

The background of the slide features a photograph of several wind turbines silhouetted against a vibrant sunset sky. The sun is low on the horizon, casting a warm orange and yellow glow across the sky and reflecting on the calm water in the foreground. The turbines are positioned at varying distances, creating a sense of depth. The overall aesthetic is modern and clean, with geometric shapes and a color palette dominated by oranges, yellows, and blues.

Predict Wind Energy of turbine using M.L

IBM HACK CHALLENGE2020

NAME	TEAM L@unchBox2.0
TITLE	Predicting The Energy Output Of Wind Turbine Based On Weather Condition PROJECT ID: SPS_PRO_1754
CATEOGARY	Machine Learning
DURATION	24 th June 2020 – 15 th July 2020

TEAM MEMBERS

Ankit Jain

Shareef Alam

Manish Prasad

TABLE OF CONTENTS

01

INTRO. TO PROJECT

02

PROJECT
DEMONSTRATION

03

REQUIREMENTS

04

PROJECT GOALS

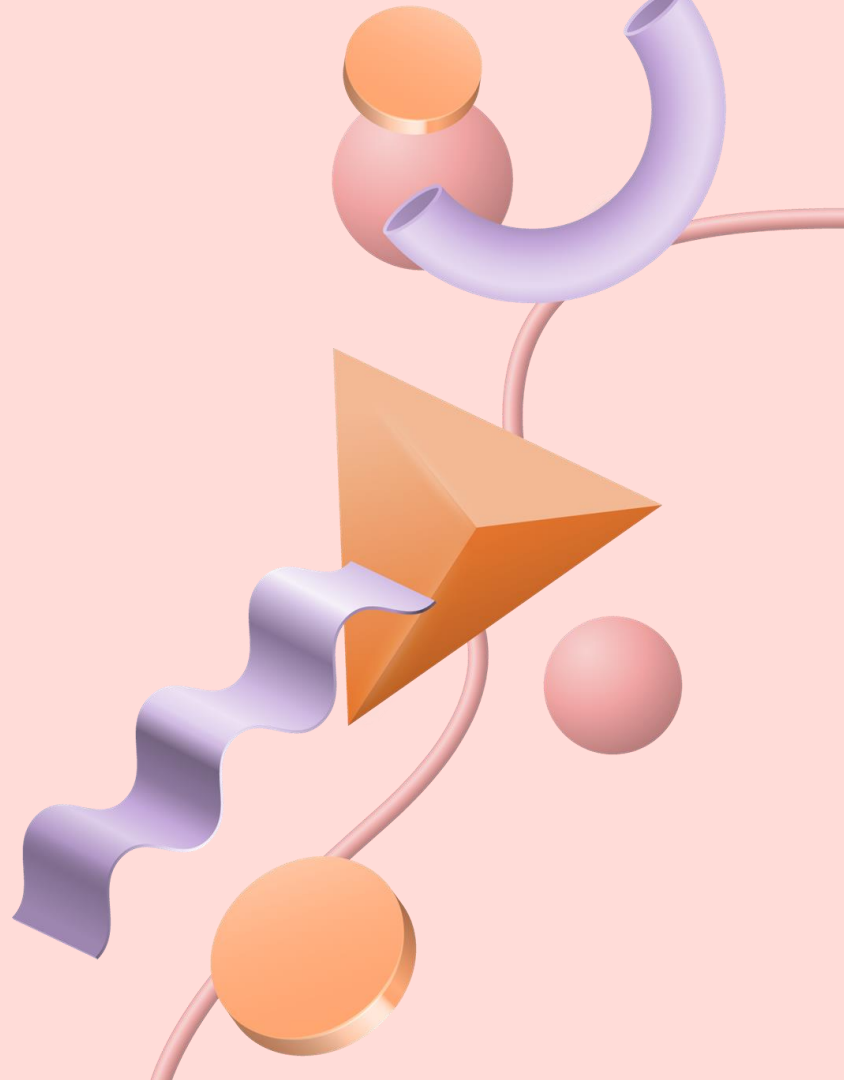
05

ADVANTAGES

06

FUTURE SCOPE

INTRODUCTION TO PROJECT



PROBLEM STATEMENT

Wind energy plays an increasing role in the supply of energy world-wide. The energy output of a wind farm is highly dependent on the wind conditions present at its site. If the output can be predicted more accurately, energy suppliers can coordinate the collaborative production of different energy sources more efficiently to avoid costly overproduction.



ABOUT THE PROJECT

Existing Problem: If we examine the problem statement we could easily identify that the problem statement talks of the problem that wind energy plays an important role in supply of energy, but yet the harnessment of energy is not up to mark. Due to irregularities or vagaries in the atmospheric conditions and the wind available there is a substantial loss of the energy that could be utilised more efficiently.

Proposed Solution: For the above problem to get solved we develop a time series model to predict the power output of wind farm based on the weather condition in the site (1Hr prediction to 72Hrs. prediction) Build an application to recommend the Power Grid to suggest the best time to utilize the energy from wind farm

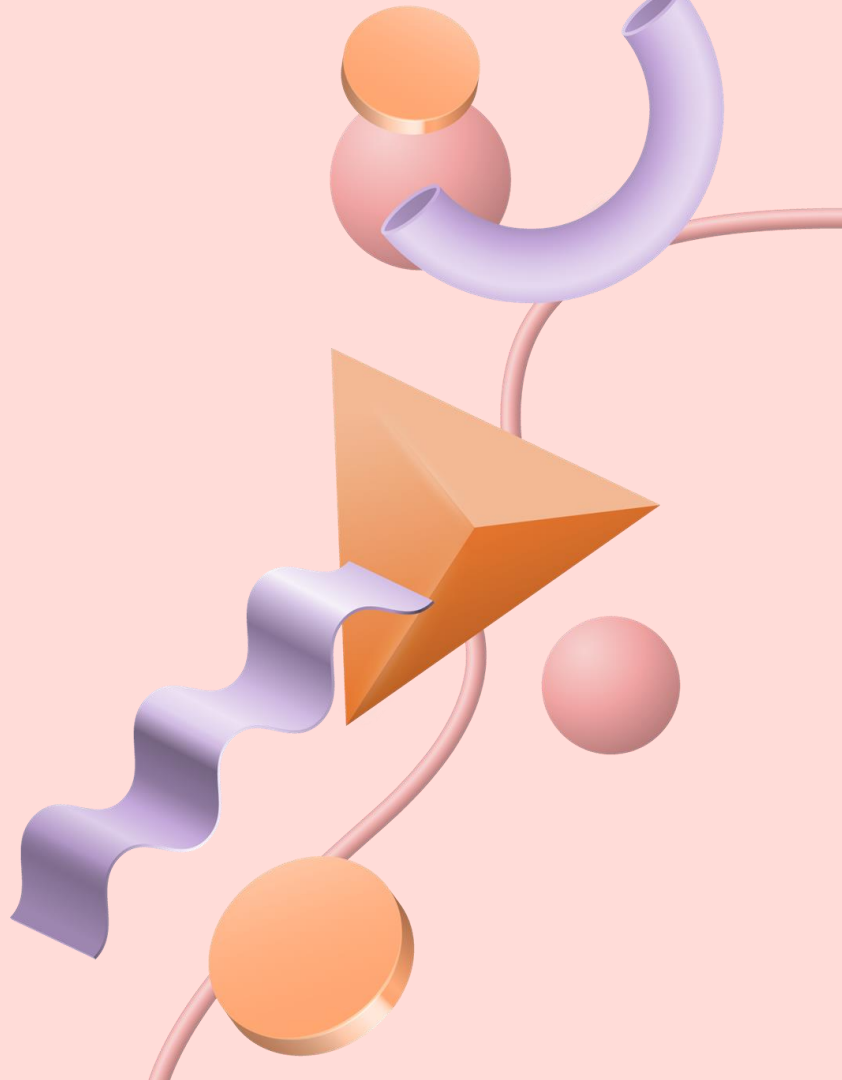


SCOPE OF WORK

The project scope is quite wide, but in order to make the application smooth, easy to load, user-friendly ,we would mainly be focusing on the following points:

1. Create a visualization dashboard predicting the weather forecast of next-48 hrs.
2. Create IBM Cloud Instance.
3. Use Watson Machine Learning To Create and Train ML Model, based on the provided Dataset.
 - Build a web application with integration to all these services & deploy the same on an external hosted server.
 - Use the most latest available IBM Watson Studio's latest features and plug-ins.
 - Meanwhile, keeping the application utmost user-friendly.
4. Also, create an external application maintaining the visiting users information in the form of a database in order to record the authentic visitors and avoid malicious intrusions on the application.

