

Creating the "Energy Production Market Action" Dashboard

In this walkthrough, we will instruct step-by-step in the creation of a dashboard that showcases the results of a market action recommendations engine for an energy plant based on the predicted hourly production, internal demands, and predicted grid prices.

This guide is provided for the second part of the 2021 PyData Global "Bridging Data and Business: Power Plant Output Optimization Based on Electricity Market Price" Workshop , and assumes that users have followed through with the first part of the workshop and have gathered the data from the machine learning model and outcomes from the market action recommendation engine. It is assumed that the following data tables are ingested into the database.

- "marketprediction" table containing the results from the market recommendation engine
- "energyprediction" table containing the energy production predictions from the ML model

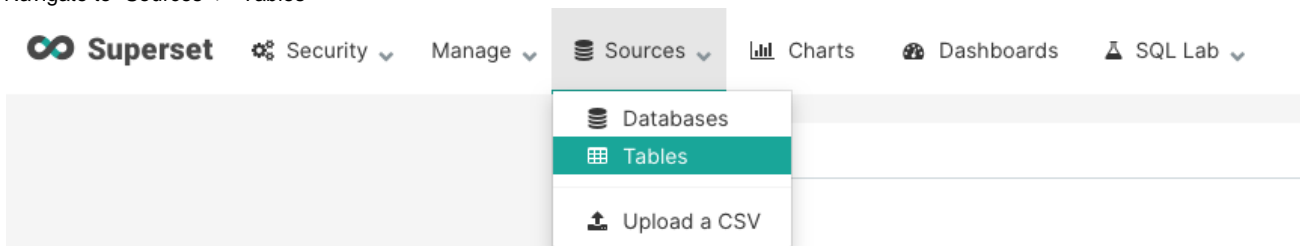
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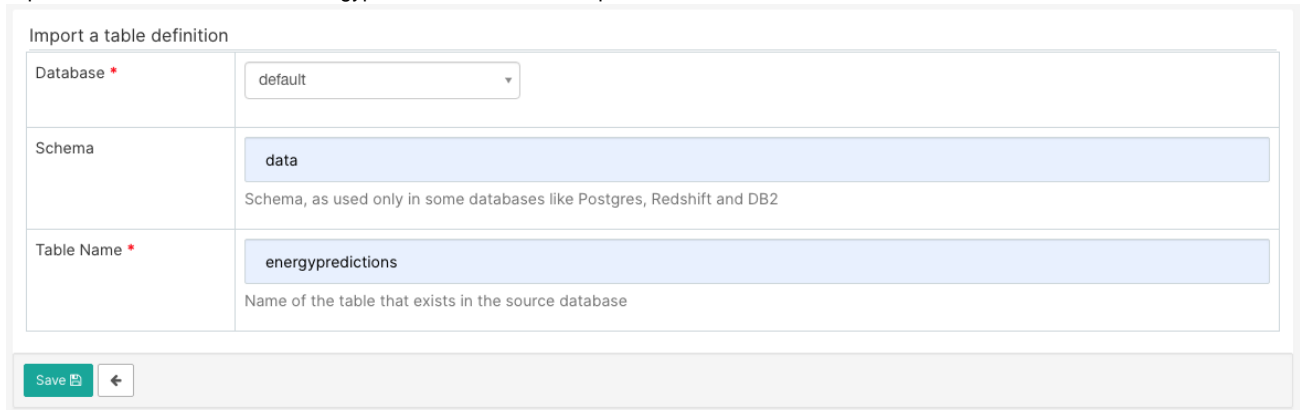
Define Tables

For Superset to access tables within the database, we need to first define these tables.

1. Navigate to "Sources" > "Tables"



2. Add a new record by clicking on 
3. Import the table definitions for "energypredictions" and "market predictions"


The screenshot shows the 'Import a table definition' form in the Superset application. The form has three main input fields: 'Database', 'Schema', and 'Table Name'. The 'Database' field is set to 'default'. The 'Schema' field is set to 'data', with a note below it stating 'Schema, as used only in some databases like Postgres, Redshift and DB2'. The 'Table Name' field is set to 'energypredictions', with a note below it stating 'Name of the table that exists in the source database'. At the bottom of the form, there are two buttons: a green 'Save' button and a gray button with a left-pointing arrow.

