Commercial Building Energy Consumption modeling

Team 4

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Energy Consumption Visualization:

The first part of integrating Tableau with R is to run the below 4 commands in R:

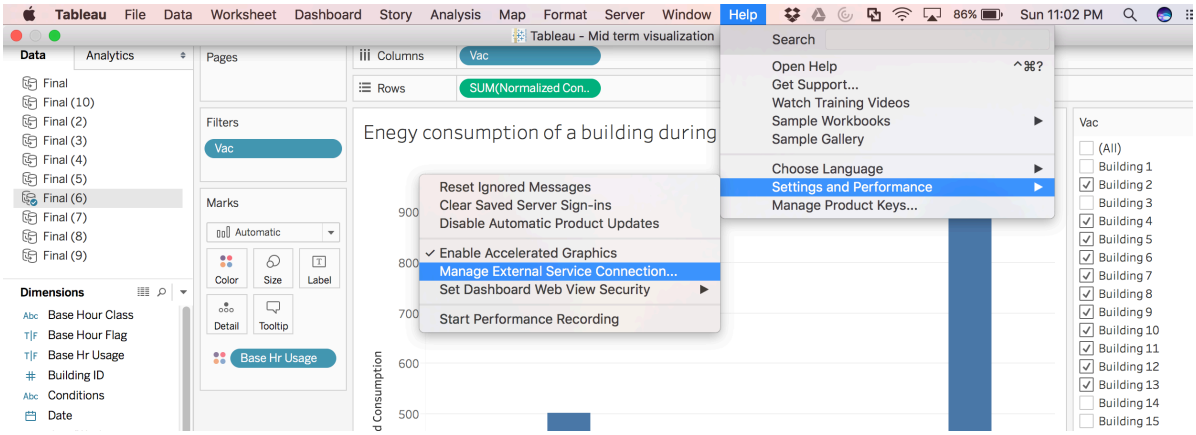
#Install Rserve package on R

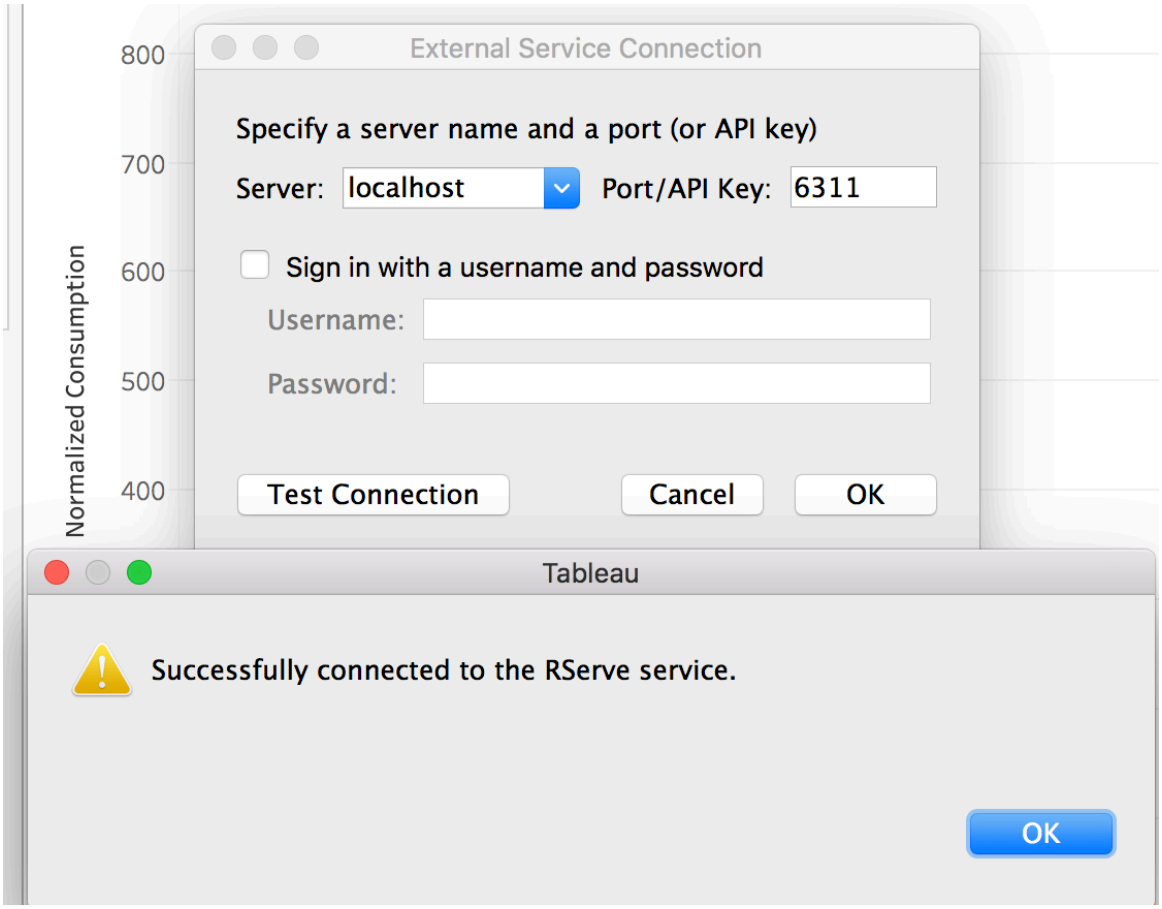
- Install.packages("Rserve")
- Rserve()

#Feature selection for KMeans Clustering

- data.for.cluster<-
  seenow2[,c("BuildingID","meternumb","Consumption","area_floor._m.sqr","normalizedConsumption","Base_Hour_Flag","Consumption_base","Base_Hour_Class")]