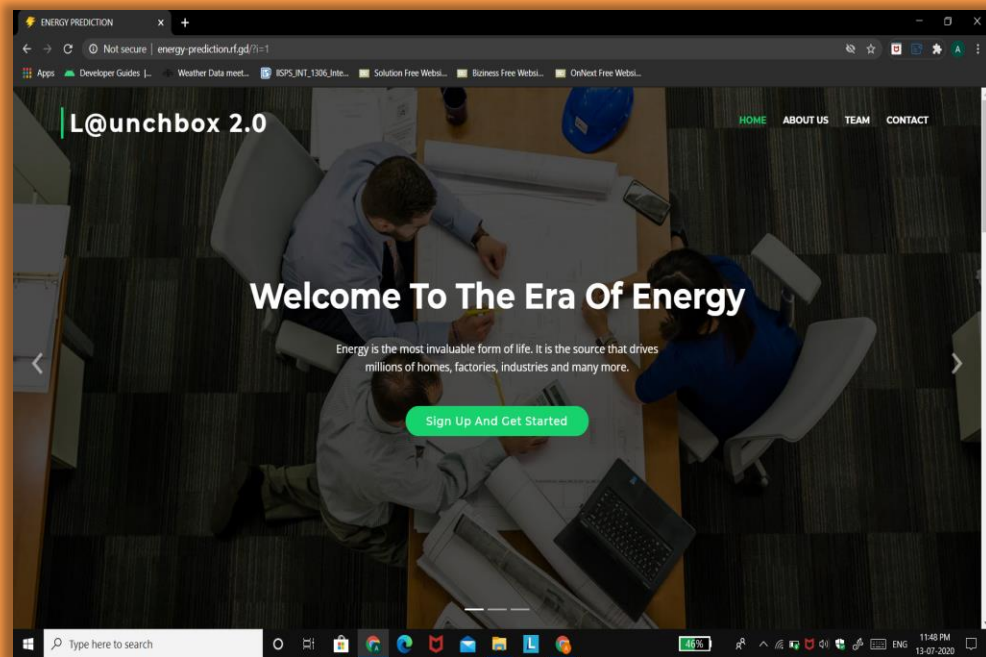
PROJECT DEMONSTRATION



DESIGNING THE UI:

Using HTML, CSS3 and JavaScript we have designed a responsive, modern UI which is packed up with core ingredients from multi-variant Bootstrap 4 libraries and a bundle of other interactive UI Widgets and effects.

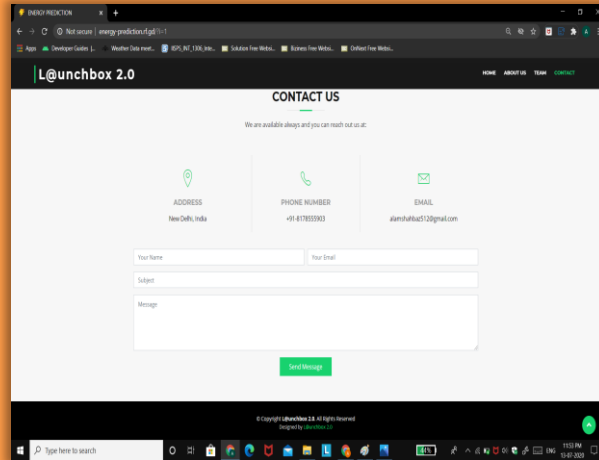
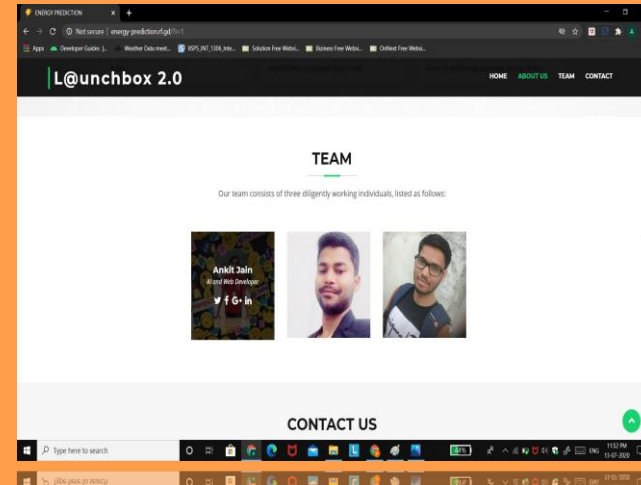
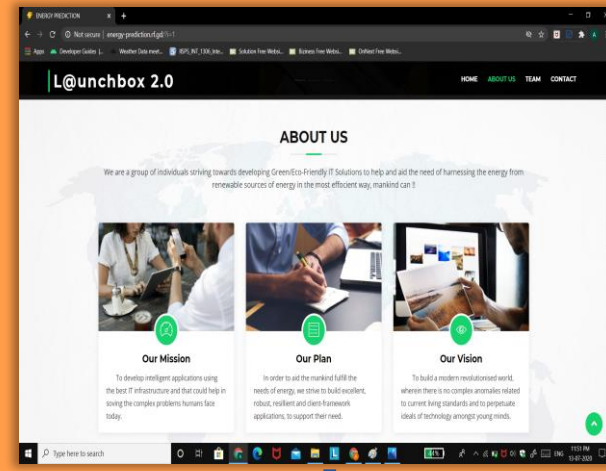
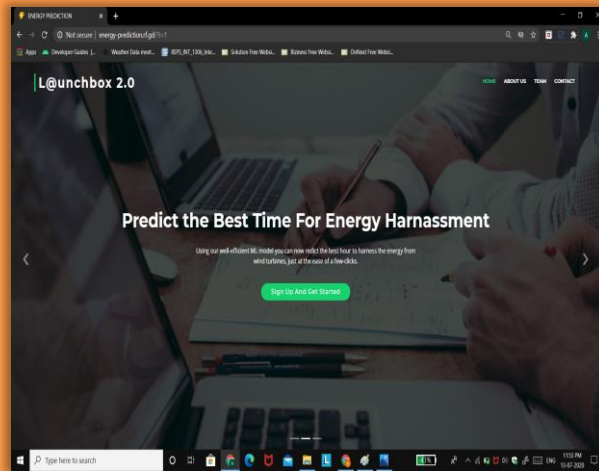
The below image shows the designed UI Frame reflecting the features involved.



STEP-1:

Landing page for the project.
Link provided in github readme.md

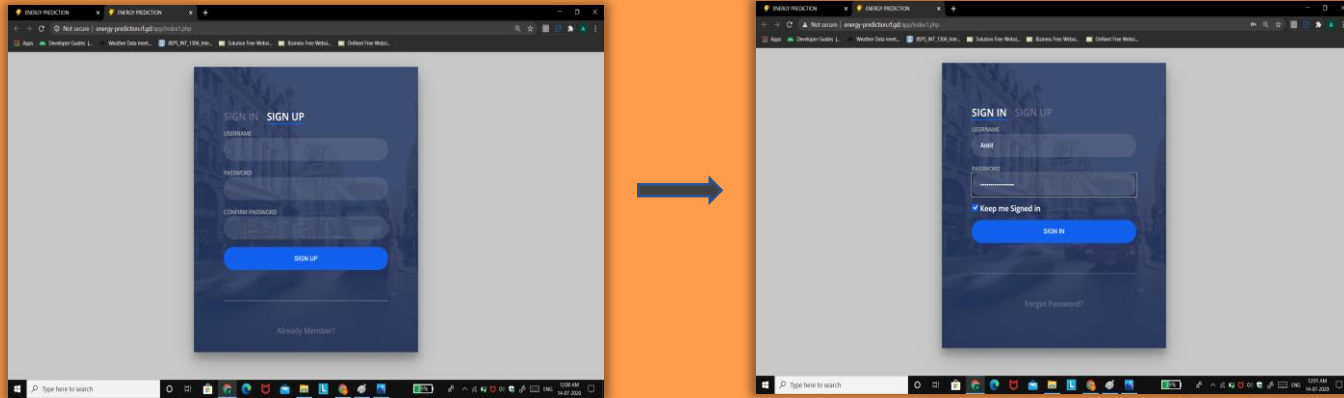
Click on
Signup and
get started



STEP-2 :

Designing the Login/SignUp portal:

Using HTML, CSS3 and effective JS libraries with PHP as the scripting language to deal with the task of integration of the project back-end to UI, we designed the portal as follows:



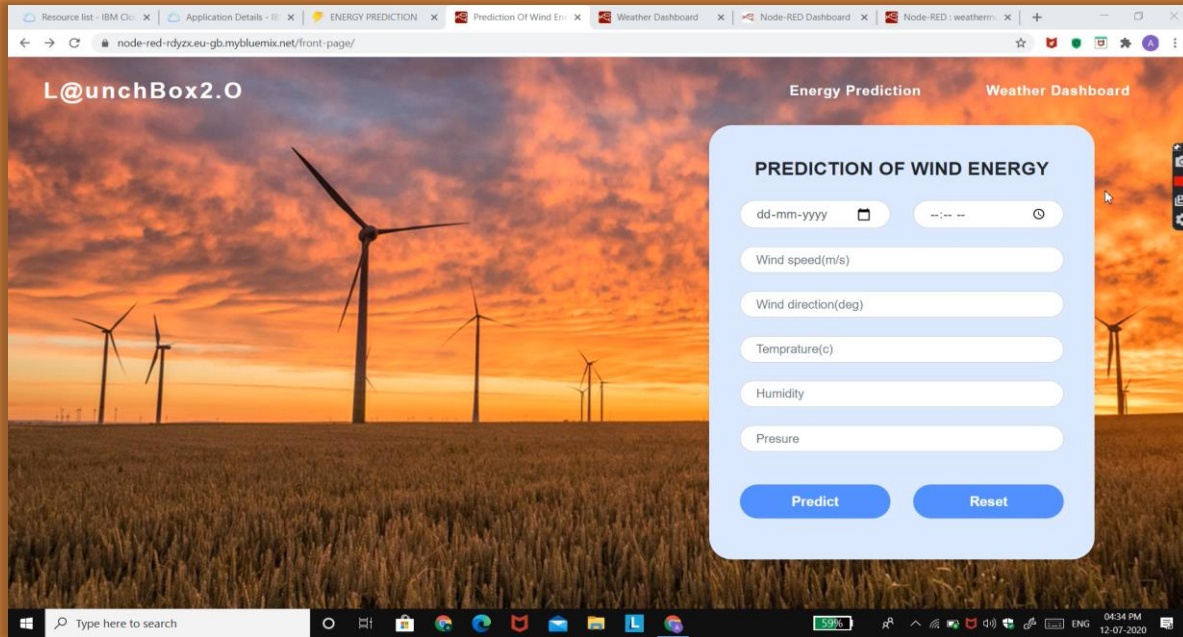
Integrating the Database using SQL and PHP-MyAdmin:

The database was seamlessly populated with data from the UI part to the back-end using PHP script and managed via PHP-MyAdmin.