Import a table definition

Database *	default
Schema	data <small>Schema, as used only in some databases like Postgres, Redshift and DB2</small>
Table Name *	marketpredictions <small>Name of the table that exists in the source database</small>

Save

Create the Dashboard

- Navigate to the “Dashboard” tab and click on  to create a new dashboard

Superset Security Manage Sources Charts **Dashboards** SQL Lab

- Name the dashboard “Energy Production Market Action” and save.


Add Dashboard

Title	Energy Production Market Action
Slug	Slug <small>To get a readable URL for your dashboard</small>
Owners	Select Value <small>Owners is a list of users who can alter the dashboard.</small>
Position JSON	Position JSON <small>This json object describes the positioning of the widgets in the dashboard. It is dynamically generated when adjusting the widgets size and positions by using drag & drop in the dashboard view</small>
CSS	CSS <small>The CSS for individual dashboards can be altered here, or in the dashboard view where changes are immediately visible</small>
JSON Metadata	JSON Metadata <small>This JSON object is generated dynamically when clicking the save or overwrite button in the dashboard view. It is exposed here for reference and for power users who may want to alter specific parameters.</small>
Published	<input type="checkbox"/> <small>Determines whether or not this dashboard is visible in the list of all dashboards</small>

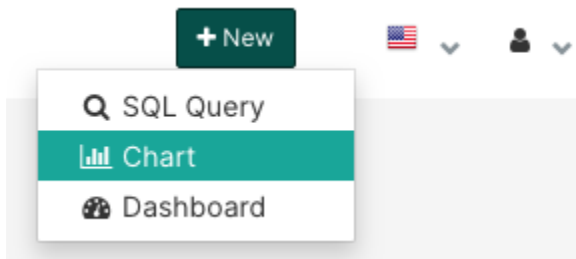
Save

Creating Charts

There are 2 methods to create a new chart

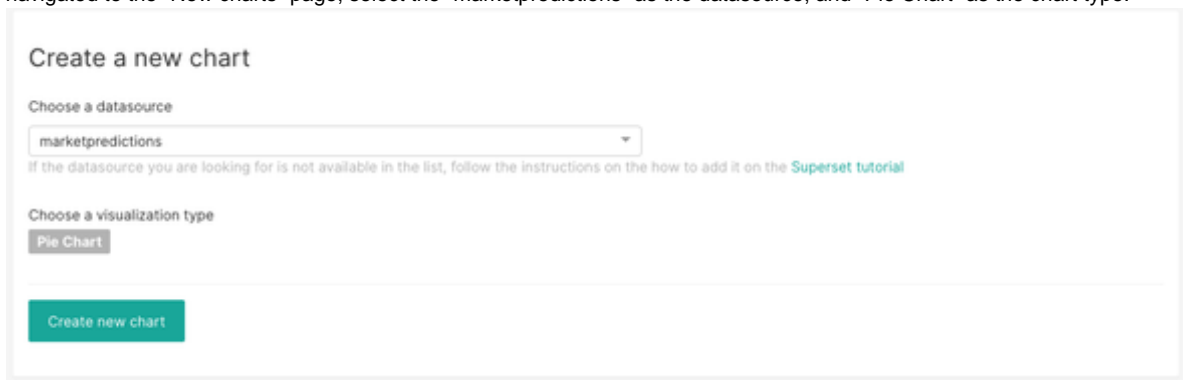
1. Navigate “Charts” tab and click 

2. Navigate to “+New” > “Charts”



Shortage vs. Surplus

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Pie Chart” as the chart type.

