Web App for exploring power plant database

Assignment done for a UX Design position at D E Shaw

Completed in 2 days

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MDes in Interaction Design from IDC
School of Design, IIT Bombay

Process

Understand

Understanding the problem statement and the data

Understanding the stakeholder

Analysing other products

Ideate

Identifying different use cases

Generating ideas from insights about the stakeholder

Prototype

Quick sketches and wireframing

Creating screens and graphical representations to convey the ideas

Understanding the problem statement and the data

Show relevant data

The trader has to analyse the data and not the designer, so the dashboard should show all the relevant data in a user friendly form.

Quality of data

Some data points are sparse, appropriate warnings need to be given.

Nature of data

Most of the data points are nominal, some are interval and very few are ratio [link].

Problem Statement:

Overview:

A Trader comes across the attached report (*A_Global_Database_of_Power_Plants.pdf*) and data (*global_power_plant_database.csv*) from World Resources Institute for various power plants across the globe. The database covers approximately 30,000 power plants from 164 countries including thermal plants and renewables. Each power plant is geo-located and entries contain information on plant capacity, generation, ownership, and fuel type. Traders are looking for effective ways to visualize, compare, and draw insights for analysis, which will help them find investment opportunities in the power sector.

As a UX designer, you need to come up with probable use cases and provide solutions to them in the form of web application.

Expectation:

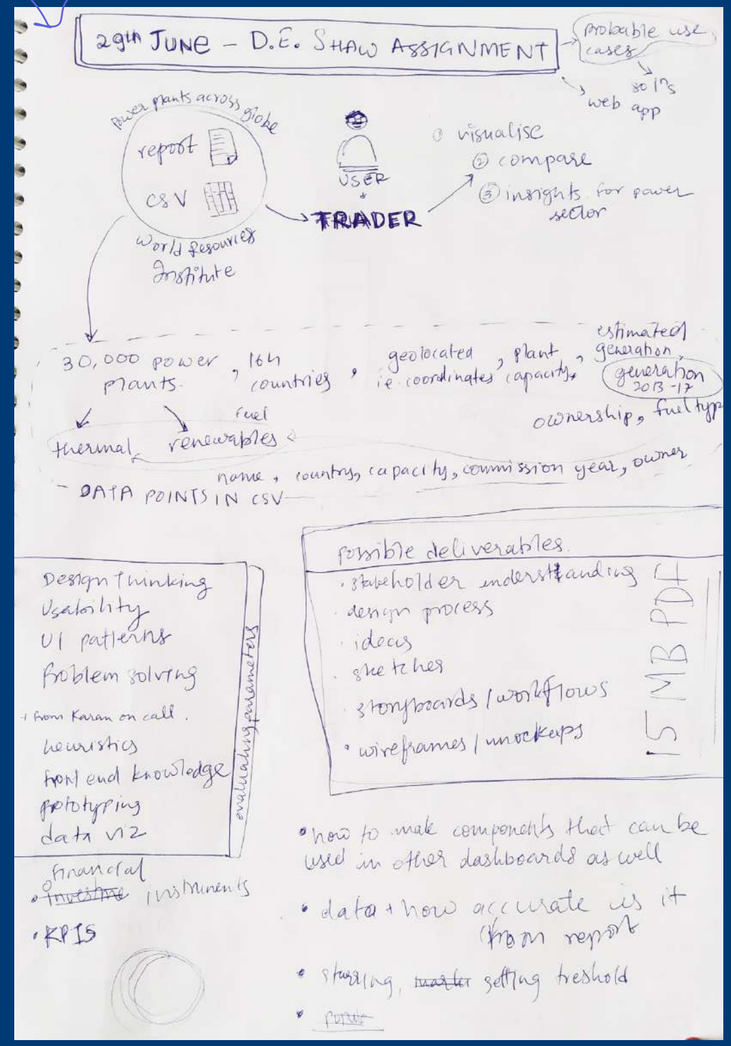
We would like to check your design thinking, understanding of usability, standard UI patterns, and problem-solving ability. We also want you to add one or two paragraphs explaining your final proposals.

Deliverables May Include:

- Stakeholder Understanding
- Design Process
- Ideas
- Sketches
- Storyboards/Workflows
- Wireframes/Mockups

Format:

Your final submission should be in a single PDF file within 15MB (Do not send zip files).



The dataset

Understanding the user

What does a trader do?

I came across information on the internet about what traders do on a typical workday.

Quora answers, investopedia articles and more.

The data points that I got were not very specific to how they conduct research before making decisions, but it was the best I got since I did not have access to traders.

How can I as a UX Designer help the trader?

Data points from the aforementioned first hand accounts of traders led me to some design insights.

Data points	*Traders look for updates from relevant data sources every morning*	*Before making decisions they double check all numbers*	*They spend hours doing research on a particular topic*
Design insights	*Notification channel*	*Bookmark option for dashboard views*	*Option to link dashboard views to other docs*

More details can be found in this doc.

Analysing other products

Sisense sample dashboards

Loading animation to show change in data points

Need for white space

Cancelling a loading option

Tableau sample dashboards

High level of flexibiliy

Need for white space

Good hierarchy

Microstrategy sample dashboards

Too many colours

Elements are part of a design system

Identifying different use cases

John Doe
Trader

‘I want to make the right investment for my clients!’

High level use cases

Details can be found here.

‘I want to do in depth research on a topic’

‘I want to quickly refer to some data points to verify decisions’

Granular use cases

‘I want to explore power plants in developing countries’

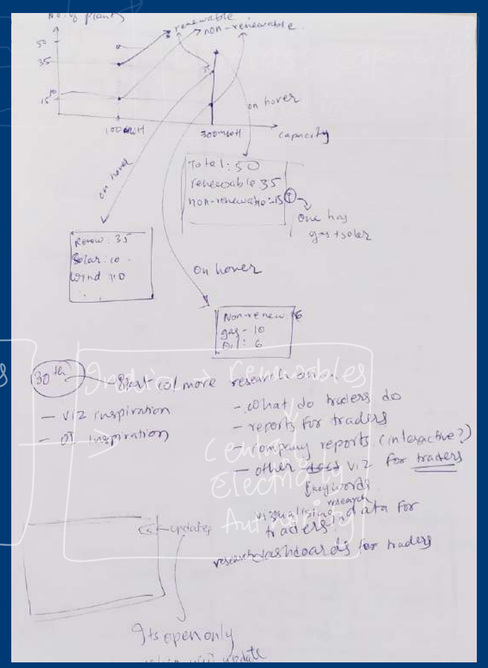
‘I don’t want to explore companies with less than 5 plants’

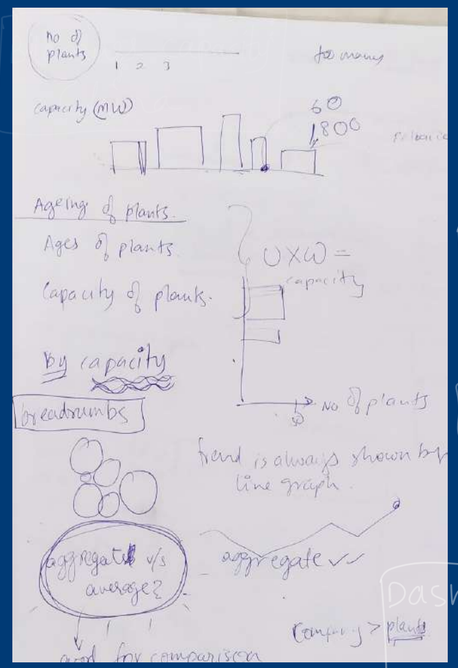
‘I want to compare two plants’

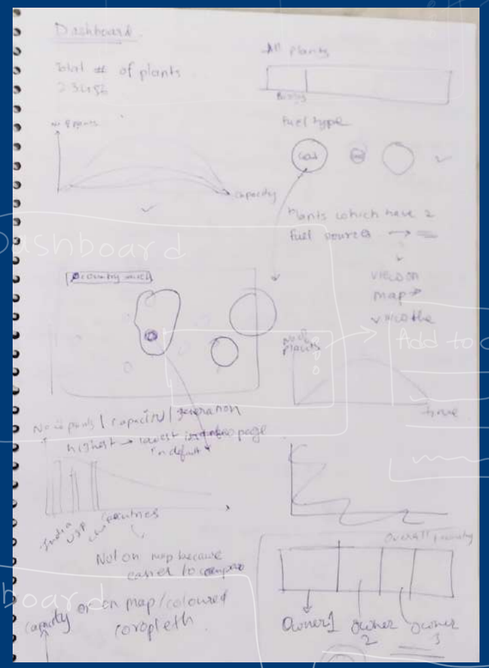
‘I want to explore renewable energy plants’

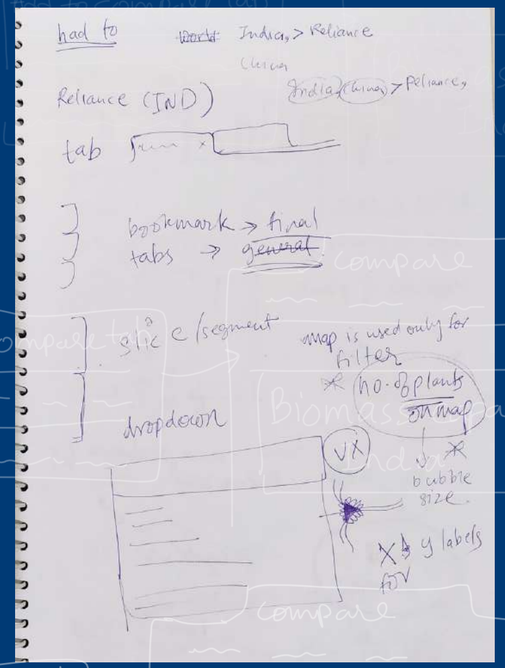
‘I want to see capacity and generation trends of those plants’

