Group-BeyondAI-Q2

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1 EE4211 Data Science for IoT Project

1.1 Group Name: BeyondAI

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2 Instructions:

In this project, you are given a dataset collected by an actual IoT system (see description below) and asked to use the dataset to build a forecasting model. You have to answer a set of questions, as well as propose your own interesting questions. 1. Form teams in groups of 4 students and select a name for your team. Be creative! Please email me your group members and team name. 2. Complete Question 1. Use a Jupyter notebook (ipynb file) to do the analysis and answer all the parts of the Question. Submit (i) PDF file/Print preview of your Jupyter note- book, and (ii) the Jupyter notebook (ipynb file). Zip both files into one zip file named as GroupName Question 1.zip and upload it to the appropriate LumiNUS folder. 3. Do the same for Question 2. Please name your file GroupName Question 2.zip and upload to LumiNUS. 4. Do the same for Question 3. For Question 3, please include a detailed description of your proposed work. Please name your file GroupName Question 3.zip and upload to LumiNUS. 5. The project carries a total of 40 marks: 30 marks for technical contributions (10 marks for each question), and 10 marks for presentation.

3 Data File:

The data file is available in the IVLE workbin under the directory "Project Details".

4 Data Description:

In this project, we will consider natural gas consumption data from residential consumers. The smart gas meter data used for this paper was obtained from the Pecan Street project (https://www.pecanstreet.org/). The source of the data are homes in the Mueller neighbor- hood of Austin, Texas, USA. The homes in this neighborhood are primarily newly constructed, and include single-family homes, apartments, and town homes. Itron Centron SR smart gas meters are deployed in these homes and these meters send their information to a gateway inside the home. The gateway uses the home's Internet connection to send the data to the meter data management

system (MDMS) or the processing center. The gas meters measure the cumulative gas consumption at a frequency of 15 seconds. The meters report a reading (in terms of the cumulative consumption) when the last marginal 2 cubic foot (or higher) of natural gas passes through the meter. Data from a six month interval (1 Oct 2015 to 31 Mar 2016) has been provided. The data has the following format: <Timestamp (localtime)> <MeterID (dataid)> <meter reading (meter_value)> The timestamp provides the date as well as the the hour and minute values when each reading was taken. Each meter has an unique identifier (MeterID). Recall that the meter readings are cumulative and not generated at periodic intervals.

5 Additional Information about Data Collection:

1. Gas flow meters have a sensor that is used to measure the volume of gas that passes though a pipe. Different meters use different sensors (e.g. ultrasonic sensors, synthetic diaphragm with rotating valve etc.). The meters check on the sensors periodically to get a reading of the current consumption value. This is what is meant in the sentence above: "The gas meters measure the cumulative gas consumption at a frequency of 15 seconds."
2. Now, just because the meter has obtained a reading from the sensors, it does not not have to send the reading off to the meter data management system (MDMS). Imagine 1.3 million households in Singapore sending out gas readings every 15 seconds to Singapore Power. The processing and bandwidth requirements may be too high for Singapore Power. So Singapore Power may wish for the meters to report at a lower frequency or when the consumption exceeds a certain threshold. However, the smart meter manufacturer does not know what is the reporting criterion of its users. So it builds meters that can read every 15 seconds because it thinks that this is a frequency that is high enough for all potential customers. The "reporting" frequency to the MDMS (as opposed to the "measuring" frequency) can be determined by the user of the meter such as Singapore Power.
3. So when are the meters supposed to "report" to the MDMS? The documentation that came with the data says "once the marginal consumption exceed 2 cubic meters". As you may observe in the data, this is not necessarily the case in some of the readings. So is that an anomaly? That is for you to decide and justify. If you were Singapore Power, under what circumstances would you think that a meter reading is suspicious and decide to investigate? Remember that there are two sides to the story. If you do not receive a reading from a meter for a really long time, would you think that the meter is defective? So would that justify sending a reading even if the consumption has not increased?

6 Questions:

6.1 2. Forecasting (10 marks)

First load the data

[1]:
```
# load necessary library

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from datetime import datetime, date
```

```
from scipy import stats
from sklearn.linear_model import LinearRegression
from sklearn.svm import SVR

import warnings
warnings.filterwarnings('ignore')
```

[2]:
```
# read original data and take out the seconds and UTC offset

data = pd.read_csv("dataport-export_gas_oct2015-mar2016.csv")
data['localminute'] = data['localminute'].astype(str).str[:19]
data['localminute'] = pd.to_datetime(data['localminute'])
```

[3]:
```
# check the first 5 rows in the dataset

data.tail()
```

[3]:

	localminute	dataid	meter_value
1584818	2016-03-31 23:59:14	2129	201726
1584819	2016-03-31 23:59:17	2945	161232
1584820	2016-03-31 23:59:35	9729	138146
1584821	2016-03-31 23:59:47	5129	166488
1584822	2016-03-31 23:59:58	484	114174

[4]:
```
# check the data information of the dataset

print(data.info())
print('-----------------------------------------------------------')
print(data.describe(include = "all"))
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1584823 entries, 0 to 1584822
Data columns (total 3 columns):
localminute    1584823 non-null datetime64[ns]
dataid         1584823 non-null int64
meter_value    1584823 non-null int64
dtypes: datetime64[ns](1), int64(2)
memory usage: 36.3 MB
None
-----------------------------------------------------------
```

	localminute	dataid	meter_value
count	1584823	1.584823e+06	1.584823e+06
unique	1499587	NaN	NaN
top	2015-12-05 20:57:14	NaN	NaN
freq	6	NaN	NaN
first	2015-10-01 00:00:10	NaN	NaN
last	2016-03-31 23:59:58	NaN	NaN

```
mean                    NaN  4.352815e+03  2.015056e+05
std                     NaN  2.941902e+03  1.351182e+05
min                     NaN  3.500000e+01  2.829800e+04
25%                     NaN  1.714000e+03  1.145800e+05
50%                     NaN  4.031000e+03  1.670940e+05
75%                     NaN  7.017000e+03  2.364940e+05
max                     NaN  9.982000e+03  8.158240e+05
```

[5]:
```
# check is there any null vales in the dataset

print("Number of null value is {}".format(data.isnull().sum()))
```

```
Number of null value is localminute    0
dataid         0
meter_value    0
dtype: int64
```

6.2 Question 2.1

In this part, you will asked to build a model to forecast the hourly readings in the future (next hour). Can you explain why you may want to forecast the gas consumption in the future? Who would find this information valuable? What can you do if you have a good forecasting model?

Answer: The gas company would like to have this prediction of gas consumption in the future. The gas company needs to know the average consumption of each individual home and also the total consumption for all the 157 homes. Then the gas company can make better strategy to do the supply of the gas like cut the man power cost, maintenance cost and decrease the wasted resources.

6.3 Question 2.2

Build a linear regression model to forecast the hourly readings in the future (next hour). Generate two plots: (i) Time series plot of the actual and predicted hourly meter readings and (ii) Scatter plot of actual vs predicted meter readings (along with the line showing how good the fit is).

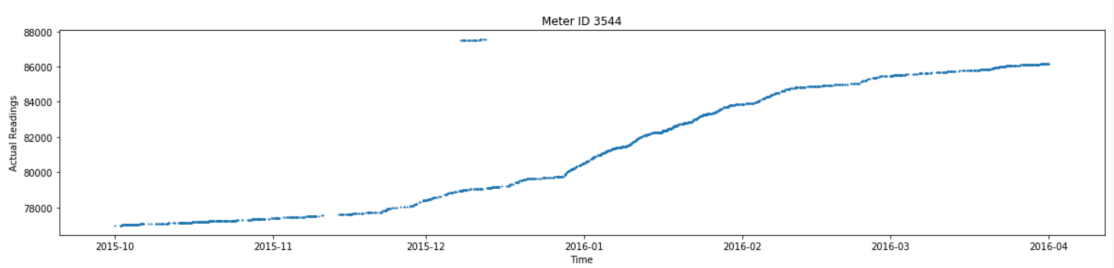
[6]:
```
# create the list that contains all the meter ID

lstMeter = data['dataid'].unique()
```

[7]:
```
# seperate all readings according to the meter ID

dictMeter = {c: pd.DataFrame(data[data['dataid']==c]) for c in lstMeter}
```

6.4 Discussion: preprocessing the raw data

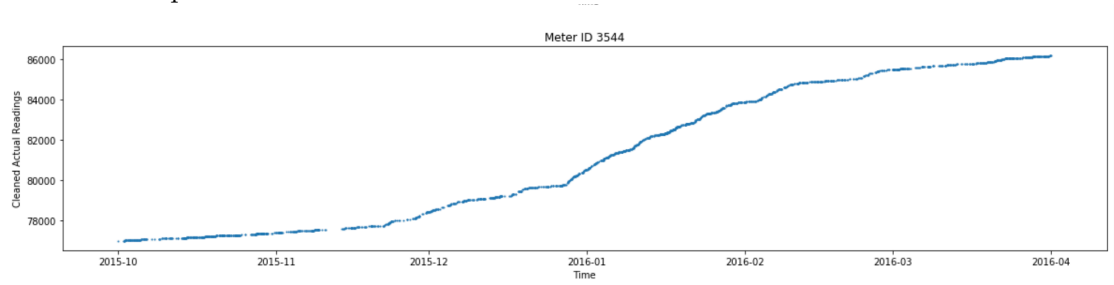
First we plot the scatter plots of actual readings vs time for each home. We found that some meters plots have outliers (readings that are even bigger than the readings on 2016-03-31). This is considered as malfunction as the meter takes cummulaitve readings so the readings should be increasing gradually.

Below are an example for meter ID 3544:

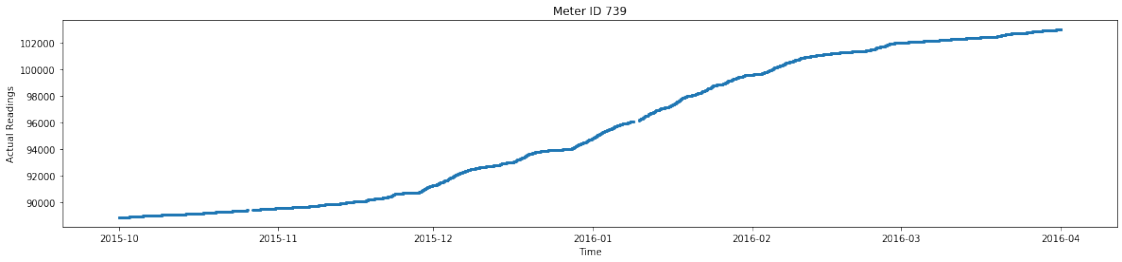


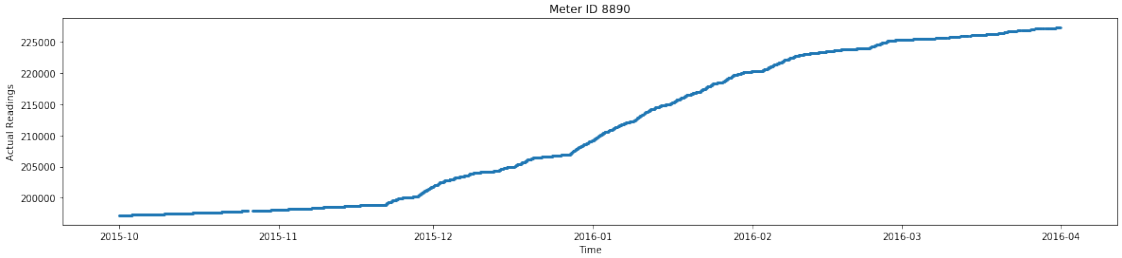
We can see that there are some outliers malfunction readings during 2015-12 to 2016-01 and we should remove those outliers as it may affect our modeling.

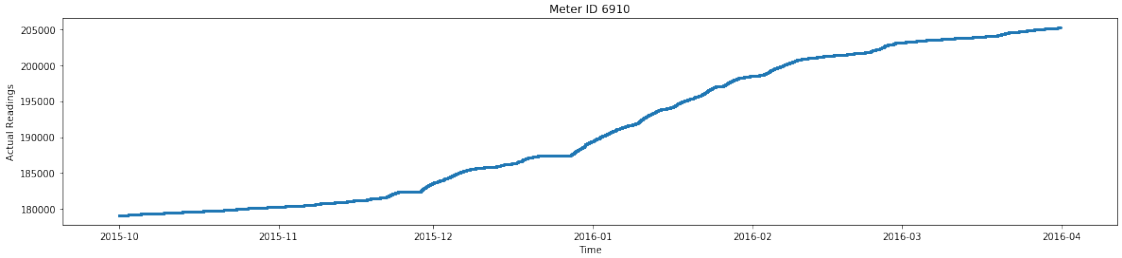
Cleaned example for meter ID 3544:

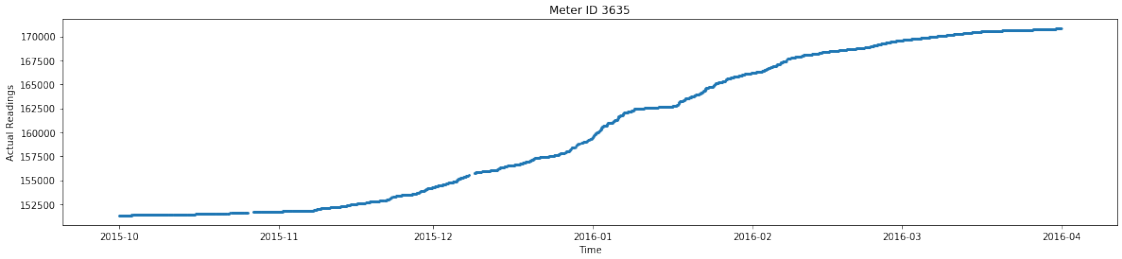


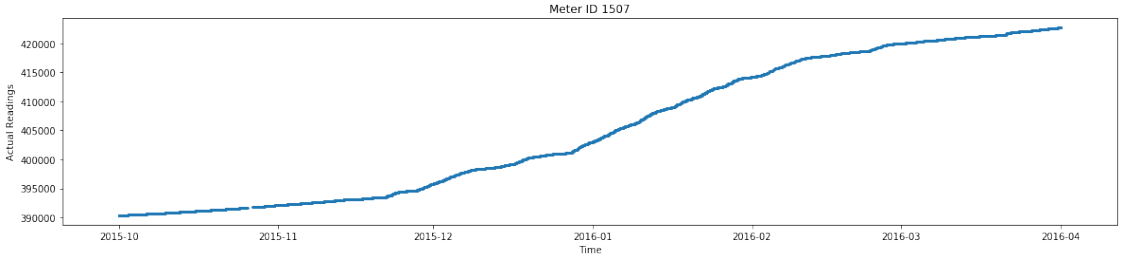
[11]:
```
# scatter plot of actual readings vs time for each home

for key in dictMeter:
    plt.figure(figsize=(20,4))
    plt.scatter(dictMeter[key]['localminute'], dictMeter[key]['meter_value'],␣
 ↪label='Actrual readings vs time', s=1)
    plt.title("Meter ID {}".format(key))
    plt.xlabel("Time")
    plt.ylabel("Actual Readings")
    plt.show()
```

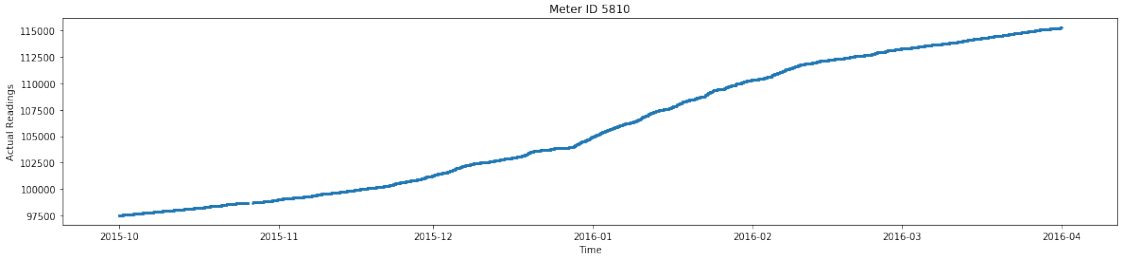


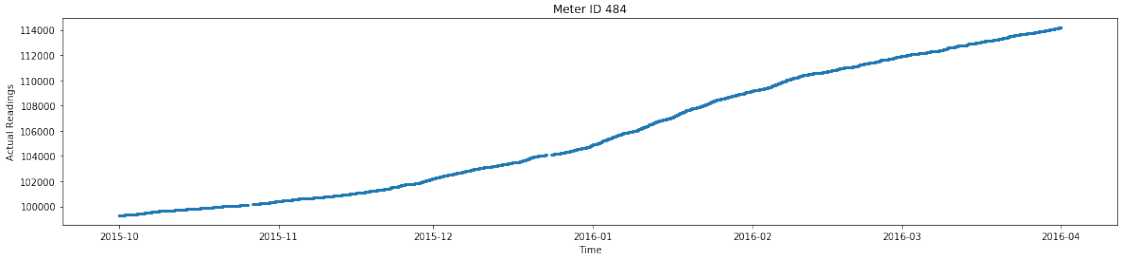

Meter ID 8890
Actual Readings
225000
220000
215000
210000
205000
200000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

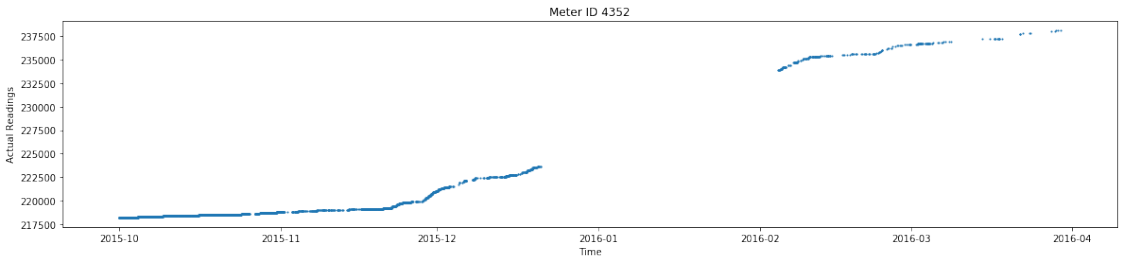

Meter ID 6910
Actual Readings
205000
200000
195000
190000
185000
180000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

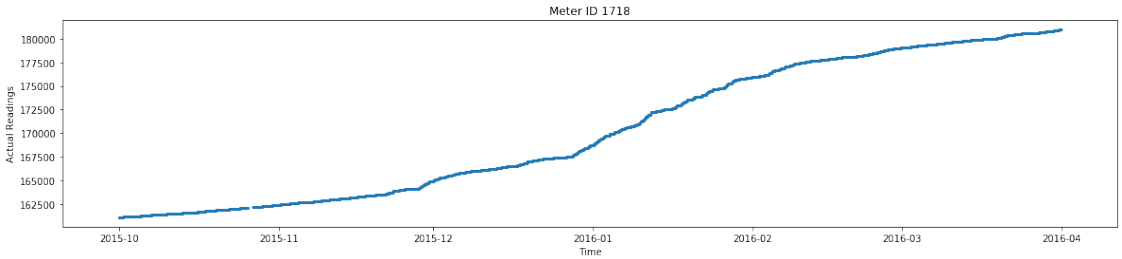

Meter ID 3635
Actual Readings
170000
167500
165000
162500
160000
157500
155000
152500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

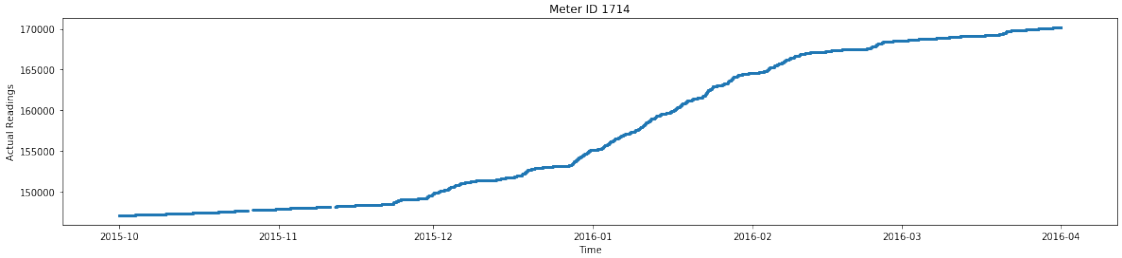

Meter ID 1507
Actual Readings
420000
415000
410000
405000
400000
395000
390000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

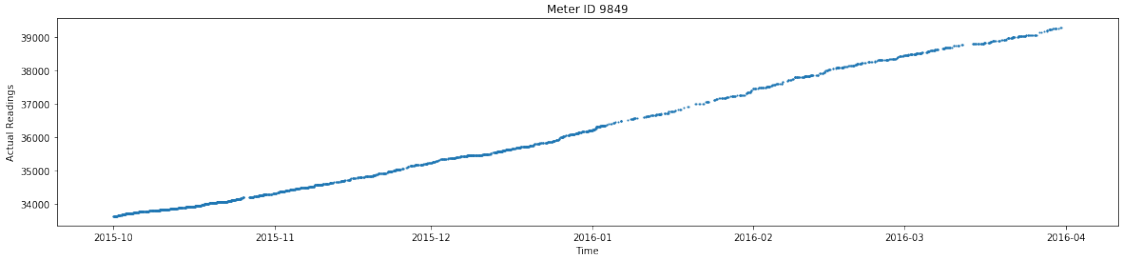

Meter ID 5810
Actual Readings
115000
112500
110000
107500
105000
102500
100000
97500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

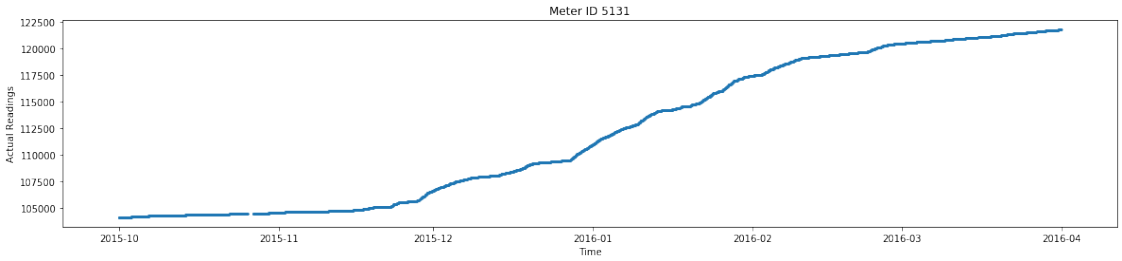

Meter ID 484
Actual Readings
114000
112000
110000
108000
106000
104000
102000
100000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

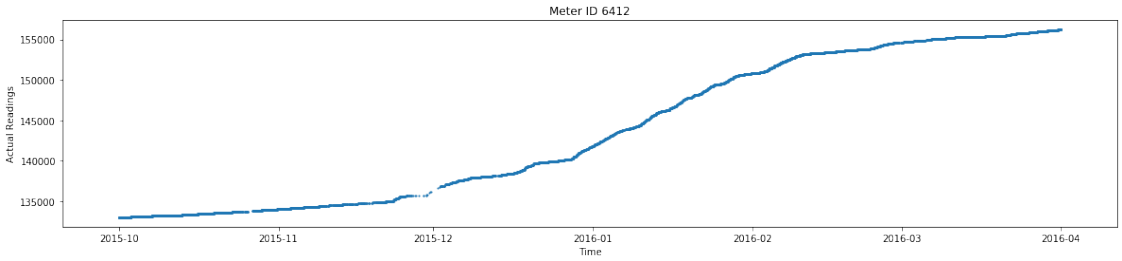

Meter ID 4352
Actual Readings
237500
235000
232500
230000
227500
225000
222500
220000
217500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

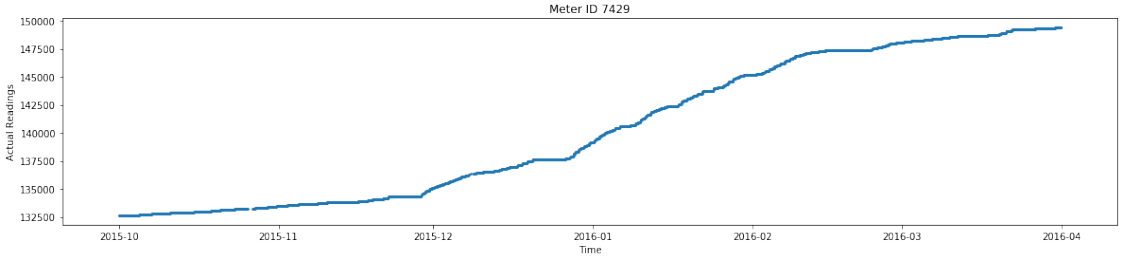

Meter ID 1718
Actual Readings
180000
177500
175000
172500
170000
167500
165000
162500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

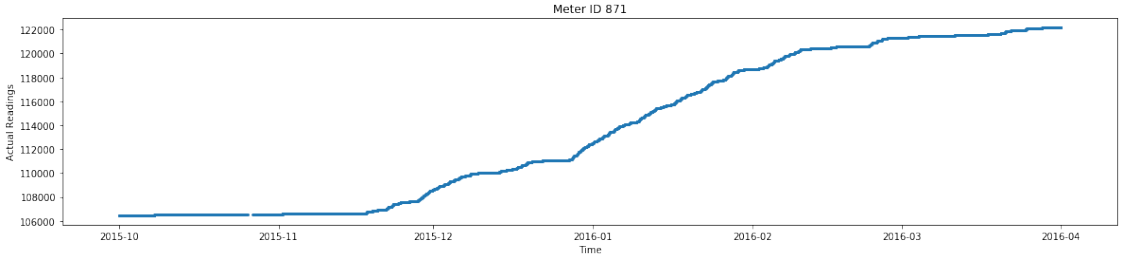

Meter ID 1714
Actual Readings
170000
165000
160000
155000
150000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

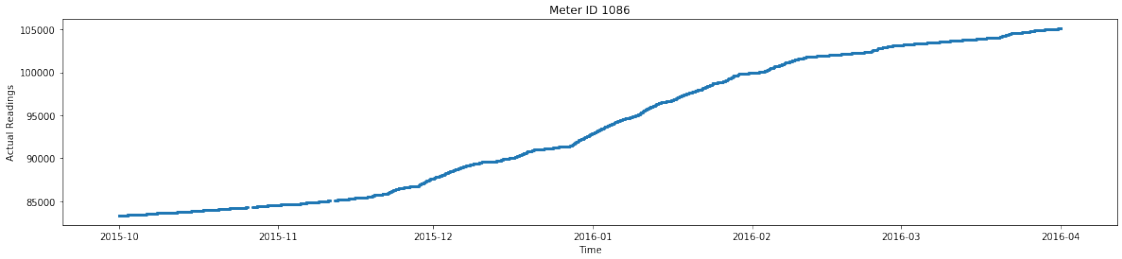

Meter ID 9849
Actual Readings
39000
38000
37000
36000
35000
34000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

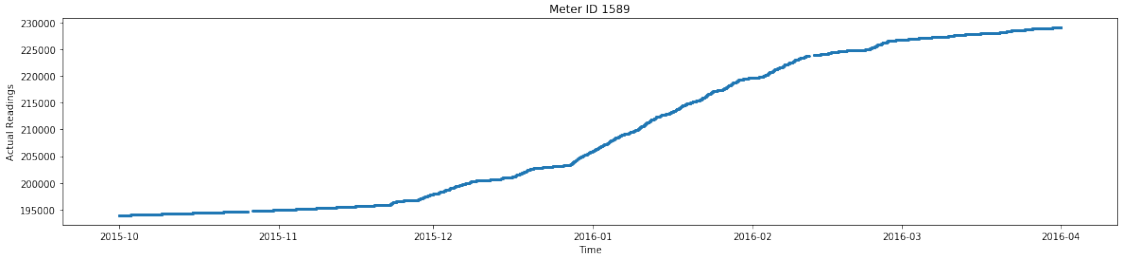

Meter ID 5131
Actual Readings
122500
120000
117500
115000
112500
110000
107500
105000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

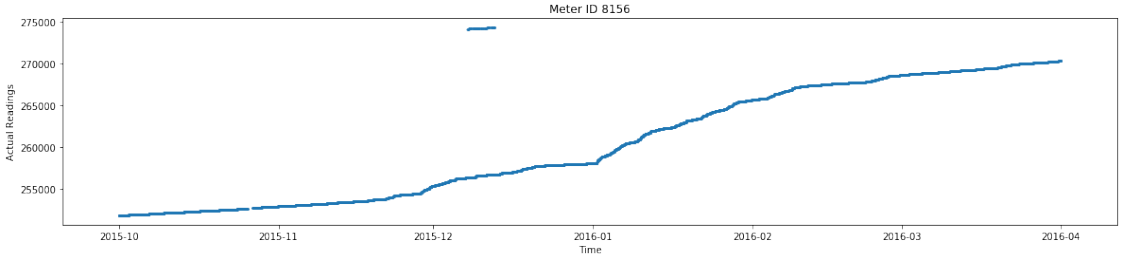

Meter ID 6412
Actual Readings
155000
150000
145000
140000
135000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

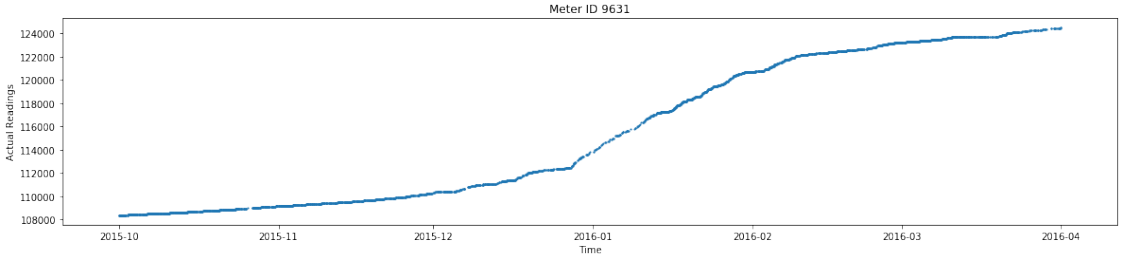

Meter ID 7429
Actual Readings
150000
147500
145000
142500
140000
137500
135000
132500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

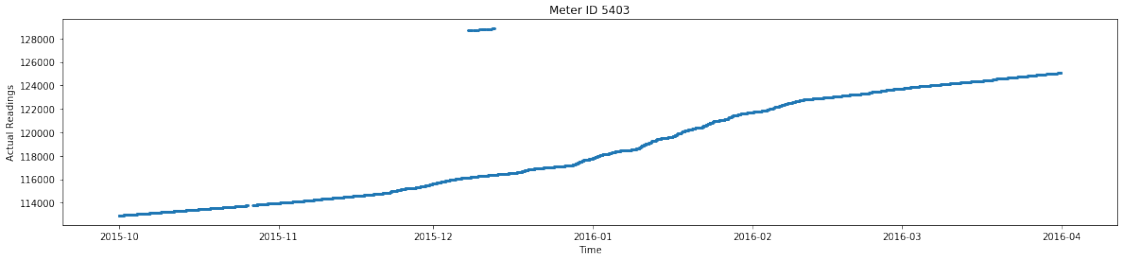

Meter ID 871
Actual Readings
122000
120000
118000
116000
114000
112000
110000
108000
106000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

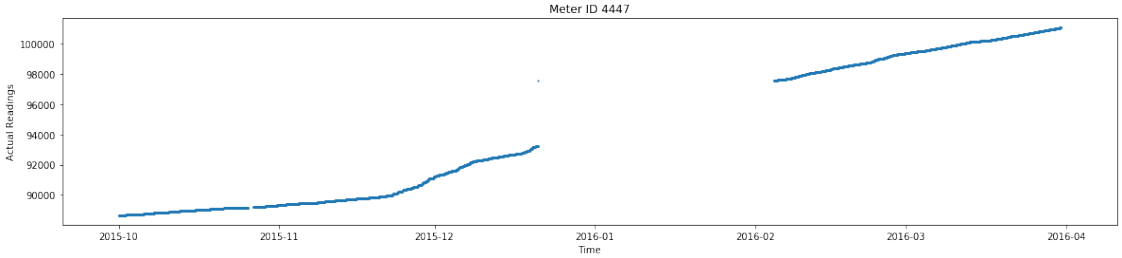

Meter ID 1086
Actual Readings
105000
100000
95000
90000
85000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

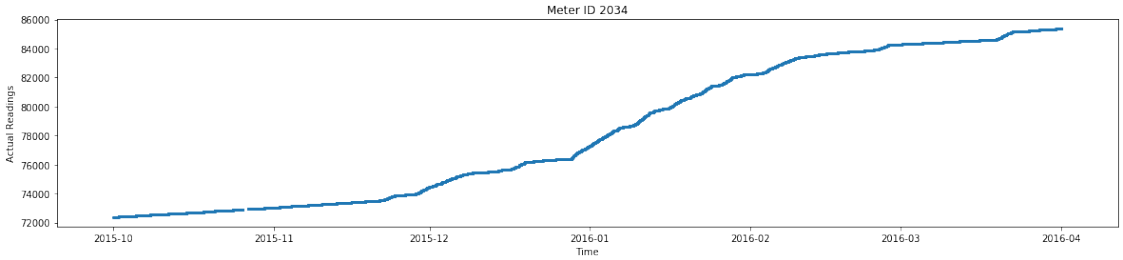

Meter ID 1589
Actual Readings
230000
225000
220000
215000
210000
205000
200000
195000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

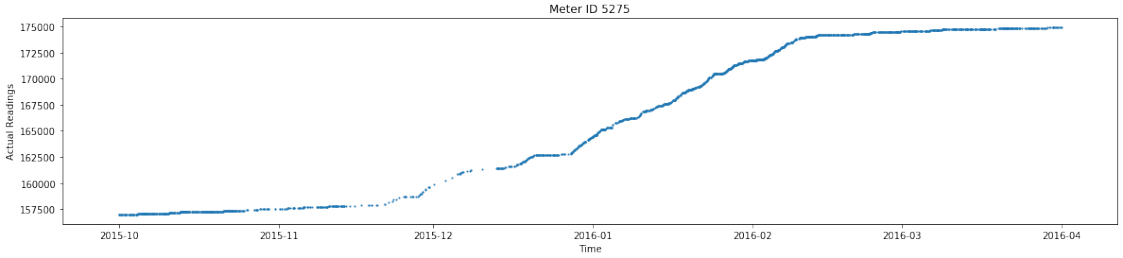

Meter ID 8156
Actual Readings
275000
270000
265000
260000
255000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

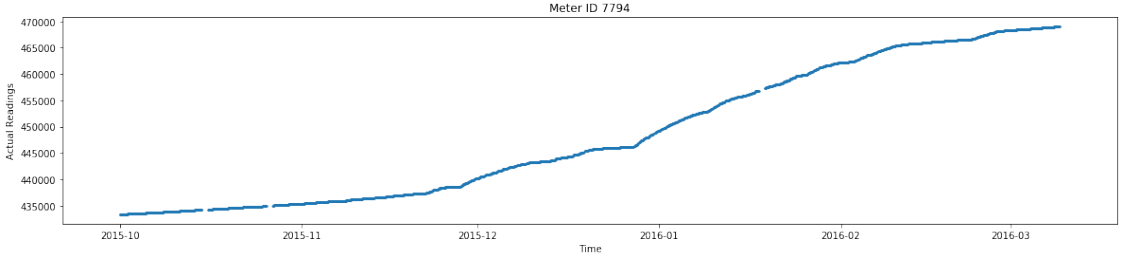

Meter ID 9631
Actual Readings
124000
122000
120000
118000
116000
114000
112000
110000
108000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

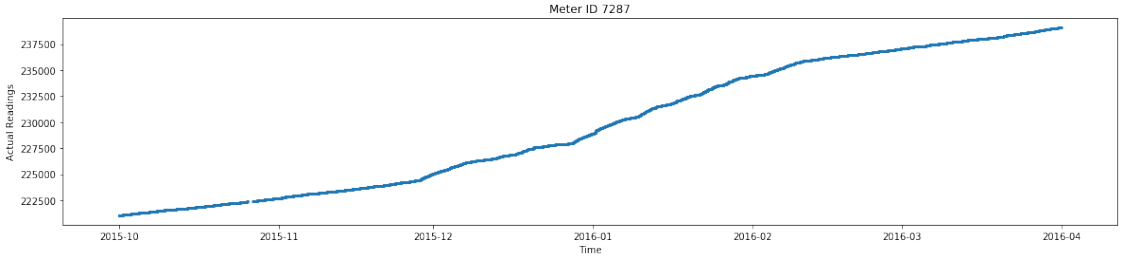

Meter ID 5403
Actual Readings
128000
126000
124000
122000
120000
118000
116000
114000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

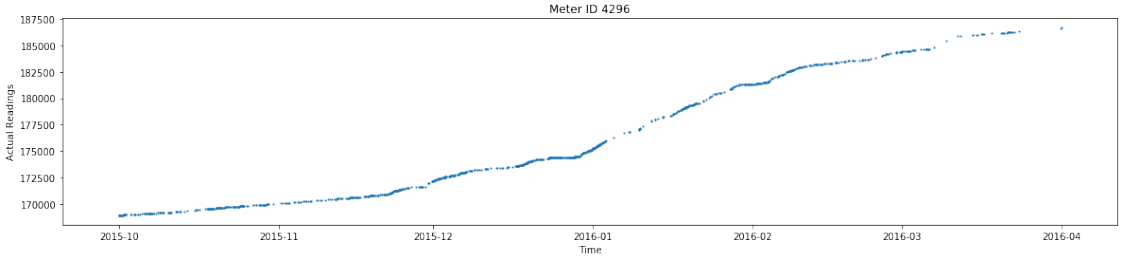

Meter ID 4447
Actual Readings
100000
98000
96000
94000
92000
90000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

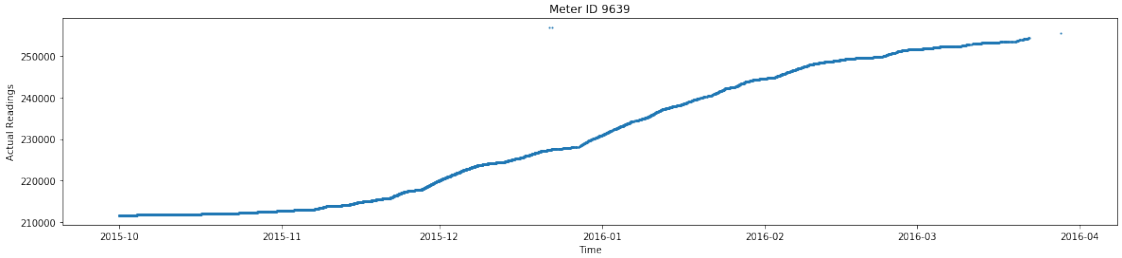

Meter ID 2034
Actual Readings
86000
84000
82000
80000
78000
76000
74000
72000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

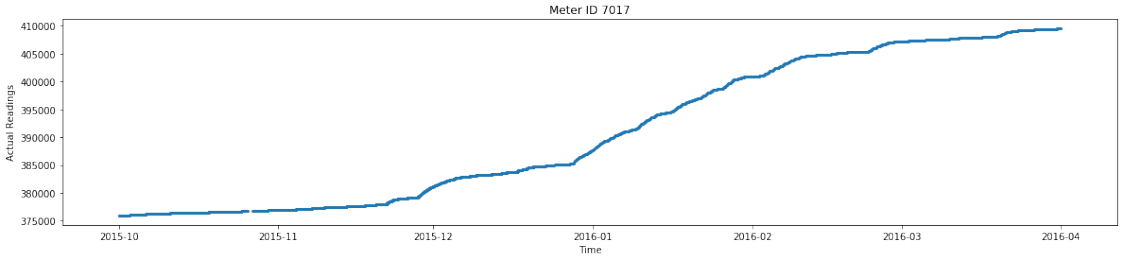

Meter ID 5275
Actual Readings
175000
172500
170000
167500
165000
162500
160000
157500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

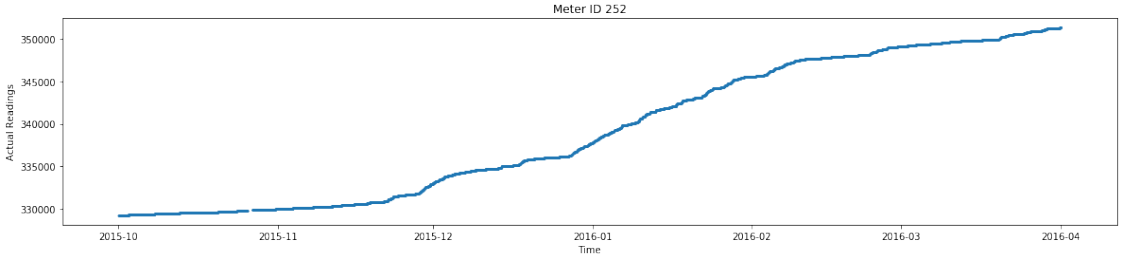

Meter ID 7794
Actual Readings
470000
465000
460000
455000
450000
445000
440000
435000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time

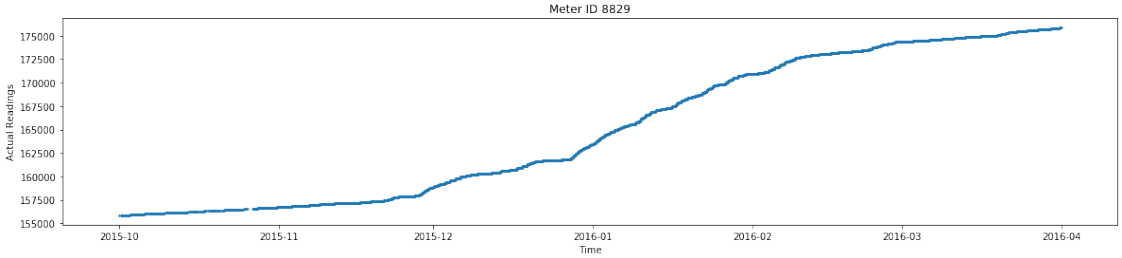

Meter ID 7287
Actual Readings
237500
235000
232500
230000
227500
225000
222500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

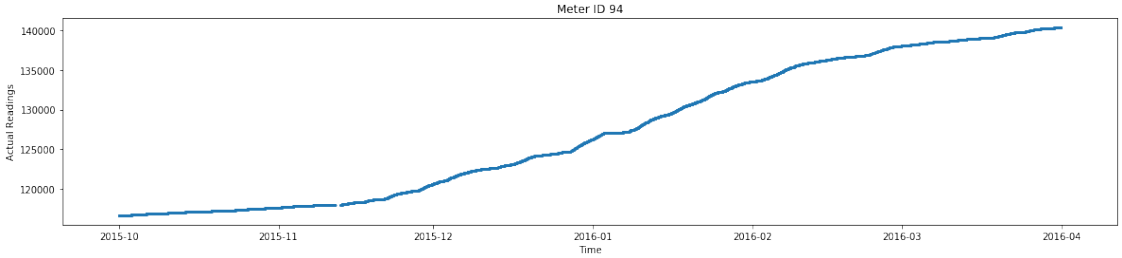

Meter ID 4296
Actual Readings
187500
185000
182500
180000
177500
175000
172500
170000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9639
Actual Readings
250000
240000
230000
220000
210000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7017
Actual Readings
410000
405000
400000
395000
390000
385000
380000
375000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 252
Actual Readings
350000
345000
340000
335000
330000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8829
Actual Readings
175000
172500
170000
167500
165000
162500
160000
157500
155000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 94
Actual Readings
140000
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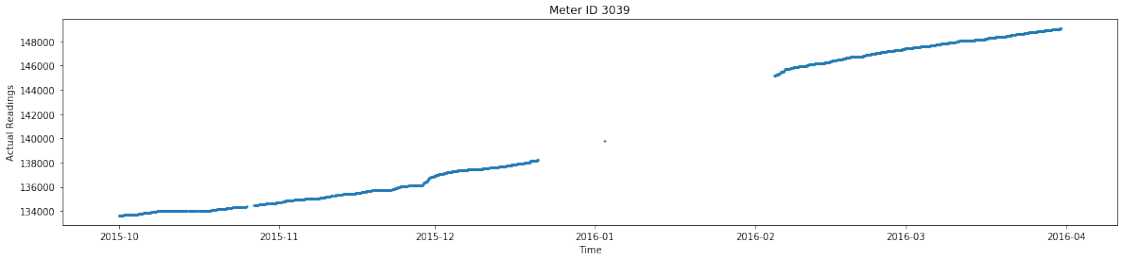
130000
125000
120000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3039
Actual Readings
148000
146000
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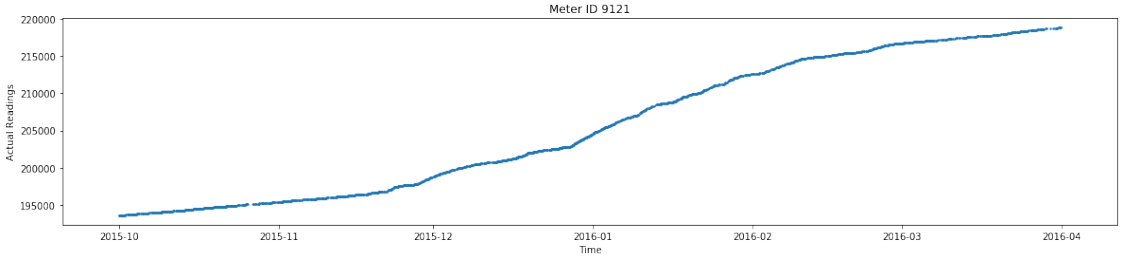
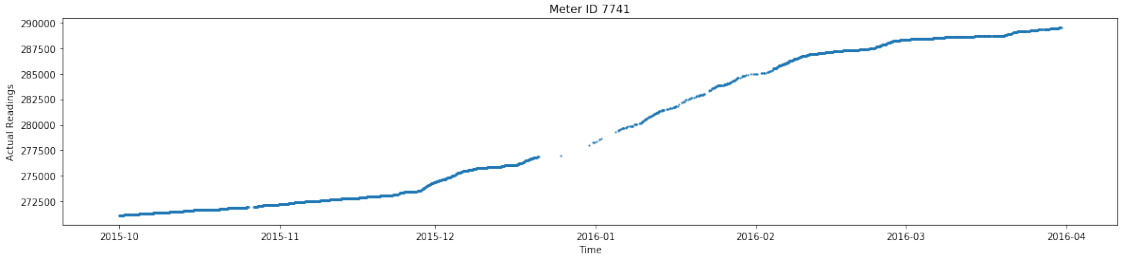
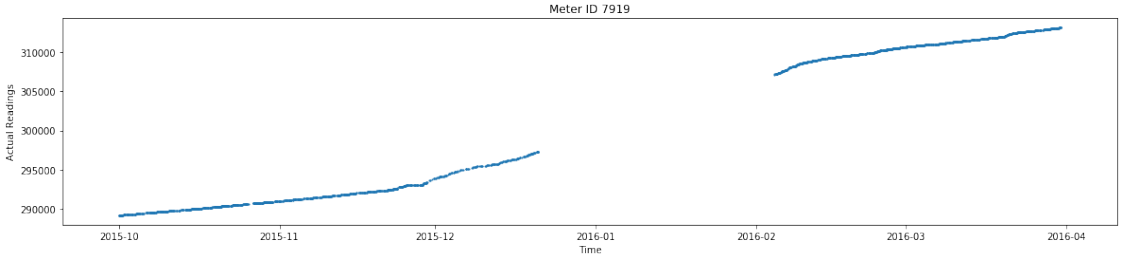
142000
140000
138000
136000
134000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9121
Actual Readings
220000
215000
210000
205000
200000
195000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7741
Actual Readings
290000
287500
285000
282500
280000
277500
275000
272500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7919
Actual Readings
310000
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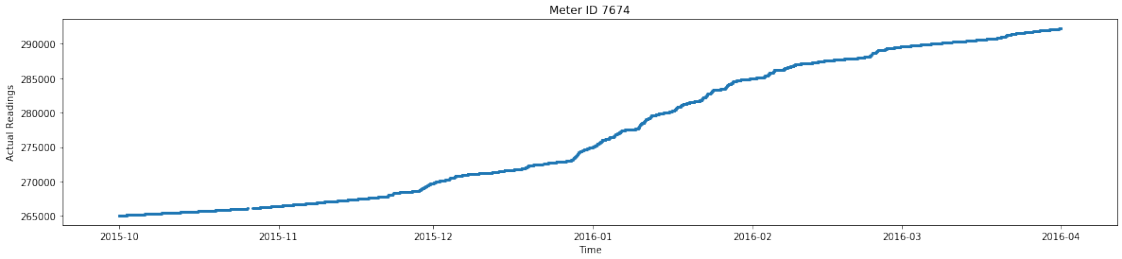
300000
295000
290000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7674
Actual Readings
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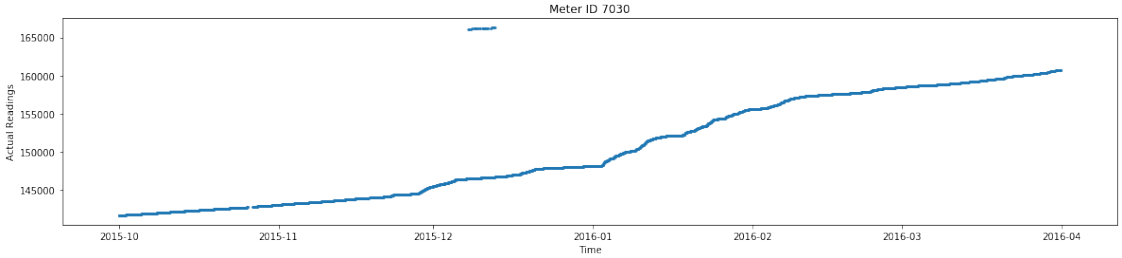
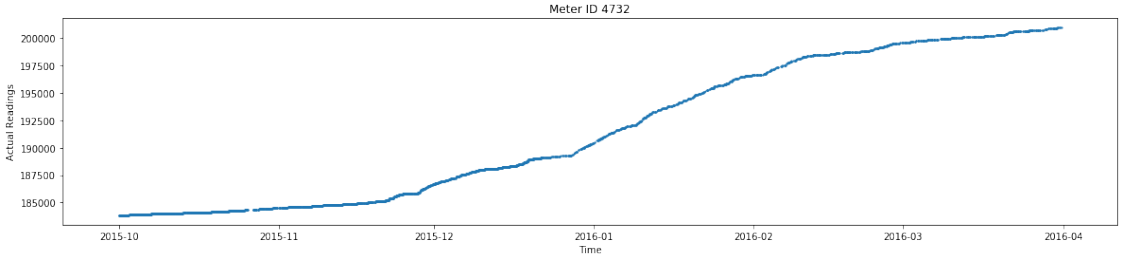
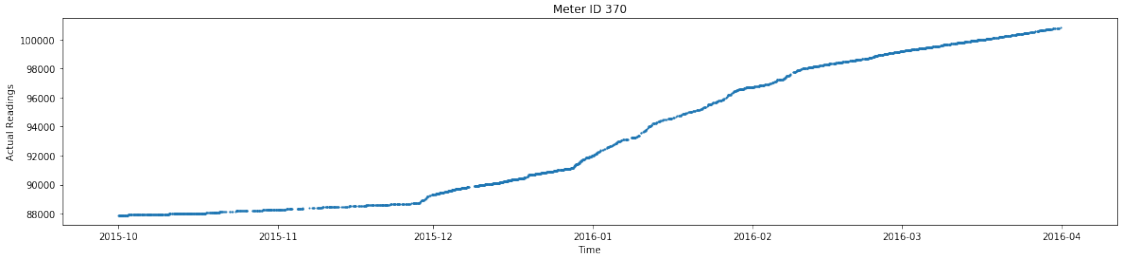
280000
275000
270000
265000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7030
Actual Readings
165000
160000
155000
150000
145000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4732
Actual Readings
200000
197500
195000
192500
190000
187500
185000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 370
Actual Readings
100000
98000
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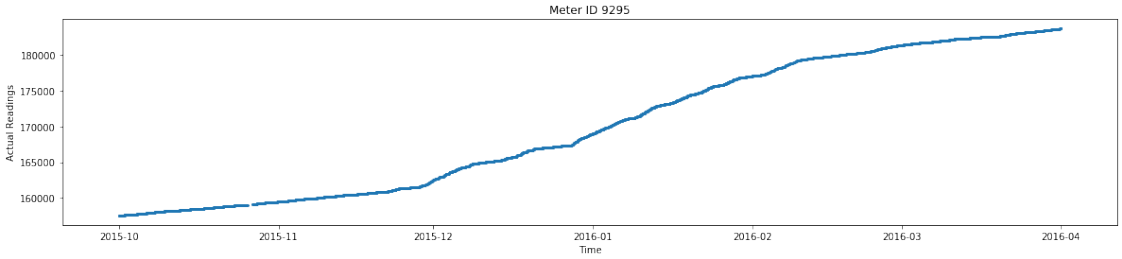
94000
92000
90000
88000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9295
Actual Readings
180000
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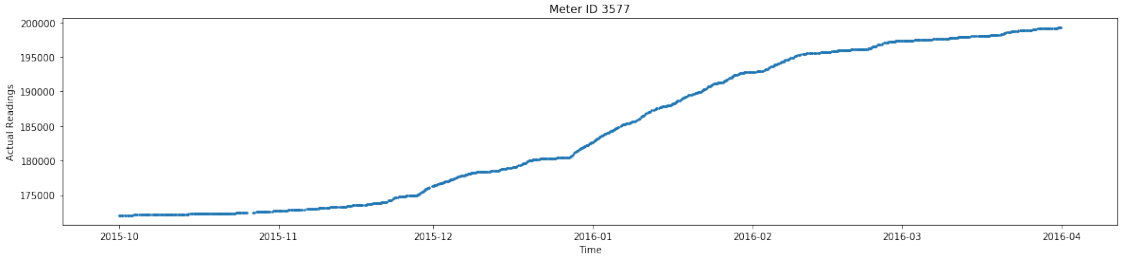
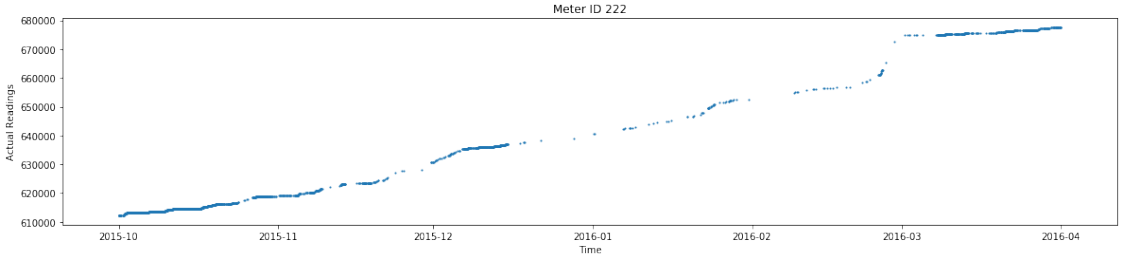
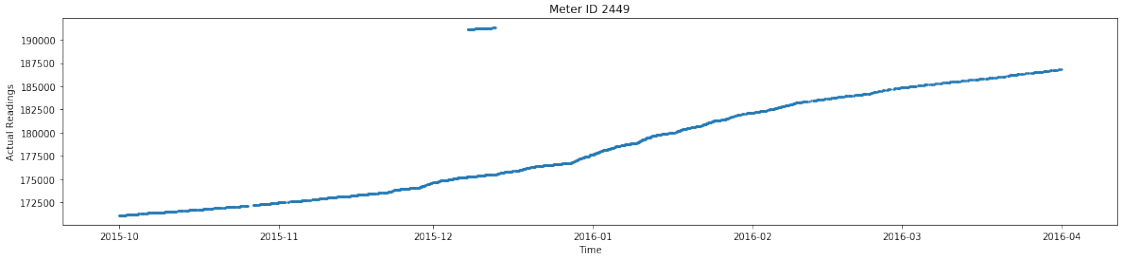
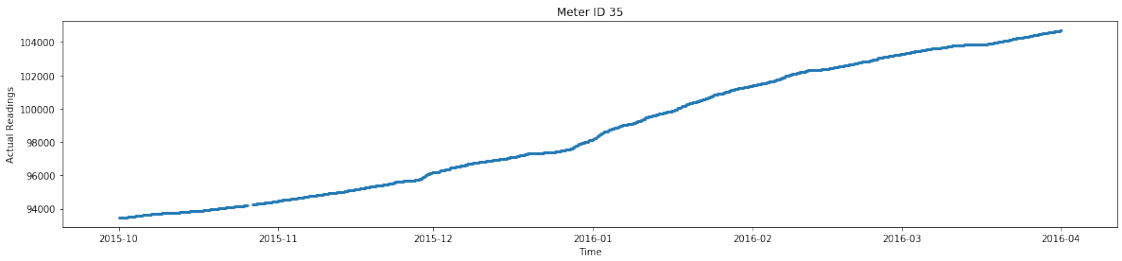
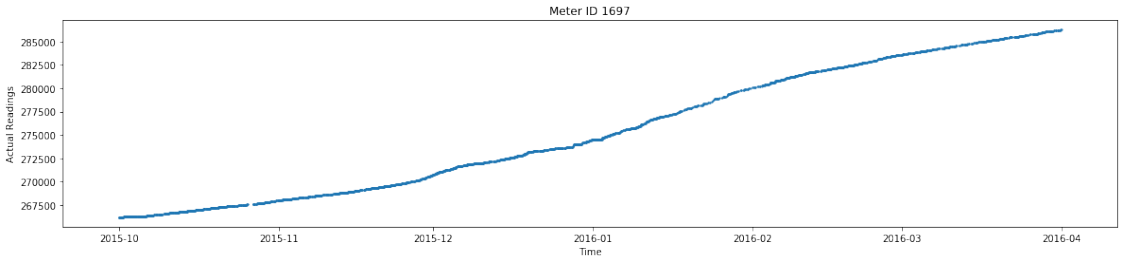
170000
165000
160000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

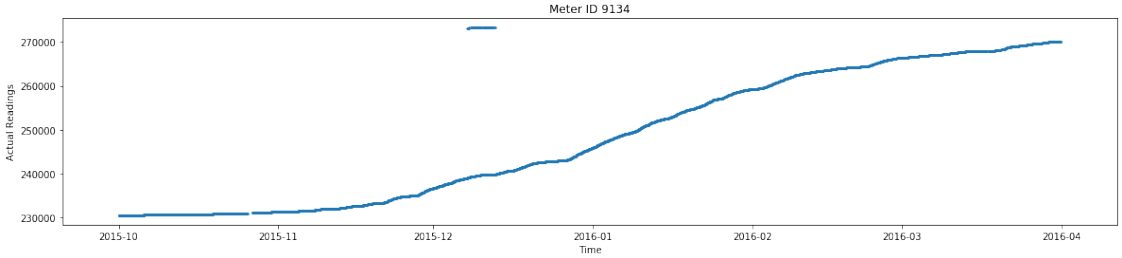

Meter ID 3577
Actual Readings
200000
195000
190000
185000
180000
175000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 222
Actual Readings
680000
670000
660000
650000
640000
630000
620000
610000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2449
Actual Readings
190000
187500
185000
182500
180000
177500
175000
172500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 35
Actual Readings
104000
102000
100000
98000
96000
94000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1697
Actual Readings
285000
282500
280000
277500
275000
272500
270000
267500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9134
Actual Readings
270000
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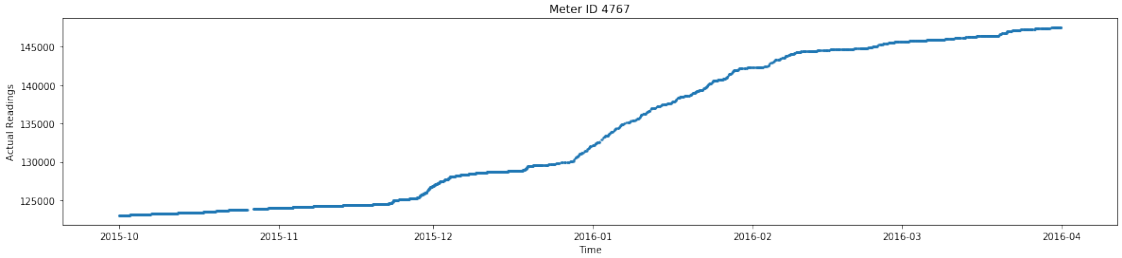
250000
240000
230000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4767
Actual Readings
145000
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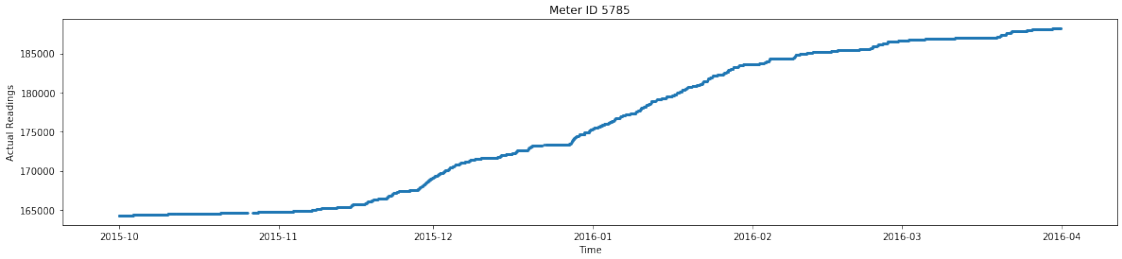
135000
130000
125000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5785
Actual Readings
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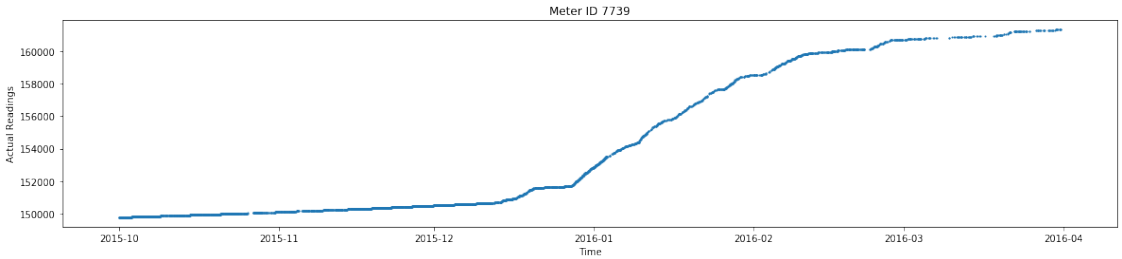
175000
170000
165000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7739
Actual Readings
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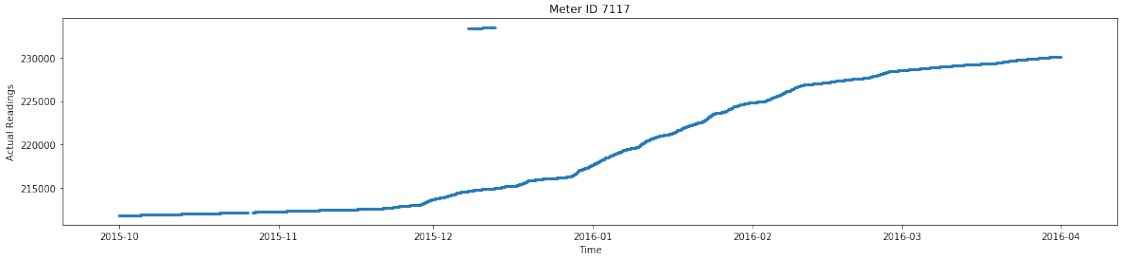
154000
152000
150000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7117
Actual Readings
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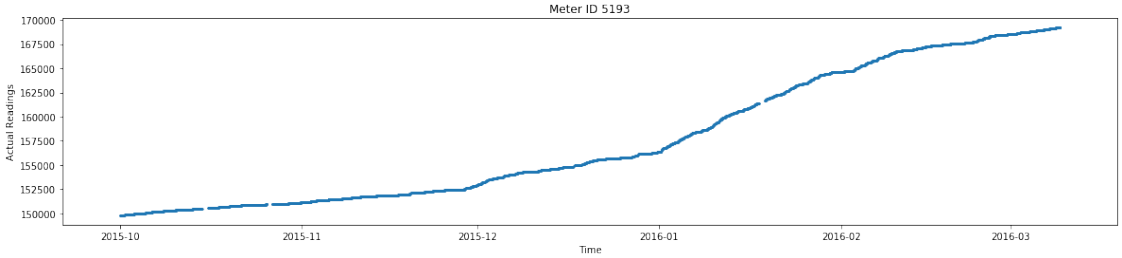
220000
215000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5193
Actual Readings
170000
167500
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160000
157500
155000
152500
150000
2015-10
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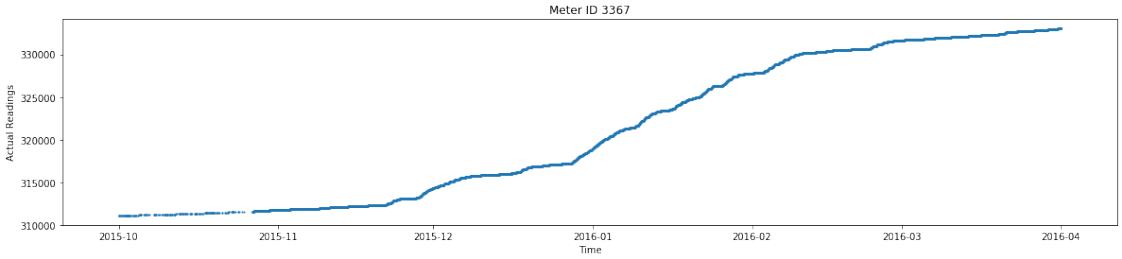
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 3367
Actual Readings
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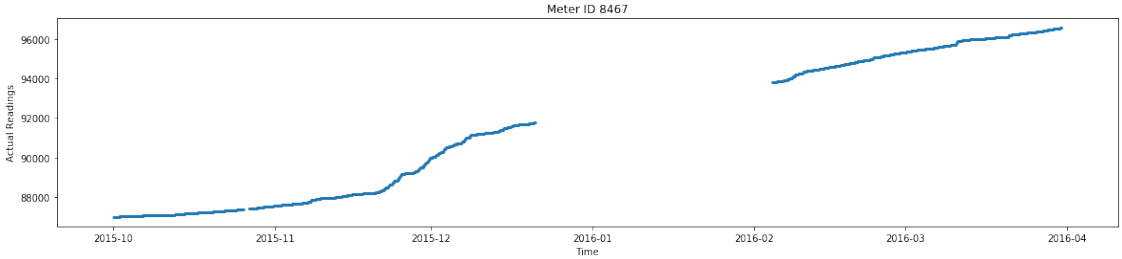
315000
310000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8467
Actual Readings
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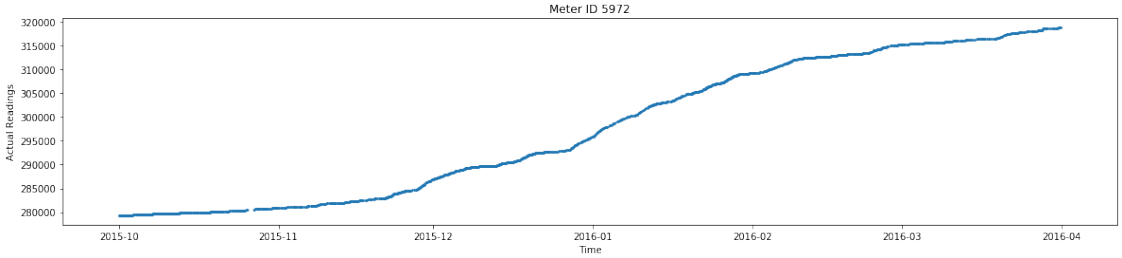
92000
90000
88000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5972
Actual Readings
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310000
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290000
285000
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2015-10
2015-11
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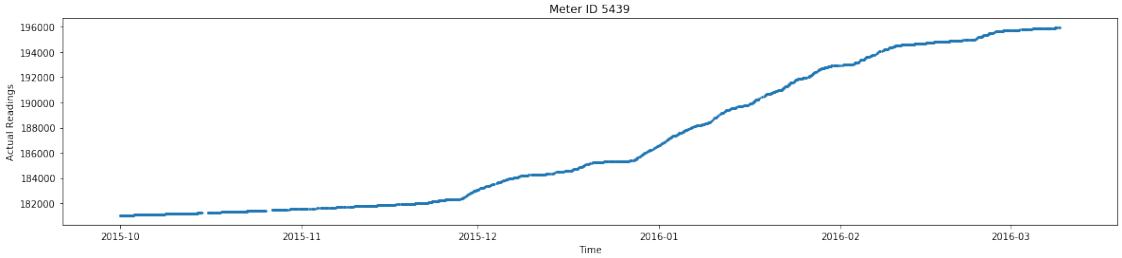
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5439
Actual Readings
196000
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188000
186000
184000
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2015-12
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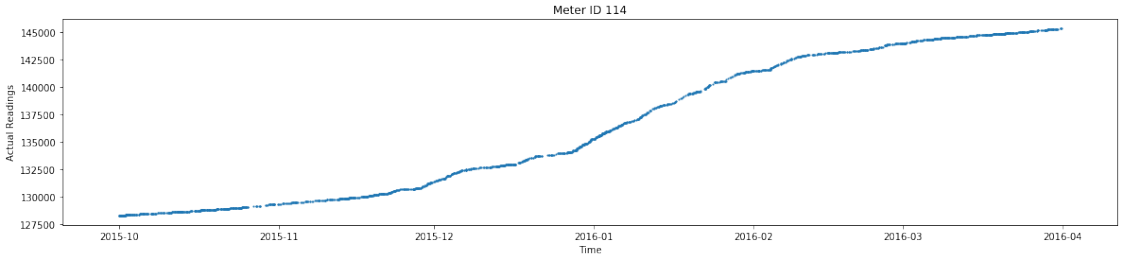
2016-02
2016-03
Time


Meter ID 114
Actual Readings
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140000
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127500
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2015-11
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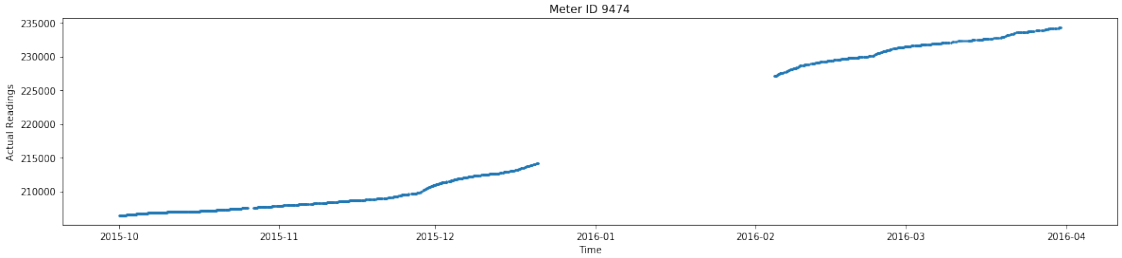
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9474
Actual Readings
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220000
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2015-11
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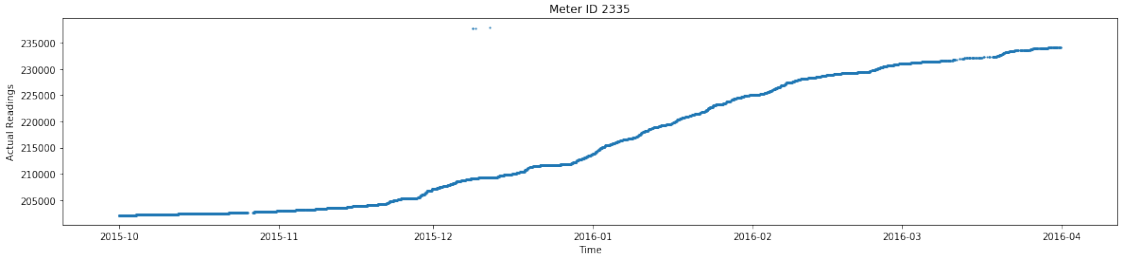
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2335
Actual Readings
235000
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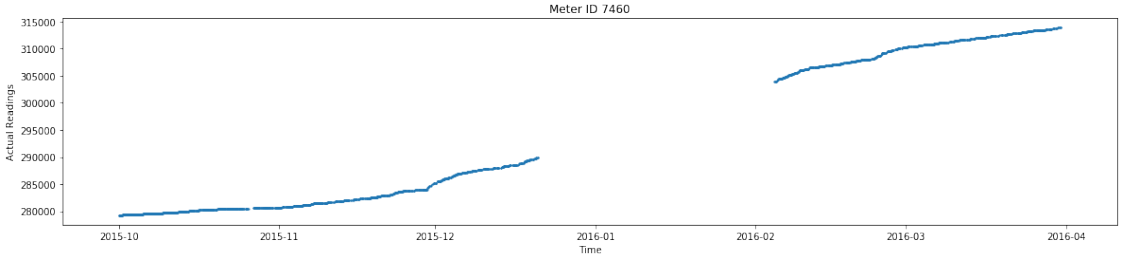
220000
215000
210000
205000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7460
Actual Readings
315000
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290000
285000
280000
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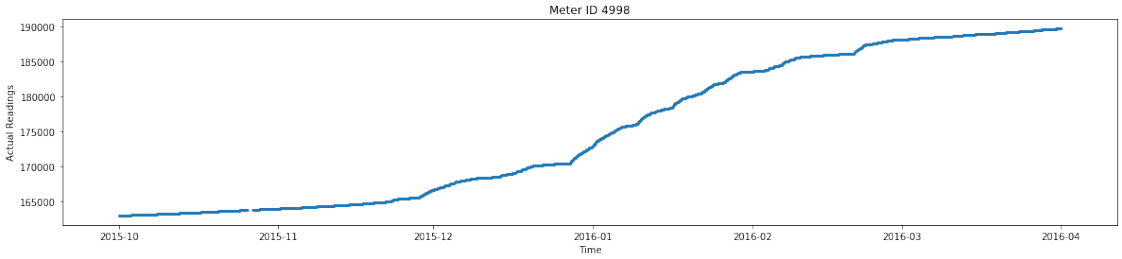
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4998
Actual Readings
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170000
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2015-11
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2016-01
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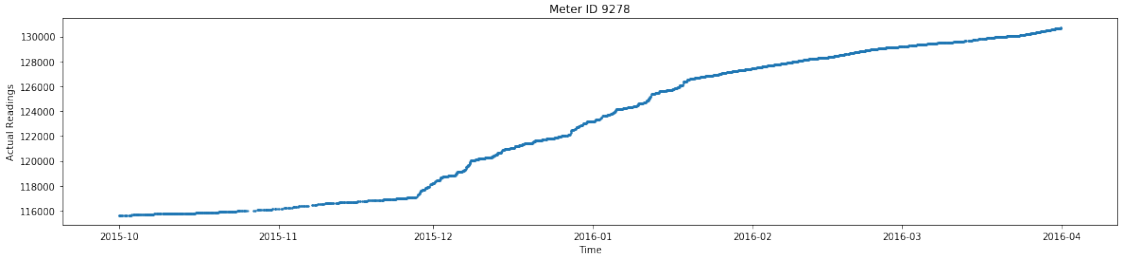
2016-03
2016-04
Time


Meter ID 9278
Actual Readings
130000
128000
126000
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120000
118000
116000
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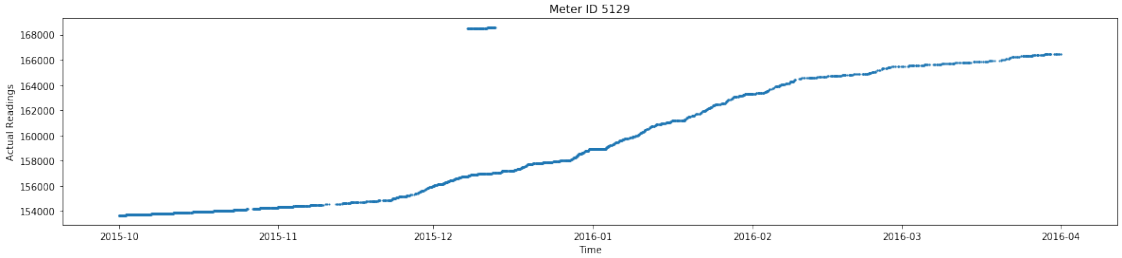
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5129
Actual Readings
168000
166000
164000
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158000
156000
154000
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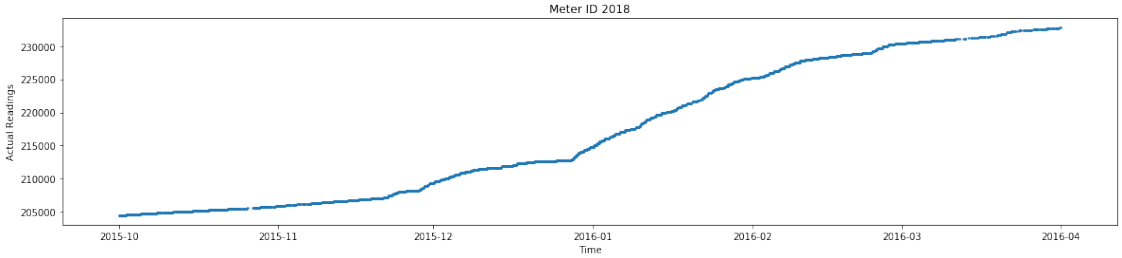
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2018
Actual Readings
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215000
210000
205000
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2015-11
2015-12
2016-01
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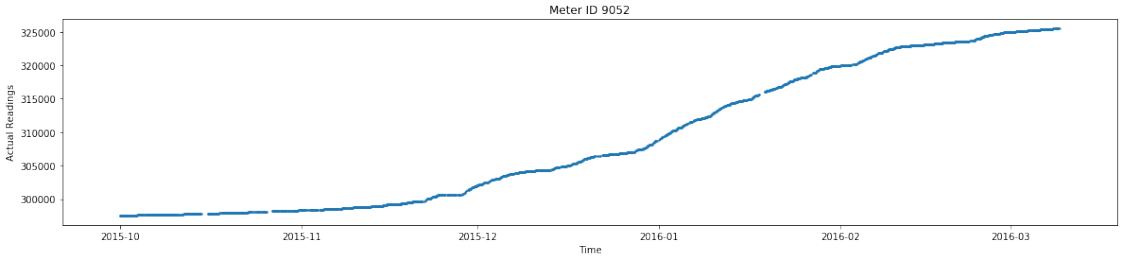
2016-03
2016-04
Time