STEP-3 :

Designing the Web Dashboard/User-Portal:

The user-portal was designed with the view to keep the application utmost user-friendly and to maintain this we created separate tabs for energy prediction as well as weather prediction.

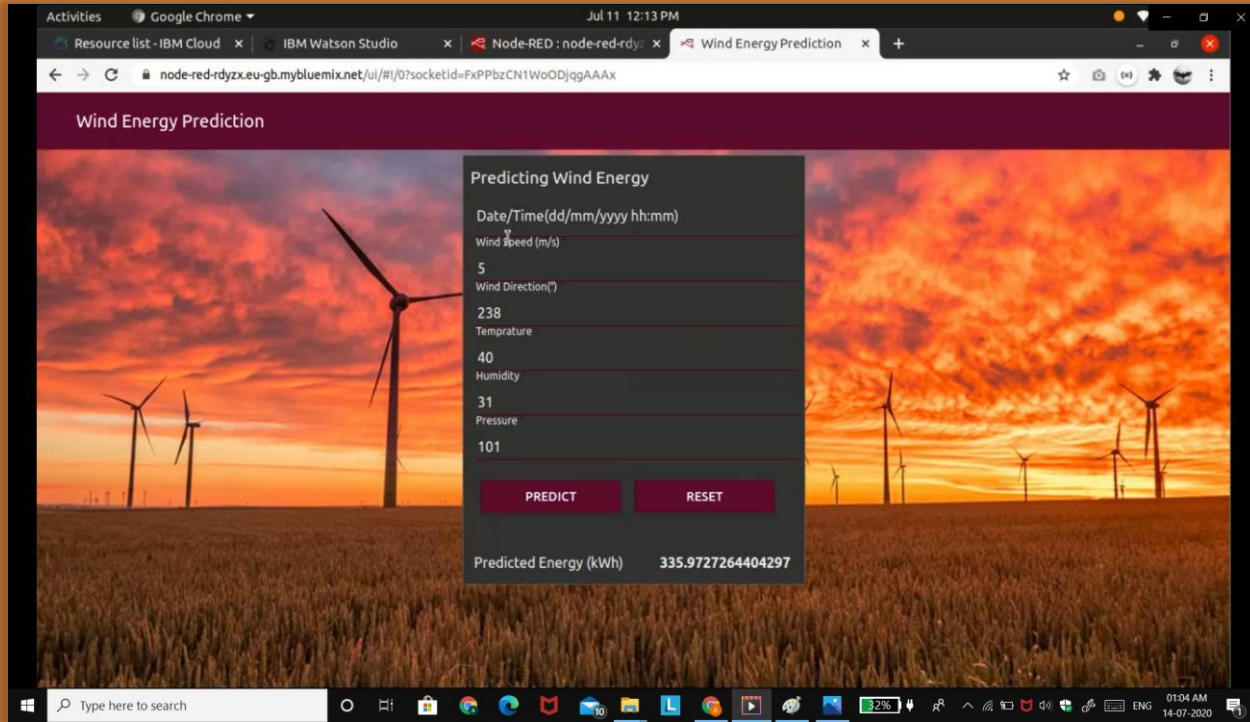


Click on the [Energy Prediction](#) nav-link , this link redirect to [manually prediction dashboard](#)

STEP-4 :

Deploying the Node-RED Flow :

The final deployed flow looks like this:



IN THIS PART WE WILL PREDICT THE ENERGY AT ANY POINT OF TIME

STEP-5 :

Lets two steps back and click on [Weather Dashboard](#) :

Designing the Weather Dashboard:

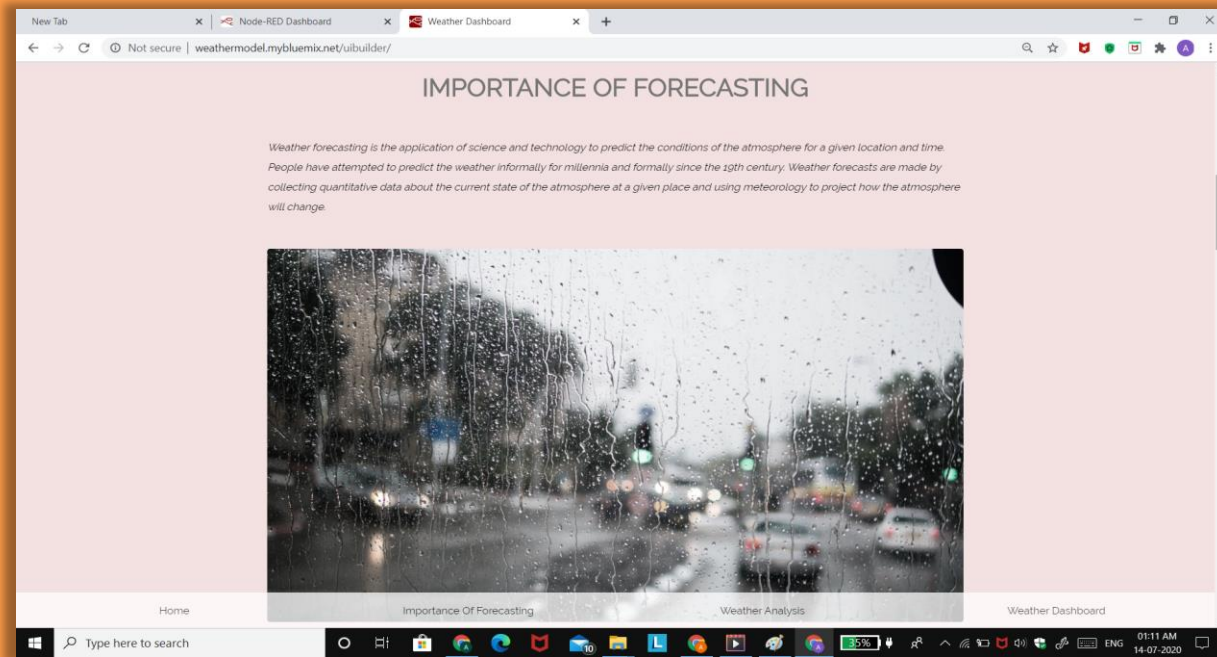
Using the Node-RED UI-Builder node we have designed an interactive, responsive UI template to enable the visitors/users to understand the role of weather in predicting the energy output of a wind turbine.

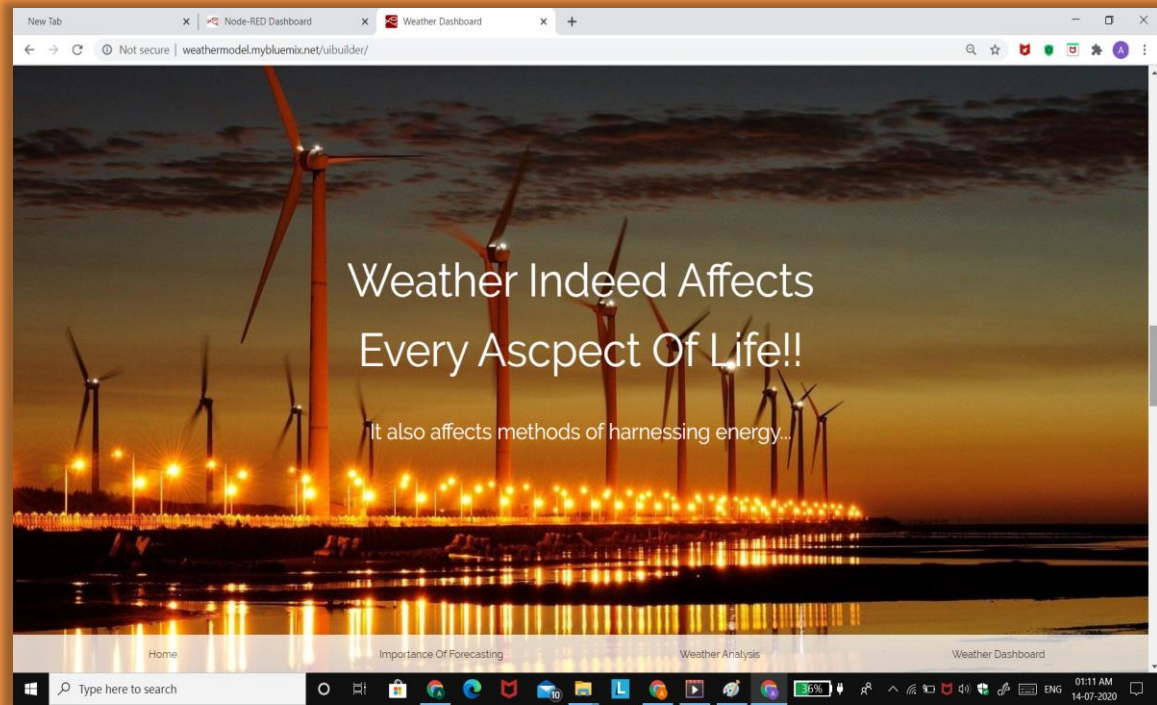
The image below shows the application interface:



If we scroll down, the various tabs have been provided to give detailed information about the

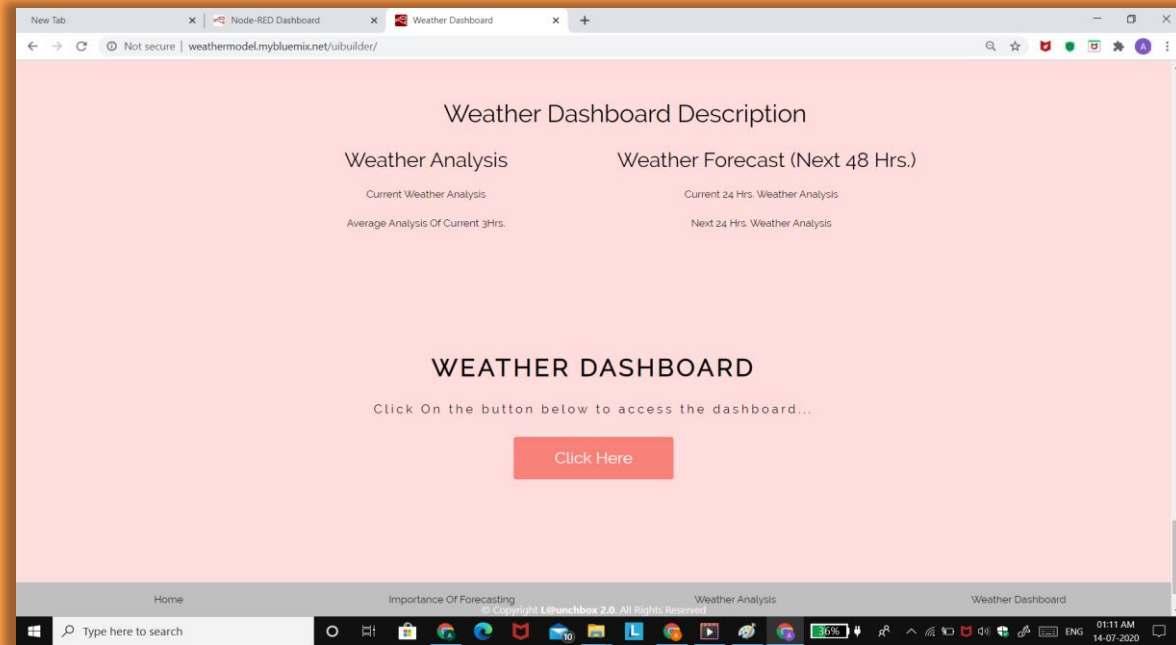
- Importance Of Weather Forecasting
- Weather Analysis
- Weather Dashboard

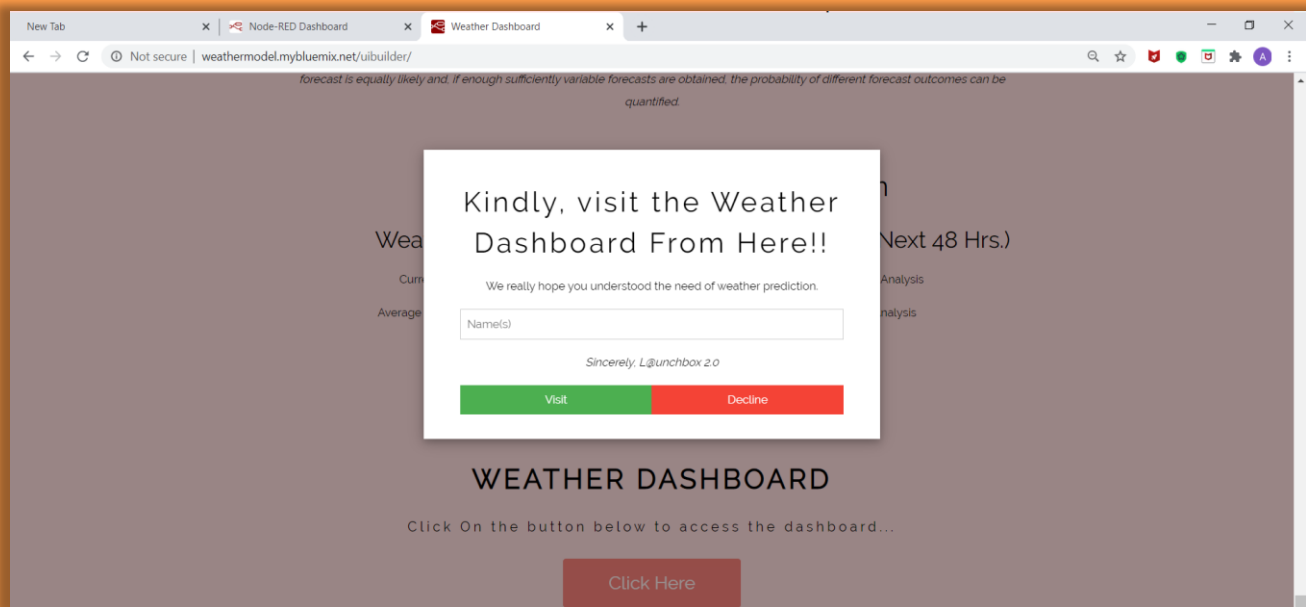




STEP-6 :

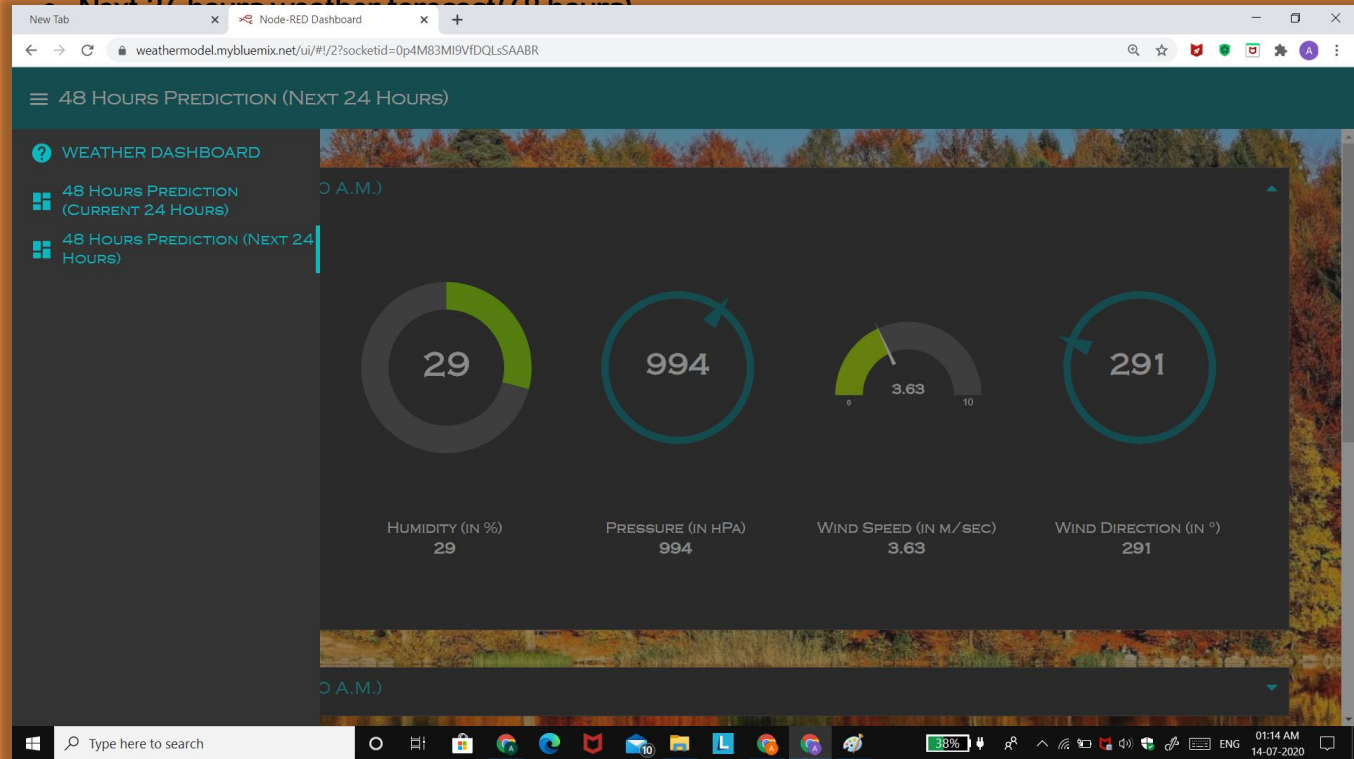
Click on the button then a box pop-up , fill the data and its redirects to Weather Dashboard Data :