A screenshot of the 'Create a new chart' form in the Superset application. The form has a title 'Create a new chart' at the top. Below it, there is a section 'Choose a datasource' with a dropdown menu showing 'marketpredictions'. A note below the dropdown says: 'If the datasource you are looking for is not available in the list, follow the instructions on the how to add it on the [Superset tutorial](#)'. Below this, there is a section 'Choose a visualization type' with a button labeled 'Pie Chart'. At the bottom of the form is a teal button labeled 'Create new chart'.

2. Create the query and customize the chart.

Data

Customize

Datasource & Chart Type

Datasource

marketpredictions

+

Visualization Type

Pie Chart

Time ⓘ

Time Column

Datetime

Time Range

No filter

Query

Metric

COUNT(Shortage/Surplus)

×

▼

Filters

choose a column or metric

▼

Group by ⓘ

×

Shortage/Surplus

×

▼

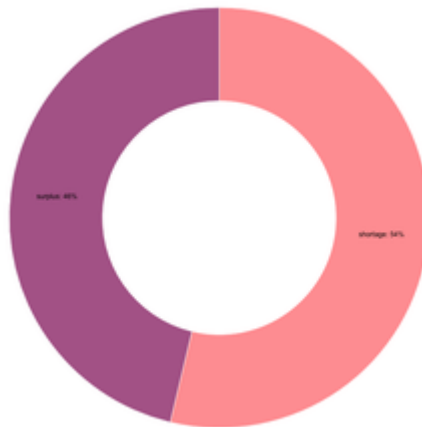
Row limit

25

×

▼

3. If the chart does not automatically appear on the right window, click “Run Query” to generate the chart.



4. Save chart as “Shortage vs. Surplus” and add it to the “Energy Prediction Market Action” dashboard.

Save A Chart

Save as

Shortage vs. Surplus

Do not add to a dashboard

Add chart to existing dashboard

Energy Production Market Action

x

Add to new dashboard

[dashboard name]

Save

Save & go to dashboard

Actions By Day

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Time-series Bar Chart” as the chart type.

Create a new chart

Choose a datasource

marketpredictions

If the datasource you are looking for is not available in the list, follow the instructions on the how to add it on the [Superset tutorial](#)

Choose a visualization type

Time-series Bar Chart

Create new chart

2. Create the following query and customize the chart.

Data
Customize

Datasource & Chart Type

Datasource
marketpredictions

Visualization Type
Time-series Bar Chart

Time

Time Column
Datetime

Time Grain
0 option(s)

Time Range
No filter

Query

Metrics
COUNT(RecommendAction)

Filters
choose a column or metric

Group by
RecommendAction

Series limit
7 option(s)

Sort By
choose a column or aggregate functi...