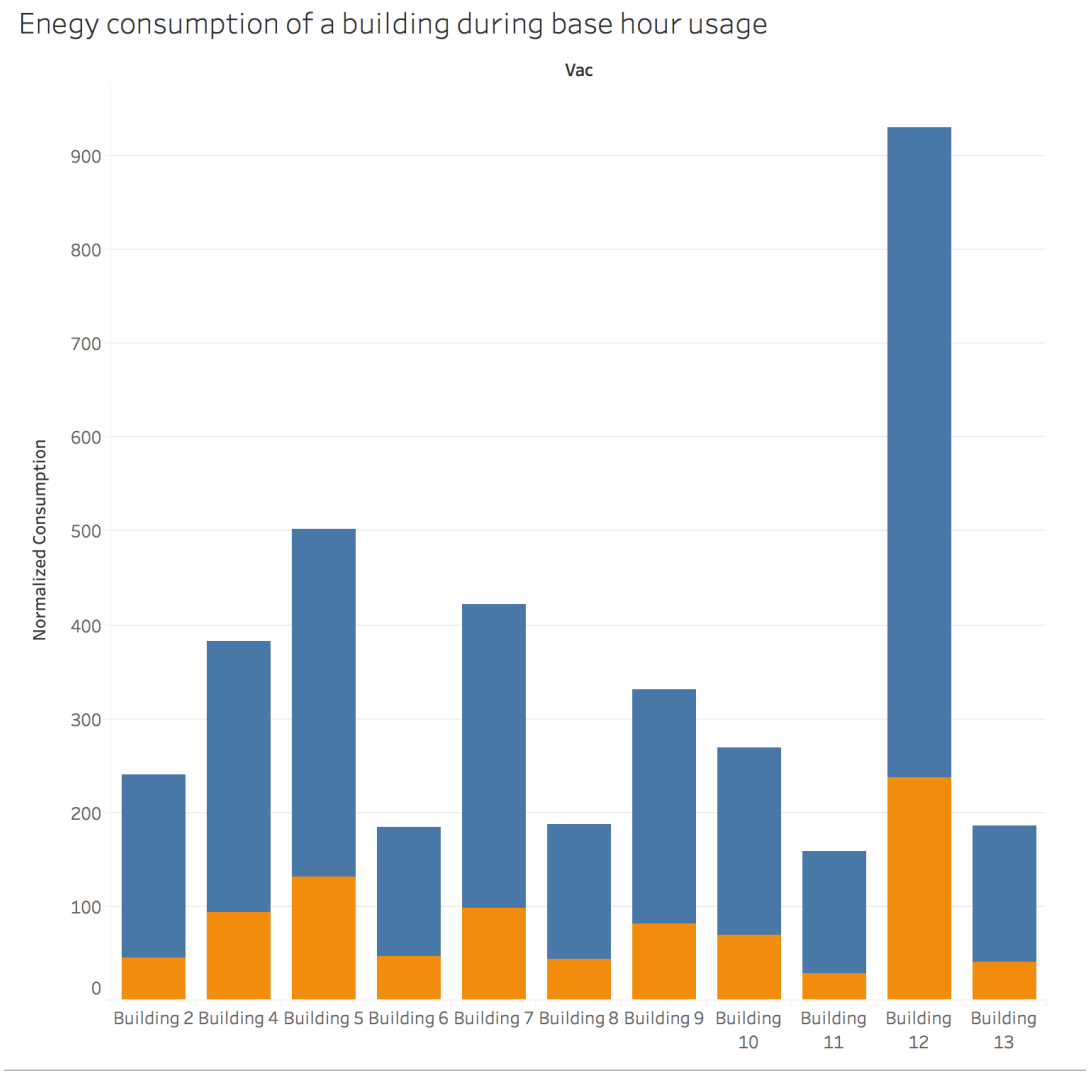
This connects R with Tableau
Now we have to go to Tableau and make the following changes in the settings:



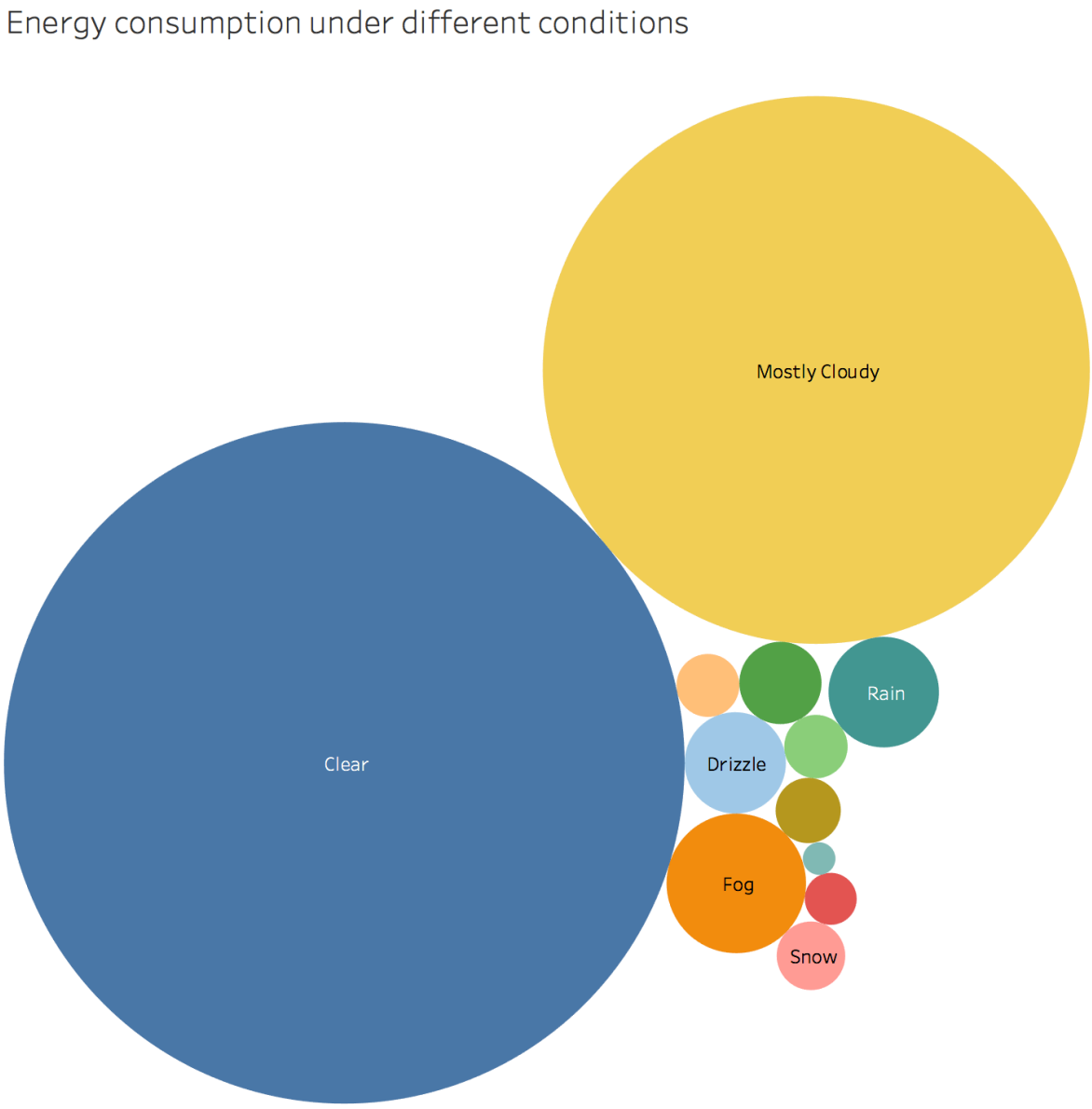


The visualization dashboards based on Exploratory data analysis are :

