

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

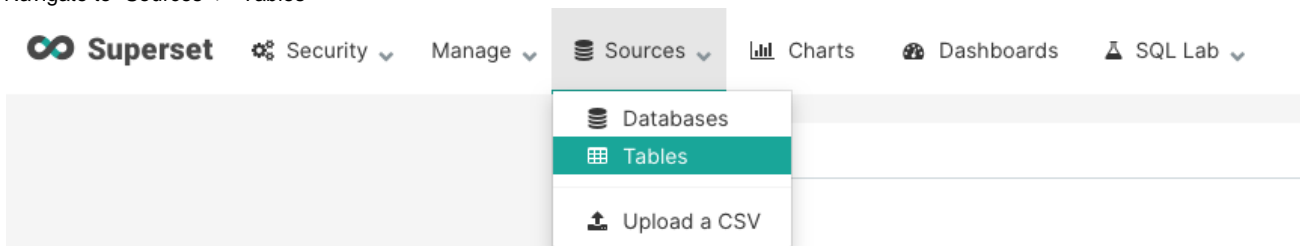
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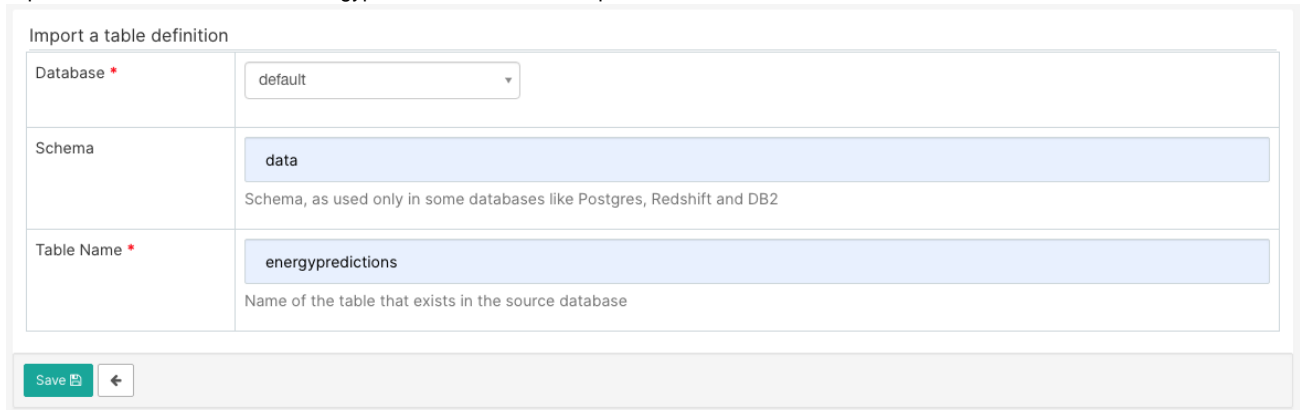
Define Tables

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 image 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 is a 'Save' button and a back arrow.

Import a table definition

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

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 To get a readable URL for your dashboard
Owners	Select Value Owners is a list of users who can alter the dashboard.
Position JSON	Position JSON 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
CSS	CSS The CSS for individual dashboards can be altered here, or in the dashboard view where changes are immediately visible
JSON Metadata	JSON Metadata 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.
Published	<input type="checkbox"/> Determines whether or not this dashboard is visible in the list of all dashboards

