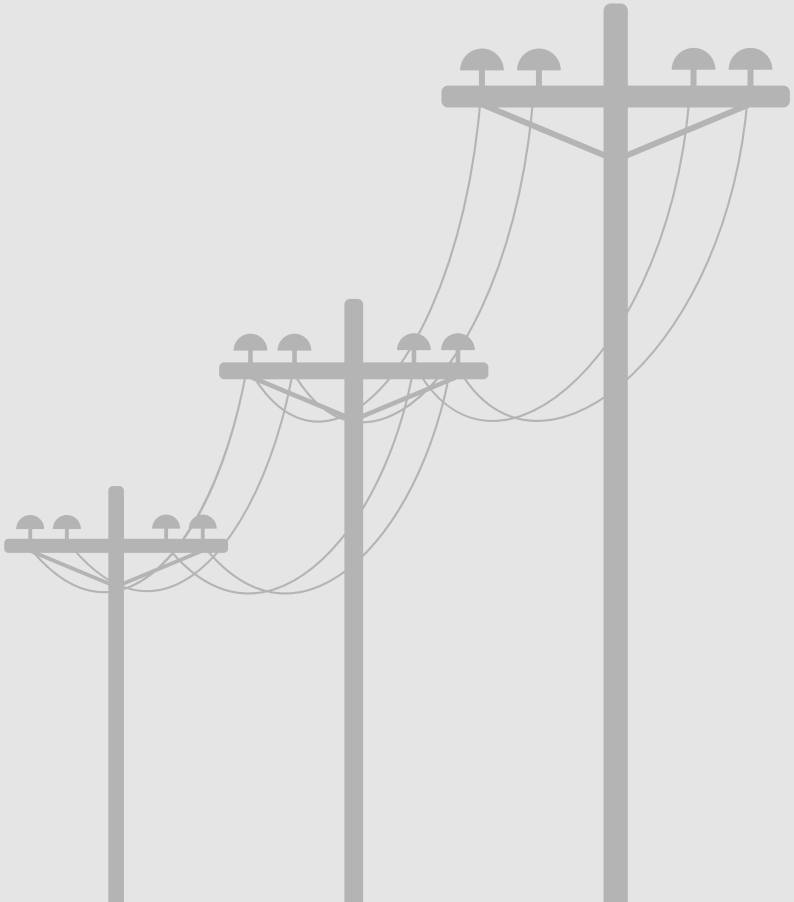
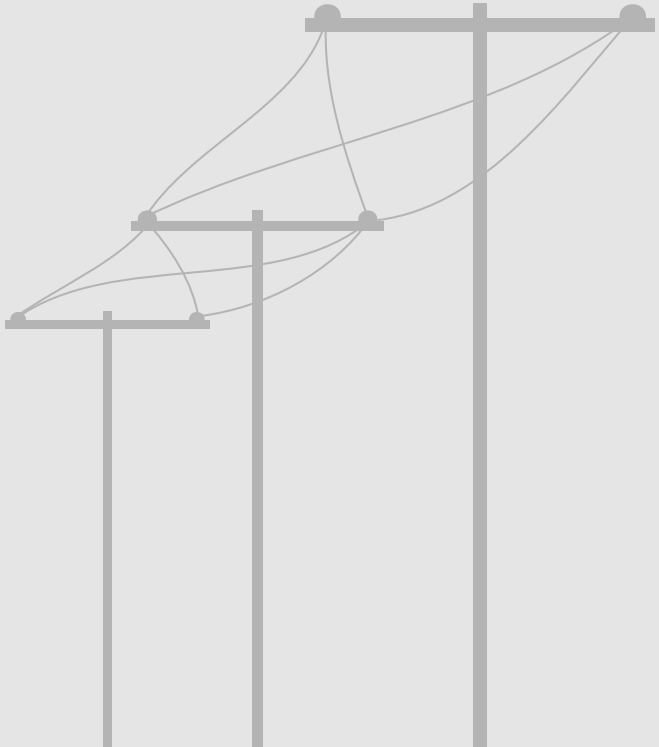
Grid Displays

Shree and Han





Displaying data from the grid

- Backgrounds in grid-related work
- Wanted an easy way to look at trends in grid data

Who Cares?

Data Centers

Green Hydrogen Production

Carbon Dioxide Removal Facilities

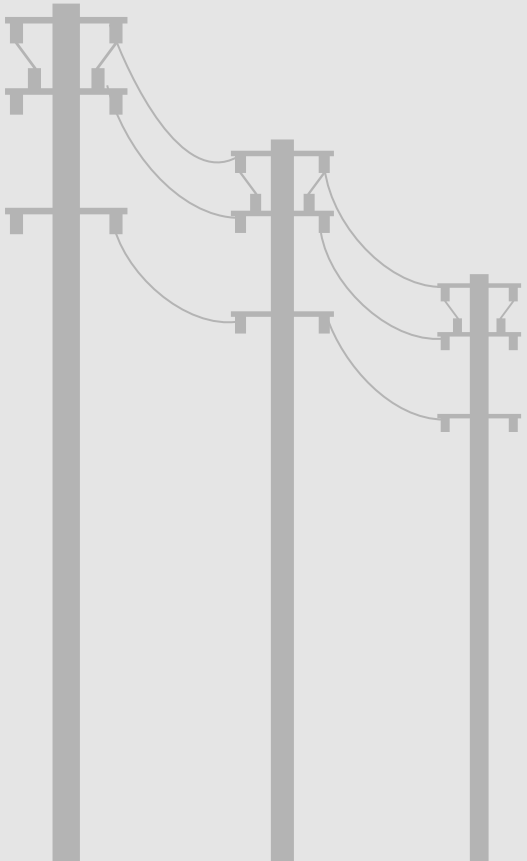
Companies with goals to reduce scope 2 emissions