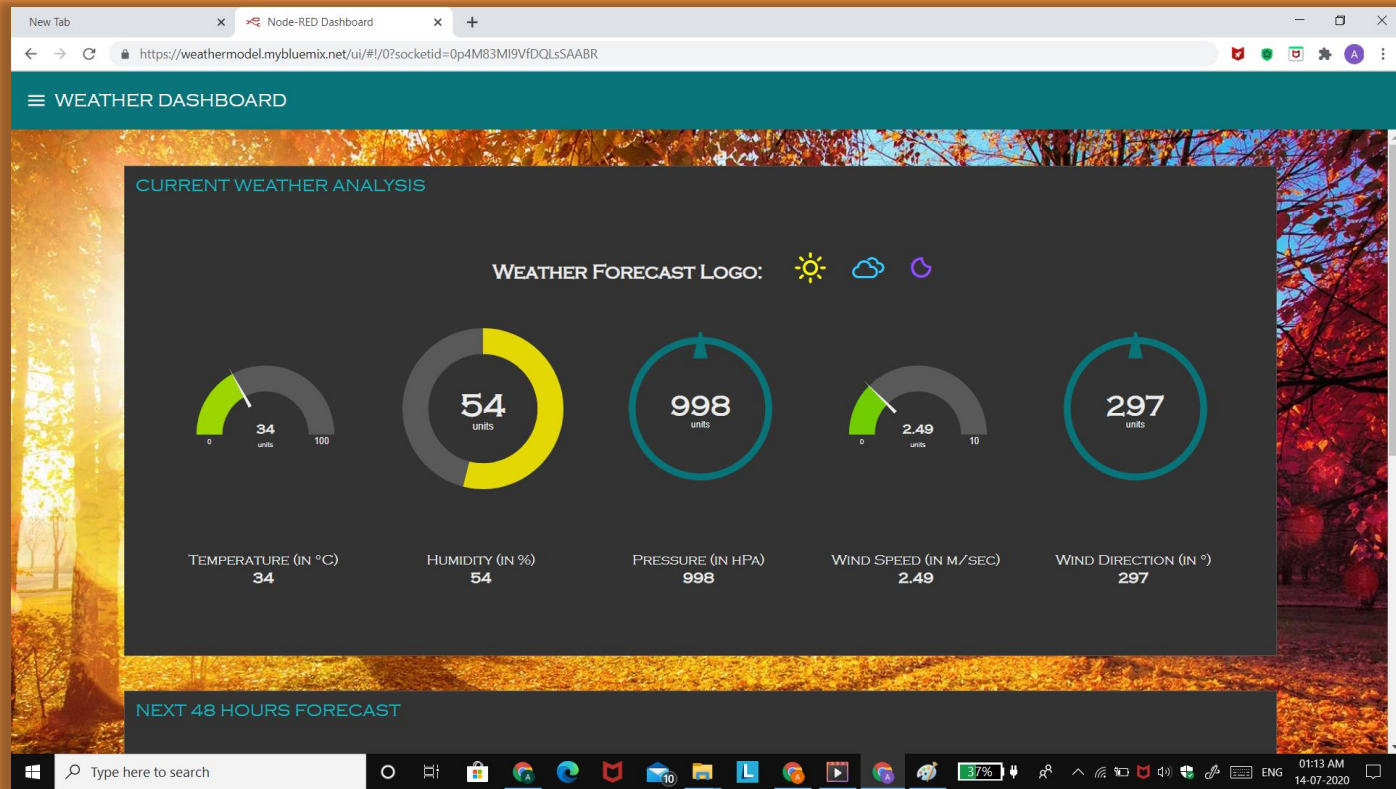


If we click on the icon left-top corner, the various tabs have been provided to give detailed information about the

- Current weather forecast
- Next 24 hours weather forecast(24 hours)



➤ Current weather forecast



➤ 48 Hours Prediction (Current 24 Hours)

New Tab x Node-RED Dashboard x +

weathermodel.mybluemix.net/ui/#/1?socketid=0p4M83MI9VTDQLSAAABR

48 HOURS PREDICTION (CURRENT 24 HOURS)

DAY 1 : (00:00 A.M. - 03:00 A.M.)

DAY 1 : (03:00 A.M. - 06:00 A.M.)

DAY 1 : (06:00 A.M. - 09:00 A.M.)

DAY 1 : (09:00 A.M. - 12:00 P.M.)

DAY 1 : (12:00 P.M. - 03:00 P.M.)

DAY 1 : (03:00 P.M. - 06:00 P.M.)

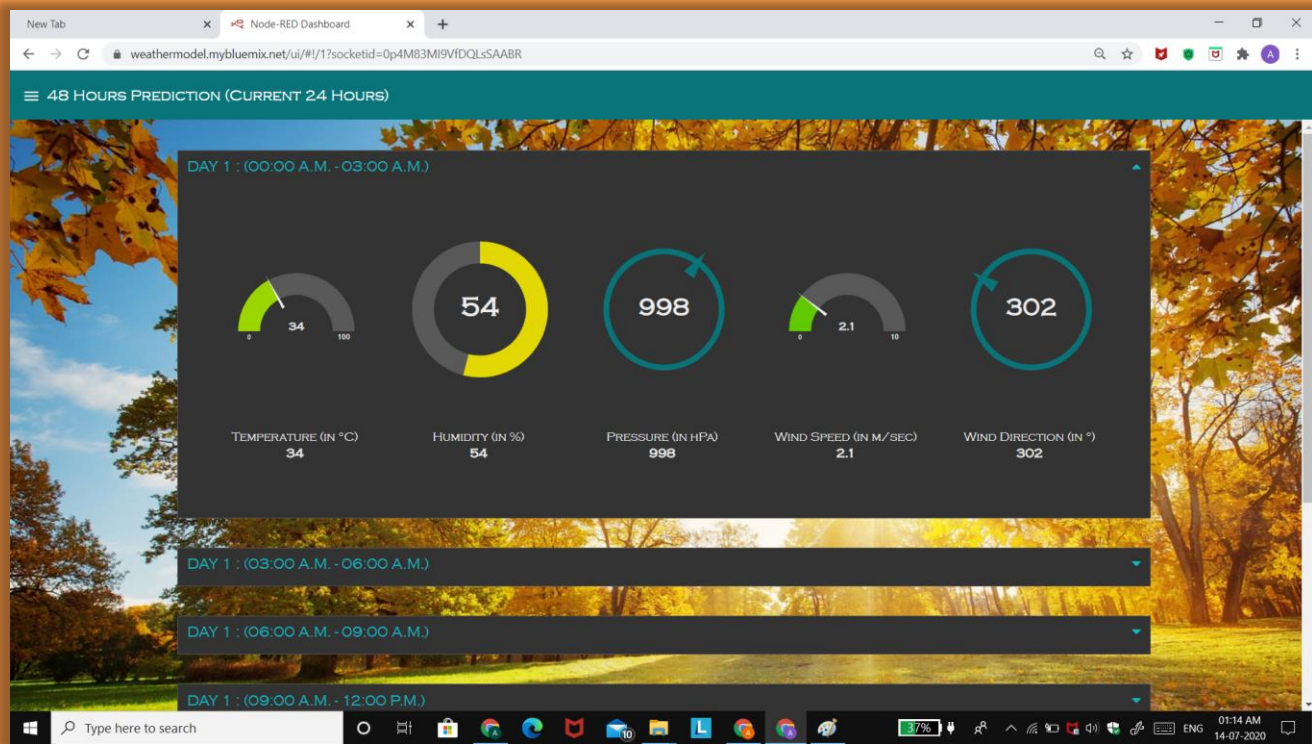
DAY 1 : (06:00 P.M. - 09:00 P.M.)

DAY 1 : (09:00 P.M. - 12:00 A.M.)