☒ Sort Descending
☐ Contribution

Row limit
50000

Advanced Analytics

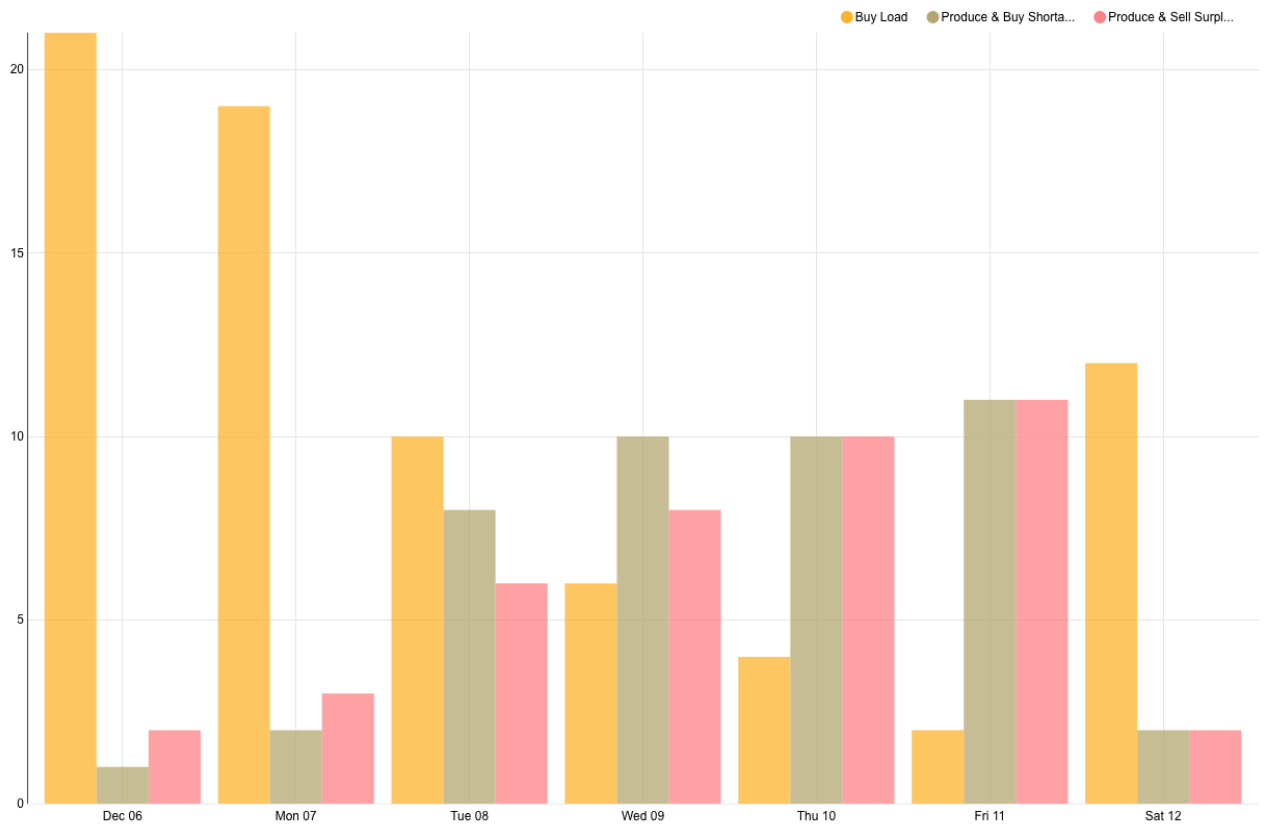
Rolling Window
Rolling Function: None
Periods:
Min Periods:

Time Comparison
Time Shift: 6 option(s)
Calculation type: Actual Values

Python Functions
pandas.resample
Rule: 1D
Method: sum

Annotations and Layers
+ Add Annotation Layer

3. If the chart does not automatically appear on the right window, click "Run Query" to generate the chart.



4. Save the chart as "Actions by day" and add it to the "Energy Prediction Market Action" dashboard.

Save A Chart

☒ Save as

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

Energy Production Market Action

☐ Add to new dashboard

Save

Save & go to dashboard

Estimated Hourly Energy Production

1. Once navigated to the "New charts" page, select the "marketpredictions" as the datasource, and "Big Number with Trendline" as the chart type.

Create a new chart

Choose a datasource

marketpredictions

If the datasource you are looking for is not available in the list, follow the instructions on the how to add it on the [Superset tutorial](#)

Choose a visualization type

Big Number with Trendline

Create new chart

2. Create the following query and customize the chart.

Data
Customize

Datasource & Chart Type

Datasource

marketpredictions +

Visualization Type

Big Number with Trendline

Time

Time Column

Datetime

Time Grain

0 option(s)

Time Range

No filter

Query

Metric

AVG(OutputEnergyPredictedMW)