Regulators

Any other group with large power consumption

Key Terms

Grid	System of power generation, transmission lines, substations, and distribution networks
Load	Total demand for electricity
Emission	Carbon dioxide (or other greenhouse gas) being released into the atmosphere
MW	1 million watts. Enough to power about 750 American homes.
LMP	Price of wholesale electricity at a given point on the grid, $/MWh



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Architecture

Overall

Backend

- Custom API
- Python (Flask)
- CSV Database

Frontend

- React Admin
- Chart JS
- Features

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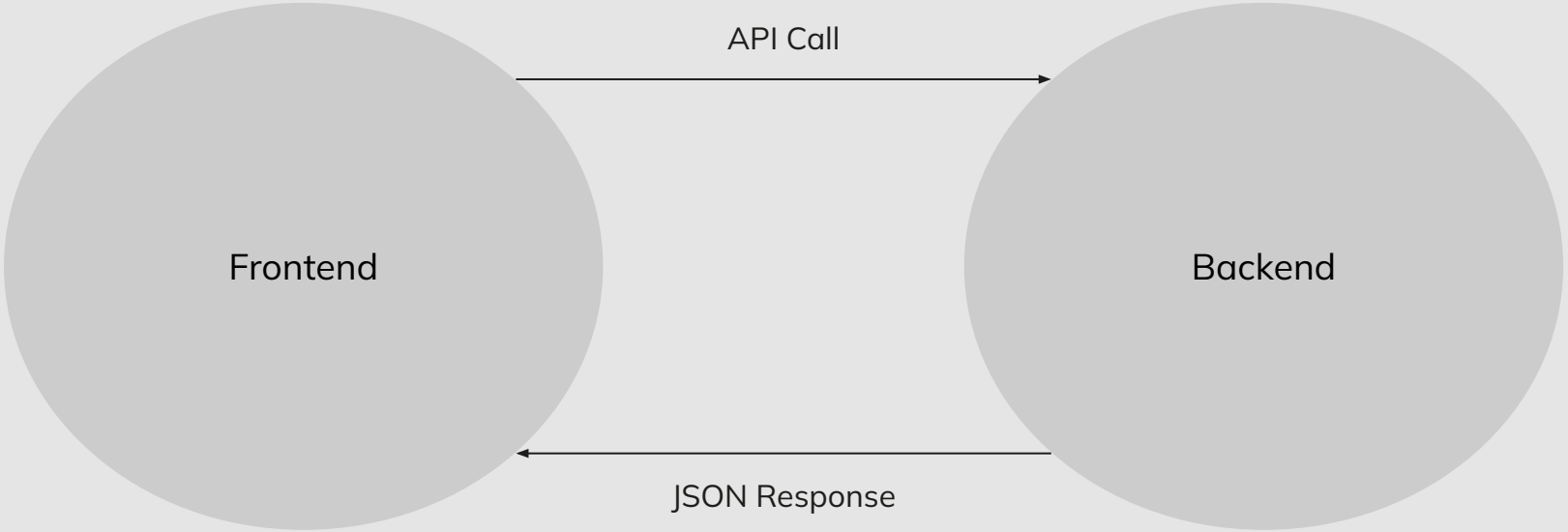
System Diagram



Backend Components

Custom API

- Lightweight
- Quick to build
- Previous experience

Flask

- Python framework
- Previous experience

Database

- Single CSV File
- Quick to set up
- Not scalable

Why React/React-admin?

Custom UI

- Component based
- Lots of plug and play
- Highly customisable framework for the UI

API Integration

- Integrates easily with many APIS
- Abstracts complexities

Ecosystem

- Extensive libraries which are compatible
- Well-documented

Experience

- Used it before
- BIG PLUS

“Chart JS is simultaneously the most useful and useless library.”

—Shree
(after spending 45 minutes trying to change the background color of a chart)

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Why ChartJS?

Flexibility

- Easy integration
- Highly customizable
- Through documentation

Interactivity

- Automatically includes interactive features (such as hover expansion)
- Easily updates based on user input

Features

Time Selection

User selects start and end date-time.

Load

Load in MW over a given time.

Emissions Intensity

Intensity of Emissions over a given time ($kgCO_2e/MWh$)

Energy Generation

Compares MW generated by source (form of generation).

Source Comparison

Looks at total load and composition based on source.

Pricing

Displays wholesale electricity prices ($/MWh) over time

02

Demo (Live!)

03

Lessons Learned

Lessons

Decide data formats and how pieces are going to communicate early.

Build dummy versions of things and test the fit before building out the component entirely.

Understand your tools and their capabilities.

Don’t overbuild if you don’t have to.

Don’t start with everything in App.js/Test as you go.

Just because there’s a component doesn’t mean you need to use it.

Thanks!

Questions?