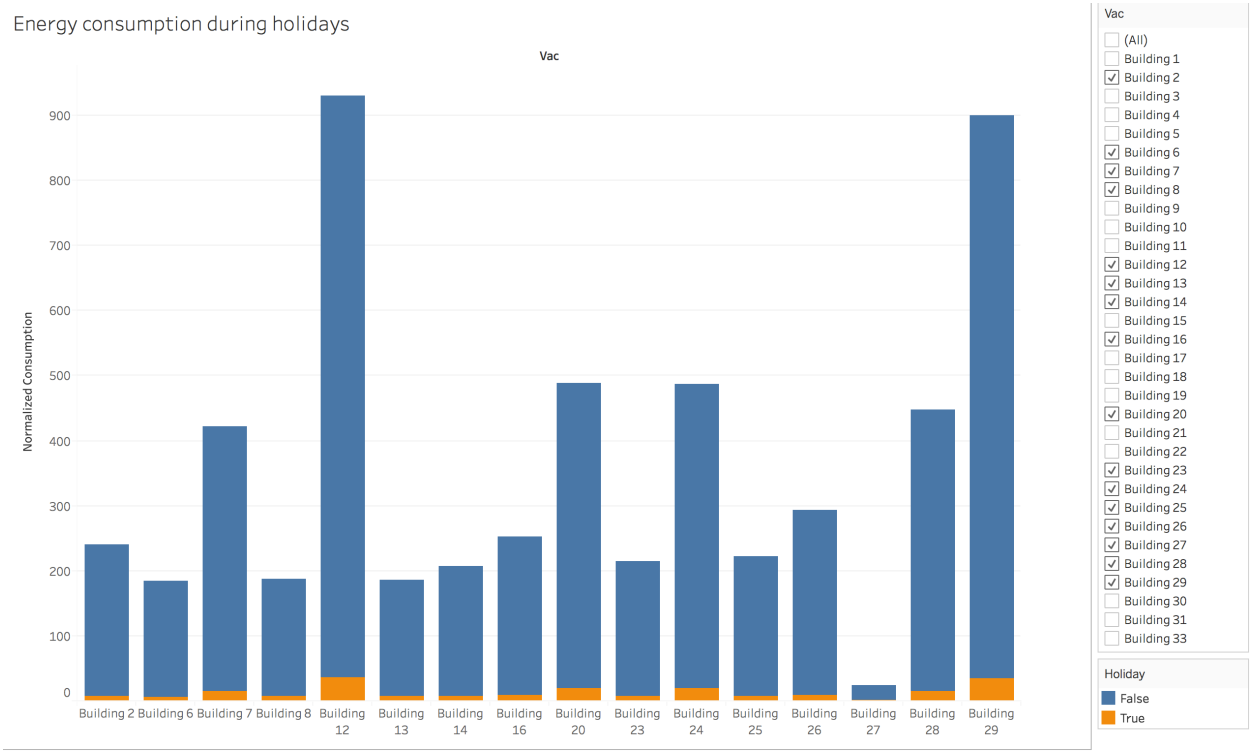
- The below sheet shows normalized energy consumption of a building. The blue colored part shows normal hours and the orange colored are base hours.



- This sheet represents most energy consumption based on the weather conditions.



- The below sheet shows normalized energy consumption of a building. The blue colored part shows non holiday days and the orange colored are holiday days.



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Monthly consumption of energy

	Monthof Year							
Vac	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Building 1	183.0	170.8	167.5	146.4	158.2	157.7	144.3	164.1
Building 2	22.3	20.4	21.9	21.6	21.7	21.8	21.6	22.5
Building 3	4.4	3.8	5.0	4.2	3.2	2.7	2.4	2.8
Building 4	73.1	58.4	72.9	44.2	14.8	5.6	4.5	5.9
Building 5	80.0	66.5	73.1	51.1	28.8	21.1	21.1	23.1
Building 6	19.6	14.7	19.1	19.3	15.6	12.2	12.4	12.6
Building 7	62.8	54.6	64.5	46.1	25.5	17.8	14.1	19.5
Building 8	28.0	22.3	27.0	18.3	12.0	9.5	10.1	10.0
Building 9	40.8	34.0	42.5	33.0	19.3	12.2	15.2	23.9
Building 10	45.1	38.1	44.1	28.0	14.2	9.1	8.9	9.7
Building 11	15.7	15.1	16.4	15.6	14.4	12.3	12.3	12.5
Building 12	147.0	116.9	140.6	99.1	55.5	38.1	36.8	41.8
Building 13	47.4	24.4	34.8	20.9	8.0	2.8	2.1	2.7
Building 14	35.8	26.5	30.9	21.0	12.6	9.0	6.4	10.4
Building 15	28.5	22.0	28.7	19.1	11.1	9.1	9.0	10.6
Building 16	39.0	32.2	36.6	26.0	18.0	13.0	11.2	14.4
Building 17	31.1	24.6	29.0	20.8	14.8	11.2	9.5	11.5
Building 18	34.6	28.0	31.1	22.6	14.0	10.5	11.1	12.3
Building 19	2.5	2.2	2.3	2.3	2.2	1.9	1.9	2.2
Building 20	65.3	54.1	63.5	47.4	33.8	31.2	31.1	32.8
Building 21	33.2	29.4	30.4	21.2	14.2	14.1	12.7	14.0
Building 22	14.3	12.0	15.4	16.2	17.3	15.2	14.0	14.8
Building 23	34.3	25.6	31.9	22.5	12.0	9.0	8.8	10.1
Building 24	74.9	59.6	73.6	50.4	28.5	22.5	20.8	22.5
Building 25	28.7	23.3	27.4	22.5	18.2	16.4	14.1	15.0
Building 26	39.0	31.8	36.7	27.2	18.5	16.1	16.3	17.2
Building 27	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1
Building 28	73.4	60.9	69.3	49.8	25.0	16.1	14.7	16.3
Building 29	158.1	135.8	163.4	107.2	49.4	19.6	20.9	23.2
Building 30	26.6	23.7	24.0	24.4	23.3	21.8	20.5	23.0
Building 31	10.1	9.5	9.6	9.4	10.8	10.8	10.0	10.6
Building 33	12.7	10.9	14.1	7.4	1.9	0.6	0.5	0.8