Meter ID 9052
Actual Readings
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315000
310000
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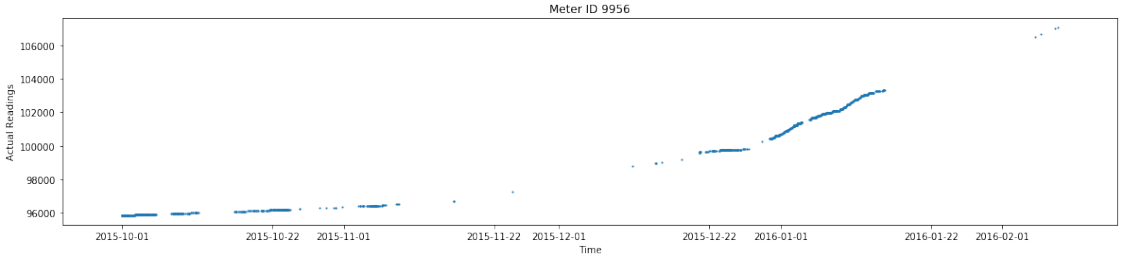
300000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 9956
Actual Readings
106000
104000
102000
100000
98000
96000
2015-10-01
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2015-11-22
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2015-12-22
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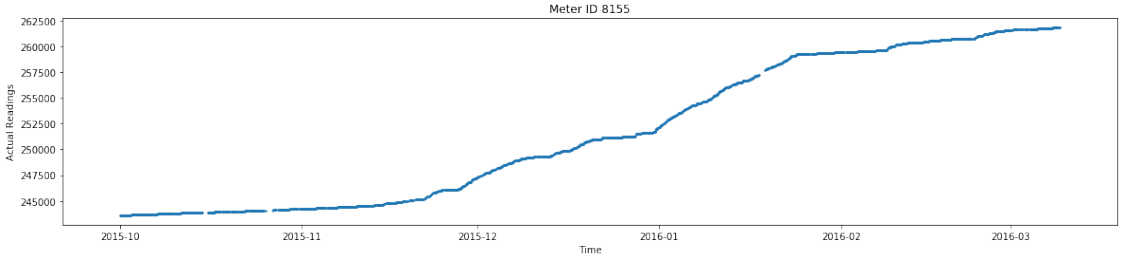
2016-01-22
2016-02-01
Time


Meter ID 8155
Actual Readings
262500
260000
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250000
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245000
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2015-12
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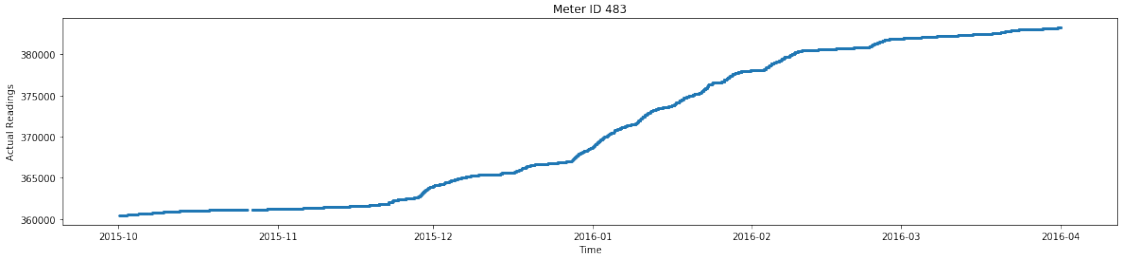
2016-02
2016-03
Time


Meter ID 483
Actual Readings
380000
375000
370000
365000
360000
2015-10
2015-11
2015-12
2016-01
2016-02
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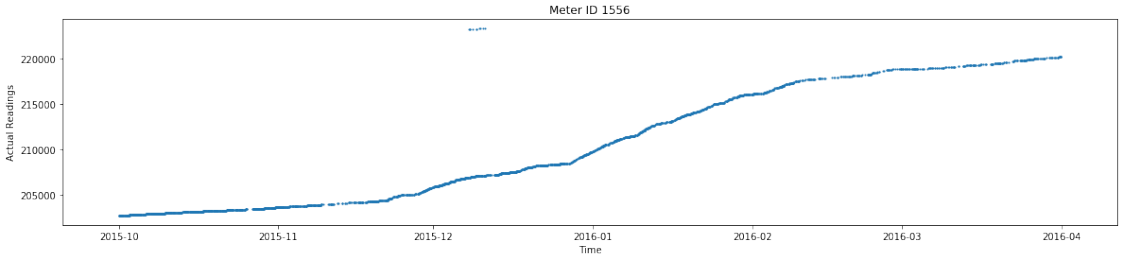
2016-04
Time


Meter ID 1556
Actual Readings
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215000
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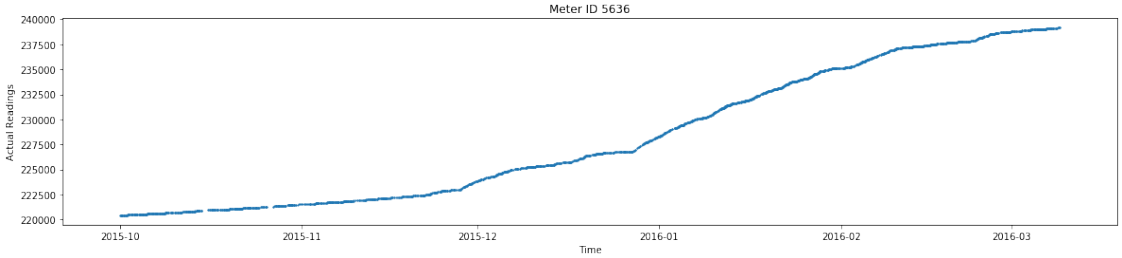
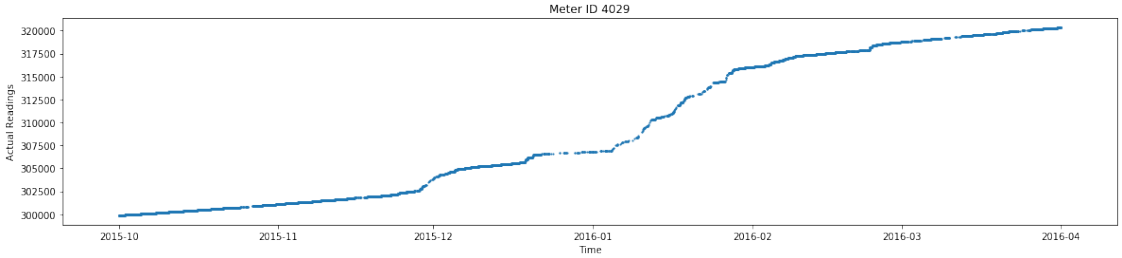
205000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5636
Actual Readings
240000
237500
235000
232500
230000
227500
225000
222500
220000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 4029
Actual Readings
320000
317500
315000
312500
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307500
305000
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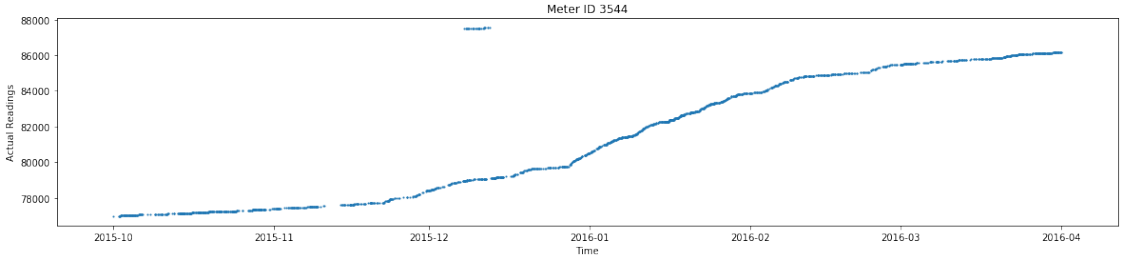
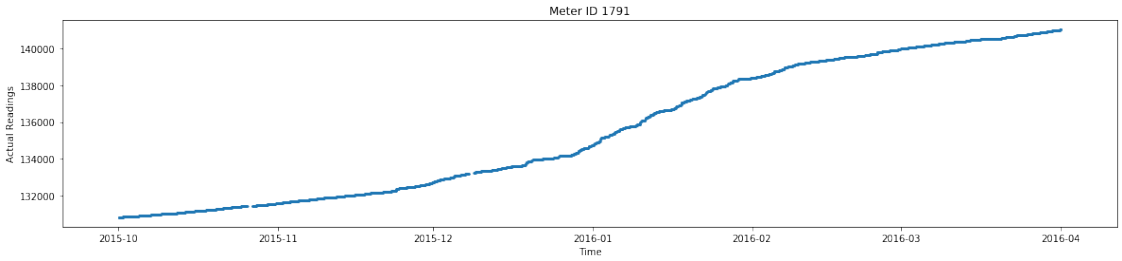
300000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3544
Actual Readings
88000
86000
84000
82000
80000
78000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1791
Actual Readings
140000
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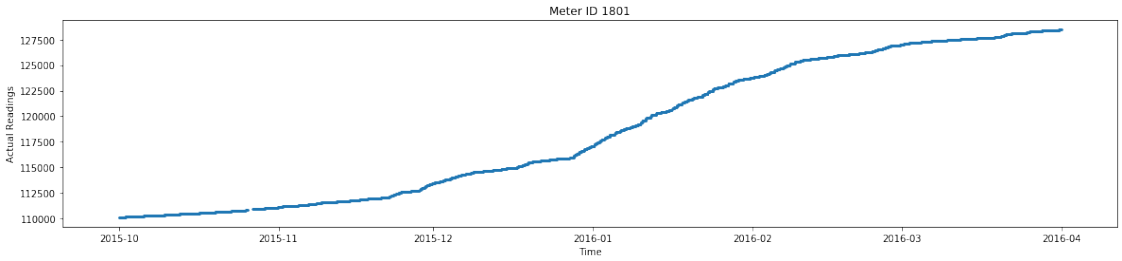
136000
134000
132000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1801
Actual Readings
127500
125000
122500
120000
117500
115000
112500
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2015-10
2015-11
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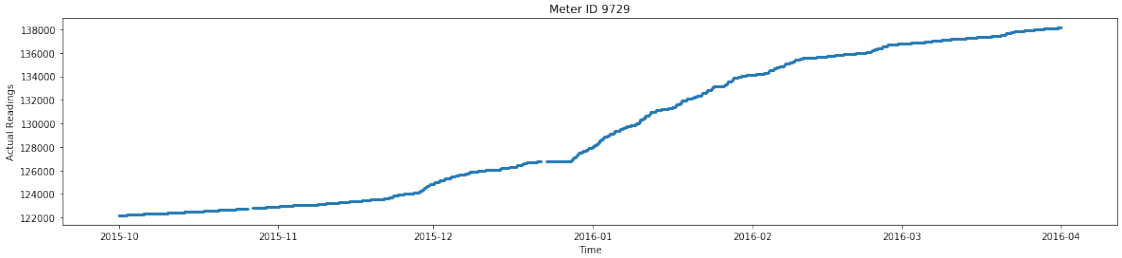
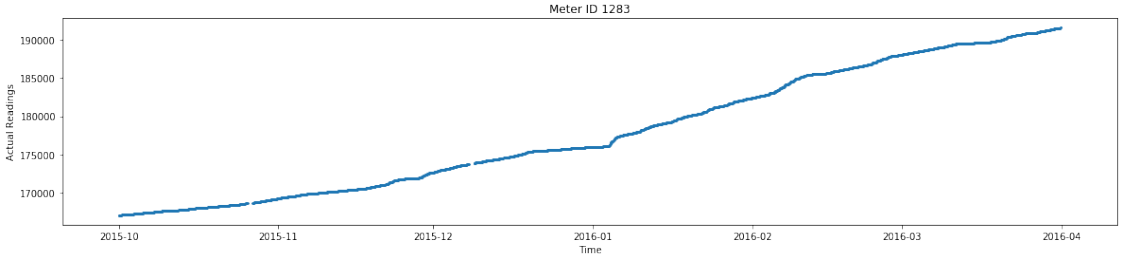
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9729
Actual Readings
138000
136000
134000
132000
130000
128000
126000
124000
122000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1283
Actual Readings
190000
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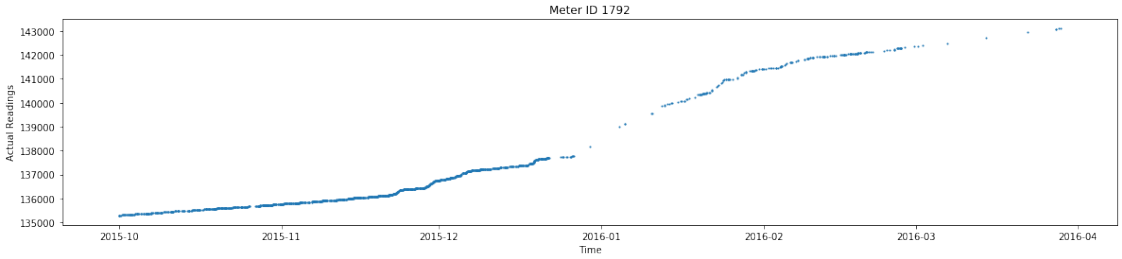
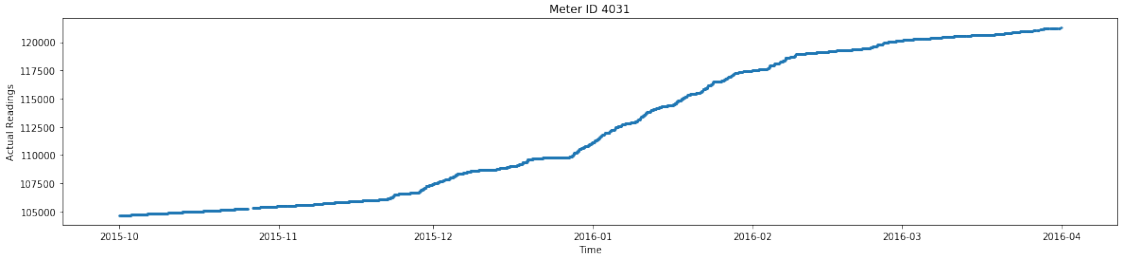
175000
170000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1792
Actual Readings
143000
142000
141000
140000
139000
138000
137000
136000
135000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4031
Actual Readings
120000
117500
115000
112500
110000
107500
105000
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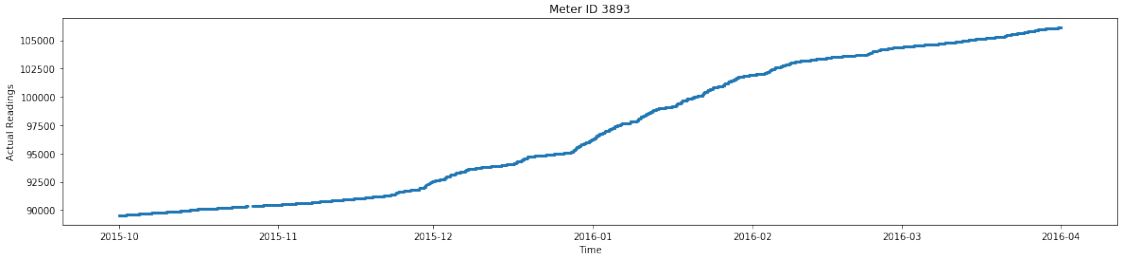
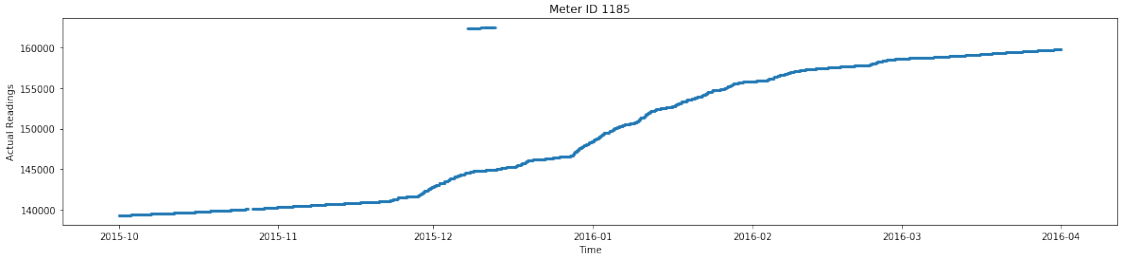
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3893
Actual Readings
105000
102500
100000
97500
95000
92500
90000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1185
Actual Readings
160000
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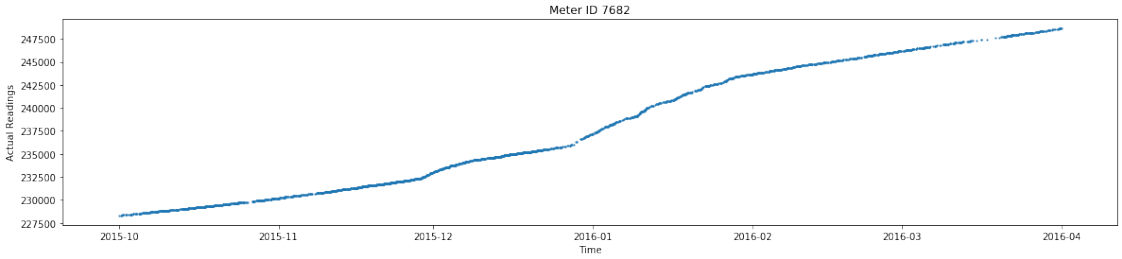
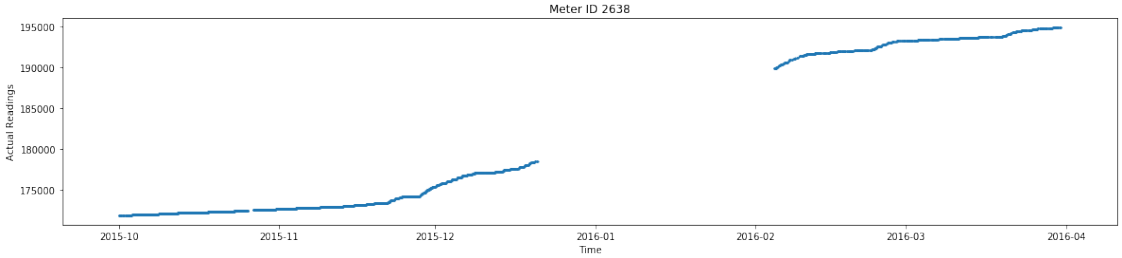
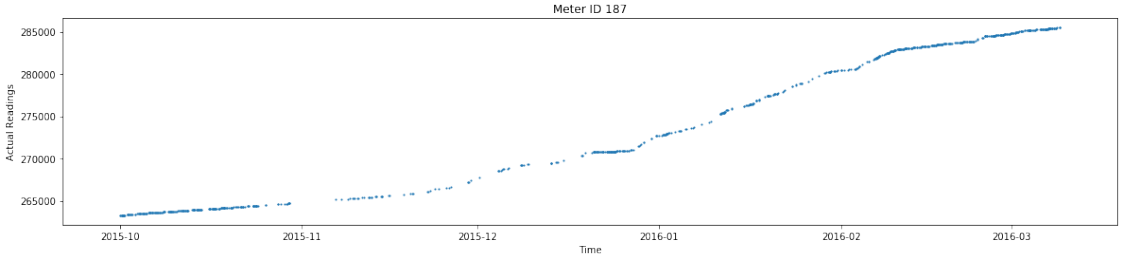
150000
145000
140000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7682
Actual Readings
247500
245000
242500
240000
237500
235000
232500
230000
227500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2638
Actual Readings
195000
190000
185000
180000
175000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 187
Actual Readings
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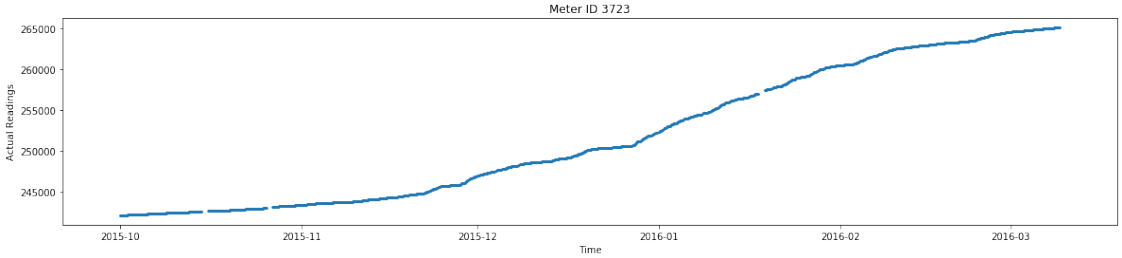
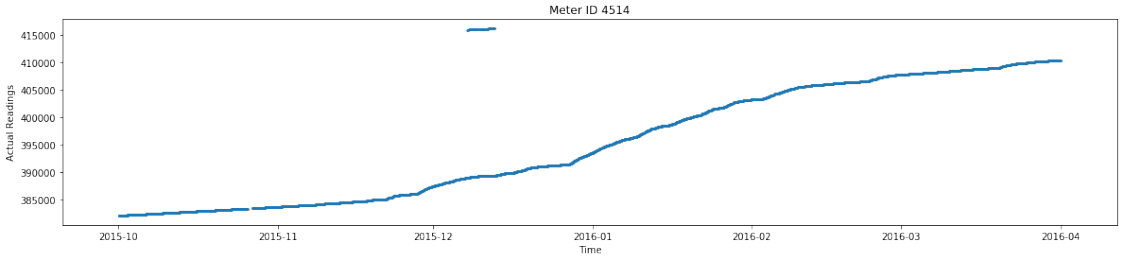
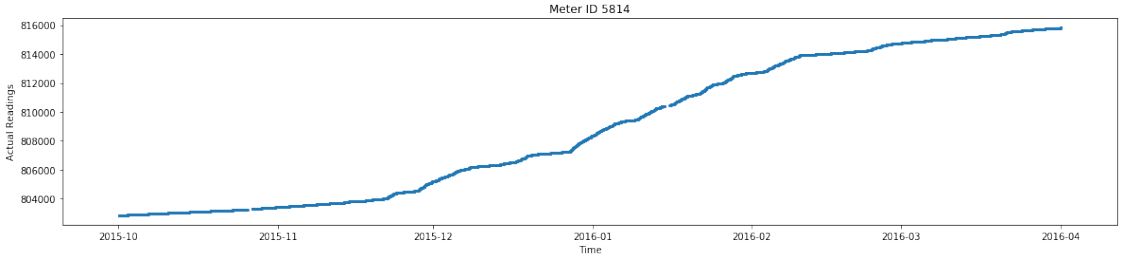
280000
275000
270000
265000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 3723
Actual Readings
265000
260000
255000
250000
245000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 4514
Actual Readings
415000
410000
405000
400000
395000
390000
385000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5814
Actual Readings
816000
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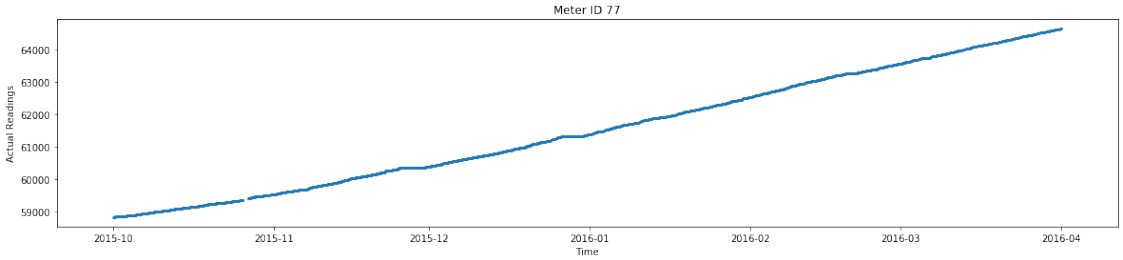
810000
808000
806000
804000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 77
Actual Readings
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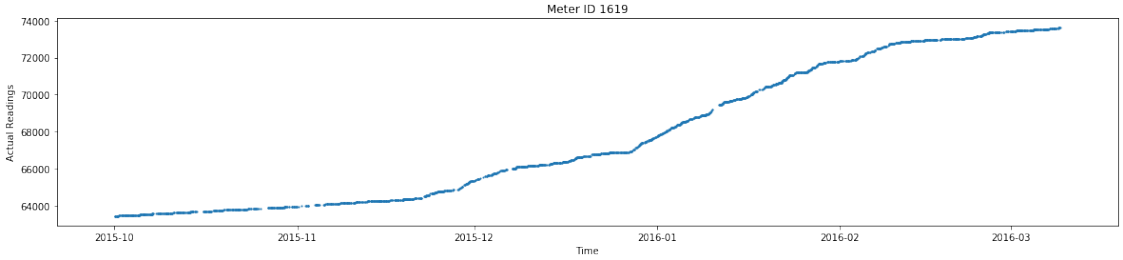
63000
62000
61000
60000
59000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1619
Actual Readings
74000
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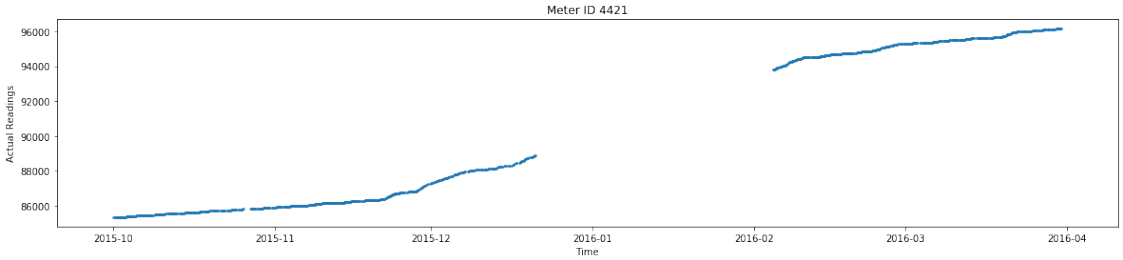
70000
68000
66000
64000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 4421
Actual Readings
96000
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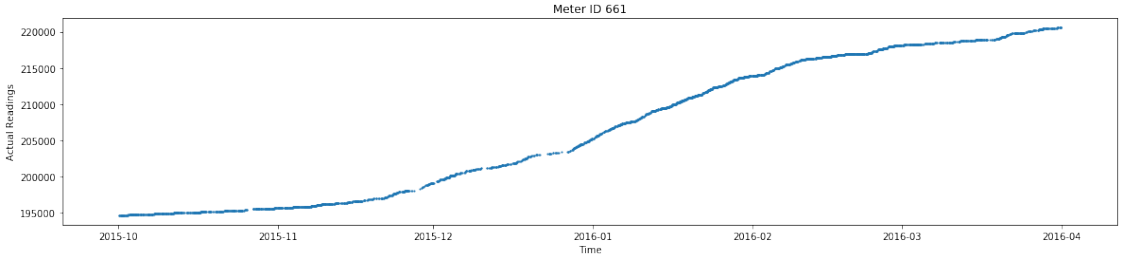
92000
90000
88000
86000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 661
Actual Readings
220000
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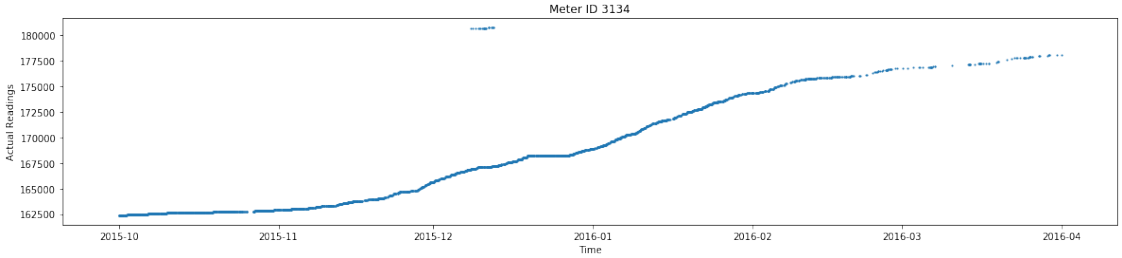
205000
200000
195000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3134
Actual Readings
180000
177500
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167500
165000
162500
2015-10
2015-11
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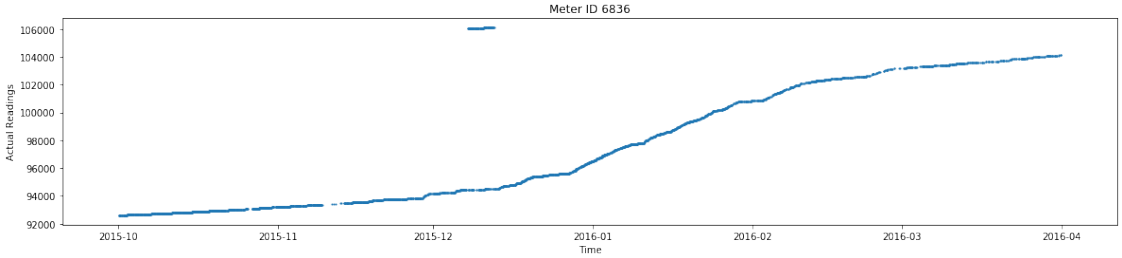
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 6836
Actual Readings
106000
104000
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100000
98000
96000
94000
92000
2015-10
2015-11
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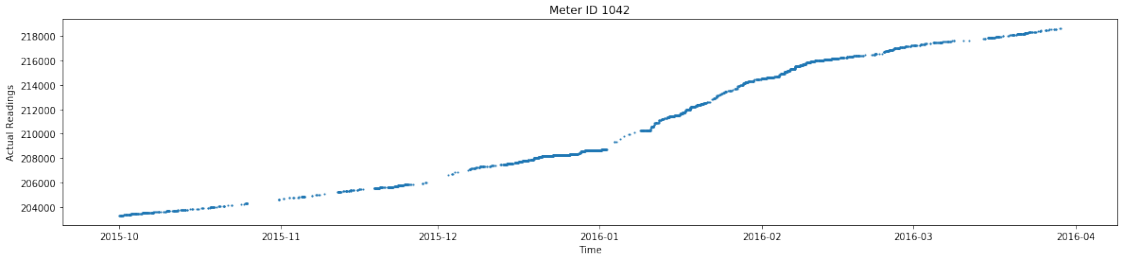
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1042
Actual Readings
218000
216000
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212000
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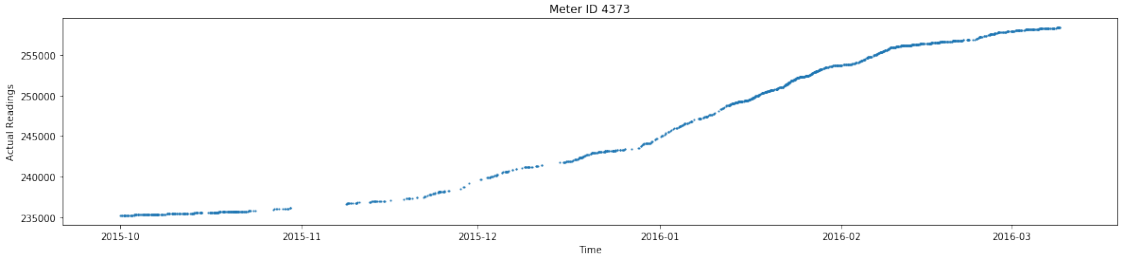
208000
206000
204000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4373
Actual Readings
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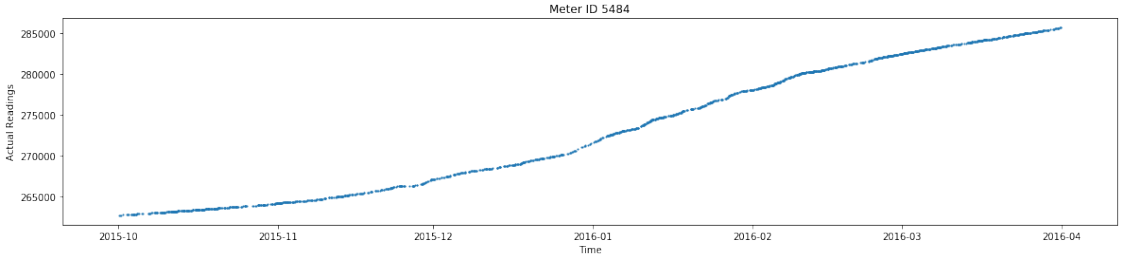
250000
245000
240000
235000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 5484
Actual Readings
285000
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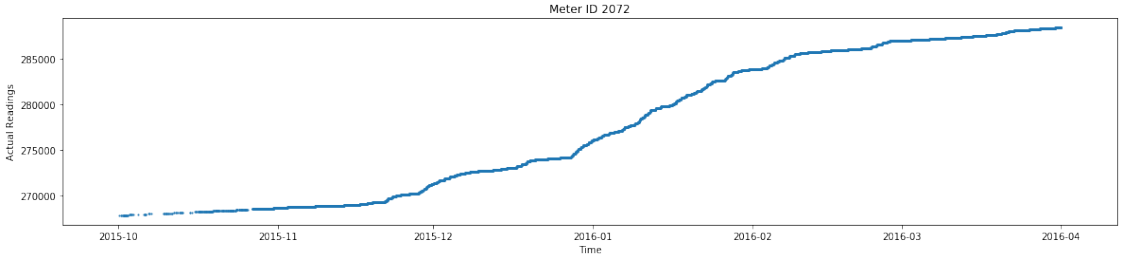
275000
270000
265000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2072
Actual Readings
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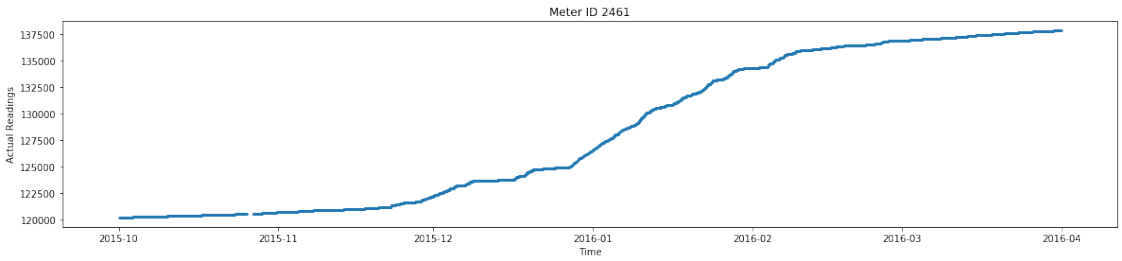
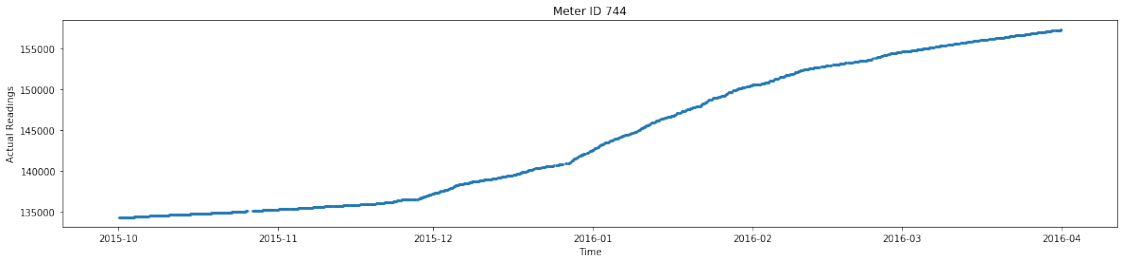
280000
275000
270000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2461
Actual Readings
137500
135000
132500
130000
127500
125000
122500
120000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 744
Actual Readings
155000
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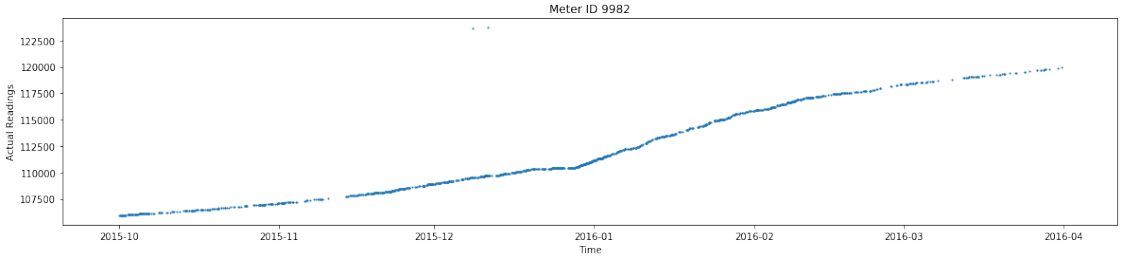
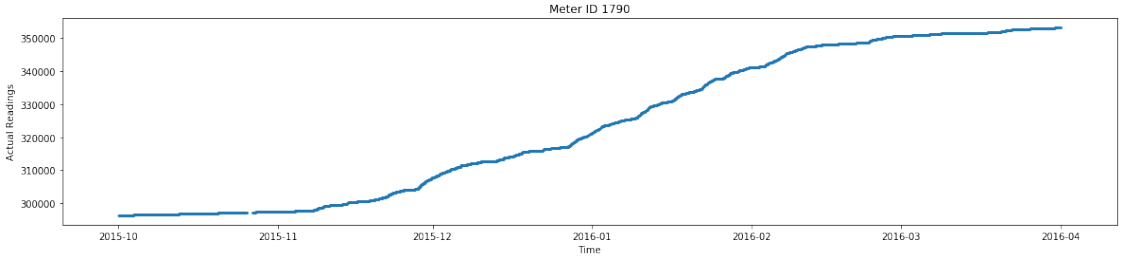
145000
140000
135000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9982
Actual Readings
122500
120000
117500
115000
112500
110000
107500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1790
Actual Readings
350000
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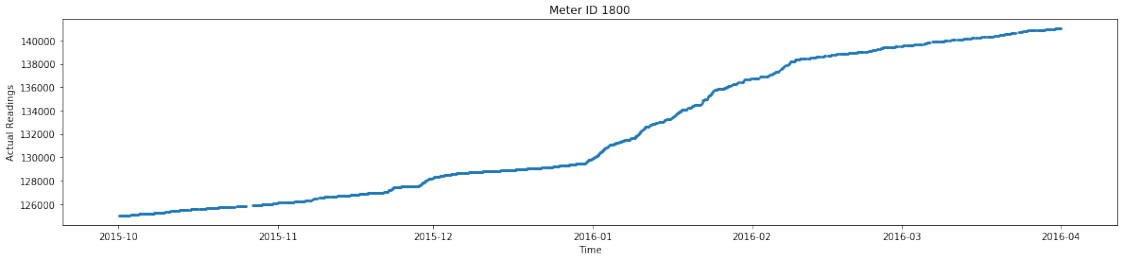
320000
310000
300000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 1800
Actual Readings
140000
138000
136000
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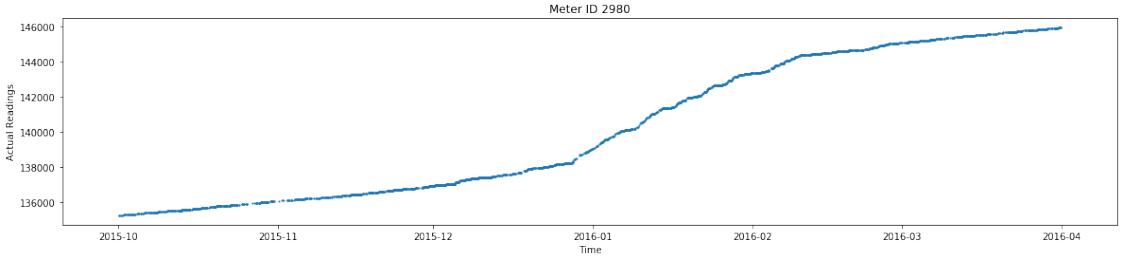
130000
128000
126000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2980
Actual Readings
146000
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142000
140000
138000
136000
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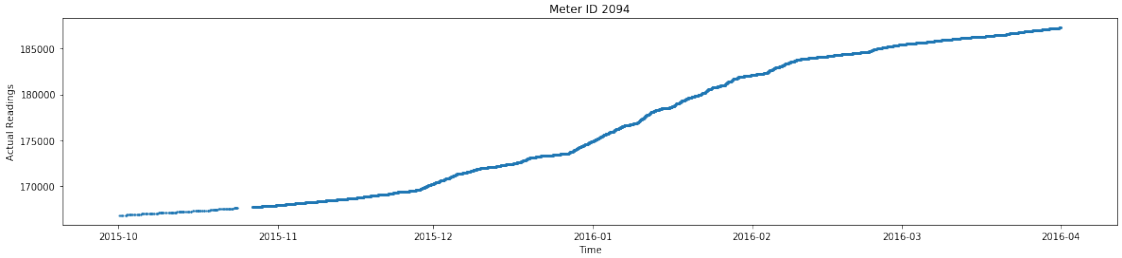
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2094
Actual Readings
185000
180000
175000
170000
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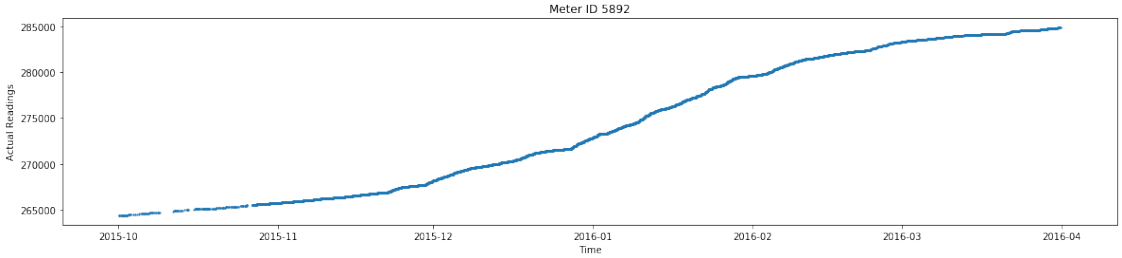
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5892
Actual Readings
285000
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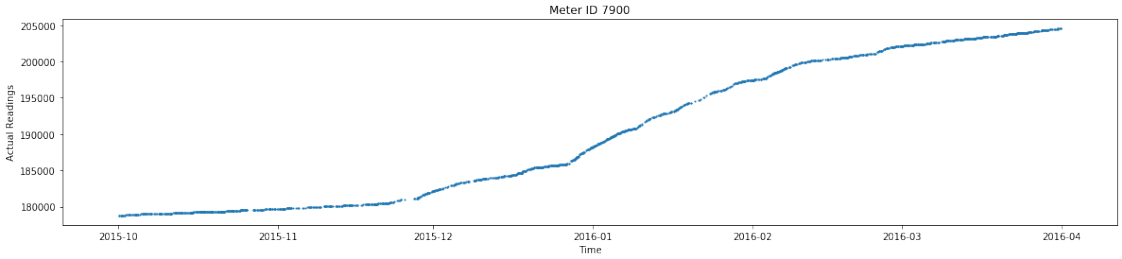
275000
270000
265000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7900
Actual Readings
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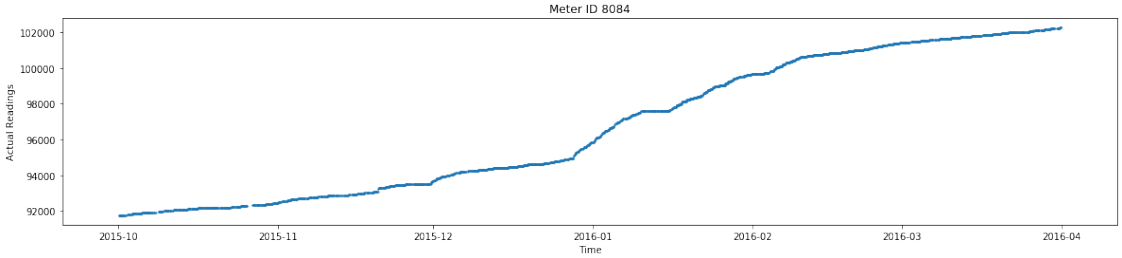
195000
190000
185000
180000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time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Actual Readings
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92000
2015-10
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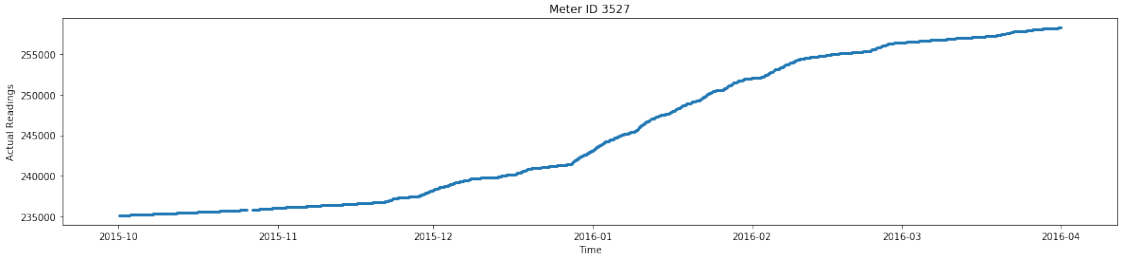
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3527
Actual Readings
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240000
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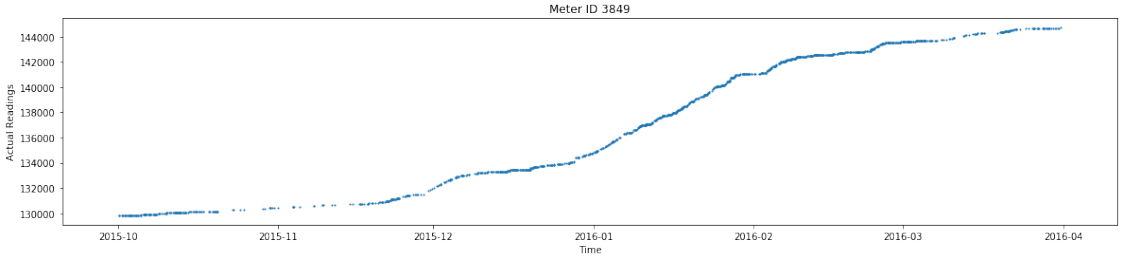
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3849
Actual Readings
144000
142000
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132000
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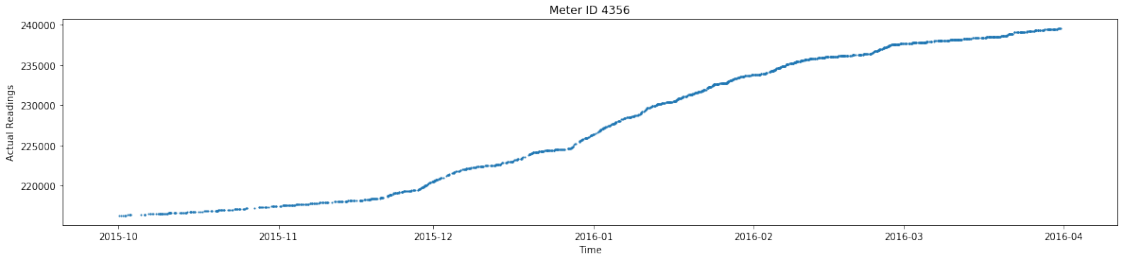
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4356
Actual Readings
240000
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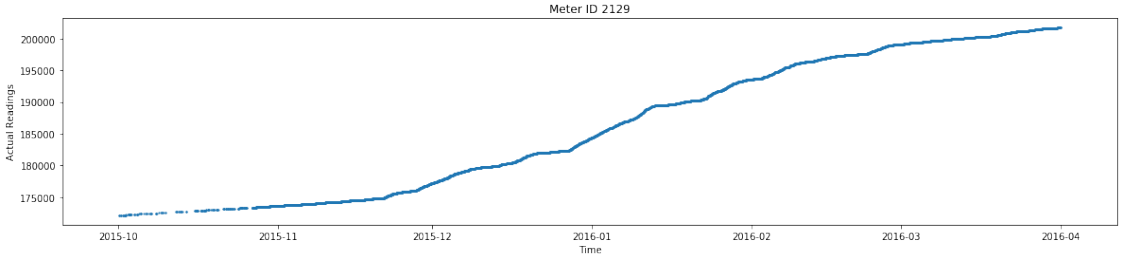
230000
225000
220000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2129
Actual Readings
200000
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185000
180000
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2015-10
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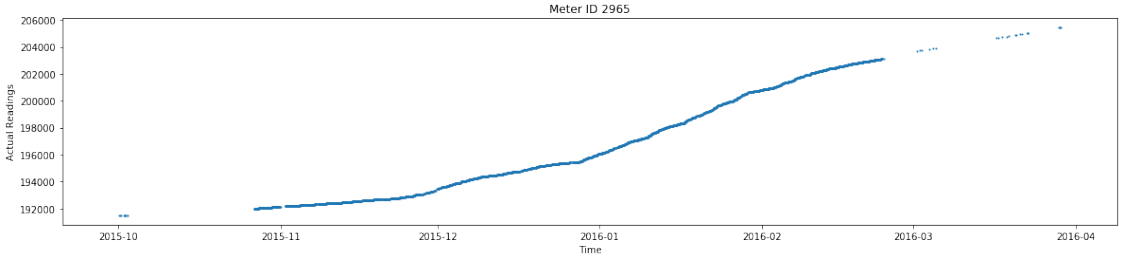
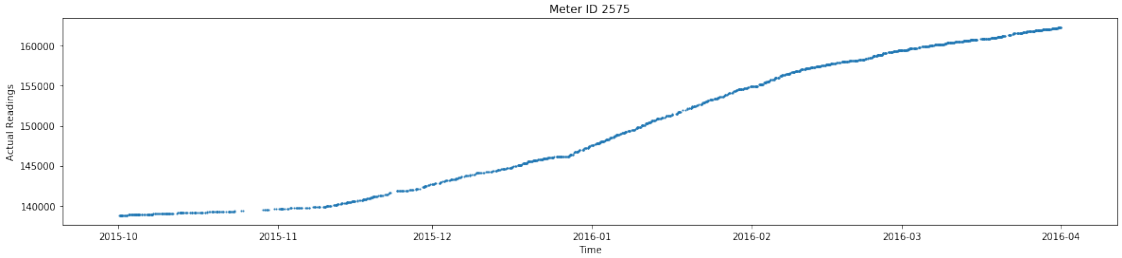
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2965
Actual Readings
206000
204000
202000
200000
198000
196000
194000
192000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2575
Actual Readings
160000
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145000
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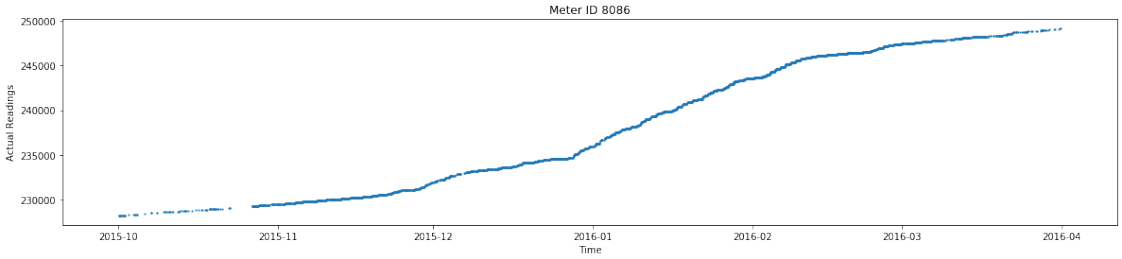
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8086
Actual Readings
250000
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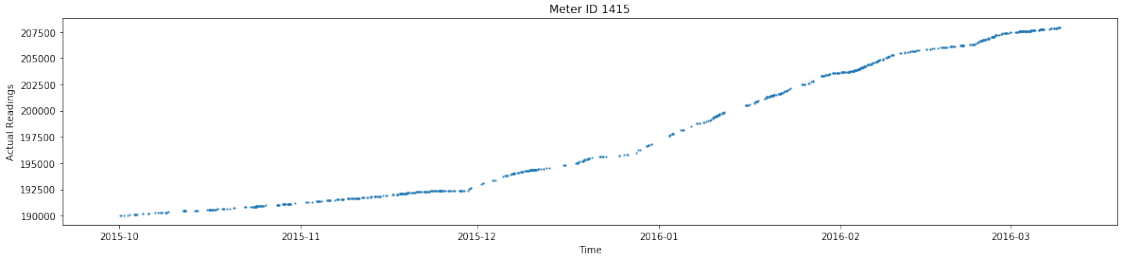
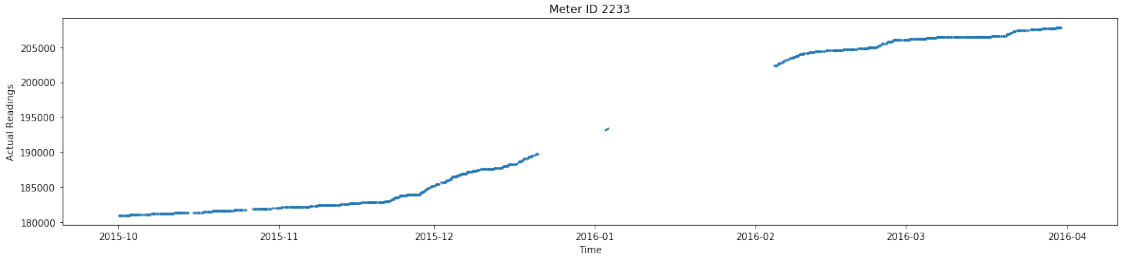
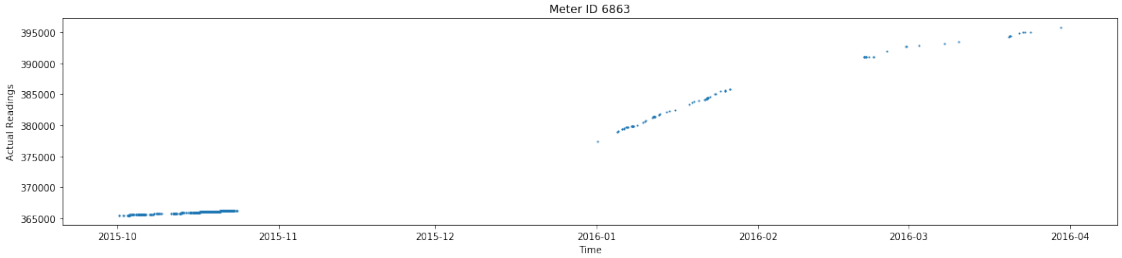
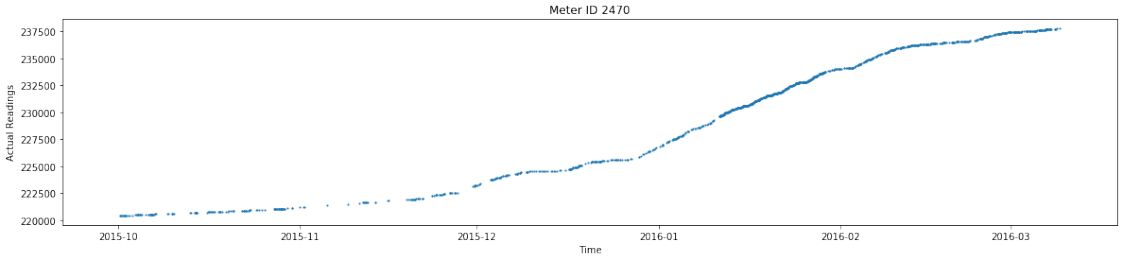
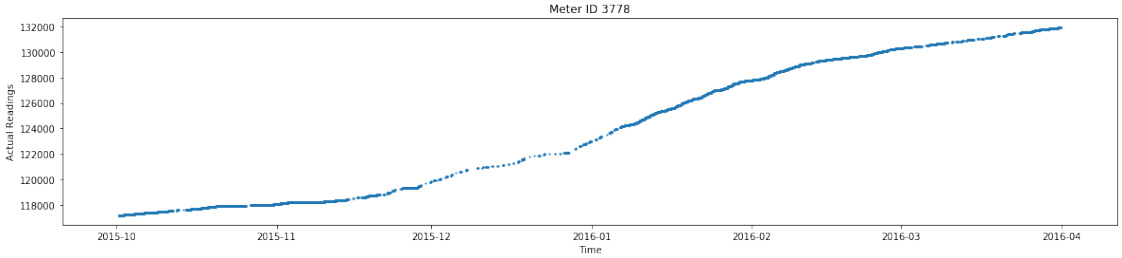
240000
235000
230000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

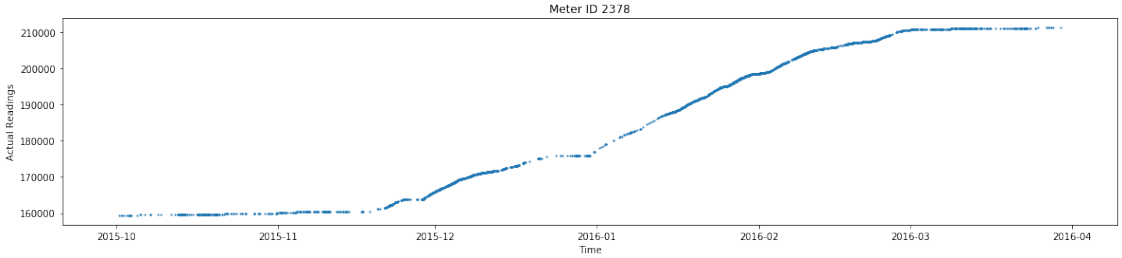

Meter ID 1415
Actual Readings
207500
205000
202500
200000
197500
195000
192500
190000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 2233
Actual Readings
205000
200000
195000
190000
185000
180000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 6863
Actual Readings
395000
390000
385000
380000
375000
370000
365000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2470
Actual Readings
237500
235000
232500
230000
227500
225000
222500
220000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 3778
Actual Readings
132000
130000
128000
126000
124000
122000
120000
118000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2378
Actual Readings
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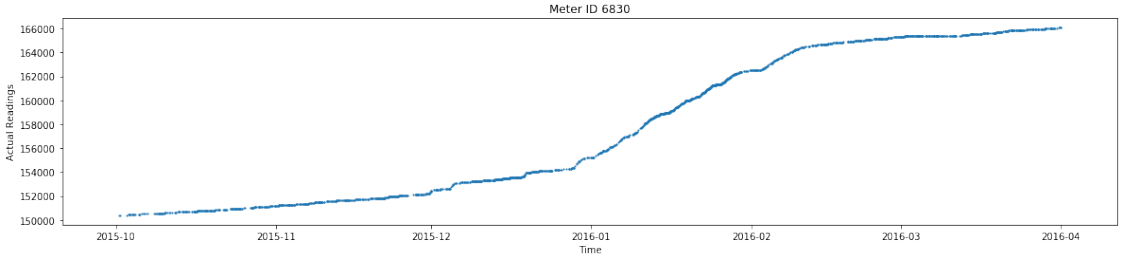
180000
170000
160000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time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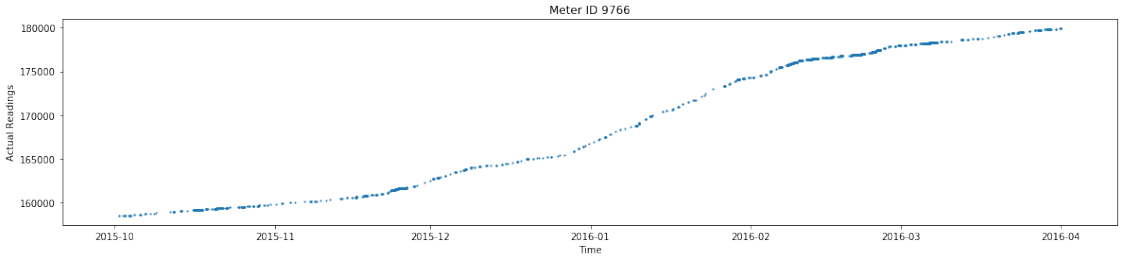
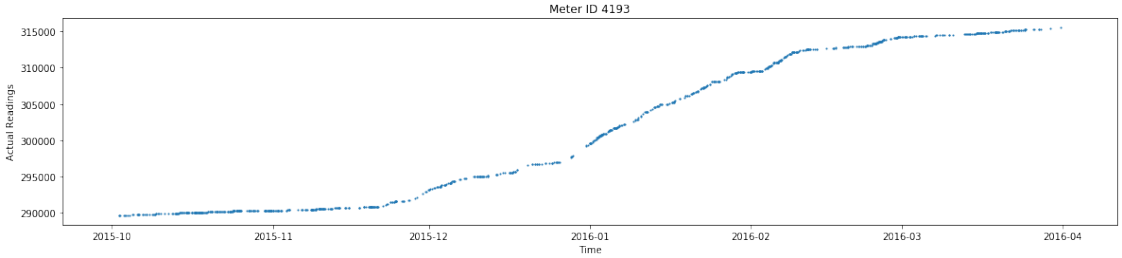
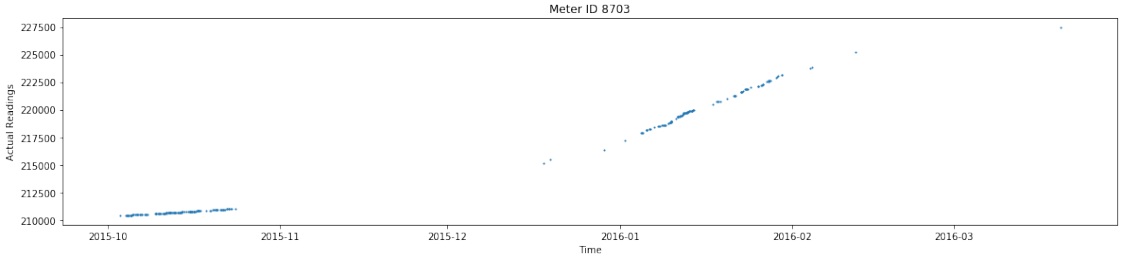
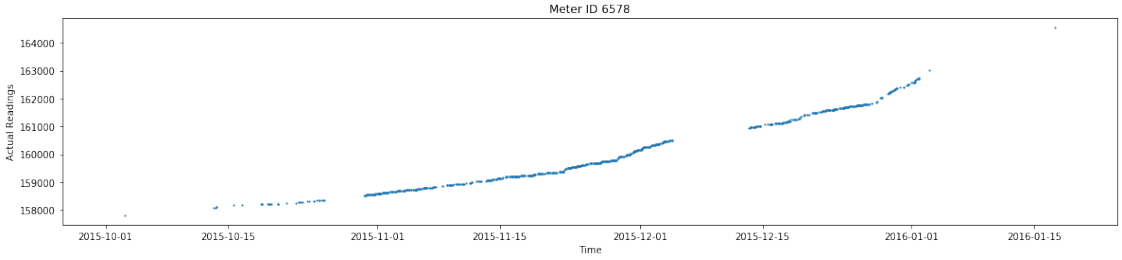
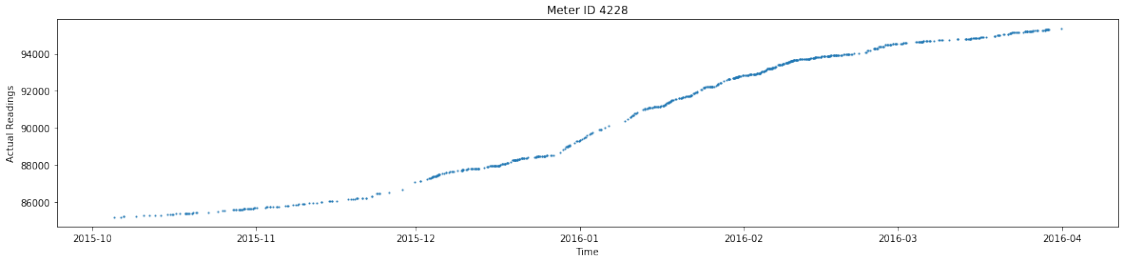
Actual Readings
166000
164000
162000
160000
158000
156000
154000
152000
150000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

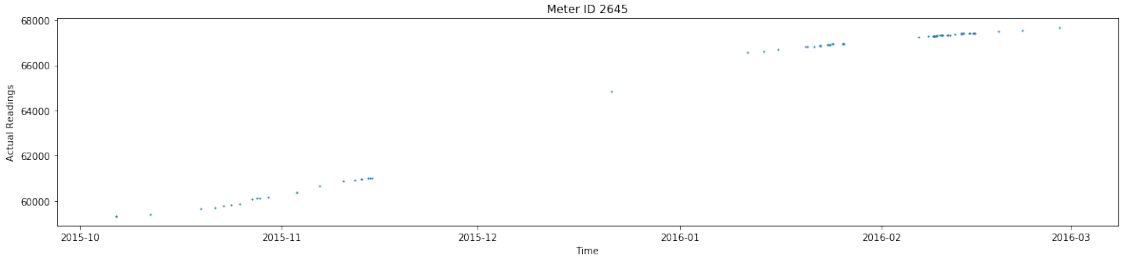

Meter ID 9766
Actual Readings
180000
175000
170000
165000
160000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4193
Actual Readings
315000
310000
305000
300000
295000
290000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8703
Actual Readings
227500
225000
222500
220000
217500
215000
212500
210000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 6578
Actual Readings
164000
163000
162000
161000
160000
159000
158000
2015-10-01
2015-10-15
2015-11-01
2015-11-15
2015-12-01
2015-12-15
2016-01-01
2016-01-15
Time


Meter ID 4228
Actual Readings
94000
92000
90000
88000
86000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2645
Actual Readings
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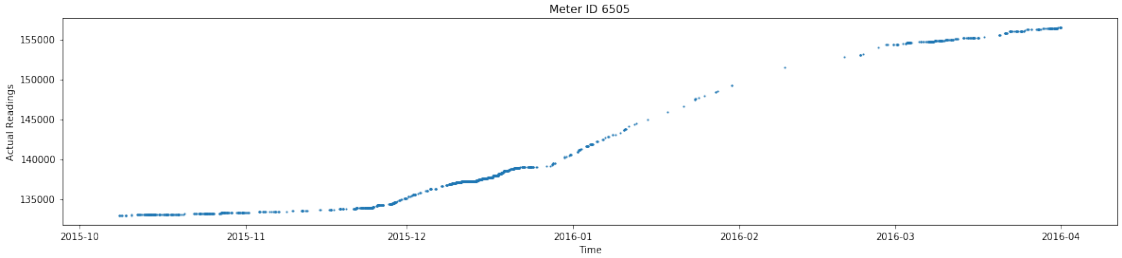
66000
64000
62000
60000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 6505
Actual Readings
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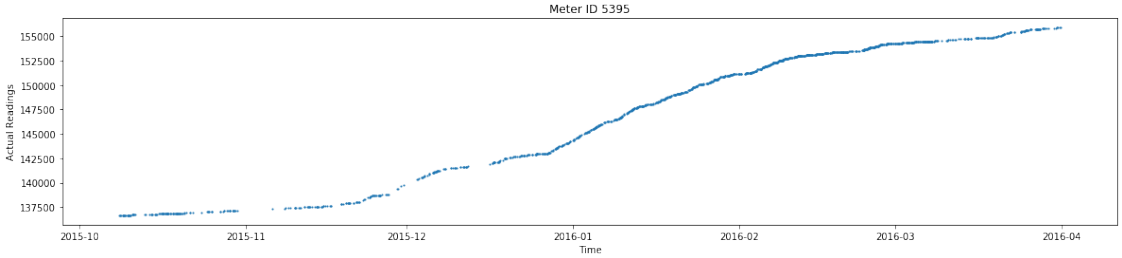
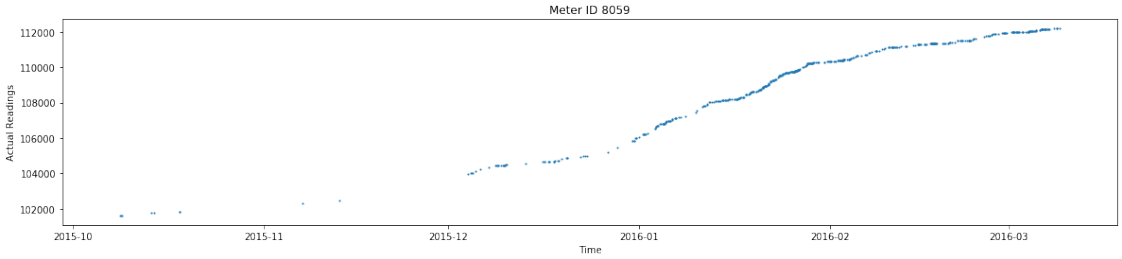
145000
140000
135000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5395
Actual Readings
155000
152500
150000
147500
145000
142500
140000
137500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8059
Actual Readings
112000
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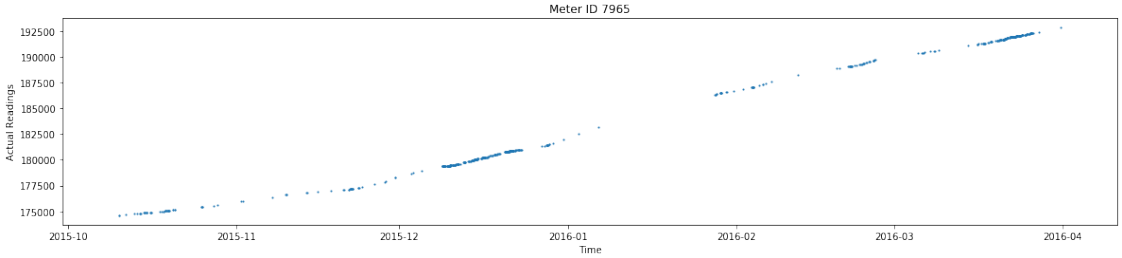
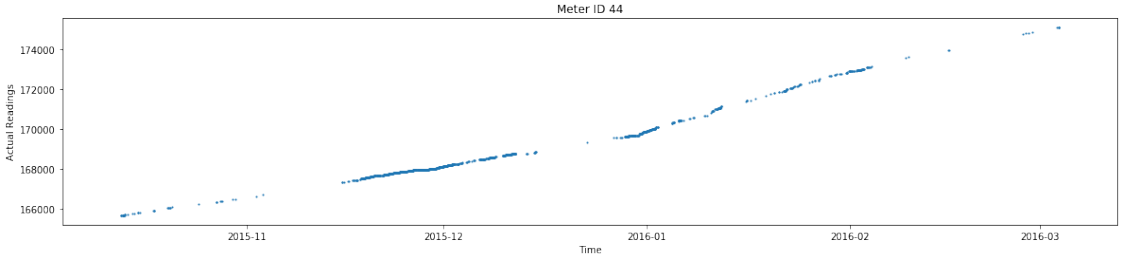
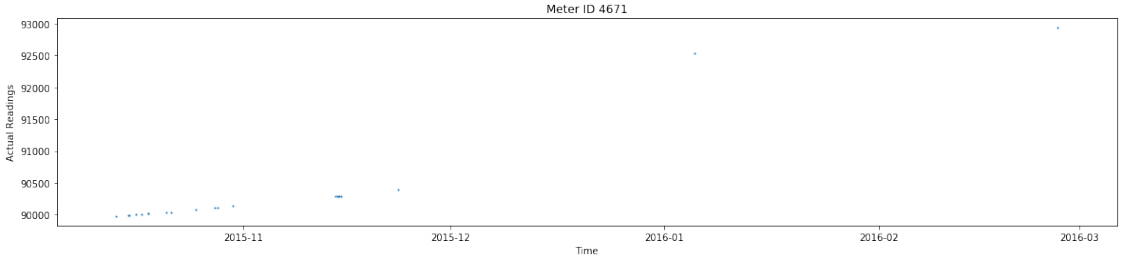
108000
106000
104000
102000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 7965
Actual Readings
192500
190000
187500
185000
182500
180000
177500
175000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 44
Actual Readings
174000
172000
170000
168000
166000
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 4671
Actual Readings
93000
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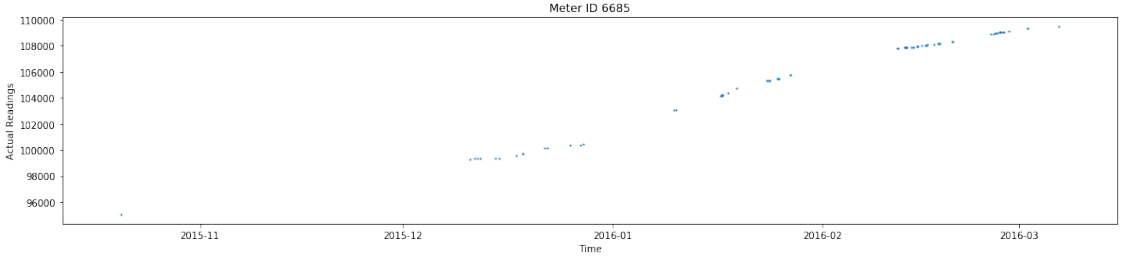
92000
91500
91000
90500
90000
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 6685
Actual Readings
110000
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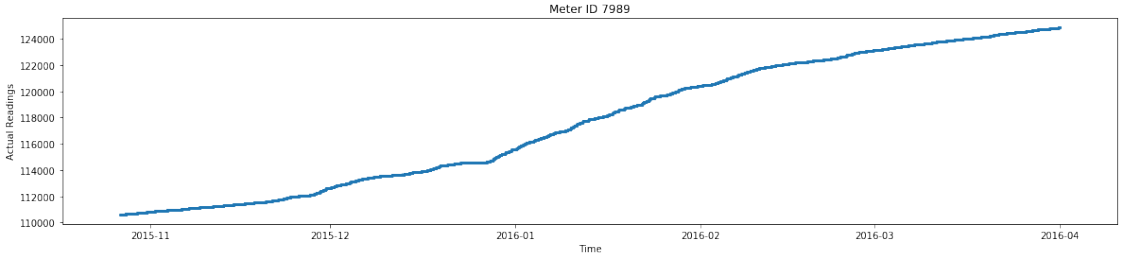
106000
104000
102000
100000
98000
96000
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 7989
Actual Readings
124000
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118000
116000
114000
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110000
2015-11
2015-12
2016-01
2016-02
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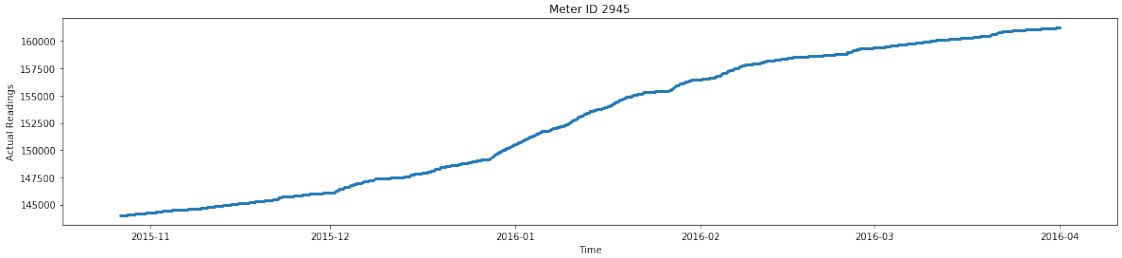
2016-04
Time