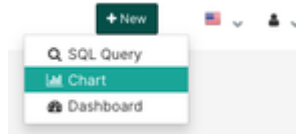
Save

Creating Charts

There are 2 methods to create a new chart

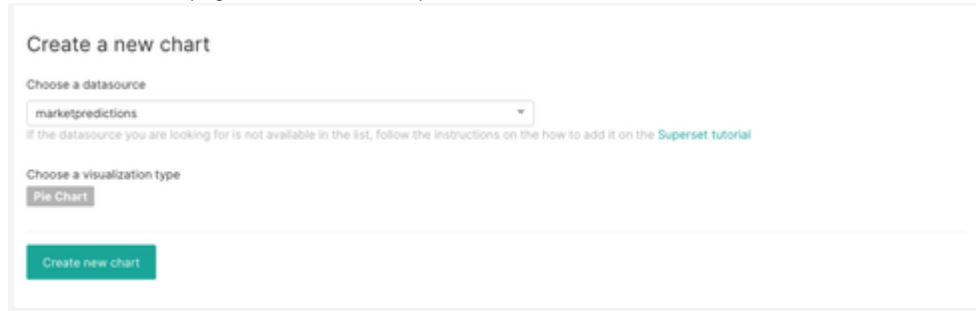
1. Navigate “Charts” tab and click 

2. Navigate to “+New” > “Charts”

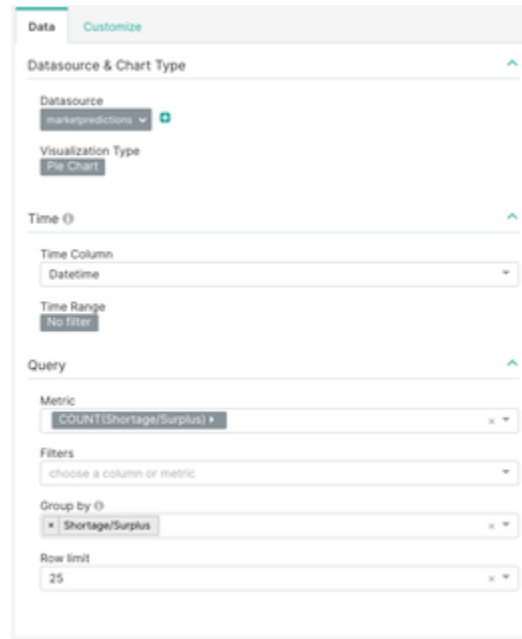


Shortage vs. Surplus

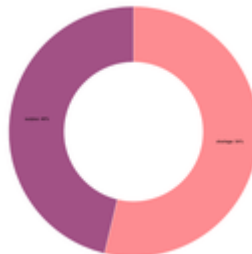
1. Once navigated to the “New charts” page, select the “marketpredictions” as the datasource, and “Pie Chart” as the chart type.

A screenshot of the 'Create a new chart' form in the Superset interface. The form has two main sections: 'Choose a datasource' and 'Choose a visualization type'. In the 'Choose a datasource' section, 'marketpredictions' is selected in the dropdown menu. Below it, there is a link to the 'Superset tutorial'. In the 'Choose a visualization type' section, 'Pie Chart' is selected. At the bottom of the form, there is a green button labeled 'Create new chart'.

2. Create the query and customize the chart.

A screenshot of the 'Customize' tab in the Superset interface. The tab is divided into several sections: 'Datasource & Chart Type', 'Time', 'Query', and 'Filters'. In the 'Datasource & Chart Type' section, 'marketpredictions' is selected as the Datasource and 'Pie Chart' as the Visualization Type. In the 'Time' section, 'Datetime' is selected as the Time Column and 'No filter' as the Time Range. In the 'Query' section, 'COUNT(Shortage/Surplus)' is selected as the Metric. In the 'Filters' section, 'Shortage/Surplus' is selected as the Group by. The Row limit is set to 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

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

Energy Production Market Action

☐ Add to new dashboard

Save

Save & go to dashboard

Actions By Day

- 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

Choose a visualization type

Time-series Bar Chart

Create new chart

- 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

☒ Sort Descending
 ☐ Contribution

Row limit

50000

Advanced Analytics ⓘ

Rolling Window

Rolling Function: ×

Periods:

Min Periods:

Time Comparison

Time Shift: ×

Calculation type: ×

Python Functions

pandas.resample

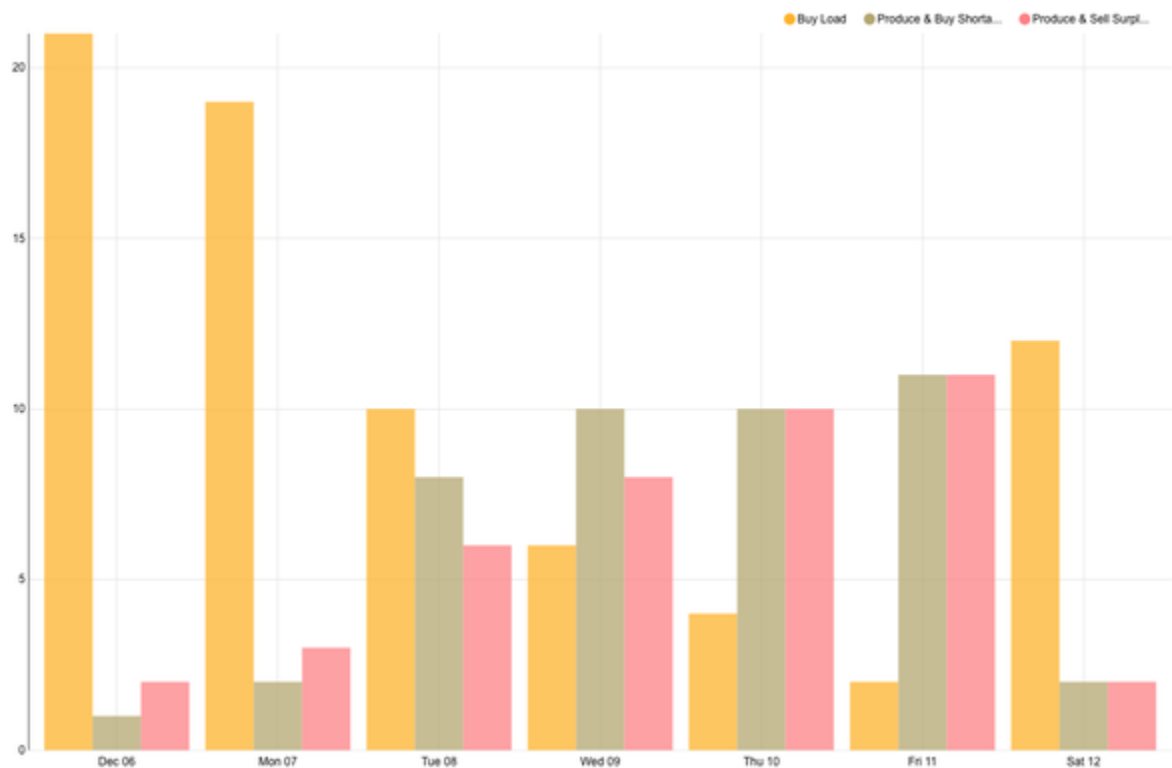
Rule: ×

Method: ×

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

×

☐ Add to new dashboard:

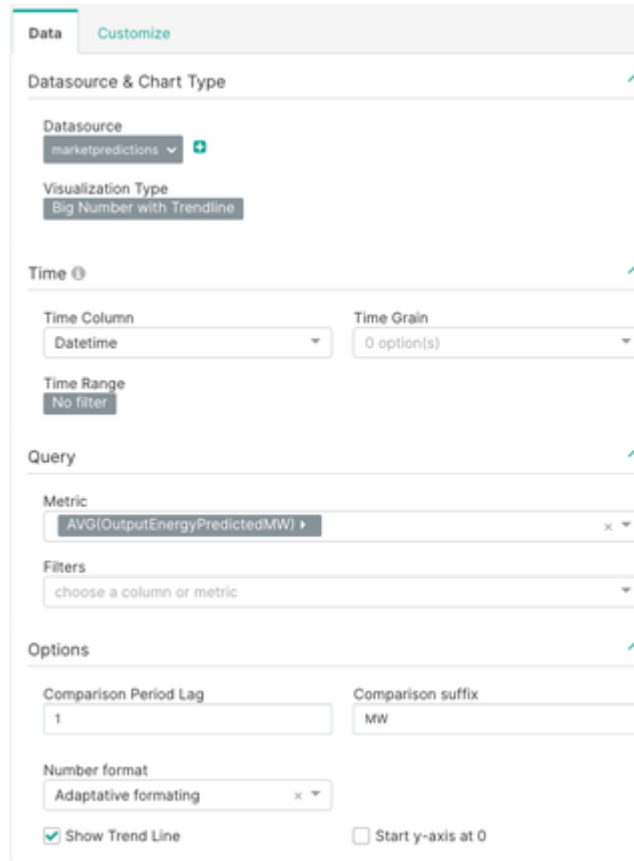
Estimated Hourly Energy Production

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



The screenshot shows a 'Create a new chart' dialog box. It has two main sections: 'Choose a datasource' and 'Choose a visualization type'. In the 'Choose a datasource' section, a dropdown menu is set to 'marketpredictions'. Below it, a small text link 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](#)'. In the 'Choose a visualization type' section, a button labeled 'Big Number with Trendline' is selected. At the bottom, there is a green button labeled 'Create new chart'.

2. Create the following query and customize the chart.



The screenshot shows the 'Customize' tab of the Superset chart configuration interface. It is divided into several sections: 'Datasource & Chart Type', 'Time', 'Query', and 'Options'. In the 'Datasource & Chart Type' section, the 'Datasource' dropdown is set to 'marketpredictions' and the 'Visualization Type' is set to 'Big Number with Trendline'. In the 'Time' section, 'Time Column' is 'Datetime', 'Time Grain' is '0 option(s)', and 'Time Range' is 'No filter'. In the 'Query' section, the 'Metric' is 'AVG(OutputEnergyPredictedMW)' and the 'Filters' dropdown is set to 'choose a column or metric'. In the 'Options' section, 'Comparison Period Lag' is '1', 'Comparison suffix' is 'MW', 'Number format' is 'Adaptative formatting', 'Show Trend Line' is checked, and 'Start y-axis at 0' is unchecked.

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

Estimated Hourly Energy

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

☐ Add to new dashboard

Energy Production Market Action

x

[dashboard name]

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.