Filters

choose a column or metric

Options

Comparison Period Lag

1

Comparison suffix

MW

Number format

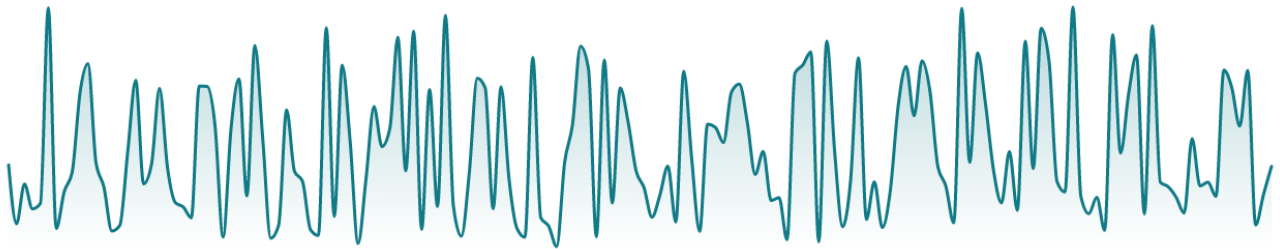
Adaptative formating

☒ Show Trend Line ☐ Start y-axis at 0

3. If the chart does not automatically appear on the right window, click "Run Query" to generate the chart.

448.23

+1.5% MW



4. Save the chart as “Estimated Hourly Energy Production” and add it to the “Energy Prediction Market Action” dashboard.

Save A Chart

☒ Save as

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

☐ Add to new dashboard

Save

Save & go to dashboard

Full Production Vs Recommended Production Cost

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Line Chart” as the chart type.

Create a new chart

Choose a datasource

marketpredictions

If the datasource you are looking for is not available in the list, follow the instructions on the how to add it on the [Superset tutorial](#)

Choose a visualization type

Line Chart

Create new chart

2. Create the following query and customize the chart.

Data

Customize

Datasource & Chart Type

Datasource

marketpredictions

Visualization Type

Line Chart

Time

Time Column

Datetime

Time Grain

0 option(s)

Time Range

No filter

Query

Metrics

×

AVG(EstimateNetCost)

▶

×

AVG(EstimatedFullProductionCostDollar)

▶

×

▼

Filters

choose a column or metric

Group by

13 option(s)

Series limit

7 option(s)

Sort By

choose a column or aggregate functi...