Meter ID 2945
Actual Readings
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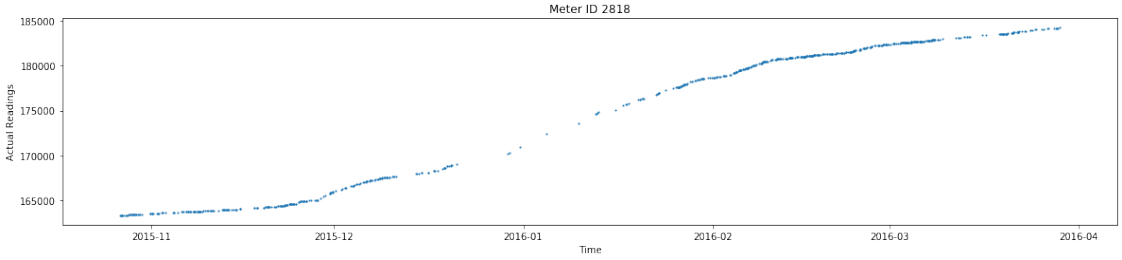
155000
152500
150000
147500
145000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 2818
Actual Readings
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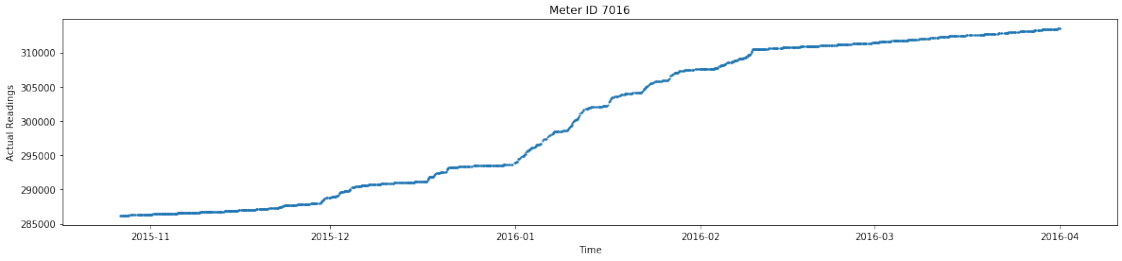
180000
175000
170000
165000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7016
Actual Readings
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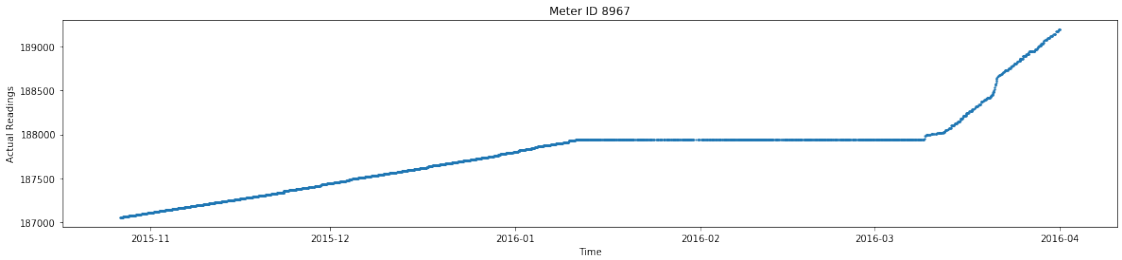
300000
295000
290000
285000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8967
Actual Readings
189000
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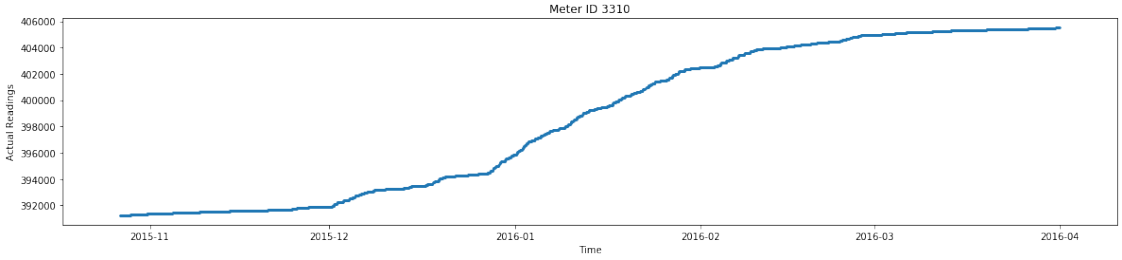
188000
187500
187000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3310
Actual Readings
406000
404000
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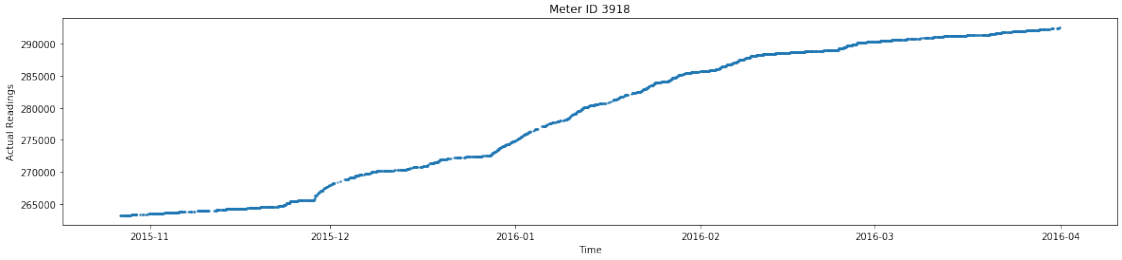
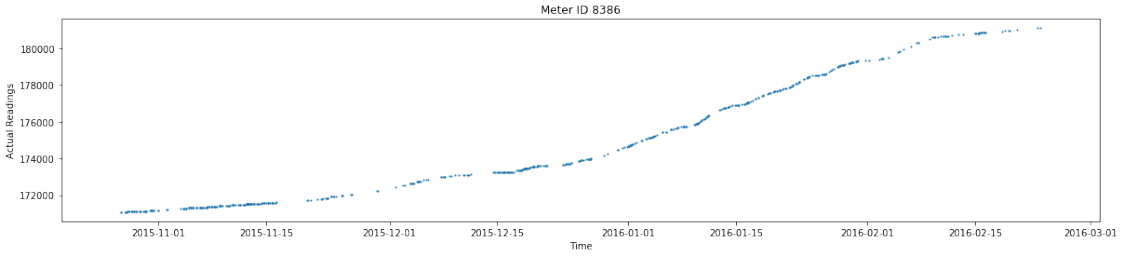
400000
398000
396000
394000
392000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 3918
Actual Readings
290000
285000
280000
275000
270000
265000
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 8386
Actual Readings
180000
178000
176000
174000
172000
2015-11-01
2015-11-15
2015-12-01
2015-12-15
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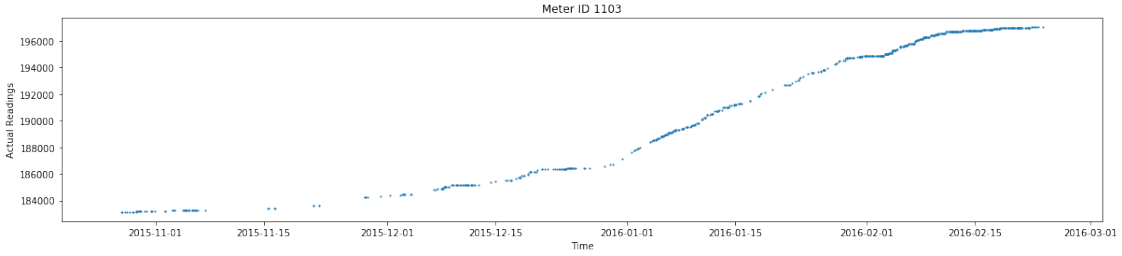
2016-02-01
2016-02-15
2016-03-01
Time


Meter ID 1103
Actual Readings
196000
194000
192000
190000
188000
186000
184000
2015-11-01
2015-11-15
2015-12-01
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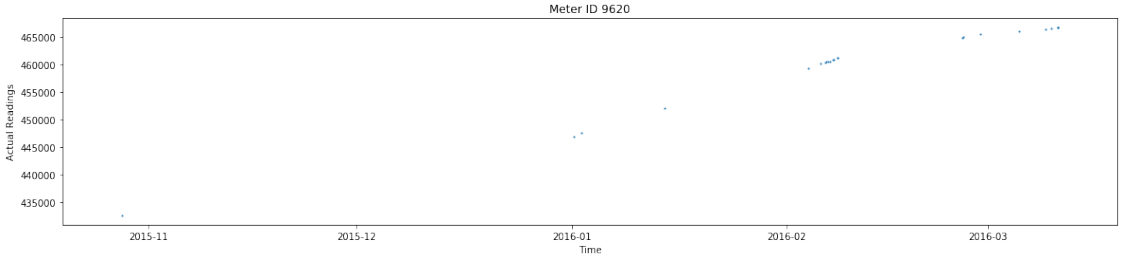
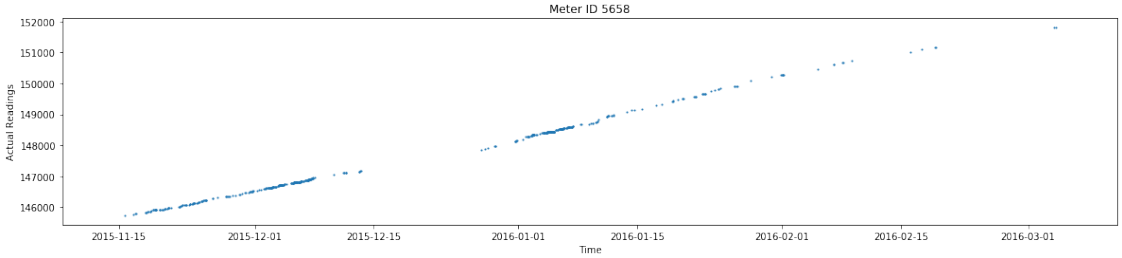
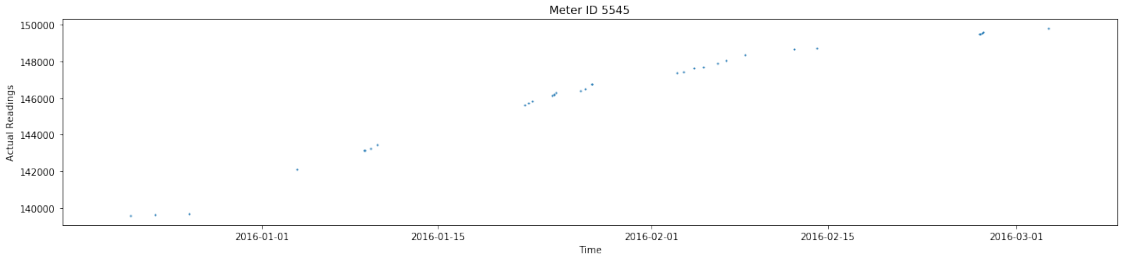
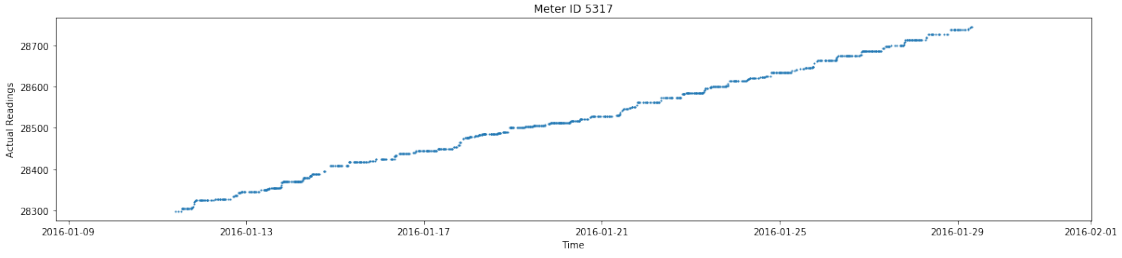
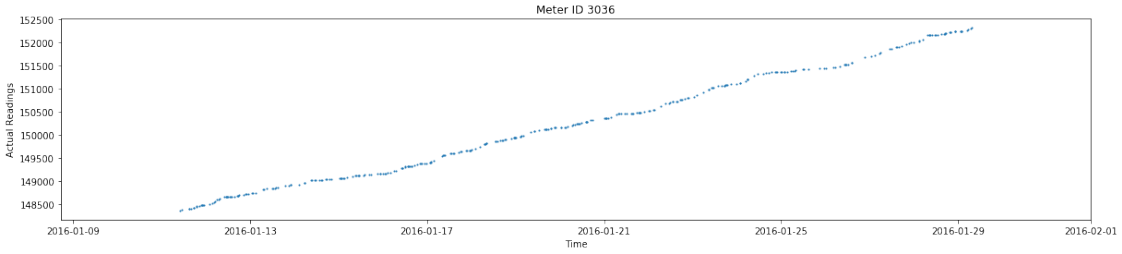
2016-02-01
2016-02-15
2016-03-01
Time

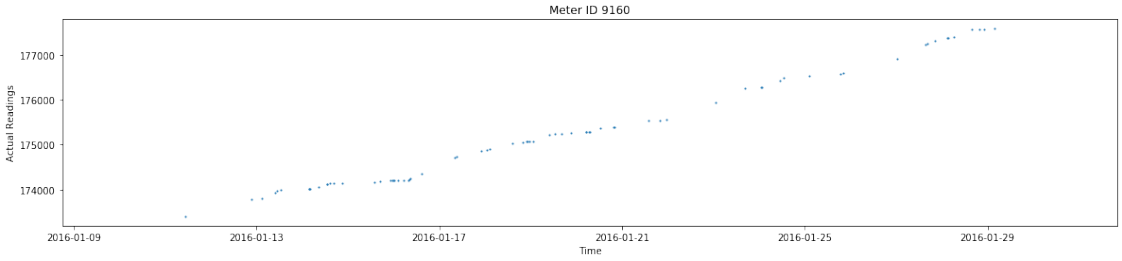

Meter ID 9620
Actual Readings
465000
460000
455000
450000
445000
440000
435000
2015-11
2015-12
2016-01
2016-02
2016-03
Time

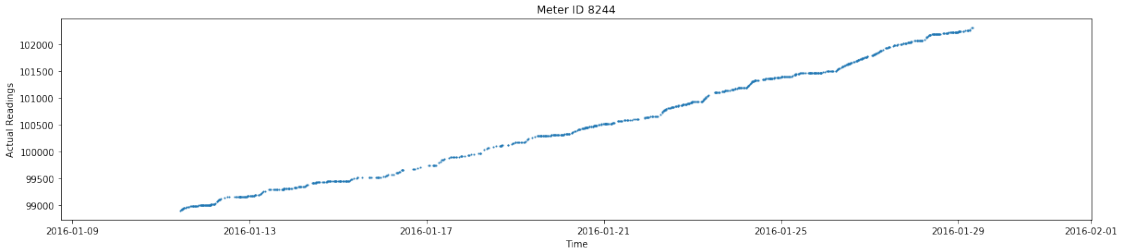

Meter ID 5658
Actual Readings
152000
151000
150000
149000
148000
147000
146000
2015-11-15
2015-12-01
2015-12-15
2016-01-01
2016-01-15
2016-02-01
2016-02-15
2016-03-01
Time

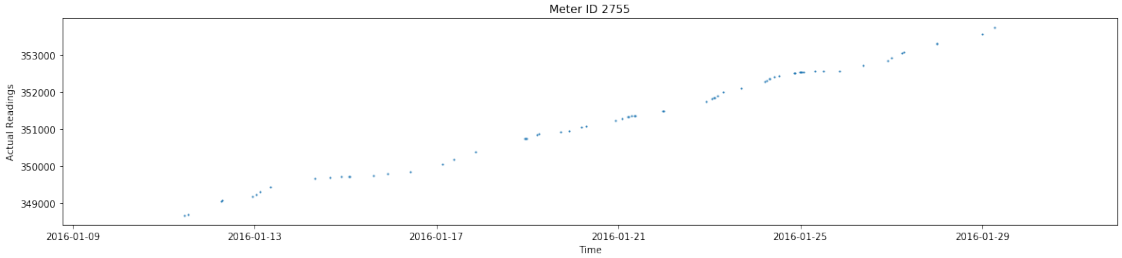

Meter ID 5545
Actual Readings
150000
148000
146000
144000
142000
140000
2016-01-01
2016-01-15
2016-02-01
2016-02-15
2016-03-01
Time

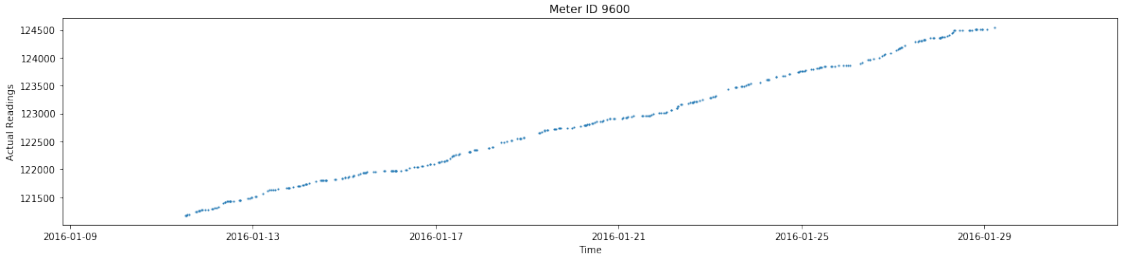

Meter ID 5317
Actual Readings
28700
28600
28500
28400
28300
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

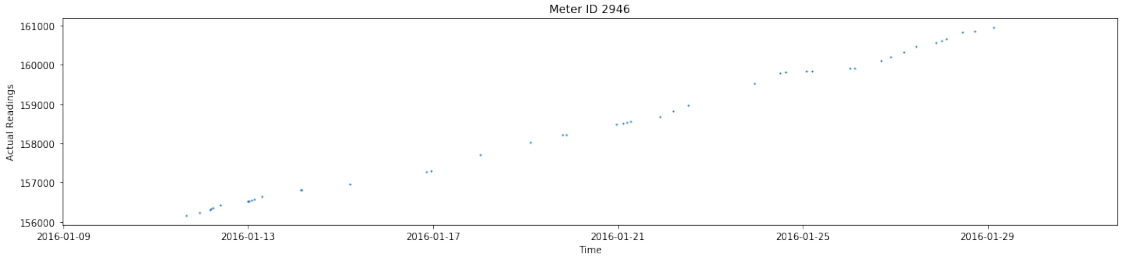

Meter ID 3036
Actual Readings
152500
152000
151500
151000
150500
150000
149500
149000
148500
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

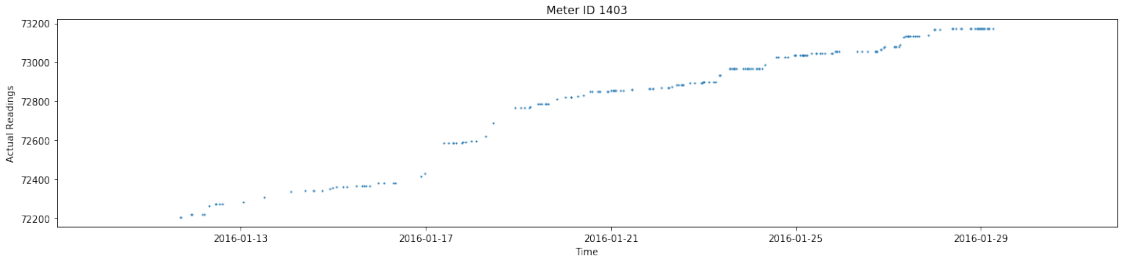

Meter ID 9160
Actual Readings
177000
176000
175000
174000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

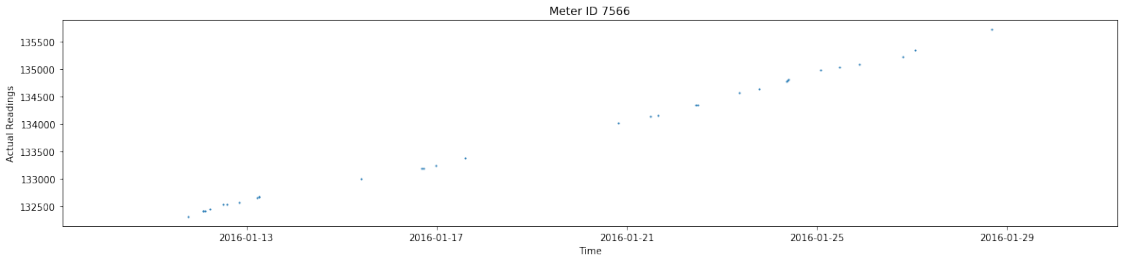

Meter ID 8244
Actual Readings
102000
101500
101000
100500
100000
99500
99000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

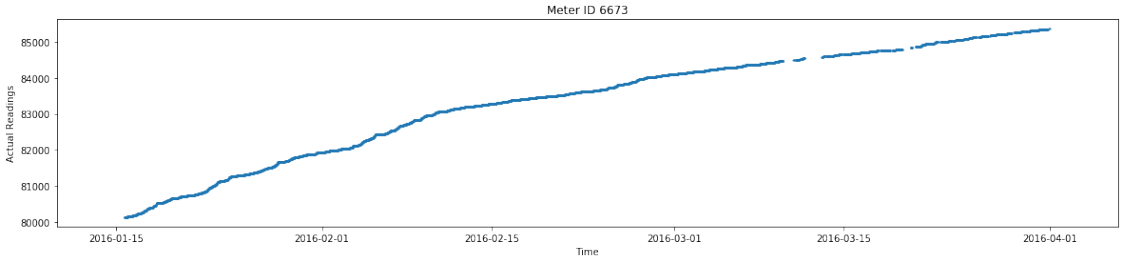

Meter ID 2755
Actual Readings
353000
352000
351000
350000
349000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

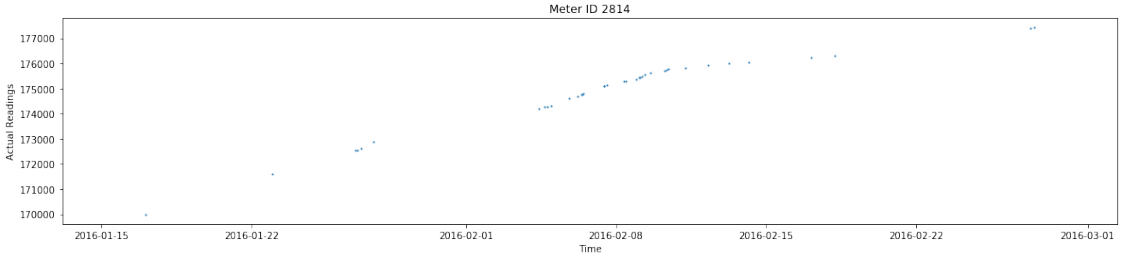

Meter ID 9600
Actual Readings
124500
124000
123500
123000
122500
122000
121500
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

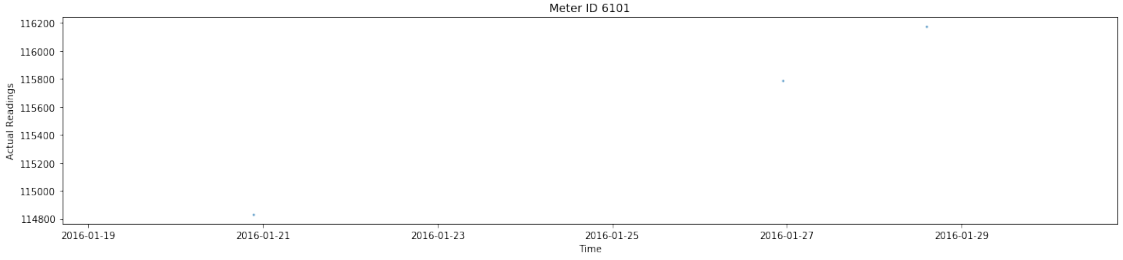

Meter ID 2946
Actual Readings
161000
160000
159000
158000
157000
156000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

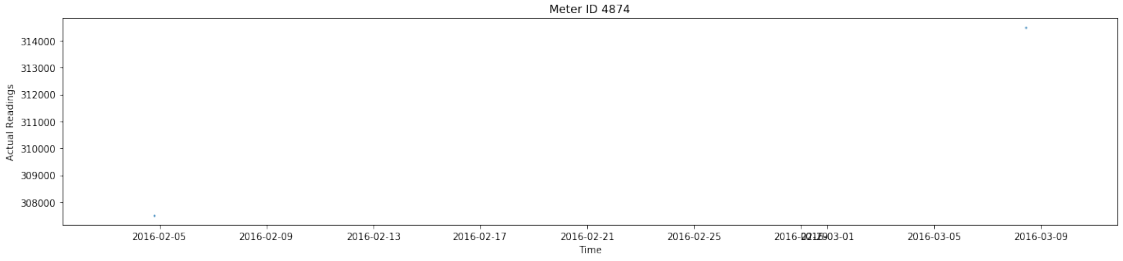

Meter ID 1403
Actual Readings
73200
73000
72800
72600
72400
72200
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time


Meter ID 7566
Actual Readings
135500
135000
134500
134000
133500
133000
132500
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time





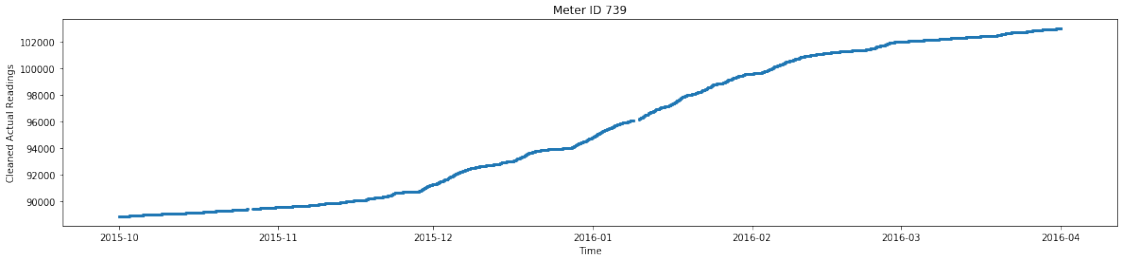


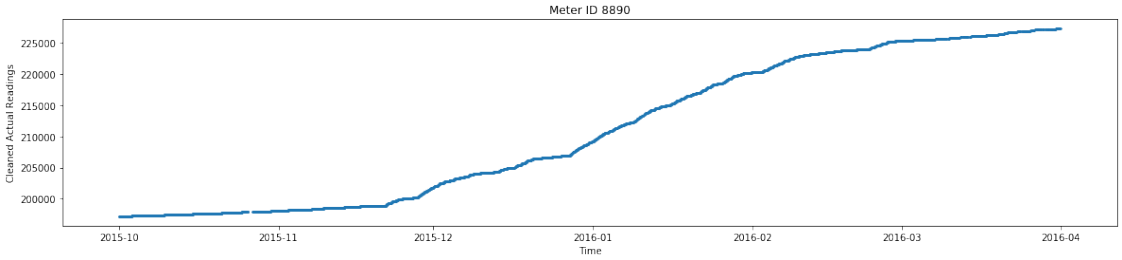


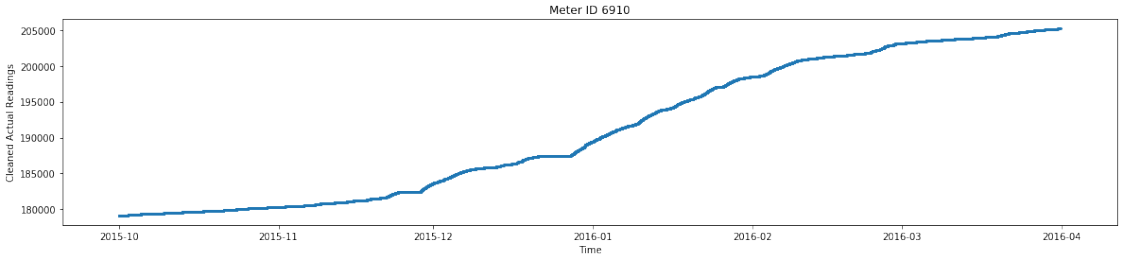
[12]:
```
# clean the original data and remove thoes ooutliers

dictMeter_clean = {}
for key in dictMeter:
    dictMeter_clean[key] = dictMeter[key].
 ↪drop(dictMeter[key][dictMeter[key]['meter_value']>dictMeter[key].\
```

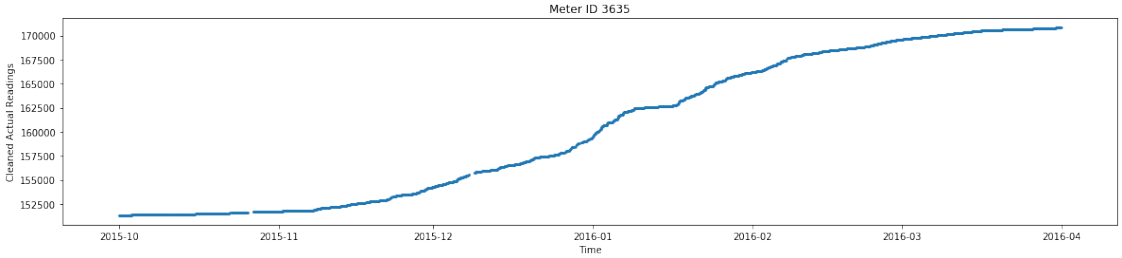
```
                                iloc[-1,:]['meter_value']].index)
```

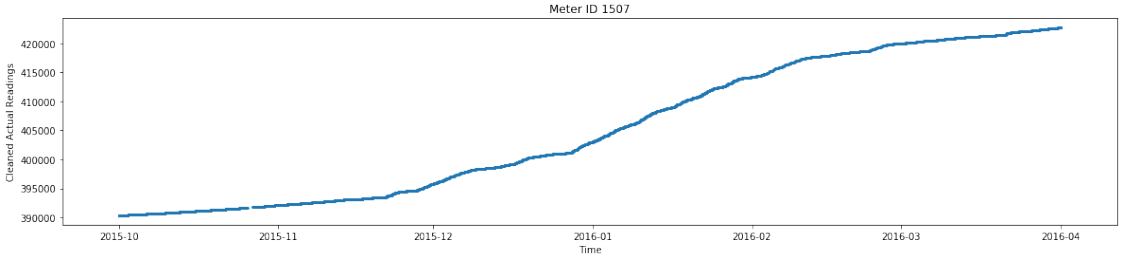
[14]:
```
# scatter plots of cleaned actual readings vs time

for key in dictMeter_clean:
    plt.figure(figsize=(20,4))
    plt.scatter(dictMeter_clean[key]['localminute'],␣
 ↪dictMeter_clean[key]['meter_value'], label='Actrual readings vs time', s=1)
    plt.title("Meter ID {}".format(key))
    plt.xlabel("Time")
    plt.ylabel("Cleaned Actual Readings")
    plt.show()
```

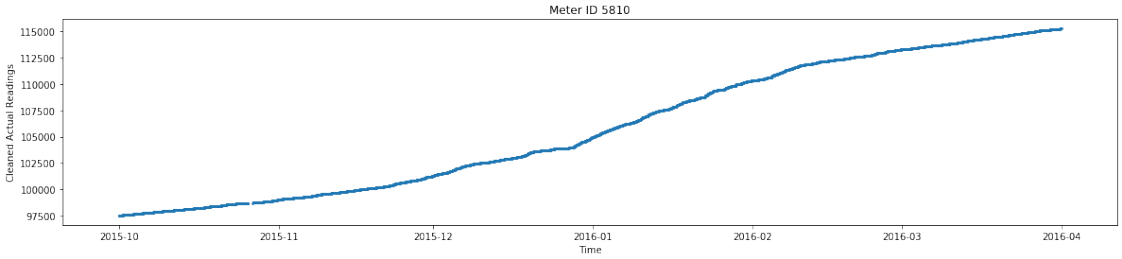


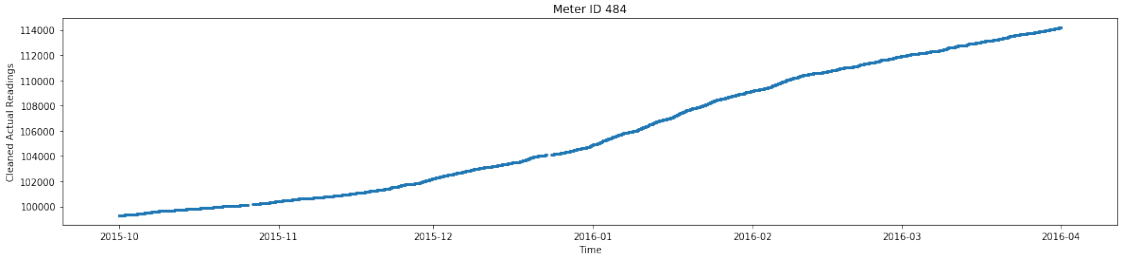


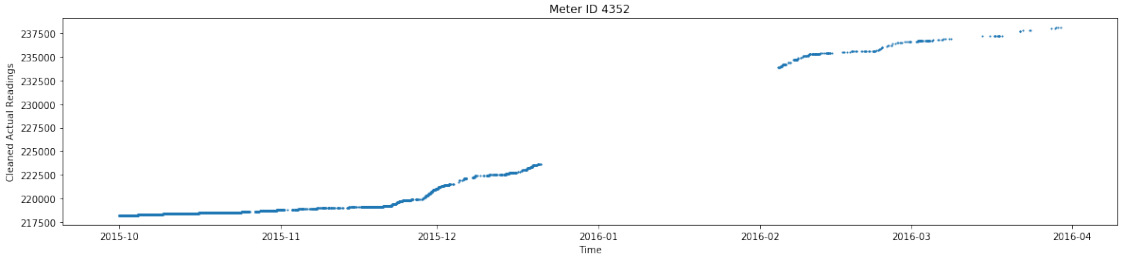


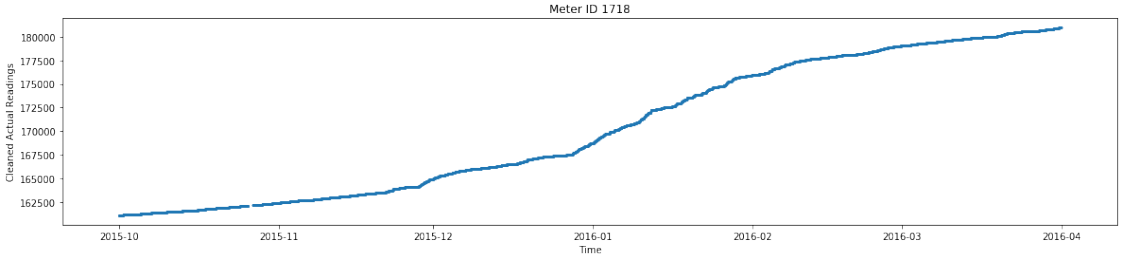

Meter ID 3635
Cleaned Actual Readings
170000
167500
165000
162500
160000
157500
155000
152500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

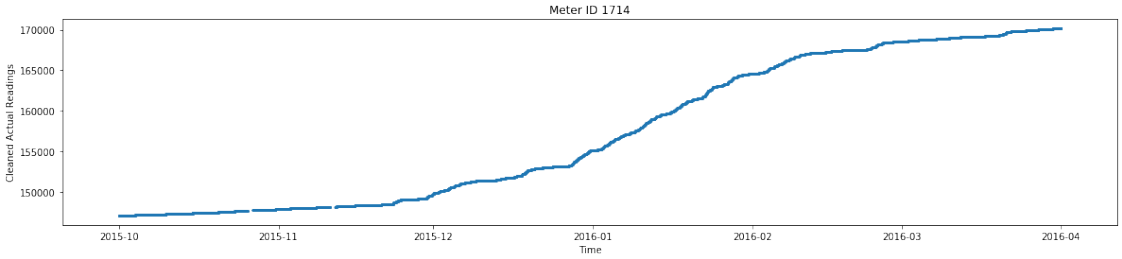

Meter ID 1507
Cleaned Actual Readings
420000
415000
410000
405000
400000
395000
390000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

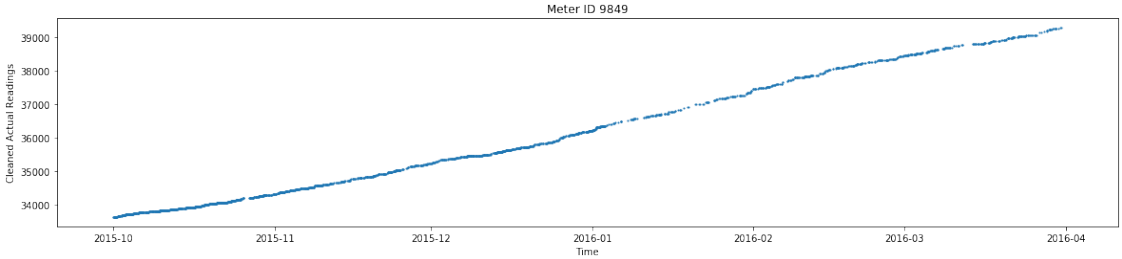

Meter ID 5810
Cleaned Actual Readings
115000
112500
110000
107500
105000
102500
100000
97500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

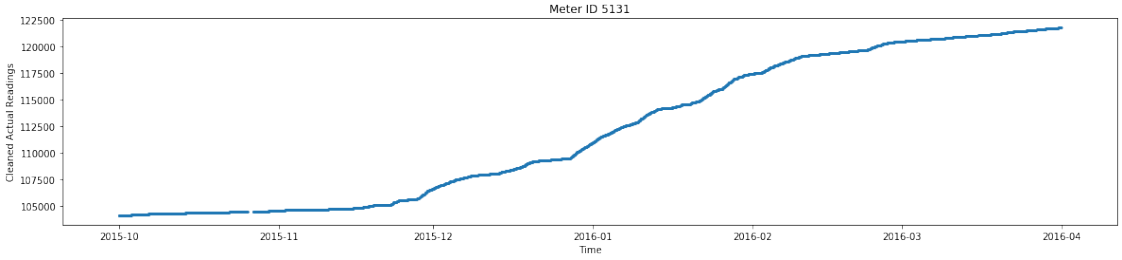

Meter ID 484
Cleaned Actual Readings
114000
112000
110000
108000
106000
104000
102000
100000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

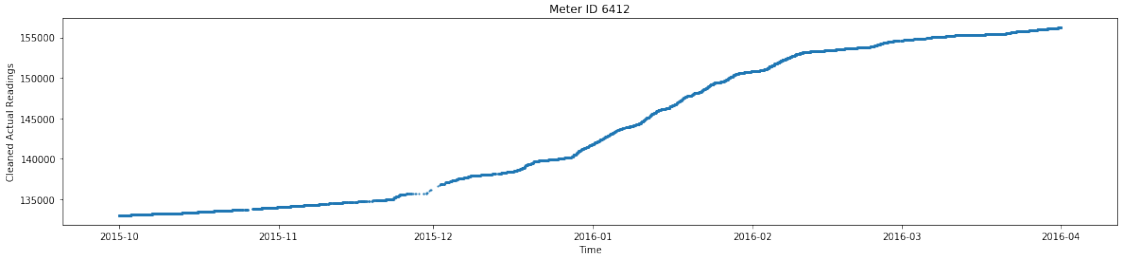

Meter ID 4352
Cleaned Actual Readings
237500
235000
232500
230000
227500
225000
222500
220000
217500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

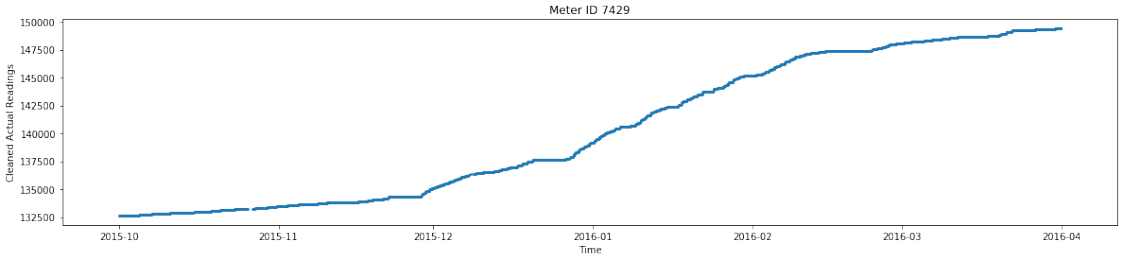

Meter ID 1718
Cleaned Actual Readings
180000
177500
175000
172500
170000
167500
165000
162500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

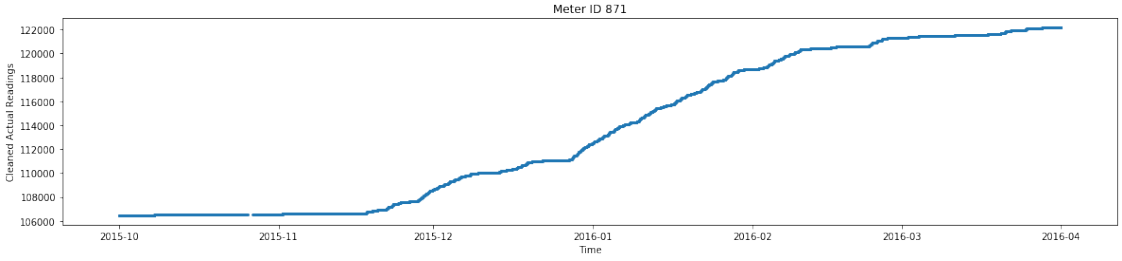

Meter ID 1714
Cleaned Actual Readings
170000
165000
160000
155000
150000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

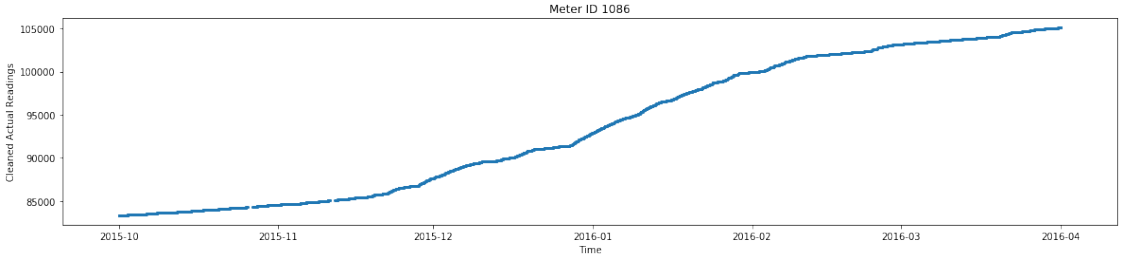

Meter ID 9849
Cleaned Actual Readings
39000
38000
37000
36000
35000
34000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

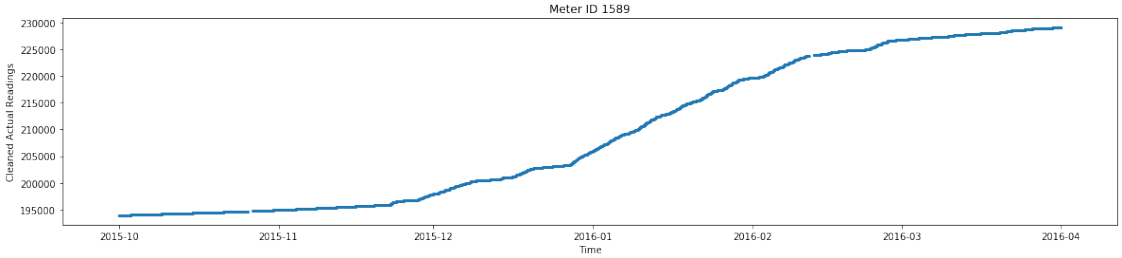

Meter ID 5131
Cleaned Actual Readings
122500
120000
117500
115000
112500
110000
107500
105000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

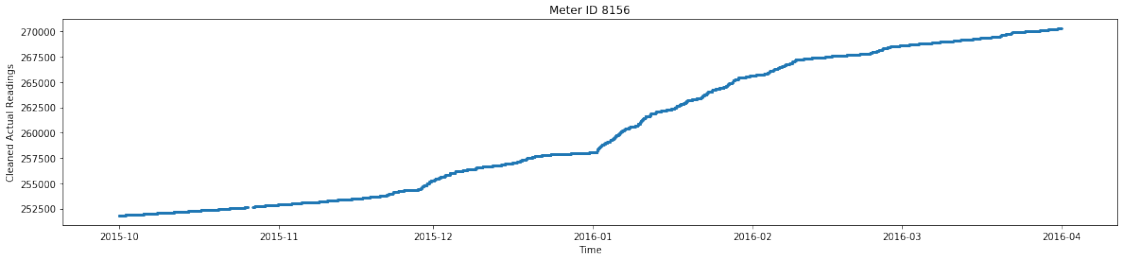

Meter ID 6412
Cleaned Actual Readings
155000
150000
145000
140000
135000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

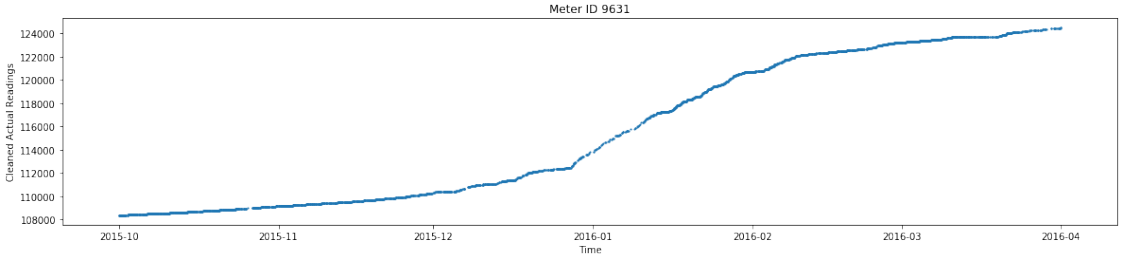

Meter ID 7429
Cleaned Actual Readings
150000
147500
145000
142500
140000
137500
135000
132500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

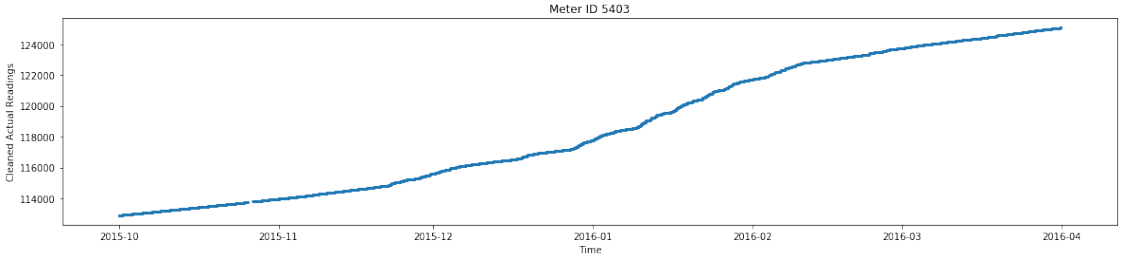

Meter ID 871
Cleaned Actual Readings
122000
120000
118000
116000
114000
112000
110000
108000
106000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

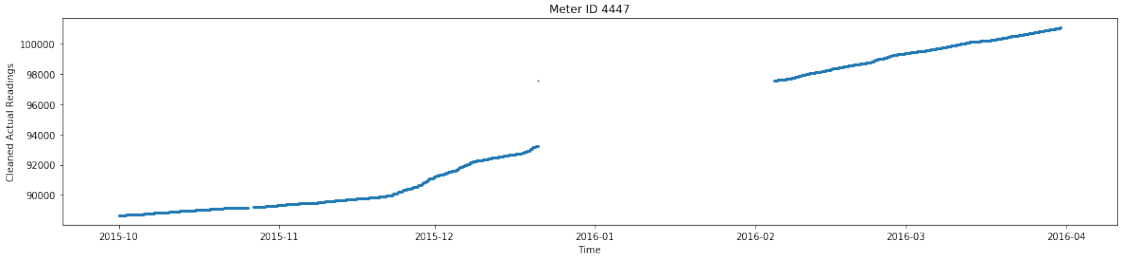

Meter ID 1086
Cleaned Actual Readings
105000
100000
95000
90000
85000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

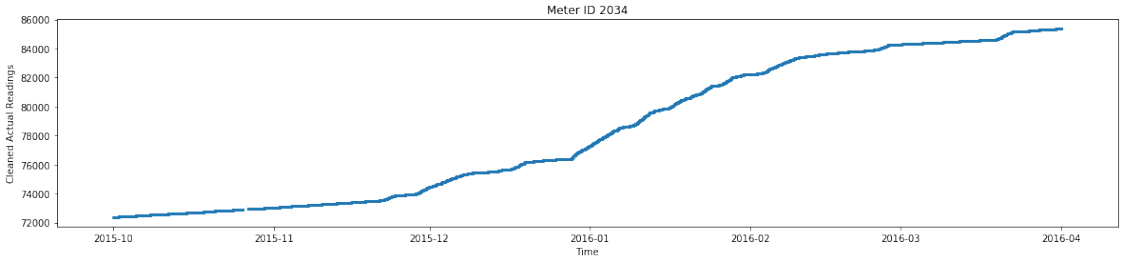

Meter ID 1589
Cleaned Actual Readings
230000
225000
220000
215000
210000
205000
200000
195000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

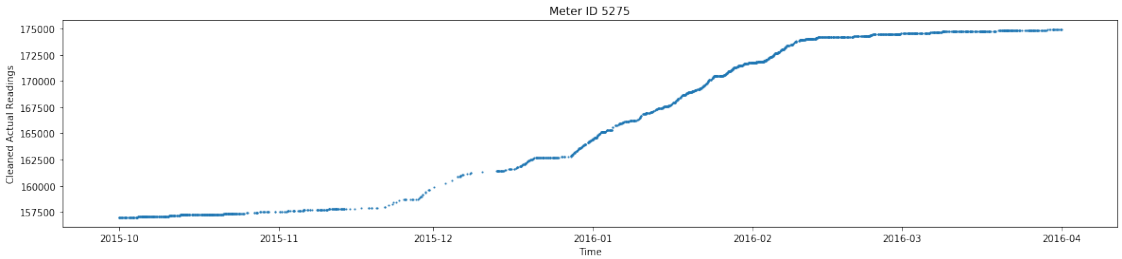

Meter ID 8156
Cleaned Actual Readings
270000
267500
265000
262500
260000
257500
255000
252500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

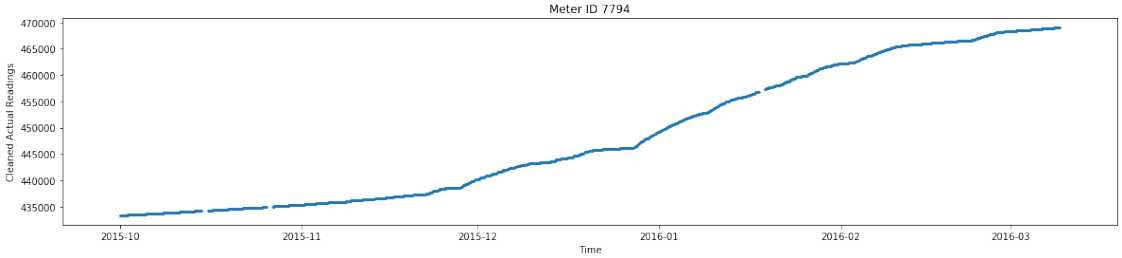

Meter ID 9631
Cleaned Actual Readings
124000
122000
120000
118000
116000
114000
112000
110000
108000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

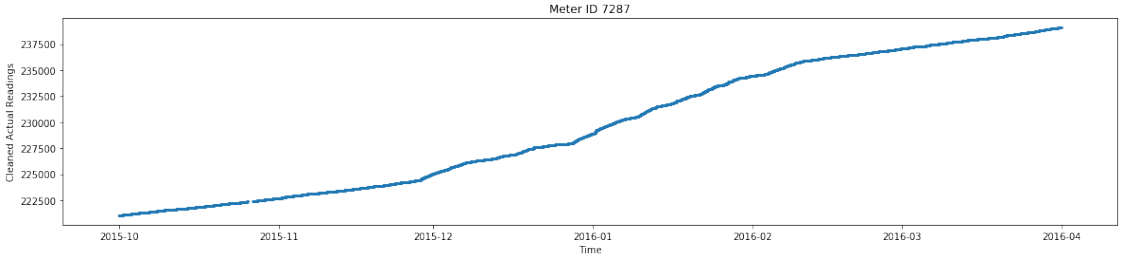

Meter ID 5403
Cleaned Actual Readings
124000
122000
120000
118000
116000
114000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

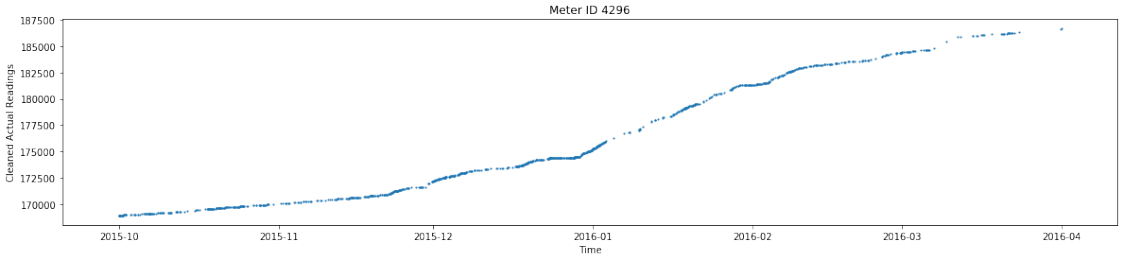

Meter ID 4447
Cleaned Actual Readings
100000
98000
96000
94000
92000
90000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time

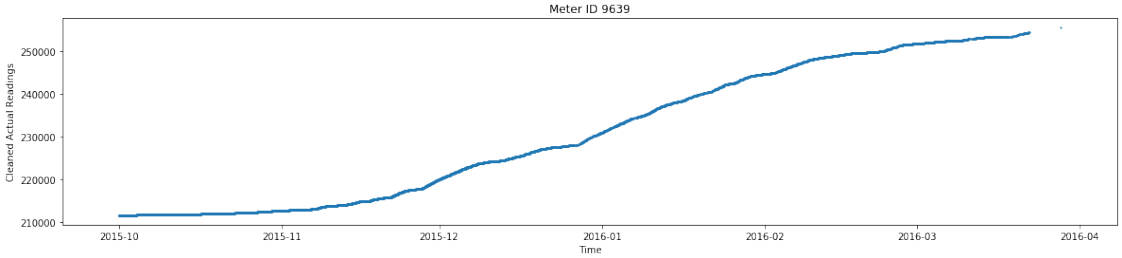

Meter ID 2034
Cleaned Actual Readings
86000
84000
82000
80000
78000
76000
74000
72000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 5275
Cleaned Actual Readings
175000
172500
170000
167500
165000
162500
160000
157500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 7794
Cleaned Actual Readings
470000
465000
460000
455000
450000
445000
440000
435000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
Time


Meter ID 7287
Cleaned Actual Readings
237500
235000
232500
230000
227500
225000
222500
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 4296
Cleaned Actual Readings
187500
185000
182500
180000
177500
175000
172500
170000
2015-10
2015-11
2015-12
2016-01
2016-02
2016-03
2016-04
Time