Quick pen and paper wireframes

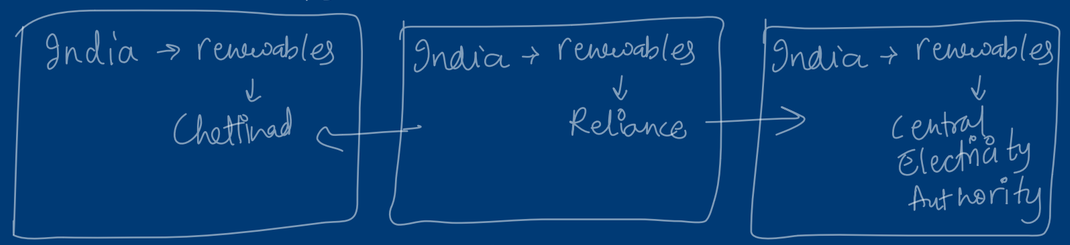


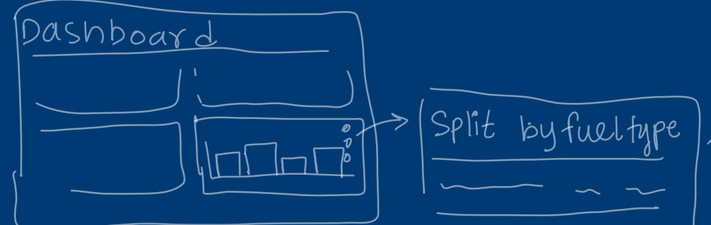


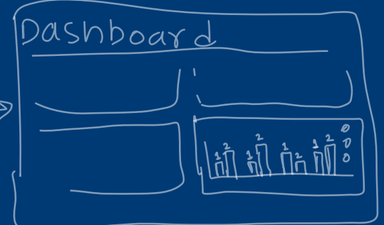


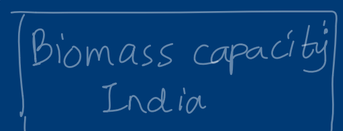


Dashboard view #1

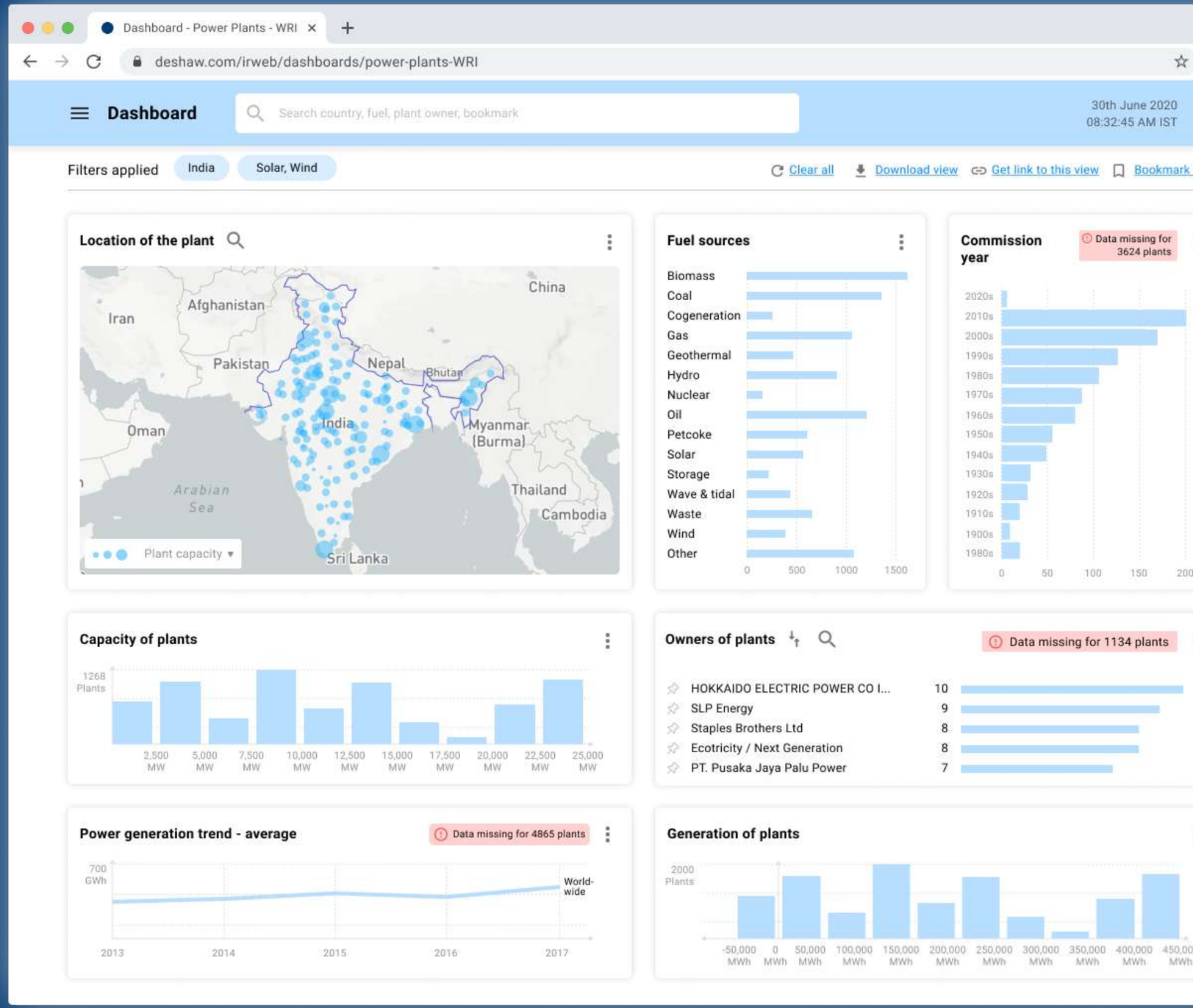








Screens in action



‘I want to explore power plants in develping countries’

The user selects the country from the map.

The user can also use a search option find the country

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

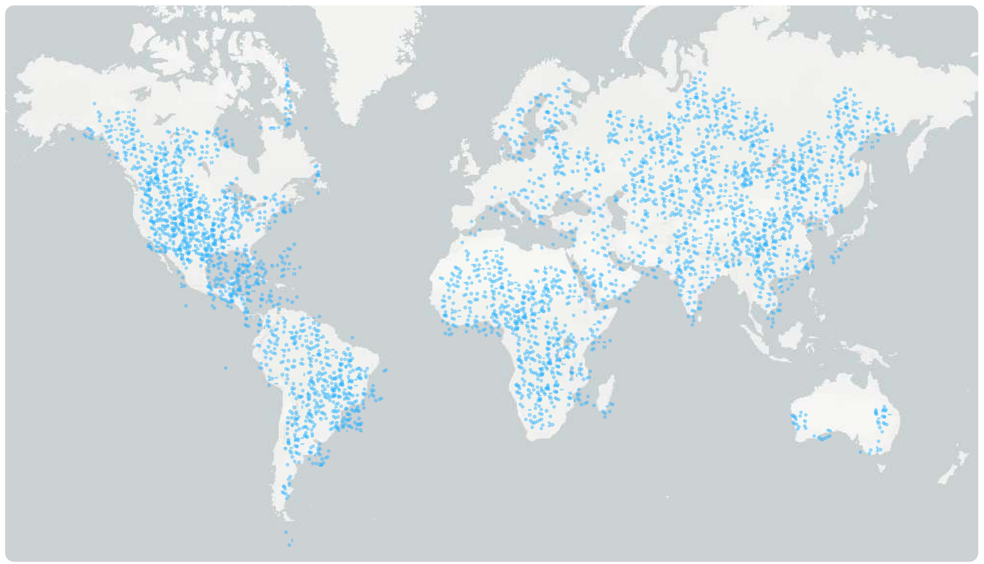
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

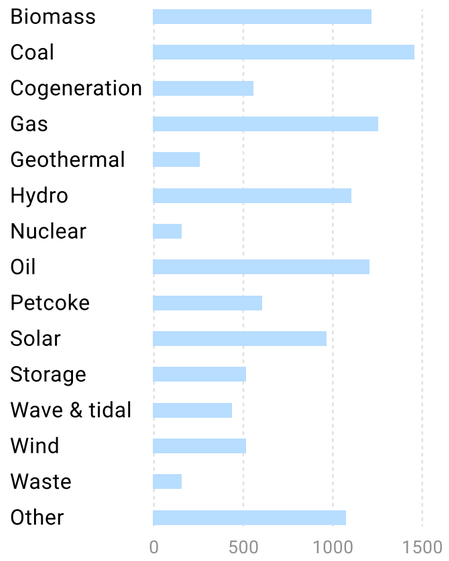
Filters applied

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant

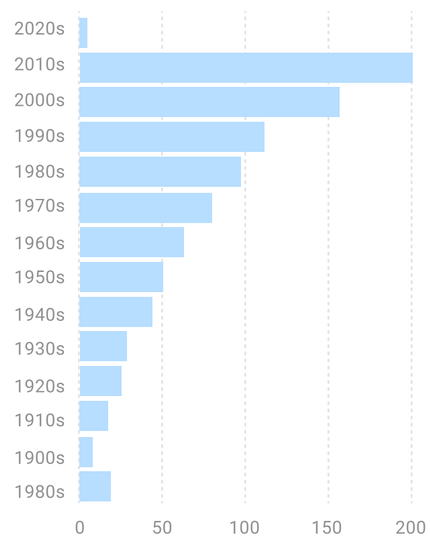


Fuel sources

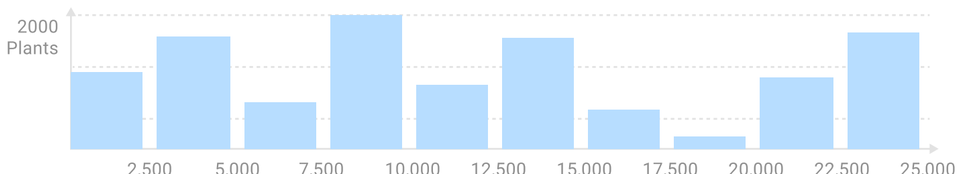


Commission year

Data missing for 3624 plants



Capacity of plants



Owners of plants

Data missing for 1134 plants

HOKKAIDO ELECTRIC POWER CO I...	10
SLP Energy	9
Staples Brothers Ltd	8
Ecotricity / Next Generation	8

‘I want to explore power plants in develping countries’

The map zooms in to the selected country and the data in the other cards also gets segmented accordingly.