DataCustomize

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

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

The chart displays two data series over a period from December 6th to December 12th. The Y-axis represents values in thousands, ranging from 12k to 24k. The X-axis shows time in 12-hour increments. The red line, representing AVG(EstimateNetCost), shows significant volatility with several sharp peaks, notably around 23k on Wednesday and 24k on Saturday. The purple line, representing AVG(EstimatedFullProductionCostDollar), shows a more stable trend, generally fluctuating between 14k and 18k.

Date/Time	AVG(EstimateNetCost) (Red)	AVG(EstimatedFullProductionCostDollar) (Purple)
Dec 06 12 PM	~14k	~16k
Mon 07 12 PM	~14k	~16k
Tue 08 12 PM	~14k	~16k
Wed 09 12 PM	~16k	~16k
Thu 10 12 PM	~16k	~16k
Fri 11 12 PM	~16k	~16k
Sat 12 12 PM	~16k	~16k

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
 Full Production Vs Recom

☐ Do not add to a dashboard

☒ Add chart to existing dashboard
 Energy Production Market Action

☐ Add to new dashboard
 [dashboard name]

Save

Save & go to dashboard

Predicted Surplus/Shortage

- 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

Choose a visualization type

Line Chart

Create new chart

- 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(PredictedExcessMW)

Filters

choose a column or metric

Group by

13 option(s)

Series limit

7 option(s)

Sort By

choose a column or aggregate functi

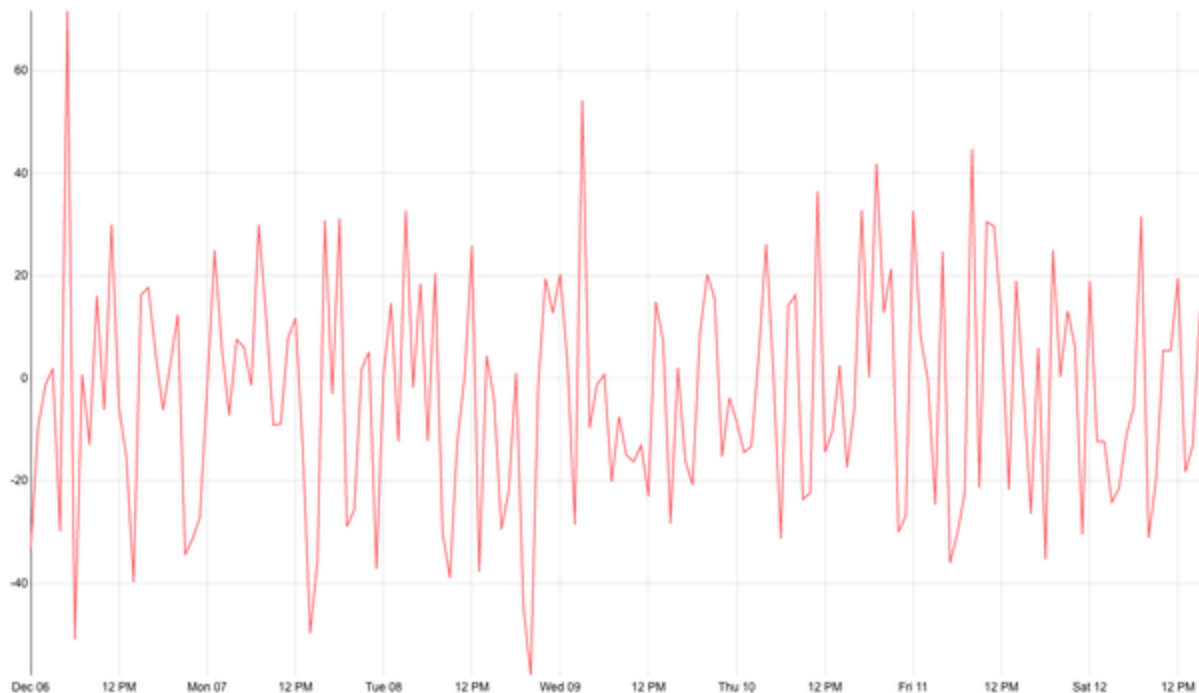
Sort Descending

☒ Sort Descending
 ☐ Contribution

Row limit

50000

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



- Save the chart as "Predicted Surplus/Shortage" and add it to the "Energy Prediction Market Action" dashboard.

Save A Chart

☒ Save as Predicted Surplus/Shortage

☐ Do not add to a dashboard

☒ Add chart to existing dashboard

Energy Production Market Action

☐ Add to new dashboard (dashboard name)

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

- 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(EstimatedFullProductionCostDollar)".
- 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.