Meter ID 9639
Cleaned Actual Readings
250000
240000
230000
220000
210000
2015-10
2015-11
2015-12
2016-01
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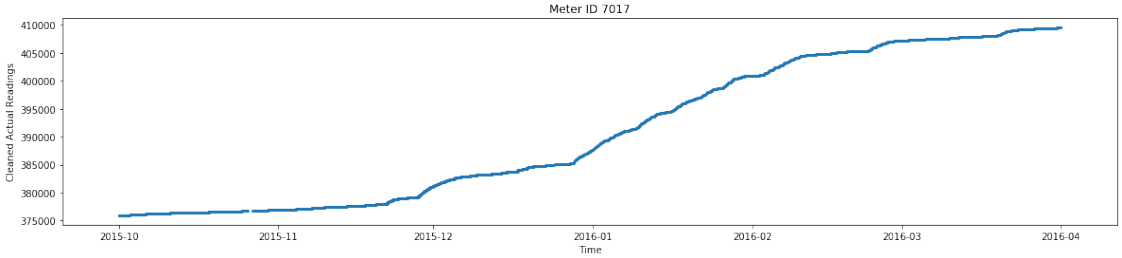
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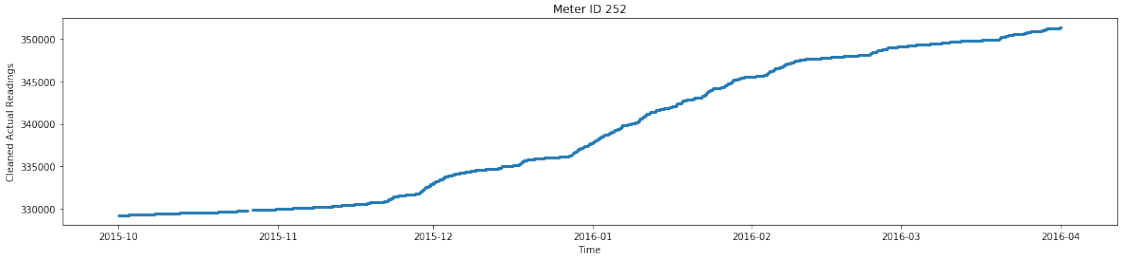
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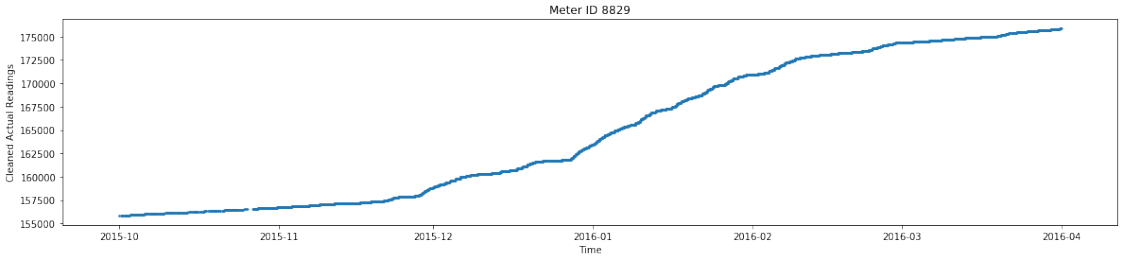
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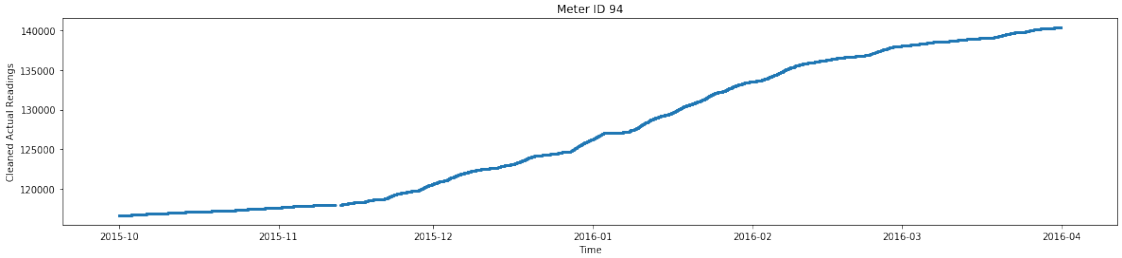
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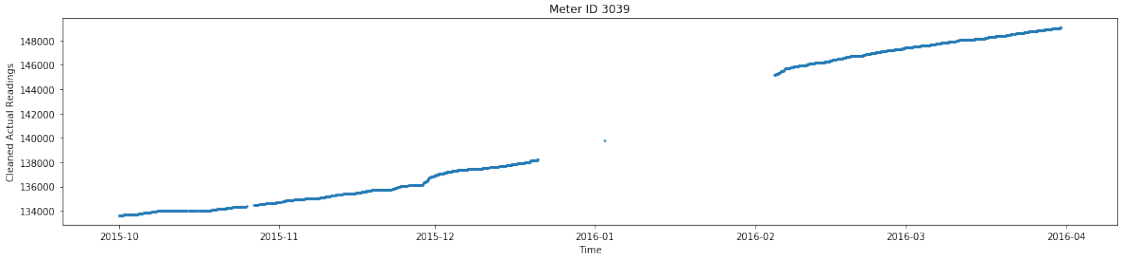
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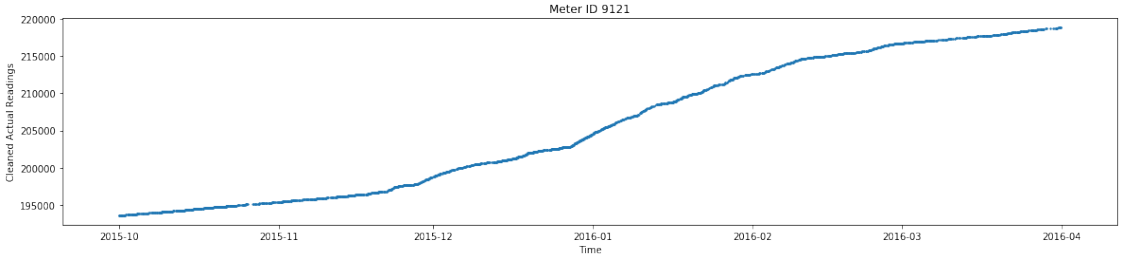
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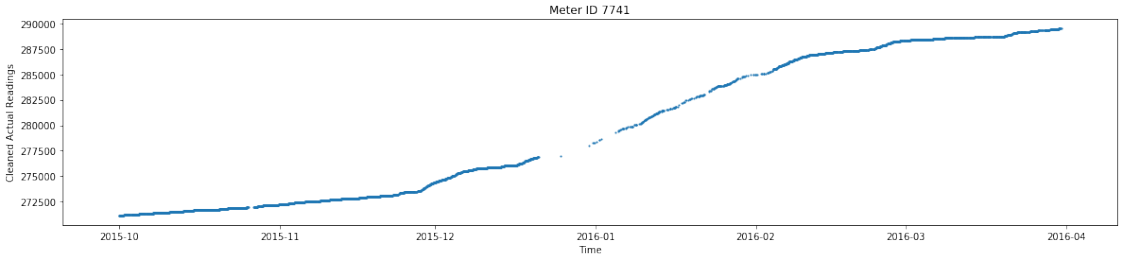
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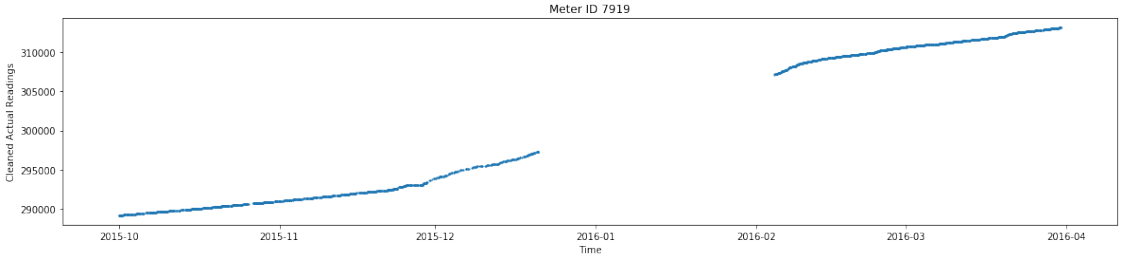
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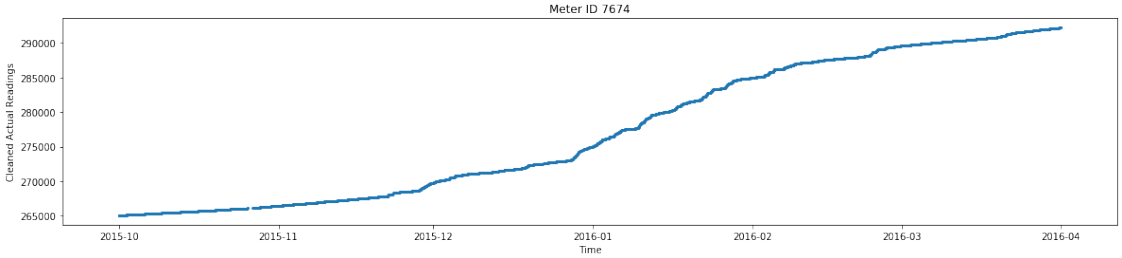
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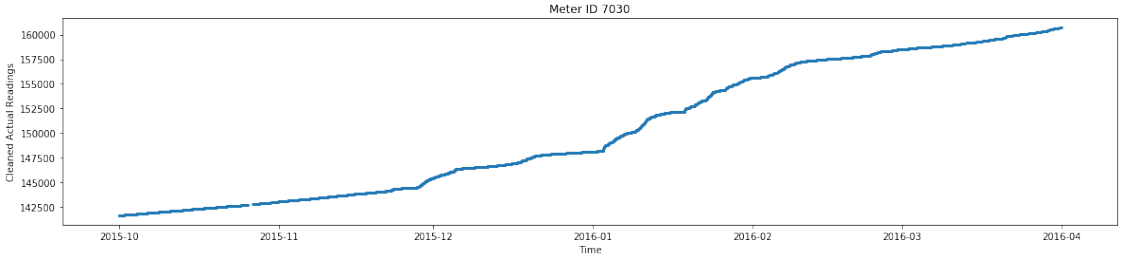
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2016-03
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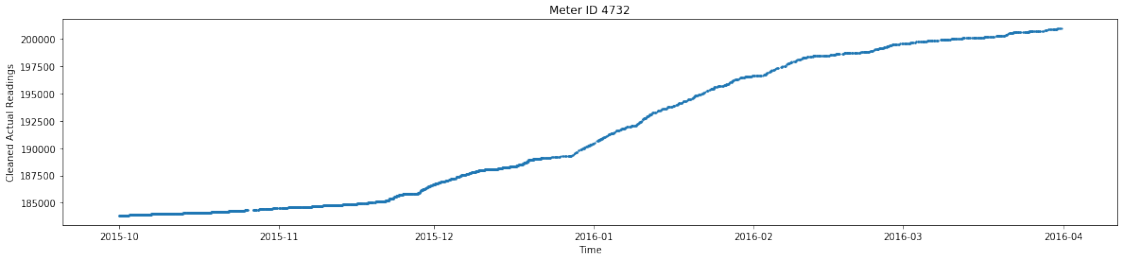
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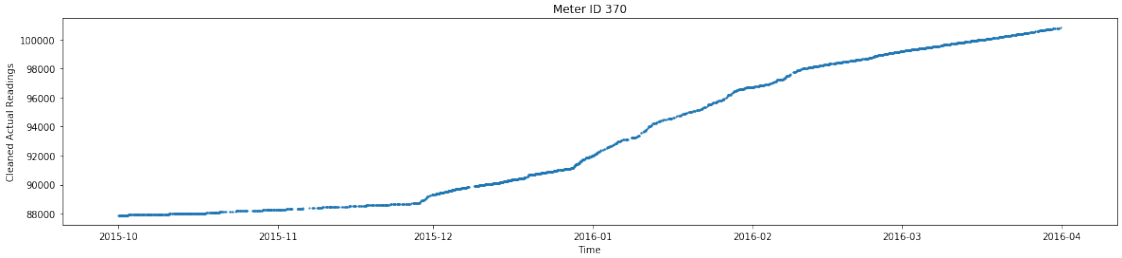
2015-12
2016-01
2016-02
2016-03
2016-04
Time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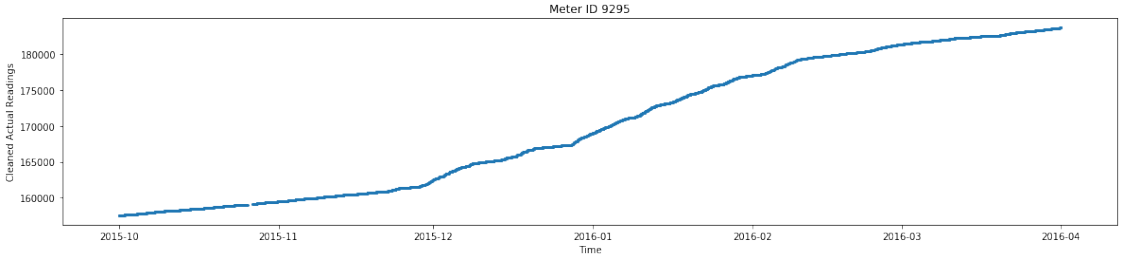
2016-03
2016-04
Time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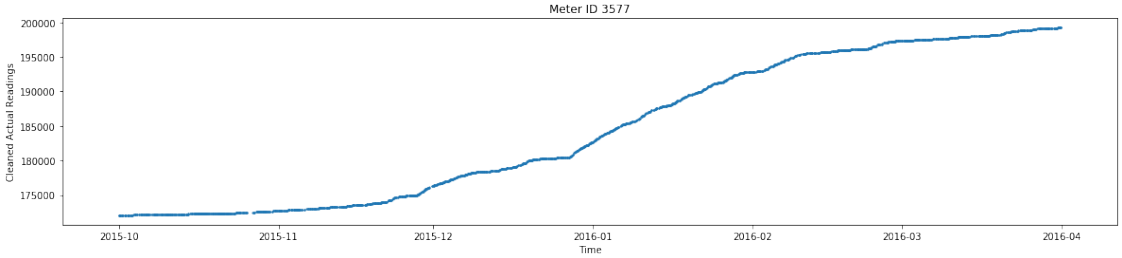
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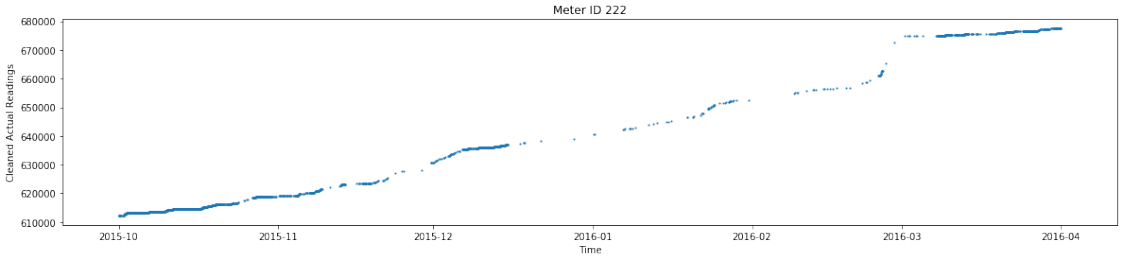
Time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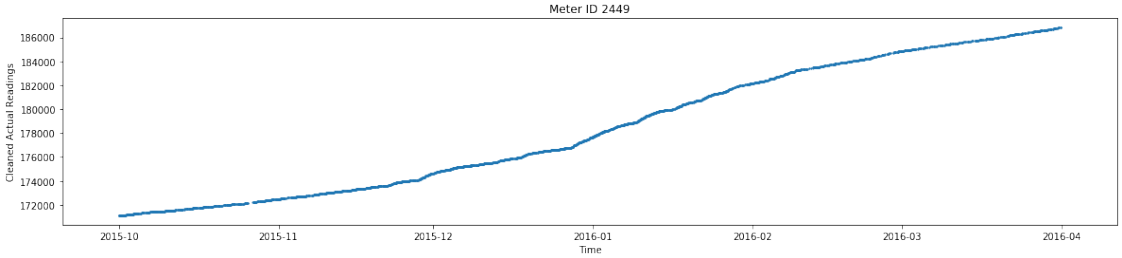
2016-03
2016-04
Time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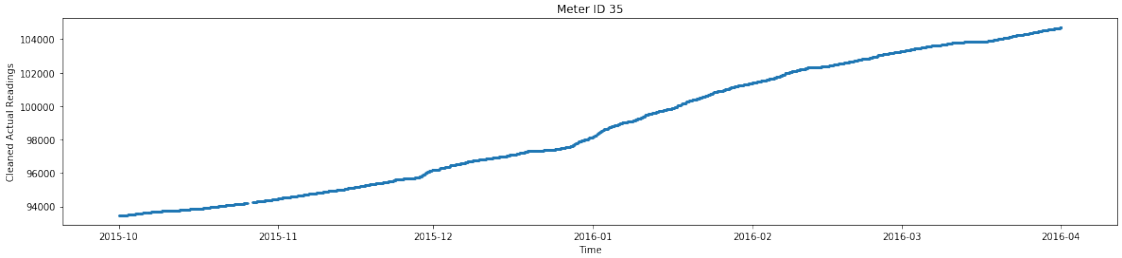
2016-04
Time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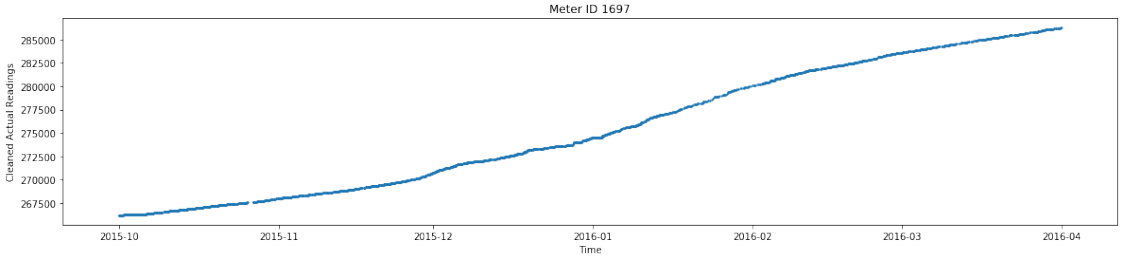
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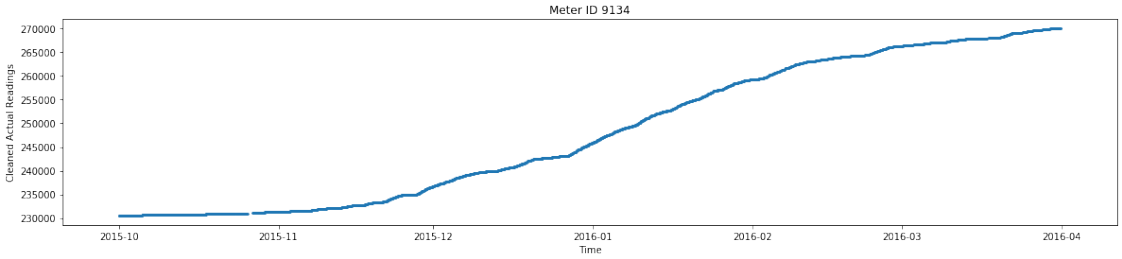
2016-03
2016-04
Time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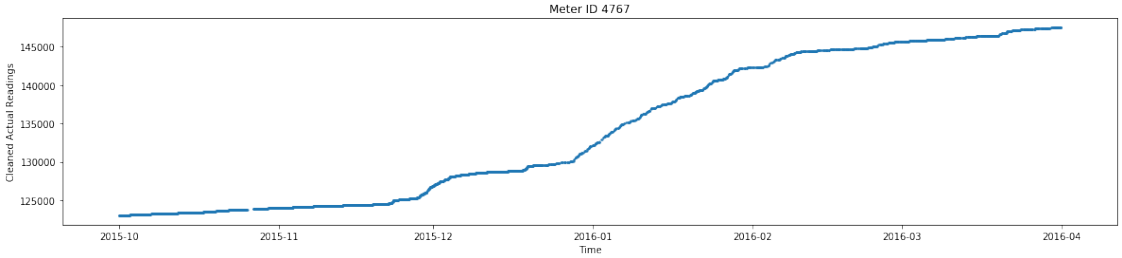
Time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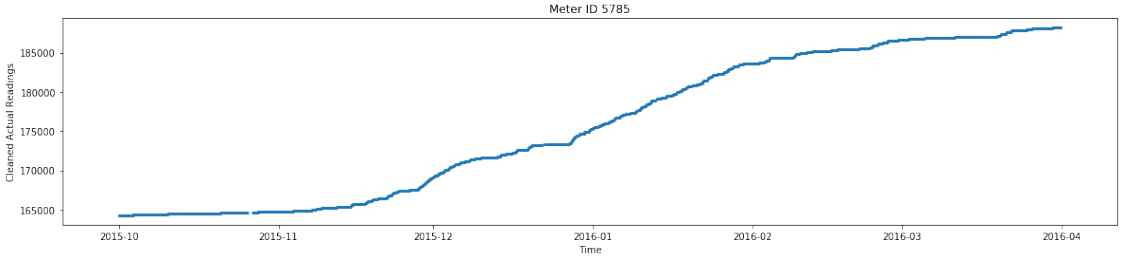
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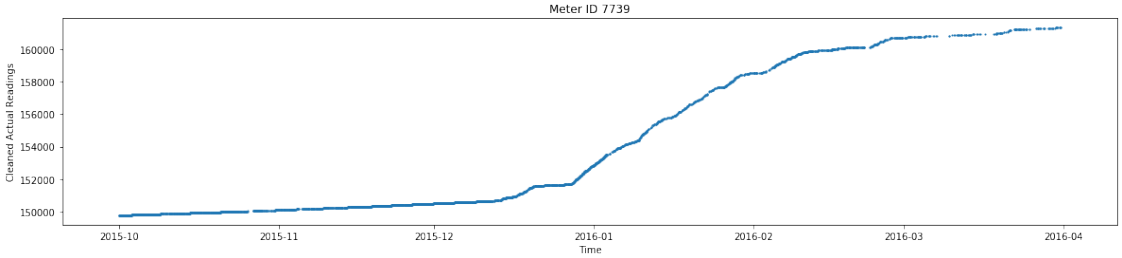
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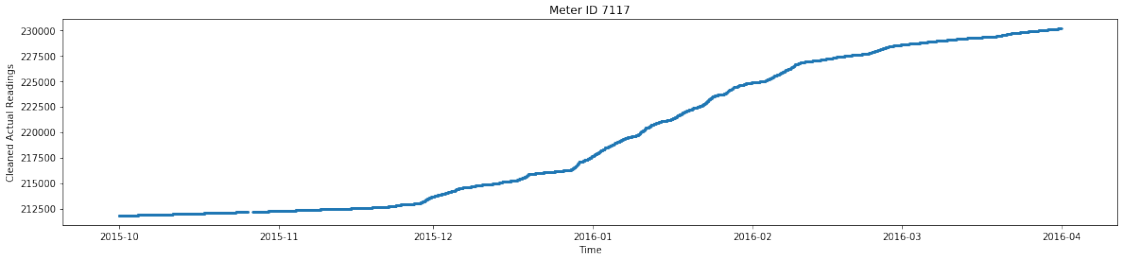
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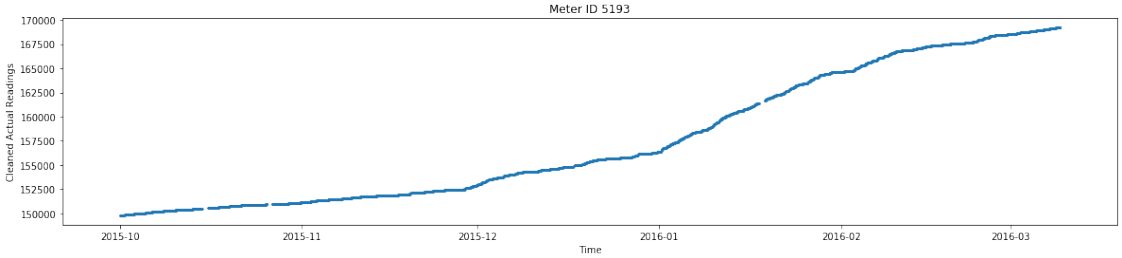
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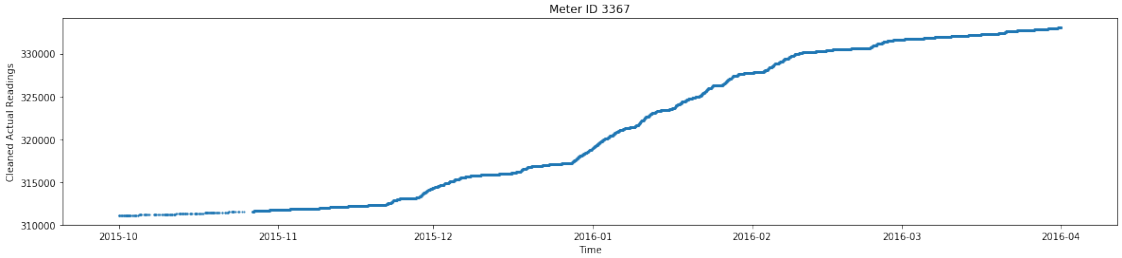
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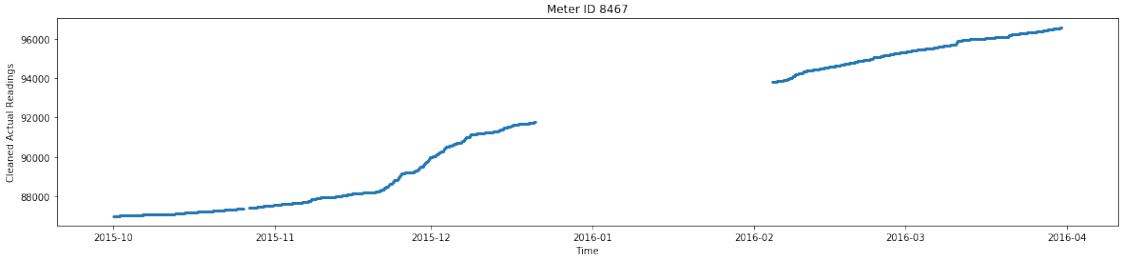
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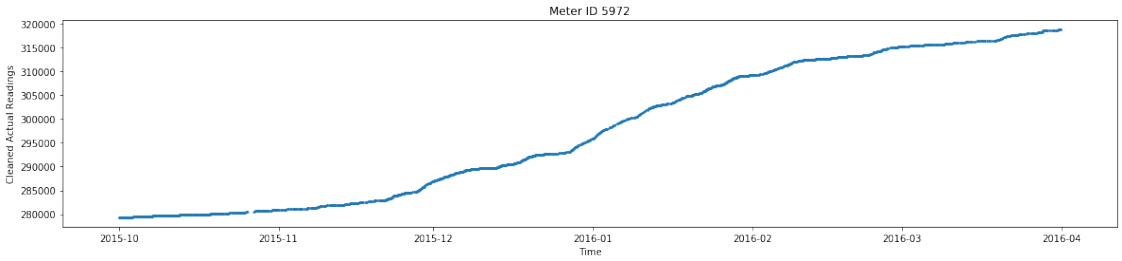
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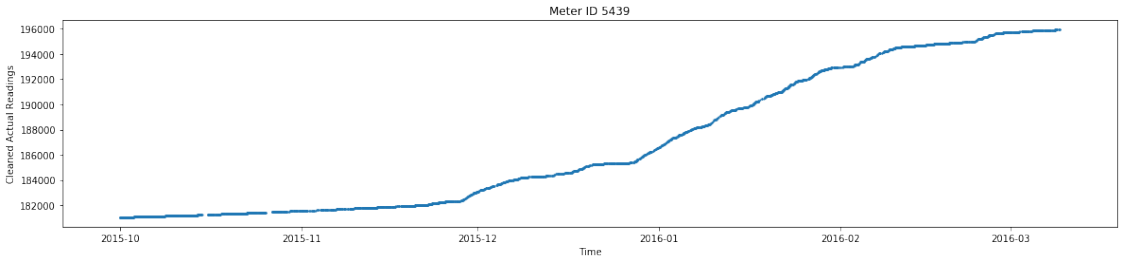
Time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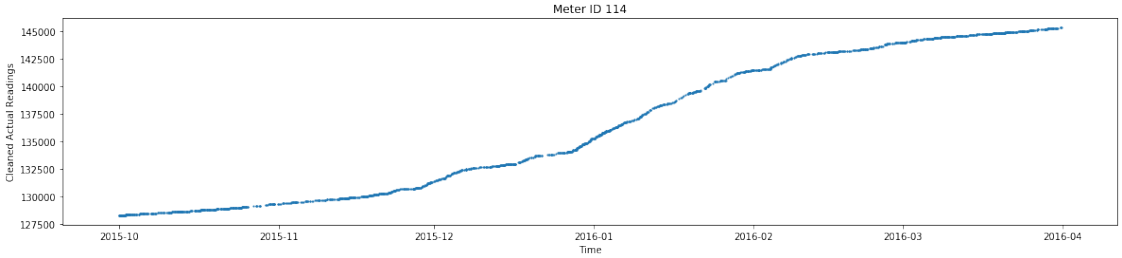
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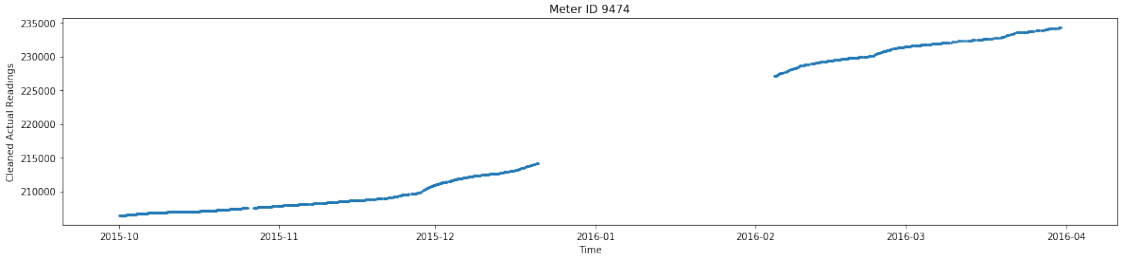
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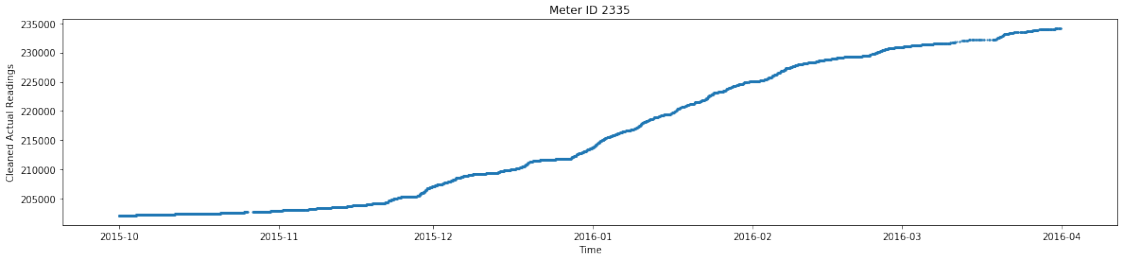
Time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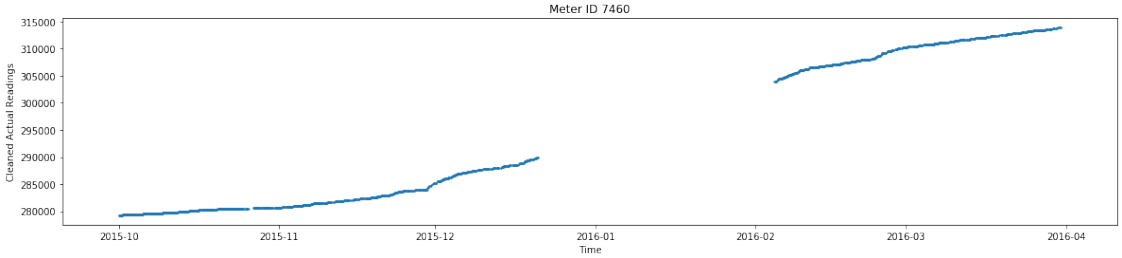
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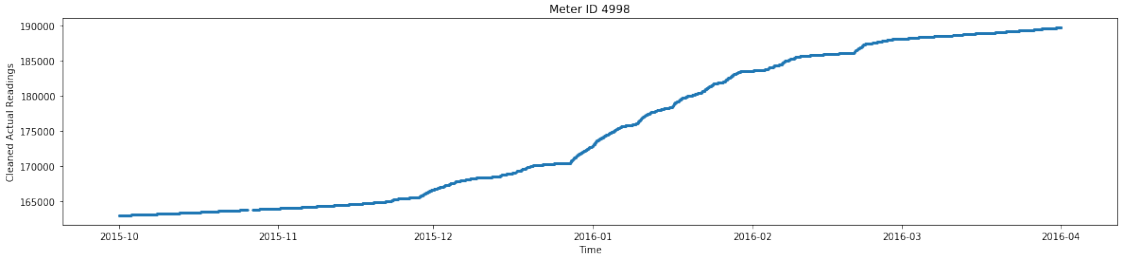
Time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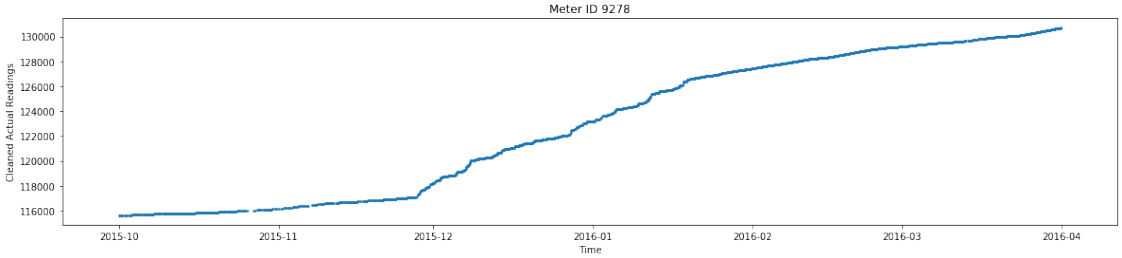
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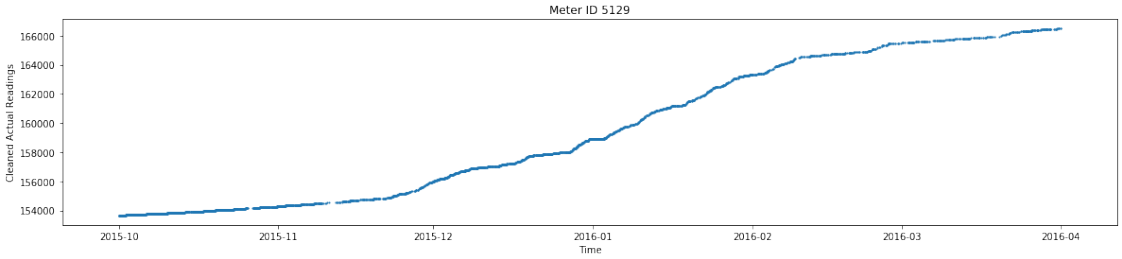
Time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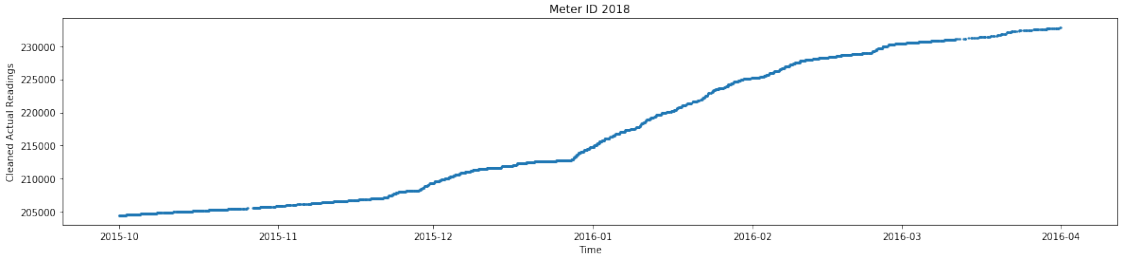
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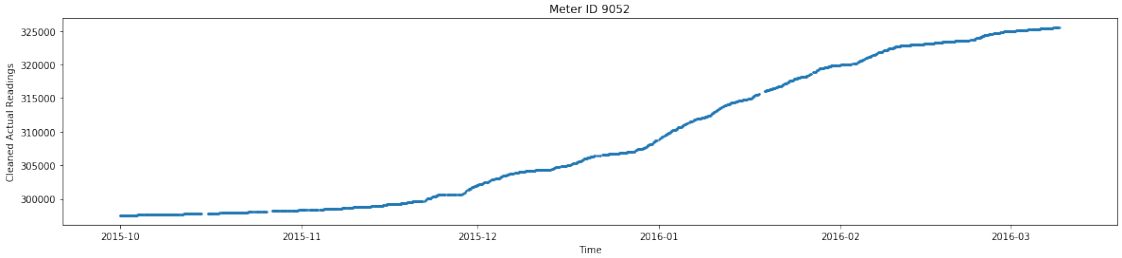
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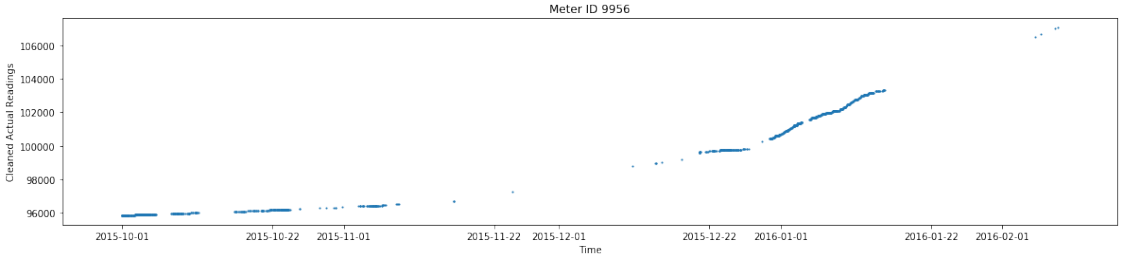
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2016-02-01
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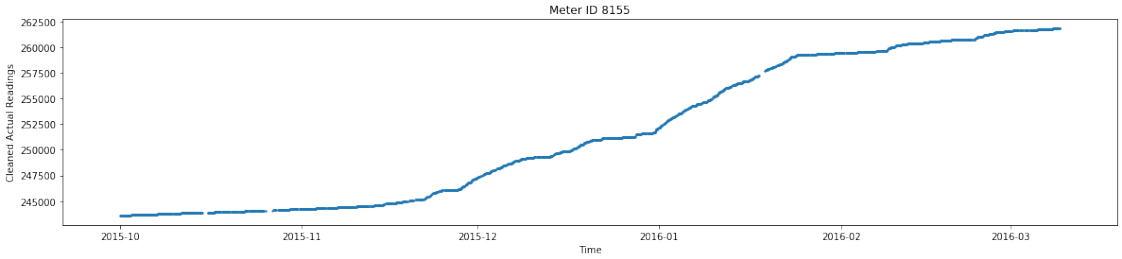
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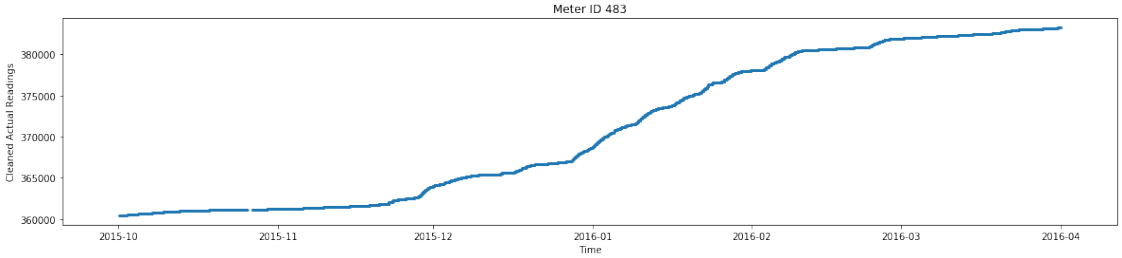
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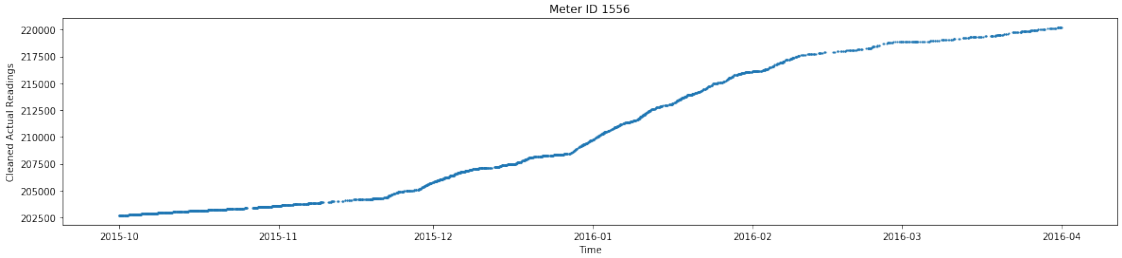
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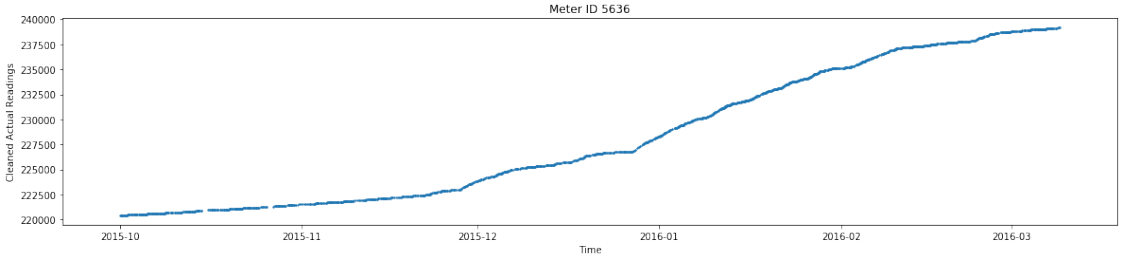
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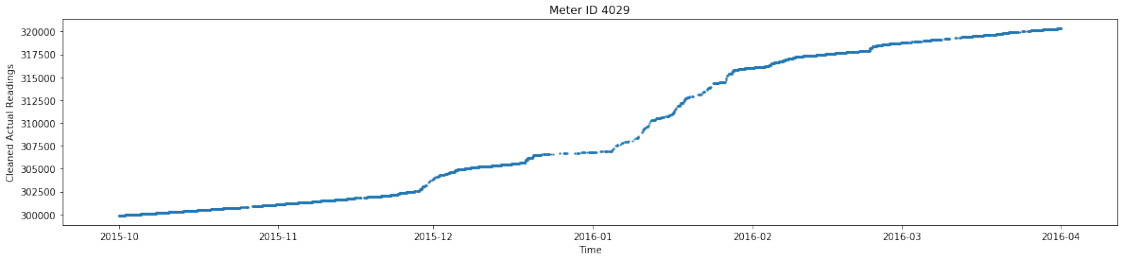
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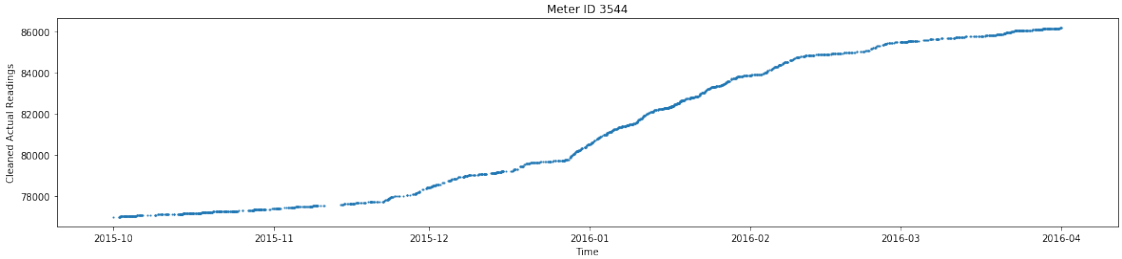
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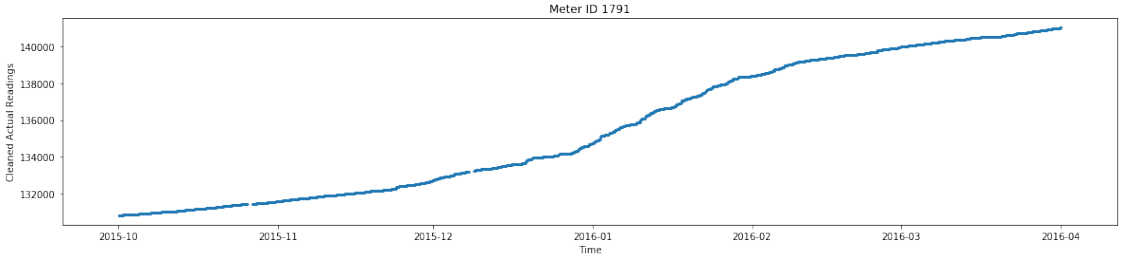
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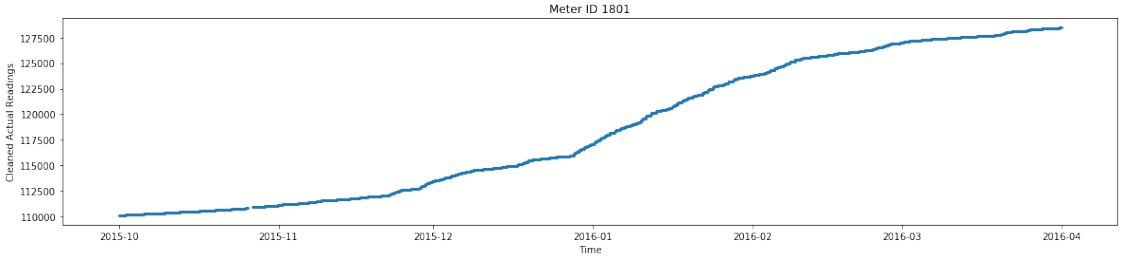
Time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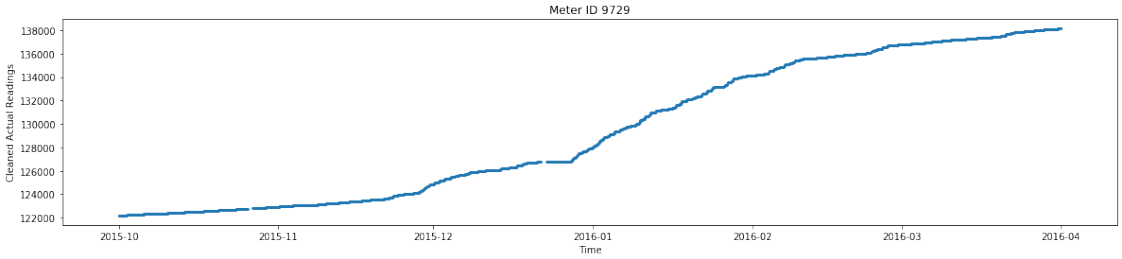
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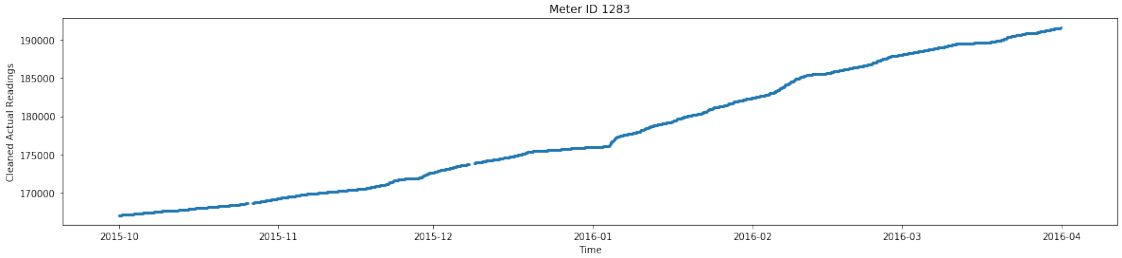
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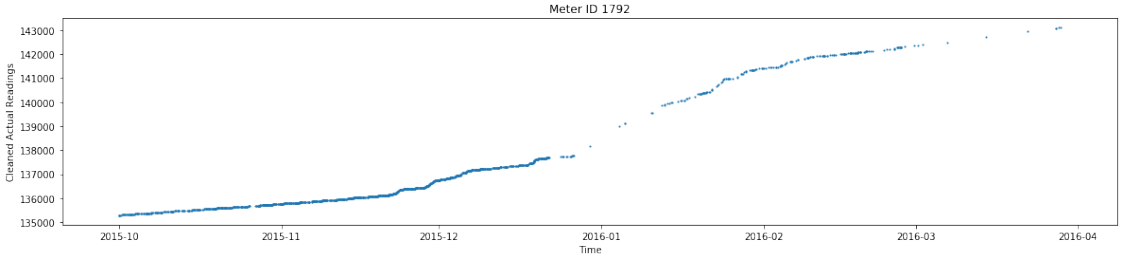
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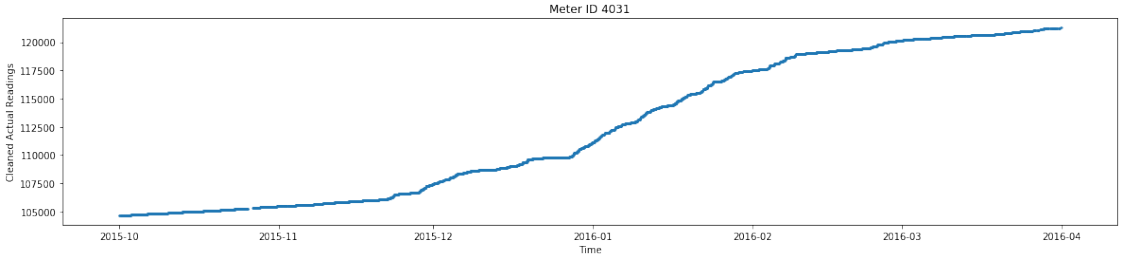
2016-02
2016-03
2016-04
Time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107500
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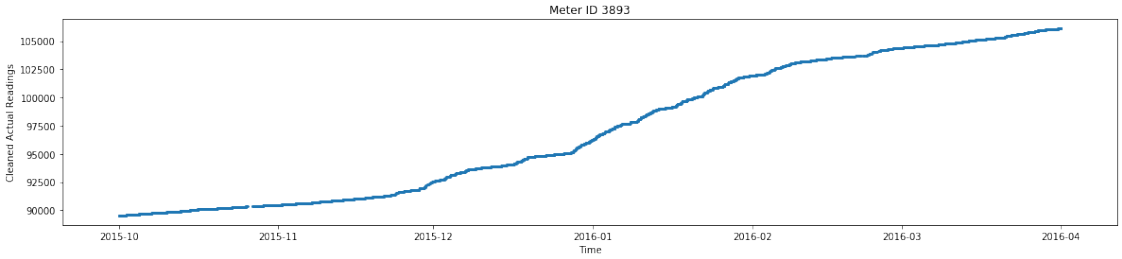
2016-02
2016-03
2016-04
Time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2016-03
2016-04
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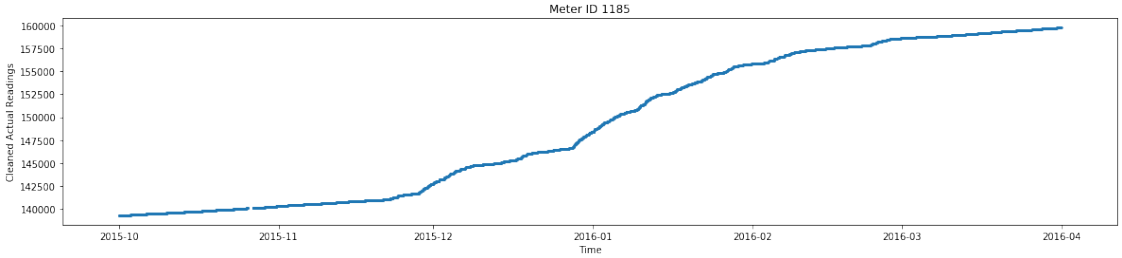
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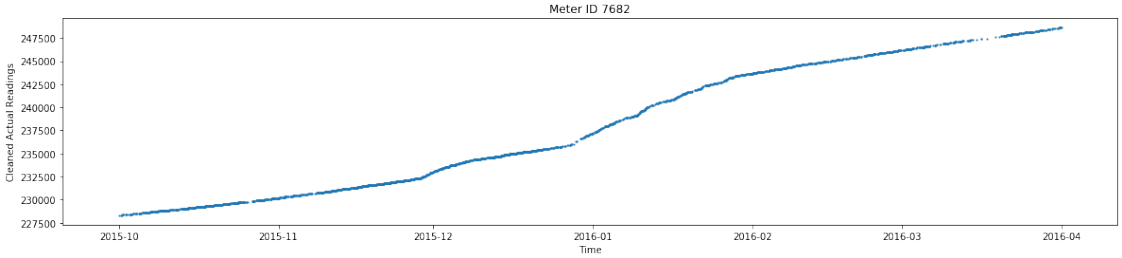
2016-01
2016-02
2016-03
2016-04
Time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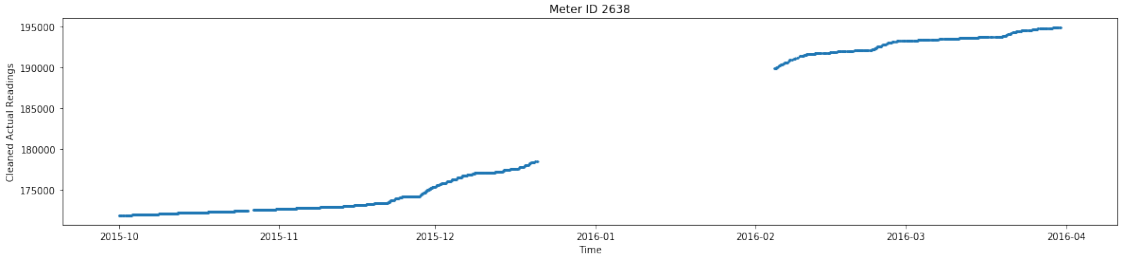
2016-02
2016-03
2016-04
Time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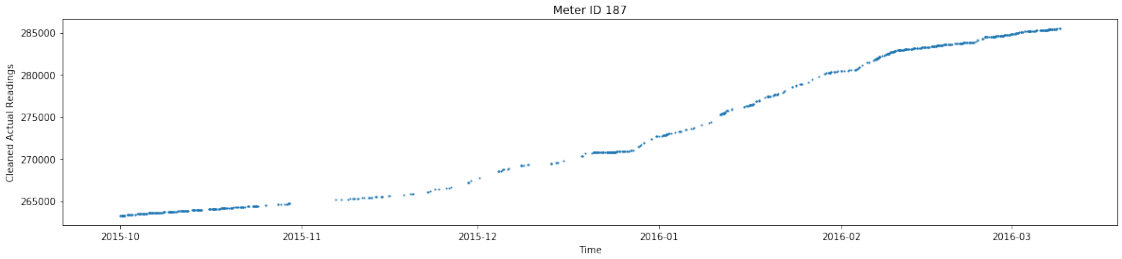
2016-03
2016-04
Time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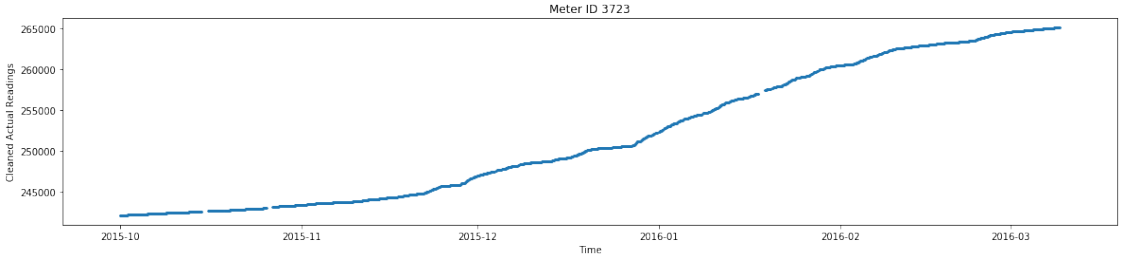
2016-02
2016-03
Time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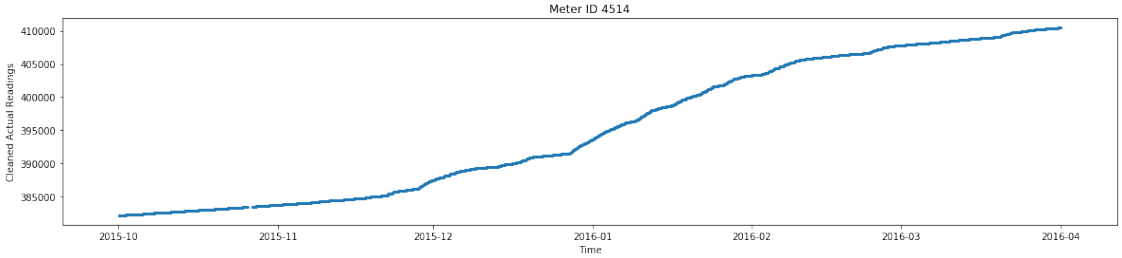
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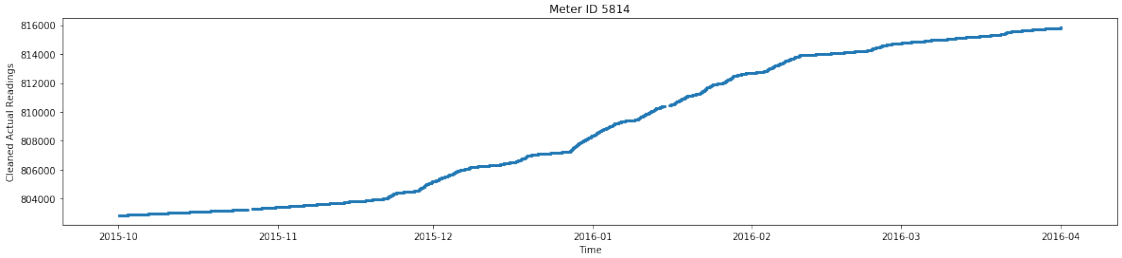
2016-03
2016-04
Time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2016-03
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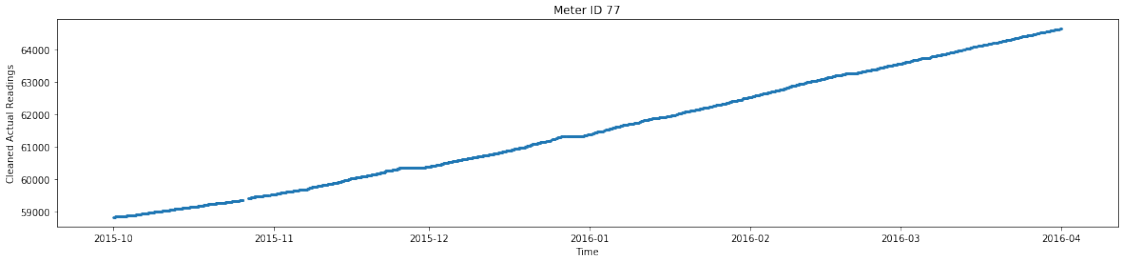
Time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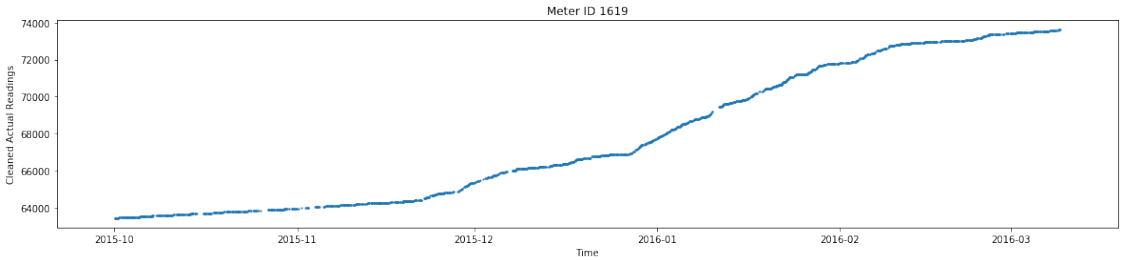
Time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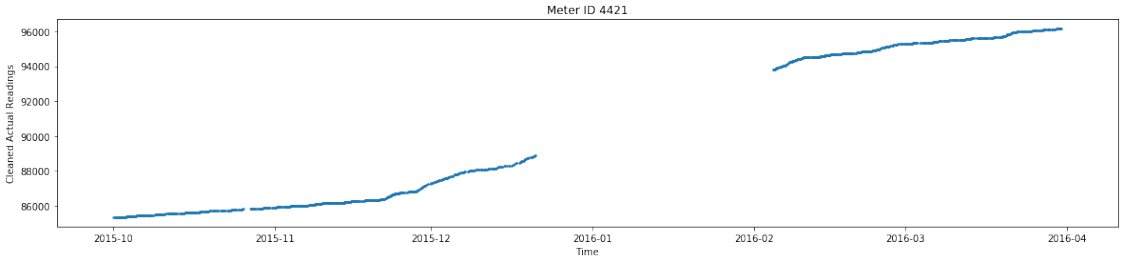
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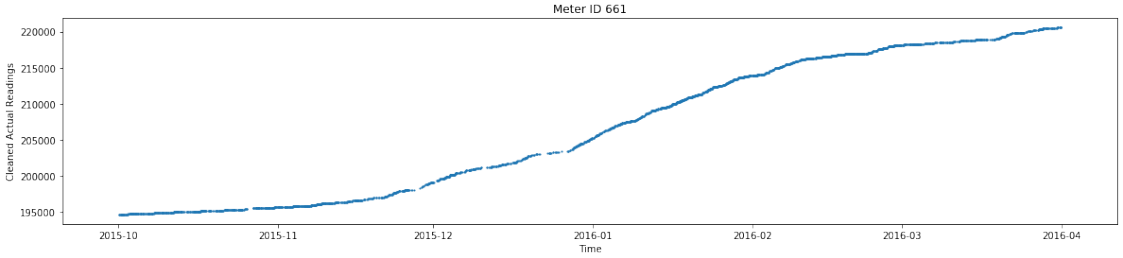
Time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2016-04
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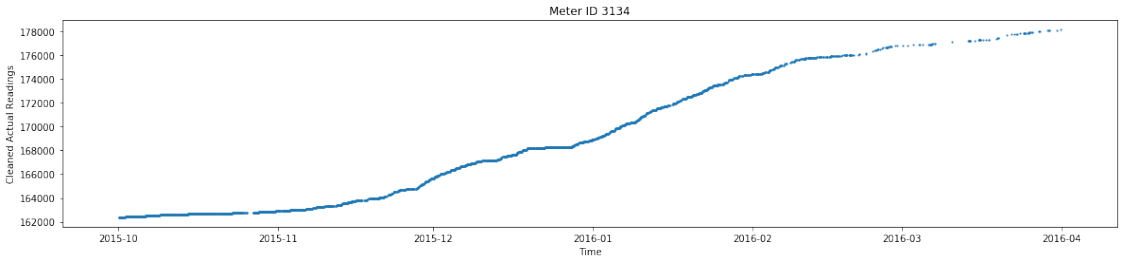
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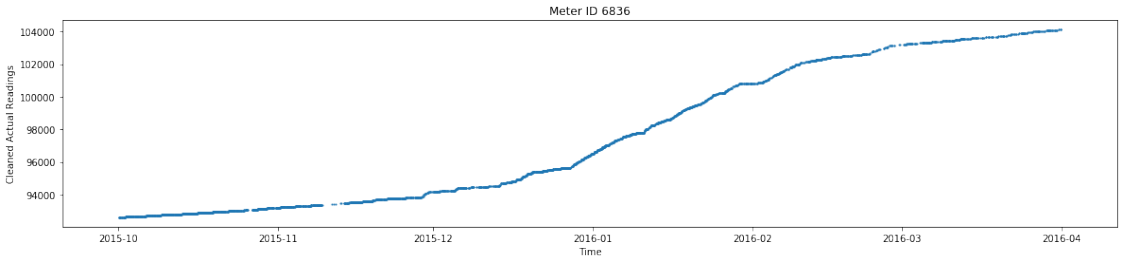
Time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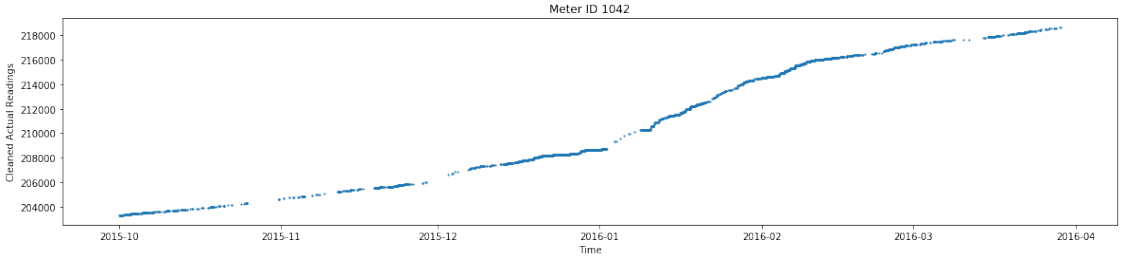
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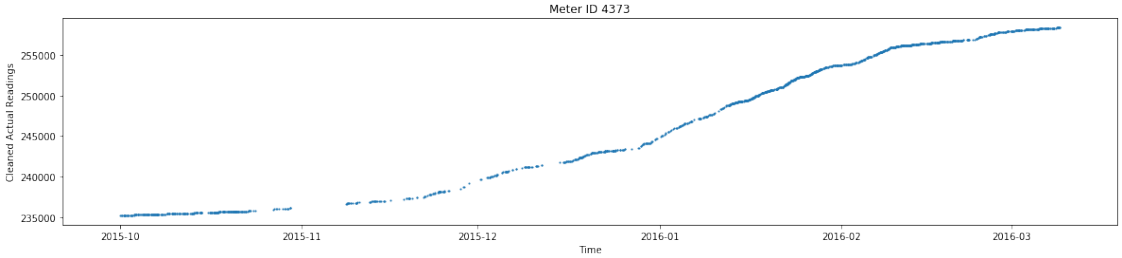
Time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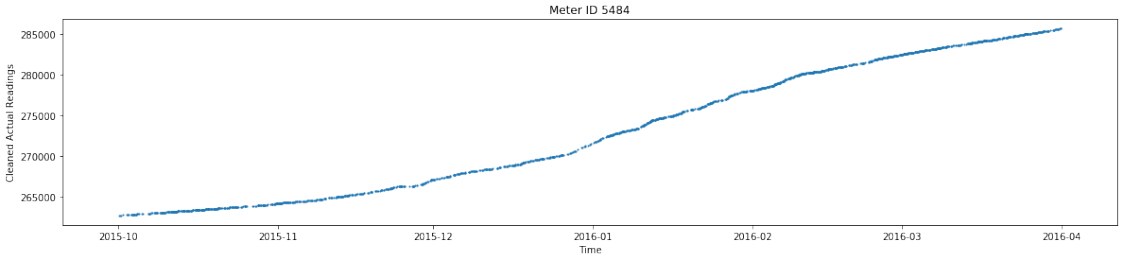
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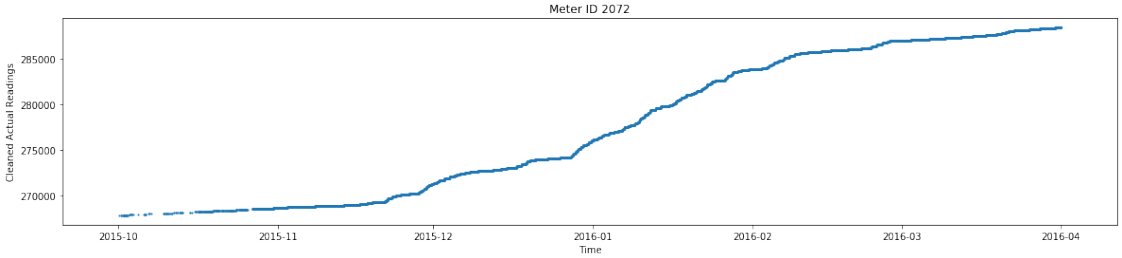
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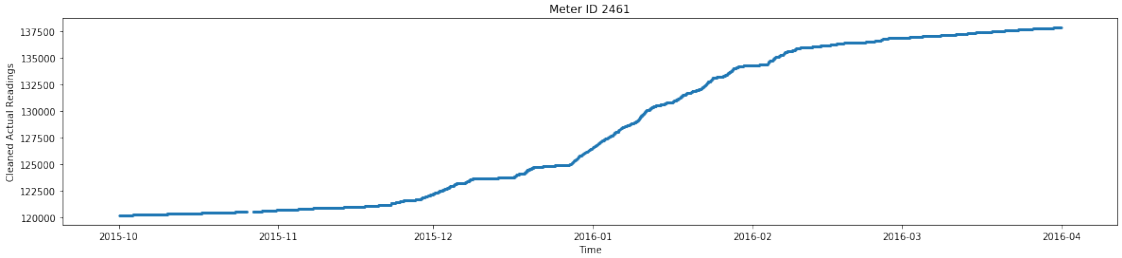
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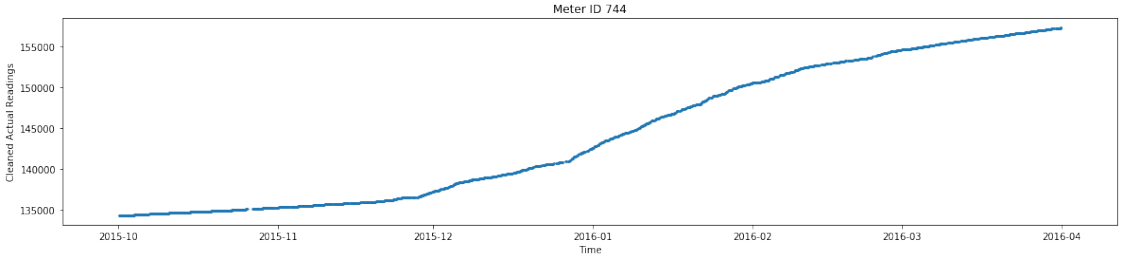
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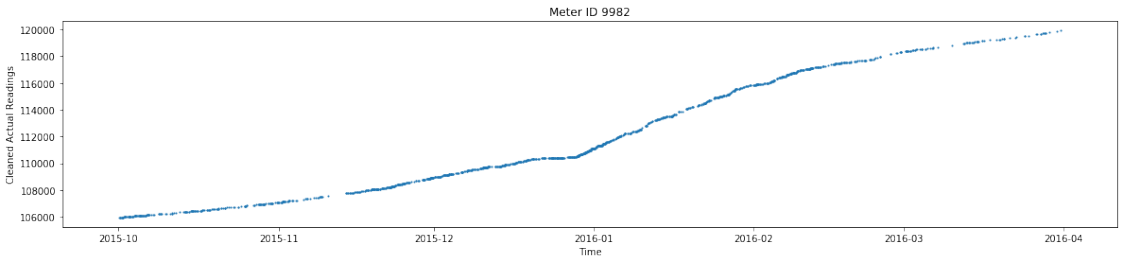
Time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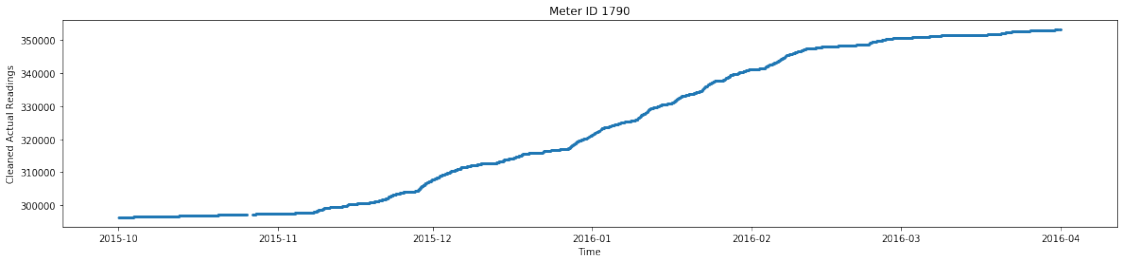
Time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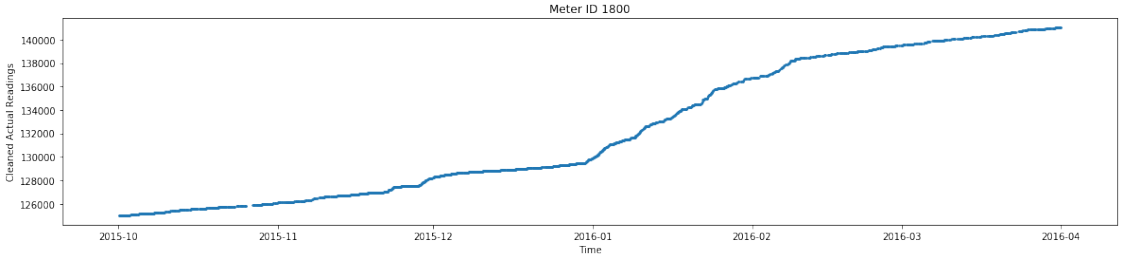
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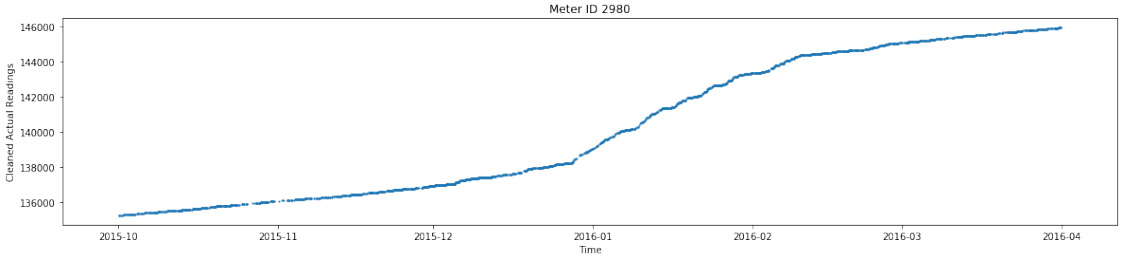
Time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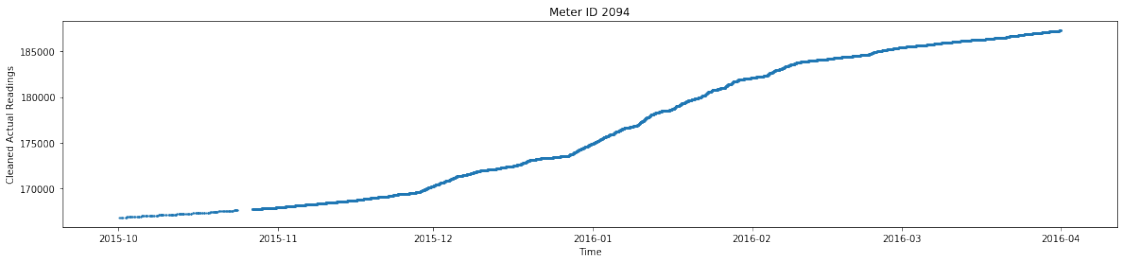
2016-04
Time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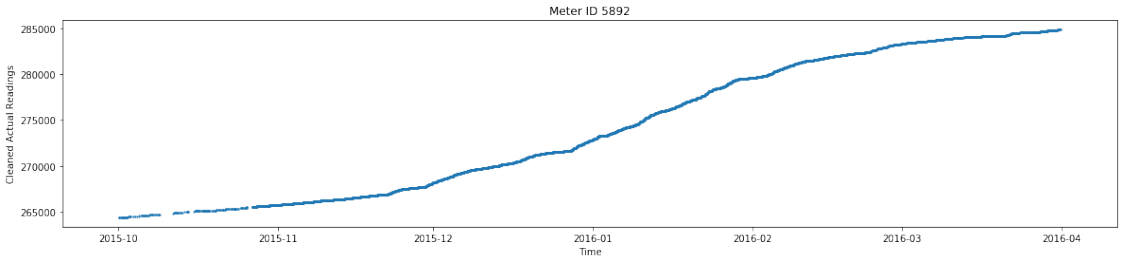
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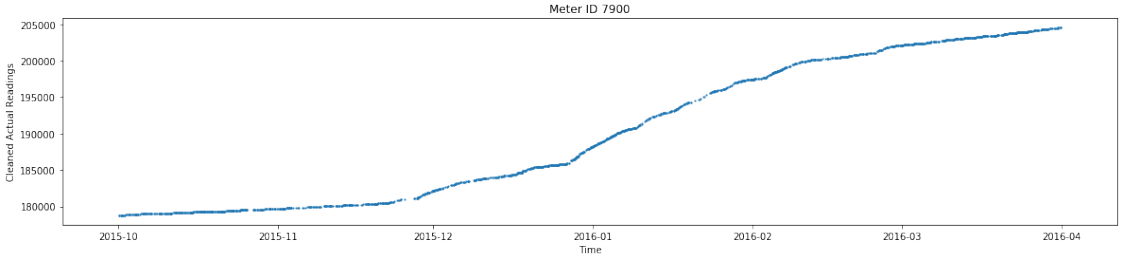
Time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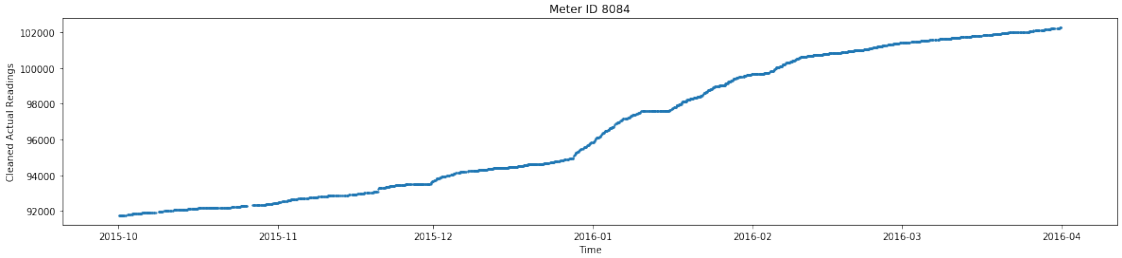
Time


Meter ID 8084
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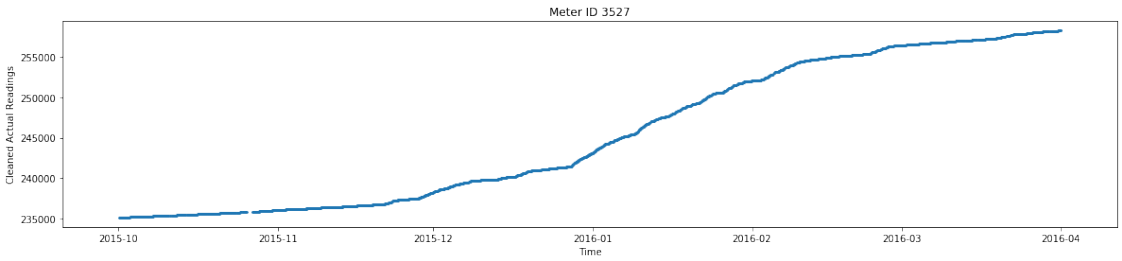
Time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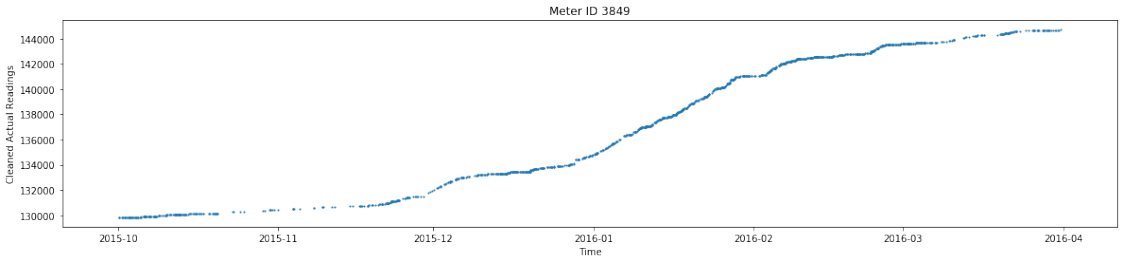
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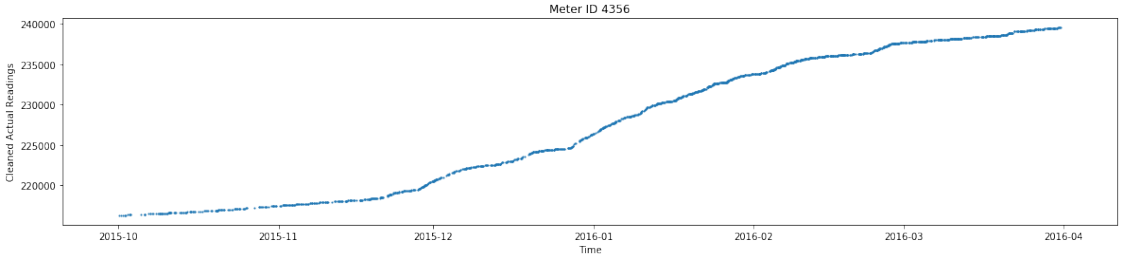
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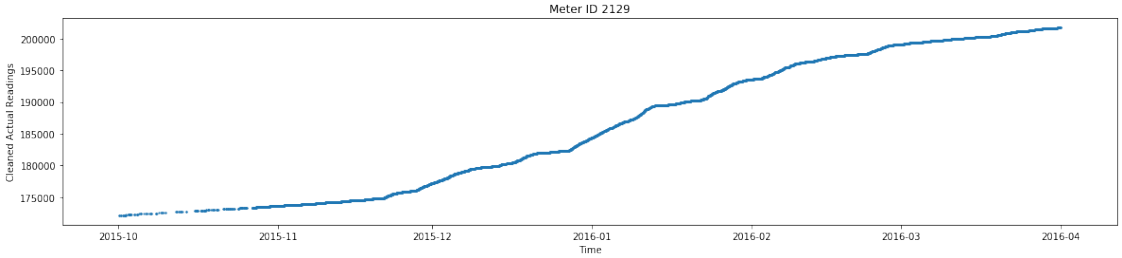
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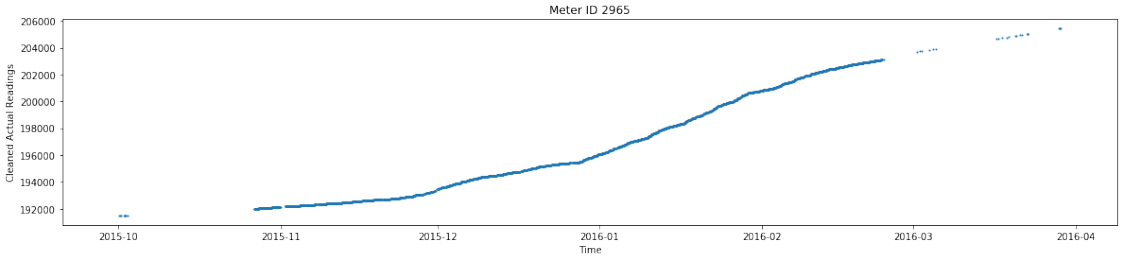
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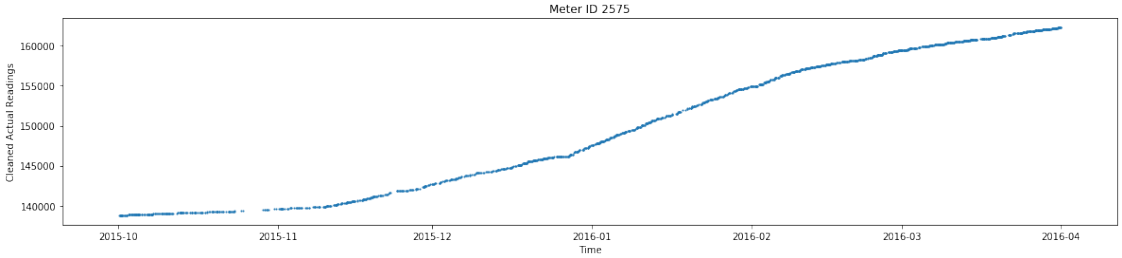
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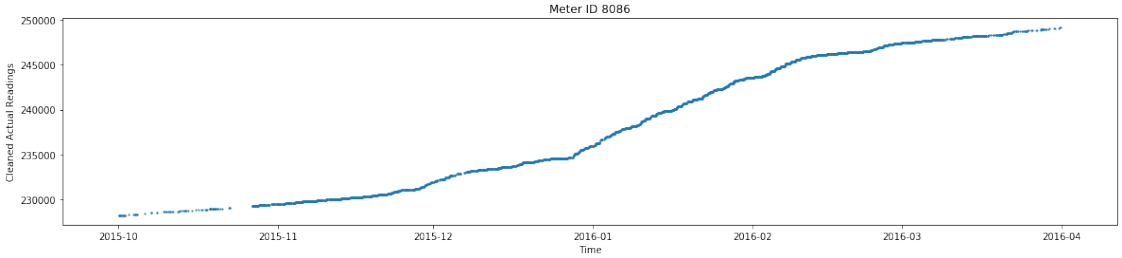
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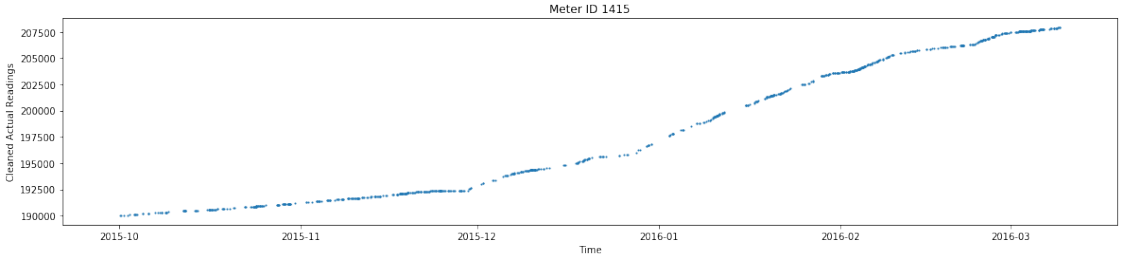
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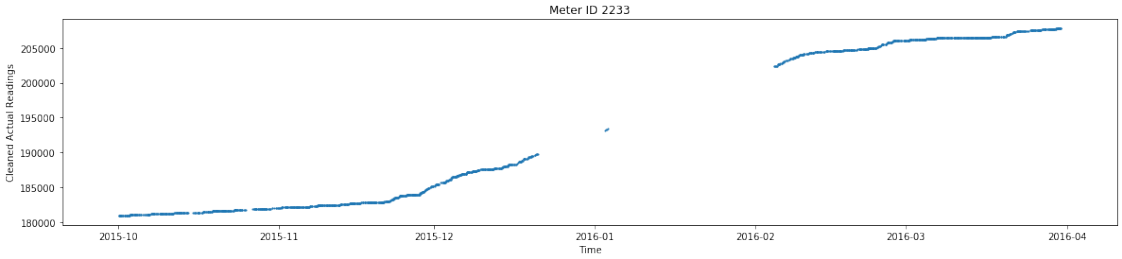
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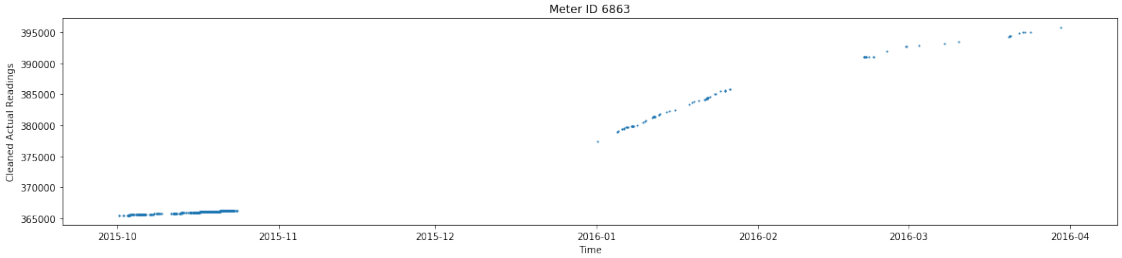
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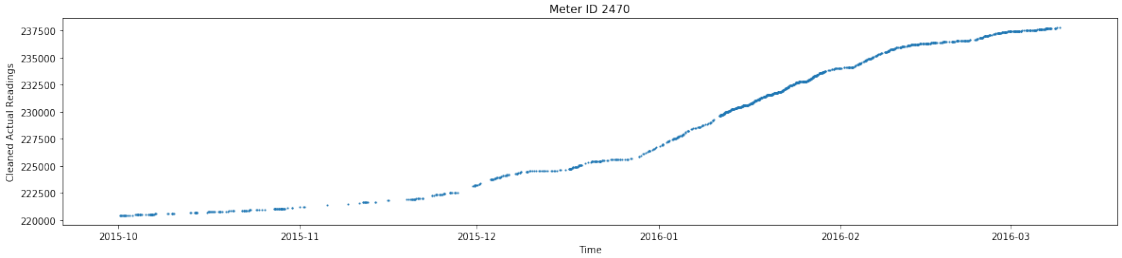
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2015-12
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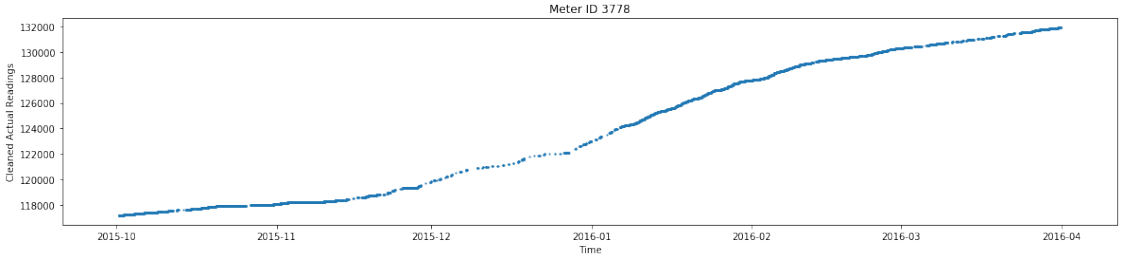
2016-02
2016-03
Time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2016-03
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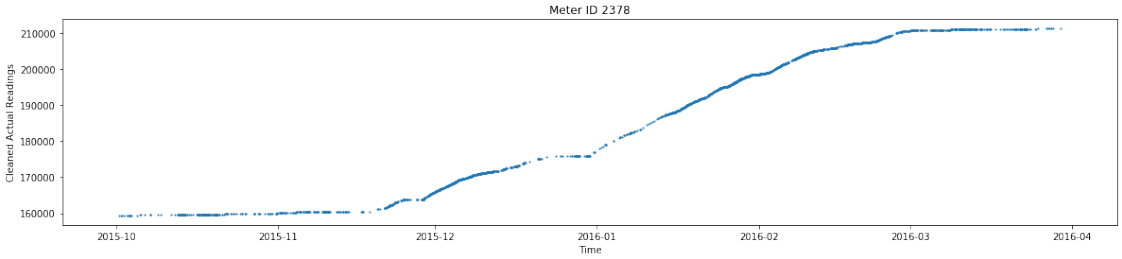
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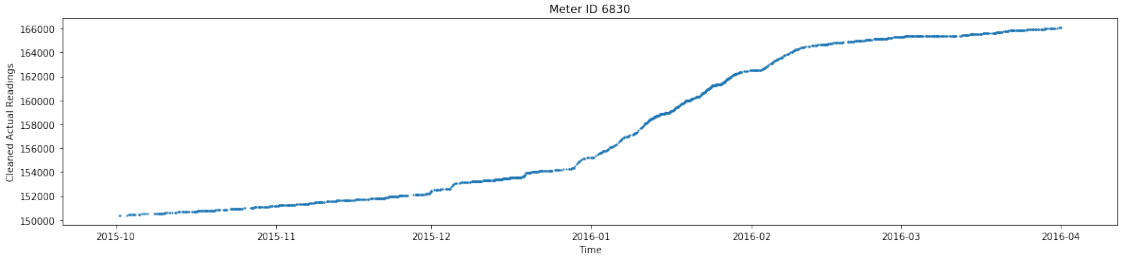
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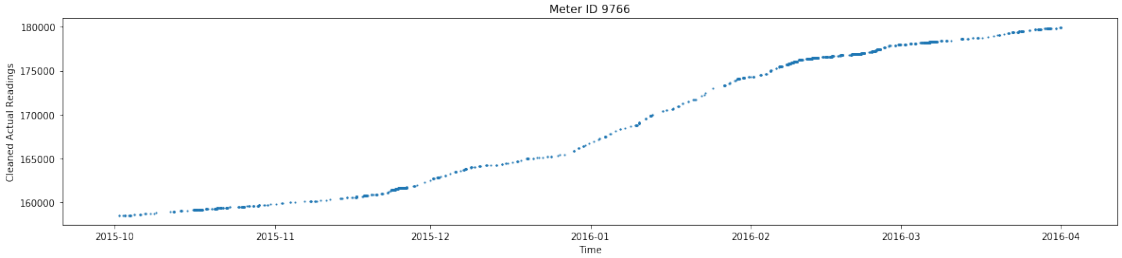
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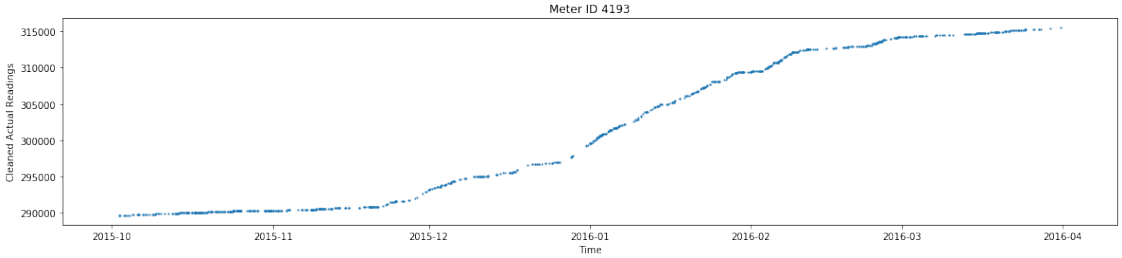
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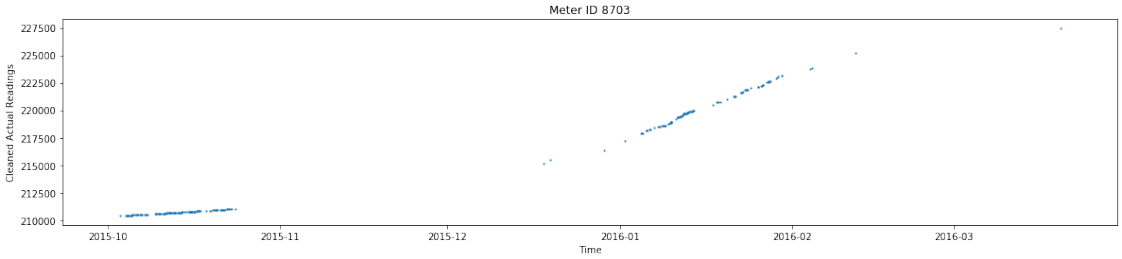
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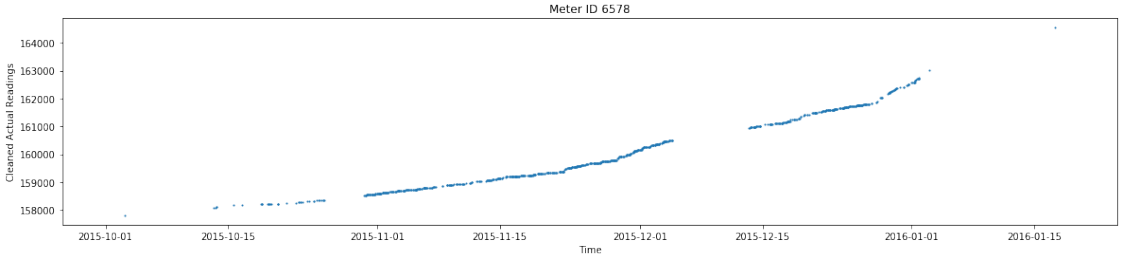
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2016-01-15
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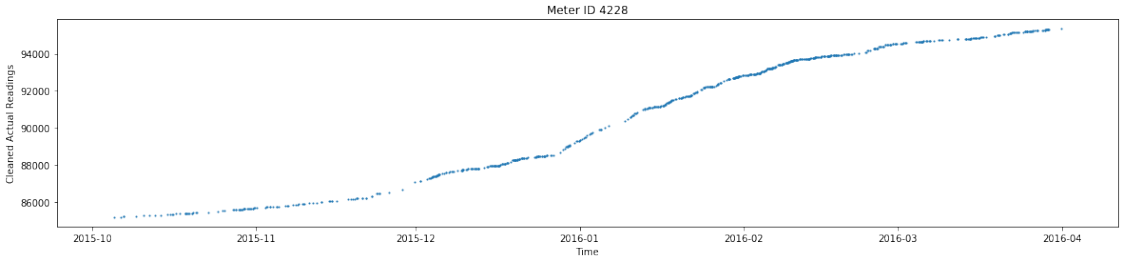
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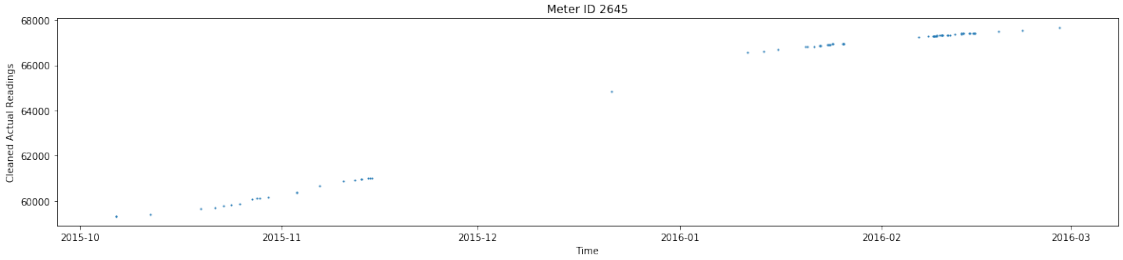
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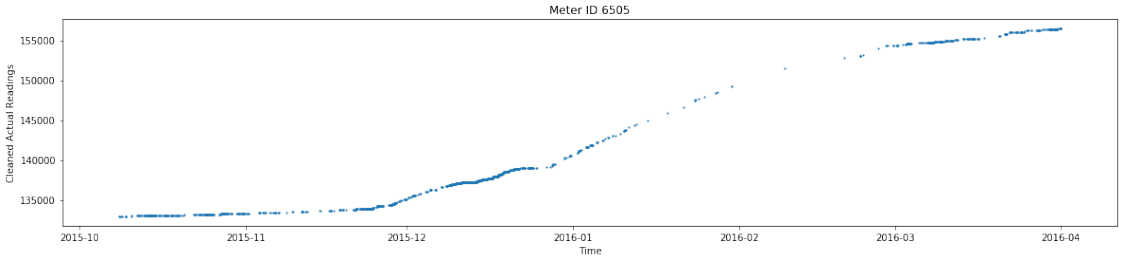
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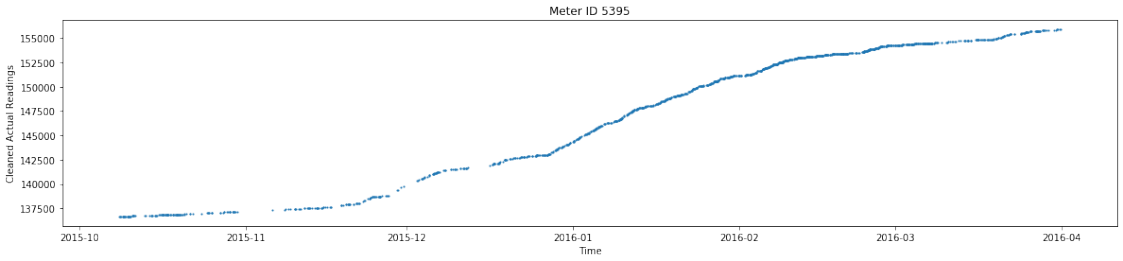
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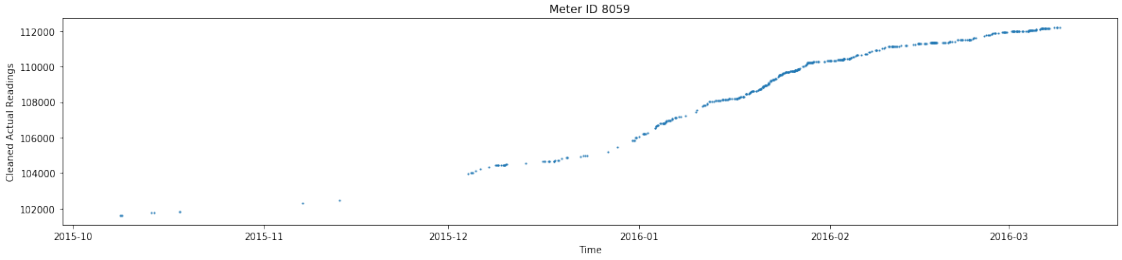
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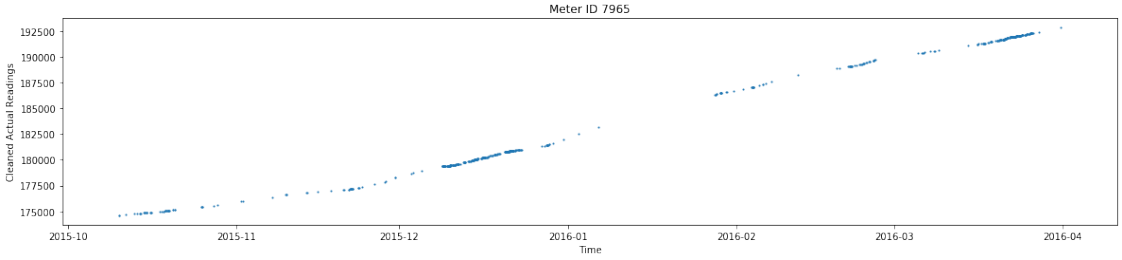
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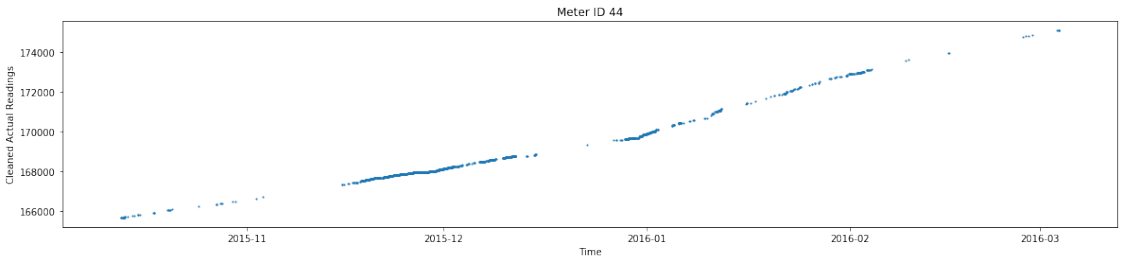
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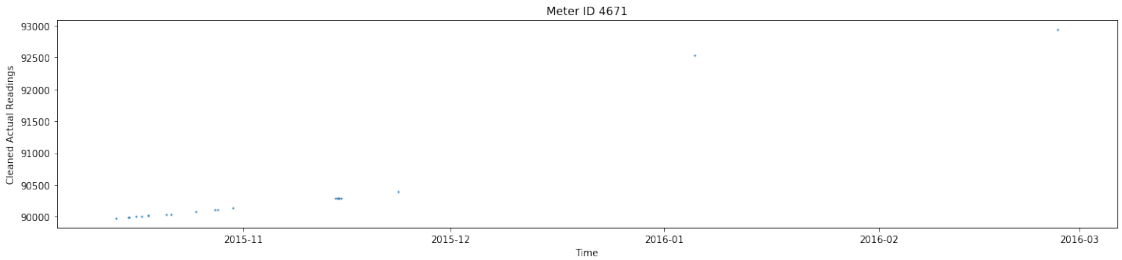
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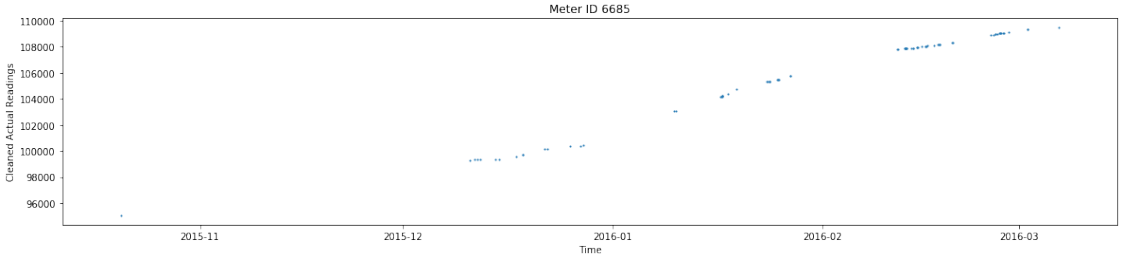
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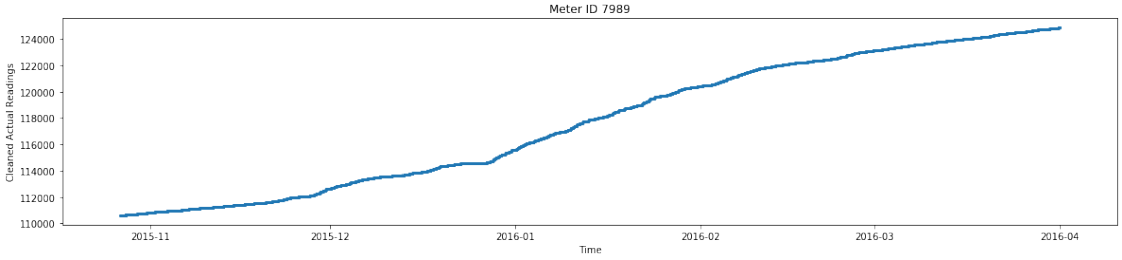
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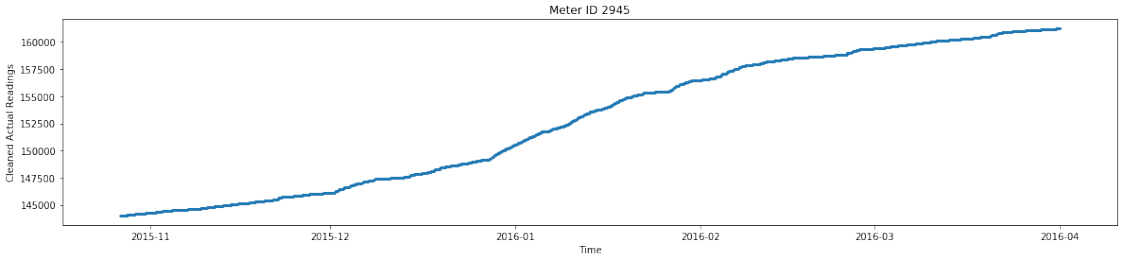
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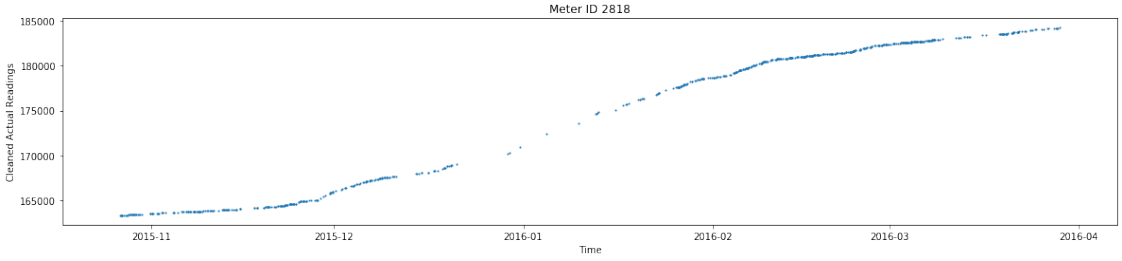
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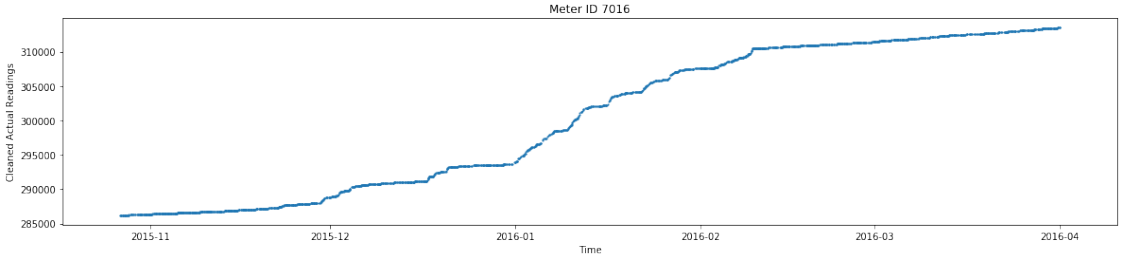
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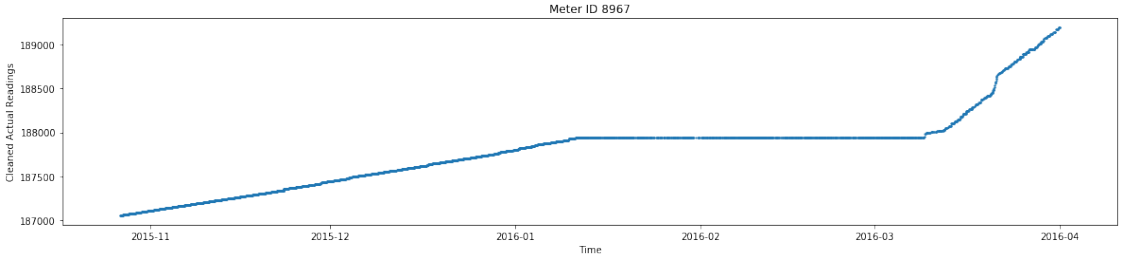
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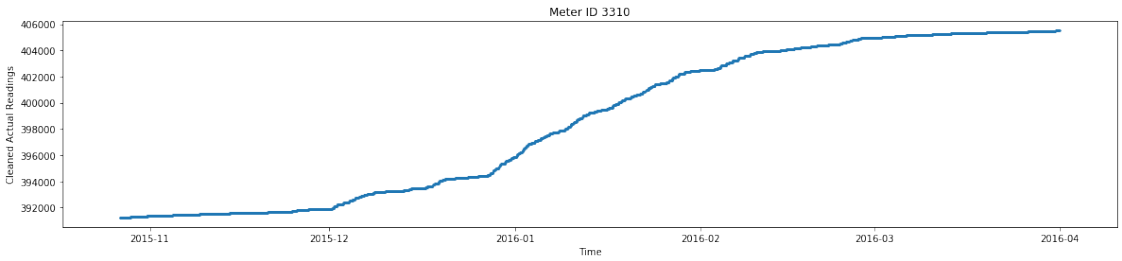
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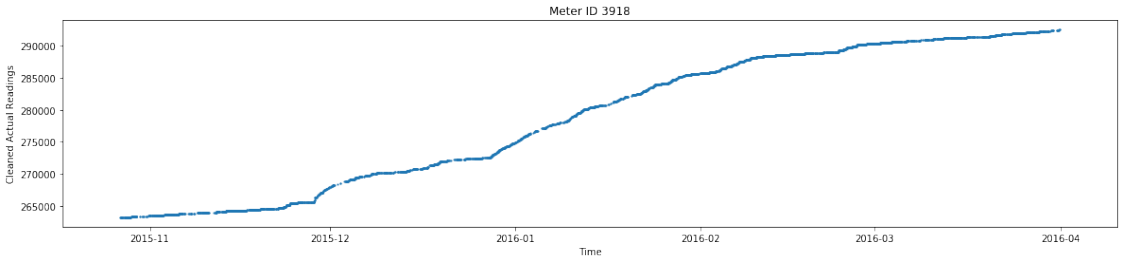
Time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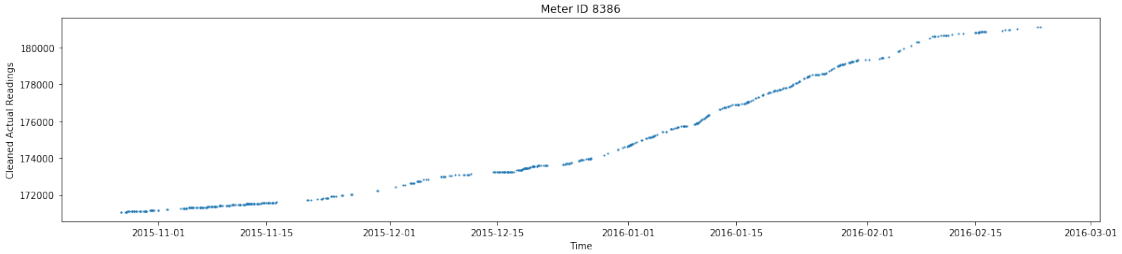
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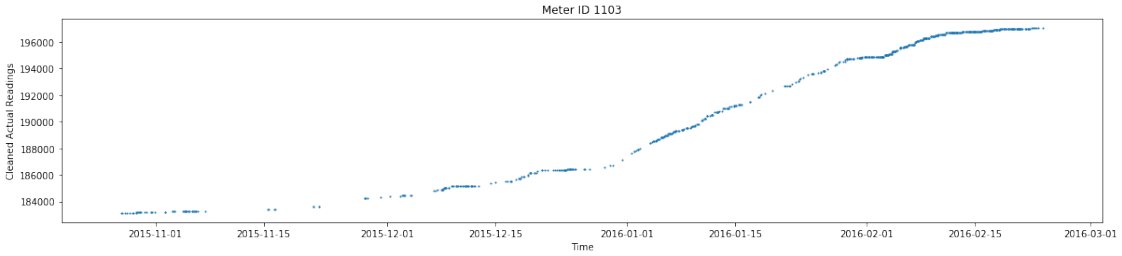
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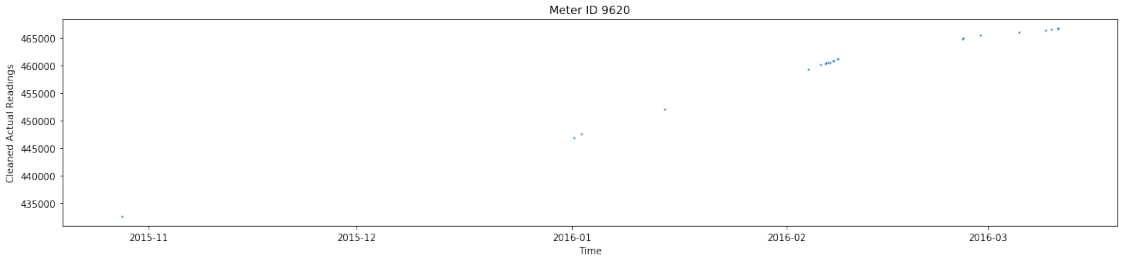
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2016-03
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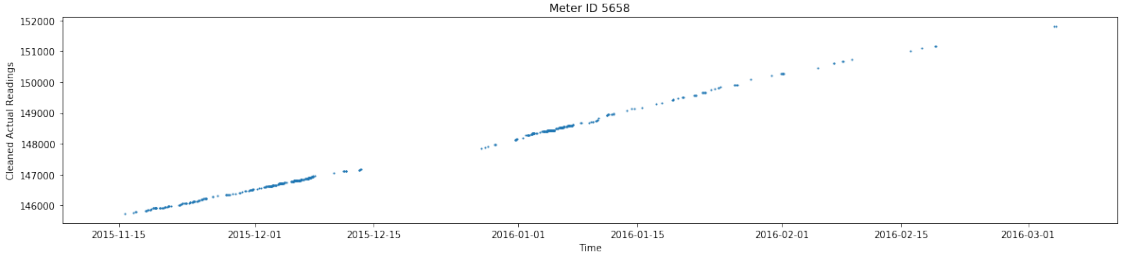
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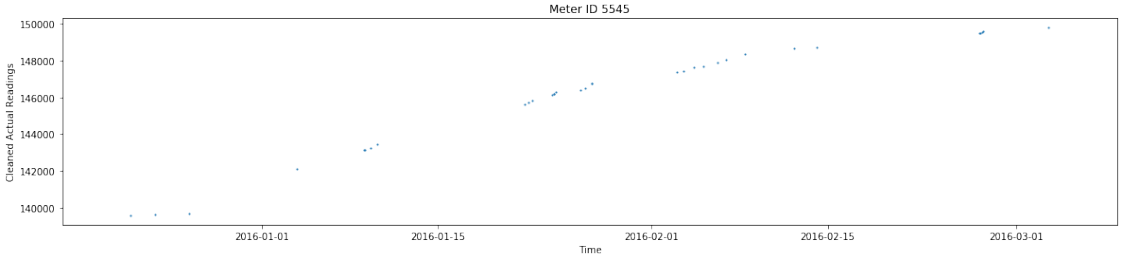
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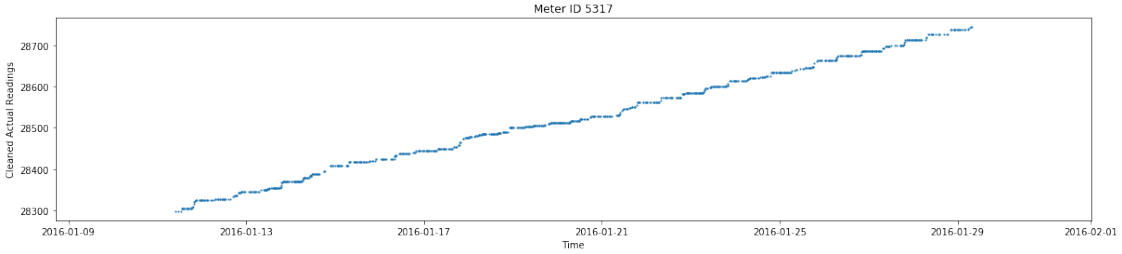
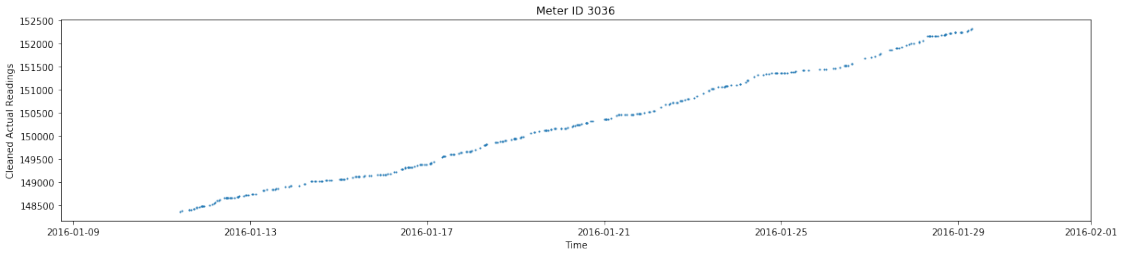
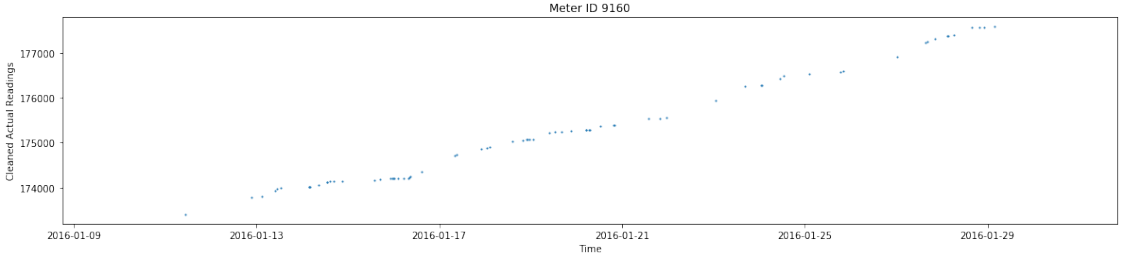
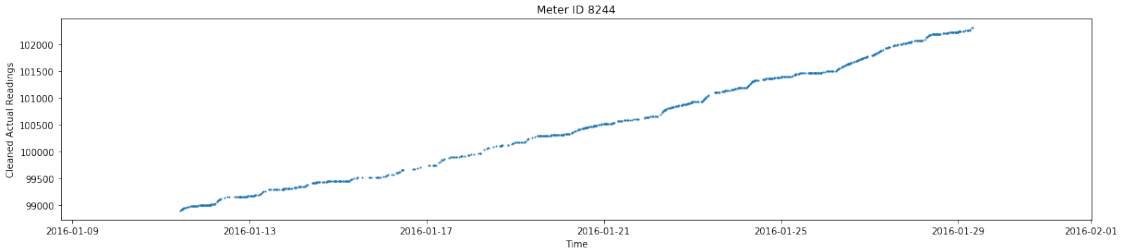
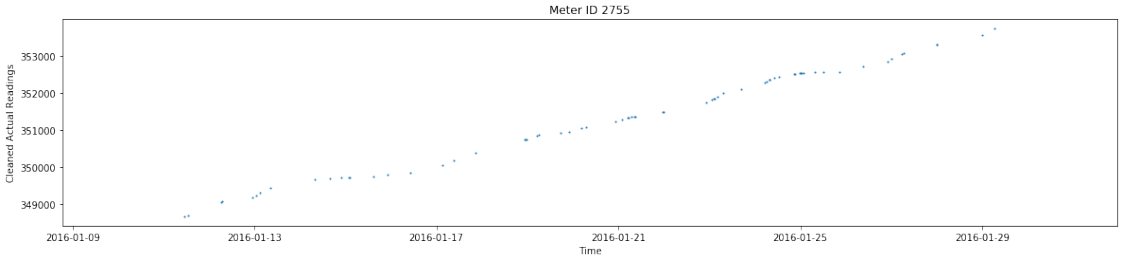
2016-03-01
Time