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

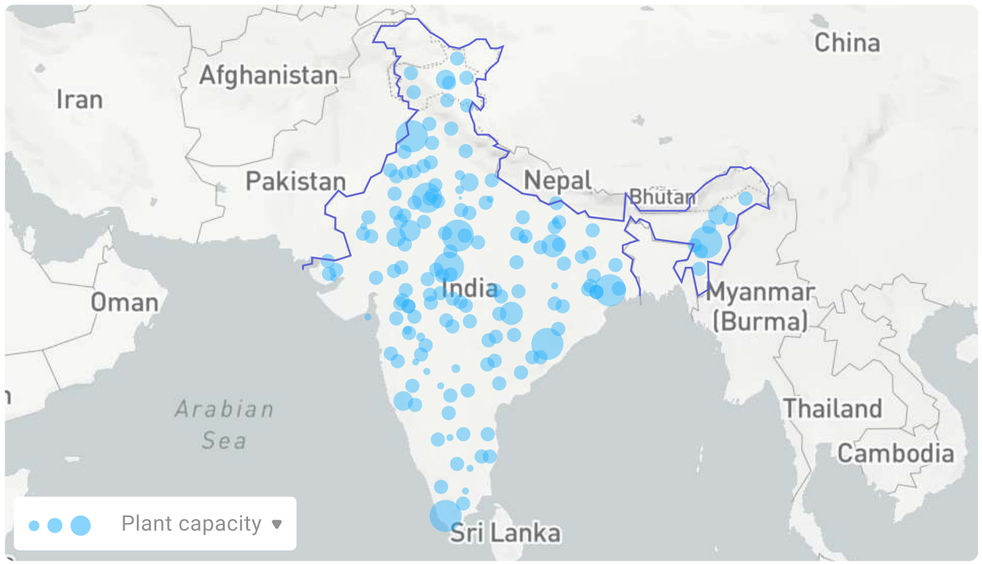
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

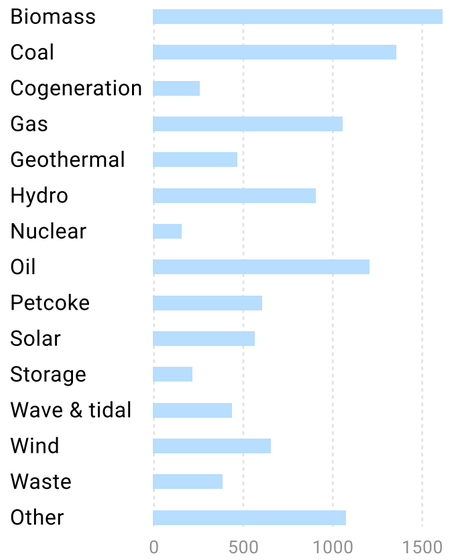
Filters applied: India, Solar, W

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant



Fuel sources



Commission year

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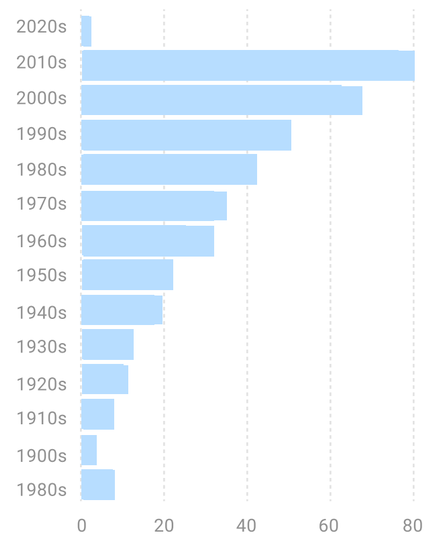
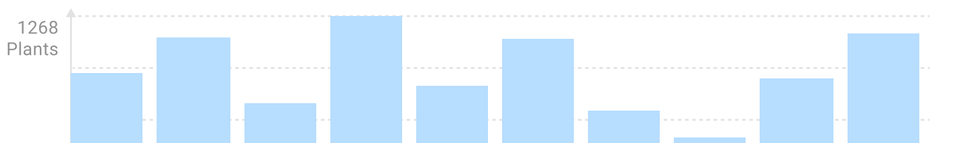


Capacity of plants



Owners of plants

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HOKKAIDO ELECTRIC POWER CO I...	10
SLP Energy	9
Staples Brothers Ltd	8
Ecotricity / Next Generation	8

‘I want to explore renewable energy plants’

The user selects the fuels he wants to explore

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

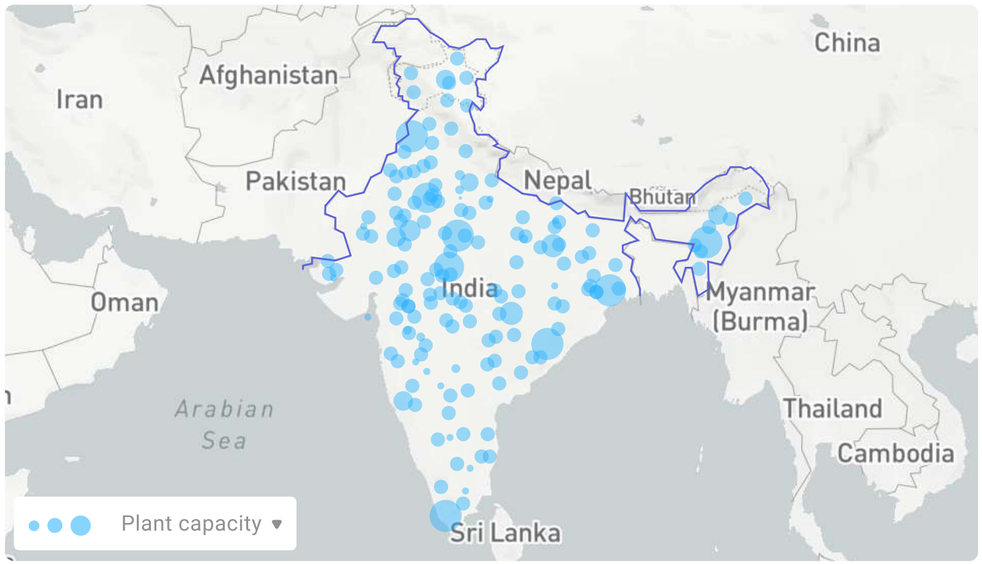
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

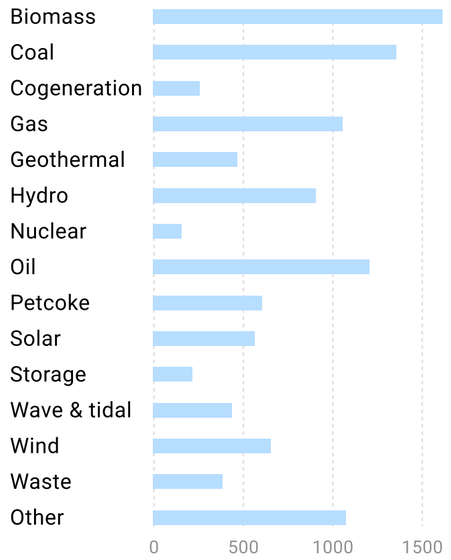
Filters applied: India ✕ Solar, Wind ✕

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant



Fuel sources



Commission year

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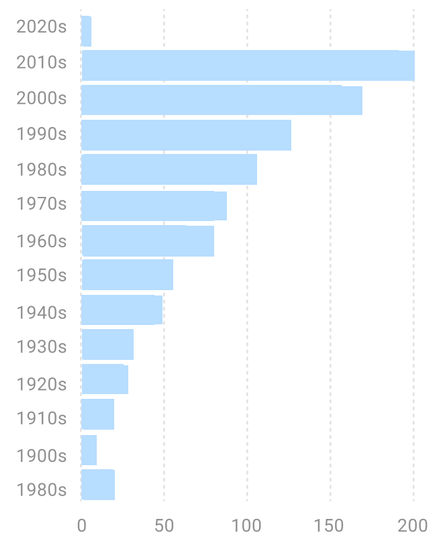

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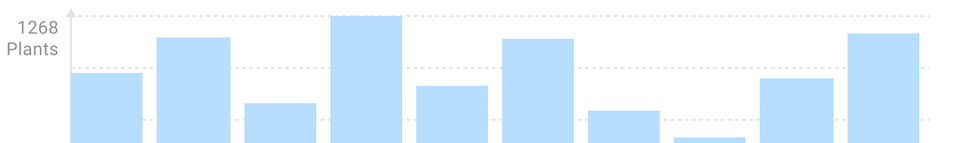

Owners of plants

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HOKKAIDO ELECTRIC POWER CO I...	10
SLP Energy	9
Staples Brothers Ltd	8
Ecotricity / Next Generation	8

‘I want to explore renewable energy plants’

Once the user segments the data through one card, the other cards will show an animation (the bar graph starting from zero, the bubbles on the map expanding, etc). If that is not possible a loading action should be shown for a second to signify that his action has resulted in the data changing in all cards

This trainsition has not been shown between every screen for convenience

Dashboard - Power Plants - WRI

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PowerPlants

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Filters applied: India, Solar, Wind

