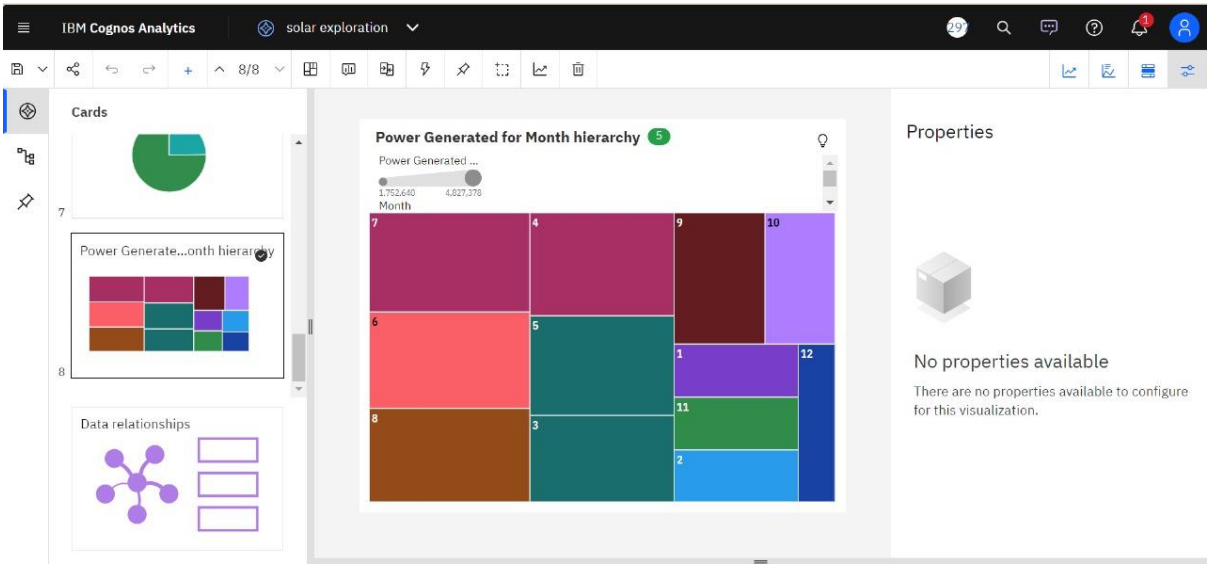
Activity 1.7: Power Generated by Average Temperature



Activity 1.8: Power Generated by Year



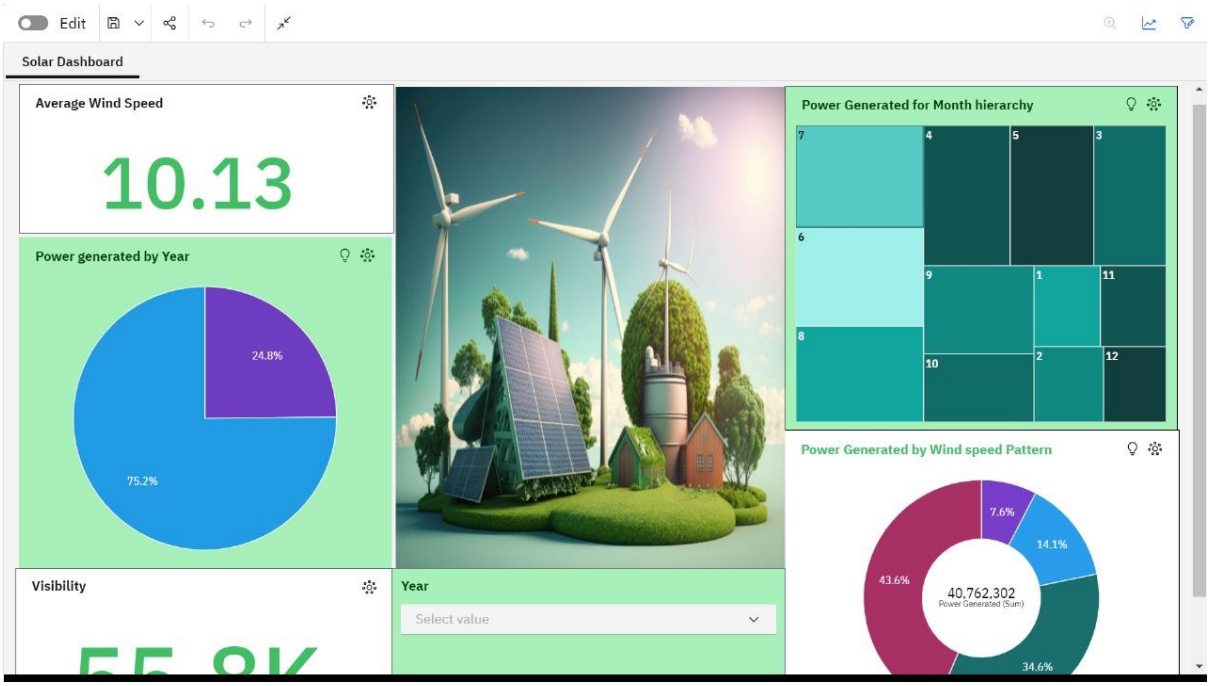
Activity 1.8: Power Generated by Month hierarchy