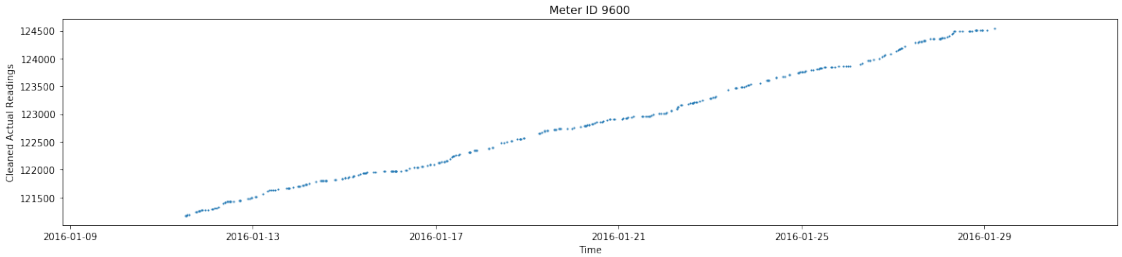

Meter ID 5317
Cleaned Actual Readings
28700
28600
28500
28400
28300
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

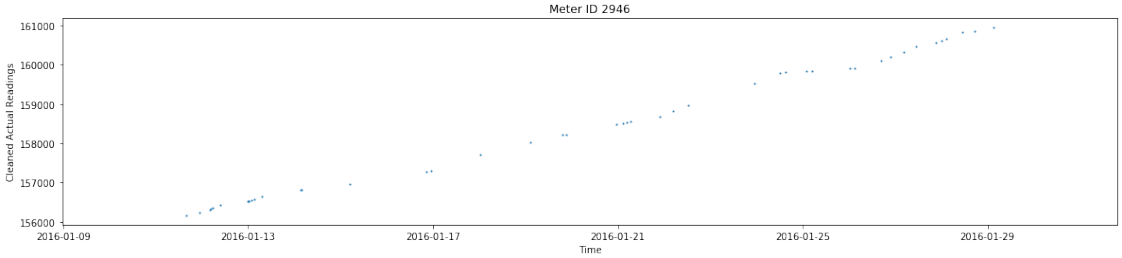

Meter ID 3036
Cleaned Actual Readings
152500
152000
151500
151000
150500
150000
149500
149000
148500
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

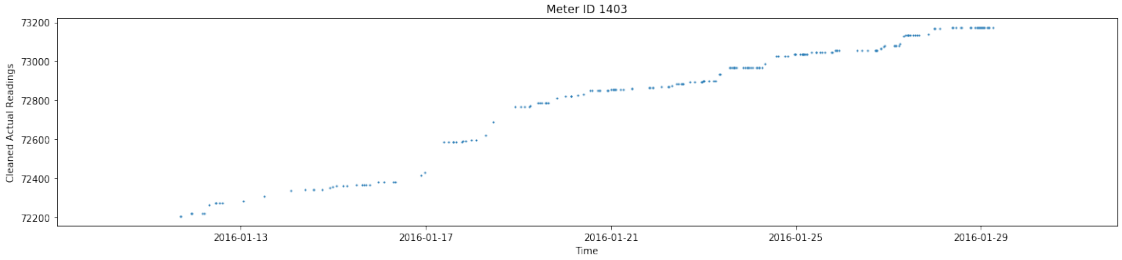

Meter ID 9160
Cleaned Actual Readings
177000
176000
175000
174000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

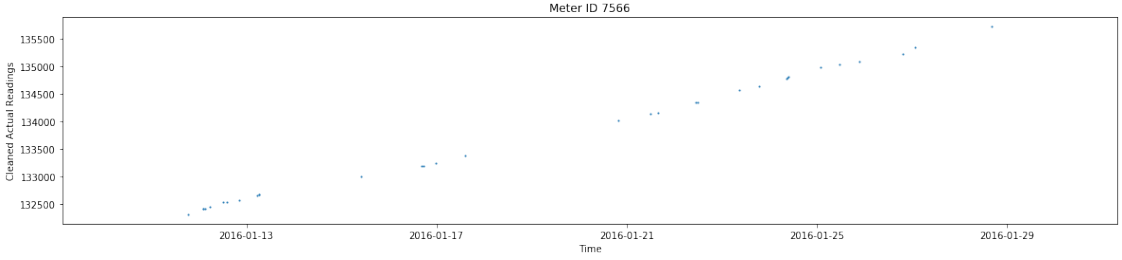

Meter ID 8244
Cleaned Actual Readings
102000
101500
101000
100500
100000
99500
99000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
2016-02-01
Time

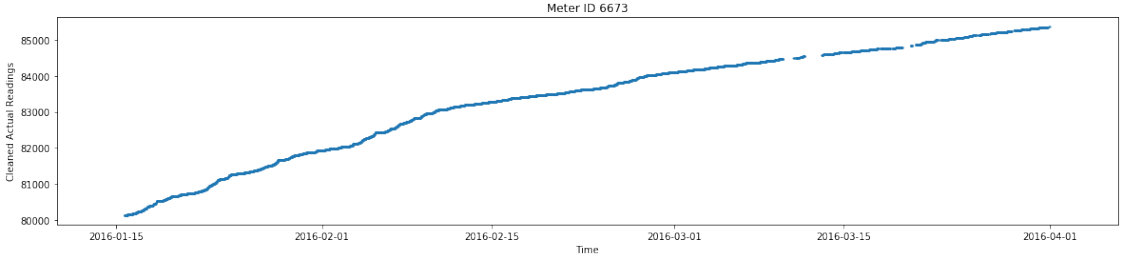

Meter ID 2755
Cleaned Actual Readings
353000
352000
351000
350000
349000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

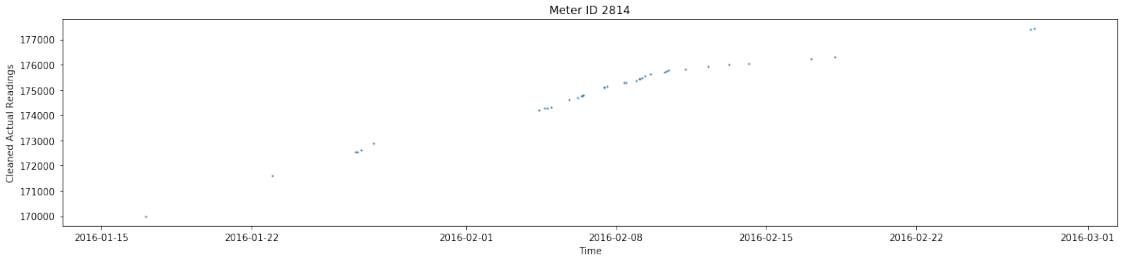

Meter ID 9600
Cleaned Actual Readings
124500
124000
123500
123000
122500
122000
121500
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

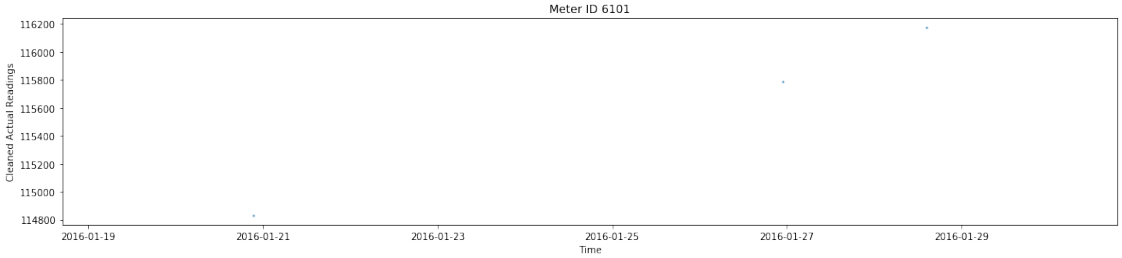

Meter ID 2946
Cleaned Actual Readings
161000
160000
159000
158000
157000
156000
2016-01-09
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time

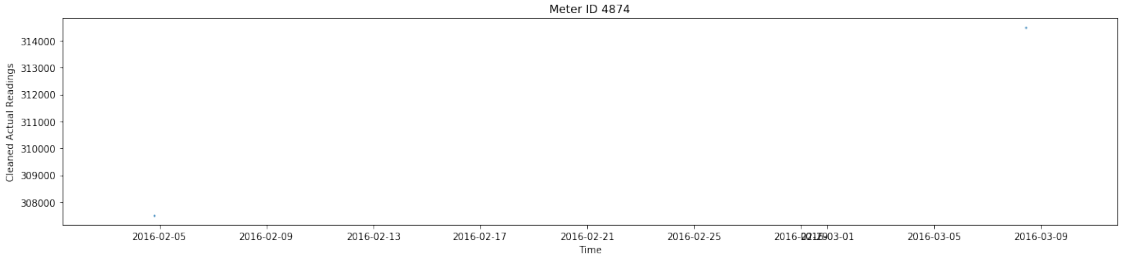

Meter ID 1403
Cleaned Actual Readings
73200
73000
72800
72600
72400
72200
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time


Meter ID 7566
Cleaned Actual Readings
135500
135000
134500
134000
133500
133000
132500
2016-01-13
2016-01-17
2016-01-21
2016-01-25
2016-01-29
Time


Meter ID 6673
Cleaned Actual Readings
85000
84000
83000
82000
81000
80000
2016-01-15
2016-02-01
2016-02-15
2016-03-01
2016-03-15
2016-04-01
Time


Meter ID 2814
Cleaned Actual Readings
177000
176000
175000
174000
173000
172000
171000
170000
2016-01-15
2016-01-22
2016-02-01
2016-02-08
2016-02-15
2016-02-22
2016-03-01
Time





6.5 Discussion

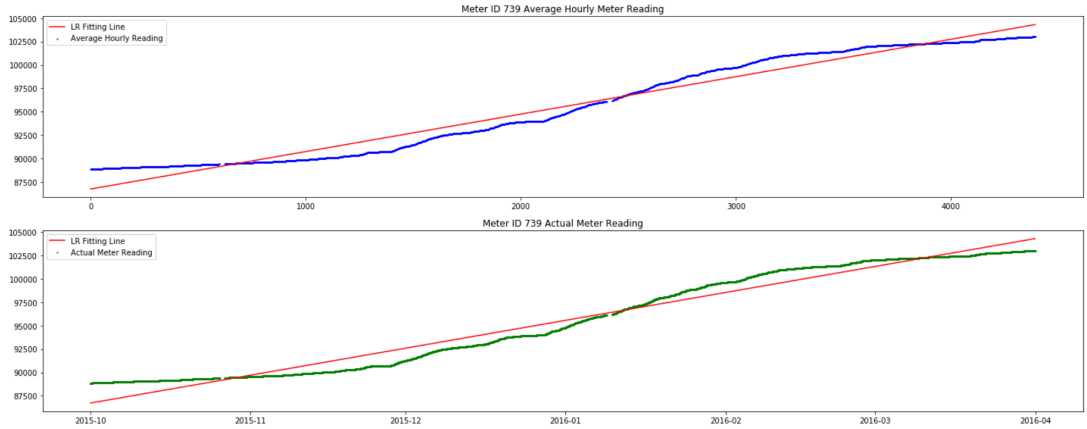
In this problem, we would like to build the model and predict the continuous meter readings after 2016-03-31 and also the average hourly consumption for each home.

To do that, first we need to preprocess the raw data. There are total 24h * 183d = 4392h and so we split all this 6 months time into 4392 segment, each segment means an hour period e.g. segement 0 means 2015-10-01 00:00:00 to 2015-10-01 01:00:00 and segement 1 means 2015-10-01 01:00:00 to 2015-10-01 02:00:00 and so on. Then for each meter, we take the average of all the actual meter readings in that particular segment as the average hourly meter reading for that segment. After processing like this, all the meters will have the same length which is 4293 readings, each reading represent the average hourly meter reading for one hour period.

However, there are some meters that do not have readings for some certain one hour period e.g. no readings between time 2015-10-01 00:00:00 to 2015-10-01 01:00:00, then the average hourly reading for this period(segment) will be nan. The last meter ID 4874 only has 2 readings for the 6 months time, then it has only 2 average hourly readings and the rest is nan.

After getting the average hourly readings array, we built the model using both linear regression and support vector regression (linear kernel). After fitting, we use the models to plot the fitting line again the actual meter readings for each home and also compute the predicted average hourly consumption for each home and the predicted meter readings for period 2016-04-01 00:00:00 to 2016-04-01 01:00:00 for each home.

6.5.1 Explaination of example graph:




```
The accuracy score of fitting for meter ID 739 is 0.9655714929595975
The next predicted average hourly reading for meter ID 739 for the period 2016-04-01 00:00:00 to 01:00:00 is 104320.8
3037140642
The average hourly consumption for meter ID 739 is 4.0063746296509635
----------------------------------------------------------------------------------------------------------------
```

You can see above image is the example output for meter ID 739. There are two subplots. The first subplot is the plot of the predicted fitting line against the scatter plot of computed average hourly meter readings for ID 739. The x-axis is the segment. The second subplot is also the plot of the predicted fitting line but against the scatter plot of the actual meter readings for ID 739. The x-axis is the actual date. The y-axis for both subplots is the meter readings.

After the prediction of each home average hourly consumption using both linear regression and support vector regression. We have a sense that some homes may consume more gas and some homes may consume less gas on average basis. Then we sum up all the homes' average consumption per hour, we get the an estimation of gas that the company needs to supply per hour:
Using linear regression: 932.767 per hour
Using support vector regression: 956.822 per hour

We can see that the prediction result using both algorithm is similar. The company needs to supply about 900-1000 gas per hour for the area. And the company can make better strategy based on this number.

[15]:
```
# divide the 6 months time into 24h * 183d = 4392 segments. For each meter, get␣
 ↪the average meter reading of all the
# readings within that segment. For example, segment 0 means period 2015-10-01␣
 ↪00:00:00 to 2015-10-01 01:00:00. So
# the first reading is the average reading of all the readings in this period.␣
 ↪After processing, all the meter will
# have the same length which is 4392 readings. If there is no reading for␣
 ↪certain meter for certain time period, the
# reading will be nan.

hourly_readings = {}
for key in dictMeter_clean:
    start_time = pd.Timestamp(year=2015, month=10, day=1)
    house_reading = dictMeter_clean[key]
```

```
    reading_arr = []
    for i in range(24*183):
        sub_row = house_reading[(house_reading['localminute']>(start_time+pd.
↪Timedelta(hours=i))) & \
                                (house_reading['localminute']<(start_time+pd.
↪Timedelta(hours=i+1)))]
        hourly_reading = sub_row['meter_value'].mean()
        reading_arr.append(hourly_reading)
    hourly_readings[key] = reading_arr
```

[16]:
```
# transfer the array to dataframe

df = pd.DataFrame(hourly_readings)
```

[17]:
```
# check the final completed data frame

df
```

[17]:

	739	8890	6910	3635	1507	5810	\
0	88858.0	197164.0	179118.0	151322.0	390354.000	97506.0	
1	88858.0	197164.8	179118.0	151330.0	390354.000	97508.0	
2	88859.0	NaN	179118.0	151330.0	390354.000	97508.0	
3	88860.0	197166.0	179118.0	151330.0	390355.875	97508.0	
4	88860.0	197166.0	179118.0	151330.0	390356.000	97508.0	
…	…	…	…	…	…	…	
4387	103010.0	227306.0	NaN	170805.0	422680.000	115248.8	
4388	103011.0	NaN	205218.0	170806.0	422690.500	115254.0	
4389	103012.0	227308.0	205222.0	170806.0	422696.000	115270.0	
4390	103012.0	NaN	205224.0	170806.0	422704.000	115270.0	
4391	103012.0	227326.0	205224.0	170816.0	422708.000	115272.0	

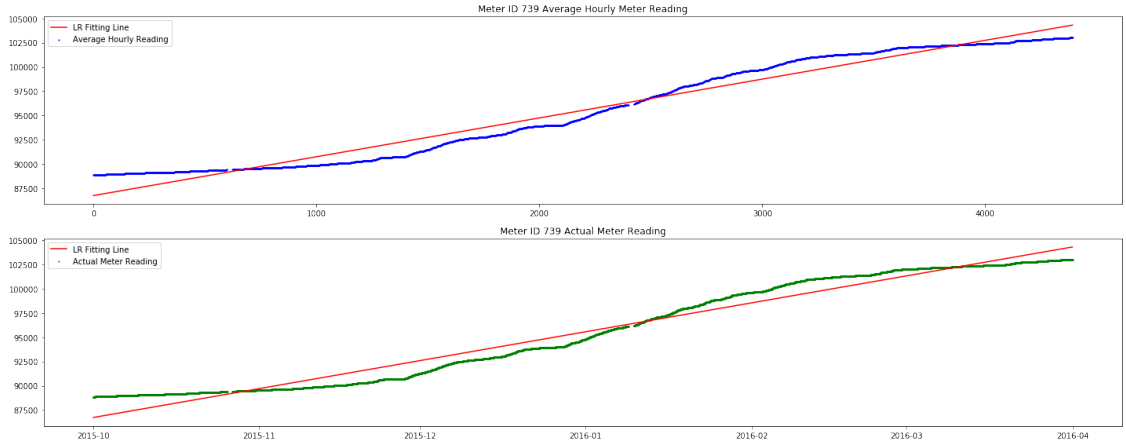
	484	4352	1718	1714	…	8244	2755	9600	\
0	99298.000000	218216.0	161076.0	147048.000000	…	NaN	NaN	NaN	
1	99299.428571	218216.0	161076.0	147048.000000	…	NaN	NaN	NaN	
2	99300.000000	218218.0	161076.0	147048.000000	…	NaN	NaN	NaN	
3	99300.000000	NaN	161077.6	147051.142857	…	NaN	NaN	NaN	
4	99302.222222	218218.0	161078.0	147058.000000	…	NaN	NaN	NaN	
…	…	…	…	…	…	…	…	…	
4387	114168.500000	NaN	180958.0	170164.000000	…	NaN	NaN	NaN	
4388	114171.538462	NaN	180958.0	170164.000000	…	NaN	NaN	NaN	
4389	114172.000000	NaN	180966.0	170164.000000	…	NaN	NaN	NaN	
4390	114172.000000	NaN	180980.0	170164.000000	…	NaN	NaN	NaN	
4391	114172.666667	NaN	180980.0	170164.000000	…	NaN	NaN	NaN	

	2946	1403	7566	6673	2814	6101	4874
0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	NaN	NaN	NaN	NaN	NaN	NaN	NaN

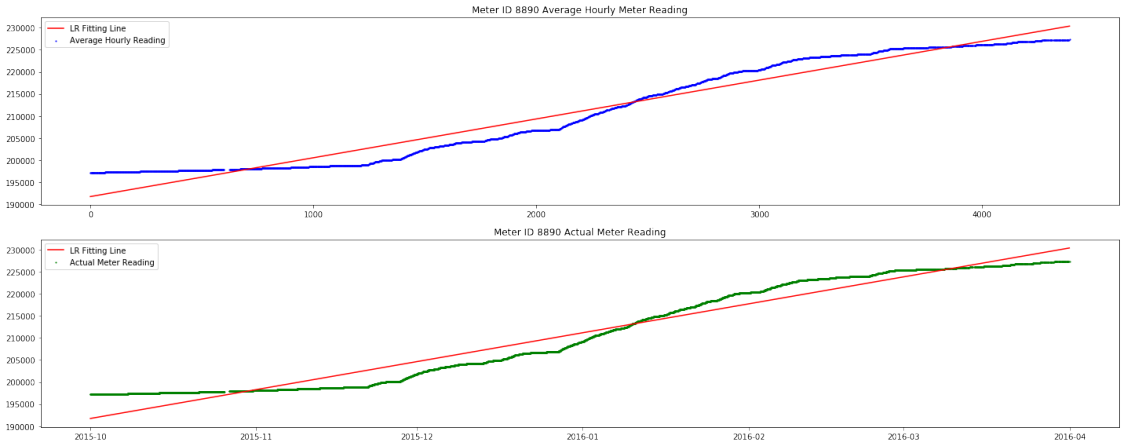
```
2       NaN   NaN   NaN       NaN   NaN   NaN   NaN
3       NaN   NaN   NaN       NaN   NaN   NaN   NaN
4       NaN   NaN   NaN       NaN   NaN   NaN   NaN
…     …   …   …       …   …   …   …
4387    NaN   NaN   NaN  85354.0   NaN   NaN   NaN
4388    NaN   NaN   NaN  85356.0   NaN   NaN   NaN
4389    NaN   NaN   NaN       NaN   NaN   NaN   NaN
4390    NaN   NaN   NaN       NaN   NaN   NaN   NaN
4391    NaN   NaN   NaN  85362.0   NaN   NaN   NaN

[4392 rows x 157 columns]
```

[18]:
```
# build the model and do the prediction using linear regression

time_arr = []
start_time = pd.Timestamp(year=2015, month=10, day=1, hour=0)

for i in range(4392):
    time_arr.append(start_time + pd.Timedelta(hours=i))

hour_dict = {}

for key in df:
    reg = LinearRegression().fit(np.array(df[key].dropna().index).
↪reshape(-1,1), df[key].dropna())

    time_arr0 = time_arr
    index = df[key].index[df[key].apply(np.isnan)]
    index = list(index)
    time_arr0 = np.delete(time_arr, index)

    fig, axs = plt.subplots(2, 1, figsize=(20,8))
    axs[0].plot(np.array(df[key].dropna().index).reshape(-1,1), \
             reg.predict(np.array(df[key].dropna().index).reshape(-1,1)),␣
↪color='r')
    axs[0].scatter(range(4392), df[key], color='b', s=1)
    axs[0].set_title("Meter ID {} Average Hourly Meter Reading".format(key))

    axs[1].plot(time_arr0, \
             reg.predict(np.array(df[key].dropna().index).reshape(-1,1)),␣
↪color='r')
    axs[1].scatter(dictMeter_clean[key]["localminute"],␣
↪dictMeter_clean[key]["meter_value"], color='g', s=1)
    axs[1].set_title("Meter ID {} Actual Meter Reading".format(key))

    plt.tight_layout()
    axs[0].legend(["LR Fitting Line", "Average Hourly Reading"])
```

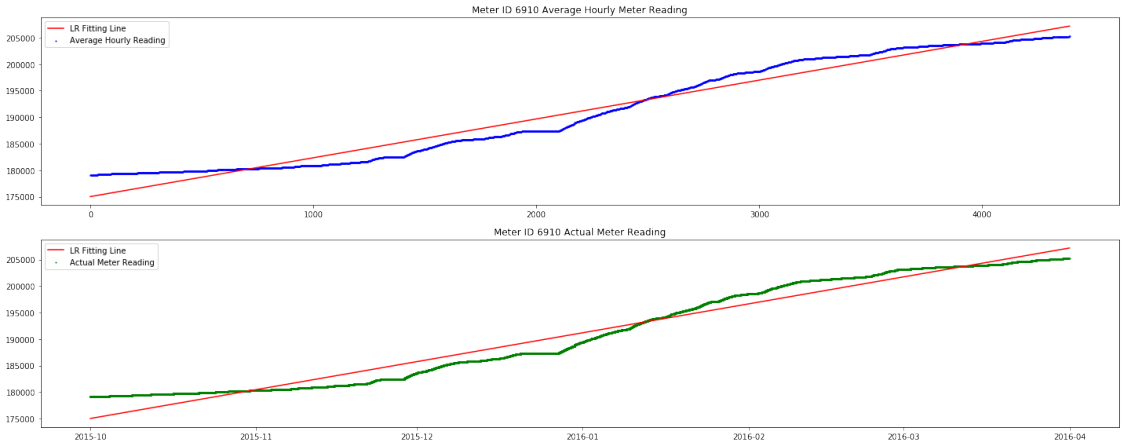
```
    axs[1].legend(["LR Fitting Line", "Actual Meter Reading"])
    plt.show()
    print("The accuracy score of fitting for meter ID {} is {}"\
          .format(key, reg.score(np.array(df[key].dropna().index).
↪reshape(-1,1), df[key].dropna())))
    print("The next predicted average hourly reading for meter ID {} for the␣
↪period 2016-04-01 00:00:00 to 01:00:00 is {}"\
          .format(key, reg.predict(np.array([[4392]]))[0]))
    print("The average hourly consumption for meter ID {} is {}".format(key,␣
↪(reg.predict(np.array([[4393]]))-reg.predict(np.array([[4392]])))[0]))
    ␣
↪print("--------------------------------------------------------------------------------

    hour_dict[key] = (reg.predict(np.array([[4393]]))-reg.predict(np.
↪array([[4392]])))[0]
```



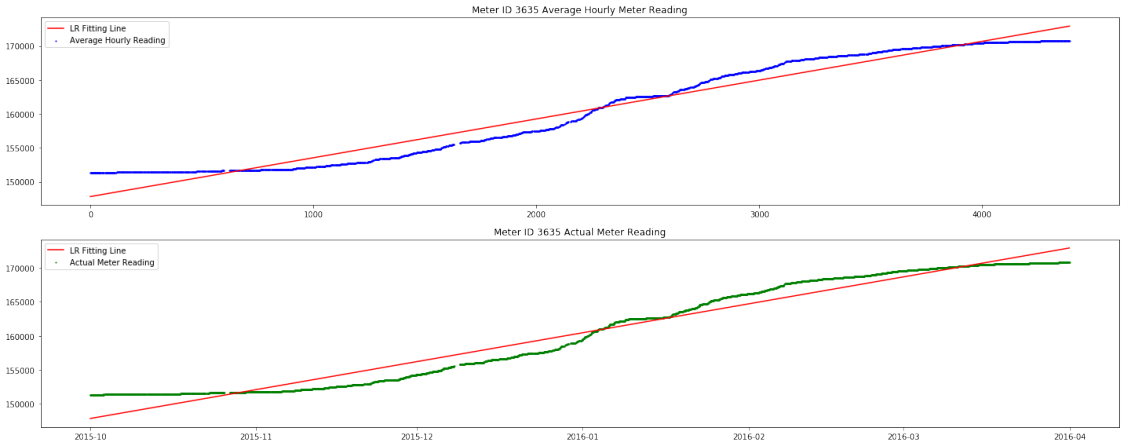

```
The accuracy score of fitting for meter ID 739 is 0.9655714929595975
The next predicted average hourly reading for meter ID 739 for the period
2016-04-01 00:00:00 to 01:00:00 is 104320.83037140642
The average hourly consumption for meter ID 739 is 4.0063746296509635
--------------------------------------------------------------------------------
------------------------------
```



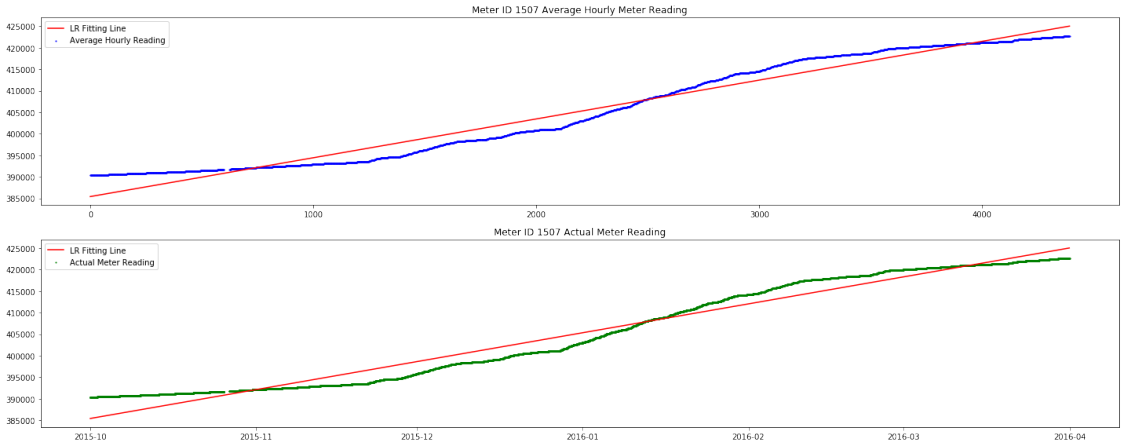

```
The accuracy score of fitting for meter ID 8890 is 0.9533238563722483
The next predicted average hourly reading for meter ID 8890 for the period
2016-04-01 00:00:00 to 01:00:00 is 230390.3885542238
The average hourly consumption for meter ID 8890 is 8.800201959442347
--------------------------------------------------------------------------------
------------------------------
```



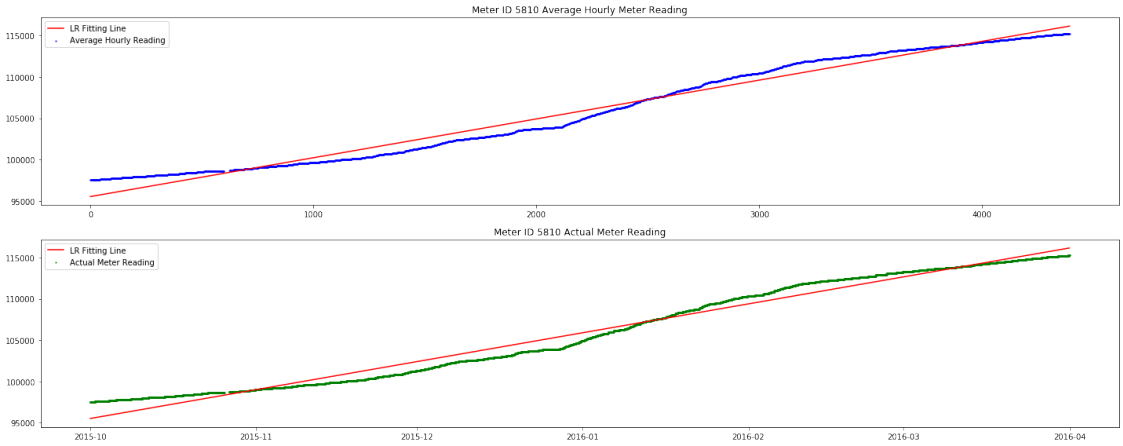

```
The accuracy score of fitting for meter ID 6910 is 0.9641517709235499
The next predicted average hourly reading for meter ID 6910 for the period
2016-04-01 00:00:00 to 01:00:00 is 207190.145714553
The average hourly consumption for meter ID 6910 is 7.324025698704645
--------------------------------------------------------------------------------
------------------------------
```



The accuracy score of fitting for meter ID 3635 is 0.9598464119450919
The next predicted average hourly reading for meter ID 3635 for the period 2016-04-01 00:00:00 to 01:00:00 is 172936.34746257047
The average hourly consumption for meter ID 3635 is 5.713619377347641



The accuracy score of fitting for meter ID 1507 is 0.964356813402992
The next predicted average hourly reading for meter ID 1507 for the period 2016-04-01 00:00:00 to 01:00:00 is 425050.2694020661
The average hourly consumption for meter ID 1507 is 9.028518683509901




```
The accuracy score of fitting for meter ID 5810 is 0.9780464419727197
The next predicted average hourly reading for meter ID 5810 for the period
2016-04-01 00:00:00 to 01:00:00 is 116168.56511439157
The average hourly consumption for meter ID 5810 is 4.701382334766095
--------------------------------------------------------------------------------
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```

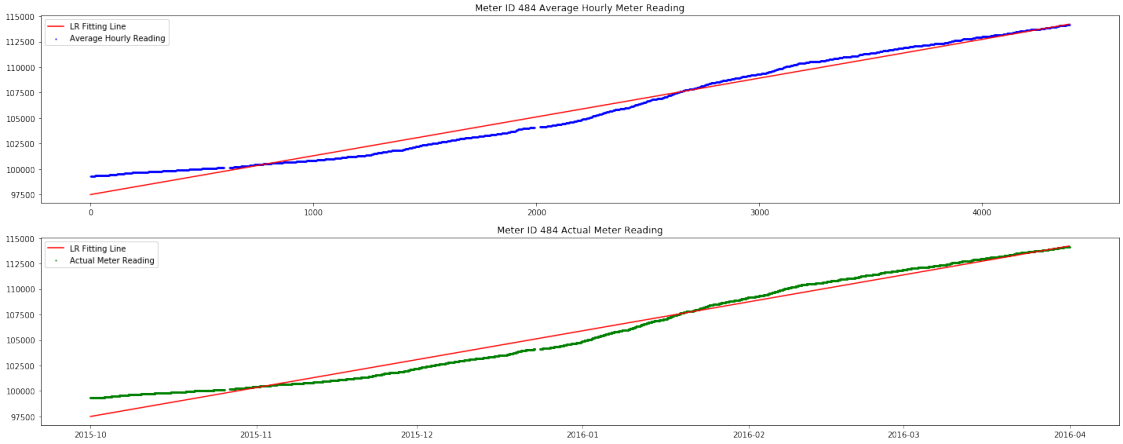


```
The accuracy score of fitting for meter ID 484 is 0.9777601069453932
The next predicted average hourly reading for meter ID 484 for the period
2016-04-01 00:00:00 to 01:00:00 is 114234.47881876788
The average hourly consumption for meter ID 484 is 3.8141304630989907
--------------------------------------------------------------------------------
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```
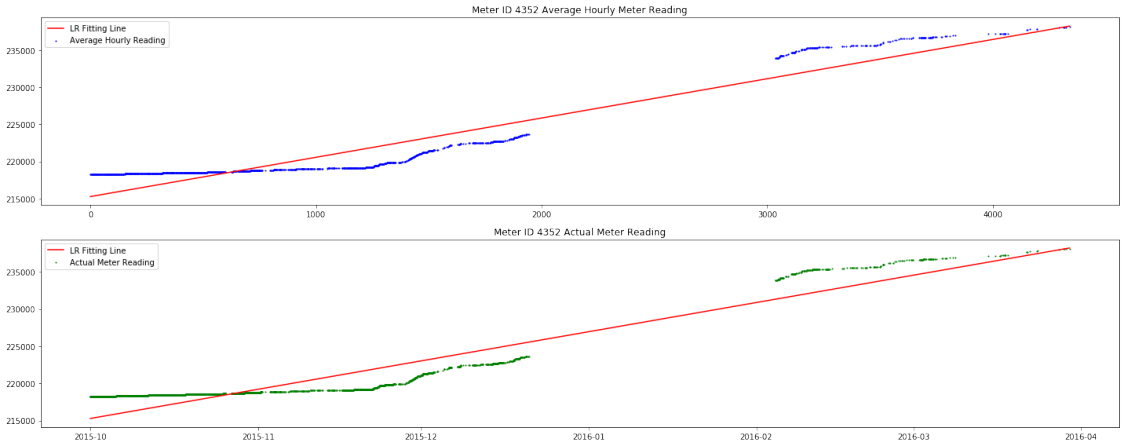
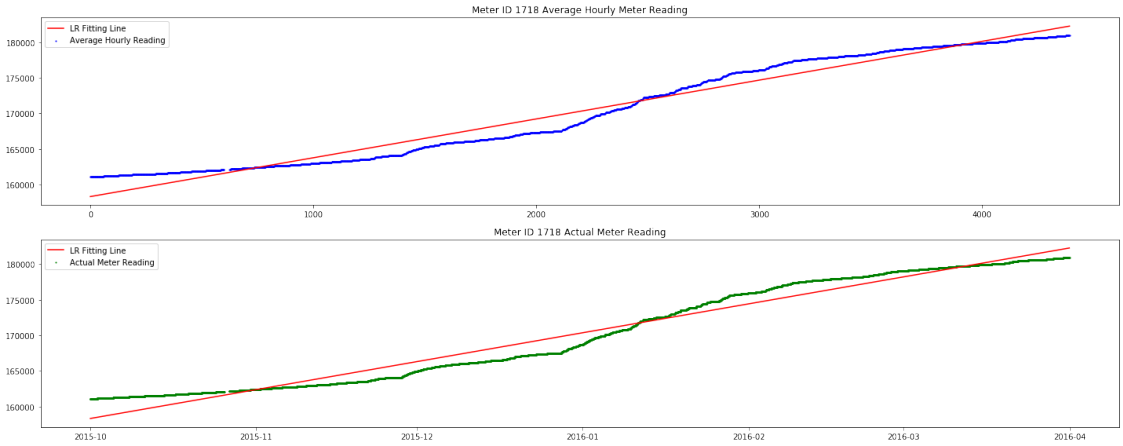
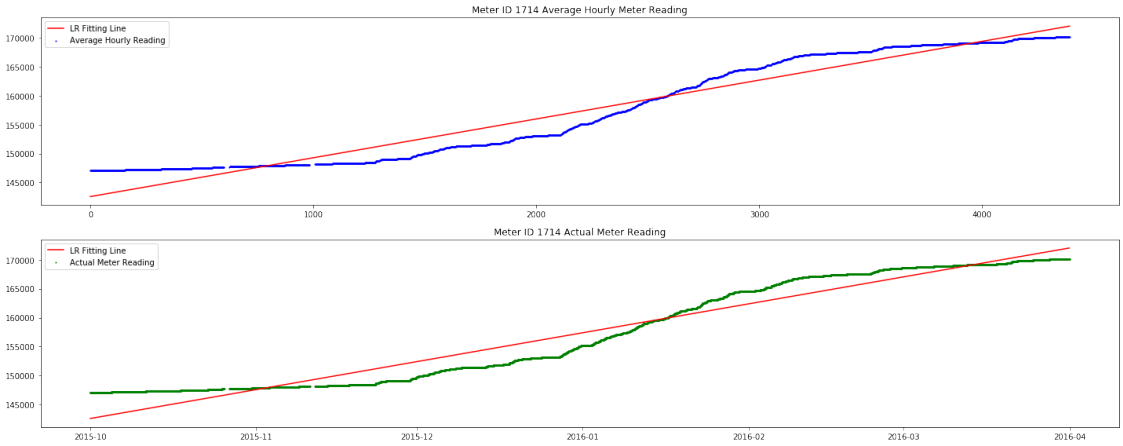



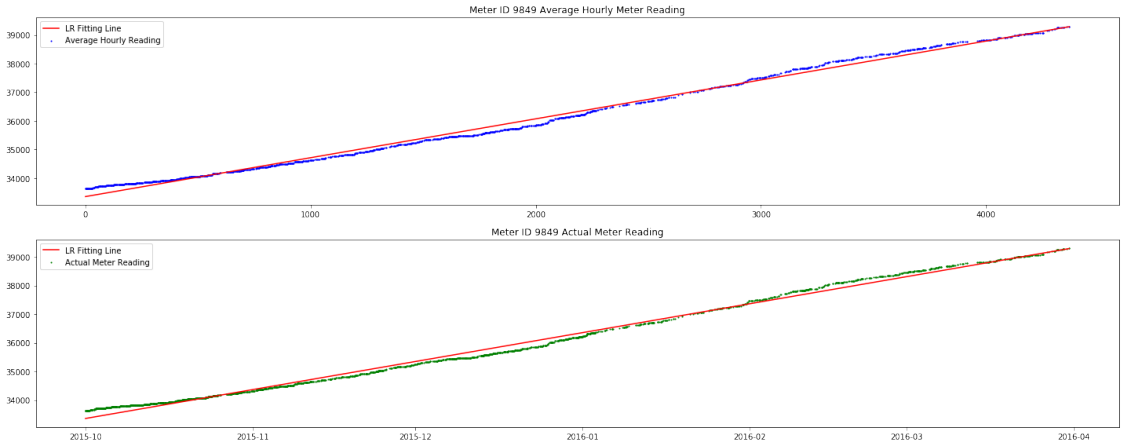

```
The accuracy score of fitting for meter ID 4352 is 0.8931891790333515
The next predicted average hourly reading for meter ID 4352 for the period
2016-04-01 00:00:00 to 01:00:00 is 238497.5513307148
The average hourly consumption for meter ID 4352 is 5.288576703809667
--------------------------------------------------------------------------------
------------------------------
```



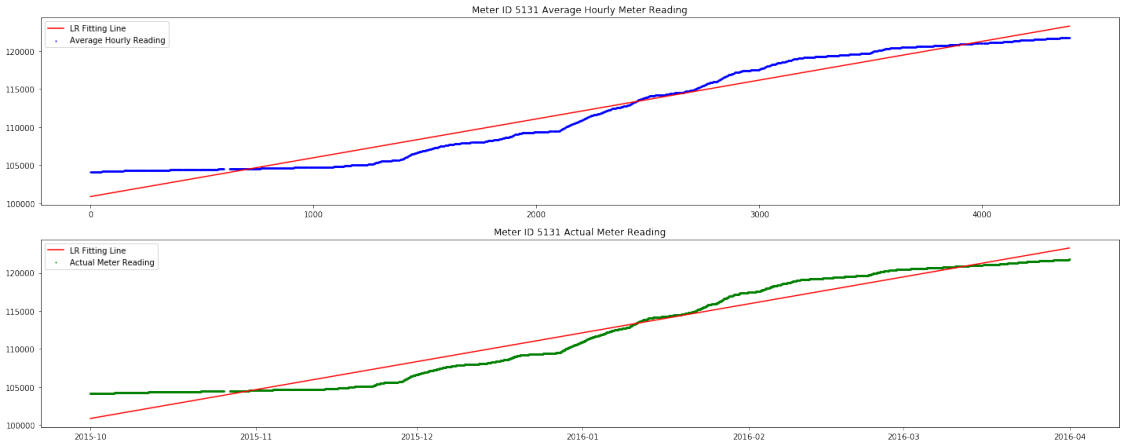

```
The accuracy score of fitting for meter ID 1718 is 0.9660585796913459
The next predicted average hourly reading for meter ID 1718 for the period
2016-04-01 00:00:00 to 01:00:00 is 182270.9313803449
The average hourly consumption for meter ID 1718 is 5.45339625235647
--------------------------------------------------------------------------------
------------------------------
```



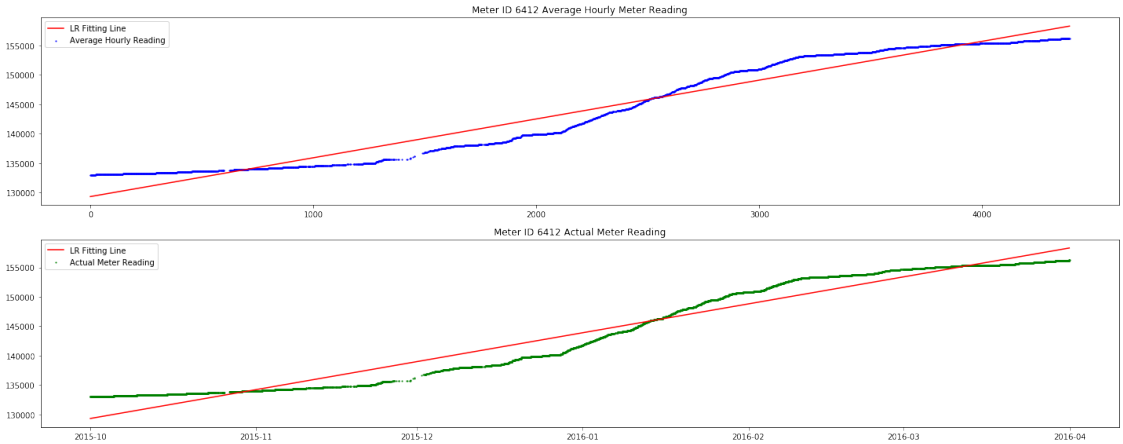
The accuracy score of fitting for meter ID 1714 is 0.94153472199379
The next predicted average hourly reading for meter ID 1714 for the period 2016-04-01 00:00:00 to 01:00:00 is 172036.565923425
The average hourly consumption for meter ID 1714 is 6.708523937501013



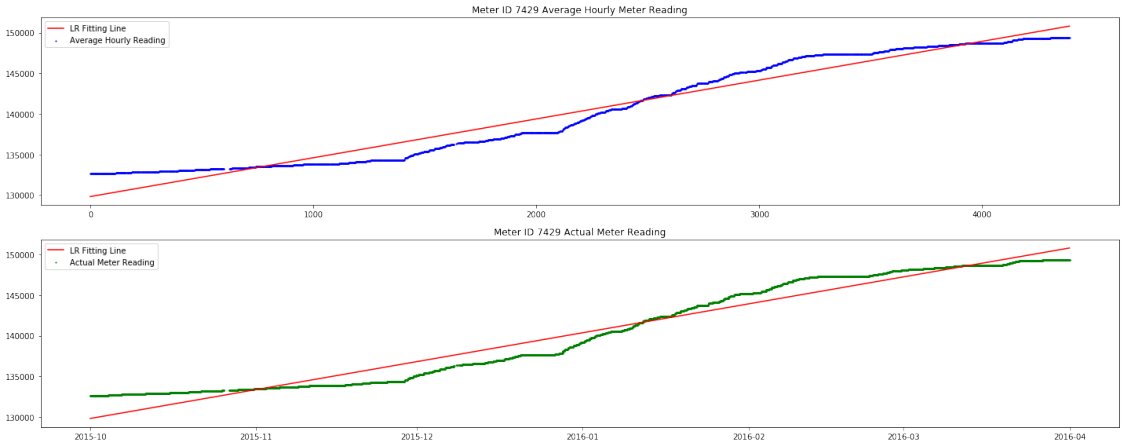
The accuracy score of fitting for meter ID 9849 is 0.9939097858505056
The next predicted average hourly reading for meter ID 9849 for the period 2016-04-01 00:00:00 to 01:00:00 is 39317.92634585174
The average hourly consumption for meter ID 9849 is 1.3568886834036675



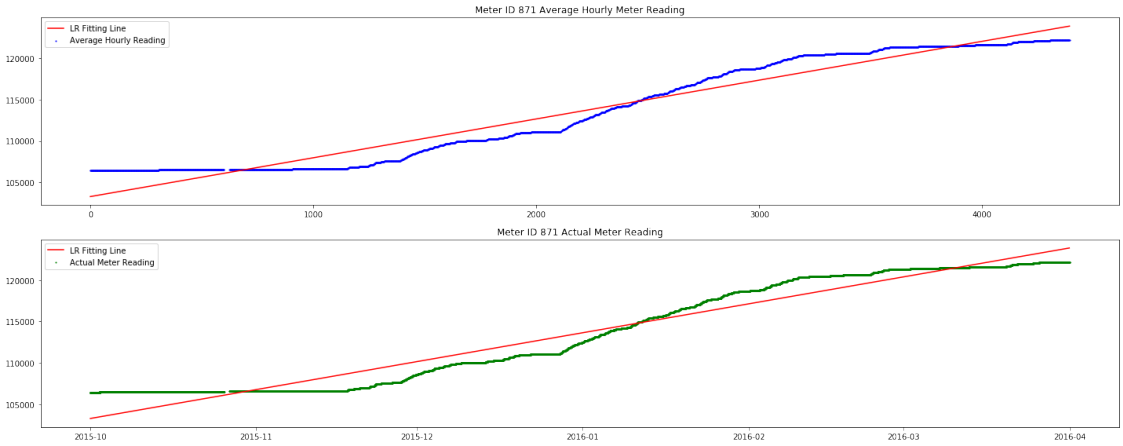
The accuracy score of fitting for meter ID 5131 is 0.9525639767287153
The next predicted average hourly reading for meter ID 5131 for the period 2016-04-01 00:00:00 to 01:00:00 is 123276.0437357654
The average hourly consumption for meter ID 5131 is 5.1002634435135406



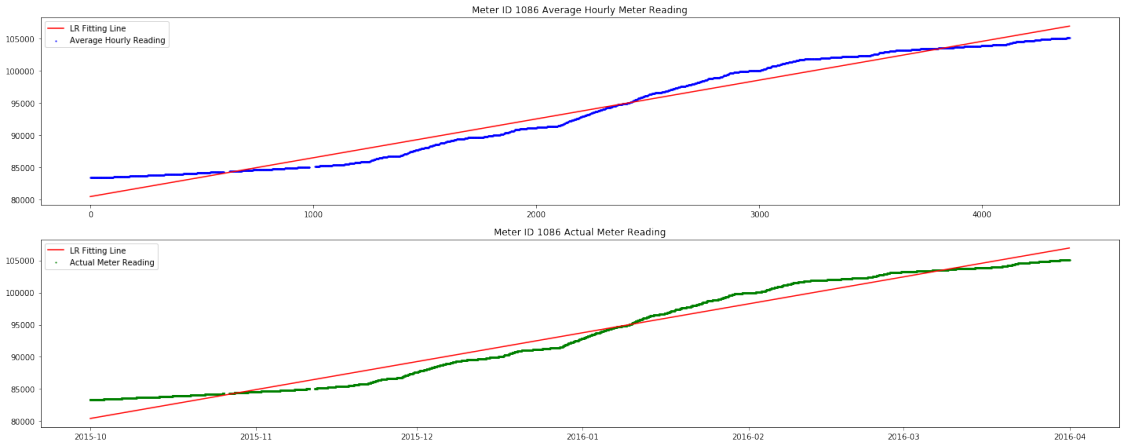
The accuracy score of fitting for meter ID 6412 is 0.9522605531818186
The next predicted average hourly reading for meter ID 6412 for the period 2016-04-01 00:00:00 to 01:00:00 is 158303.55093501462
The average hourly consumption for meter ID 6412 is 6.599239577510161



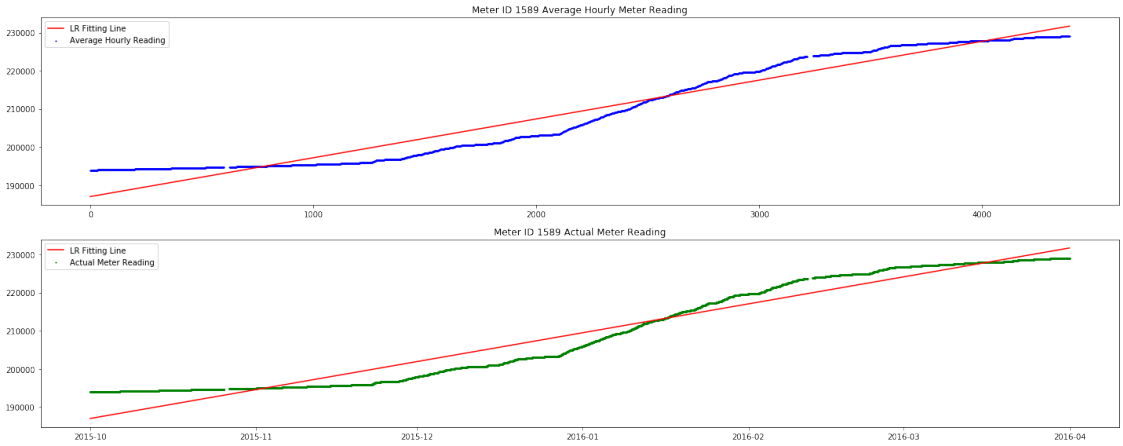
The accuracy score of fitting for meter ID 7429 is 0.9568147124036157
The next predicted average hourly reading for meter ID 7429 for the period 2016-04-01 00:00:00 to 01:00:00 is 150813.3620011288
The average hourly consumption for meter ID 7429 is 4.781683330249507



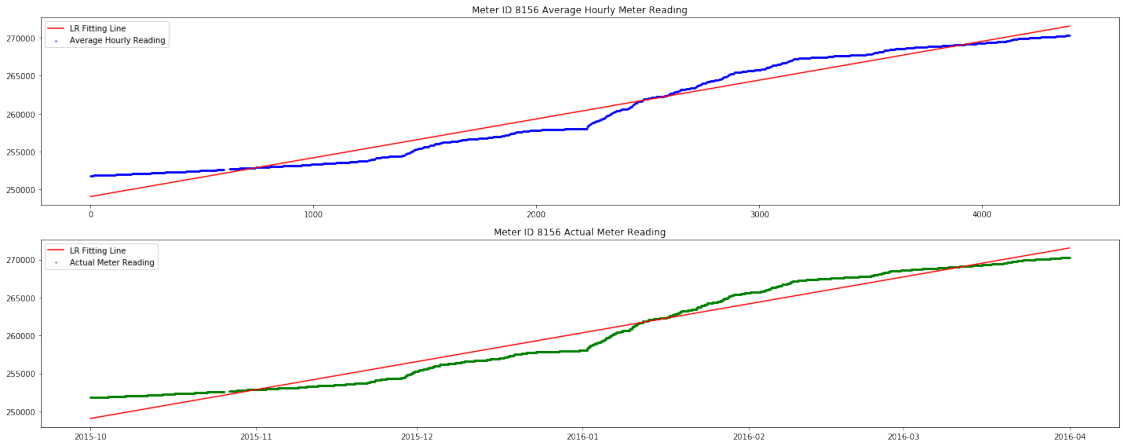
The accuracy score of fitting for meter ID 871 is 0.9462686488169489
The next predicted average hourly reading for meter ID 871 for the period 2016-04-01 00:00:00 to 01:00:00 is 123882.63462541159
The average hourly consumption for meter ID 871 is 4.6874071037600515



The accuracy score of fitting for meter ID 1086 is 0.9696115571937927
The next predicted average hourly reading for meter ID 1086 for the period 2016-04-01 00:00:00 to 01:00:00 is 106929.1492690585
The average hourly consumption for meter ID 1086 is 6.036095044837566



The accuracy score of fitting for meter ID 1589 is 0.9454917885408648
The next predicted average hourly reading for meter ID 1589 for the period 2016-04-01 00:00:00 to 01:00:00 is 231711.68446897468
The average hourly consumption for meter ID 1589 is 10.180536970641697




```
The accuracy score of fitting for meter ID 8156 is 0.9630223098309062
The next predicted average hourly reading for meter ID 8156 for the period
2016-04-01 00:00:00 to 01:00:00 is 271538.7693425275
The average hourly consumption for meter ID 8156 is 5.116373689728789
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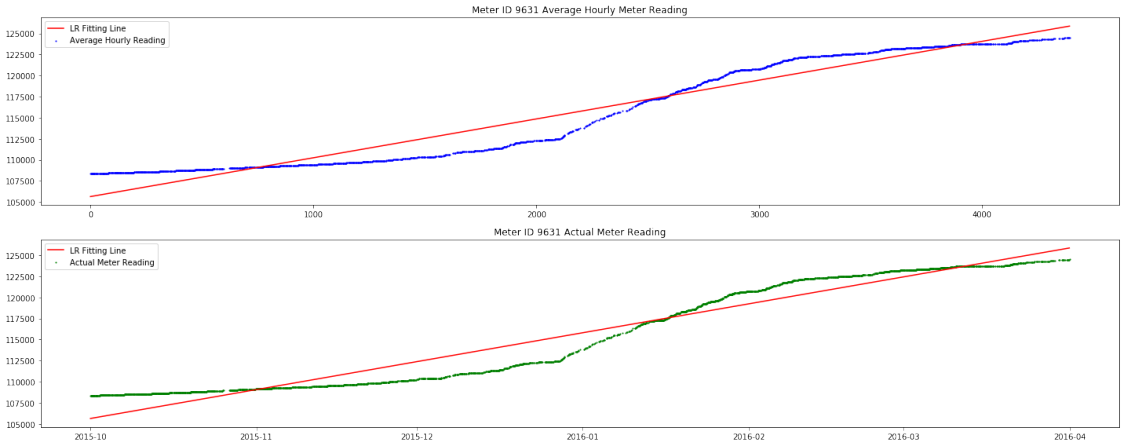


```
The accuracy score of fitting for meter ID 9631 is 0.9405216846281947
The next predicted average hourly reading for meter ID 9631 for the period
2016-04-01 00:00:00 to 01:00:00 is 125867.785893441
The average hourly consumption for meter ID 9631 is 4.605432643656968
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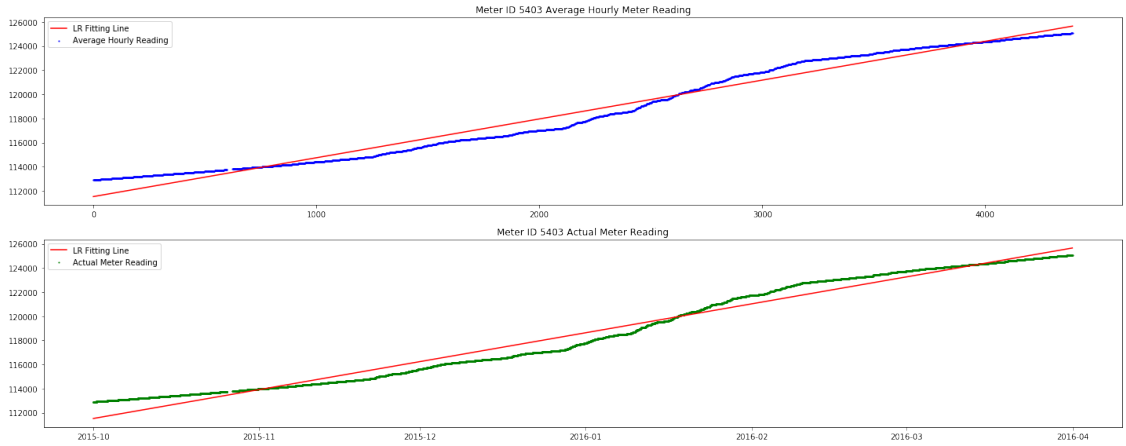


```
The accuracy score of fitting for meter ID 5403 is 0.9750584817388261
The next predicted average hourly reading for meter ID 5403 for the period
2016-04-01 00:00:00 to 01:00:00 is 125659.09056901124
The average hourly consumption for meter ID 5403 is 3.2175254039175343
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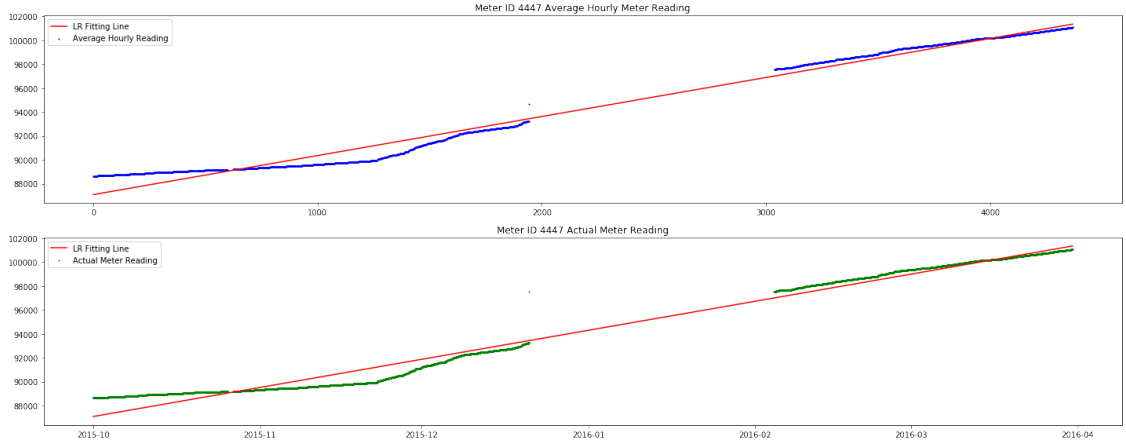