Dashboards based on these charts:

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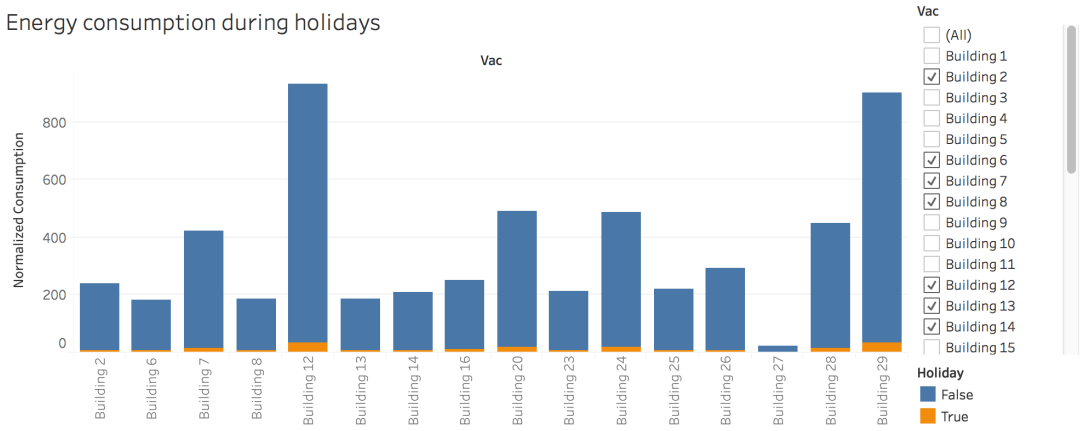

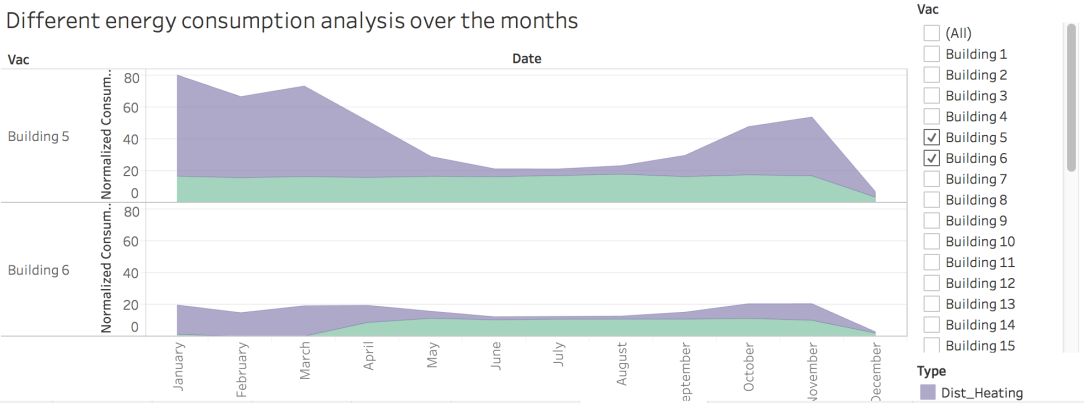

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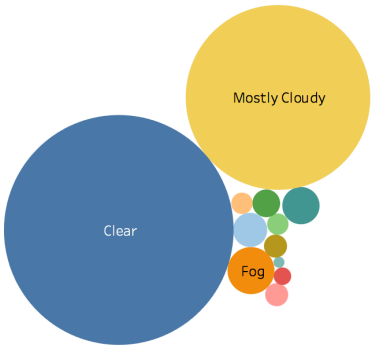
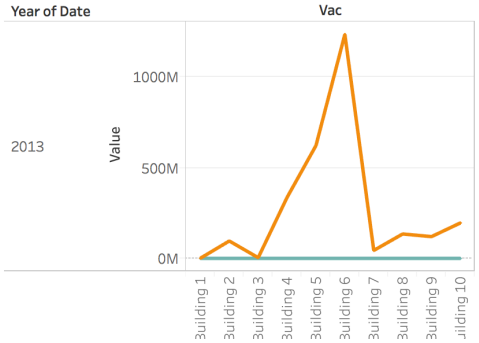
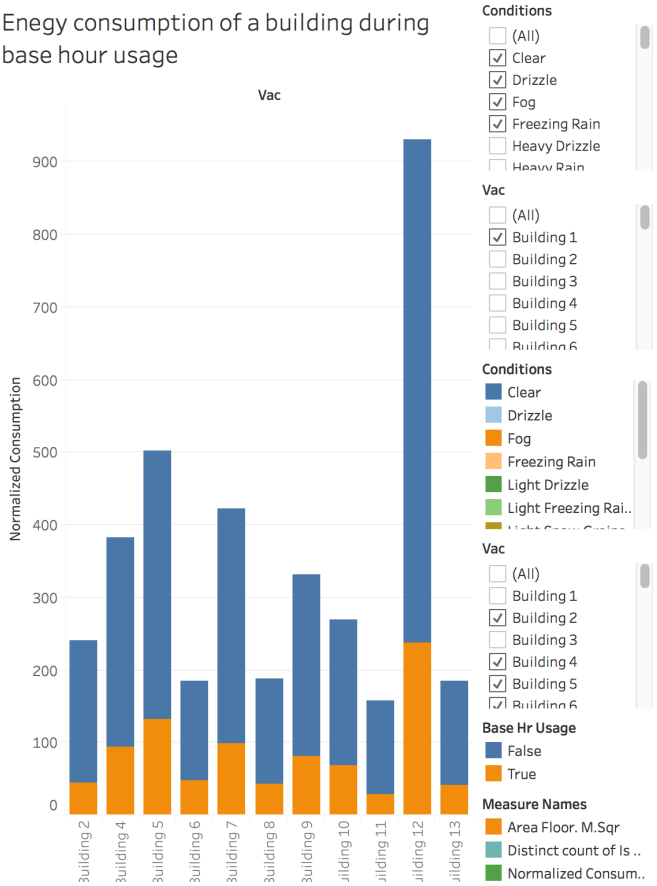
Energy consumption under different conditions



Energy consumption based on different parameters



Enegy consumption of a building during base hour usage



Linear Regression in Tableau:

- The below images show our linear regression model. The dotted values are the predicted values
- Different color represents different source of Energy.