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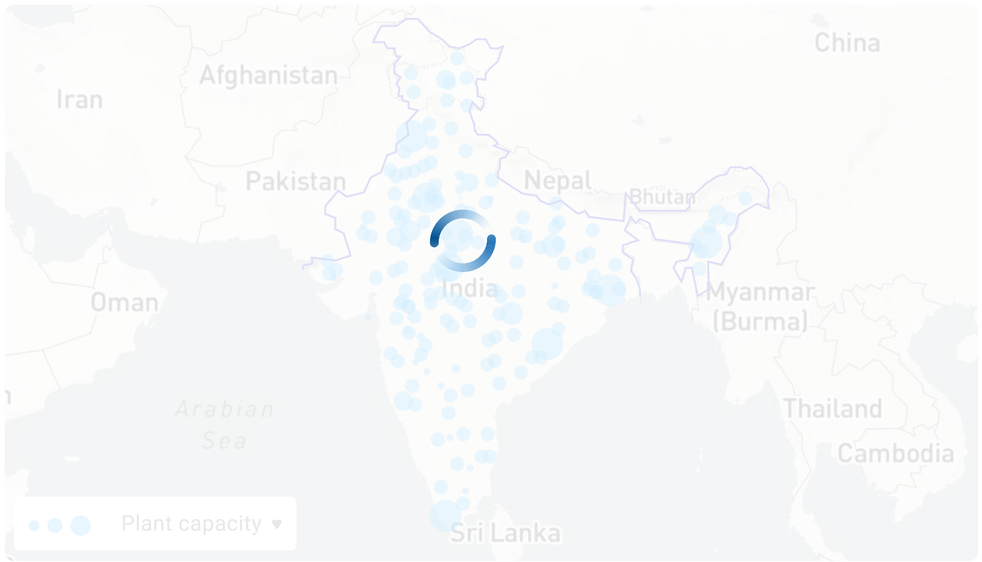
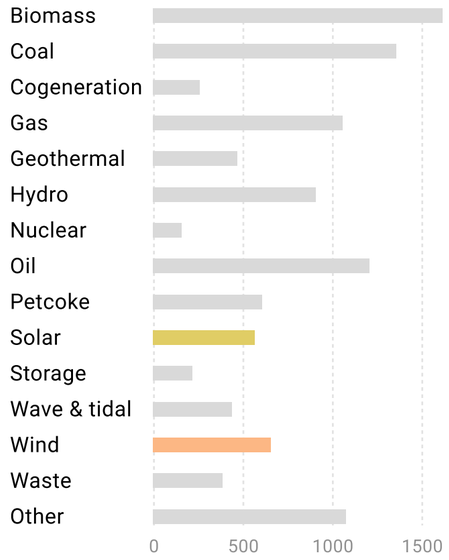


Fuel sources



Commission year

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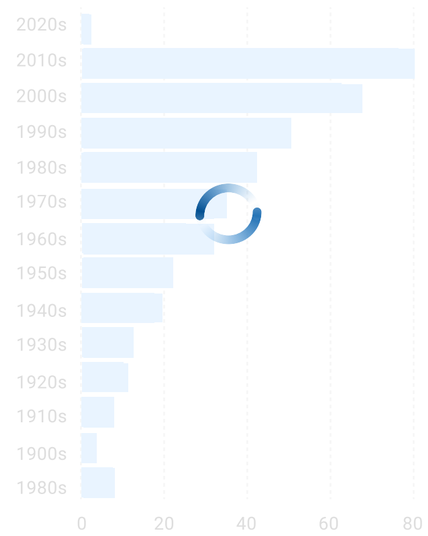
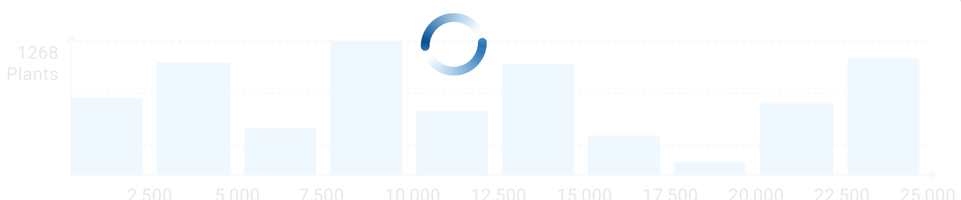


Capacity of plants



Owners of plants

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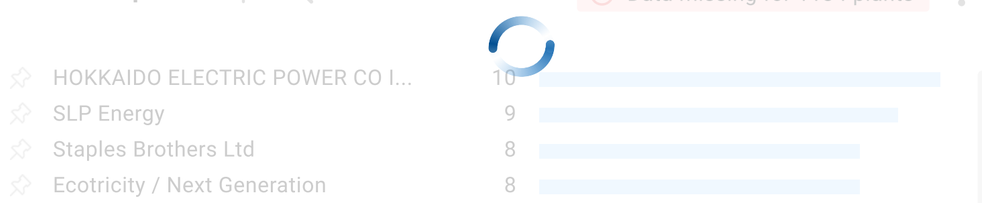


‘I want to explore renewable energy plants’

The different filters that are added to the dashboard get updated here.

This bar remains sticky and scrolls with the page.

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

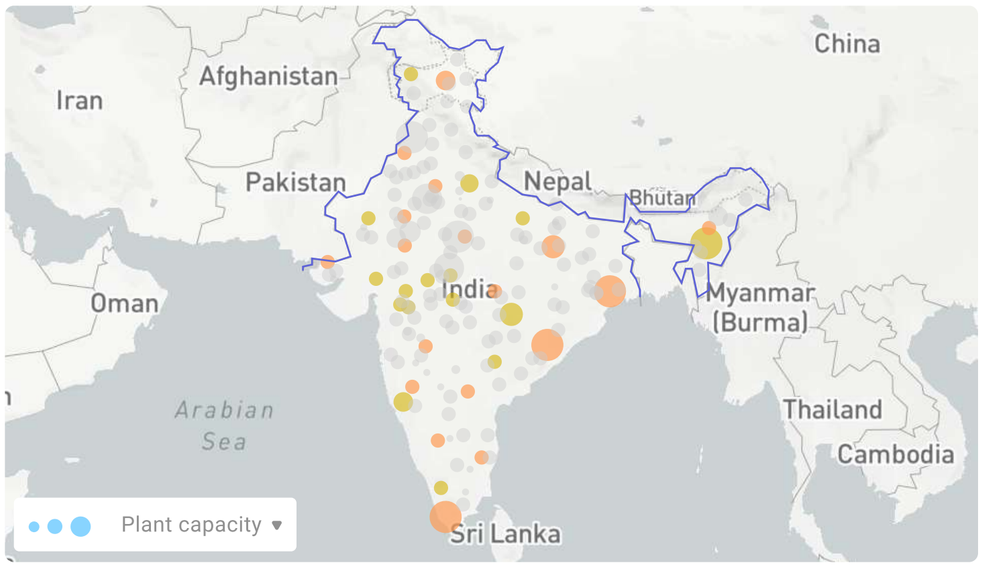
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

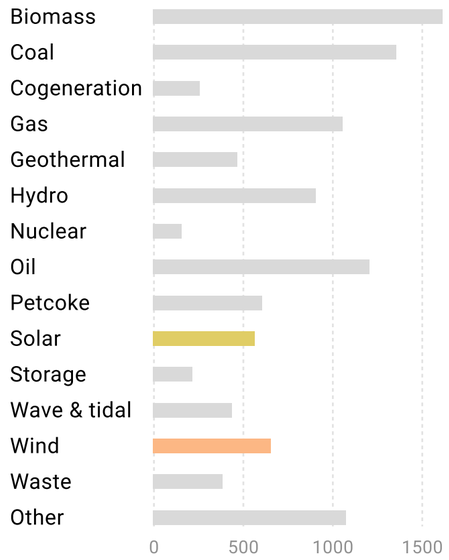
Filters applied: India ✕ Solar, Wind ✕

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant

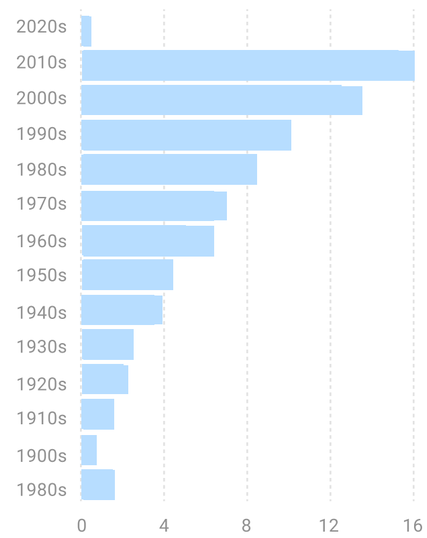


Fuel sources

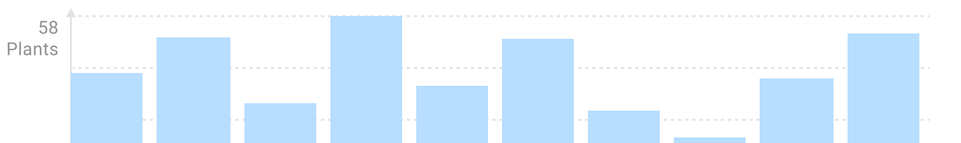


Commission year

Data missing for 3624 plants



Capacity of plants



Owners of plants

Data missing for 1134 plants

HOKKAIDO ELECTRIC POWER CO I...	10
SLP Energy	9
Staples Brothers Ltd	8
Ecotricity / Next Generation	8

‘I dont want to explore companies with less than 5 plants’