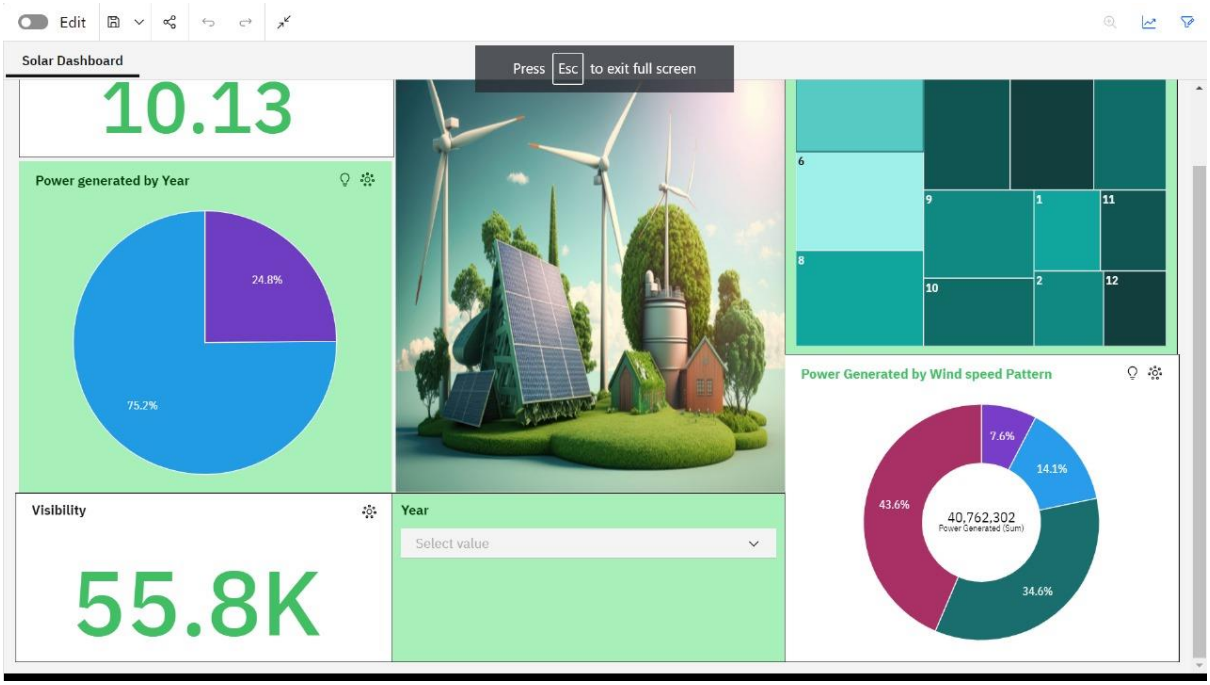


Milestone 5: Dashboard

A dashboard is a type of graphical user interface (GUI) that presents facts and information in a logical, readable manner. Dashboards are usually made for a particular use case or purpose and are frequently used to enable real-time data monitoring and analysis. Dashboards are useful in many different contexts, including business, finance, manufacturing, healthcare, and several other sectors. They may be used to monitor performance metrics, track key performance indicators (KPIs), and present data as tables, graphs, and charts.