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K Means Clustering in Tableau:

- Clustering of different buildings based on energy consumption

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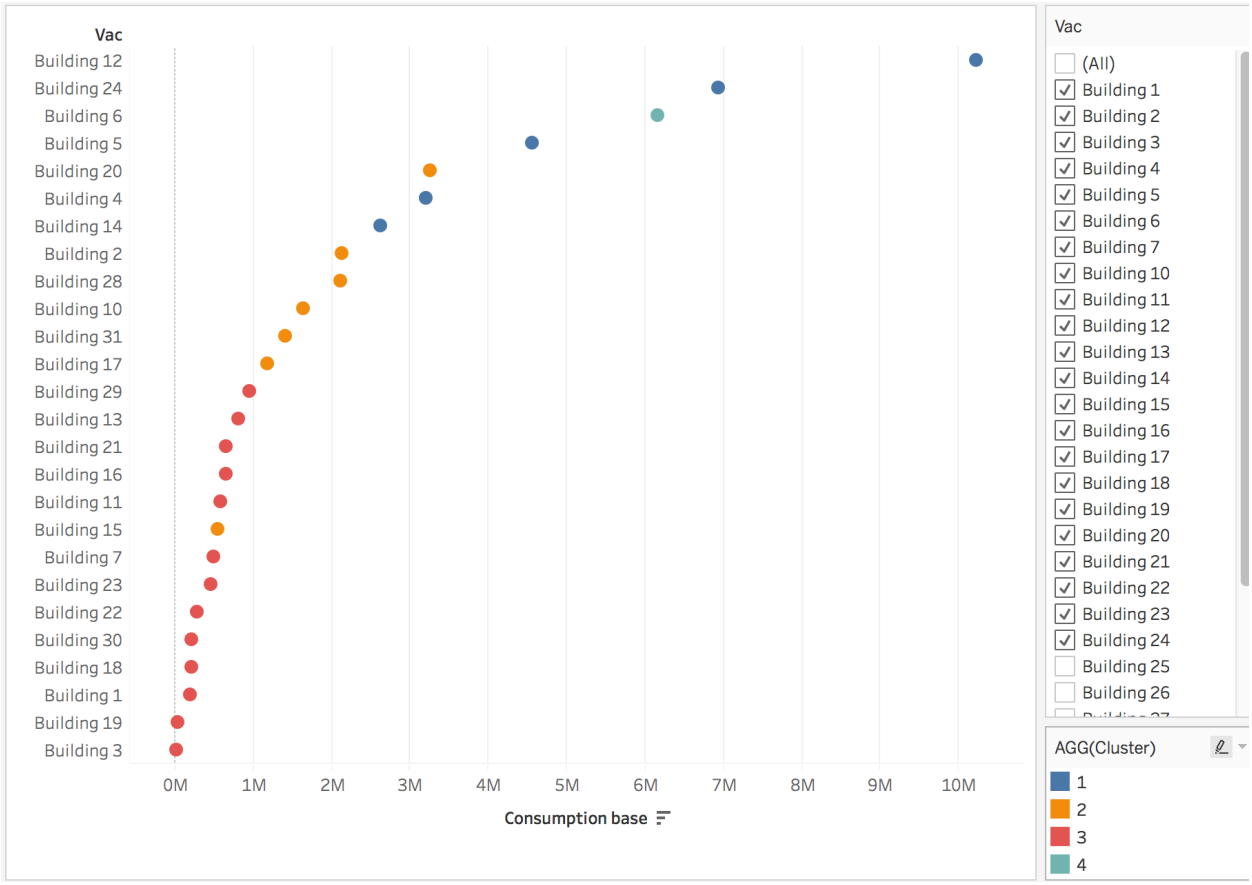
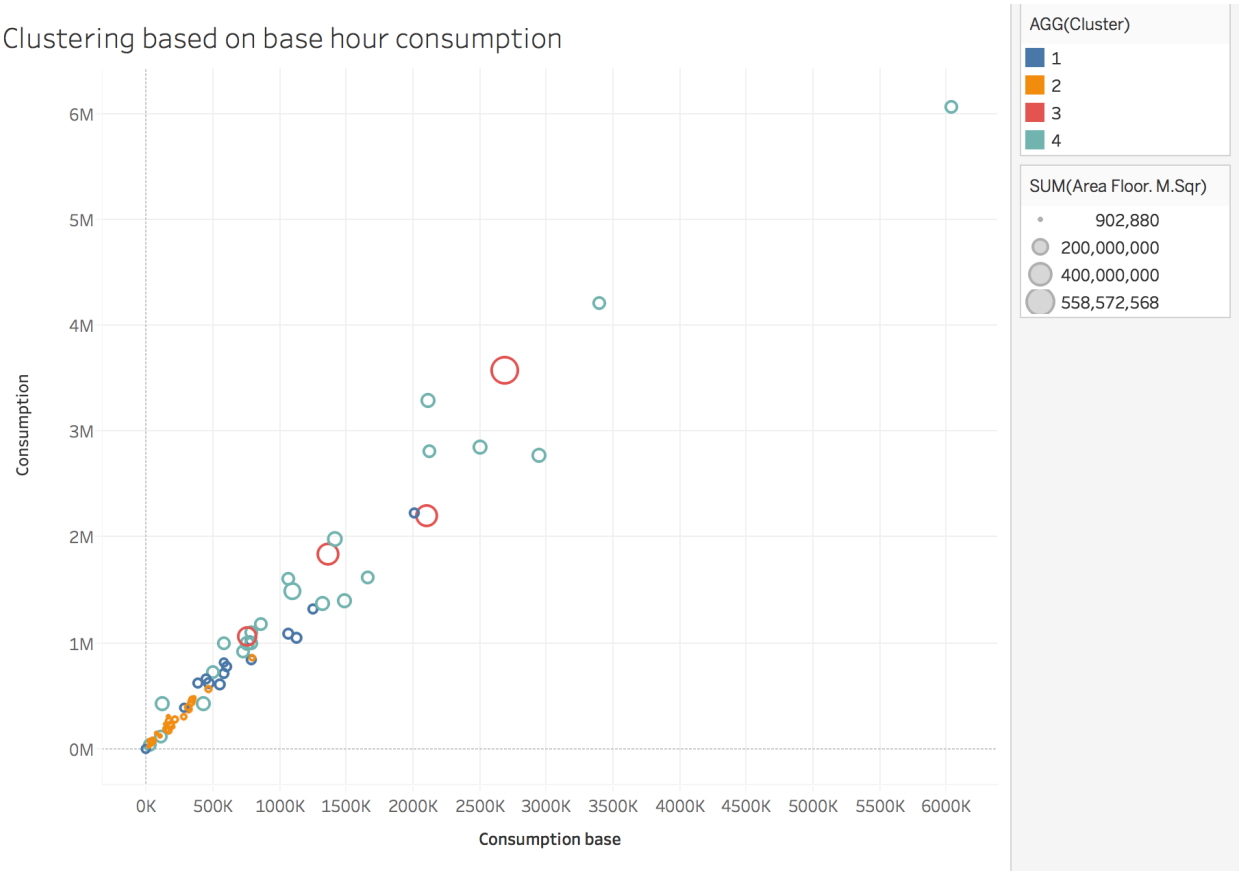
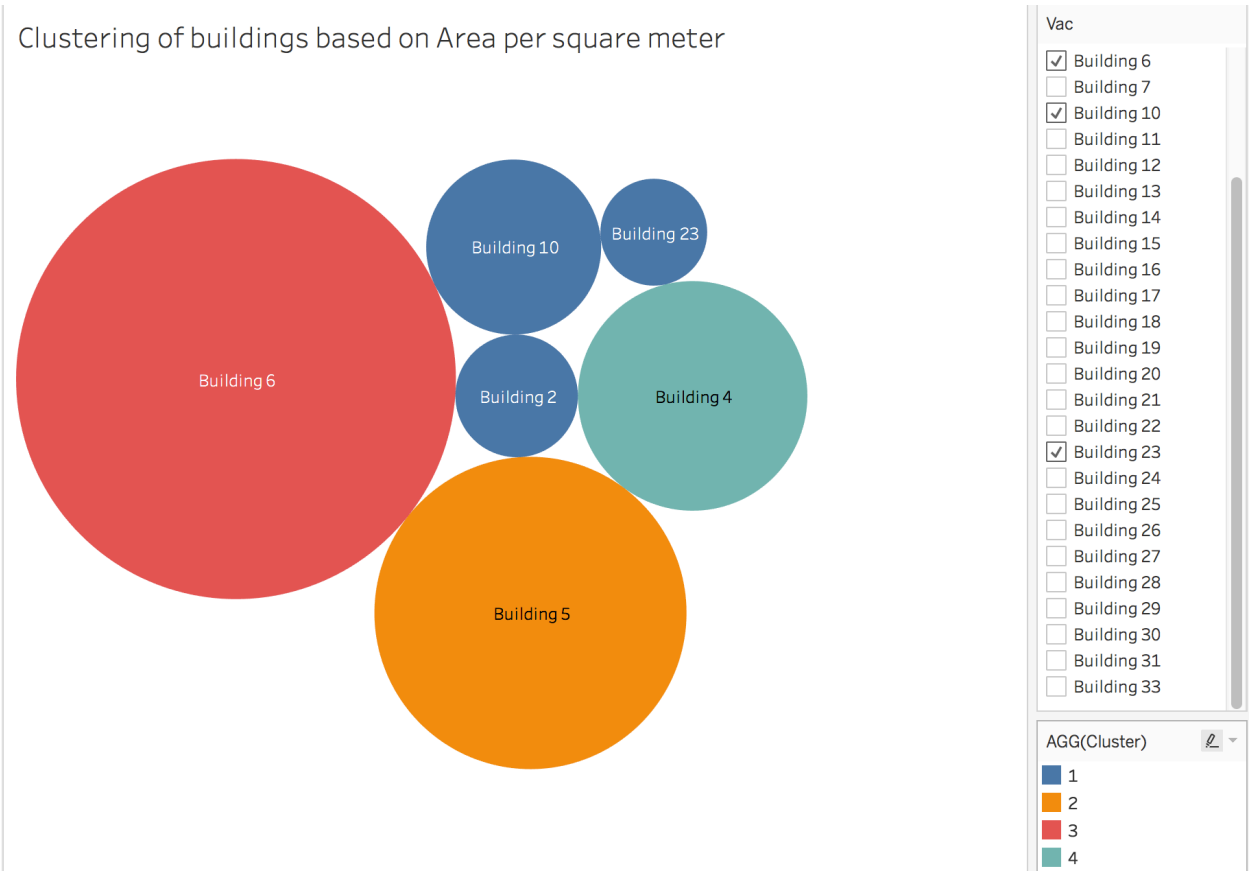