The user pins the companies that have more than 5 plants

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

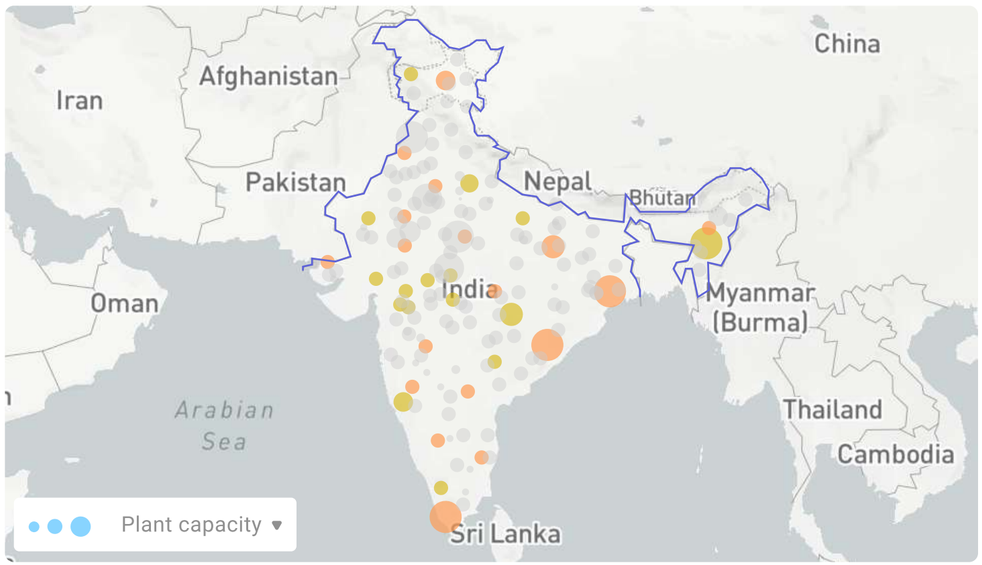
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

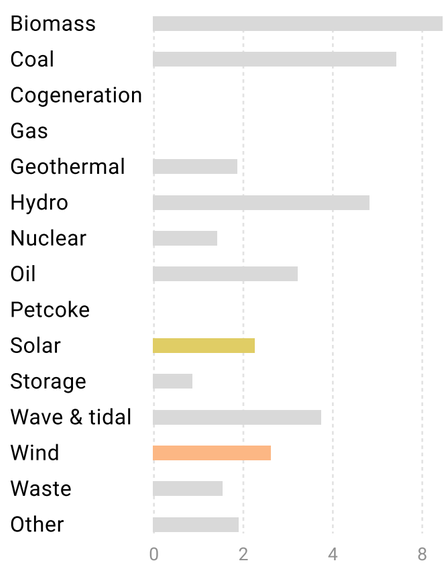
Filters applied: India ✕ | Solar, Wind ✕ | Reliance, Chettinad ✕

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant



Fuel sources



Commission year

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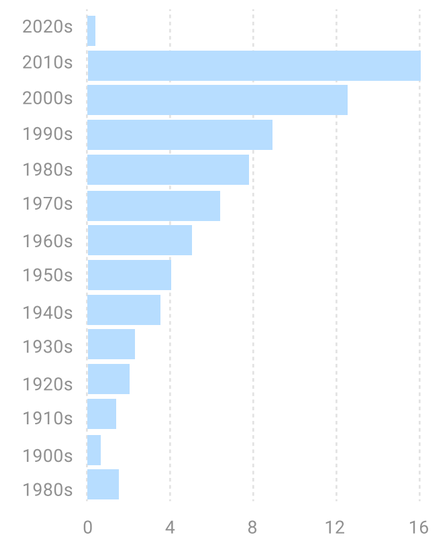
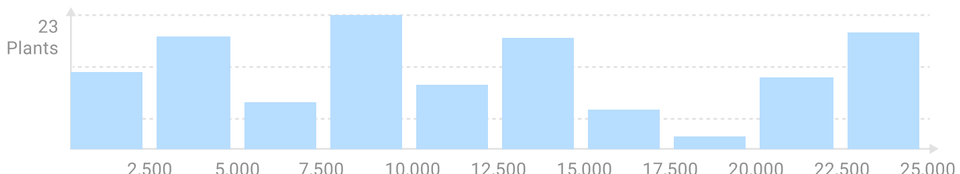


Capacity of plants



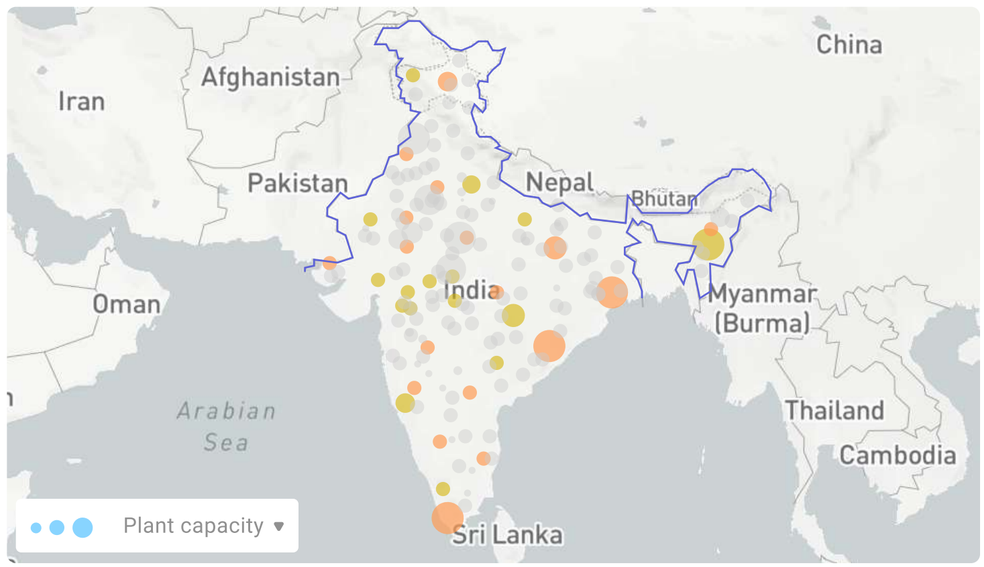
Owners of plants

Data missing for 1134 plants

Reliance Power Limited	8
Chettinad Corp ltd	6
Kjs Ahluwalia group	2
Sunkon Energy Private Limited	3

‘I want to know which company has high capacity plants’

Clear all | Download view | Get link to this view | Bookmark view



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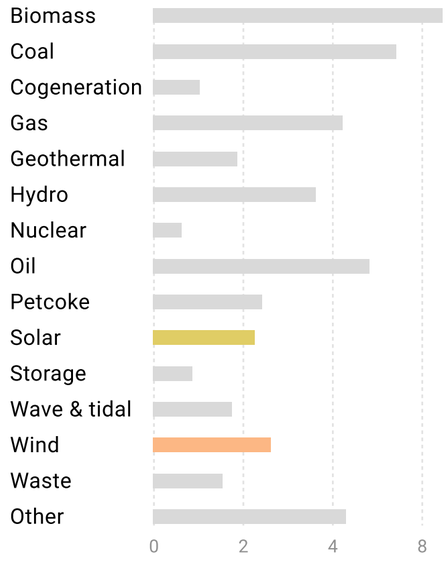
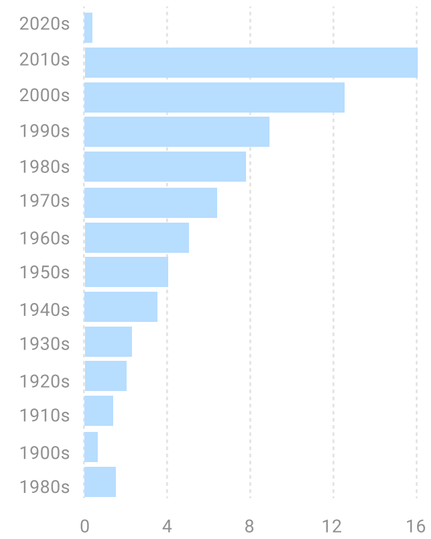
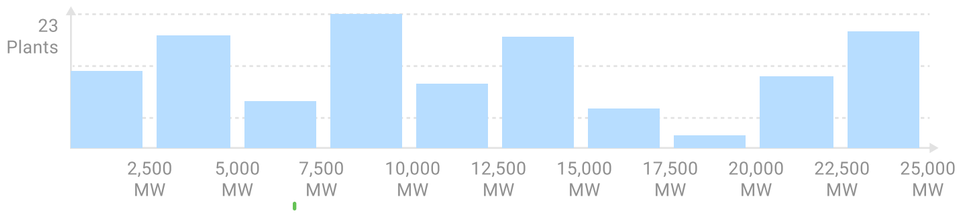


Commission year

Data missing for 3624 plants



Capacity of plants



Owners of plants

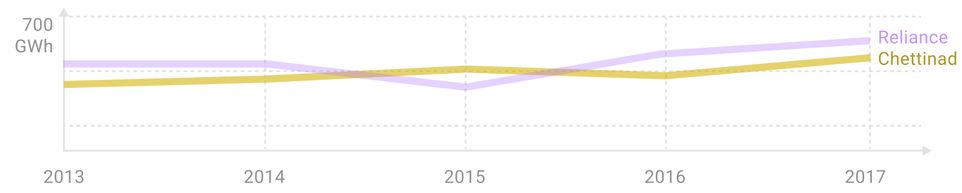
Data missing for 1134 plants

Reliance Power Limited	8
Chettinad Corp ltd	6
Kjs Ahluwalia group	2
Sunkon Energy Private Limited	3
West Bengal Energy Development	3

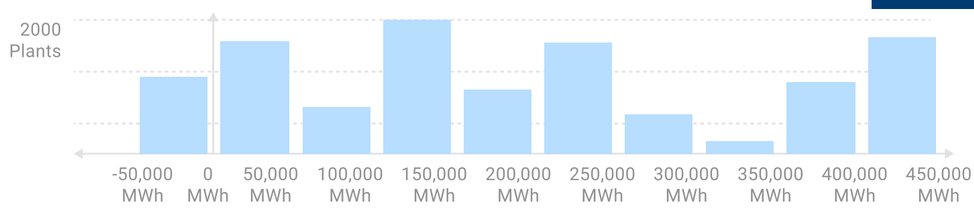
By toggling between the pins, the user identifies the company with the high capacity plants