Activity :1- Responsive and Design of Dashboard



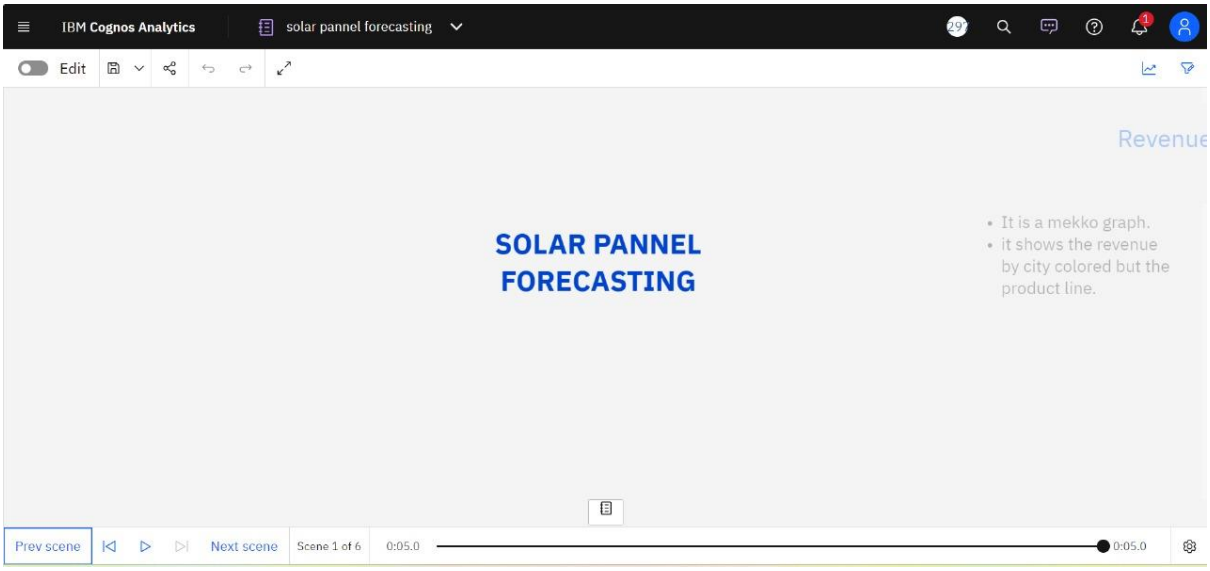


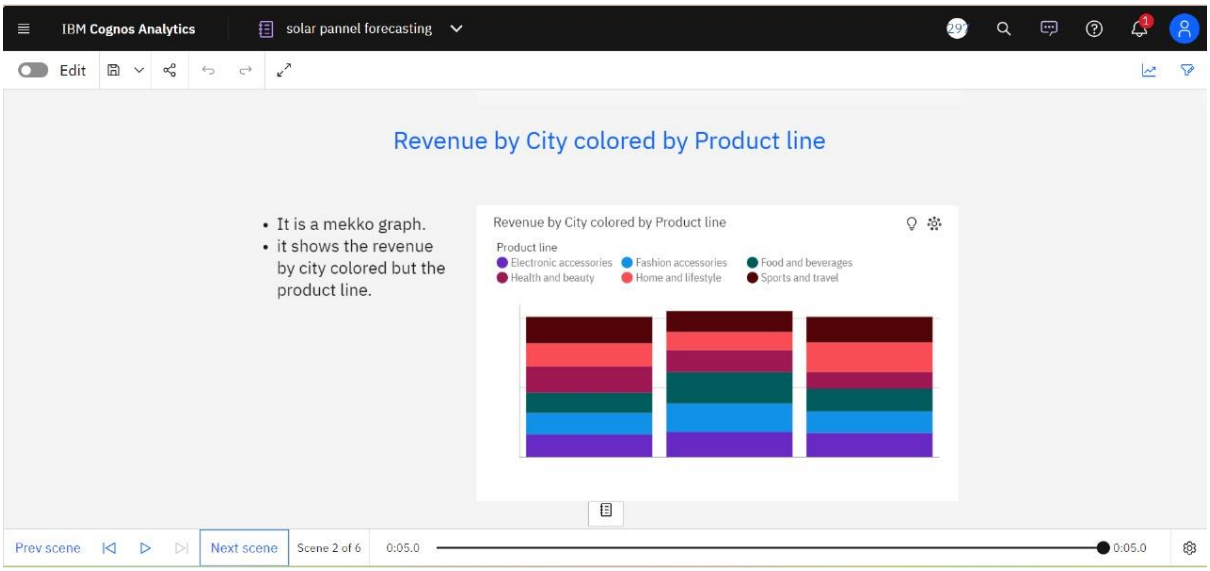
Milestone 6: Story

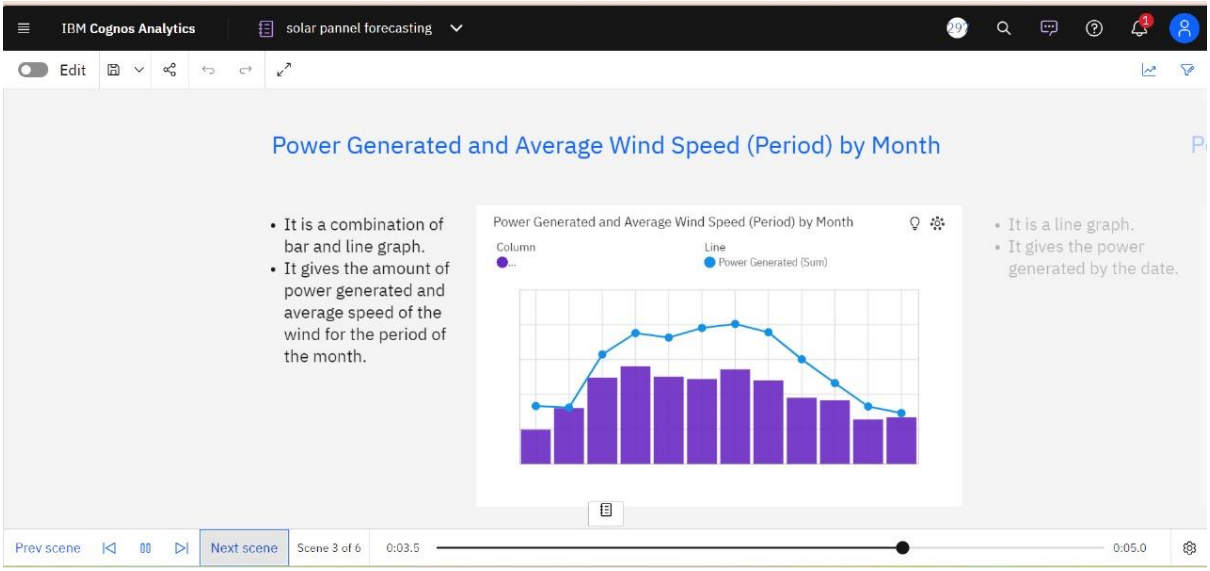
A data story is a narrative structure used to display data and analysis with the intention of improving the information's readability and engagement. A typical data tale consists of an introduction that clearly lays out the background and context of the data, a body that logically and methodically provides the data and analysis, and a conclusion that emphasizes the conclusions and summarizes the most important discoveries. A range of media, including reports, presentations, interactive visualizations, and films, may be used to tell data stories.