```
The accuracy score of fitting for meter ID 4447 is 0.9818094808202186
The next predicted average hourly reading for meter ID 4447 for the period
2016-04-01 00:00:00 to 01:00:00 is 101436.48836030572
The average hourly consumption for meter ID 4447 is 3.266116062688525
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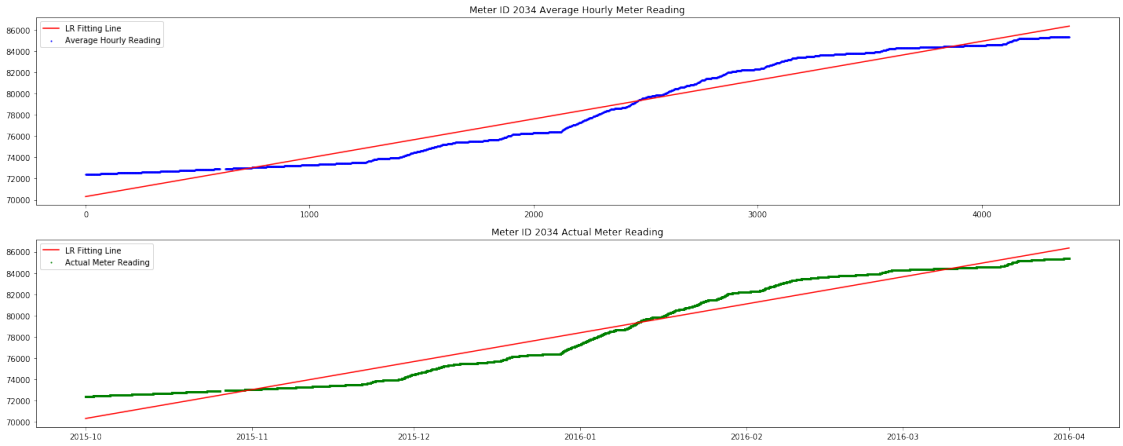


```
The accuracy score of fitting for meter ID 2034 is 0.9559074589024151
The next predicted average hourly reading for meter ID 2034 for the period
2016-04-01 00:00:00 to 01:00:00 is 86360.26393204284
The average hourly consumption for meter ID 2034 is 3.654690031107748
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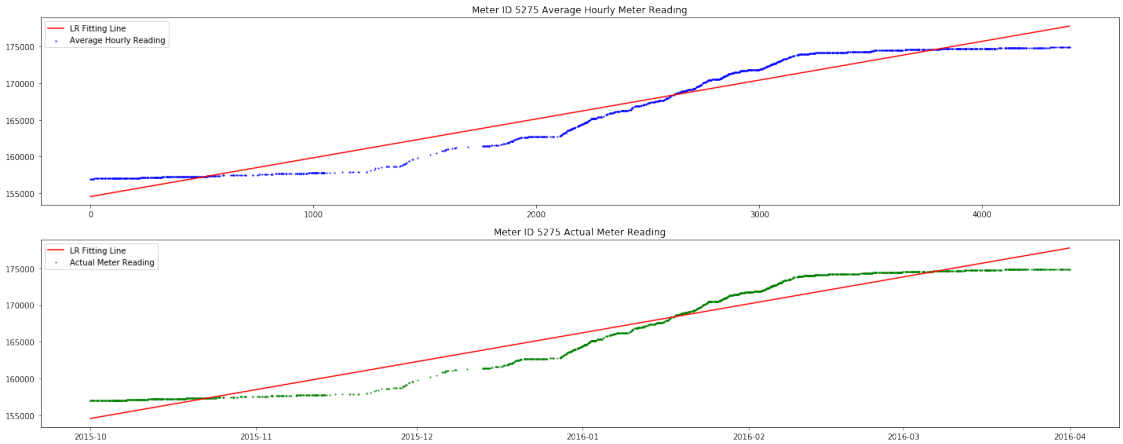


```
The accuracy score of fitting for meter ID 5275 is 0.9451944534898851
The next predicted average hourly reading for meter ID 5275 for the period
2016-04-01 00:00:00 to 01:00:00 is 177779.1210847574
The average hourly consumption for meter ID 5275 is 5.287207529123407
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The accuracy score of fitting for meter ID 7794 is 0.956613188239643
The next predicted average hourly reading for meter ID 7794 for the period
2016-04-01 00:00:00 to 01:00:00 is 475680.78608187975
The average hourly consumption for meter ID 7794 is 11.034387995256111
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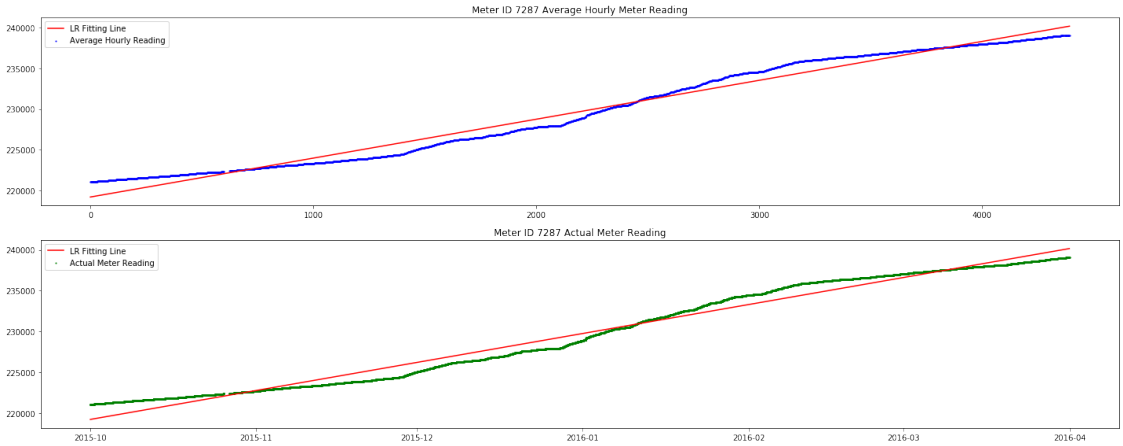


```
The accuracy score of fitting for meter ID 7287 is 0.9780163766022189
The next predicted average hourly reading for meter ID 7287 for the period
2016-04-01 00:00:00 to 01:00:00 is 240174.99922847172
The average hourly consumption for meter ID 7287 is 4.773916641192045
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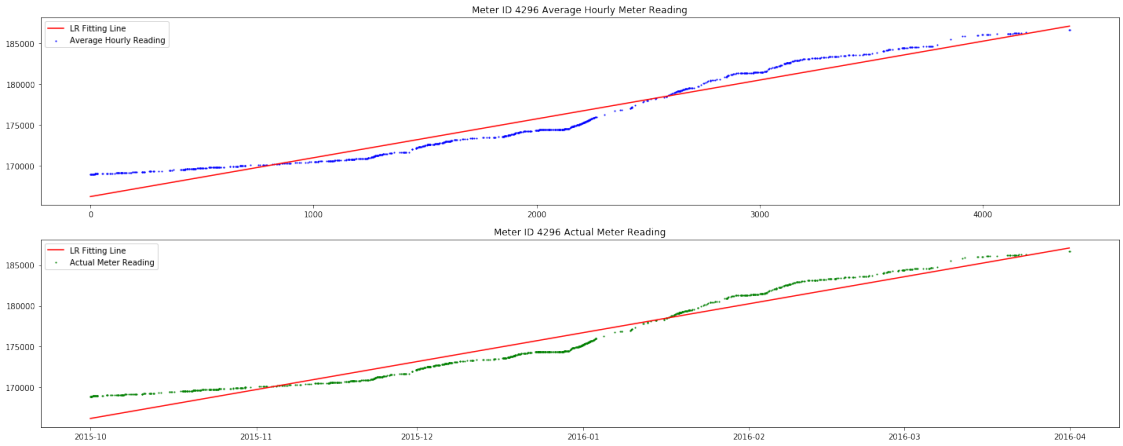
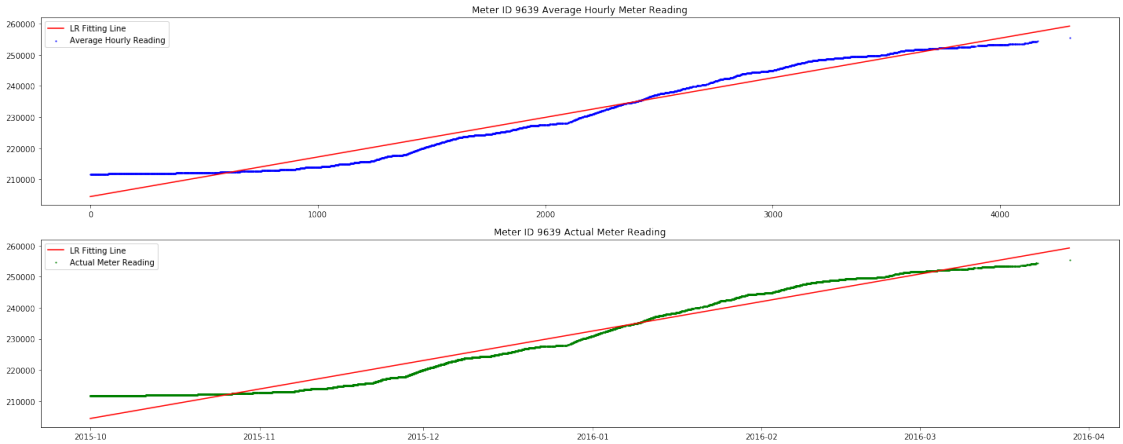
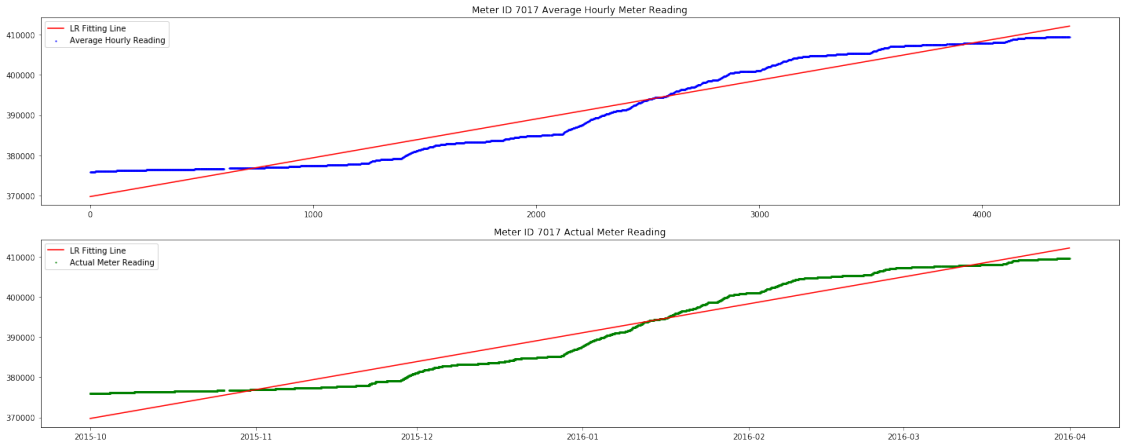


The accuracy score of fitting for meter ID 4296 is 0.9417577274998938
The next predicted average hourly reading for meter ID 4296 for the period 2016-04-01 00:00:00 to 01:00:00 is 187111.30718714828
The average hourly consumption for meter ID 4296 is 4.763702637050301



The accuracy score of fitting for meter ID 9639 is 0.9682616594614691
The next predicted average hourly reading for meter ID 9639 for the period 2016-04-01 00:00:00 to 01:00:00 is 260311.116462718
The average hourly consumption for meter ID 9639 is 12.714881142077502




```
The accuracy score of fitting for meter ID 7017 is 0.9501414310115117
The next predicted average hourly reading for meter ID 7017 for the period
2016-04-01 00:00:00 to 01:00:00 is 412131.8832436246
The average hourly consumption for meter ID 7017 is 9.649077675014269
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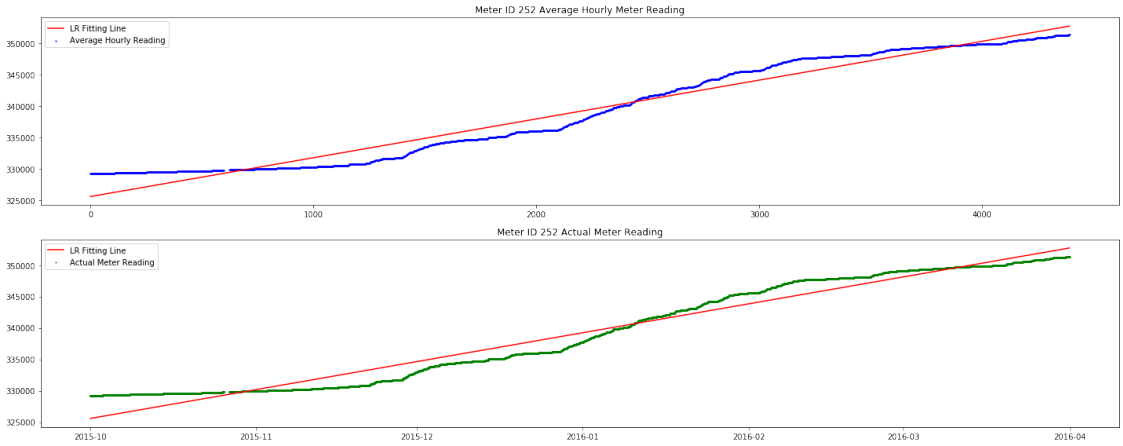


```
The accuracy score of fitting for meter ID 252 is 0.9616770650728532
The next predicted average hourly reading for meter ID 252 for the period
2016-04-01 00:00:00 to 01:00:00 is 352740.33431045373
The average hourly consumption for meter ID 252 is 6.183441385976039
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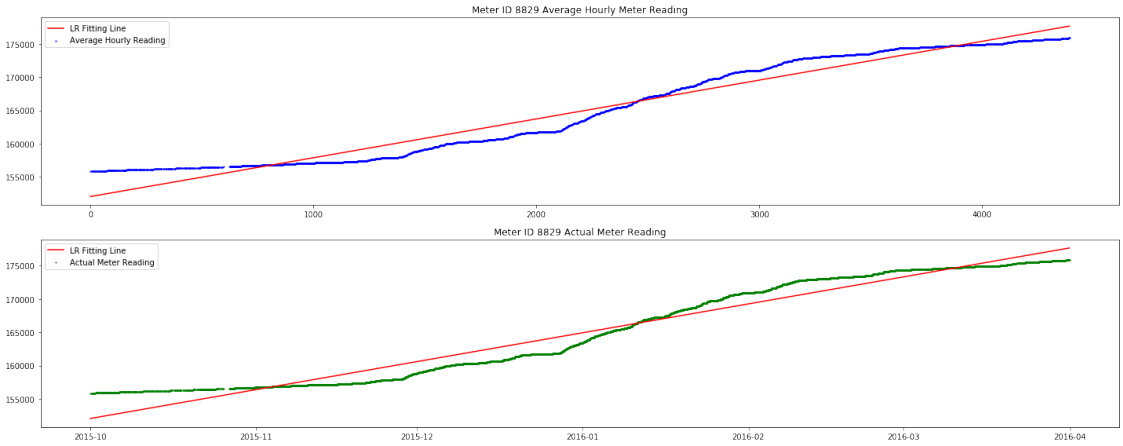


```
The accuracy score of fitting for meter ID 8829 is 0.9543337860259594
The next predicted average hourly reading for meter ID 8829 for the period
2016-04-01 00:00:00 to 01:00:00 is 177660.0401498435
The average hourly consumption for meter ID 8829 is 5.829690643207869
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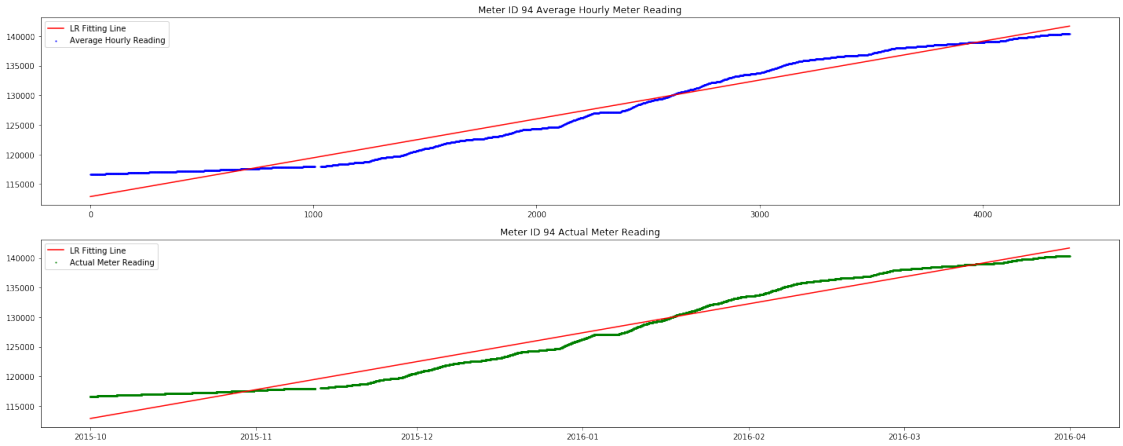


```
The accuracy score of fitting for meter ID 94 is 0.9680806542576655
The next predicted average hourly reading for meter ID 94 for the period
2016-04-01 00:00:00 to 01:00:00 is 141697.44746232862
The average hourly consumption for meter ID 94 is 6.557184366509318
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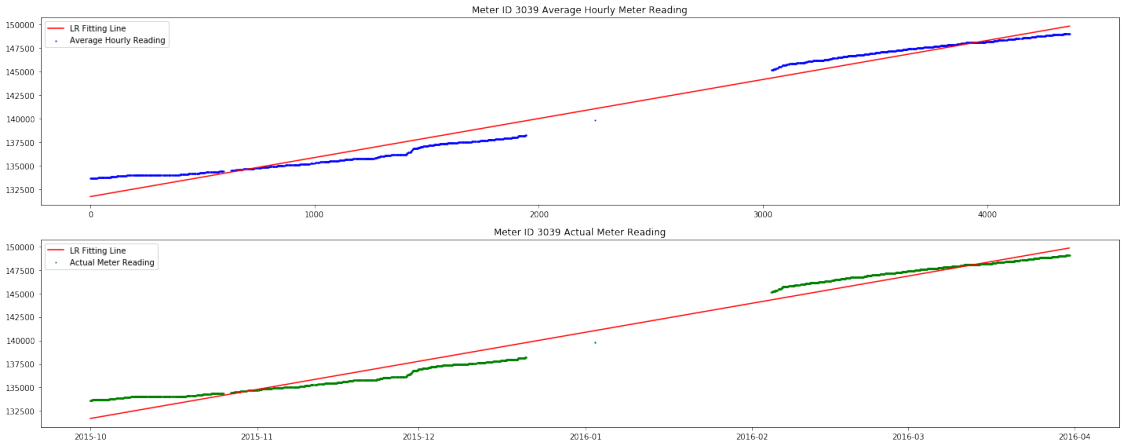


```
The accuracy score of fitting for meter ID 3039 is 0.9766831050913707
The next predicted average hourly reading for meter ID 3039 for the period
2016-04-01 00:00:00 to 01:00:00 is 149945.10321900903
The average hourly consumption for meter ID 3039 is 4.1545751843368635
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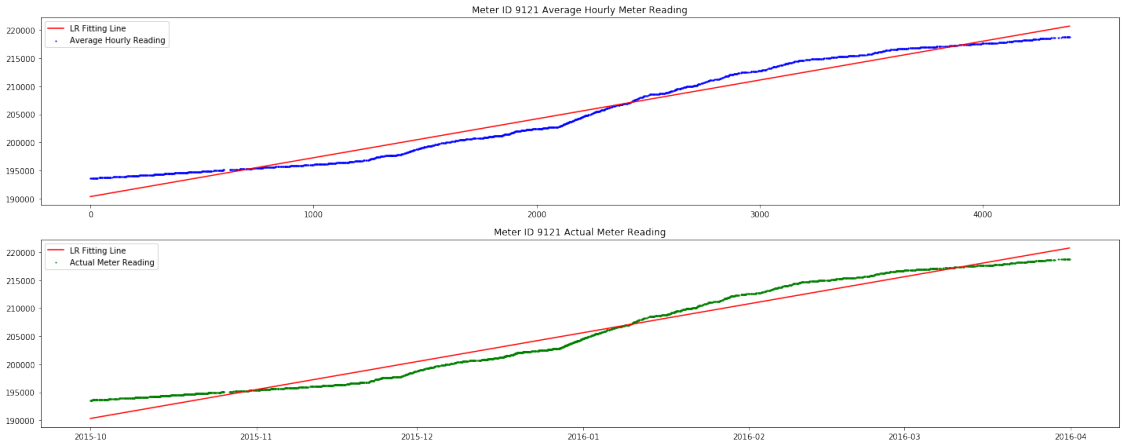


```
The accuracy score of fitting for meter ID 9121 is 0.969063016988502
The next predicted average hourly reading for meter ID 9121 for the period
2016-04-01 00:00:00 to 01:00:00 is 220751.51026509333
The average hourly consumption for meter ID 9121 is 6.9234394798695575
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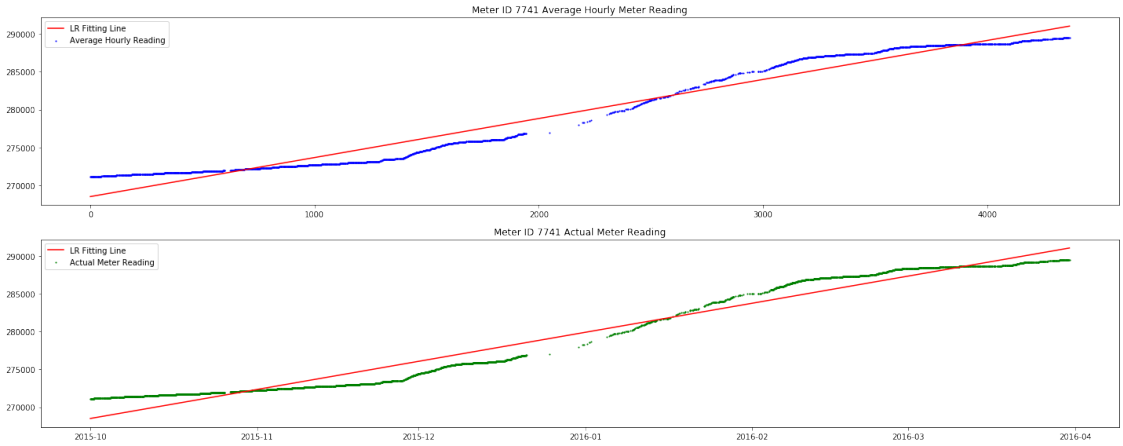


```
The accuracy score of fitting for meter ID 7741 is 0.9656212306468864
The next predicted average hourly reading for meter ID 7741 for the period
2016-04-01 00:00:00 to 01:00:00 is 291164.00142613973
The average hourly consumption for meter ID 7741 is 5.155986905738246
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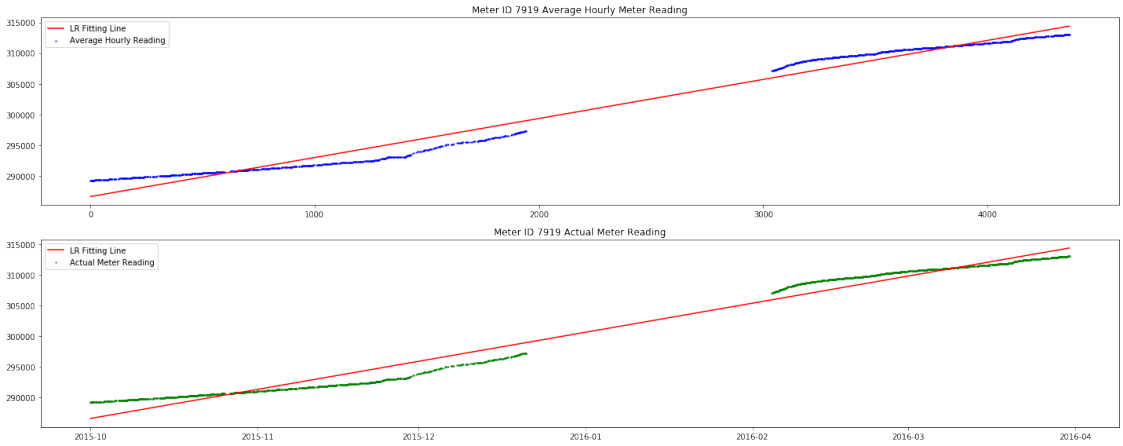


```
The accuracy score of fitting for meter ID 7919 is 0.9791195218714798
The next predicted average hourly reading for meter ID 7919 for the period
2016-04-01 00:00:00 to 01:00:00 is 314587.4733719817
The average hourly consumption for meter ID 7919 is 6.375291245232802
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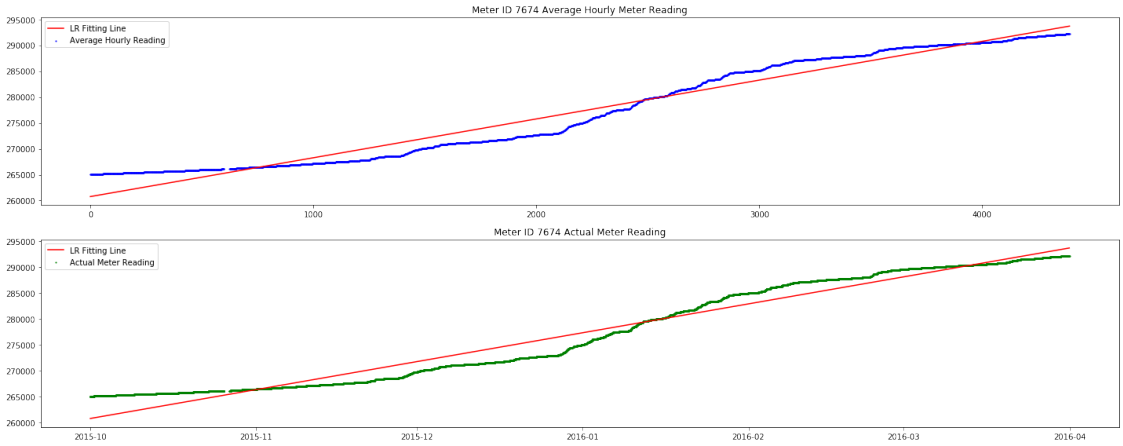


```
The accuracy score of fitting for meter ID 7674 is 0.9604456319381749
The next predicted average hourly reading for meter ID 7674 for the period
2016-04-01 00:00:00 to 01:00:00 is 293714.22406946146
The average hourly consumption for meter ID 7674 is 7.498970867774915
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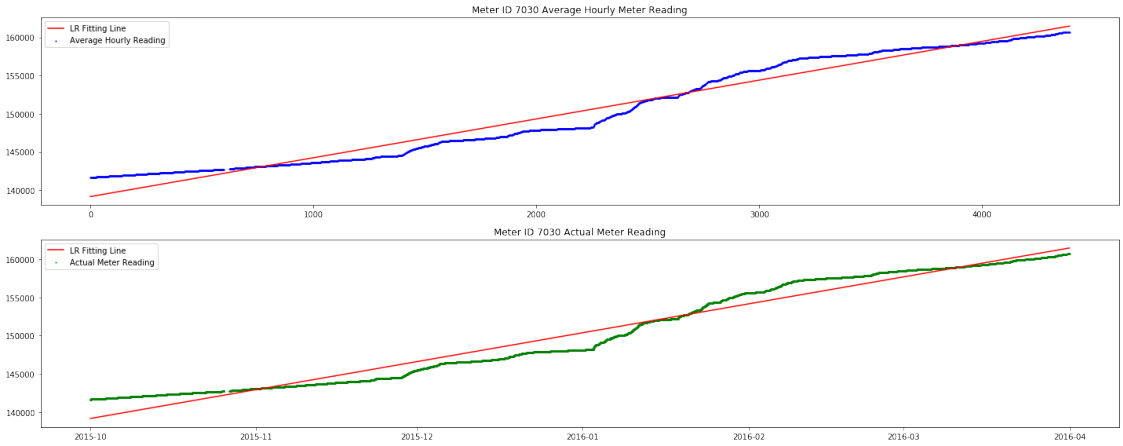


```
The accuracy score of fitting for meter ID 7030 is 0.9642660550119895
The next predicted average hourly reading for meter ID 7030 for the period
2016-04-01 00:00:00 to 01:00:00 is 161479.06657041982
The average hourly consumption for meter ID 7030 is 5.081328996864613
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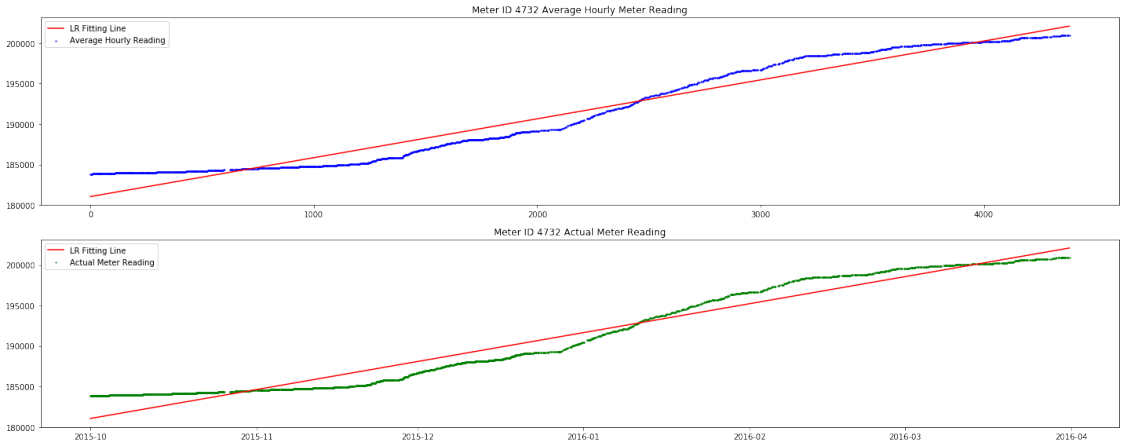


```
The accuracy score of fitting for meter ID 4732 is 0.9550904915074988
The next predicted average hourly reading for meter ID 4732 for the period
2016-04-01 00:00:00 to 01:00:00 is 202149.32081005734
The average hourly consumption for meter ID 4732 is 4.805405400751624
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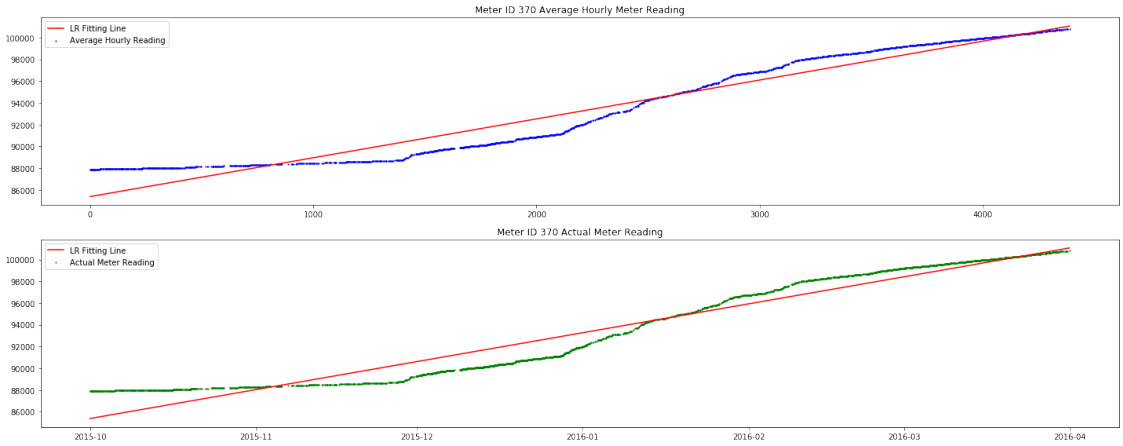


```
The accuracy score of fitting for meter ID 370 is 0.9389516758795321
The next predicted average hourly reading for meter ID 370 for the period
2016-04-01 00:00:00 to 01:00:00 is 101074.33133708128
The average hourly consumption for meter ID 370 is 3.5724874707811978
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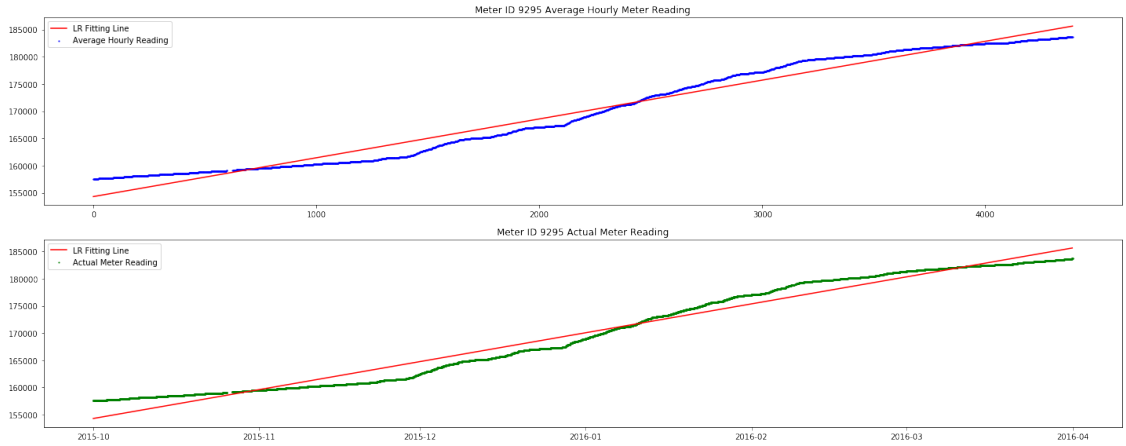


```
The accuracy score of fitting for meter ID 9295 is 0.9720719662479038
The next predicted average hourly reading for meter ID 9295 for the period
2016-04-01 00:00:00 to 01:00:00 is 185635.28858386847
The average hourly consumption for meter ID 9295 is 7.133370524214115
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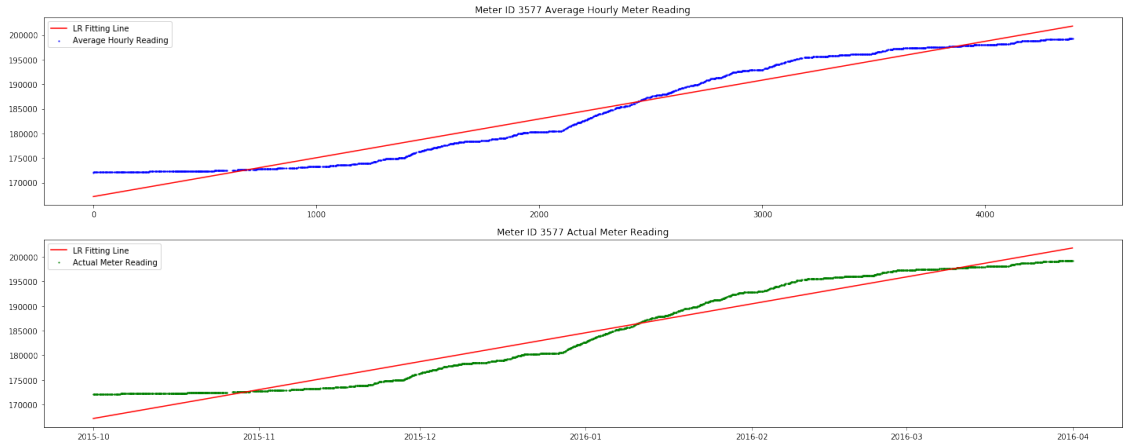


```
The accuracy score of fitting for meter ID 3577 is 0.9560004992683342
The next predicted average hourly reading for meter ID 3577 for the period
2016-04-01 00:00:00 to 01:00:00 is 201809.87165431632
The average hourly consumption for meter ID 3577 is 7.890962371777277
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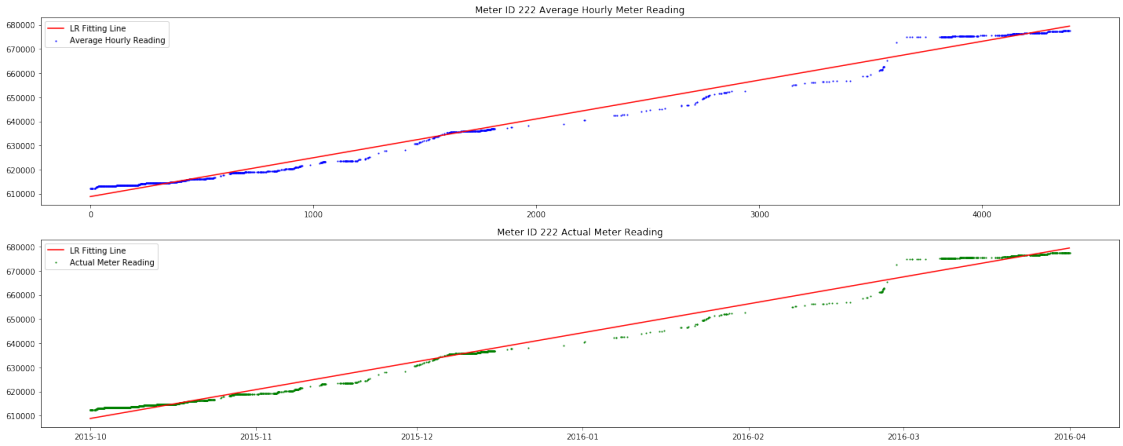


```
The accuracy score of fitting for meter ID 222 is 0.9910365466812477
The next predicted average hourly reading for meter ID 222 for the period
2016-04-01 00:00:00 to 01:00:00 is 679490.0675792564
The average hourly consumption for meter ID 222 is 16.092826179228723
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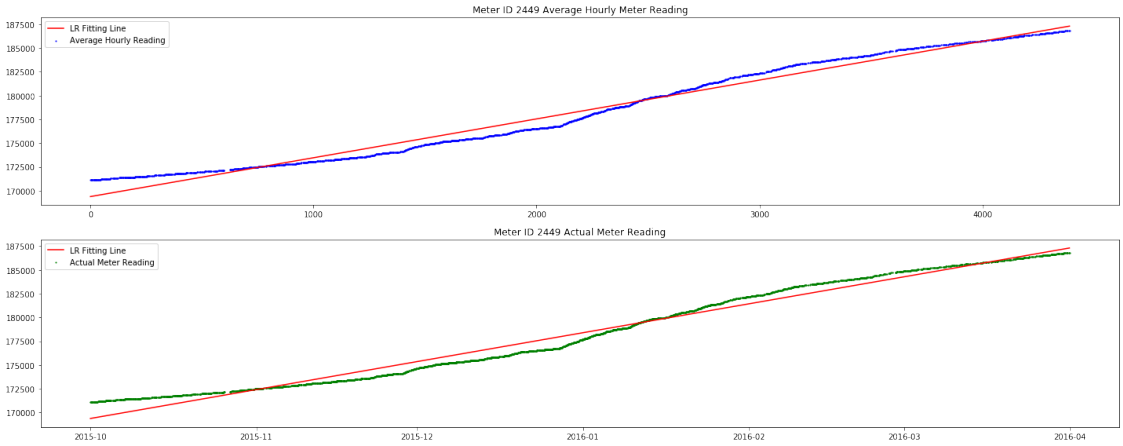


```
The accuracy score of fitting for meter ID 2449 is 0.9776792297918164
The next predicted average hourly reading for meter ID 2449 for the period
2016-04-01 00:00:00 to 01:00:00 is 187307.74380170292
The average hourly consumption for meter ID 2449 is 4.081004469655454
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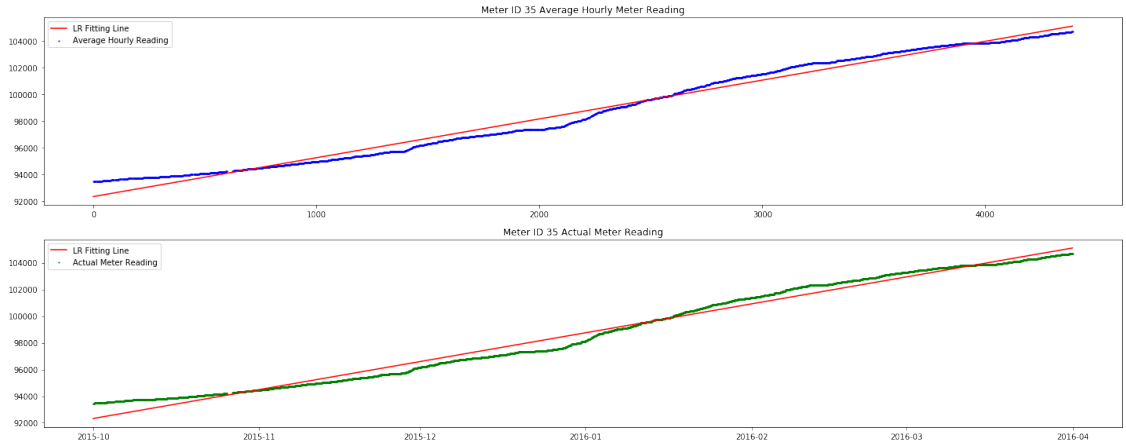


```
The accuracy score of fitting for meter ID 35 is 0.9844585833065554
The next predicted average hourly reading for meter ID 35 for the period
2016-04-01 00:00:00 to 01:00:00 is 105107.0423194006
The average hourly consumption for meter ID 35 is 2.909971609697095
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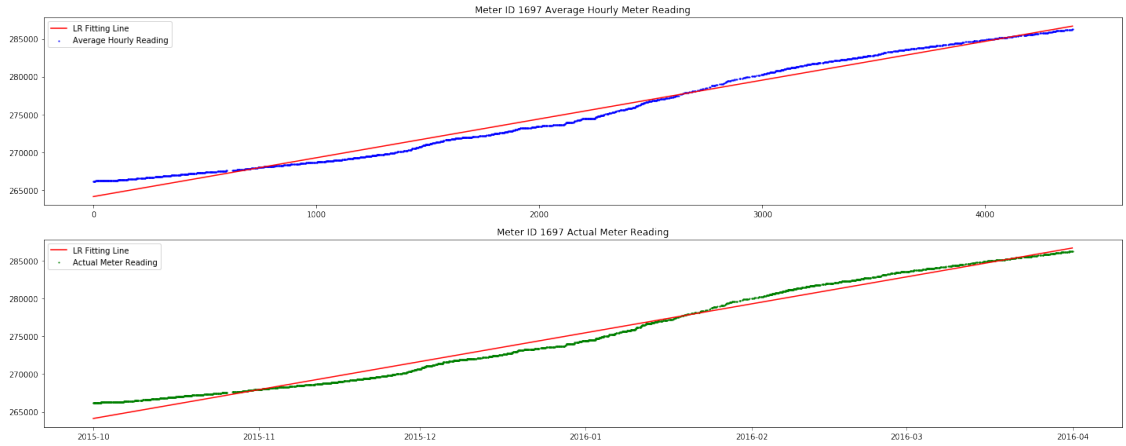


```
The accuracy score of fitting for meter ID 1697 is 0.98311257358998
The next predicted average hourly reading for meter ID 1697 for the period
2016-04-01 00:00:00 to 01:00:00 is 286704.40030929964
The average hourly consumption for meter ID 1697 is 5.140469952428248
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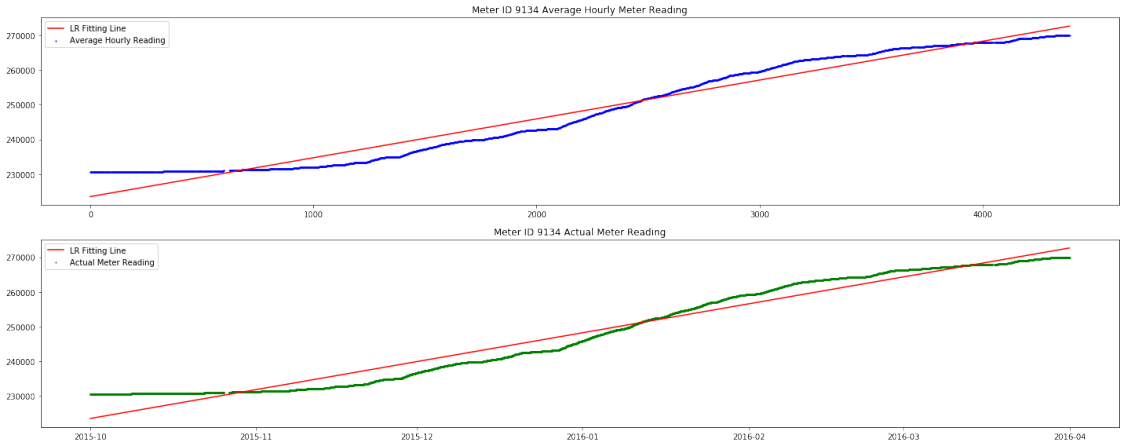
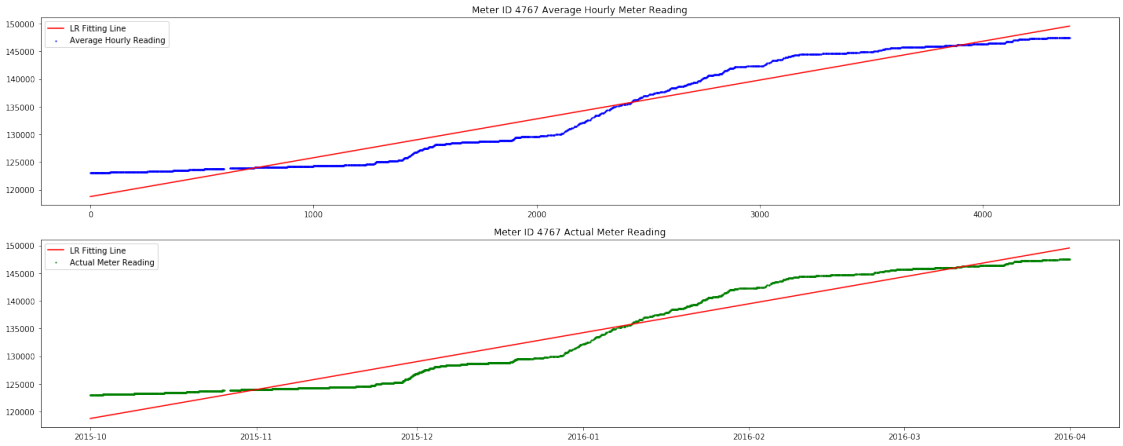
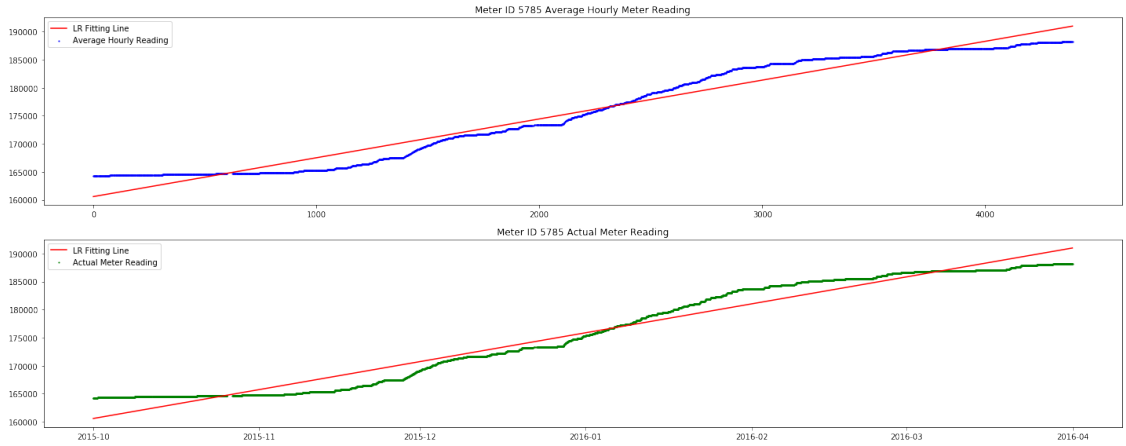


The accuracy score of fitting for meter ID 9134 is 0.9626835247325104
The next predicted average hourly reading for meter ID 9134 for the period 2016-04-01 00:00:00 to 01:00:00 is 272697.6854064461
The average hourly consumption for meter ID 9134 is 11.189684698474593



The accuracy score of fitting for meter ID 4767 is 0.9458526078849658
The next predicted average hourly reading for meter ID 4767 for the period 2016-04-01 00:00:00 to 01:00:00 is 149575.17674218802
The average hourly consumption for meter ID 4767 is 7.017428359715268




```
The accuracy score of fitting for meter ID 5785 is 0.9625261424894506
The next predicted average hourly reading for meter ID 5785 for the period
2016-04-01 00:00:00 to 01:00:00 is 190993.22025886836
The average hourly consumption for meter ID 5785 is 6.923724352498539
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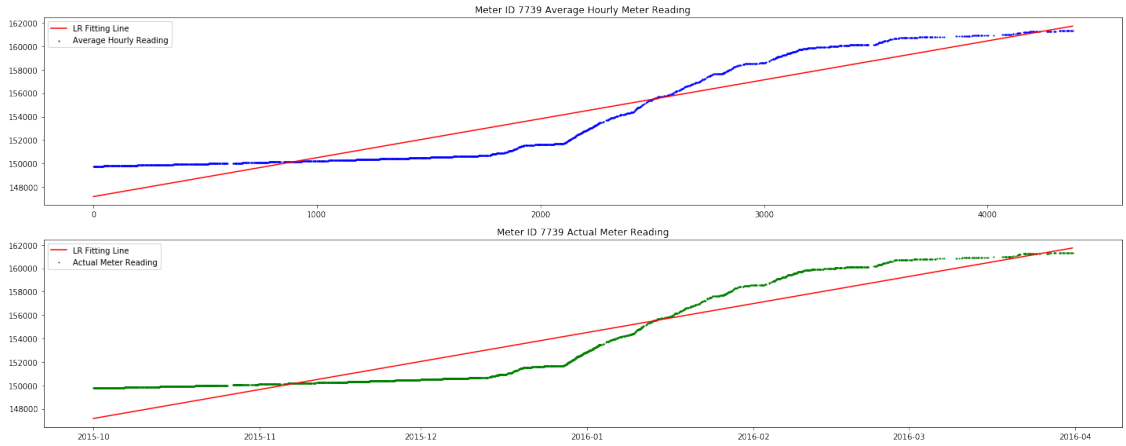


```
The accuracy score of fitting for meter ID 7739 is 0.8582487671590564
The next predicted average hourly reading for meter ID 7739 for the period
2016-04-01 00:00:00 to 01:00:00 is 161767.68389555052
The average hourly consumption for meter ID 7739 is 3.3231690847314894
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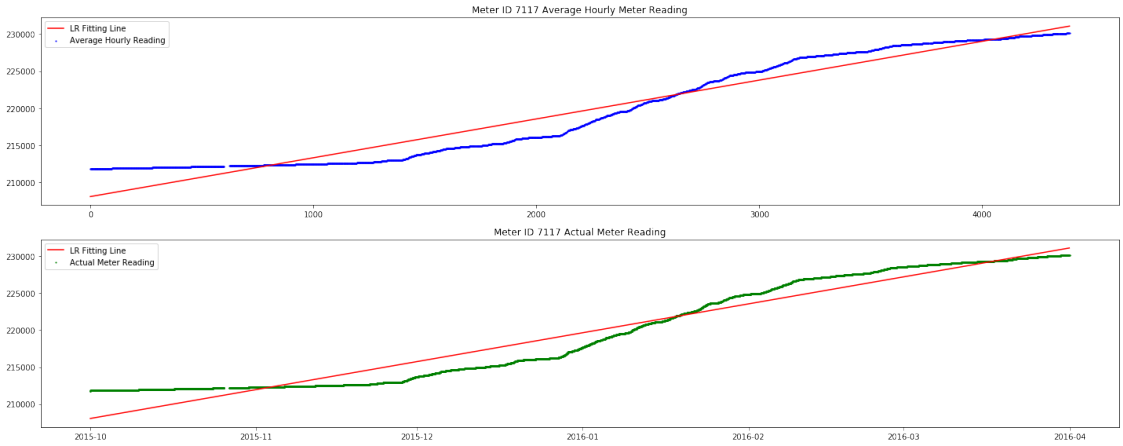


```
The accuracy score of fitting for meter ID 7117 is 0.940085739612425
The next predicted average hourly reading for meter ID 7117 for the period
2016-04-01 00:00:00 to 01:00:00 is 231091.85439121514
The average hourly consumption for meter ID 7117 is 5.243806903279619
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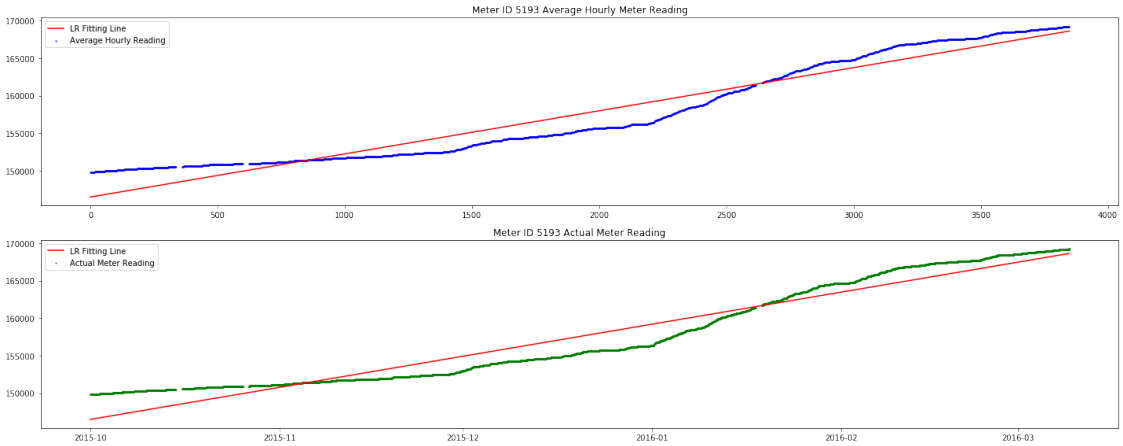


```
The accuracy score of fitting for meter ID 5193 is 0.9349677577839833
The next predicted average hourly reading for meter ID 5193 for the period
2016-04-01 00:00:00 to 01:00:00 is 171726.69929406216
The average hourly consumption for meter ID 5193 is 5.7422662639582995
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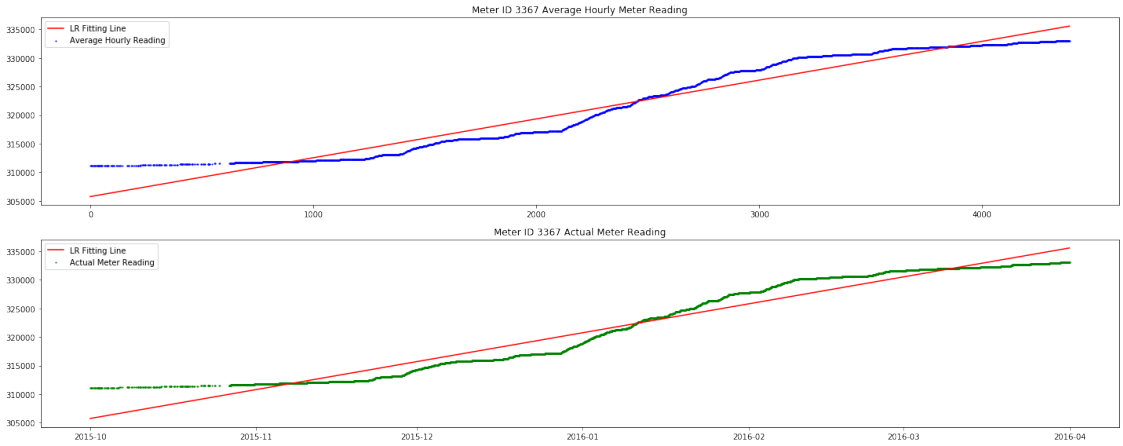
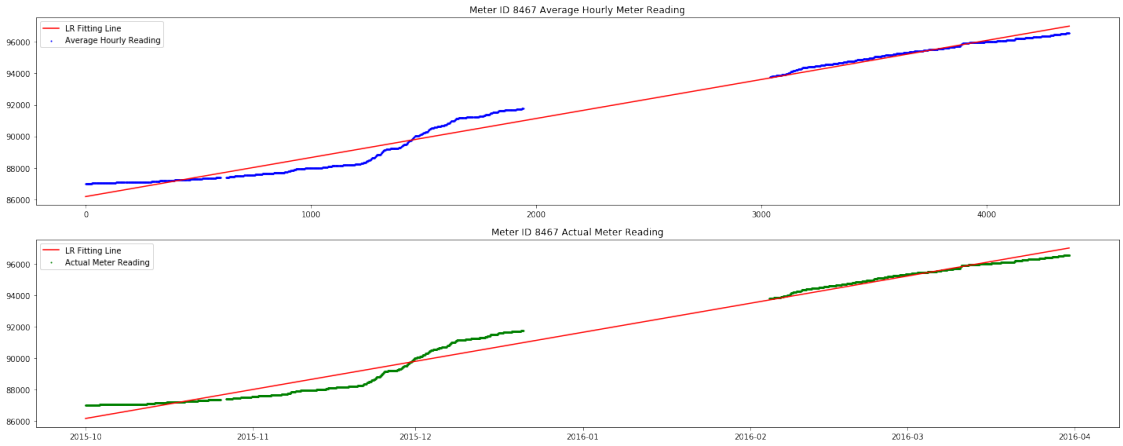
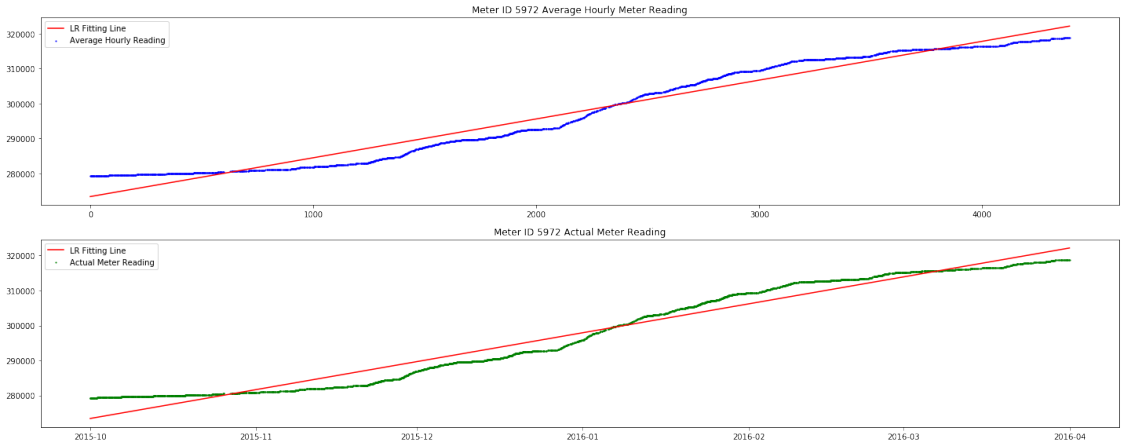


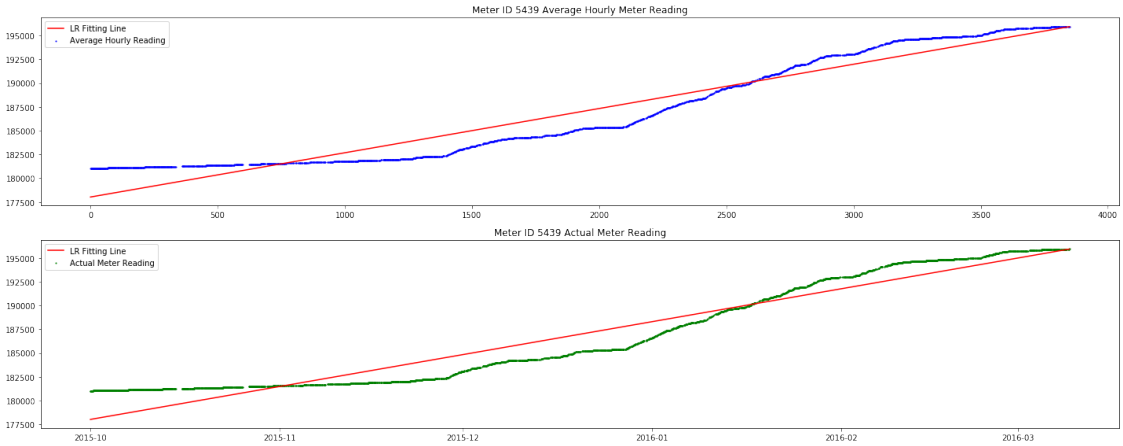
The accuracy score of fitting for meter ID 3367 is 0.9535517252518826
The next predicted average hourly reading for meter ID 3367 for the period 2016-04-01 00:00:00 to 01:00:00 is 335562.4918361979
The average hourly consumption for meter ID 3367 is 6.7862836080021225



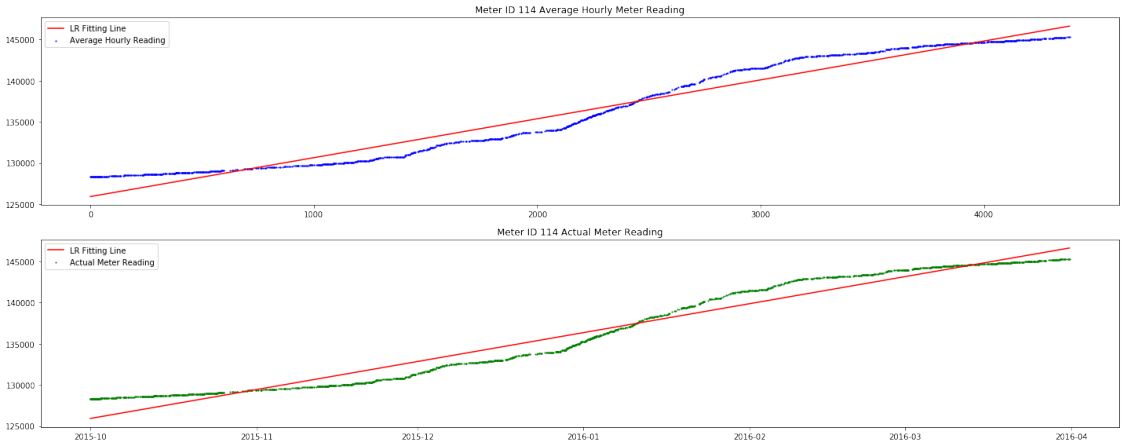
The accuracy score of fitting for meter ID 8467 is 0.9824661738664207
The next predicted average hourly reading for meter ID 8467 for the period 2016-04-01 00:00:00 to 01:00:00 is 97058.44447649152
The average hourly consumption for meter ID 8467 is 2.477588736976031



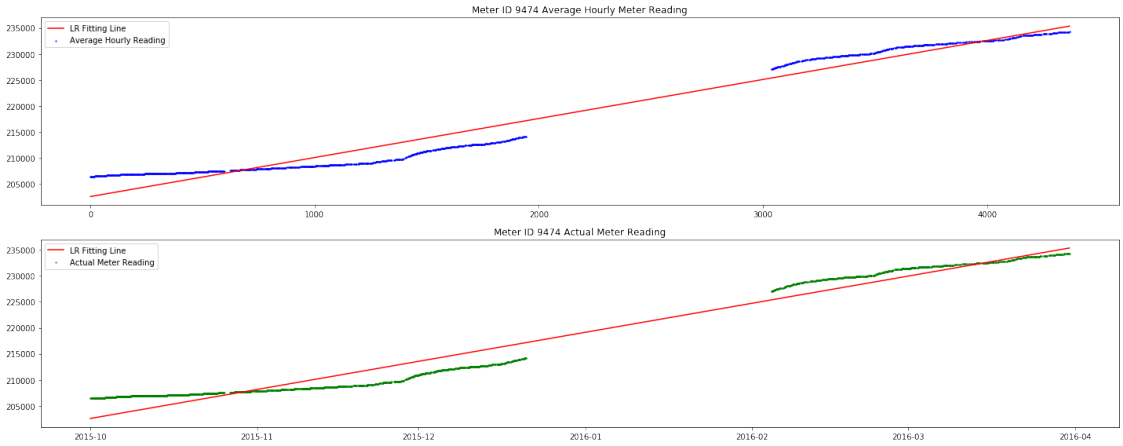
The accuracy score of fitting for meter ID 5972 is 0.9625531659736939
The next predicted average hourly reading for meter ID 5972 for the period 2016-04-01 00:00:00 to 01:00:00 is 322168.5355655999
The average hourly consumption for meter ID 5972 is 11.100608667649794



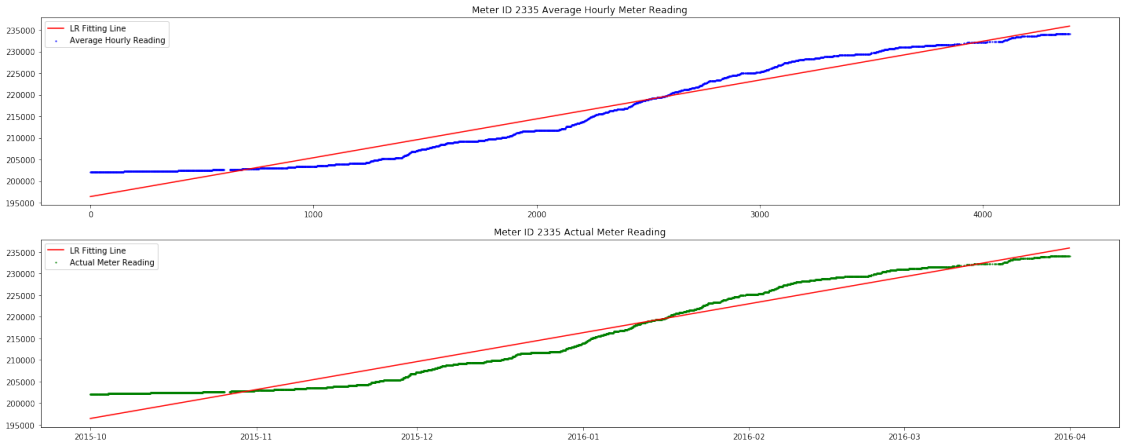
The accuracy score of fitting for meter ID 5439 is 0.9278985900217315
The next predicted average hourly reading for meter ID 5439 for the period 2016-04-01 00:00:00 to 01:00:00 is 198461.22328127816
The average hourly consumption for meter ID 5439 is 4.65259525924921



The accuracy score of fitting for meter ID 114 is 0.9619602674285271
The next predicted average hourly reading for meter ID 114 for the period 2016-04-01 00:00:00 to 01:00:00 is 146668.31934479153
The average hourly consumption for meter ID 114 is 4.725208111398388



The accuracy score of fitting for meter ID 9474 is 0.9623945100912127
The next predicted average hourly reading for meter ID 9474 for the period 2016-04-01 00:00:00 to 01:00:00 is 235542.34172802966
The average hourly consumption for meter ID 9474 is 7.505970449215965




```
The accuracy score of fitting for meter ID 2335 is 0.9557007164301182
The next predicted average hourly reading for meter ID 2335 for the period
2016-04-01 00:00:00 to 01:00:00 is 235927.4028718518
The average hourly consumption for meter ID 2335 is 8.995272088213824
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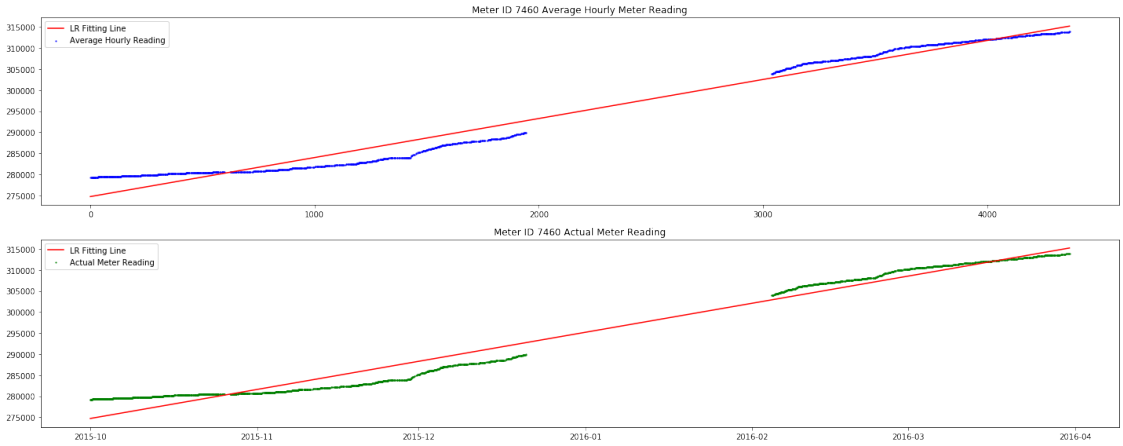


```
The accuracy score of fitting for meter ID 7460 is 0.9731057219317554
The next predicted average hourly reading for meter ID 7460 for the period
2016-04-01 00:00:00 to 01:00:00 is 315451.5905691708
The average hourly consumption for meter ID 7460 is 9.272075302666053
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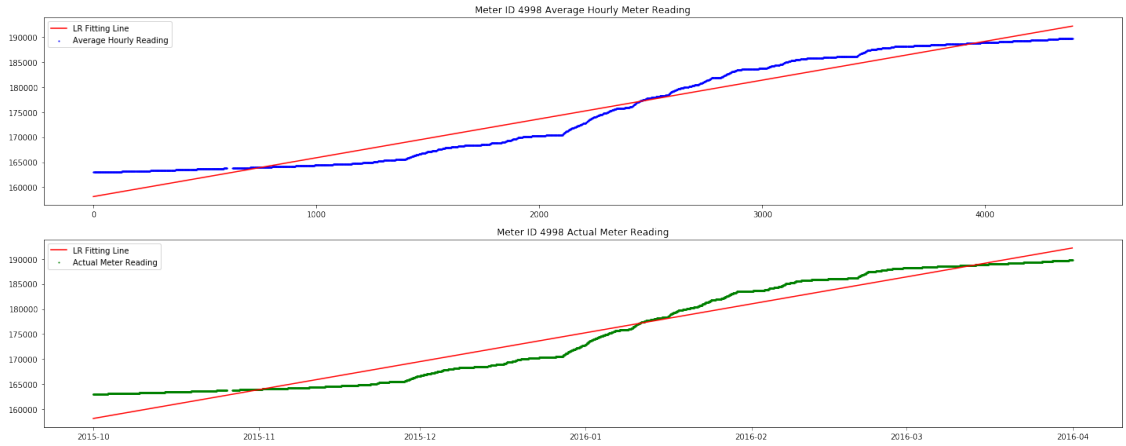


```
The accuracy score of fitting for meter ID 4998 is 0.948270505166919
The next predicted average hourly reading for meter ID 4998 for the period
2016-04-01 00:00:00 to 01:00:00 is 192195.11854620877
The average hourly consumption for meter ID 4998 is 7.7555478894209955
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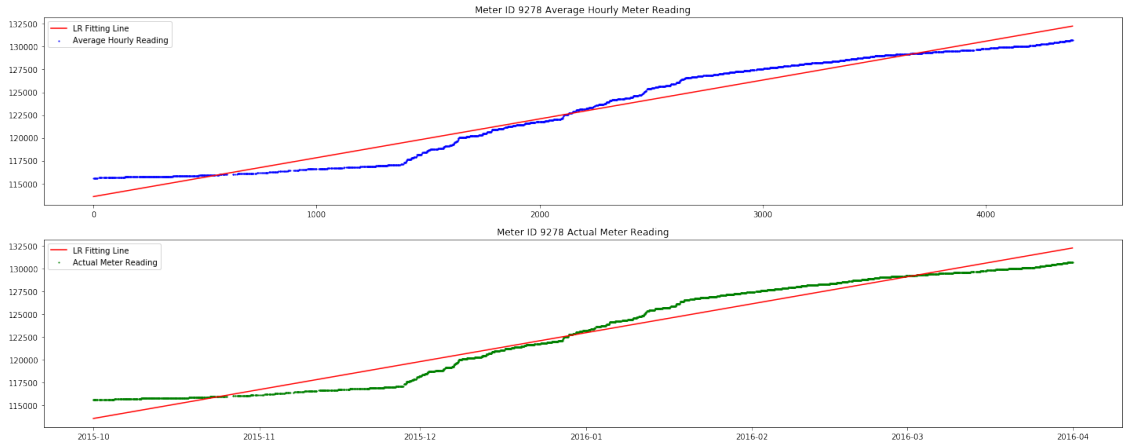


```
The accuracy score of fitting for meter ID 9278 is 0.9579186382413898
The next predicted average hourly reading for meter ID 9278 for the period
2016-04-01 00:00:00 to 01:00:00 is 132261.39348794307
The average hourly consumption for meter ID 9278 is 4.255373133317335
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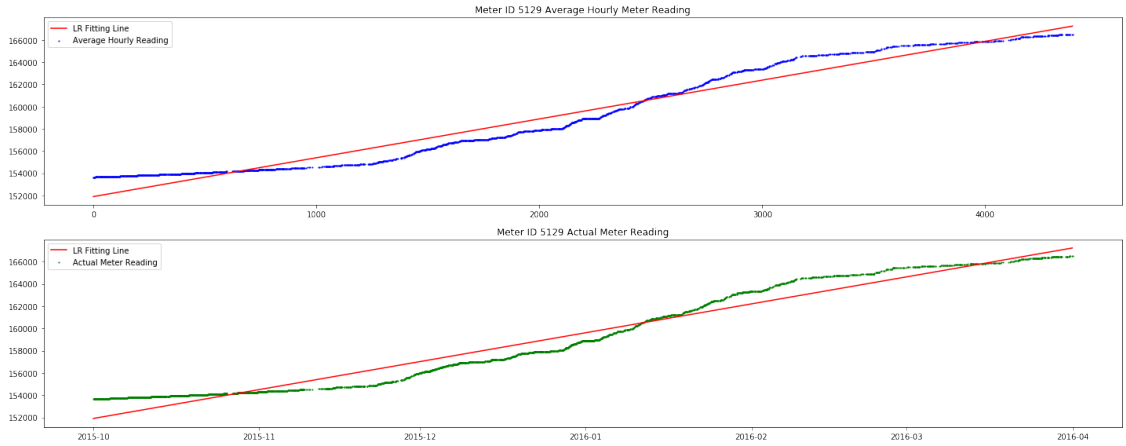


```
The accuracy score of fitting for meter ID 5129 is 0.9559424884068792
The next predicted average hourly reading for meter ID 5129 for the period
2016-04-01 00:00:00 to 01:00:00 is 167236.74629032638
The average hourly consumption for meter ID 5129 is 3.490460893313866
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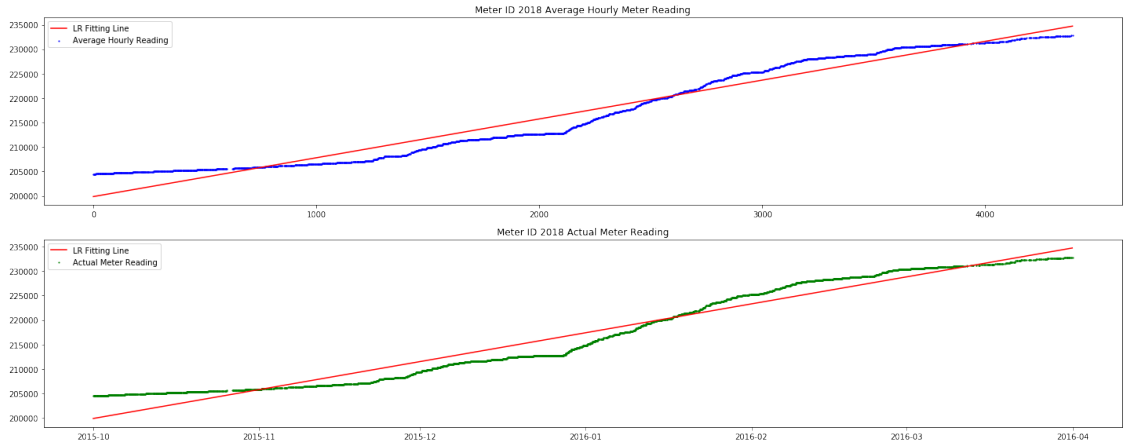


```
The accuracy score of fitting for meter ID 2018 is 0.9554522198924804
The next predicted average hourly reading for meter ID 2018 for the period
2016-04-01 00:00:00 to 01:00:00 is 234727.33214122156
The average hourly consumption for meter ID 2018 is 7.933761720138136
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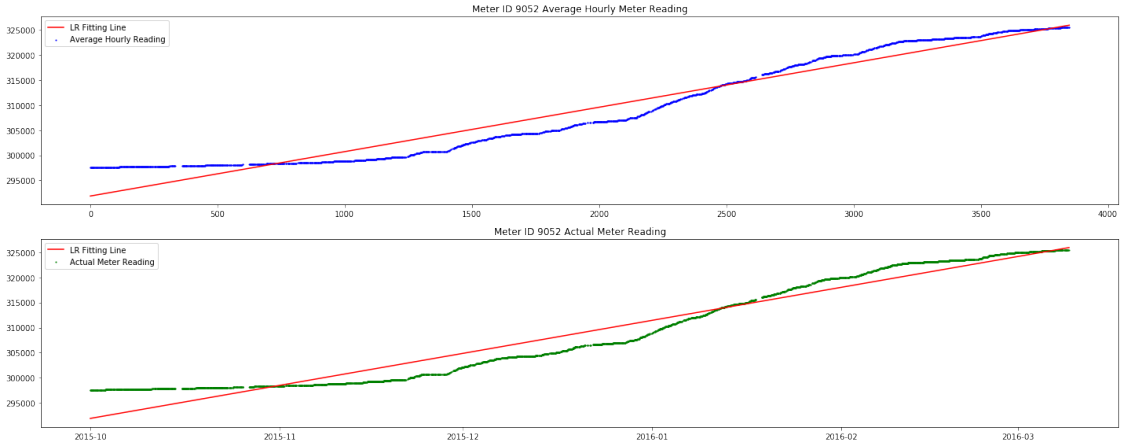