Power generation trend - average

Data missing for 2 plants

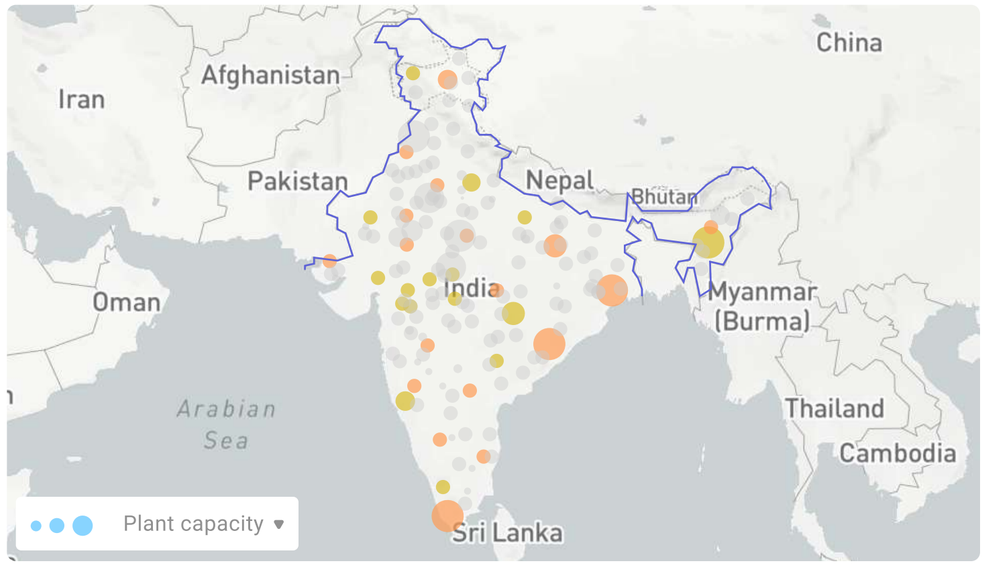


Generation of plants

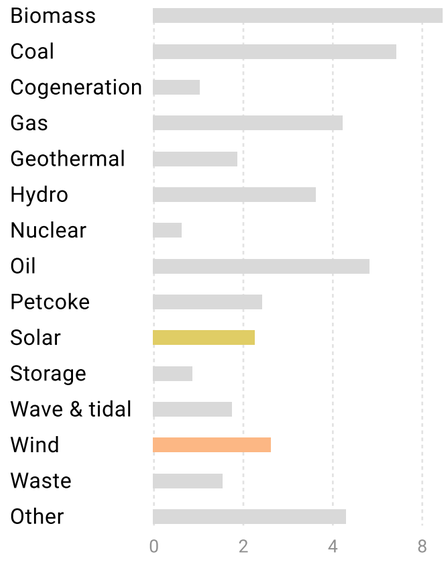


‘I want to compare generation trends of these companies’

Clear all | Download view | Get link to this view | Bookmark view

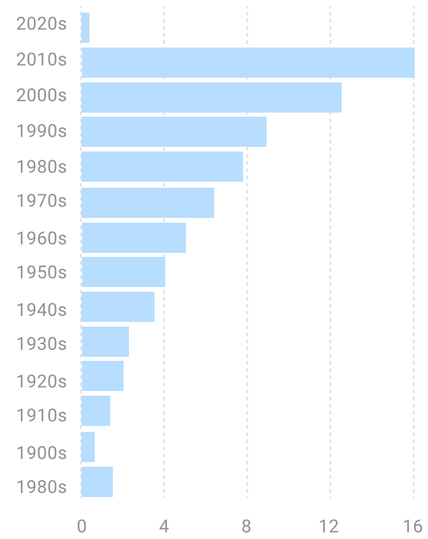


Fuel sources

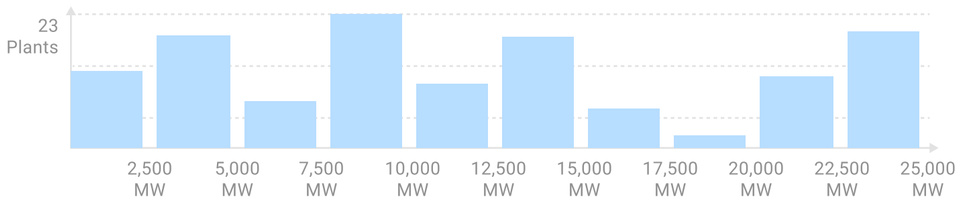


Commission year

Data missing for 3624 plants



Capacity of plants



Owners of plants

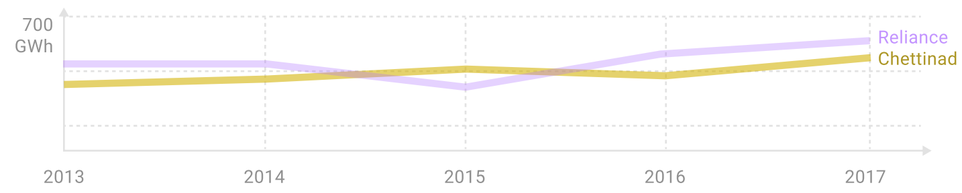
Data missing for 1134 plants

Reliance Power Limited	8
Chettinad Corp ltd	6
Kjs Ahluwalia group	2
Sunkon Energy Private Limited	3
West Bengal Energy Development	3

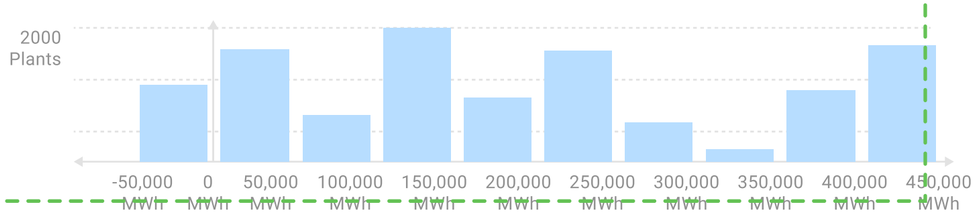
The card on the bottom shows the YOY production trends. The appropriate warnings are given for the missing data in each card.

Power generation trend - average

Data missing for 2 plants



Generation of plants



‘I want to do an in-depth research on a topic’

If the user is doing in depth research, then he might want to save certain ‘dashboard views’ i.e. the data on the cards with a certain combination of segments. These bookmarks can be accessed from the drawer menu.

To do this, he can either (1) bookmark the dashboard view and a nickname to the view (2) get a link to the view so that it can be added to some other software where he collates data (3) download the view so that it can be added in presentations

When a jpeg of the view is downloaded, the time stamp should be automatically overlaid

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

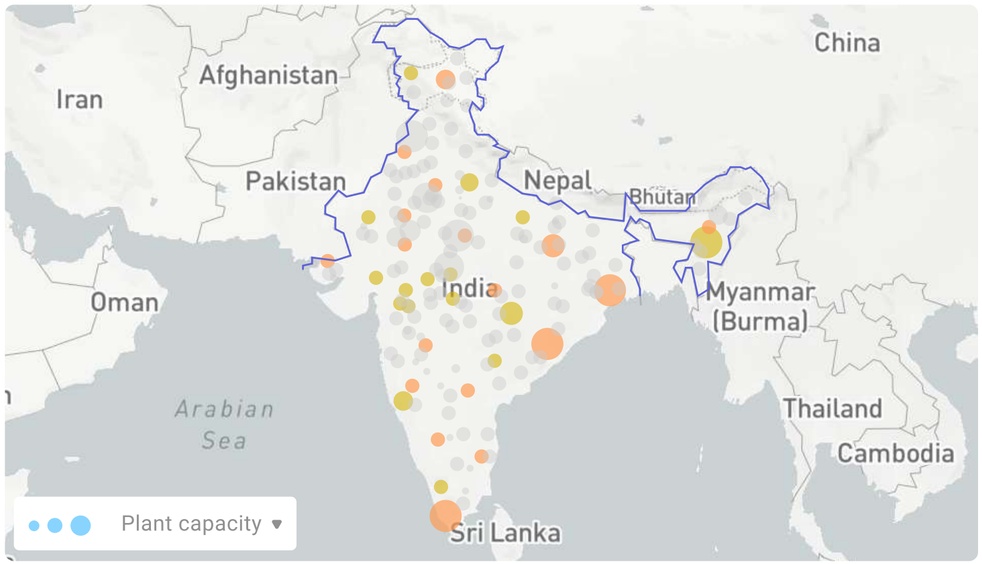
Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

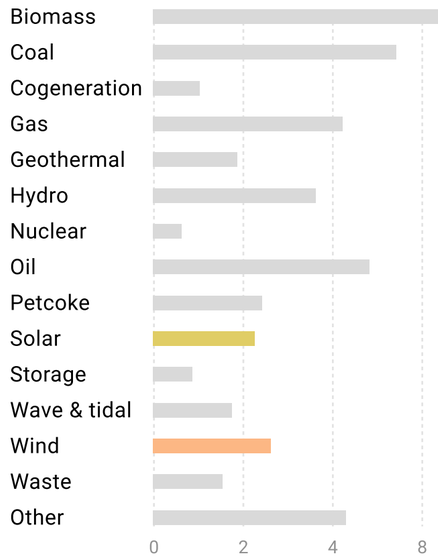
Filters applied: India | Solar, Wind | Reliance, Chettinad