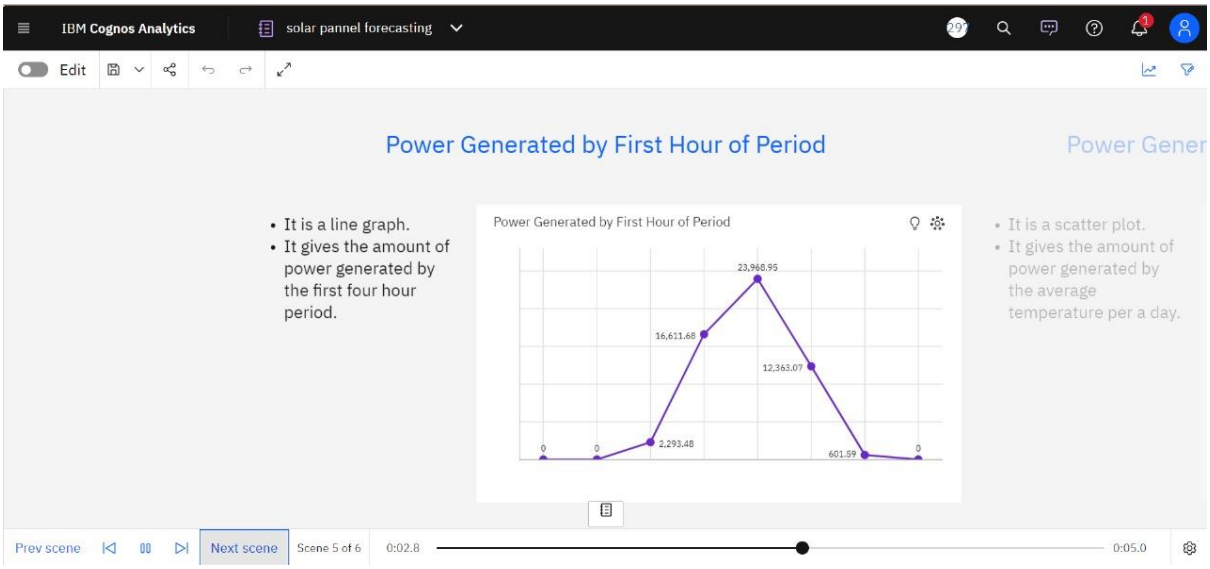
Activity:1- No of Scenes of Story

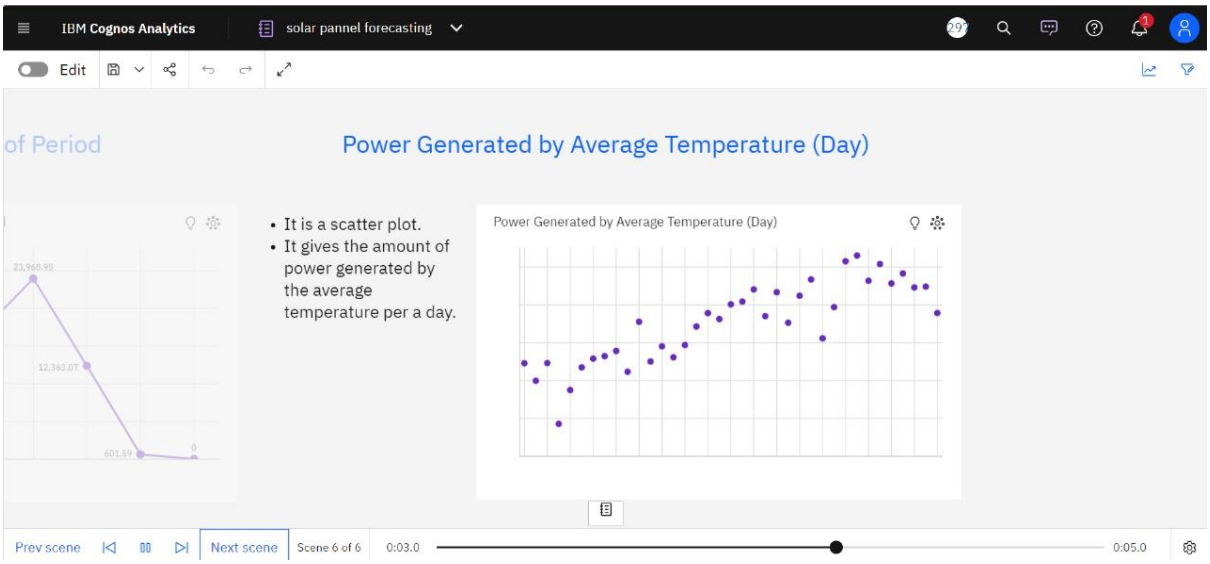
The number of scenes in a storyboard for Data-Driven insights on Solar Panel forecasting will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

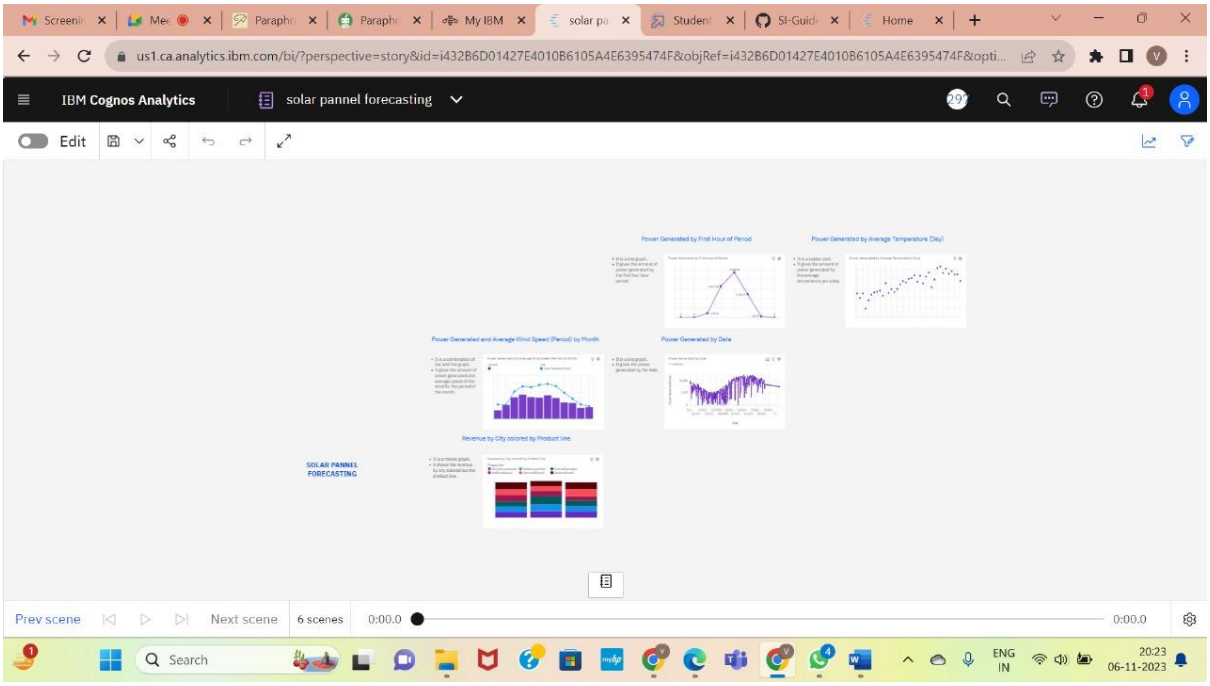



IBM Cognos Analytics
solar pannel forecasting
Edit
Revenue by City colored by Product line
• It is a mekko graph.
• it shows the revenue by city colored but the product line.
Revenue by City colored by Product line
Product line
Electronic accessories
Fashion accessories
Food and beverages
Health and beauty
Home and lifestyle
Sports and travel
Prev scene
Next scene
Scene 2 of 6
0:05.0
0:05.0


IBM Cognos Analytics
solar pannel forecasting
Edit
Power Generated and Average Wind Speed (Period) by Month
• It is a combination of bar and line graph.
• It gives the amount of power generated and average speed of the wind for the period of the month.
Power Generated and Average Wind Speed (Period) by Month
Column
Line
Power Generated (Sum)
• It is a line graph.
• It gives the power generated by the date.
Prev scene
Next scene
Scene 3 of 6
0:03.5
0:05.0


IBM Cognos Analytics
solar pannel forecasting
Edit
Power Generated by First Hour of Period
Power Gener
• It is a line graph.
• It gives the amount of power generated by the first four hour period.
Power Generated by First Hour of Period
23,968.95
16,611.68
12,363.07
2,293.48
0
0
601.59
0
• It is a scatter plot.
• It gives the amount of power generated by the average temperature per a day.
Prev scene
Next scene
Scene 5 of 6
0:02.8
0:05.0


IBM Cognos Analytics
solar pannel forecasting
Edit
of Period
Power Generated by Average Temperature (Day)
23,968.95
12,363.07
601.59
0
• It is a scatter plot.
• It gives the amount of power generated by the average temperature per a day.
Power Generated by Average Temperature (Day)
Prev scene
Next scene
Scene 6 of 6
0:03.0
0:05.0