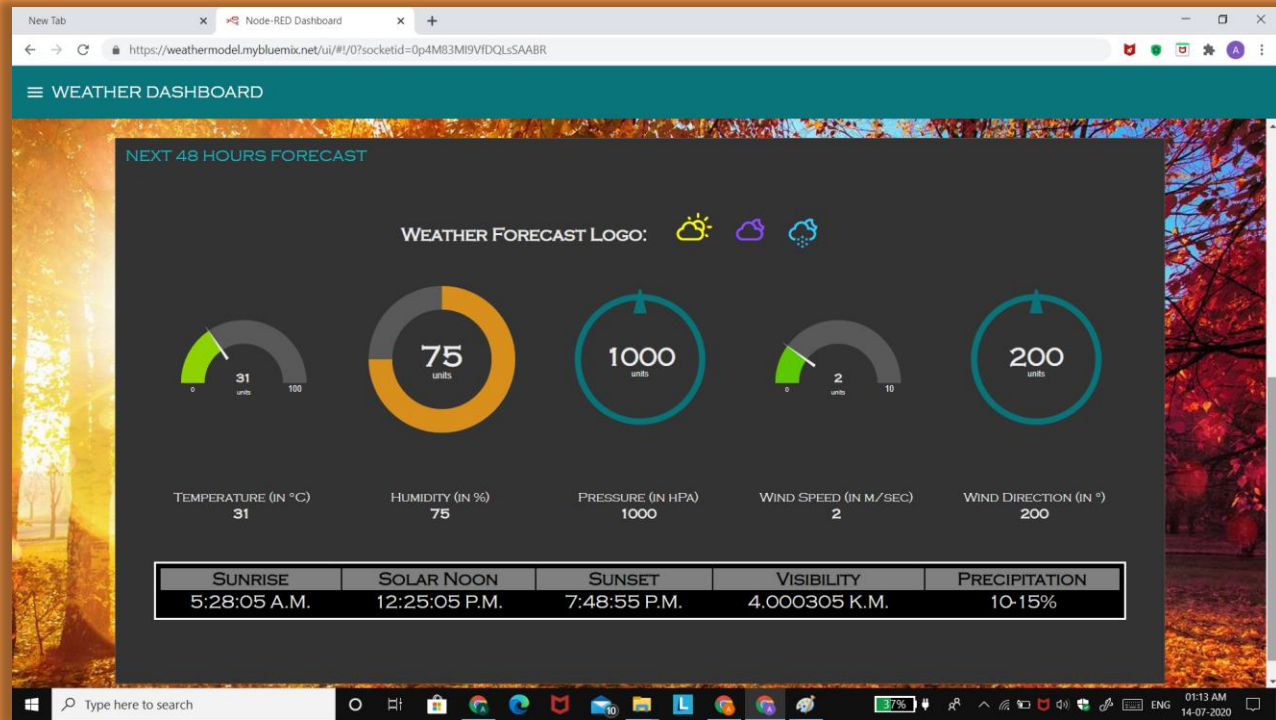
Type here to search

01:14 AM 14-07-2020

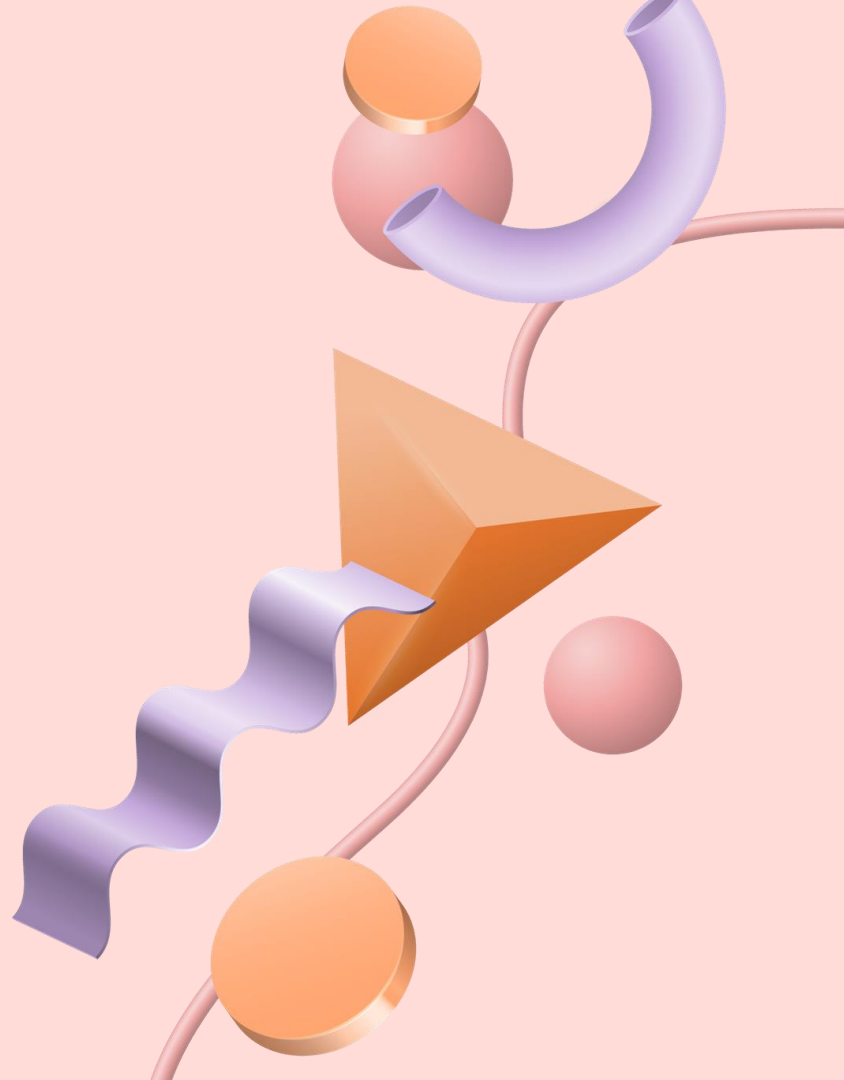
➤ 48 Hours Prediction (Current 24 Hours)



➤ Next 48 Hours forecast



REQUIREMENTS



MAJOR REQUIREMENTS



IBM CLOUD

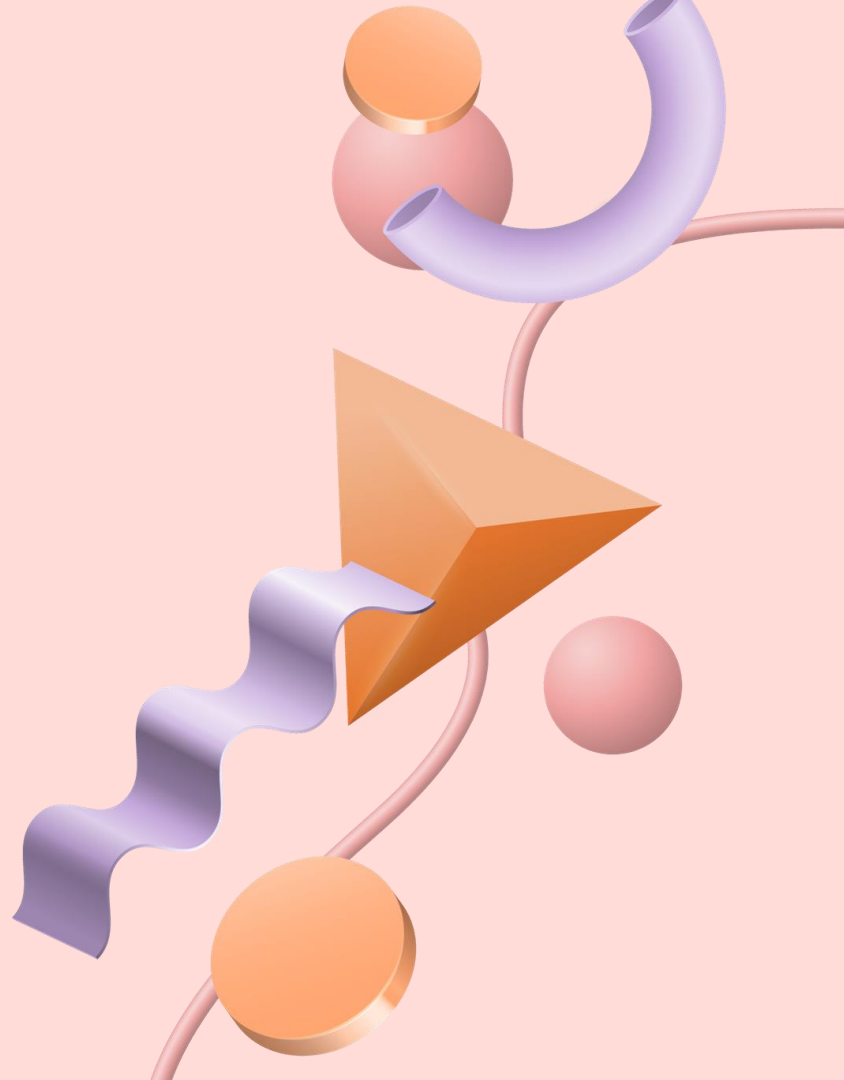
The major requirement from the IBM Cloud is related to IBM Watson Machine Learning Service.



NODE RED

The major role is related to UI Nodes and service deployment.

PROJECT GOALS



WHAT WE ARE WORKING ON



USER FRIENDLY UI

We deem to provide best interactive UI design.



ACCURATE ANALYSIS

We aspire to predict accurate energy insights + weather conditions



COST-EFFECTIVE

We aim to keep the cost as low as possible.