Clear all | Download view | Get link to this view | Bookmark view

Location of the plant

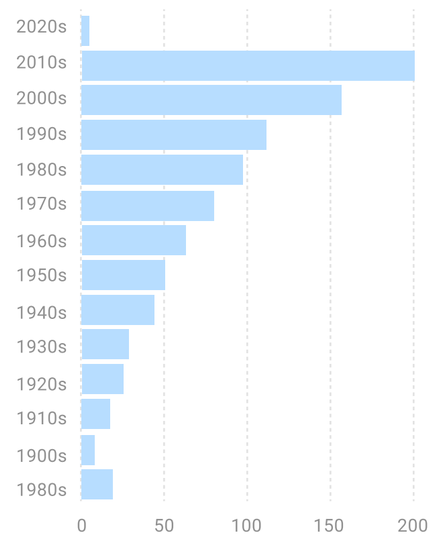


Fuel sources

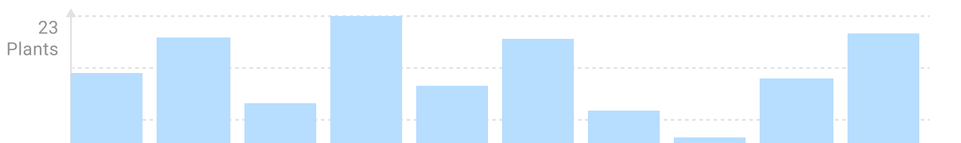


Commission year

Data missing for 3624 plants

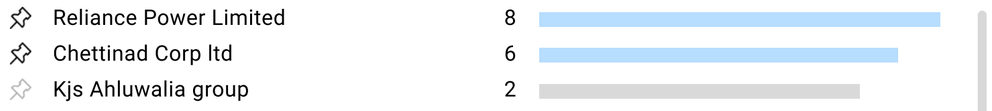


Capacity of plants



Owners of plants

Data missing for 1134 plants



‘I want to quickly refer to some data points’

If the user has saved a bookmark about some earlier data point, he can directly access it from the drawer menu

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

Dashboard

Bookmarks

Settings

History

country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

Reliance, Chettinad

Clear all | Download view | Get link to this view | Bookmark view

China
Nepal
Bhutan
India
Myanmar (Burma)
Thailand
Cambodia
Sri Lanka

Fuel sources

Biomass
Coal
Cogeneration
Gas
Geothermal
Hydro
Nuclear
Oil
Petcoke
Solar
Storage
Wave & tidal
Wind
Waste
Other

0 500 1000 1500

Commission year

Data missing for 3624 plants

2020s
2010s
2000s
1990s
1980s
1970s
1960s
1950s
1940s
1930s
1920s
1910s
1900s
1980s

0 50 100 150 200

12.500 15.000 17.500 20.000 22.500 25.000

Owners of plants

Data missing for 1134 plants

Reliance Power Limited	8
Chettinad Corp ltd	6
Kjs Ahluwalia group	2
Sunkon Energy Private Limited	3

And more...

If there are any updates in the database then they will be communicated through the notification tray

The primary data metric I have used to talk about the plants is the country since it is most recognisable, however this can be revisited when real users are interviewed

Dashboard - Power Plants - WRI

deshaw.com/irweb/dashboards/power-plants-WRI

PowerPlants

Search country, fuel, plant owner, bookmark

30th June 2020
08:32:45 AM IST

Filters applied: India ✕ | Solar, Wind ✕ | Reliance, Chettinad ✕

Clear all | Download view

30th June, 2018 14:27:13
2 new plants added in India - Nagpur Mill, Nagpur Sponge Iron

30th June, 2018 14:27:13
1 new plant added in Bangladesh - Rangpur GT

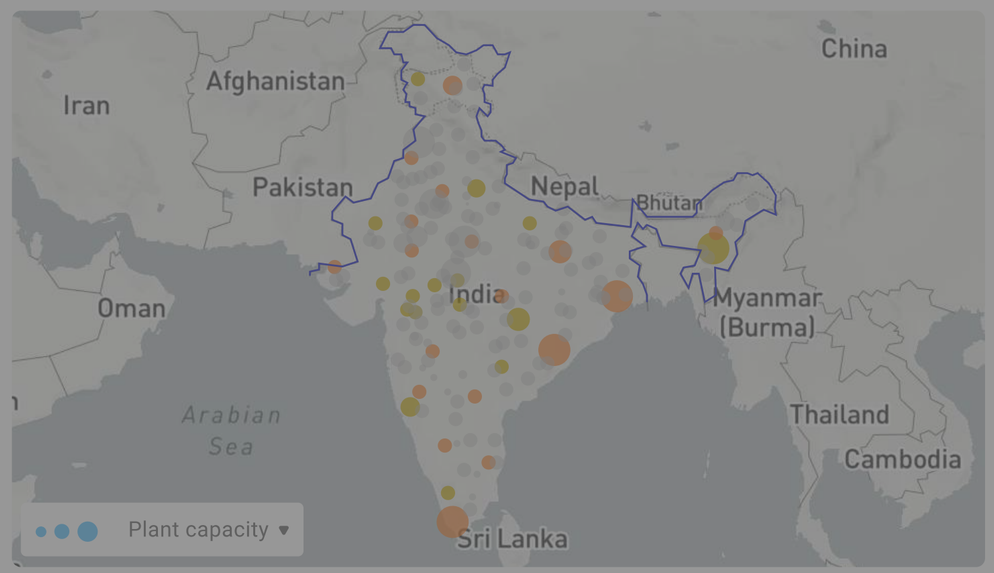
12th June, 2018 14:27:13
Capacity of Shahjibazar 330 MW in Bangladesh increased

12th June, 2018 14:27:13
Location of 3 plants in Bangladesh changed

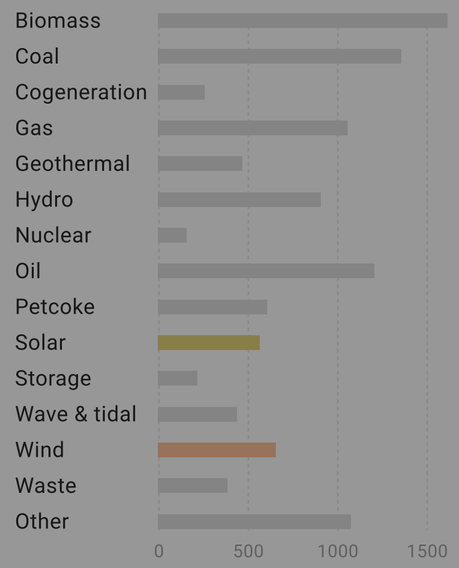
View all

The scroll bar appears on hover for 5 sec, after that it appears when the user scrolls

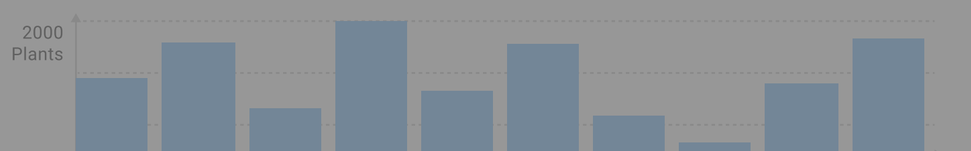
Location of the plant



Fuel sources



Capacity of plants



Owners of plants

Data missing for 1134 plants

Reliance Power Limited	8
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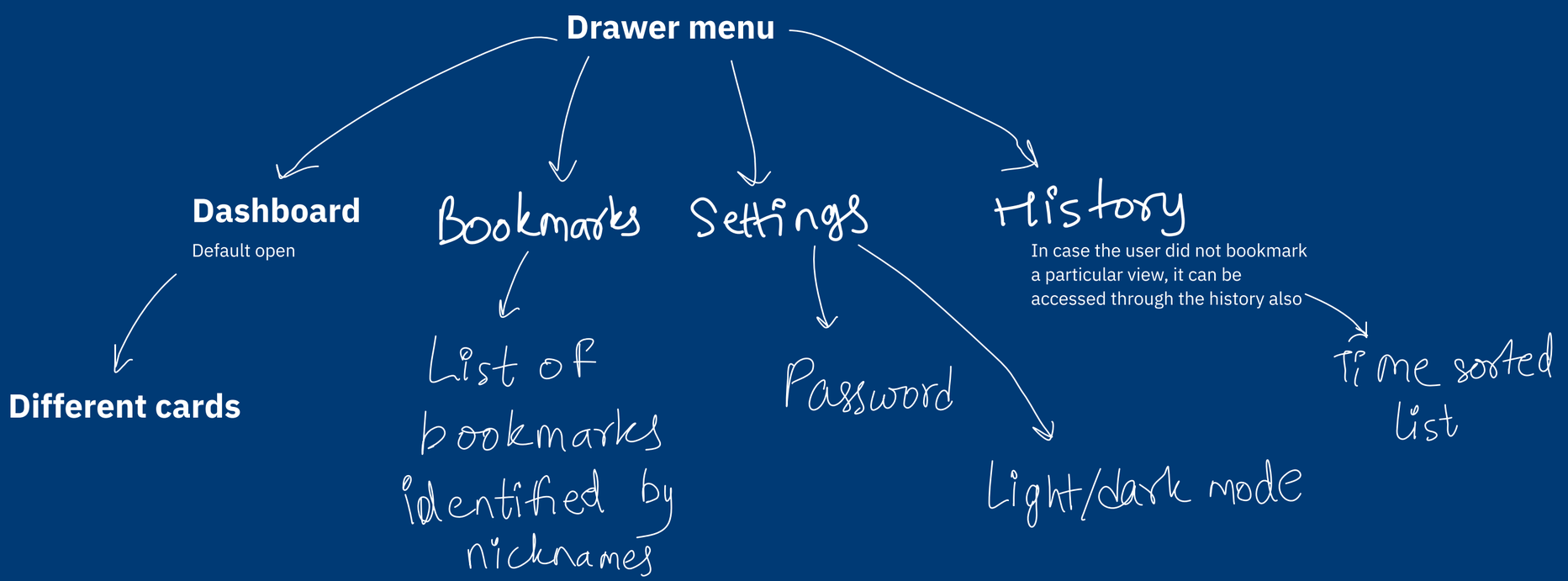
Kjs Ahluwalia group	2
Sunkon Energy Private Limited	3

Information architecture



Some more ideas and their pen and paper prototypes

Which were not prototyped in much detail due to either lack of user data or lack of time