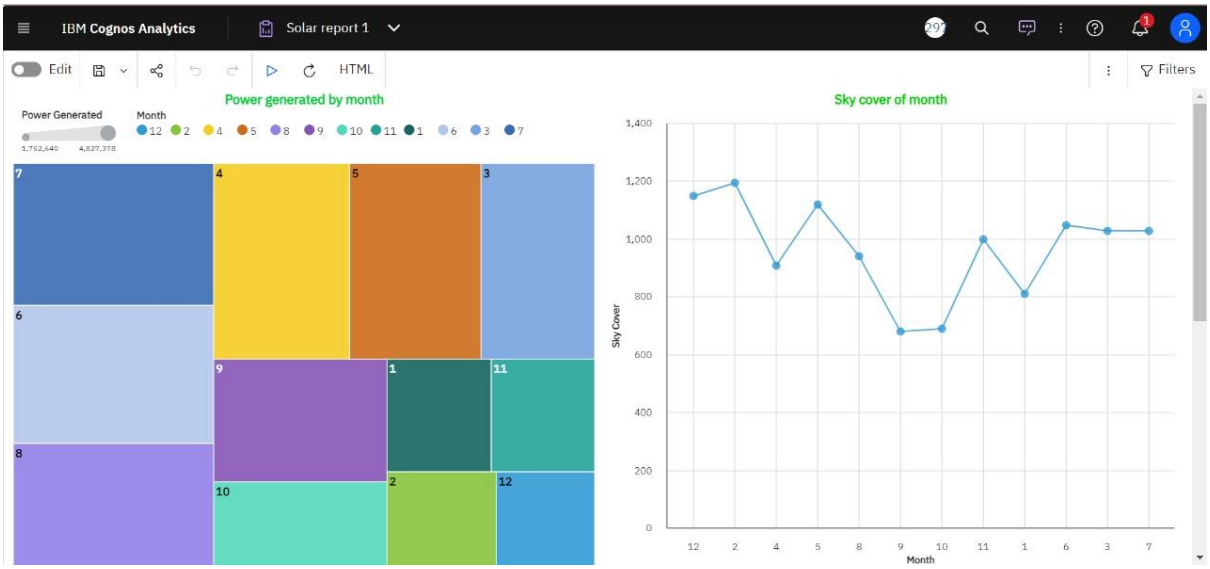


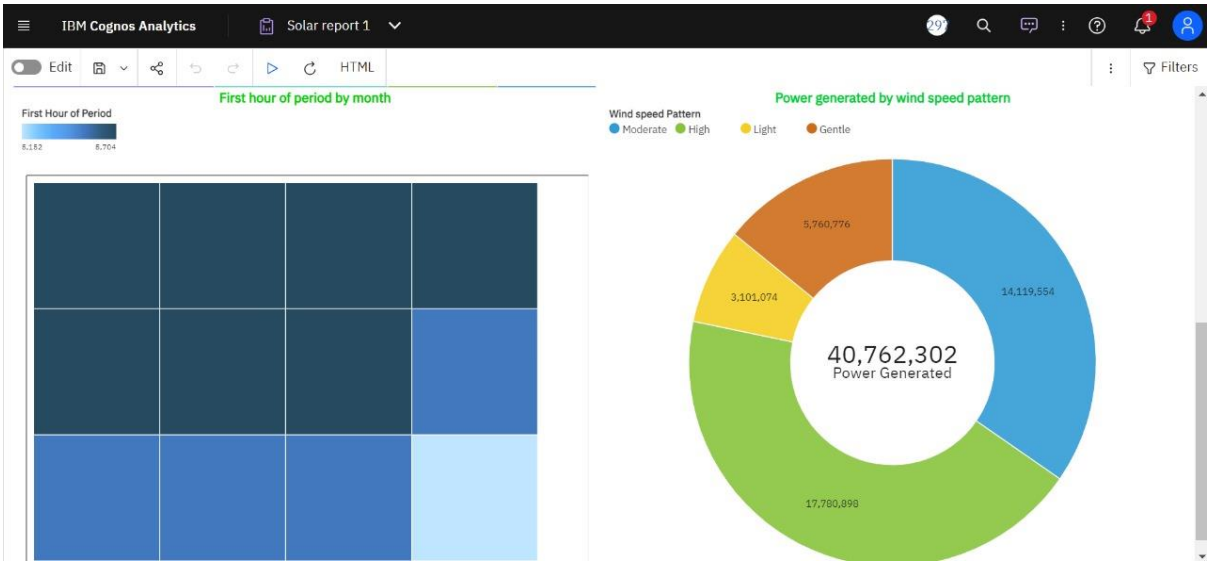
Milestone 7: Report

In a data analytics report, analysis and interpretation of data are usually conducted in order to derive insights and conclusions that can guide corporate choices or answer research questions. A overview of the data analysis procedure, including the techniques and instruments employed, as well as the conclusions and suggestions derived from the study, are often included in the report. An executive summary, which offers a concise synopsis of the key conclusions and suggestions, need to open a report. Background information about the issue or research topic being addressed, as well as the data sources used, should be included in the introduction.

Activity:1- No of Visualization with detail information

When creating a report in Cognos, it is often helpful to include visualizations to help communicate the findings of the analysis.