- Clustering of buildings based on base hour consumption



- Clustering of buildings based on area per meter square.



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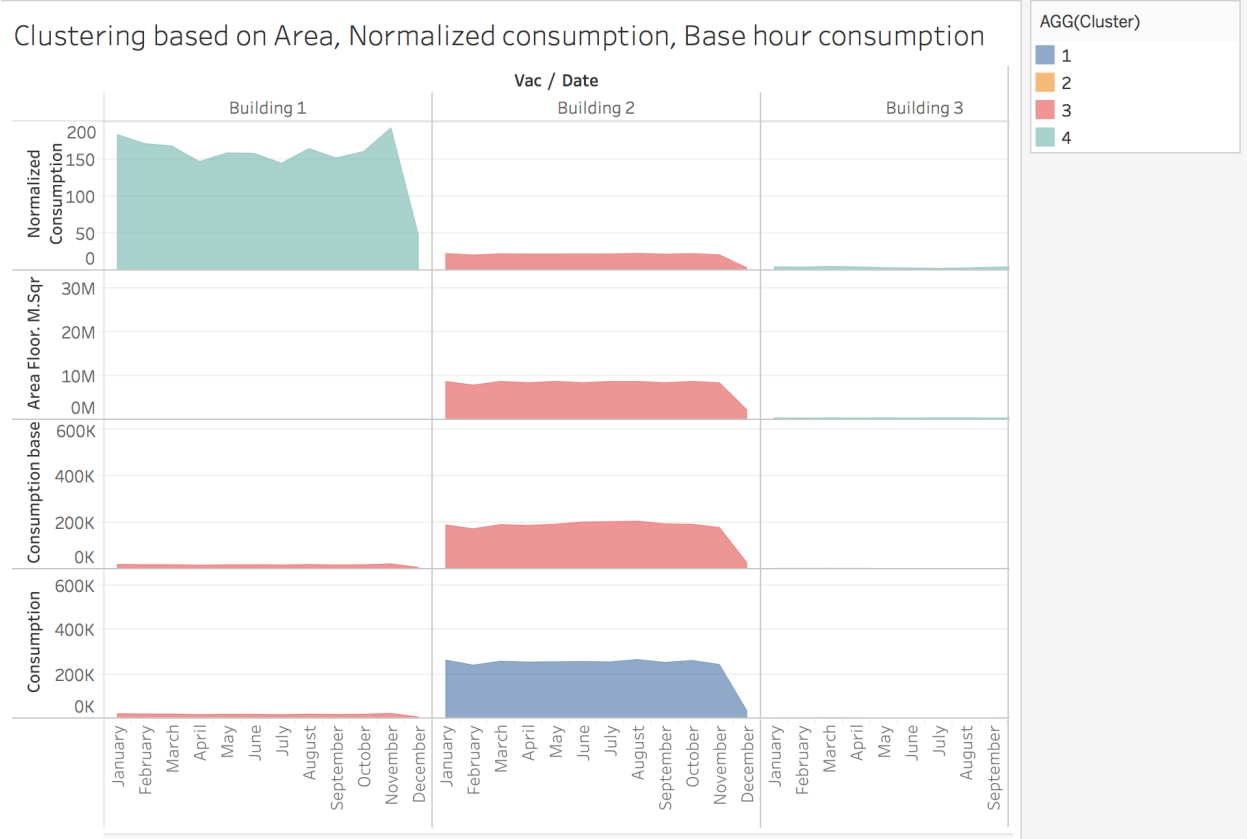
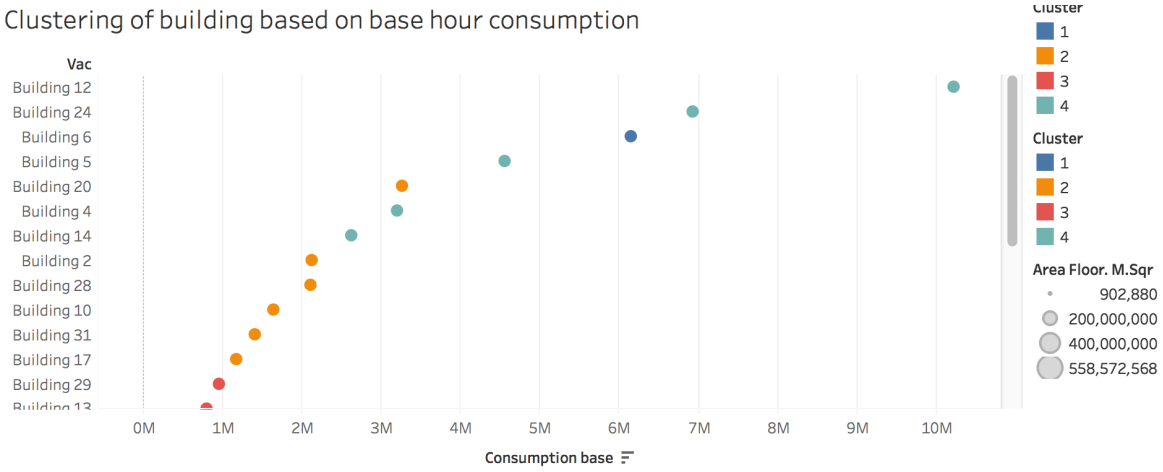
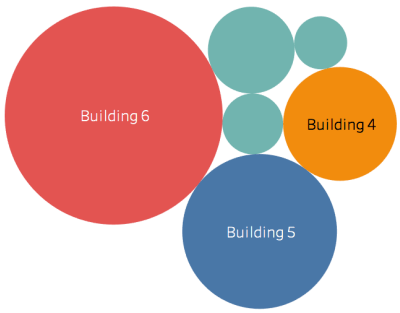


- Dashboards based on clustering:

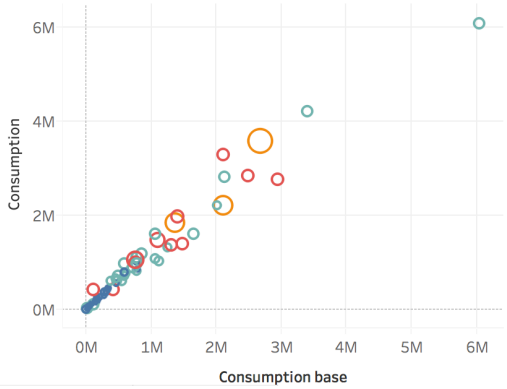
Clustering of building based on base hour consumption