```
The accuracy score of fitting for meter ID 9052 is 0.9456307674856077
The next predicted average hourly reading for meter ID 9052 for the period
2016-04-01 00:00:00 to 01:00:00 is 330782.7865102929
The average hourly consumption for meter ID 9052 is 8.859818533004727
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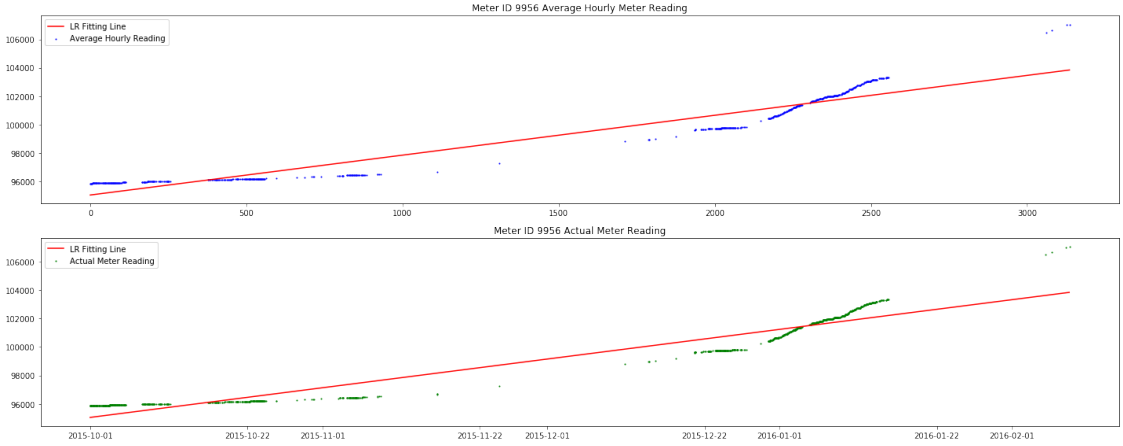


```
The accuracy score of fitting for meter ID 9956 is 0.9375563092876494
The next predicted average hourly reading for meter ID 9956 for the period
2016-04-01 00:00:00 to 01:00:00 is 107365.96397073942
The average hourly consumption for meter ID 9956 is 2.8051071940135444
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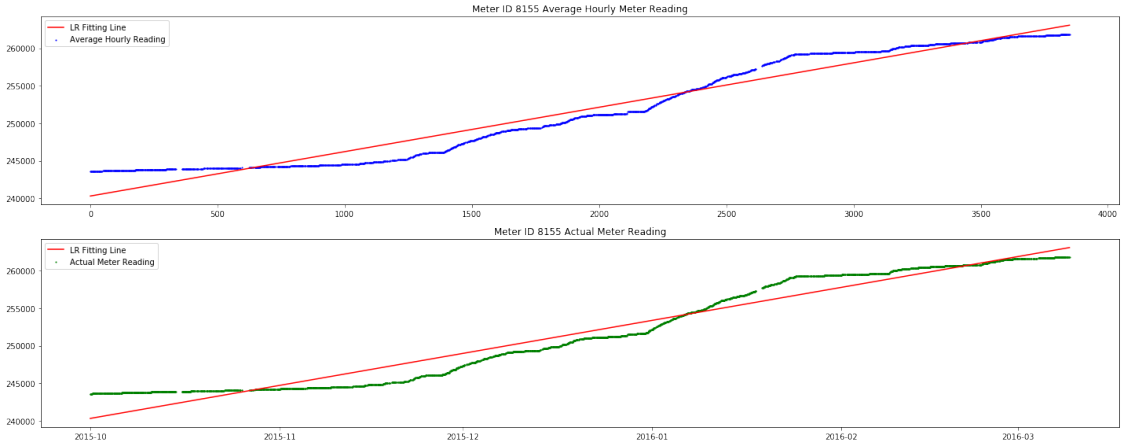


```
The accuracy score of fitting for meter ID 8155 is 0.9526793723015581
The next predicted average hourly reading for meter ID 8155 for the period
2016-04-01 00:00:00 to 01:00:00 is 266276.1437777899
The average hourly consumption for meter ID 8155 is 5.910600387258455
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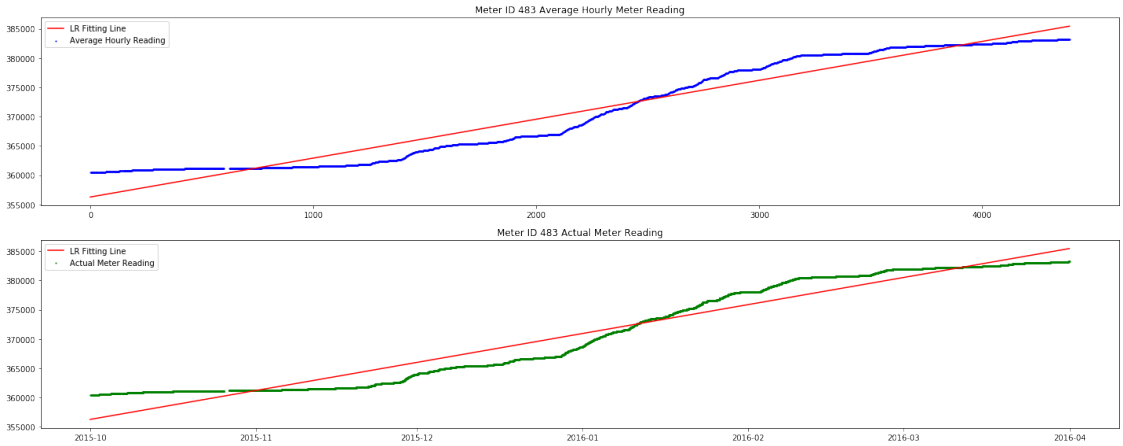


```
The accuracy score of fitting for meter ID 483 is 0.9453051617716312
The next predicted average hourly reading for meter ID 483 for the period
2016-04-01 00:00:00 to 01:00:00 is 385458.87979888264
The average hourly consumption for meter ID 483 is 6.645055750967003
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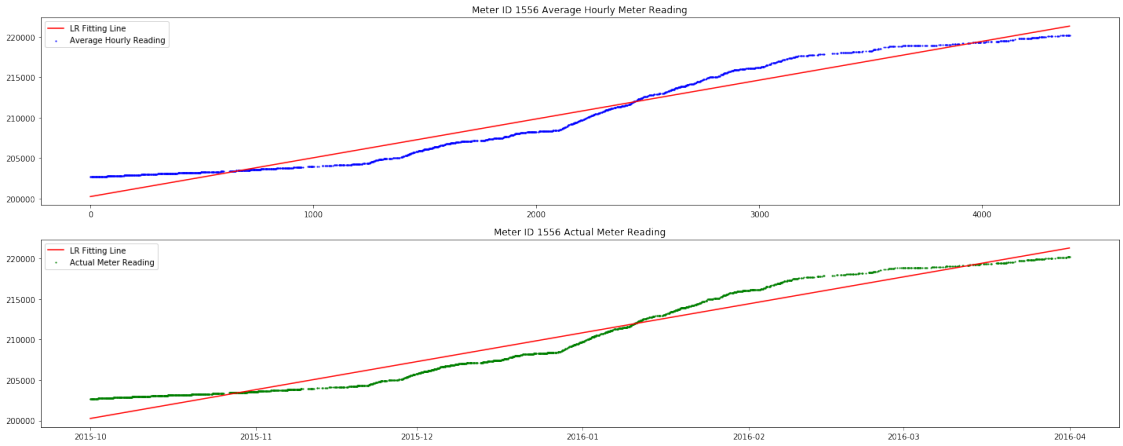


```
The accuracy score of fitting for meter ID 1556 is 0.949518912992585
The next predicted average hourly reading for meter ID 1556 for the period
2016-04-01 00:00:00 to 01:00:00 is 221321.23315349864
The average hourly consumption for meter ID 1556 is 4.79695786072989
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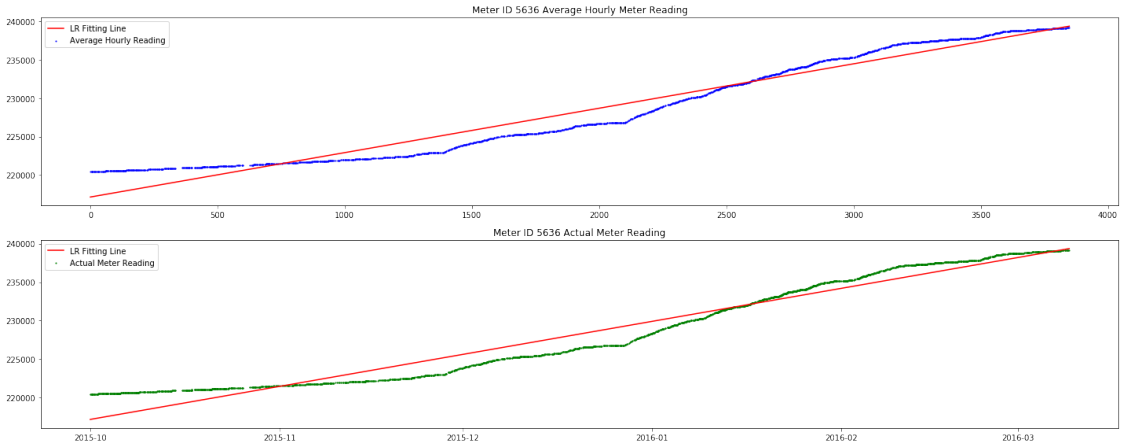


```
The accuracy score of fitting for meter ID 5636 is 0.9539556335890054
The next predicted average hourly reading for meter ID 5636 for the period
2016-04-01 00:00:00 to 01:00:00 is 242512.11240875686
The average hourly consumption for meter ID 5636 is 5.778065294318367
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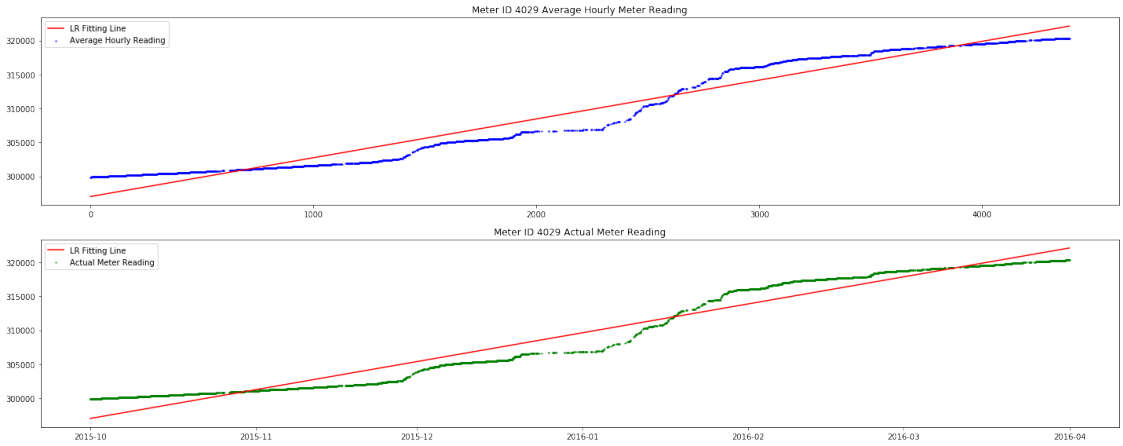


```
The accuracy score of fitting for meter ID 4029 is 0.9593795906419241
The next predicted average hourly reading for meter ID 4029 for the period
2016-04-01 00:00:00 to 01:00:00 is 322126.0711660831
The average hourly consumption for meter ID 4029 is 5.718406303611118
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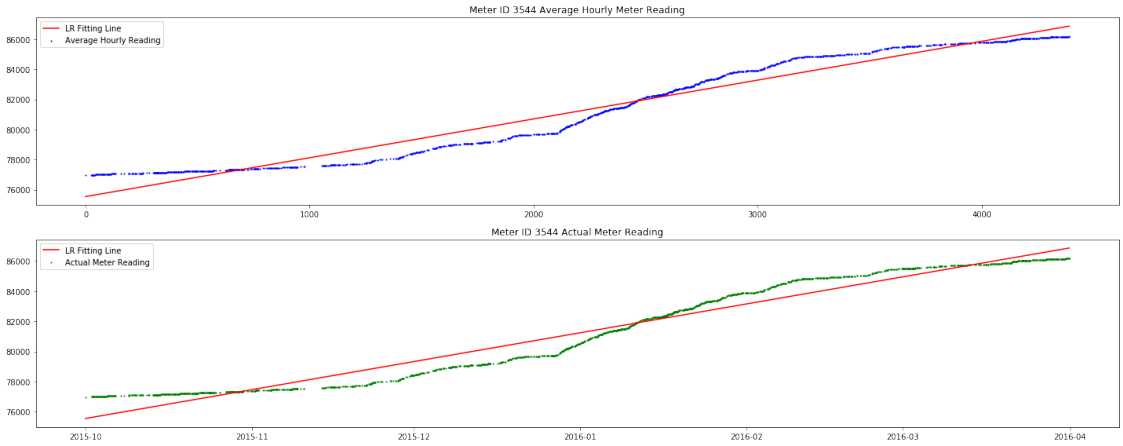


```
The accuracy score of fitting for meter ID 3544 is 0.9573126547894653
The next predicted average hourly reading for meter ID 3544 for the period
2016-04-01 00:00:00 to 01:00:00 is 86869.29903476575
The average hourly consumption for meter ID 3544 is 2.5783669850061415
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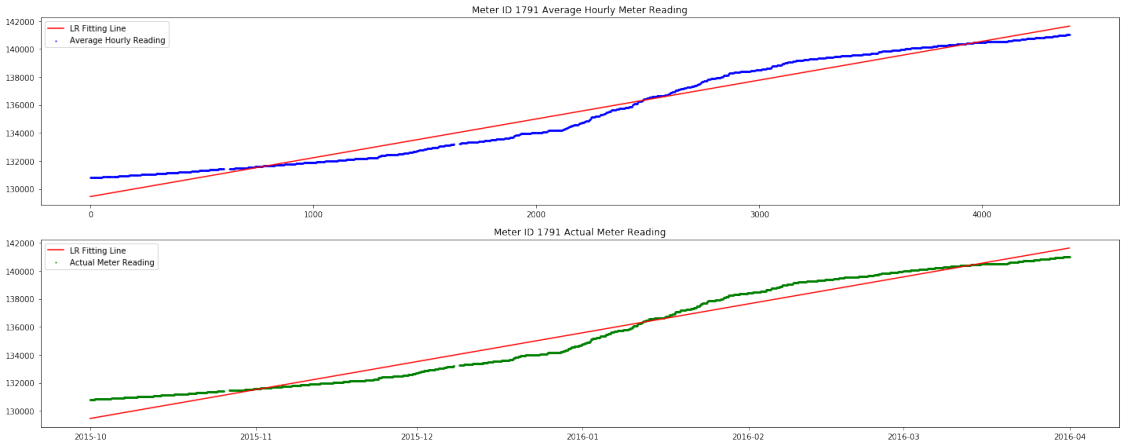


```
The accuracy score of fitting for meter ID 1791 is 0.9661042378476143
The next predicted average hourly reading for meter ID 1791 for the period
2016-04-01 00:00:00 to 01:00:00 is 141638.66294405673
The average hourly consumption for meter ID 1791 is 2.774724239425268
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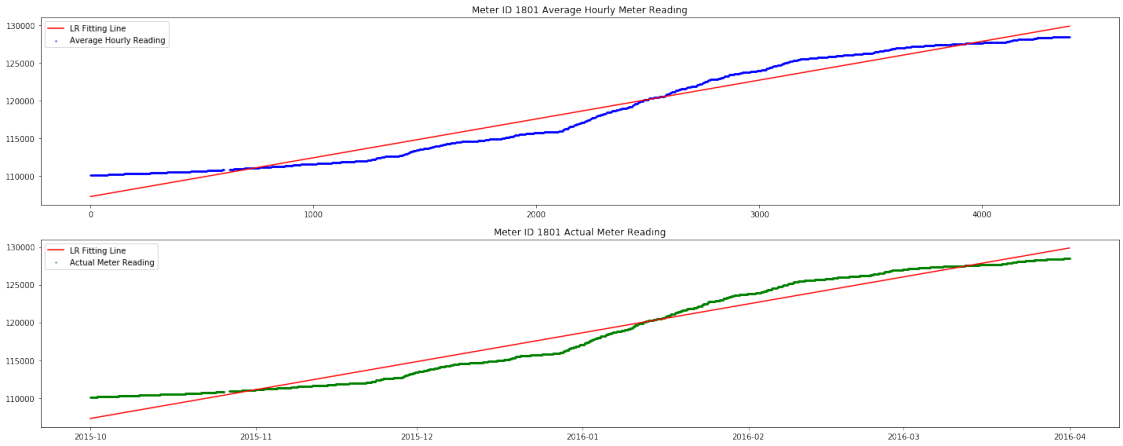


```
The accuracy score of fitting for meter ID 1801 is 0.9622462400464905
The next predicted average hourly reading for meter ID 1801 for the period
2016-04-01 00:00:00 to 01:00:00 is 129865.73922083808
The average hourly consumption for meter ID 1801 is 5.140879350728937
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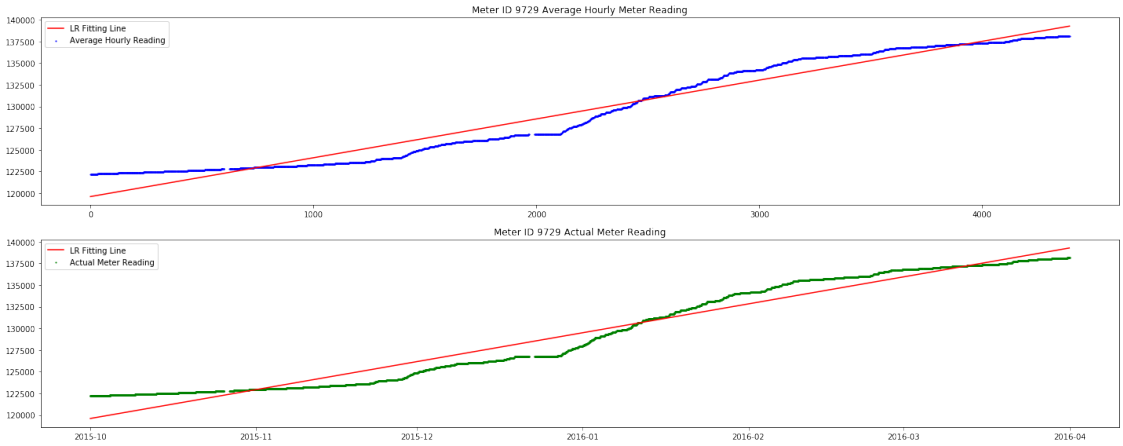


```
The accuracy score of fitting for meter ID 9729 is 0.958807415754961
The next predicted average hourly reading for meter ID 9729 for the period
2016-04-01 00:00:00 to 01:00:00 is 139282.92146066218
The average hourly consumption for meter ID 9729 is 4.481571779993828
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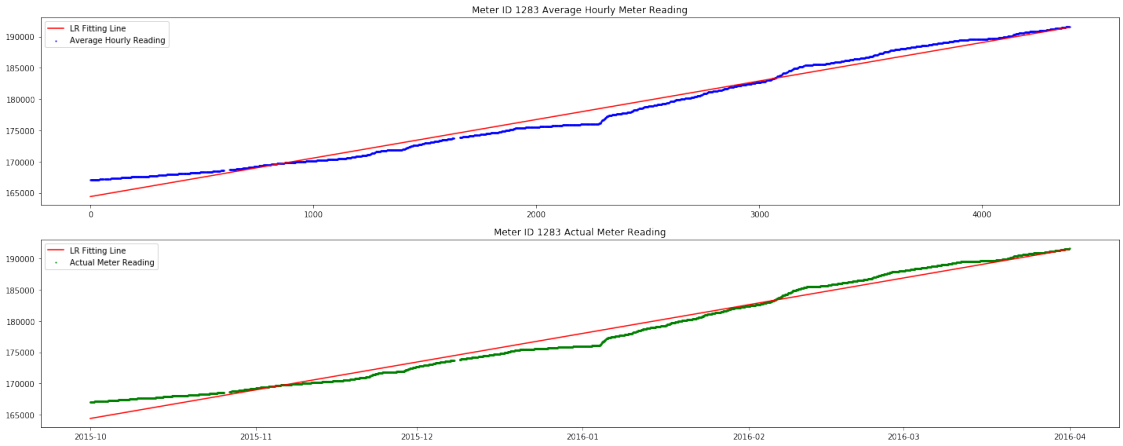


```
The accuracy score of fitting for meter ID 1283 is 0.9818056400639985
The next predicted average hourly reading for meter ID 1283 for the period
2016-04-01 00:00:00 to 01:00:00 is 191486.13321661545
The average hourly consumption for meter ID 1283 is 6.166650100523839
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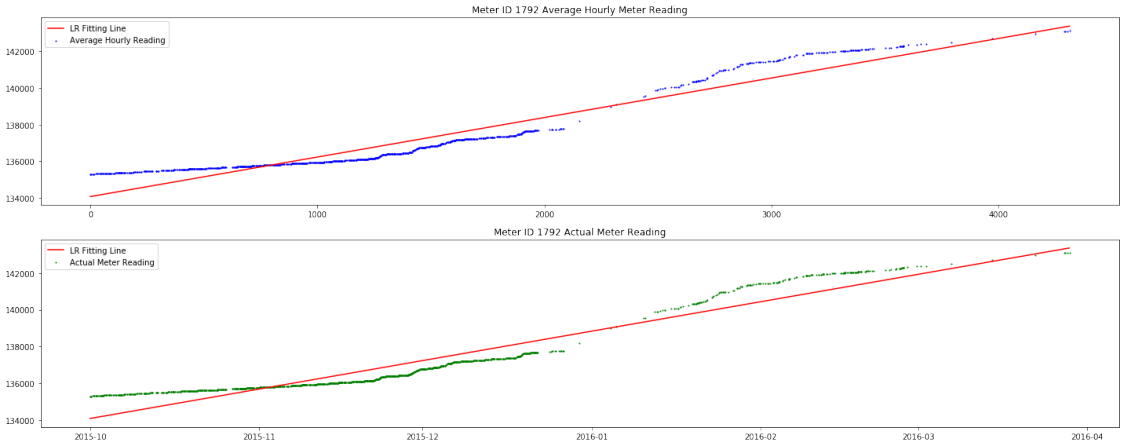
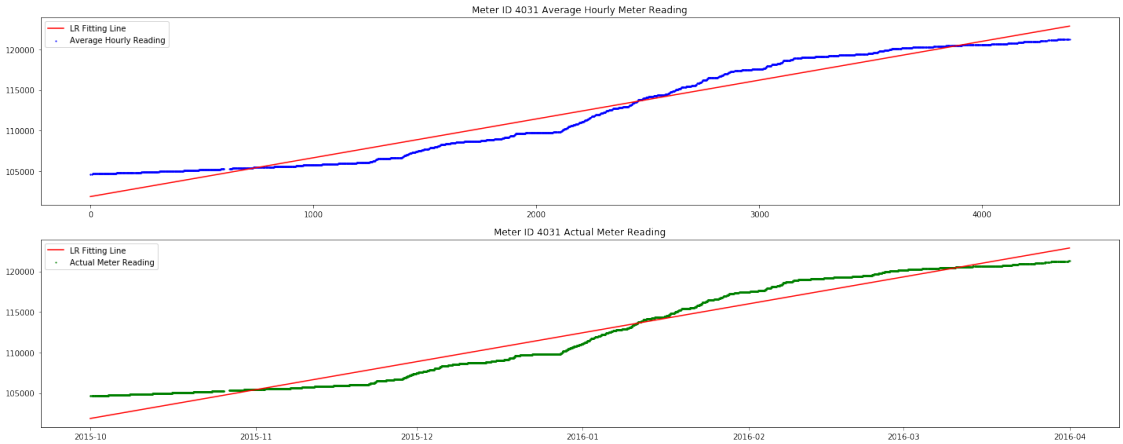
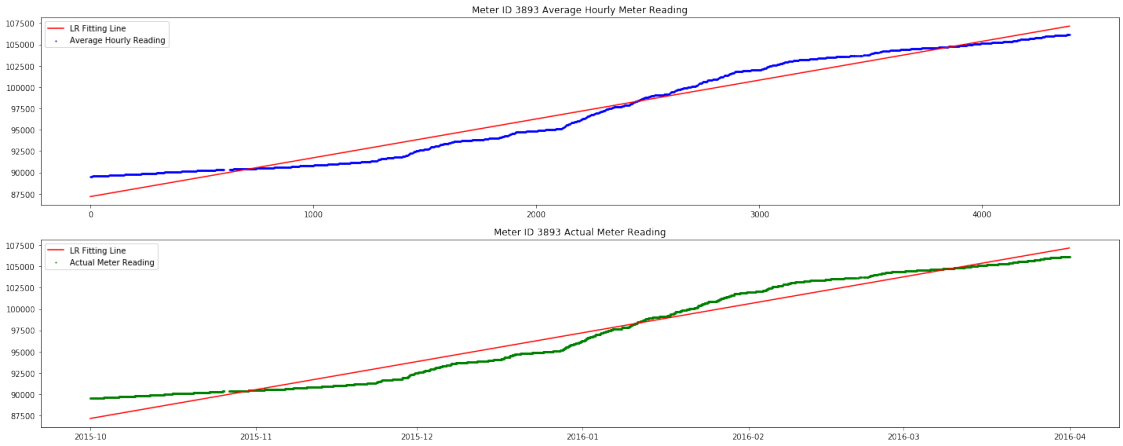


The accuracy score of fitting for meter ID 1792 is 0.9153716848175844
The next predicted average hourly reading for meter ID 1792 for the period 2016-04-01 00:00:00 to 01:00:00 is 143543.47461607066
The average hourly consumption for meter ID 1792 is 2.1545921577198897



The accuracy score of fitting for meter ID 4031 is 0.9543172808037509
The next predicted average hourly reading for meter ID 4031 for the period 2016-04-01 00:00:00 to 01:00:00 is 122884.69052762933
The average hourly consumption for meter ID 4031 is 4.785000198884518




```
The accuracy score of fitting for meter ID 3893 is 0.9652272529389854
The next predicted average hourly reading for meter ID 3893 for the period
2016-04-01 00:00:00 to 01:00:00 is 107145.44534236615
The average hourly consumption for meter ID 3893 is 4.546786680832156
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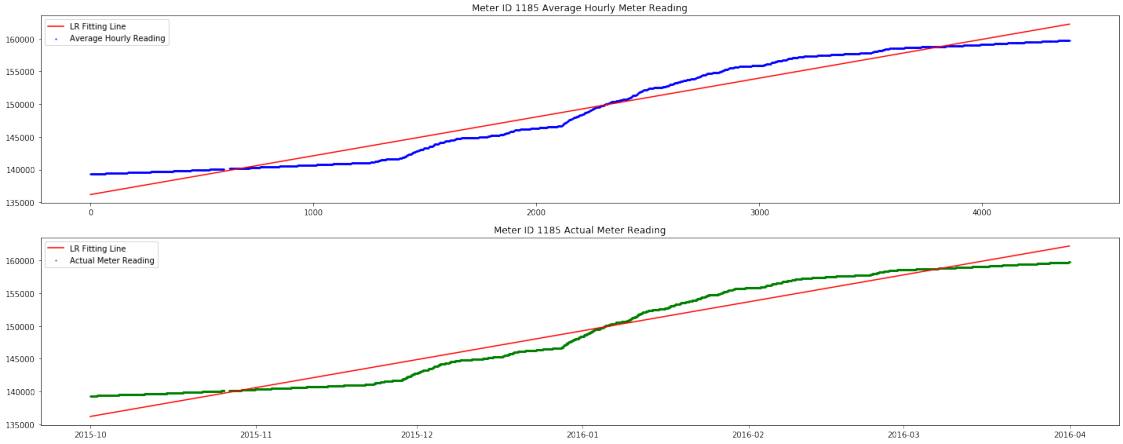


```
The accuracy score of fitting for meter ID 1185 is 0.9554495053006462
The next predicted average hourly reading for meter ID 1185 for the period
2016-04-01 00:00:00 to 01:00:00 is 162219.69539979467
The average hourly consumption for meter ID 1185 is 5.926437226997223
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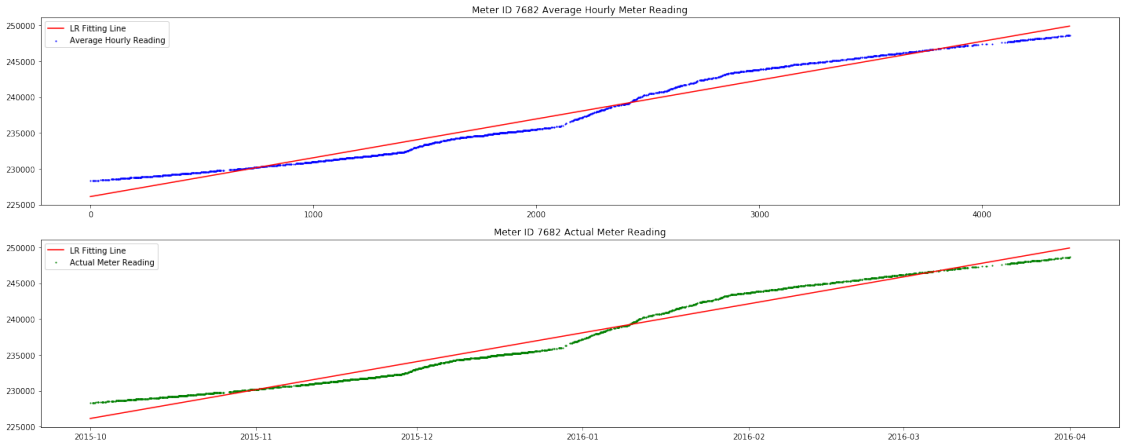


```
The accuracy score of fitting for meter ID 7682 is 0.975525357589771
The next predicted average hourly reading for meter ID 7682 for the period
2016-04-01 00:00:00 to 01:00:00 is 249903.58765121034
The average hourly consumption for meter ID 7682 is 5.412603998614941
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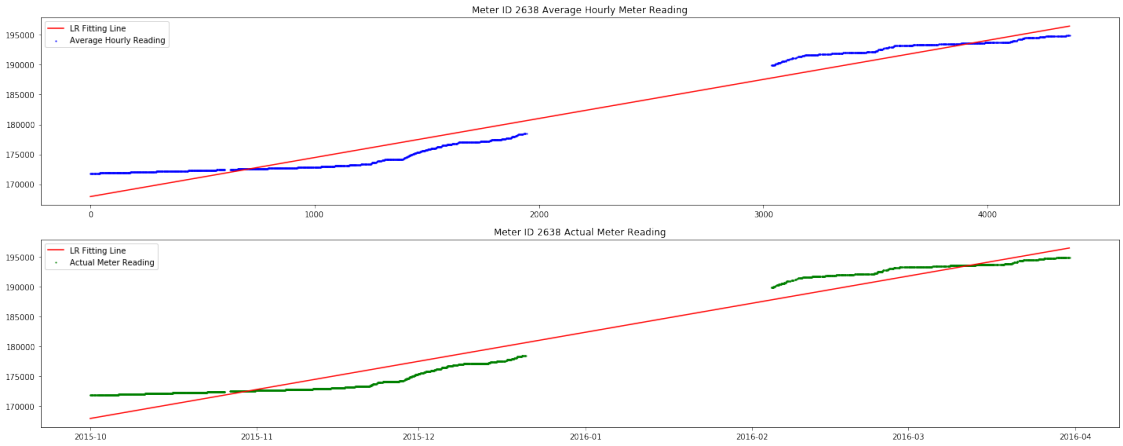


```
The accuracy score of fitting for meter ID 2638 is 0.9588265638583453
The next predicted average hourly reading for meter ID 2638 for the period
2016-04-01 00:00:00 to 01:00:00 is 196612.37289749246
The average hourly consumption for meter ID 2638 is 6.527675415651174
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The accuracy score of fitting for meter ID 187 is 0.9663625470038734
The next predicted average hourly reading for meter ID 187 for the period
2016-04-01 00:00:00 to 01:00:00 is 289071.1885756117
The average hourly consumption for meter ID 187 is 6.409507668751758
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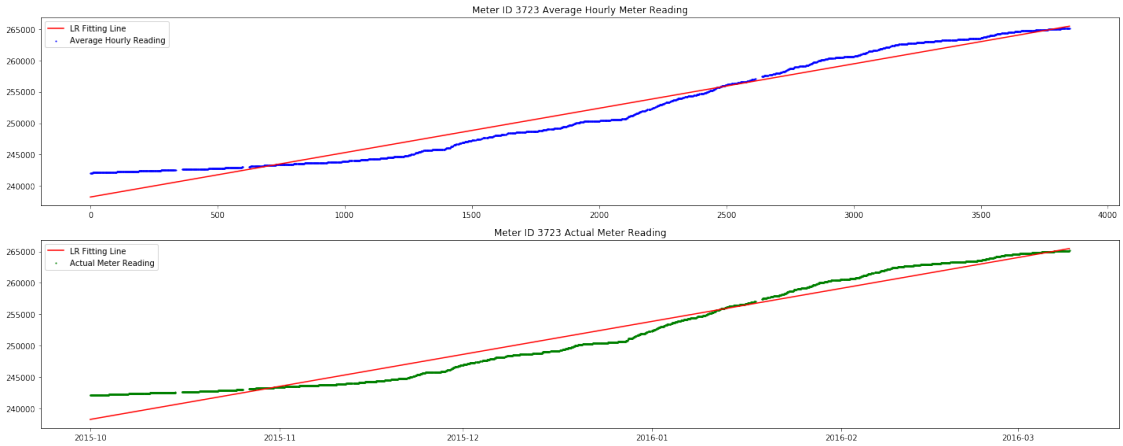


```
The accuracy score of fitting for meter ID 3723 is 0.9616150064380857
The next predicted average hourly reading for meter ID 3723 for the period
2016-04-01 00:00:00 to 01:00:00 is 269313.841027029
The average hourly consumption for meter ID 3723 is 7.0781228263513185
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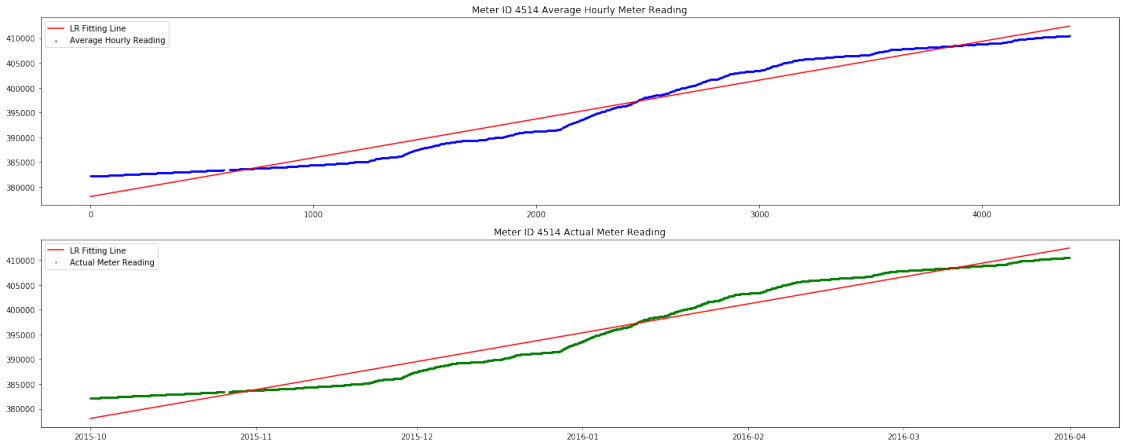


```
The accuracy score of fitting for meter ID 4514 is 0.9656113575300393
The next predicted average hourly reading for meter ID 4514 for the period
2016-04-01 00:00:00 to 01:00:00 is 412424.22421396605
The average hourly consumption for meter ID 4514 is 7.824841795372777
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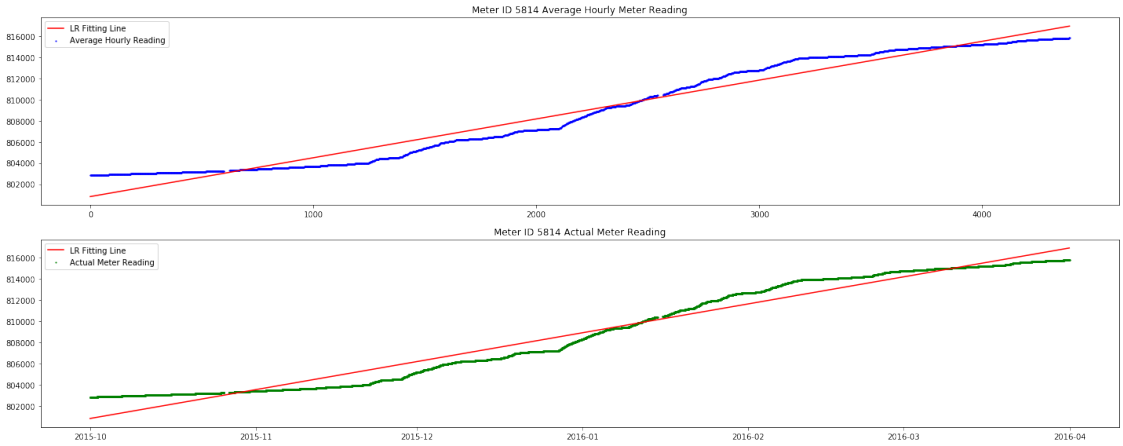


```
The accuracy score of fitting for meter ID 5814 is 0.9642471111721219
The next predicted average hourly reading for meter ID 5814 for the period
2016-04-01 00:00:00 to 01:00:00 is 816940.9685456916
The average hourly consumption for meter ID 5814 is 3.666869369451888
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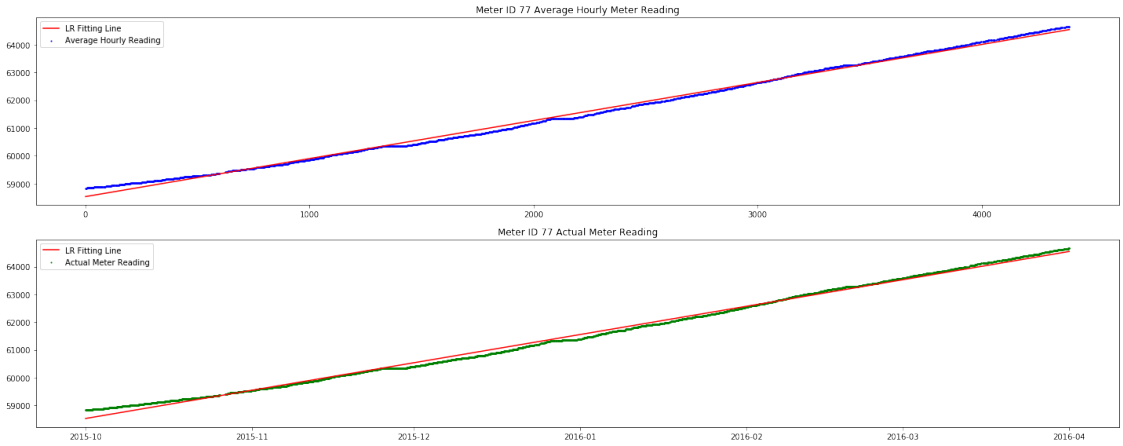


```
The accuracy score of fitting for meter ID 77 is 0.9963564807102118
The next predicted average hourly reading for meter ID 77 for the period
2016-04-01 00:00:00 to 01:00:00 is 64545.18314713264
The average hourly consumption for meter ID 77 is 1.3696703913228703
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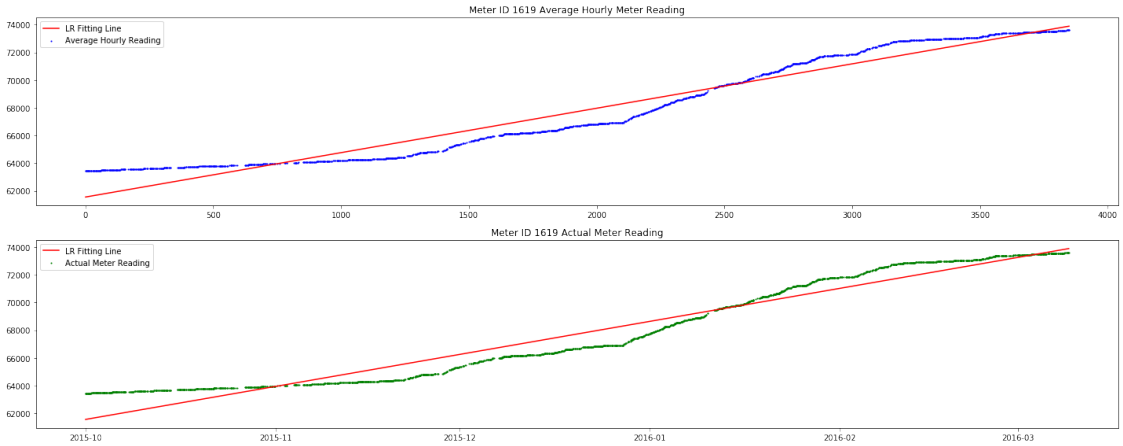


```
The accuracy score of fitting for meter ID 1619 is 0.9457942803915703
The next predicted average hourly reading for meter ID 1619 for the period
2016-04-01 00:00:00 to 01:00:00 is 75635.04214661565
The average hourly consumption for meter ID 1619 is 3.2052779876830755
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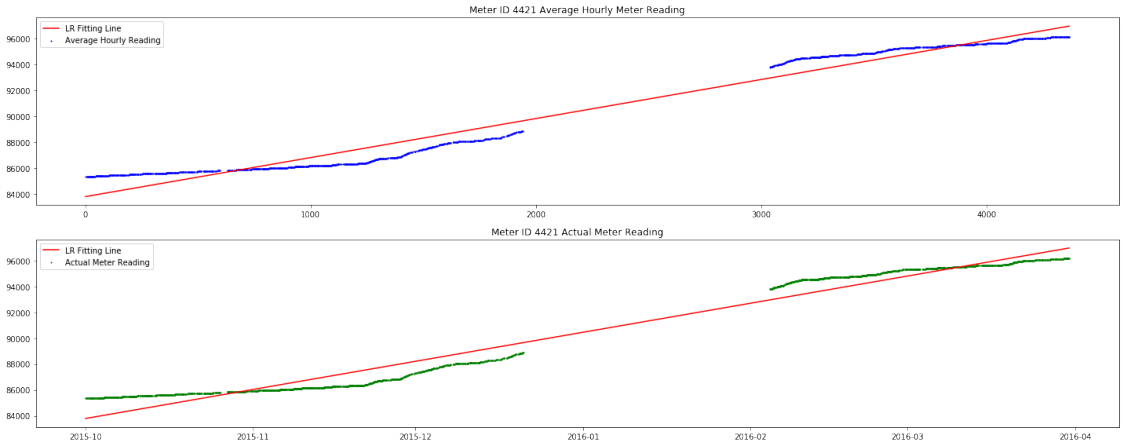


```
The accuracy score of fitting for meter ID 4421 is 0.9685270320753457
The next predicted average hourly reading for meter ID 4421 for the period
2016-04-01 00:00:00 to 01:00:00 is 97046.80529240421
The average hourly consumption for meter ID 4421 is 3.0170421869697748
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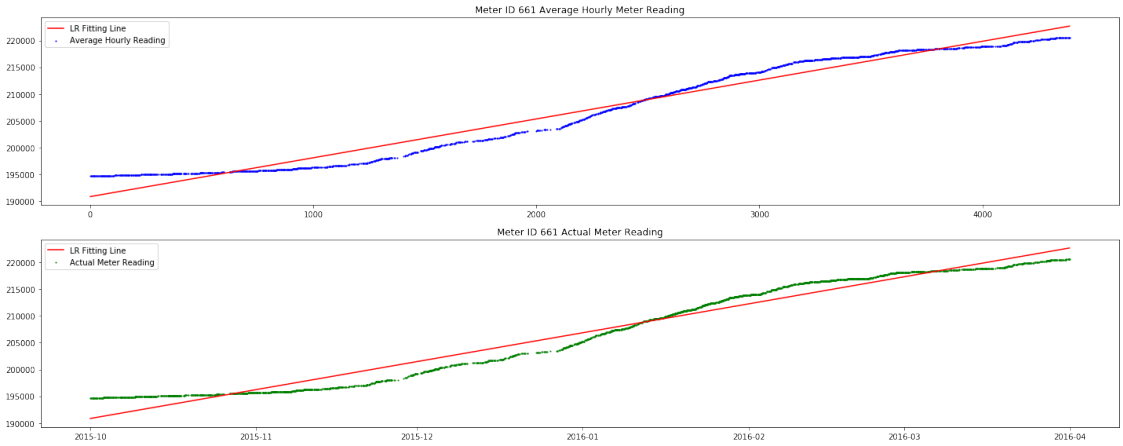


```
The accuracy score of fitting for meter ID 661 is 0.9679954732609775
The next predicted average hourly reading for meter ID 661 for the period
2016-04-01 00:00:00 to 01:00:00 is 222698.64032840024
The average hourly consumption for meter ID 661 is 7.252603456377983
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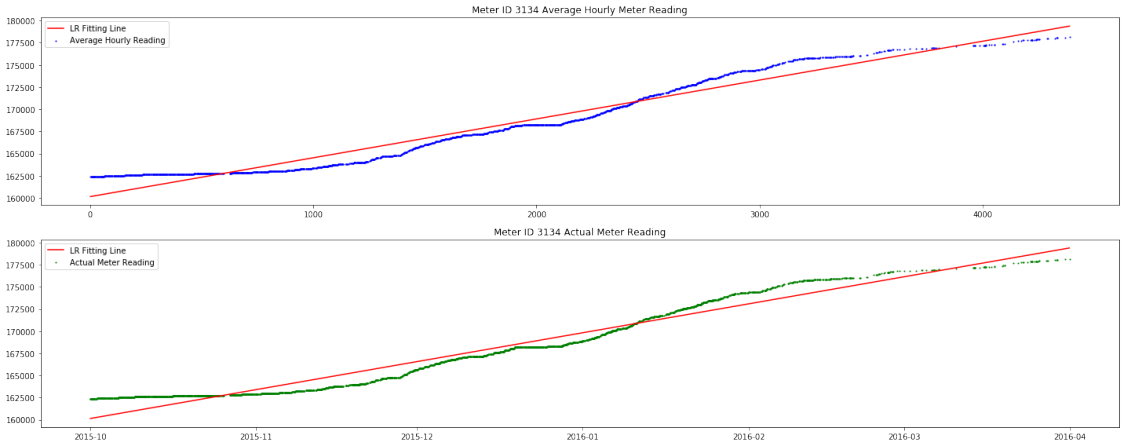


```
The accuracy score of fitting for meter ID 3134 is 0.9522697258783906
The next predicted average hourly reading for meter ID 3134 for the period
2016-04-01 00:00:00 to 01:00:00 is 179394.9239230302
The average hourly consumption for meter ID 3134 is 4.3833746333257295
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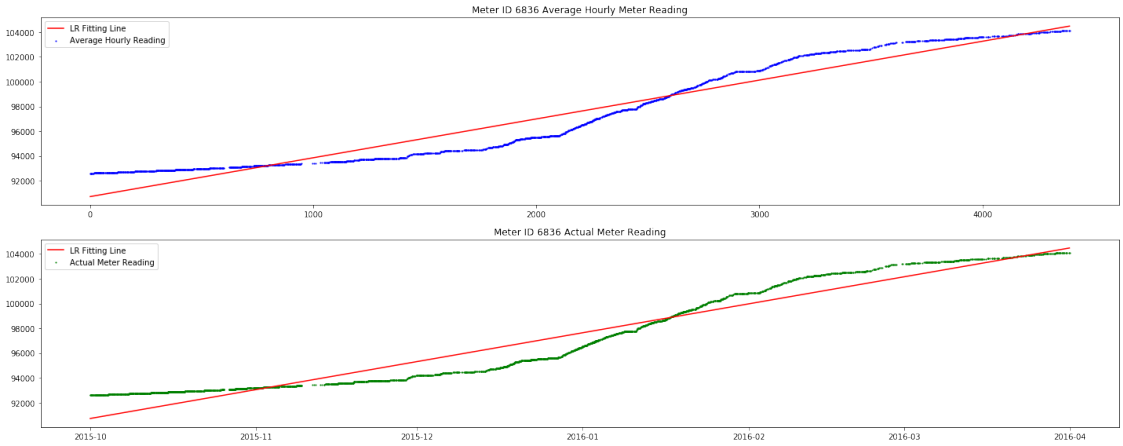


```
The accuracy score of fitting for meter ID 6836 is 0.931450462640811
The next predicted average hourly reading for meter ID 6836 for the period
2016-04-01 00:00:00 to 01:00:00 is 104490.16516528602
The average hourly consumption for meter ID 6836 is 3.1360097357537597
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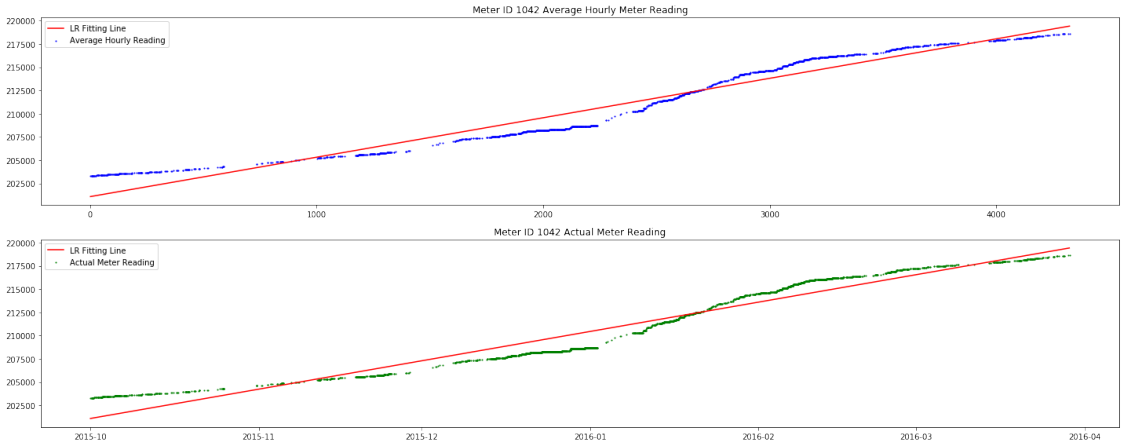


```
The accuracy score of fitting for meter ID 1042 is 0.947156326641714
The next predicted average hourly reading for meter ID 1042 for the period
2016-04-01 00:00:00 to 01:00:00 is 219714.40967984556
The average hourly consumption for meter ID 1042 is 4.244044036371633
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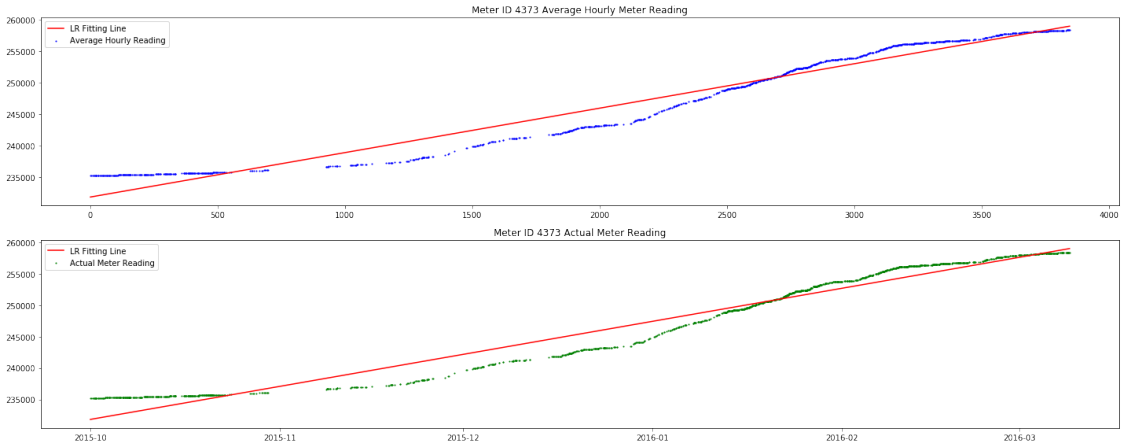


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The accuracy score of fitting for meter ID 4373 is 0.9596418137933242
The next predicted average hourly reading for meter ID 4373 for the period
2016-04-01 00:00:00 to 01:00:00 is 262876.415451252
The average hourly consumption for meter ID 4373 is 7.071263904508669
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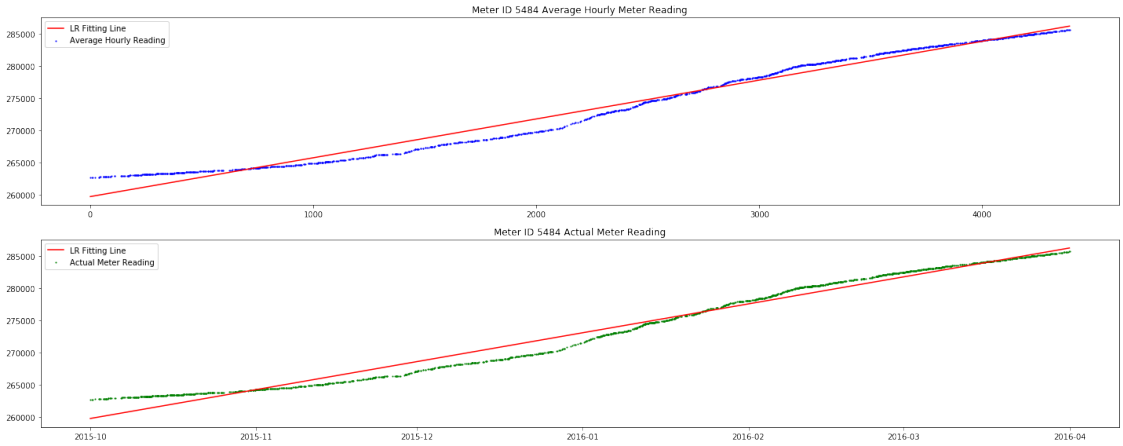


```
The accuracy score of fitting for meter ID 5484 is 0.9799521636198729
The next predicted average hourly reading for meter ID 5484 for the period
2016-04-01 00:00:00 to 01:00:00 is 286252.62384192226
The average hourly consumption for meter ID 5484 is 6.039232854906004
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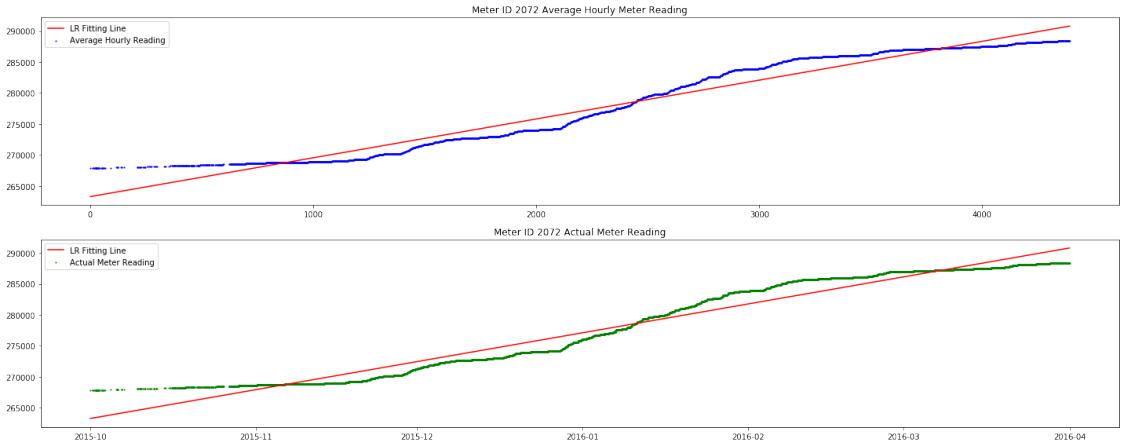


```
The accuracy score of fitting for meter ID 2072 is 0.9595744569946849
The next predicted average hourly reading for meter ID 2072 for the period
2016-04-01 00:00:00 to 01:00:00 is 290811.1451073316
The average hourly consumption for meter ID 2072 is 6.271534743020311
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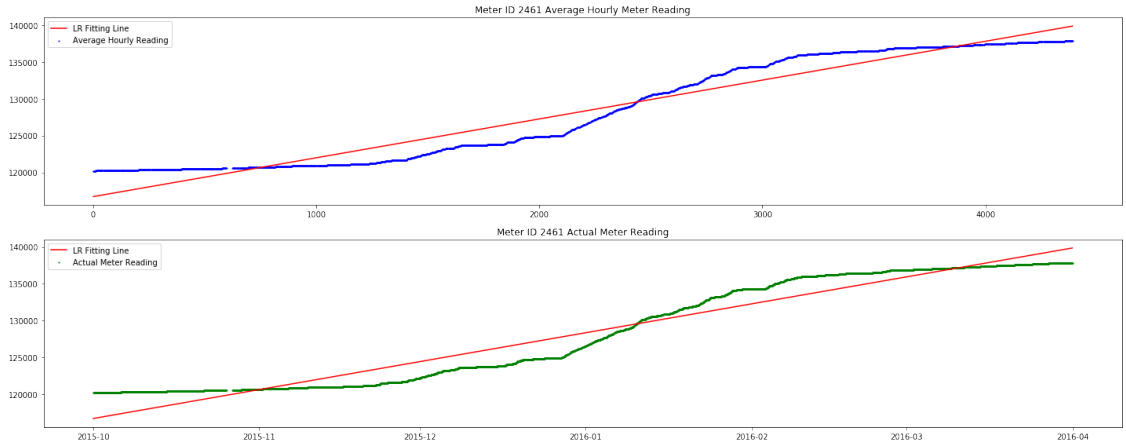


```
The accuracy score of fitting for meter ID 2461 is 0.9355468192998749
The next predicted average hourly reading for meter ID 2461 for the period
2016-04-01 00:00:00 to 01:00:00 is 139869.81327982398
The average hourly consumption for meter ID 2461 is 5.273481676616939
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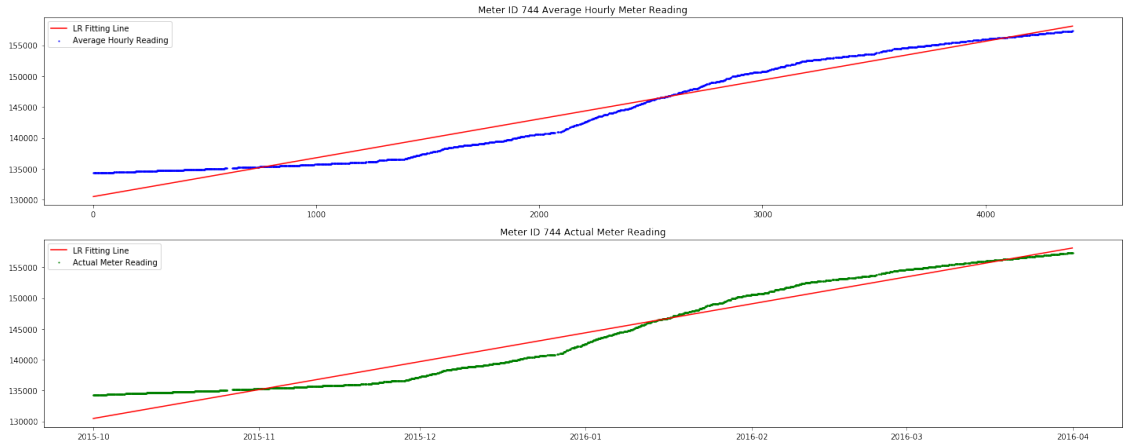


```
The accuracy score of fitting for meter ID 744 is 0.9562956261622477
The next predicted average hourly reading for meter ID 744 for the period
2016-04-01 00:00:00 to 01:00:00 is 158118.08354792735
The average hourly consumption for meter ID 744 is 6.295551251532743
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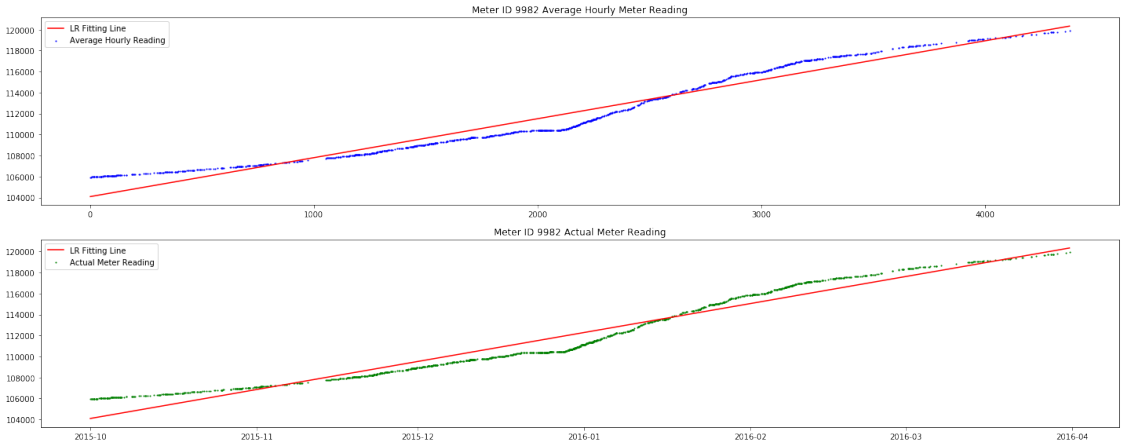


```
The accuracy score of fitting for meter ID 9982 is 0.9532869893294519
The next predicted average hourly reading for meter ID 9982 for the period
2016-04-01 00:00:00 to 01:00:00 is 120384.02305841971
The average hourly consumption for meter ID 9982 is 3.710523377128993
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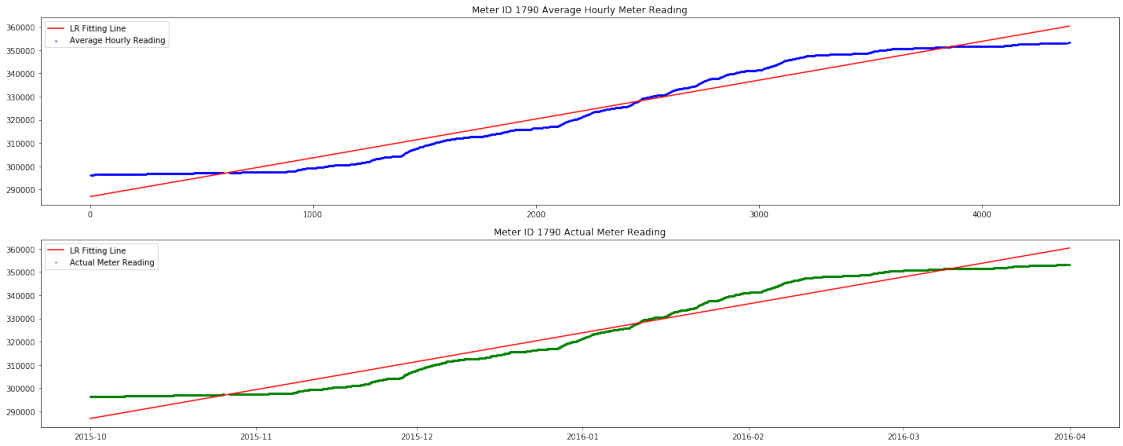


```
The accuracy score of fitting for meter ID 1790 is 0.9620999080610423
The next predicted average hourly reading for meter ID 1790 for the period
2016-04-01 00:00:00 to 01:00:00 is 360375.96361344866
The average hourly consumption for meter ID 1790 is 16.71664508333197
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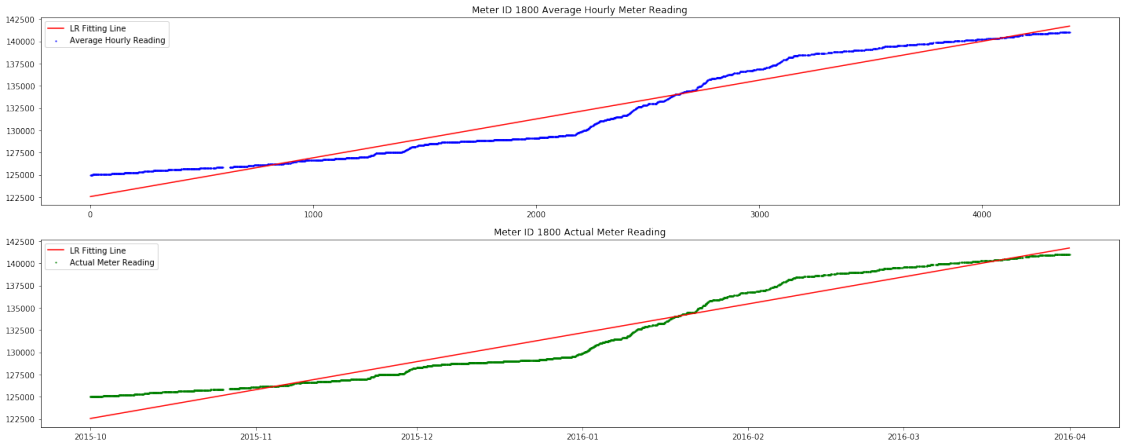


```
The accuracy score of fitting for meter ID 1800 is 0.9443905346182297
The next predicted average hourly reading for meter ID 1800 for the period
2016-04-01 00:00:00 to 01:00:00 is 141716.44685188774
The average hourly consumption for meter ID 1800 is 4.364342725632014
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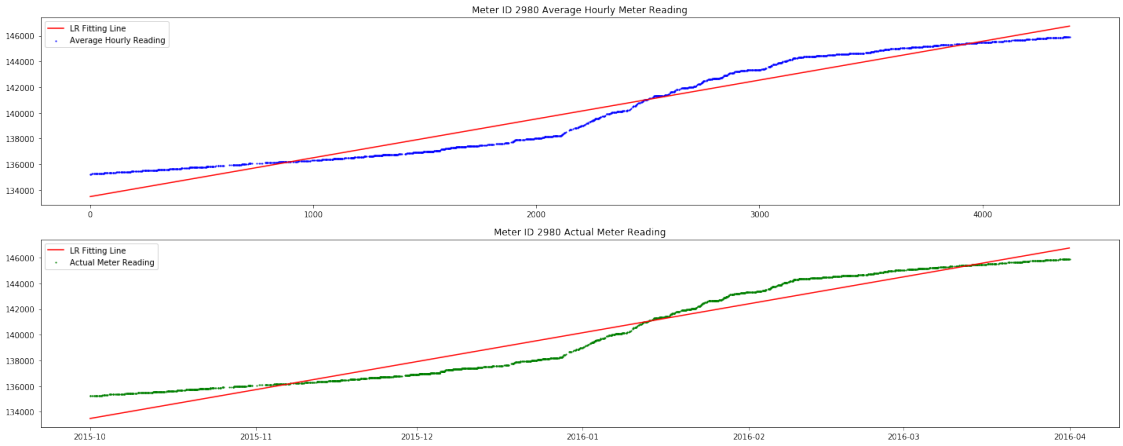


```
The accuracy score of fitting for meter ID 2980 is 0.9440339267430469
The next predicted average hourly reading for meter ID 2980 for the period
2016-04-01 00:00:00 to 01:00:00 is 146761.83548224389
The average hourly consumption for meter ID 2980 is 3.024271385569591
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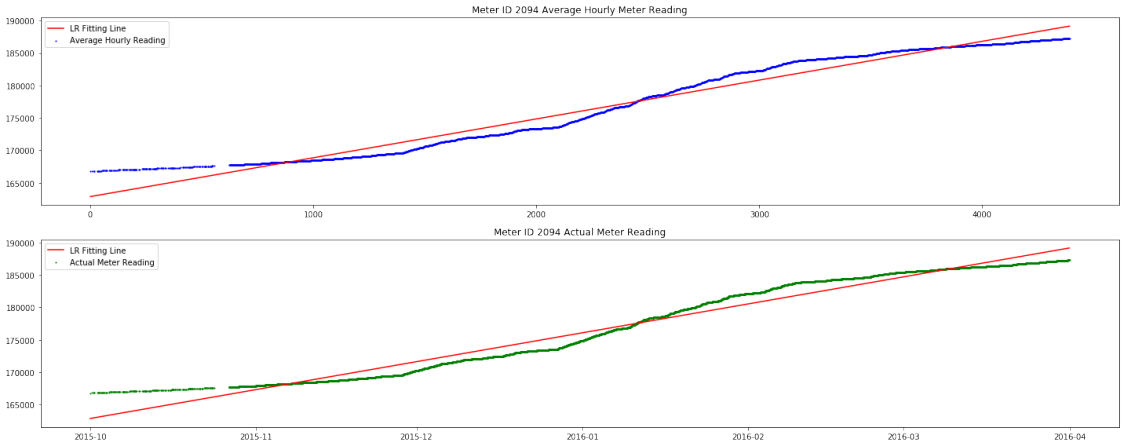
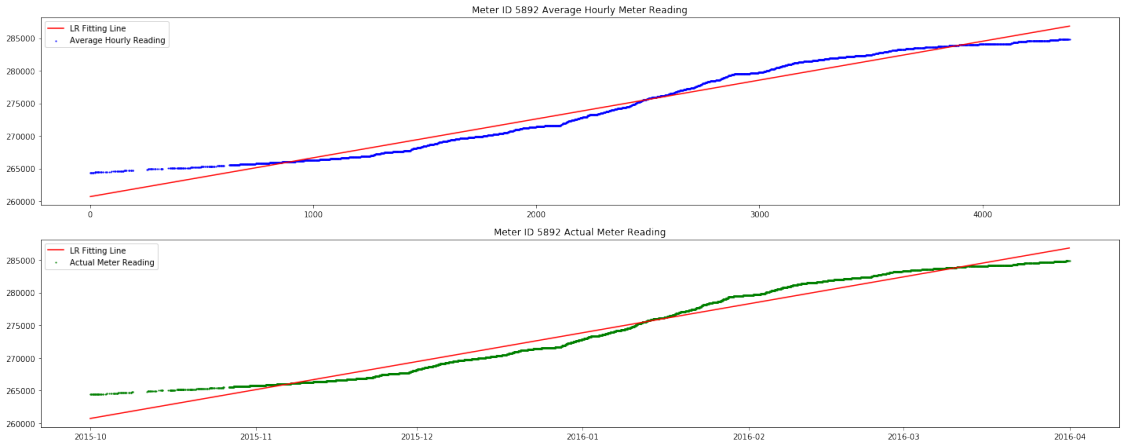
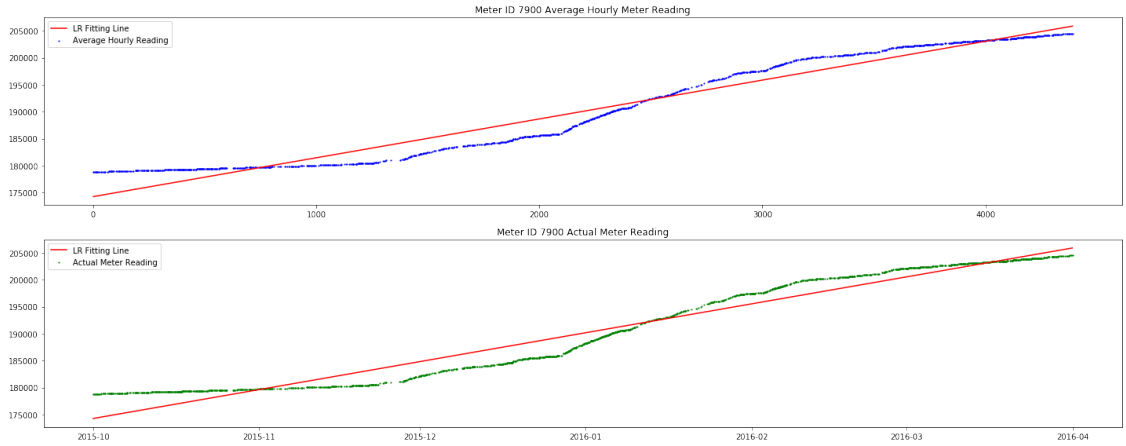


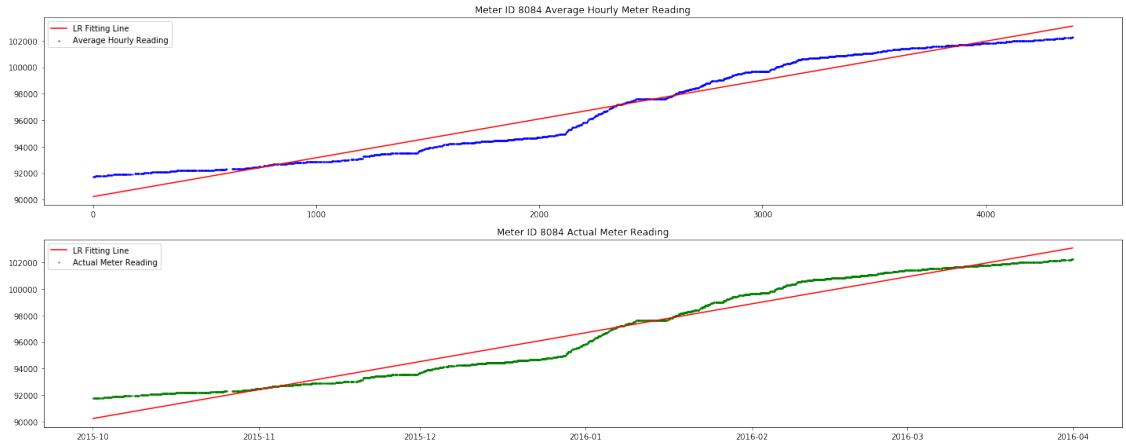
The accuracy score of fitting for meter ID 2094 is 0.9674771037697167
The next predicted average hourly reading for meter ID 2094 for the period 2016-04-01 00:00:00 to 01:00:00 is 189157.05553724713
The average hourly consumption for meter ID 2094 is 5.985188654536614



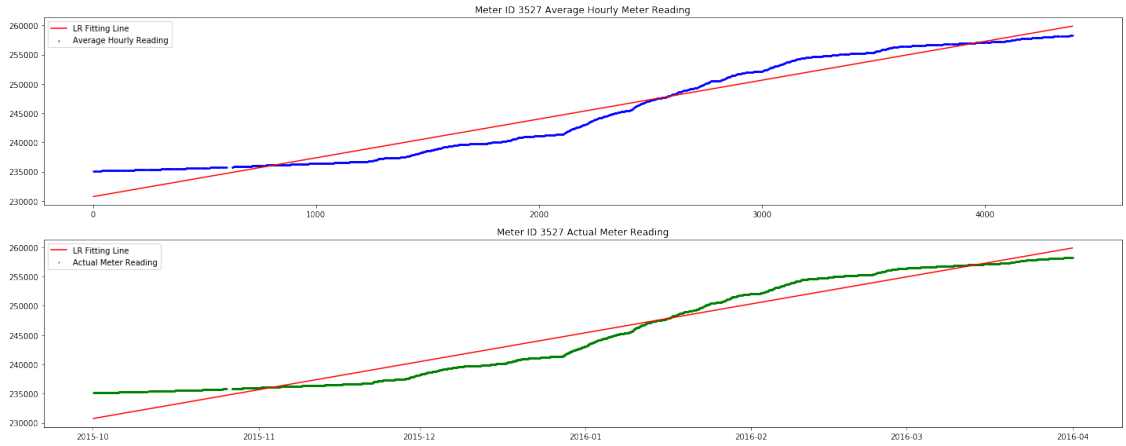
The accuracy score of fitting for meter ID 5892 is 0.9710311981415108
The next predicted average hourly reading for meter ID 5892 for the period 2016-04-01 00:00:00 to 01:00:00 is 286850.90470174595
The average hourly consumption for meter ID 5892 is 5.954381295421626



The accuracy score of fitting for meter ID 7900 is 0.9536491158101464
The next predicted average hourly reading for meter ID 7900 for the period 2016-04-01 00:00:00 to 01:00:00 is 205905.79256311347
The average hourly consumption for meter ID 7900 is 7.205346205882961



The accuracy score of fitting for meter ID 8084 is 0.9590985883624408
The next predicted average hourly reading for meter ID 8084 for the period 2016-04-01 00:00:00 to 01:00:00 is 103107.42421649312
The average hourly consumption for meter ID 8084 is 2.9329746496659936