Milestone 8: Performance Testing

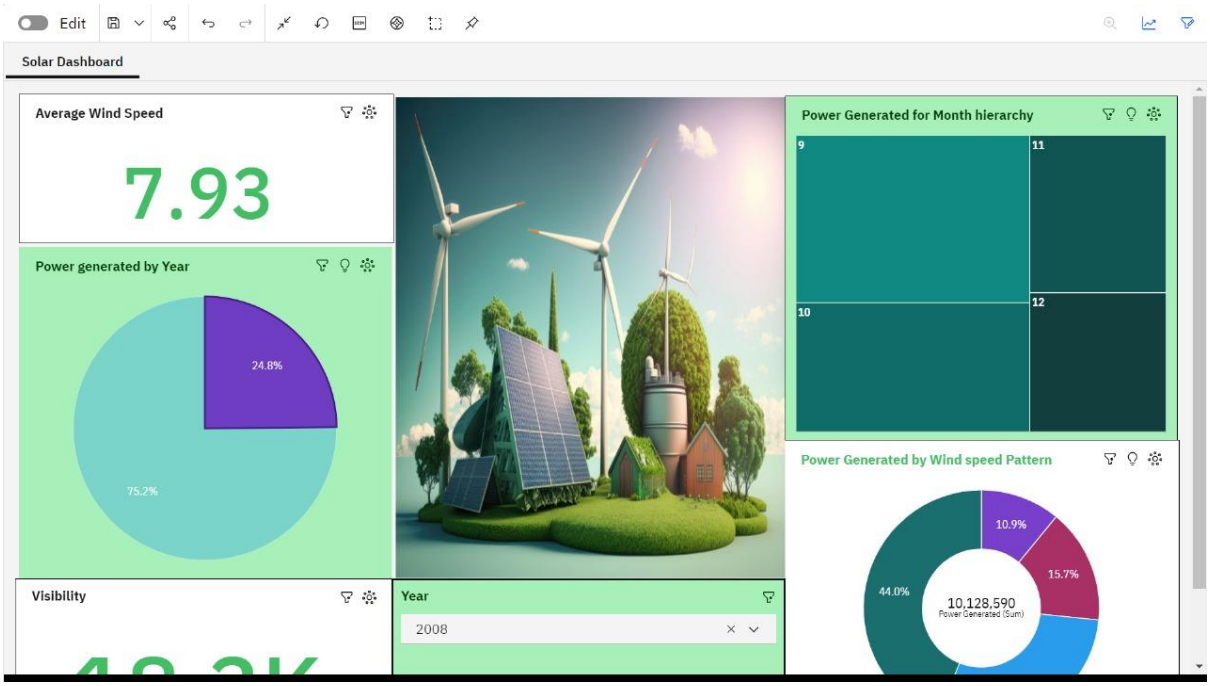
Activity 1: Amount of Data Rendered to DB2

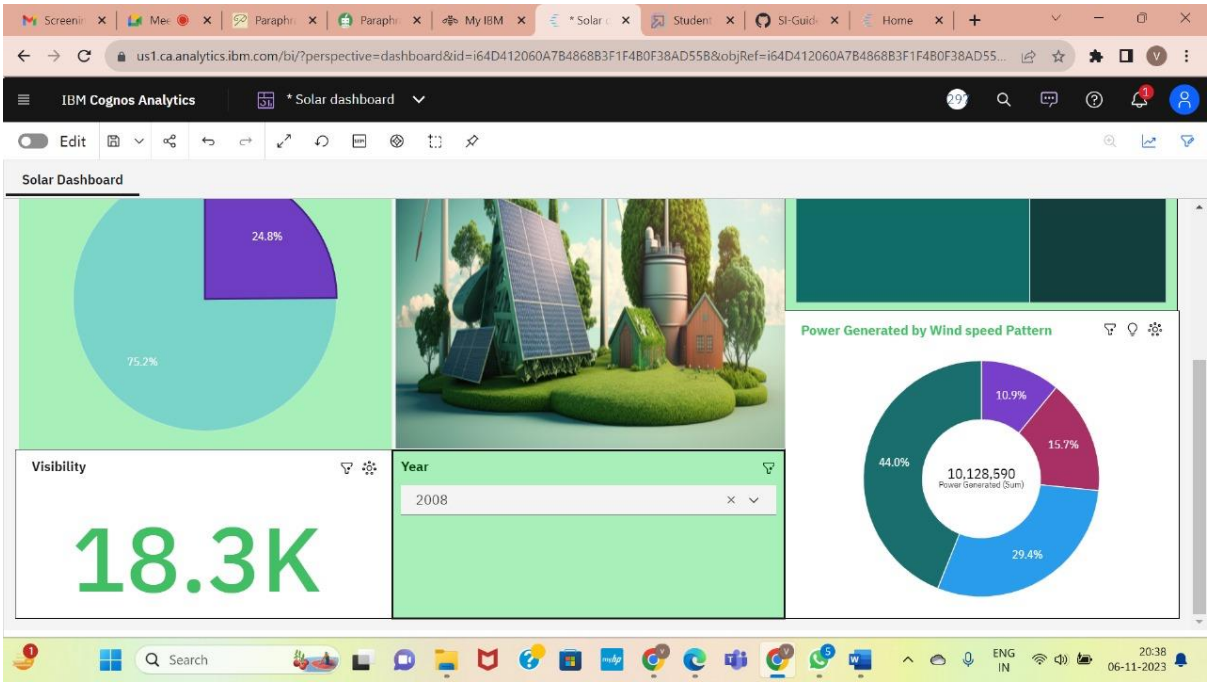
● The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.

Activity 2: Utilization of Filters

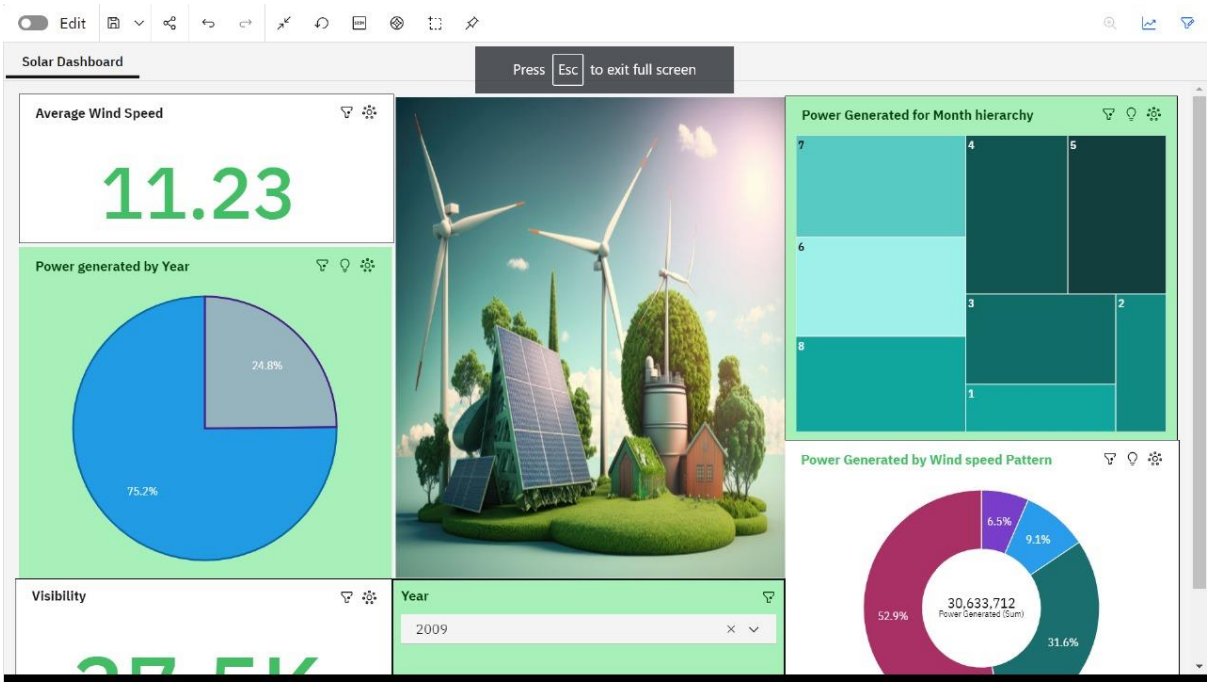
We created year filter :