PROJECT GOALS

Energy analytics

On time energy prediction as per wind speed



Database Support

A real-time database managing each user's login/logout access to the portal

Interactive UI

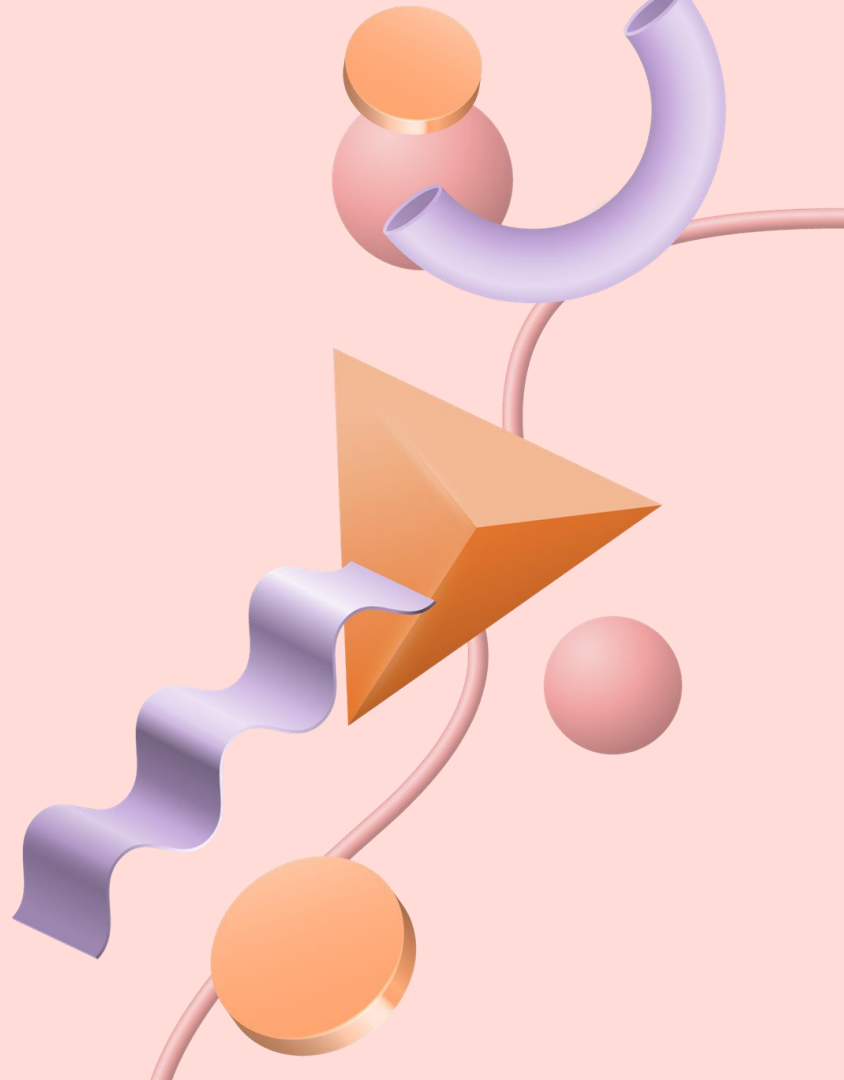
A well-responsive UI framework, that to user-friendly.



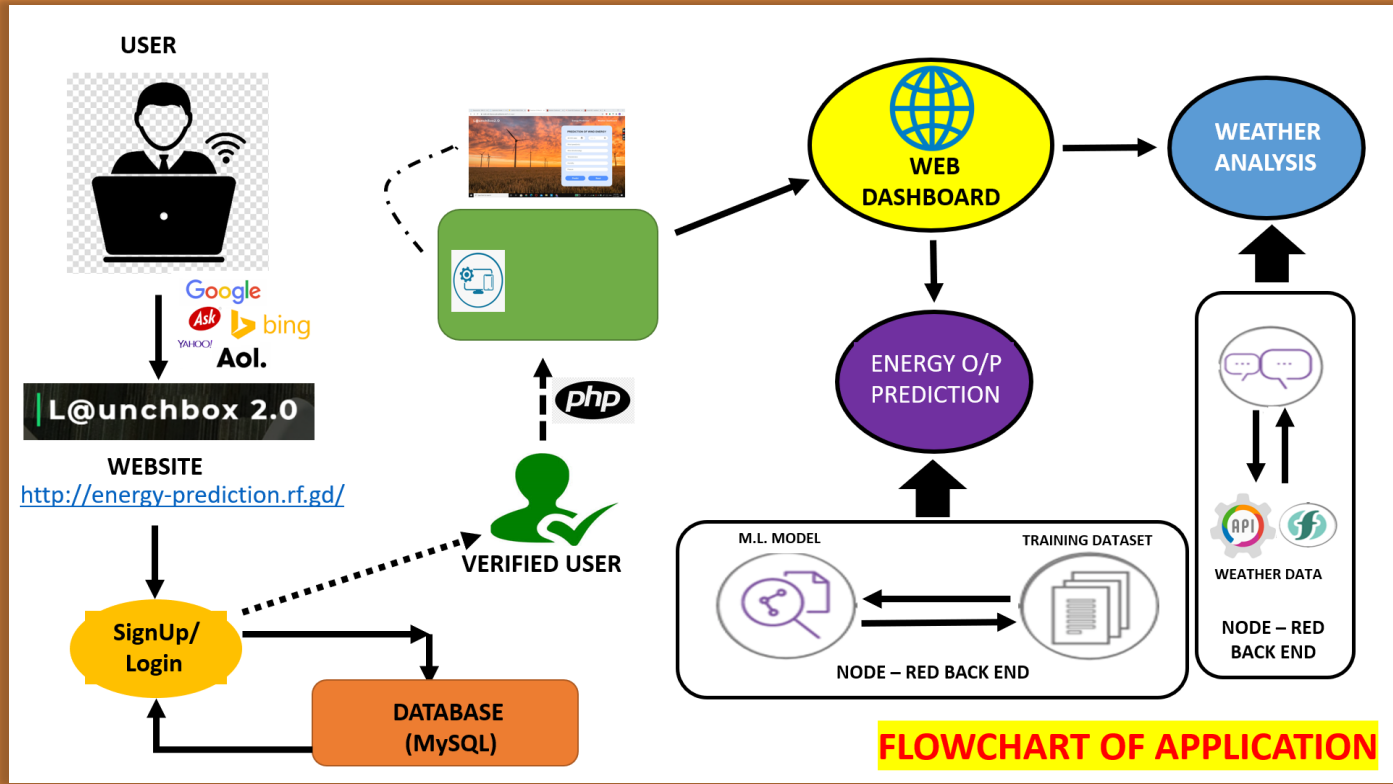
Weather Analytics

Wide analysis of the next 48-hours.

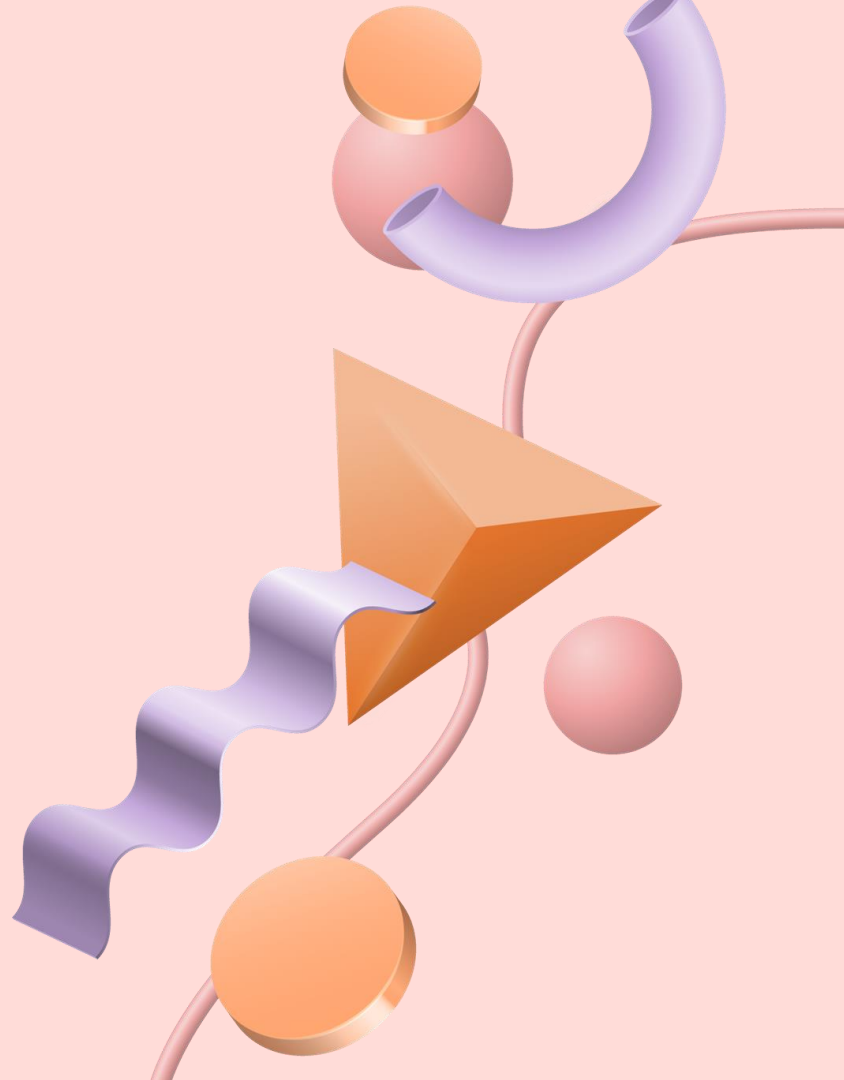
PROJECT STAGES (FLOWCHART)