Clustering of buildings based on Area per square meter



Clustering based on base hour consumption



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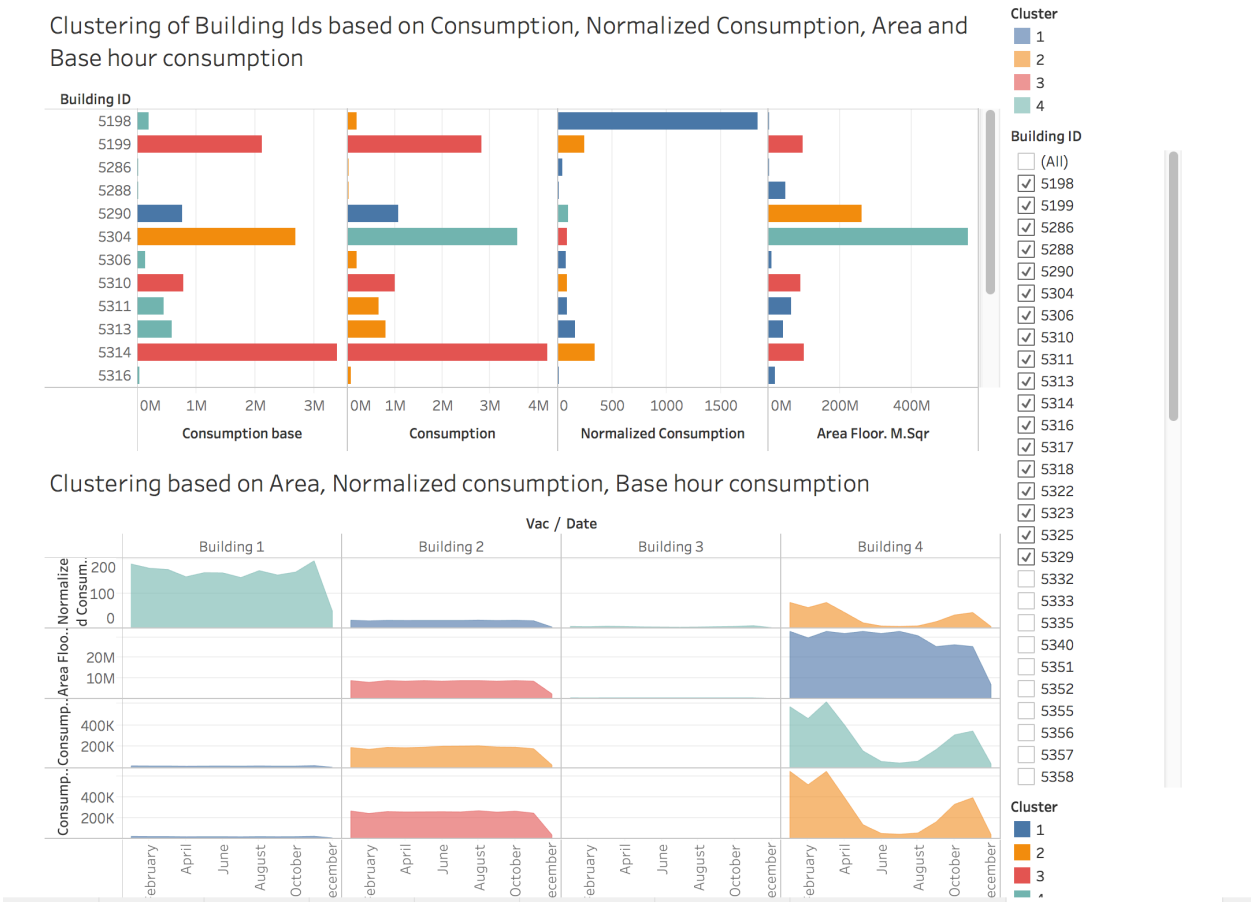
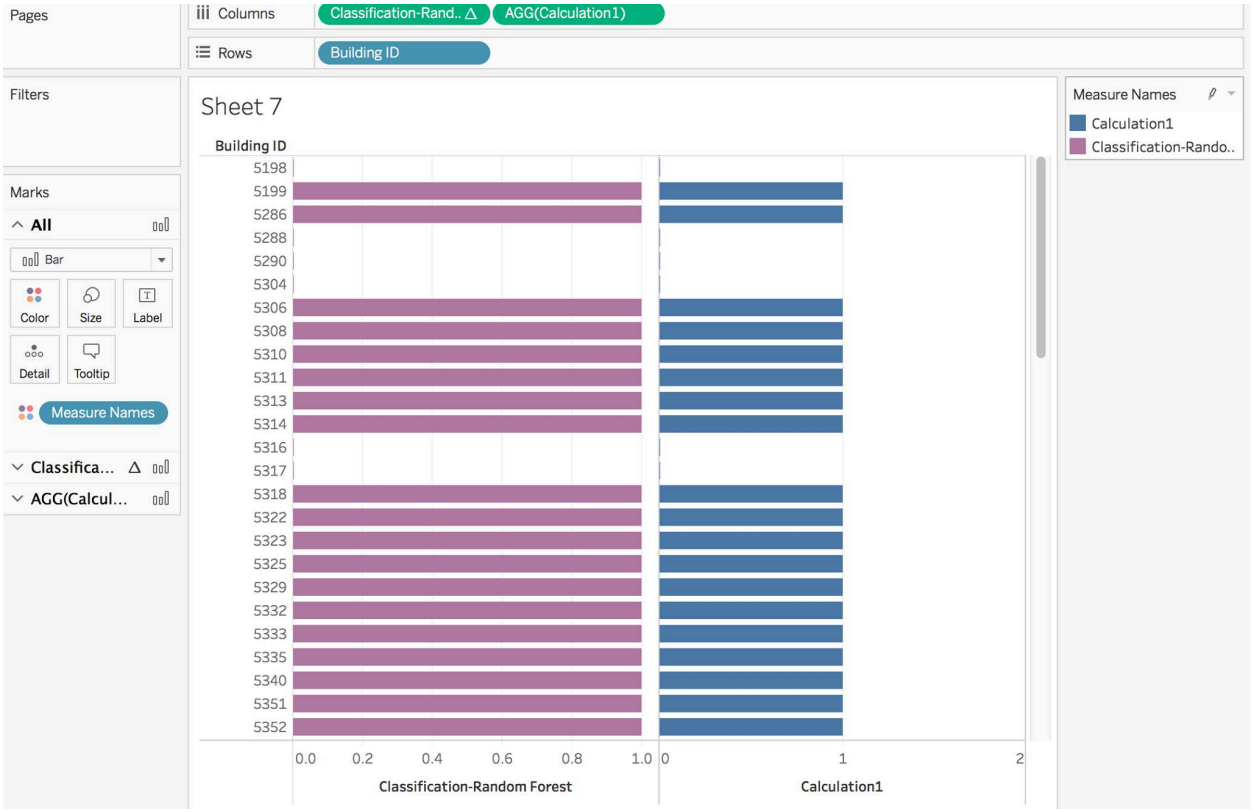


Random Forest Classification in Tableau:



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