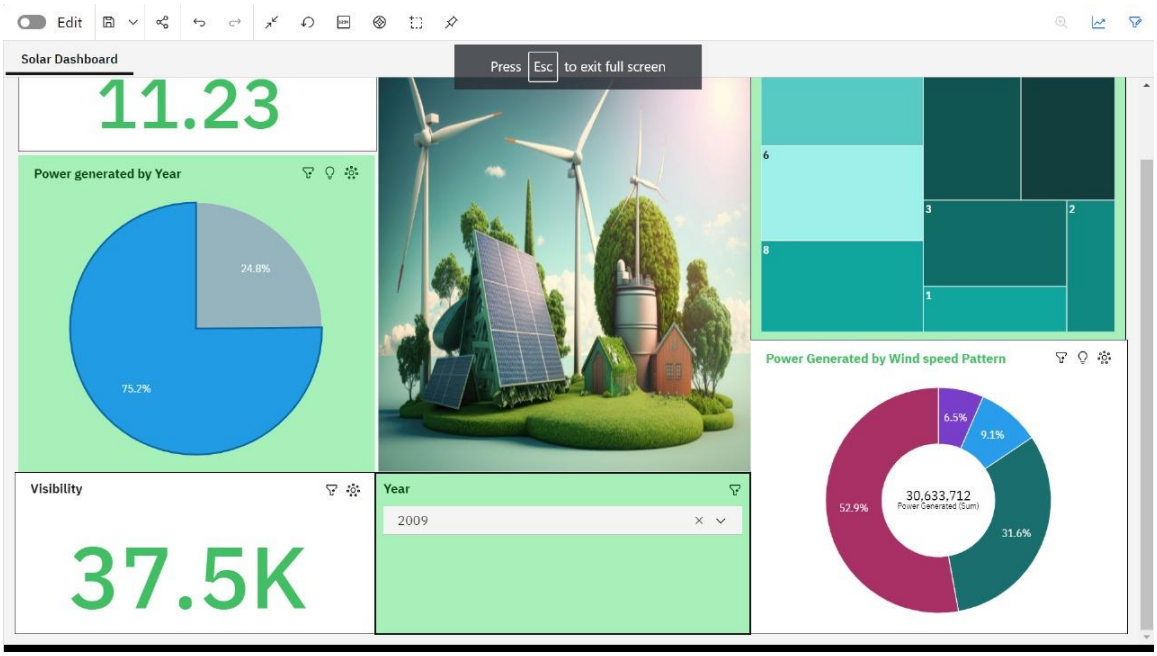
For year 2008:



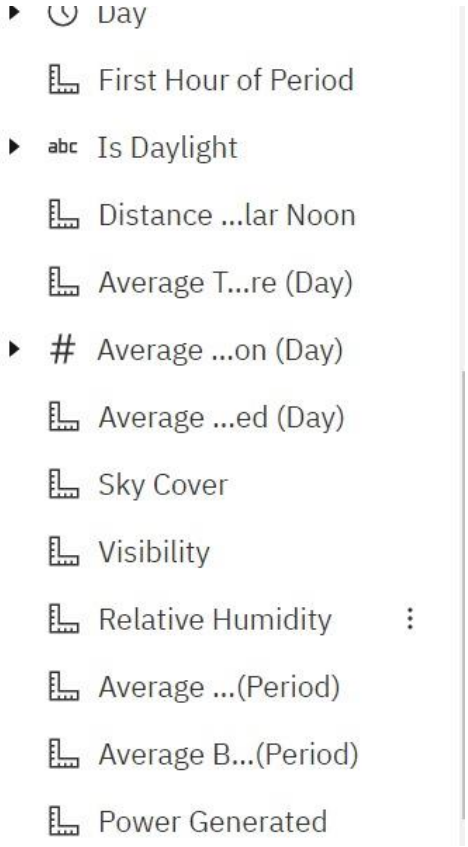


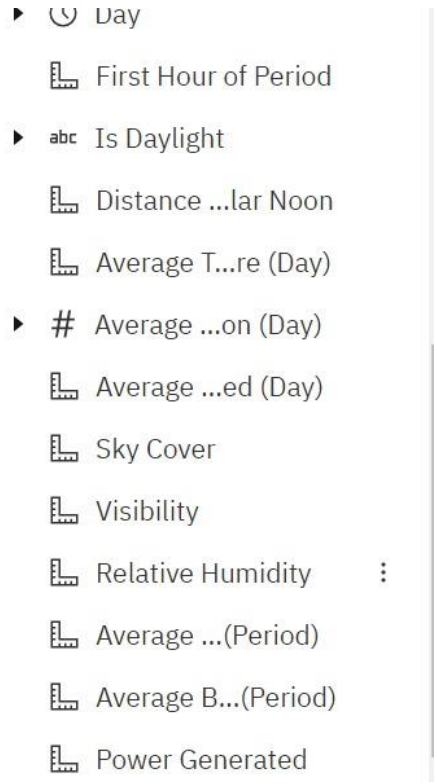
For year 2009:





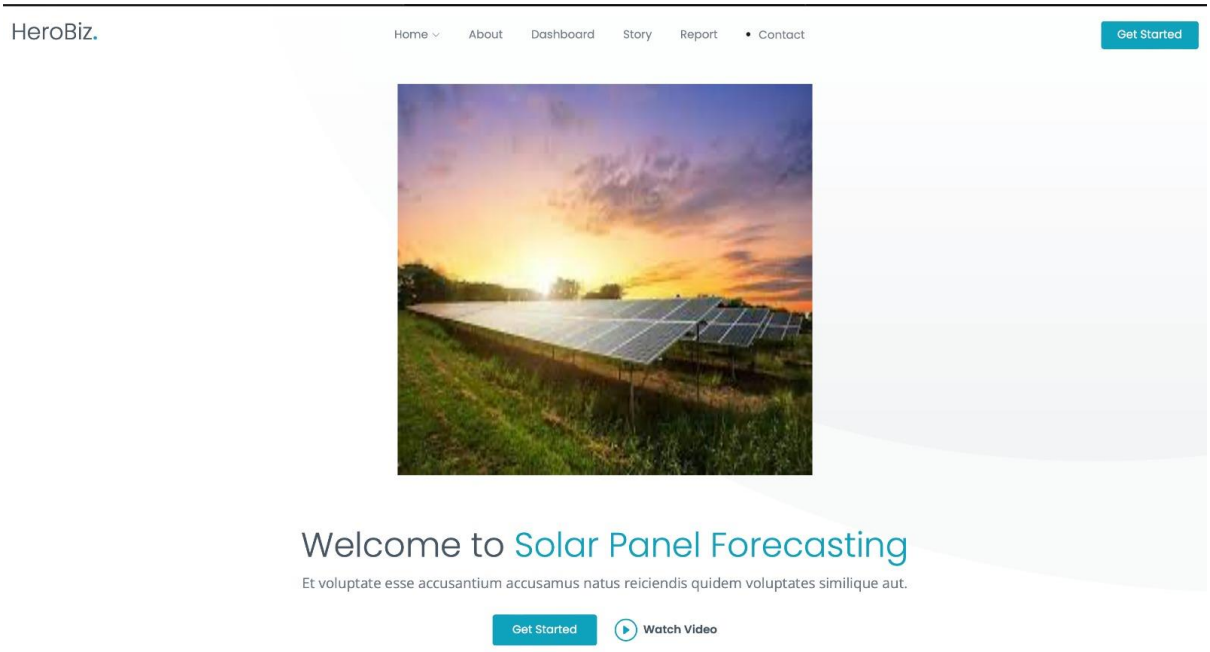
Activity 3: No of Calculation Fields





Milestone 9: Web integration

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.



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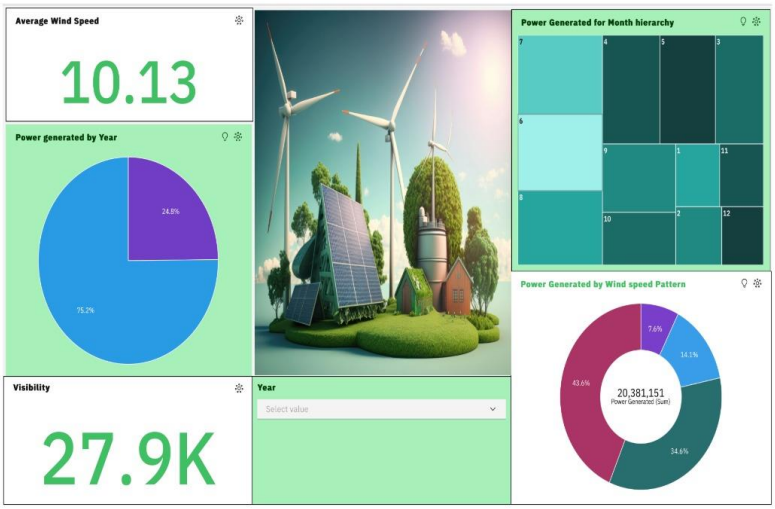
Dashboard



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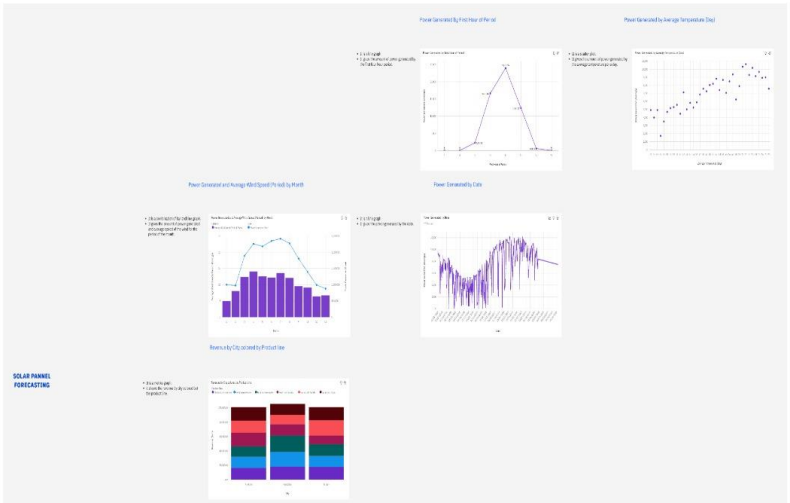
Story



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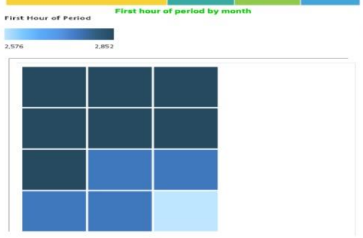
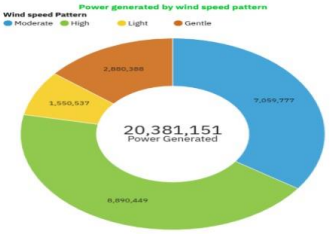
Report





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Contact Us

Get in touch

Location:
VIT-AP,Near Secrateriat,Andhra Pradesh

Email:
rupa.21bce8457@vitapstudent.ac.in

Call:
+91 6300165363

Your Name

Your Email

Subject

Message

Send Message