➤ Flowchart of application

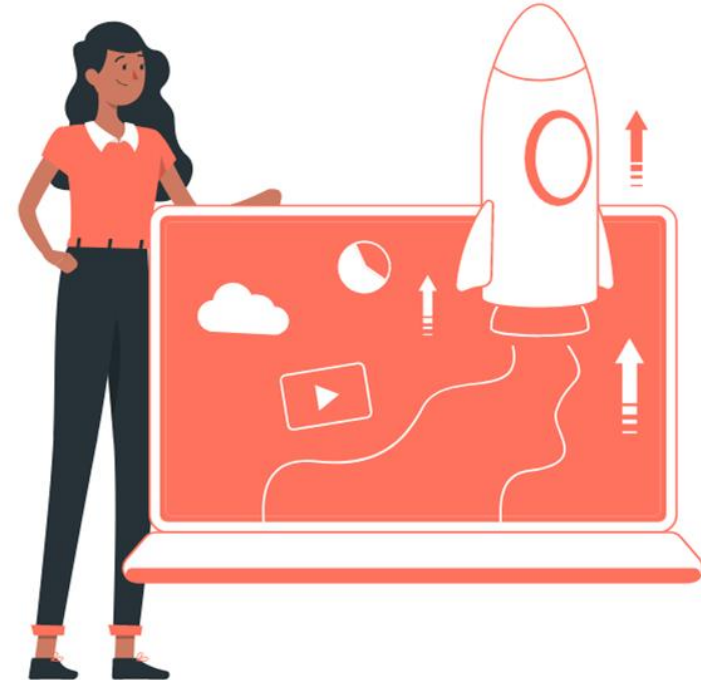


FUTURE SCOPE

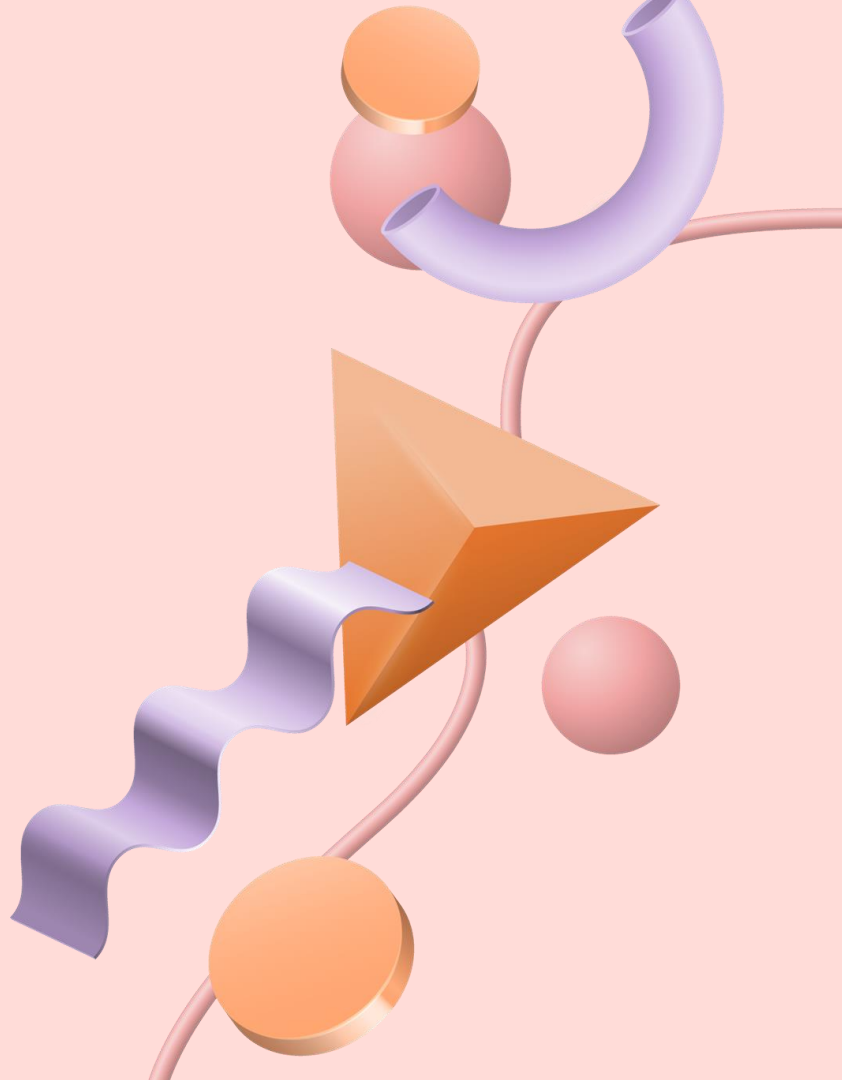


IN THE FUTURE

- We can include Watson studio text to speech and speech to text services to access the application handsfree. This is one of the future scope of this project.
- More attractive user-interface design can implement with help of node-red dashboard.

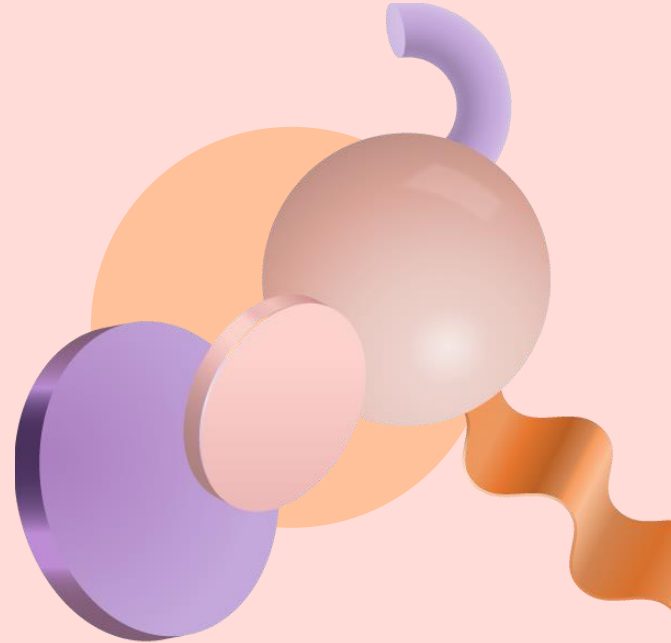


ADVANTAGES + EXTRA FEATURES



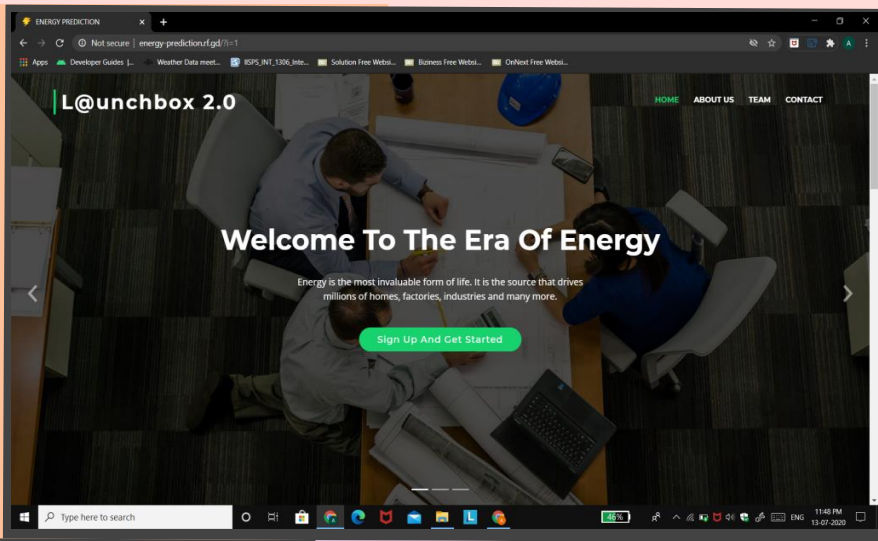
LET'S CHECK THIS LIST

- The Web Dashboard responds to weather conditions analysis that are not manually answered.
- We can improve results by training data to our choice of parameters.
- No need to search weather analysis in different sites.
- Easy to use and has a friendly user interface to work with.
- Companies can deploy to improve their energy harnessing efficiency.
- Reduces man power
- Can be used even in areas of less connectivity.
- Cost efficient
- The database maintained can allow companies, to easily monitor the access/users.
- Promotes Alternative resources of energy and drives a motto to use Clean & Green Fuel.

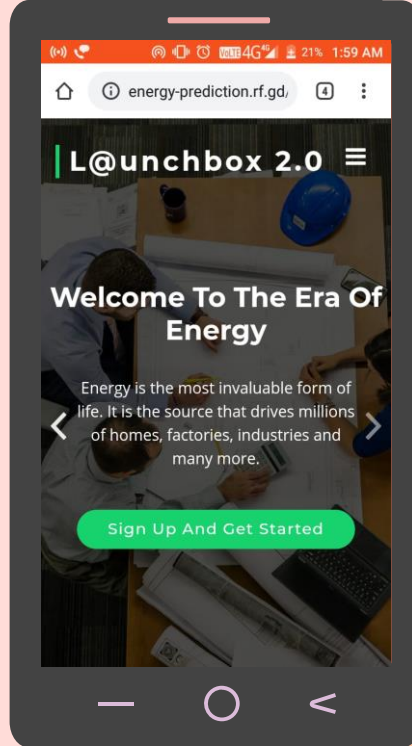


DESKTOP APPLICATION

Works Perfectly in any desktop
resolution with great UI effects.



MOBILE WEB



Similarly, displays excellent resolution in mobile devices too..

CONTACT US

Do you have any questions?

Email At:

alamshahbaz512@gmail.com

Or Contact At:

<http://energy-prediction.rf.gd/>

Wabeeja
Medawagse
Mersi
unalchéesh
Tingki
Komapsumnida
Shukuria
Paldies
Hatur
Tashakkur
hui
Sanco
Maketai
Maake
Denkauja
gozaimashita
Fakaaue
Spasibo
Ekhmet
Mehrbani
Nenachalhya
Baiika
Yuspagarâtam
Minmonchar
Atto
Gaejtho
Maiteka
ekoju
Tavtapuch
Sikomo
Yaqhanyelay
Efcharisto
Gui
Dankscheen
Arigato
bolzin
YU
Merci
Shukria
lah
Merastawhy
Dhanyabaad
Chaltu
Biyangrazie
Snachalhuya
Juspaxar
Thank