☒ Sort Descending

☐ Contribution

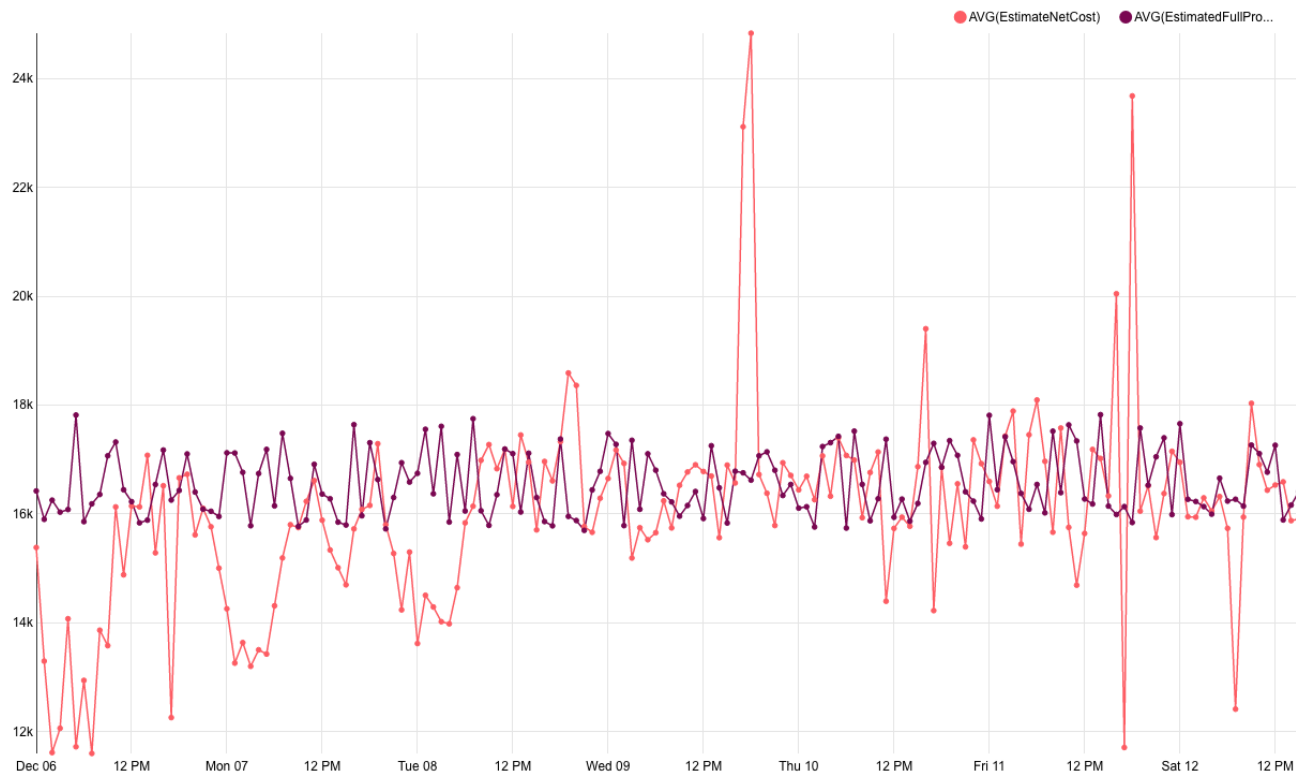
Row limit

50000

×

▼

- If the chart does not automatically appear on the right window, click "Run Query" to generate the chart.



4. Save the chart as “Full Production Vs Recommended Production Cost” and add it to the “Energy Prediction Market Action” dashboard.

Save A Chart

☒ Save as

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

☐ Add to new dashboard

Predicted Surplus/Shortage

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Line Chart” as the chart type.

Create a new chart

Choose a datasource

If the datasource you are looking for is not available in the list, follow the instructions on the how to add it on the [Superset tutorial](#)

Choose a visualization type

2. Create the following query and customize the chart.

Data

Customize

Datasource & Chart Type

Datasource

marketpredictions

+

Visualization Type

Line Chart

Time

Time Column

Datetime

Time Grain

0 option(s)

Time Range

No filter

Query

Metrics

x

AVG(PredictedExcessMW)

x

Filters

choose a column or metric

Group by

13 option(s)

Series limit

7 option(s)

Sort By

choose a column or aggregate functi..