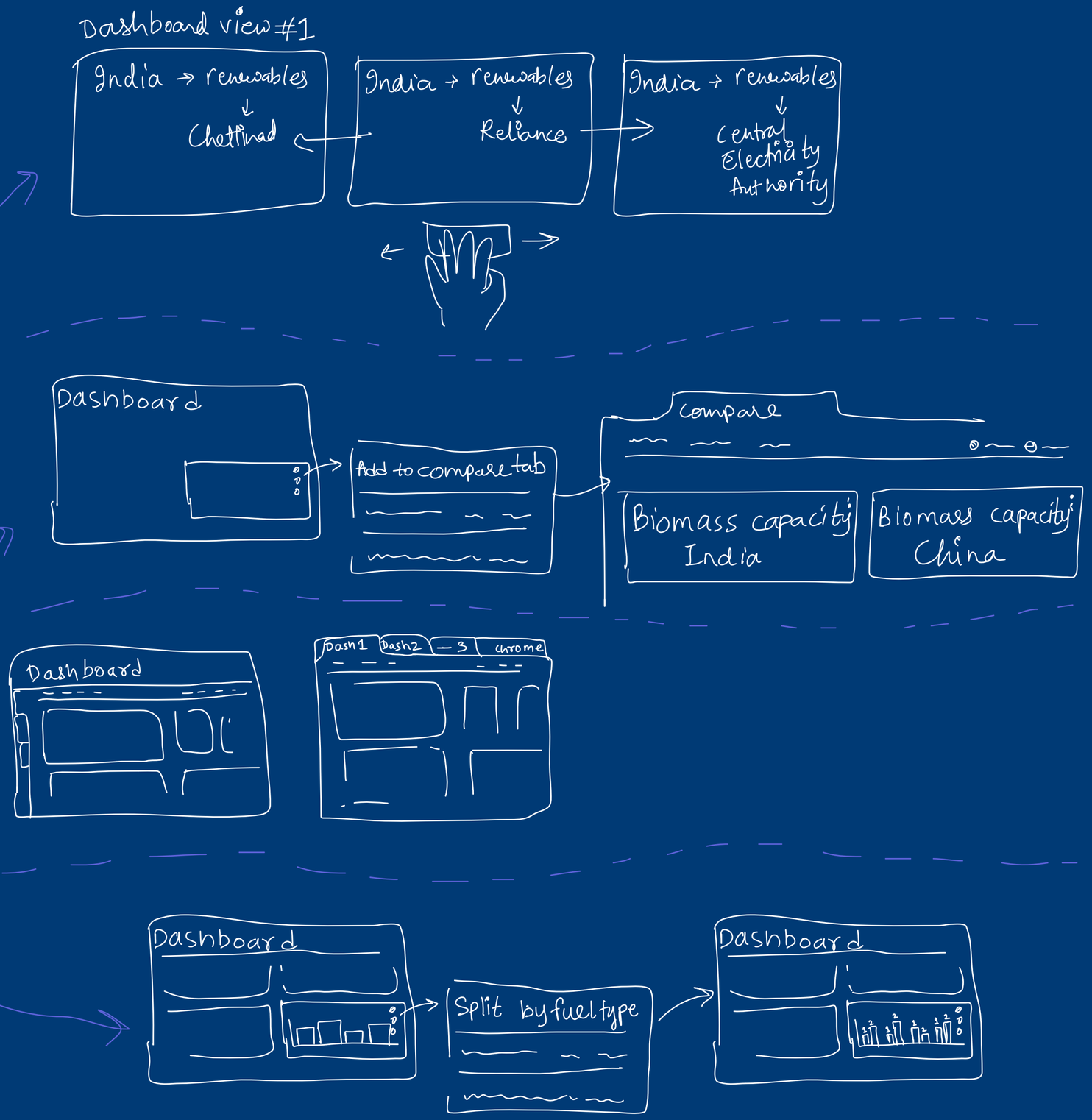
For ease in comparison

Adding a parallel dashboard which they can access similar to the Mac's multiple desktops could be interesting.

Creating a 'compare' tab where the user can add cards from the dashboard.

If it is a desktop app, incorporating tabs inside it. If it is a webapp, then promoting the use of browser tabs to compare different views.

Giving the user an option to change the visualisation type based on analysis of the data



Some more ideas and their pen and paper prototypes

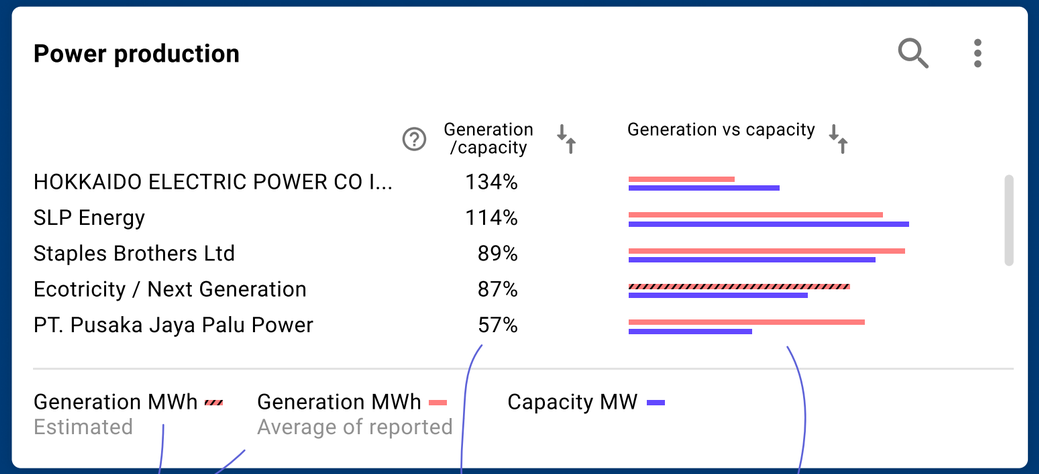
Which were not prototyped in much detail due to either lack of user data or lack of time

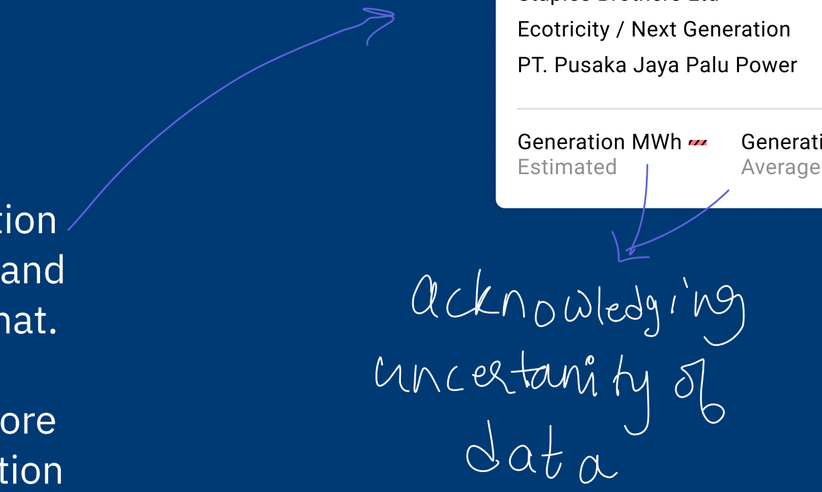
Efficiency metric
Comparing the capacity and generation data points can give insightful data, and an entire card can be dedicated to that. Though this would more thorough research and input from experts before it was implemented, here is an iteration for the same.

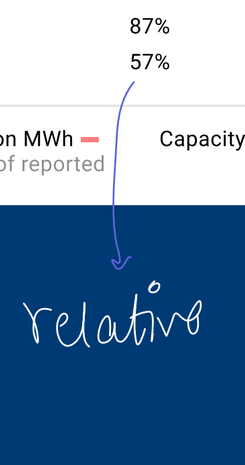
To get the percentage, calculations have been done according to this article.

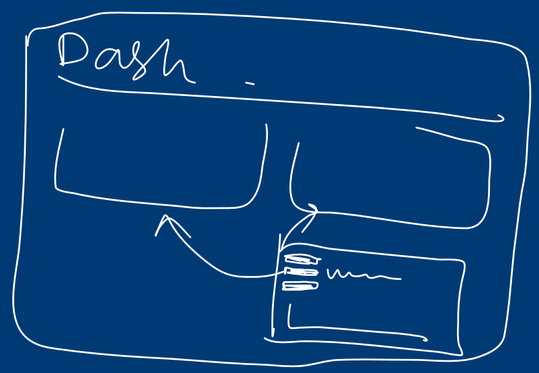
More power to the user
Letting the user move the cards around and add/remove them

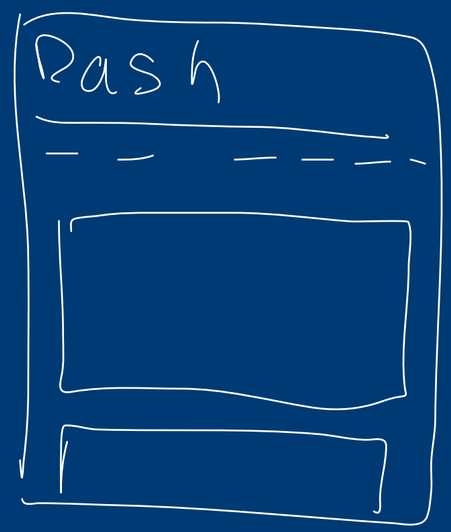
Responsive dashboard
Making it easier for the trader to use different softwares at once











Discussion and future work

Lack of user research
This project lacked rigorous user research which could have helped in decision making as well as ideation.

Working towards a design system
A secondary aim through the project was to keep the UI on the cards consistent in order to inform a possible deisgn system in the future.

UX Writing
After reflecting on the work I realise that the UX Writing would need more iterations.

Thank You

Prachi Tank

I recently (as recently as last week) completed my Masters in Interaction Design from IDC School of Design, IIT Bombay.

My work has beeen documented at prachitank.com.