☒ Sort Descending

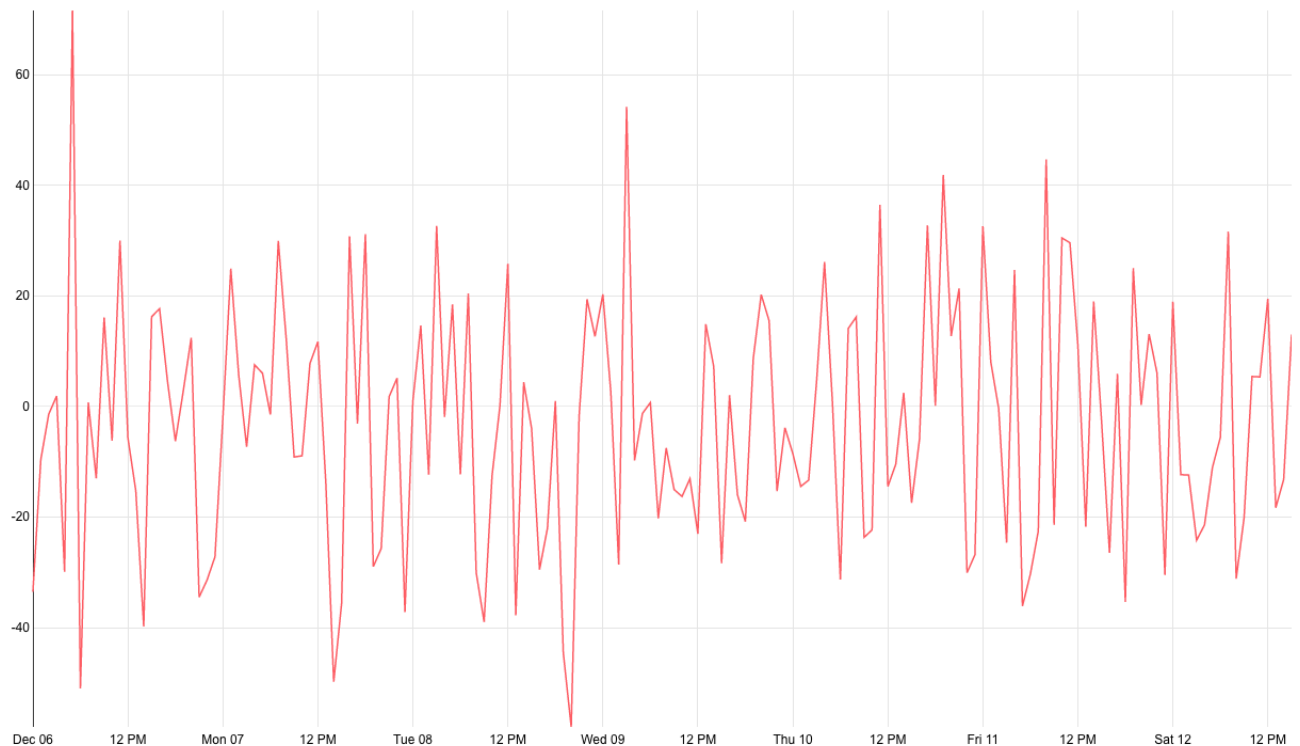
☐ Contribution

Row limit

50000

x

3. If the chart does not automatically appear on the right window, click "Run Query" to generate the chart.



4. Save the chart as “Predicted Surplus/Shortage” and add it to the “Energy Prediction Market Action” dashboard.

Save A Chart

☒ Save as

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

Energy Production Market Action

☐ Add to new dashboard

Save

Save & go to dashboard

1234 Create “Big Numbers”

“Big Numbers” Are created in the same way as a chart

Total Estimated Optimized Cost	Estimated Full Production Cost	Estimated Buy From Grid Cost	Estimated Total Energy Produced
2.56M	2.65M	4.13M	72.4k MW

Total Estimated Optimized Cost

- Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Big Number” as the chart type.
- In the option “Query” > “Metric”, select “SUM(EstimatedNetCost)”.
- Save the chart as “Total Estimated Optimized Cost” and add it to the “Energy Prediction Market Action” dashboard.

Estimated Full Production Cost

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Big Number” as the chart type.
2. In the option “Query” > “Metric”, select “SUM(EstimatedFullProductionCostDollar)” .
3. Save the chart as “Estimated Full Production Cost” and add it to the “Energy Prediction Market Action” dashboard.

Estimated Buy From Grid Cost

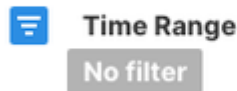
1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Big Number” as the chart type.
2. In the option “Query” > “Metric”, select “SUM(BuyDemandFromGridDollar)” .
3. Save the chart as “Estimated Buy From Grid Cost” and add it to the “Energy Prediction Market Action” dashboard.

Estimated Total Energy Produced

1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Big Number” as the chart type.
2. In the option “Query” > “Metric”, select “SUM(OutputEnergyPredictedMW)” .
3. In the option “Options” > “Subheader”, enter “MW”.
4. Save the chart as “Estimated Total Energy Produced” and add it to the “Energy Prediction Market Action” dashboard.

Create Filter Box

Datetime Filter



1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Filter Box” as the chart type.
2. Use default settings for datetime filter
3. Save the filter as “Datetime Filter” and add it to the “Energy Prediction Market Action” dashboard.

Edit Dashboard

1. Navigate to “Dashboard” tab and select “Energy Production Market Action”.
2. Click on “Edit Dashboard” on the top right corner of the window.
3. Drag and drop the charts into a layout of your choice.

Energy Production Market Action Draft ☆

Components Colors Filters Save changes ▼