```
The accuracy score of fitting for meter ID 3527 is 0.9482481893041069
The next predicted average hourly reading for meter ID 3527 for the period
2016-04-01 00:00:00 to 01:00:00 is 259886.52655761383
The average hourly consumption for meter ID 3527 is 6.637281826202525
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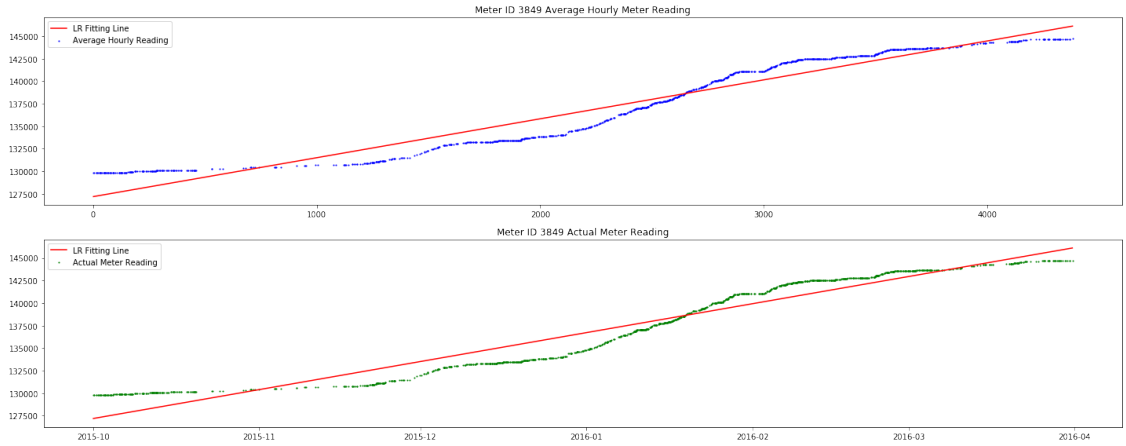


```
The accuracy score of fitting for meter ID 3849 is 0.9333015005815682
The next predicted average hourly reading for meter ID 3849 for the period
2016-04-01 00:00:00 to 01:00:00 is 146165.31331066974
The average hourly consumption for meter ID 3849 is 4.320913567760726
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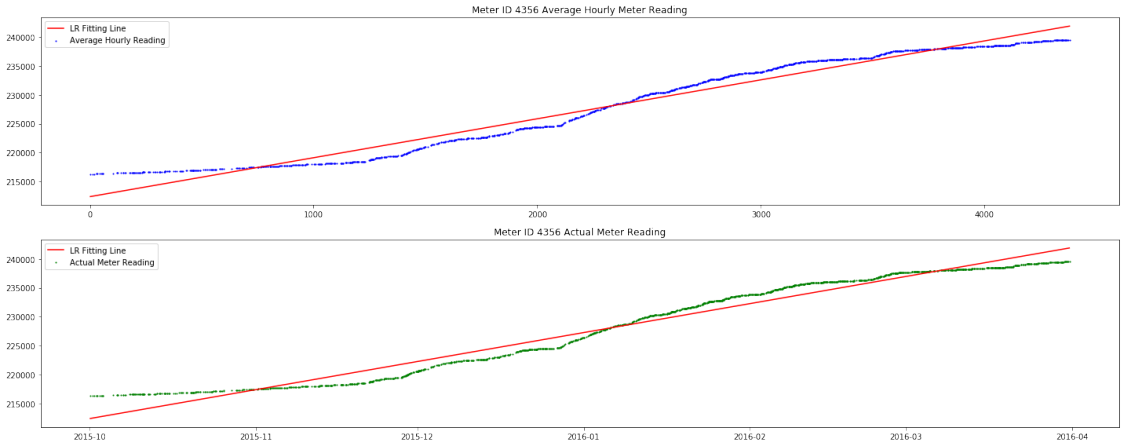
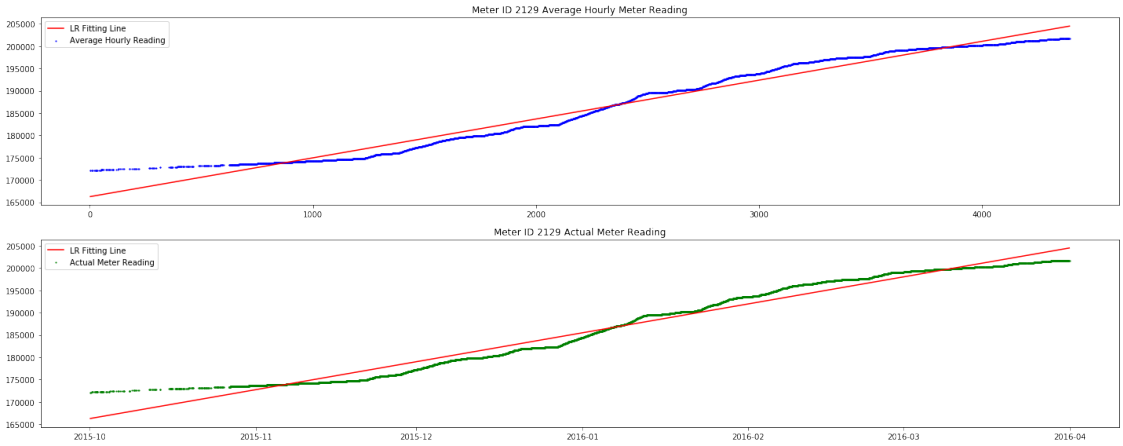
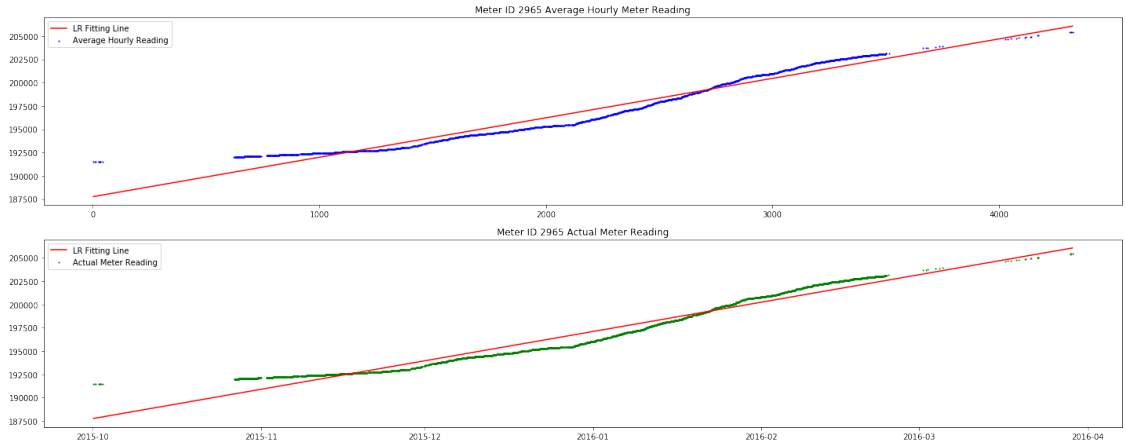


The accuracy score of fitting for meter ID 4356 is 0.967750675637899
The next predicted average hourly reading for meter ID 4356 for the period 2016-04-01 00:00:00 to 01:00:00 is 241970.1844380927
The average hourly consumption for meter ID 4356 is 6.735917623329442



The accuracy score of fitting for meter ID 2129 is 0.9742822954853175
The next predicted average hourly reading for meter ID 2129 for the period 2016-04-01 00:00:00 to 01:00:00 is 204490.3374816696
The average hourly consumption for meter ID 2129 is 8.707472440059064




```
The accuracy score of fitting for meter ID 2965 is 0.9596324705649097
The next predicted average hourly reading for meter ID 2965 for the period
2016-04-01 00:00:00 to 01:00:00 is 206347.2348219302
The average hourly consumption for meter ID 2965 is 4.233356789016398
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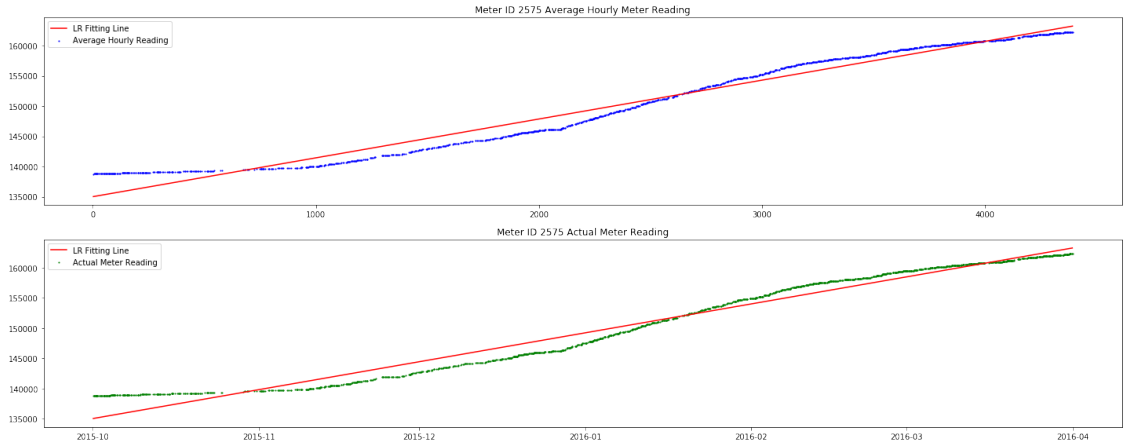


```
The accuracy score of fitting for meter ID 2575 is 0.96889769164696
The next predicted average hourly reading for meter ID 2575 for the period
2016-04-01 00:00:00 to 01:00:00 is 163246.13031329436
The average hourly consumption for meter ID 2575 is 6.425662689667661
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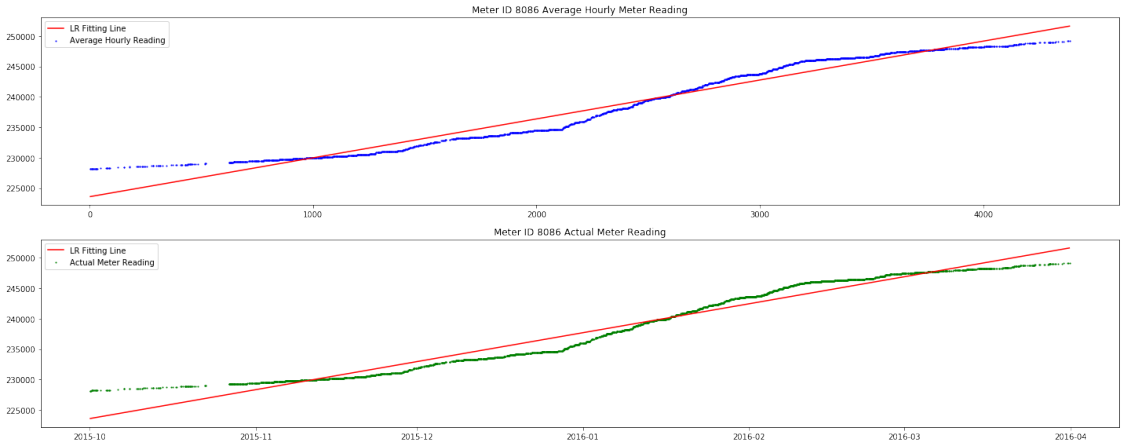


```
The accuracy score of fitting for meter ID 8086 is 0.965179905950671
The next predicted average hourly reading for meter ID 8086 for the period
2016-04-01 00:00:00 to 01:00:00 is 251647.93352278054
The average hourly consumption for meter ID 8086 is 6.387771970243193
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The accuracy score of fitting for meter ID 1415 is 0.9655619644002827
The next predicted average hourly reading for meter ID 1415 for the period
2016-04-01 00:00:00 to 01:00:00 is 211009.95793847457
The average hourly consumption for meter ID 1415 is 5.570882736821659
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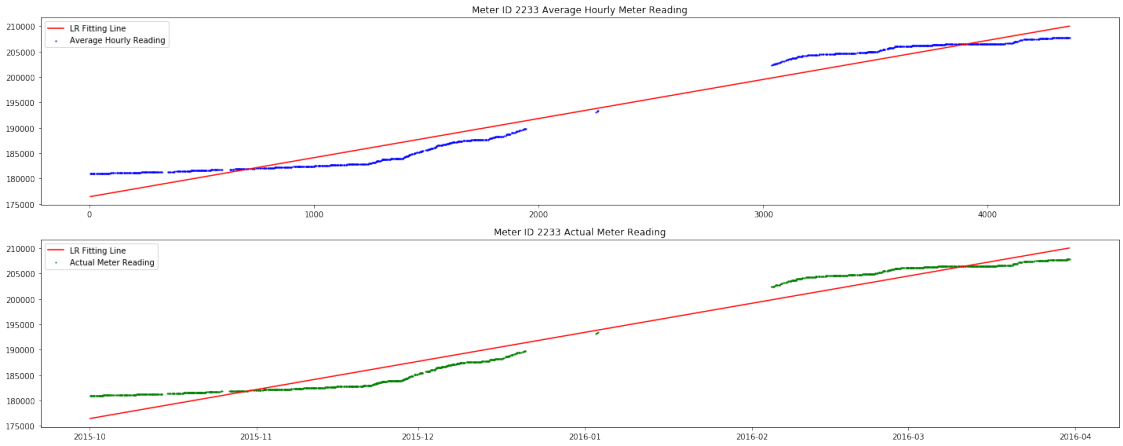
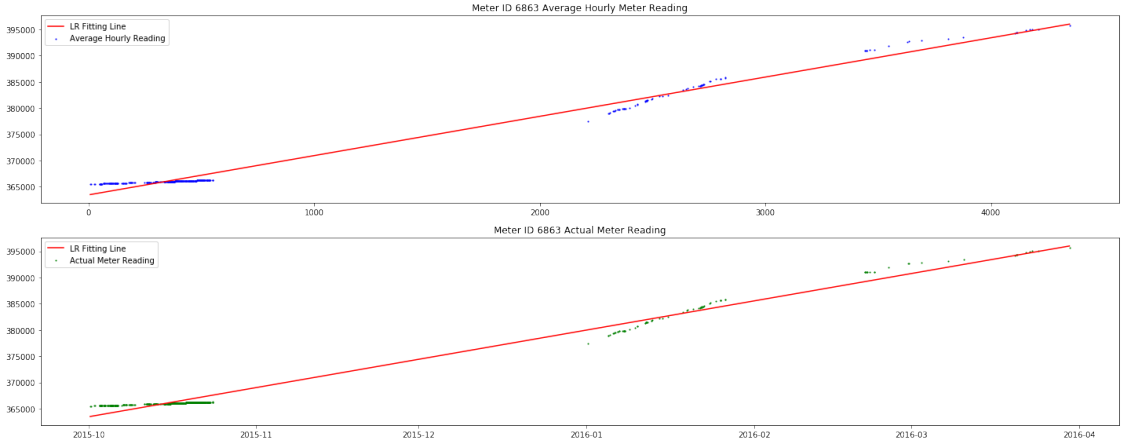


The accuracy score of fitting for meter ID 2233 is 0.9631021441563459
The next predicted average hourly reading for meter ID 2233 for the period 2016-04-01 00:00:00 to 01:00:00 is 210246.48994557123
The average hourly consumption for meter ID 2233 is 7.698771535186097



The accuracy score of fitting for meter ID 6863 is 0.9866658630546451
The next predicted average hourly reading for meter ID 6863 for the period 2016-04-01 00:00:00 to 01:00:00 is 396329.54174465564
The average hourly consumption for meter ID 6863 is 7.487682396022137


```
The accuracy score of fitting for meter ID 2470 is 0.9440963594452955
The next predicted average hourly reading for meter ID 2470 for the period
2016-04-01 00:00:00 to 01:00:00 is 241207.5278671329
The average hourly consumption for meter ID 2470 is 5.547945348604117
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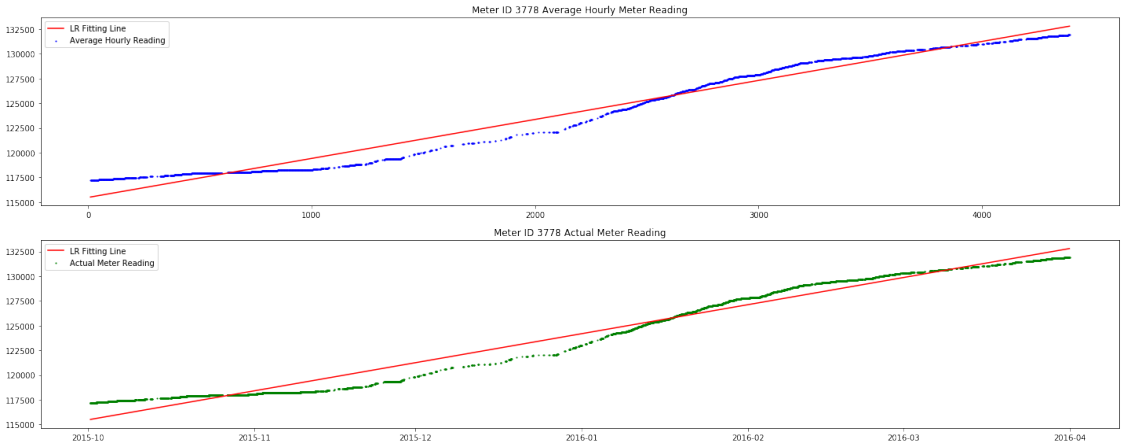


```
The accuracy score of fitting for meter ID 3778 is 0.9753967381169777
The next predicted average hourly reading for meter ID 3778 for the period
2016-04-01 00:00:00 to 01:00:00 is 132799.97746140693
The average hourly consumption for meter ID 3778 is 3.947432500484865
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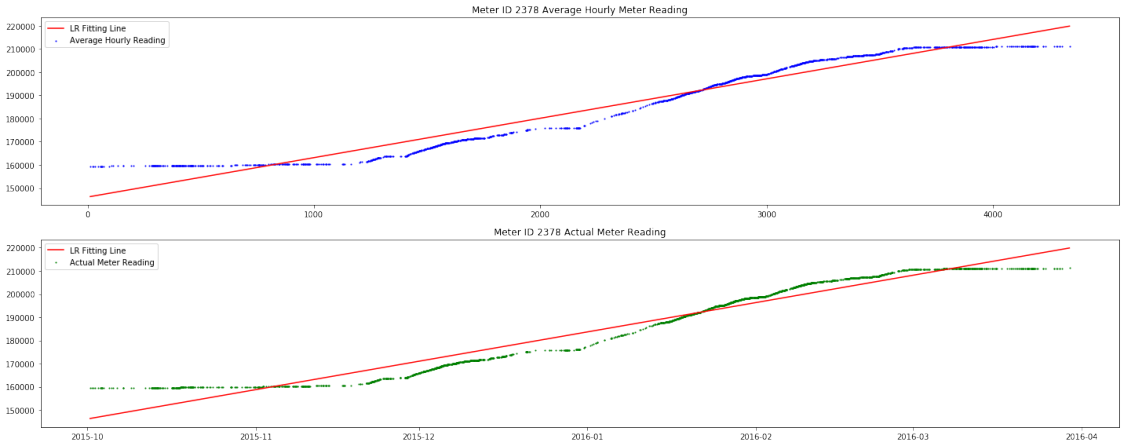


```
The accuracy score of fitting for meter ID 2378 is 0.9567233501610696
The next predicted average hourly reading for meter ID 2378 for the period
2016-04-01 00:00:00 to 01:00:00 is 220789.1903960303
The average hourly consumption for meter ID 2378 is 16.99921696956153
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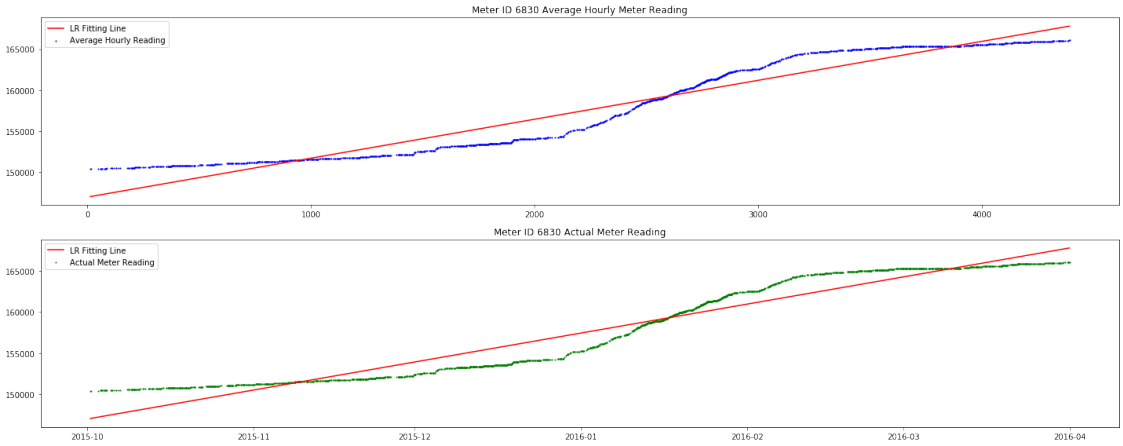


```
The accuracy score of fitting for meter ID 6830 is 0.9340250640512672
The next predicted average hourly reading for meter ID 6830 for the period
2016-04-01 00:00:00 to 01:00:00 is 167821.2807195866
The average hourly consumption for meter ID 6830 is 4.748737058165716
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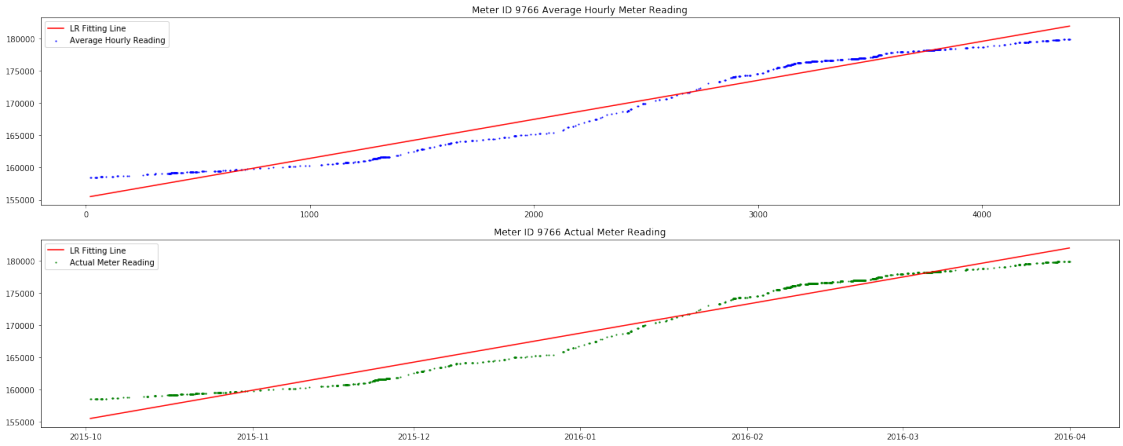


```
The accuracy score of fitting for meter ID 9766 is 0.9710463542775012
The next predicted average hourly reading for meter ID 9766 for the period
2016-04-01 00:00:00 to 01:00:00 is 181954.967263454
The average hourly consumption for meter ID 9766 is 6.049378603202058
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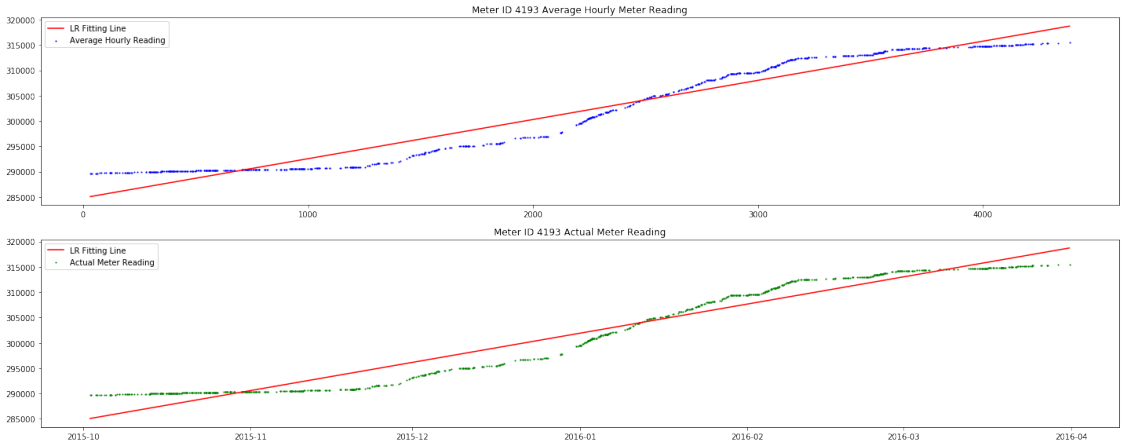


```
The accuracy score of fitting for meter ID 4193 is 0.9528280275428344
The next predicted average hourly reading for meter ID 4193 for the period
2016-04-01 00:00:00 to 01:00:00 is 318792.7798083499
The average hourly consumption for meter ID 4193 is 7.731065251398832
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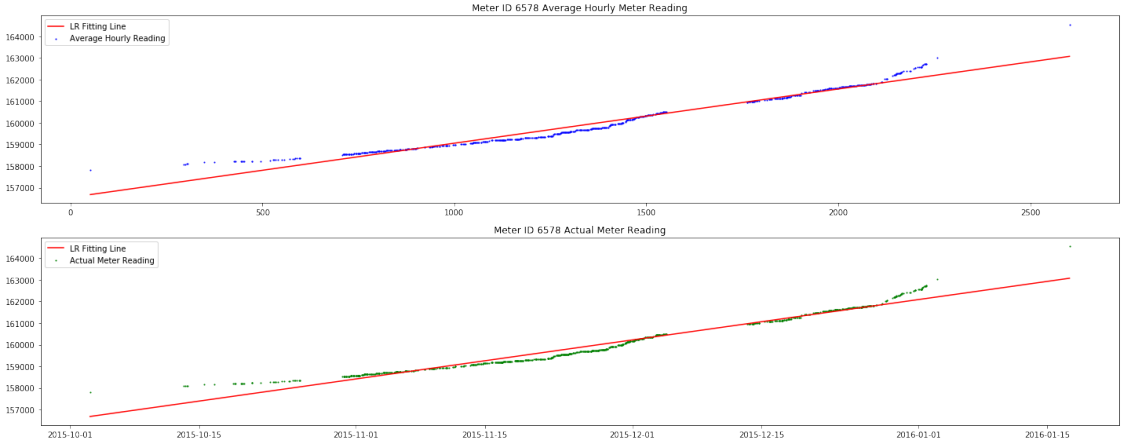
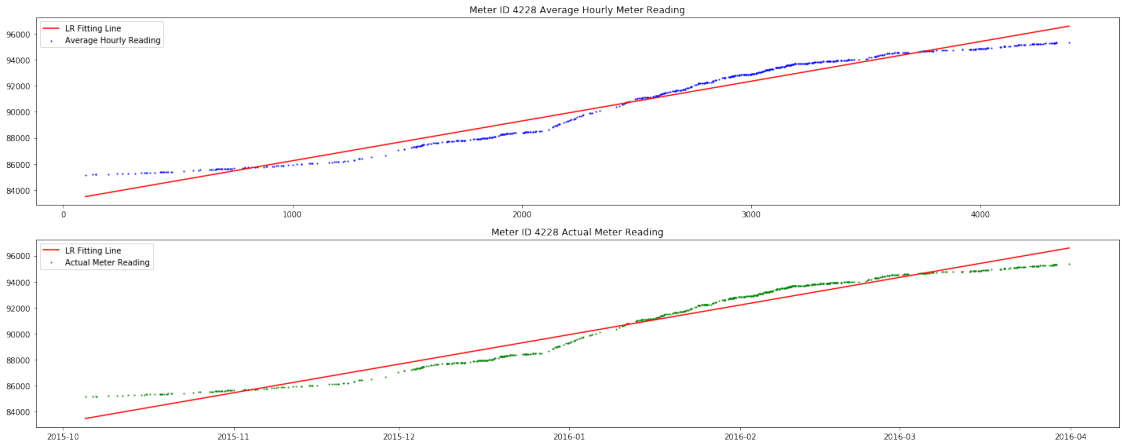
The accuracy score of fitting for meter ID 8703 is 0.98094379600557
The next predicted average hourly reading for meter ID 8703 for the period 2016-04-01 00:00:00 to 01:00:00 is 228033.89502836872
The average hourly consumption for meter ID 8703 is 4.252275978506077



The accuracy score of fitting for meter ID 6578 is 0.9691558330311623
The next predicted average hourly reading for meter ID 6578 for the period 2016-04-01 00:00:00 to 01:00:00 is 167557.7980504464
The average hourly consumption for meter ID 6578 is 2.506375631404808




```
The accuracy score of fitting for meter ID 4228 is 0.9629760725522901
The next predicted average hourly reading for meter ID 4228 for the period
2016-04-01 00:00:00 to 01:00:00 is 96607.53773257228
The average hourly consumption for meter ID 4228 is 3.055257417654502
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```

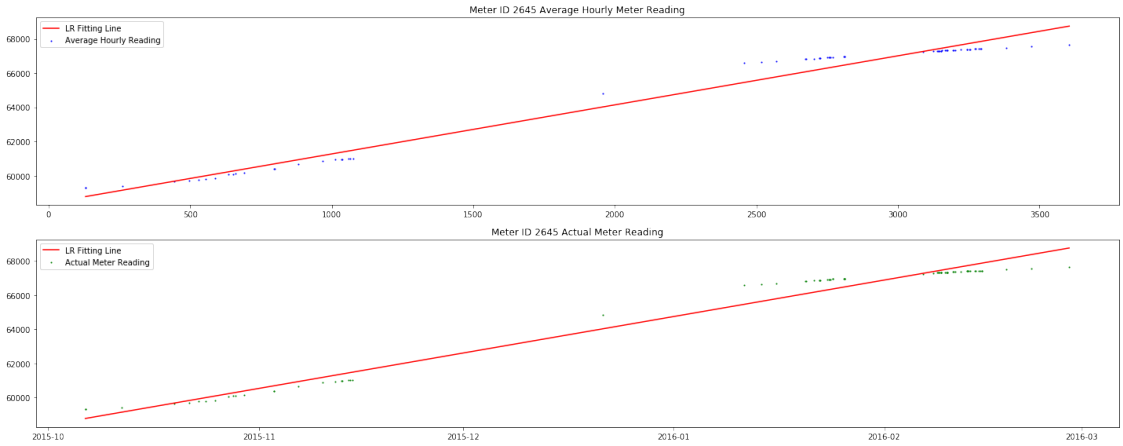


```
The accuracy score of fitting for meter ID 2645 is 0.9787302913937809
The next predicted average hourly reading for meter ID 2645 for the period
2016-04-01 00:00:00 to 01:00:00 is 71003.36755753079
The average hourly consumption for meter ID 2645 is 2.867500335458317
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```

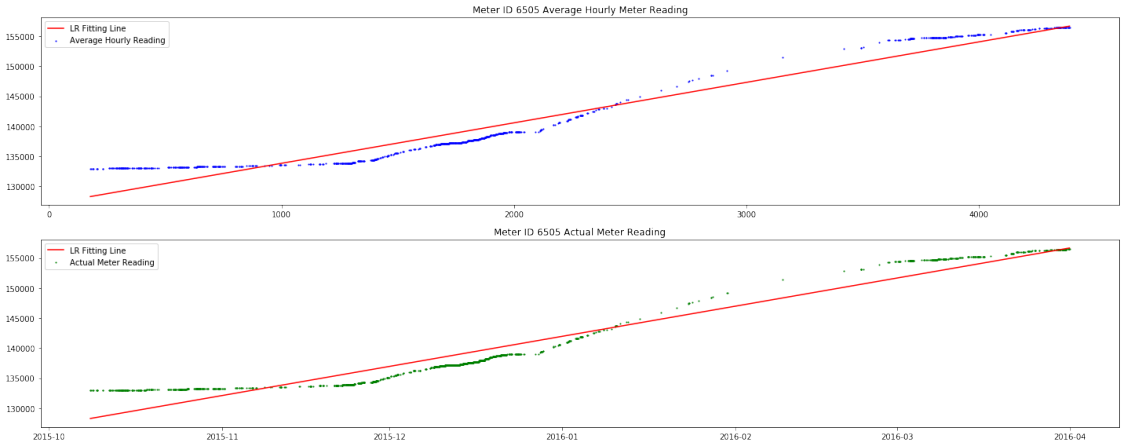


```
The accuracy score of fitting for meter ID 6505 is 0.9493657212616323
The next predicted average hourly reading for meter ID 6505 for the period
2016-04-01 00:00:00 to 01:00:00 is 156676.95291442244
The average hourly consumption for meter ID 6505 is 6.735362242907286
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```

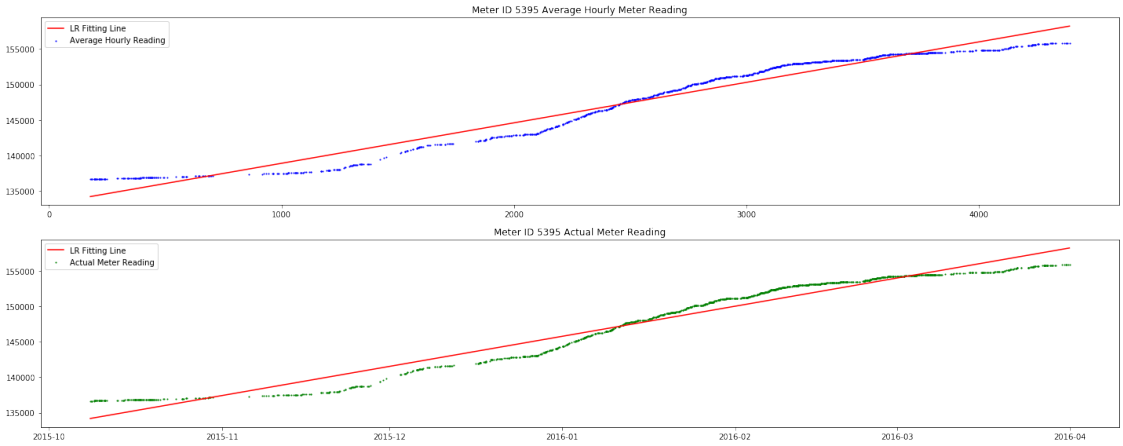


```
The accuracy score of fitting for meter ID 5395 is 0.9597912061504056
The next predicted average hourly reading for meter ID 5395 for the period
2016-04-01 00:00:00 to 01:00:00 is 158239.6610825031
The average hourly consumption for meter ID 5395 is 5.706901698024012
--------------------------------------------------------------------------------
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```


```
The accuracy score of fitting for meter ID 8059 is 0.9481746572946578
The next predicted average hourly reading for meter ID 8059 for the period
2016-04-01 00:00:00 to 01:00:00 is 114995.64680374238
The average hourly consumption for meter ID 8059 is 3.6700158851454034
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```


```
The accuracy score of fitting for meter ID 7965 is 0.9913334596594513
The next predicted average hourly reading for meter ID 7965 for the period
2016-04-01 00:00:00 to 01:00:00 is 192943.91079652408
The average hourly consumption for meter ID 7965 is 4.807667788059916
--------------------------------------------------------------------------------
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```


```
The accuracy score of fitting for meter ID 44 is 0.9752100419003704
The next predicted average hourly reading for meter ID 44 for the period
2016-04-01 00:00:00 to 01:00:00 is 176366.58604628805
The average hourly consumption for meter ID 44 is 2.7798459329933394
--------------------------------------------------------------------------------
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```

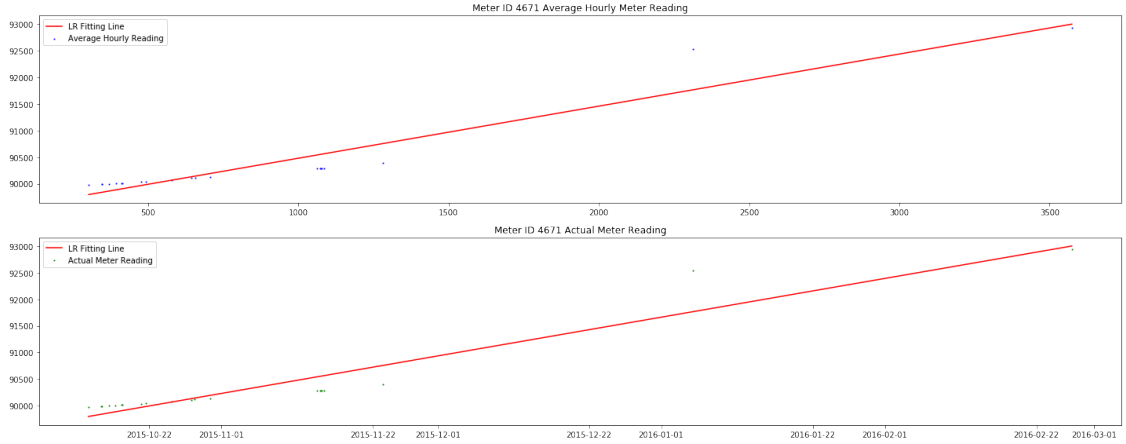


```
The accuracy score of fitting for meter ID 4671 is 0.9037662871082788
The next predicted average hourly reading for meter ID 4671 for the period
2016-04-01 00:00:00 to 01:00:00 is 93802.81240943684
The average hourly consumption for meter ID 4671 is 0.9794320209766738
--------------------------------------------------------------------------------
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```
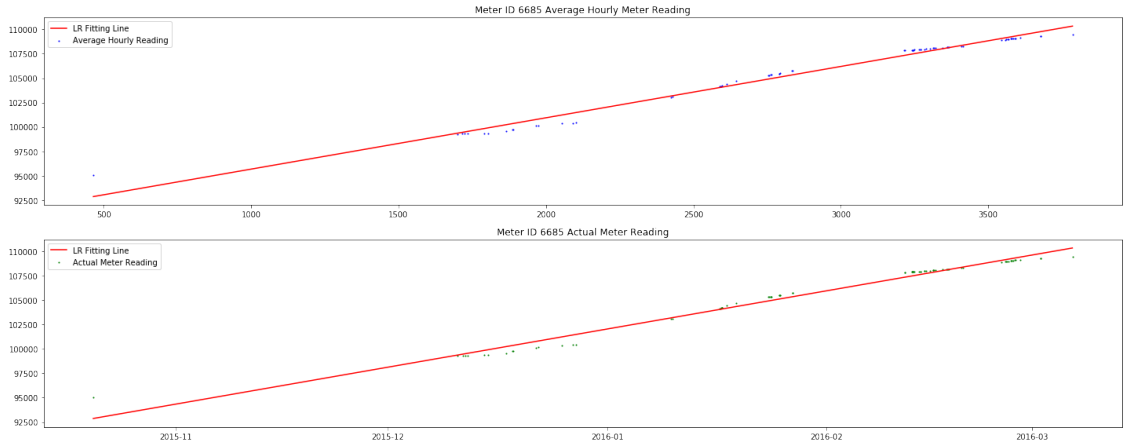
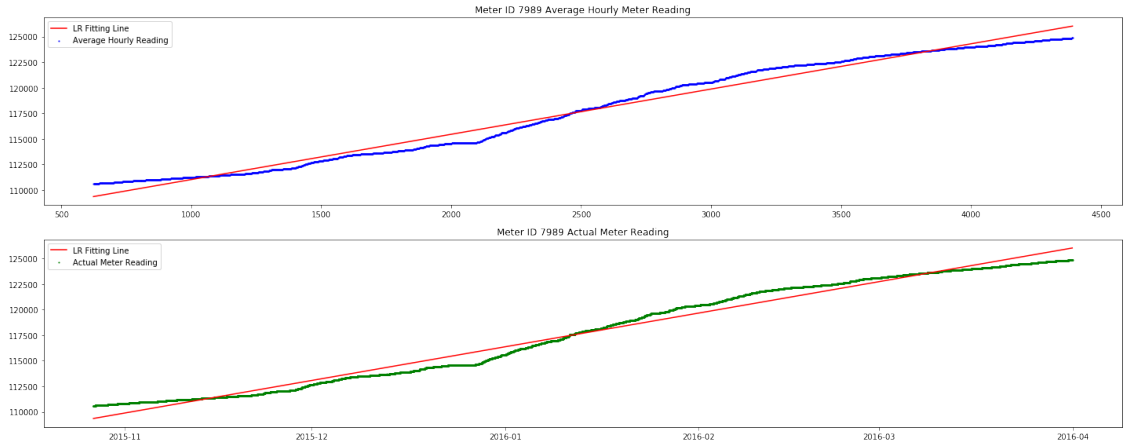
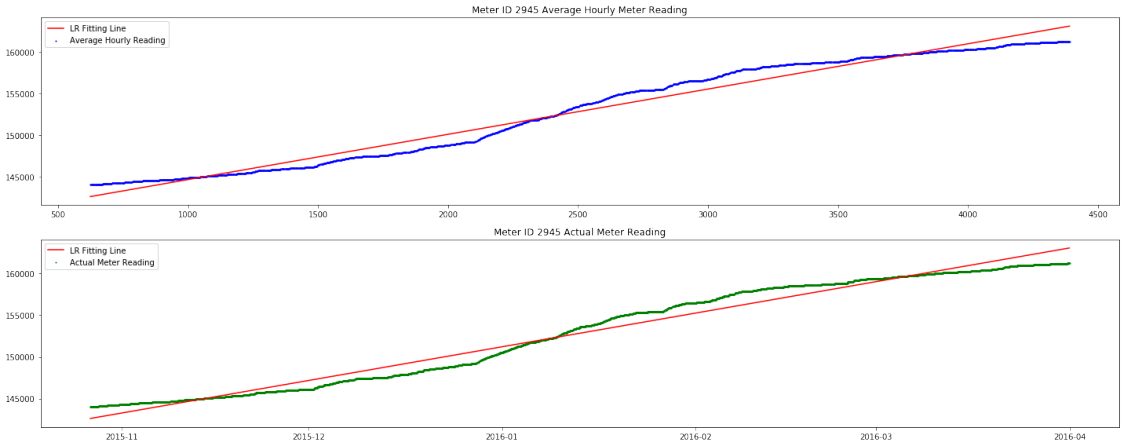



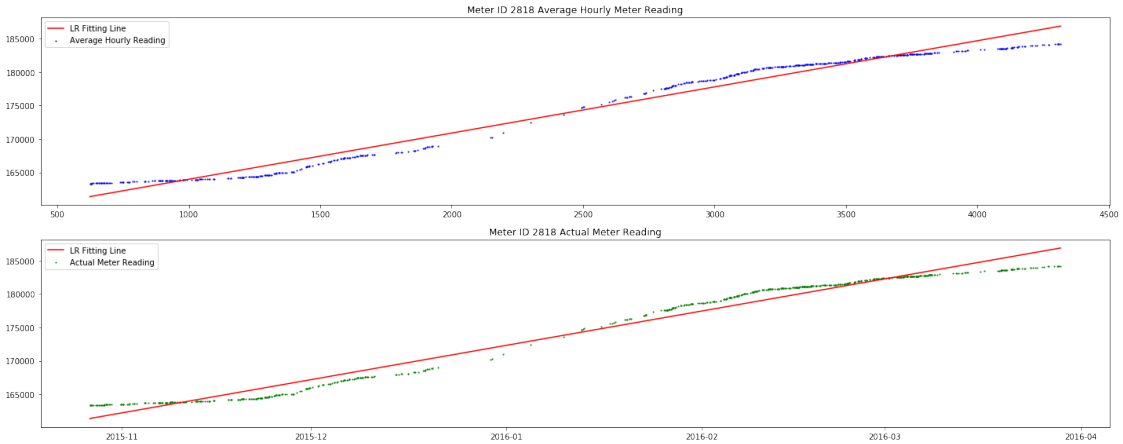
The accuracy score of fitting for meter ID 6685 is 0.9832685277476394
The next predicted average hourly reading for meter ID 6685 for the period 2016-04-01 00:00:00 to 01:00:00 is 113512.27313431974
The average hourly consumption for meter ID 6685 is 5.256397490942618



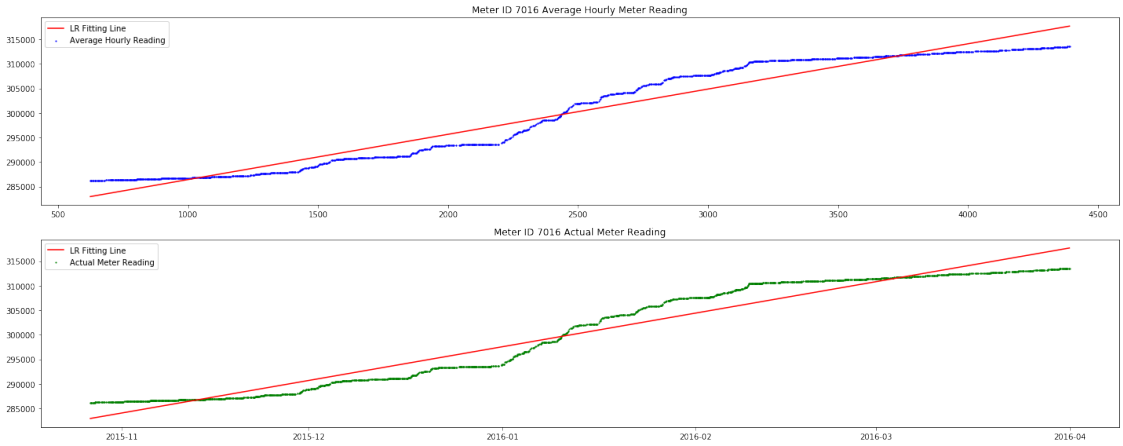
The accuracy score of fitting for meter ID 7989 is 0.9821682405074511
The next predicted average hourly reading for meter ID 7989 for the period 2016-04-01 00:00:00 to 01:00:00 is 126029.09860412903
The average hourly consumption for meter ID 7989 is 4.4246675516915275



The accuracy score of fitting for meter ID 2945 is 0.9744892320310333
The next predicted average hourly reading for meter ID 2945 for the period 2016-04-01 00:00:00 to 01:00:00 is 163077.81034611142
The average hourly consumption for meter ID 2945 is 5.433362393989228



The accuracy score of fitting for meter ID 2818 is 0.9785029577783674
The next predicted average hourly reading for meter ID 2818 for the period 2016-04-01 00:00:00 to 01:00:00 is 187407.61830439302
The average hourly consumption for meter ID 2818 is 6.9084159905905835




```
The accuracy score of fitting for meter ID 7016 is 0.9519913051466524
The next predicted average hourly reading for meter ID 7016 for the period
2016-04-01 00:00:00 to 01:00:00 is 317687.6548389037
The average hourly consumption for meter ID 7016 is 9.21885378845036
--------------------------------------------------------------------------------
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```


```
The accuracy score of fitting for meter ID 8967 is 0.836708382919112
The next predicted average hourly reading for meter ID 8967 for the period
2016-04-01 00:00:00 to 01:00:00 is 188486.45072655217
The average hourly consumption for meter ID 8967 is 0.3603680633532349
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```

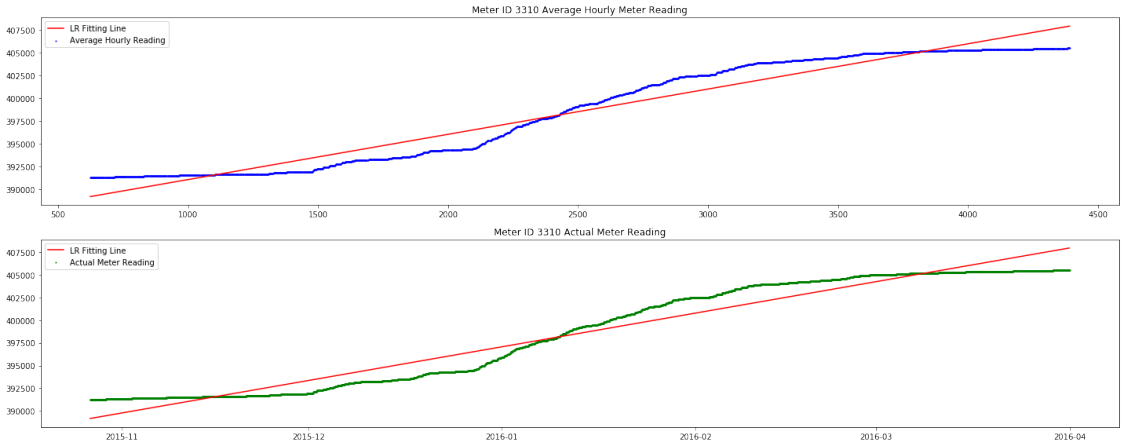


```
The accuracy score of fitting for meter ID 3310 is 0.9472961737093888
The next predicted average hourly reading for meter ID 3310 for the period
2016-04-01 00:00:00 to 01:00:00 is 407950.9016056607
The average hourly consumption for meter ID 3310 is 4.983263127156533
--------------------------------------------------------------------------------
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```

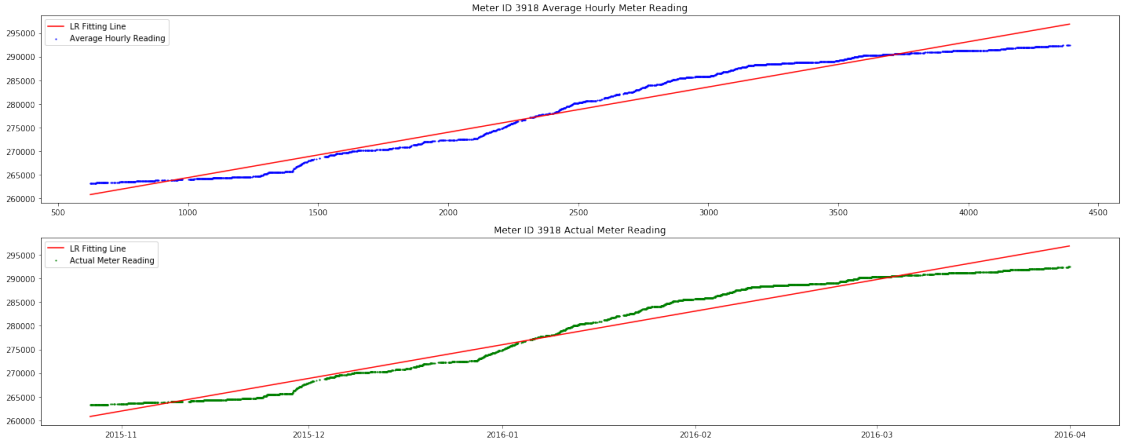


```
The accuracy score of fitting for meter ID 3918 is 0.9673368830594253
The next predicted average hourly reading for meter ID 3918 for the period
2016-04-01 00:00:00 to 01:00:00 is 296913.04736784566
The average hourly consumption for meter ID 3918 is 9.581420685572084
--------------------------------------------------------------------------------
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```
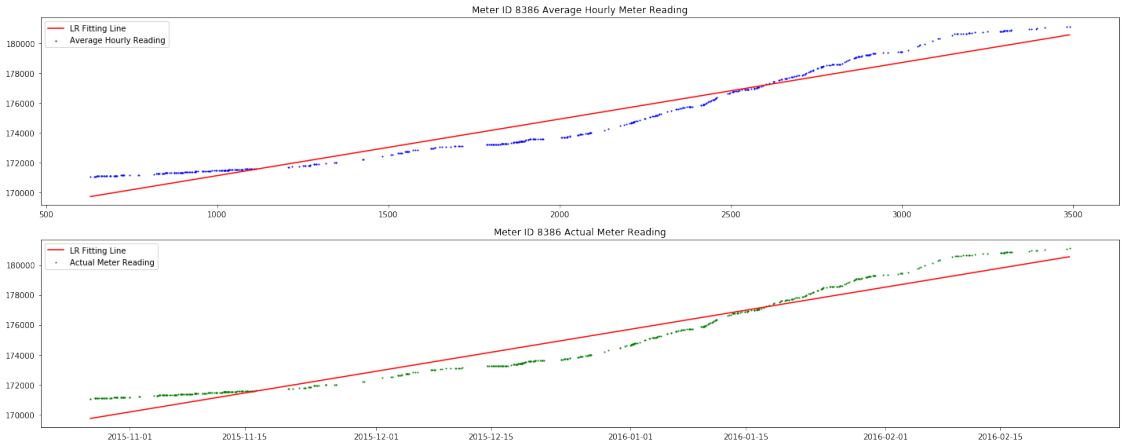
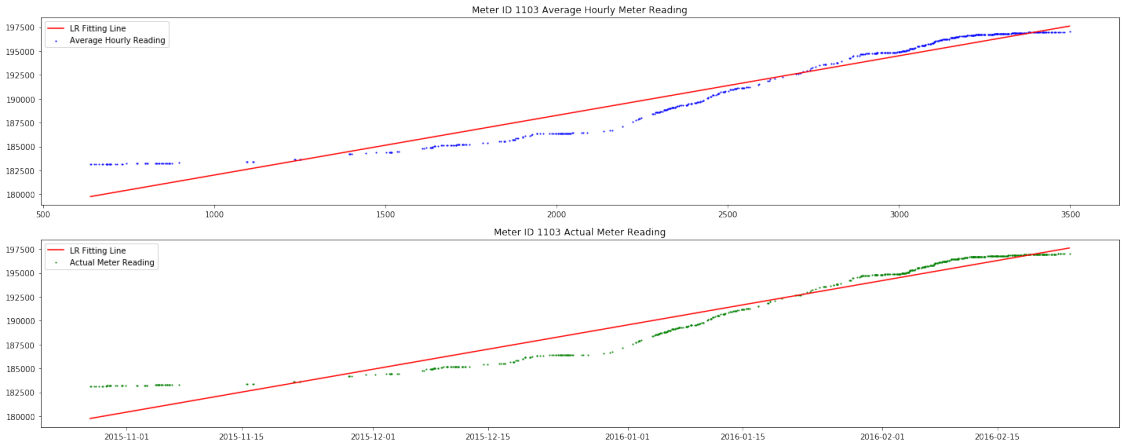




```
The accuracy score of fitting for meter ID 8386 is 0.9359248325879136
The next predicted average hourly reading for meter ID 8386 for the period
2016-04-01 00:00:00 to 01:00:00 is 183974.47948631868
The average hourly consumption for meter ID 8386 is 3.785331065679202
--------------------------------------------------------------------------------
------------------------------
```




```
The accuracy score of fitting for meter ID 1103 is 0.9410037030970796
The next predicted average hourly reading for meter ID 1103 for the period
2016-04-01 00:00:00 to 01:00:00 is 203190.08737064395
The average hourly consumption for meter ID 1103 is 6.2413899503008
--------------------------------------------------------------------------------
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```

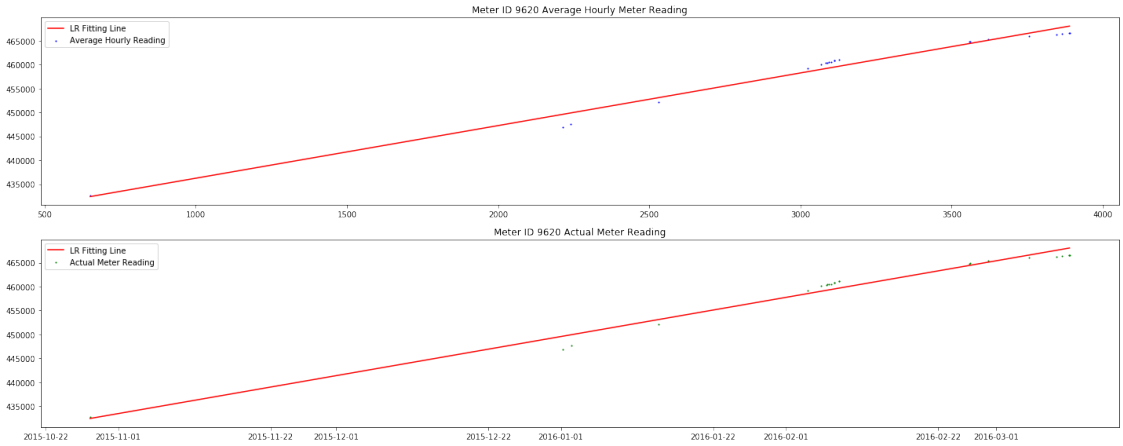


```
The accuracy score of fitting for meter ID 9620 is 0.9754210594988072
The next predicted average hourly reading for meter ID 9620 for the period
2016-04-01 00:00:00 to 01:00:00 is 473628.26585602824
The average hourly consumption for meter ID 9620 is 11.021704906772356
--------------------------------------------------------------------------------
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```
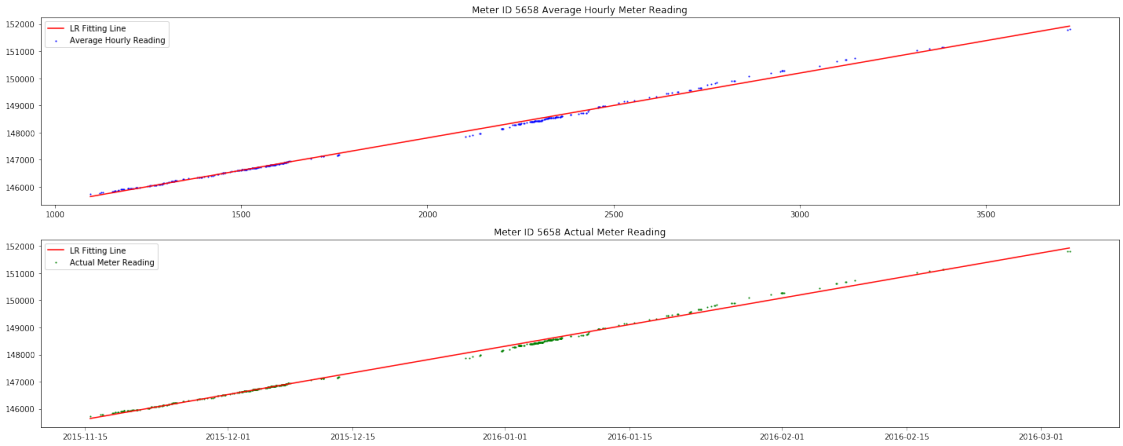
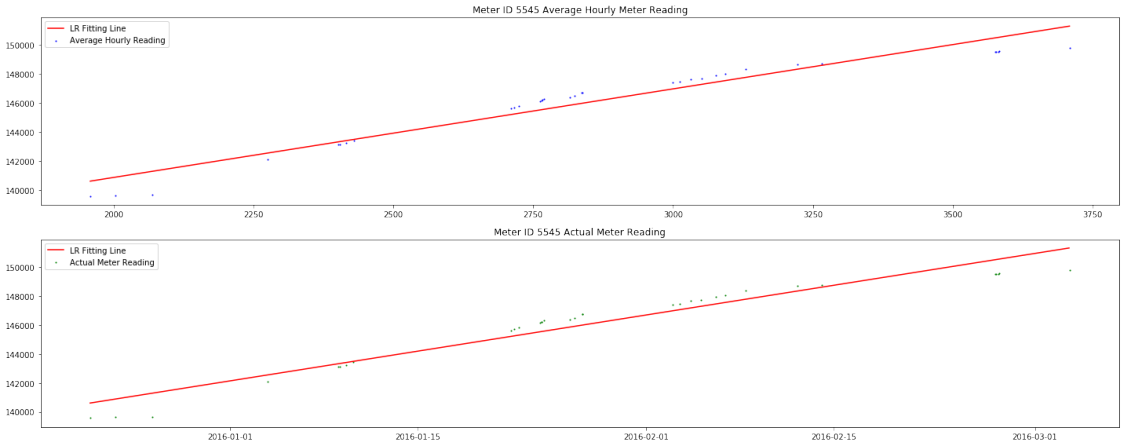




```
The accuracy score of fitting for meter ID 5658 is 0.9973744965101595
The next predicted average hourly reading for meter ID 5658 for the period
2016-04-01 00:00:00 to 01:00:00 is 153518.25953324736
The average hourly consumption for meter ID 5658 is 2.388262446213048
--------------------------------------------------------------------------------
------------------------------
```




```
The accuracy score of fitting for meter ID 5545 is 0.9347234194105742
The next predicted average hourly reading for meter ID 5545 for the period
2016-04-01 00:00:00 to 01:00:00 is 155485.2581725257
The average hourly consumption for meter ID 5545 is 6.109923223062651
--------------------------------------------------------------------------------
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```

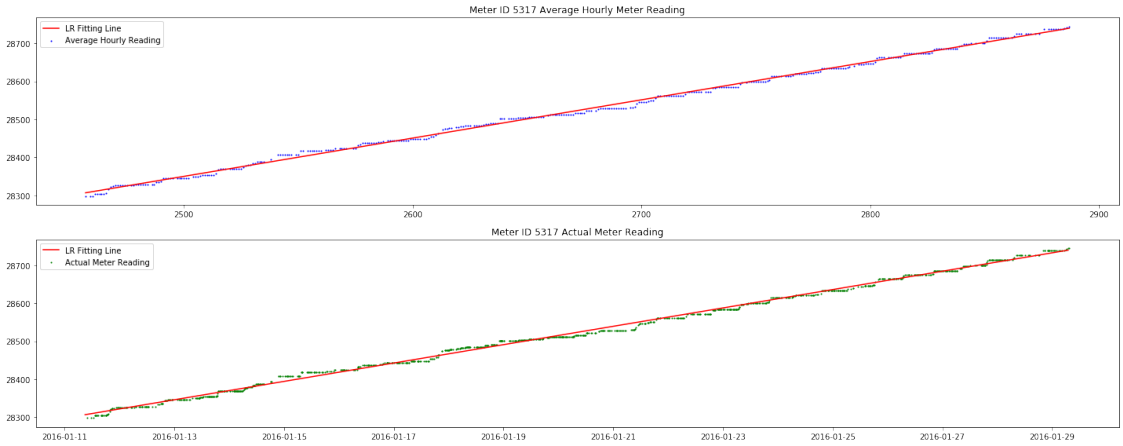


```
The accuracy score of fitting for meter ID 5317 is 0.9975267501239515
The next predicted average hourly reading for meter ID 5317 for the period
2016-04-01 00:00:00 to 01:00:00 is 30254.44385506263
The average hourly consumption for meter ID 5317 is 1.006563552437001
--------------------------------------------------------------------------------
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```

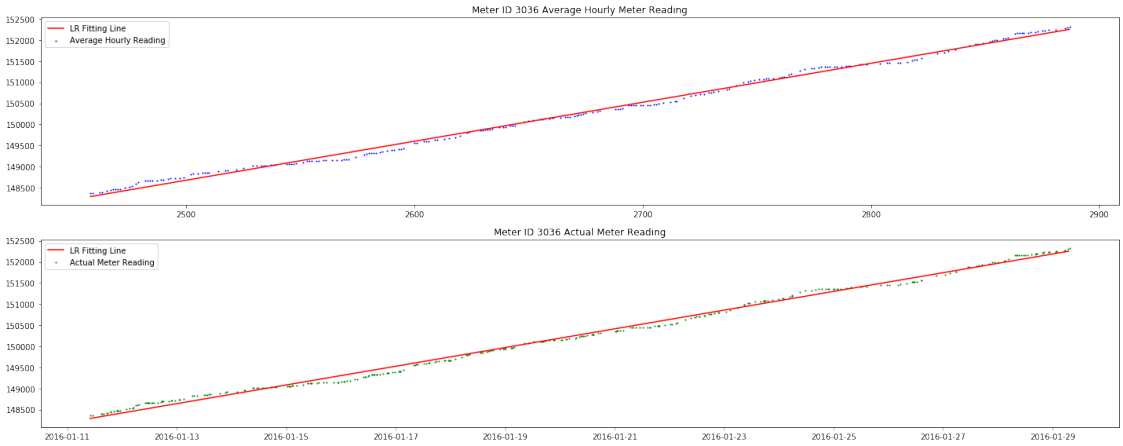


```
The accuracy score of fitting for meter ID 3036 is 0.9956048972504471
The next predicted average hourly reading for meter ID 3036 for the period
2016-04-01 00:00:00 to 01:00:00 is 166148.93964945665
The average hourly consumption for meter ID 3036 is 9.23400544852484
--------------------------------------------------------------------------------
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```

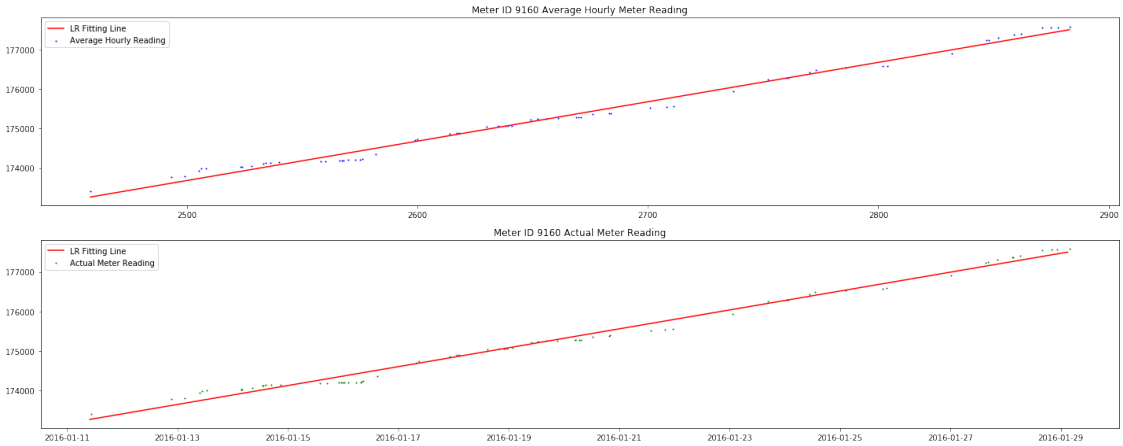


```
The accuracy score of fitting for meter ID 9160 is 0.9896249327011938
The next predicted average hourly reading for meter ID 9160 for the period
2016-04-01 00:00:00 to 01:00:00 is 192530.69615193806
The average hourly consumption for meter ID 9160 is 9.959059843909927
--------------------------------------------------------------------------------
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```

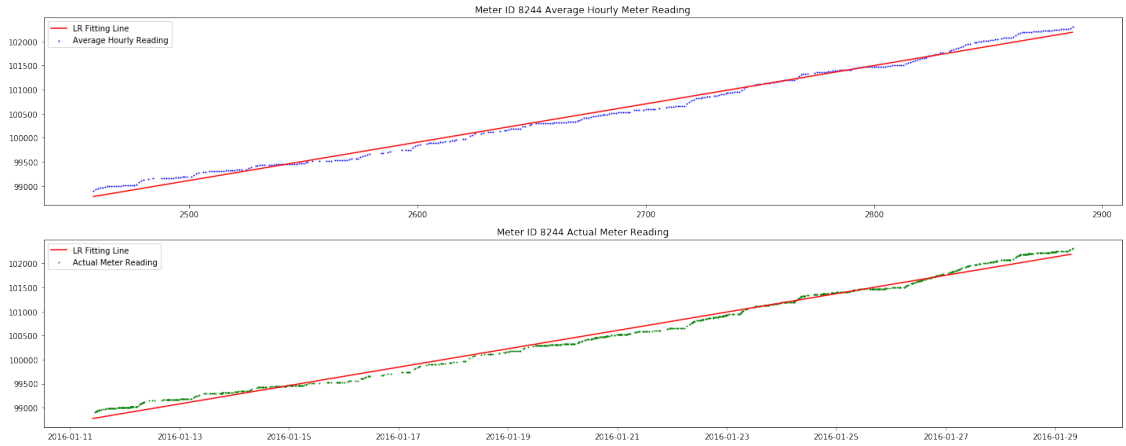


```
The accuracy score of fitting for meter ID 8244 is 0.991933418755657
The next predicted average hourly reading for meter ID 8244 for the period
2016-04-01 00:00:00 to 01:00:00 is 114159.40405031349
The average hourly consumption for meter ID 8244 is 7.953170957363909
--------------------------------------------------------------------------------
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```

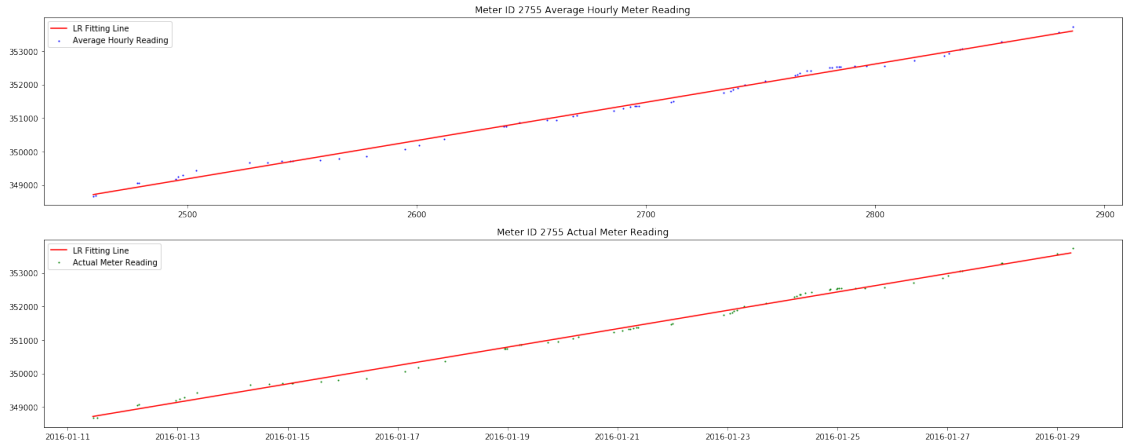


```
The accuracy score of fitting for meter ID 2755 is 0.9947963350171705
The next predicted average hourly reading for meter ID 2755 for the period
2016-04-01 00:00:00 to 01:00:00 is 370807.38959356304
The average hourly consumption for meter ID 2755 is 11.428274748439435
--------------------------------------------------------------------------------
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```

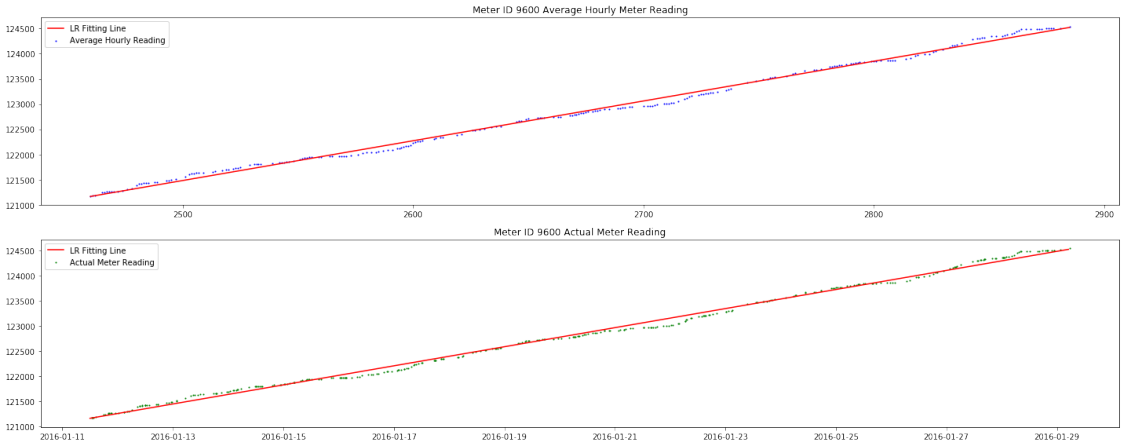


```
The accuracy score of fitting for meter ID 9600 is 0.99608093737579
The next predicted average hourly reading for meter ID 9600 for the period
2016-04-01 00:00:00 to 01:00:00 is 136424.29994792922
The average hourly consumption for meter ID 9600 is 7.897490664356155
--------------------------------------------------------------------------------
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```

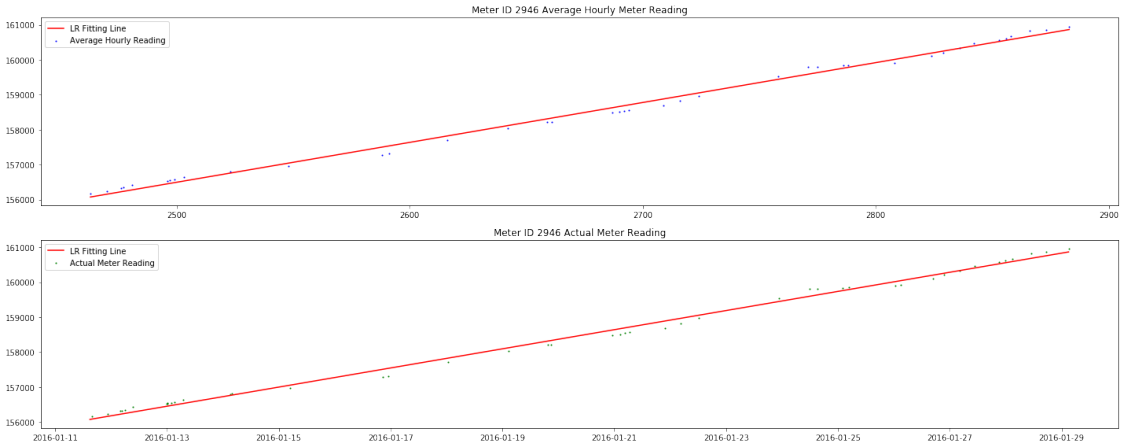


```
The accuracy score of fitting for meter ID 2946 is 0.9943910348137527
The next predicted average hourly reading for meter ID 2946 for the period
2016-04-01 00:00:00 to 01:00:00 is 178084.60196681658
The average hourly consumption for meter ID 2946 is 11.409925291140098
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```

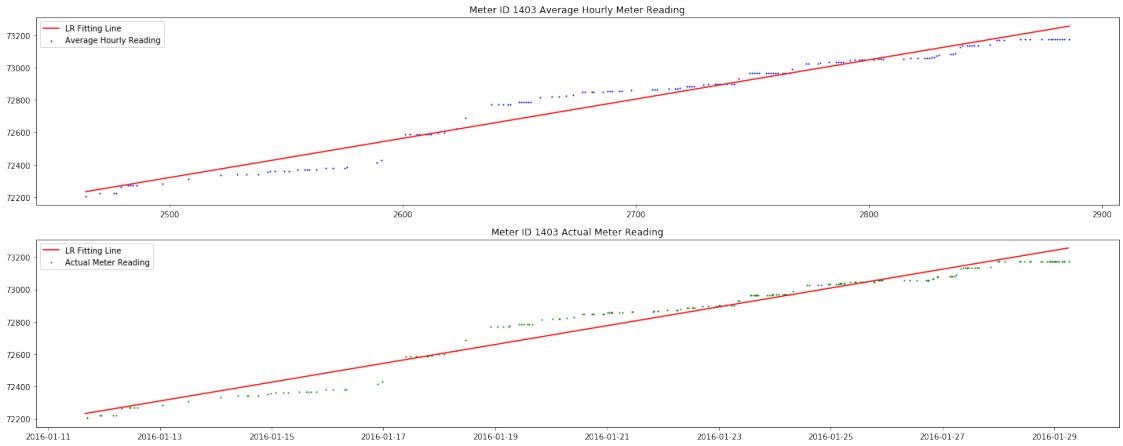


```
The accuracy score of fitting for meter ID 1403 is 0.959863800774555
The next predicted average hourly reading for meter ID 1403 for the period
2016-04-01 00:00:00 to 01:00:00 is 76902.41569602289
The average hourly consumption for meter ID 1403 is 2.421584813957452
--------------------------------------------------------------------------------
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```

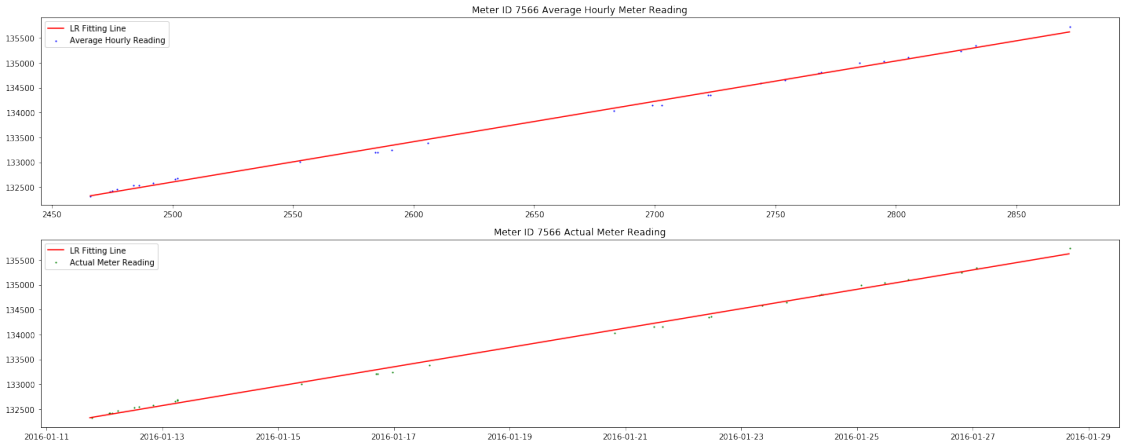


```
The accuracy score of fitting for meter ID 7566 is 0.9972442441039325
The next predicted average hourly reading for meter ID 7566 for the period
2016-04-01 00:00:00 to 01:00:00 is 147959.51882894934
The average hourly consumption for meter ID 7566 is 8.117843233339954
--------------------------------------------------------------------------------
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```

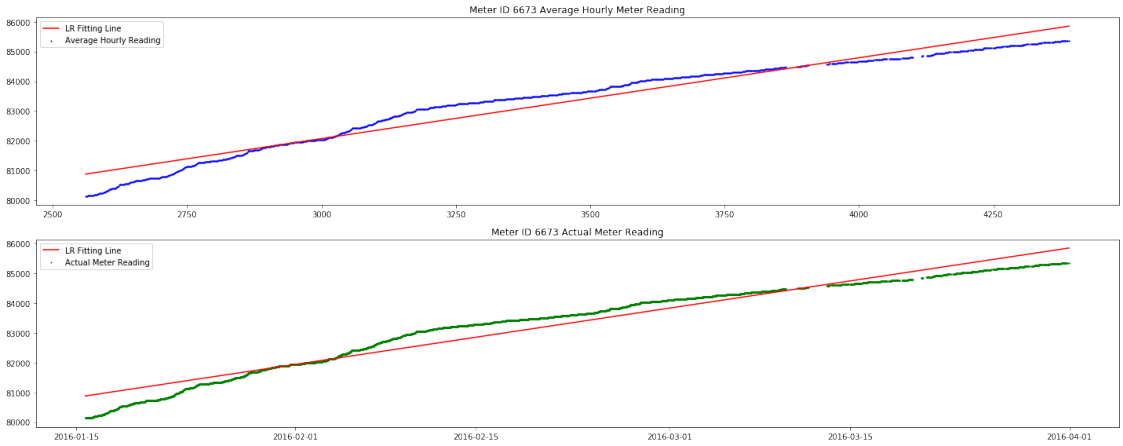


```
The accuracy score of fitting for meter ID 6673 is 0.9513405199612599
The next predicted average hourly reading for meter ID 6673 for the period
2016-04-01 00:00:00 to 01:00:00 is 85858.45425574416
The average hourly consumption for meter ID 6673 is 2.718699524688418
--------------------------------------------------------------------------------
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```

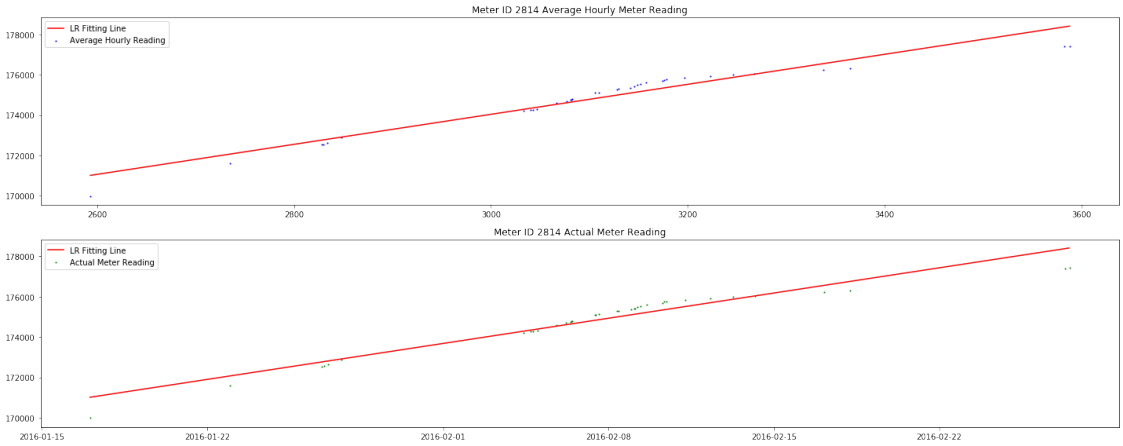


```
The accuracy score of fitting for meter ID 2814 is 0.9360377315282905
The next predicted average hourly reading for meter ID 2814 for the period
2016-04-01 00:00:00 to 01:00:00 is 184384.91140108707
The average hourly consumption for meter ID 2814 is 7.431309221603442
--------------------------------------------------------------------------------
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```

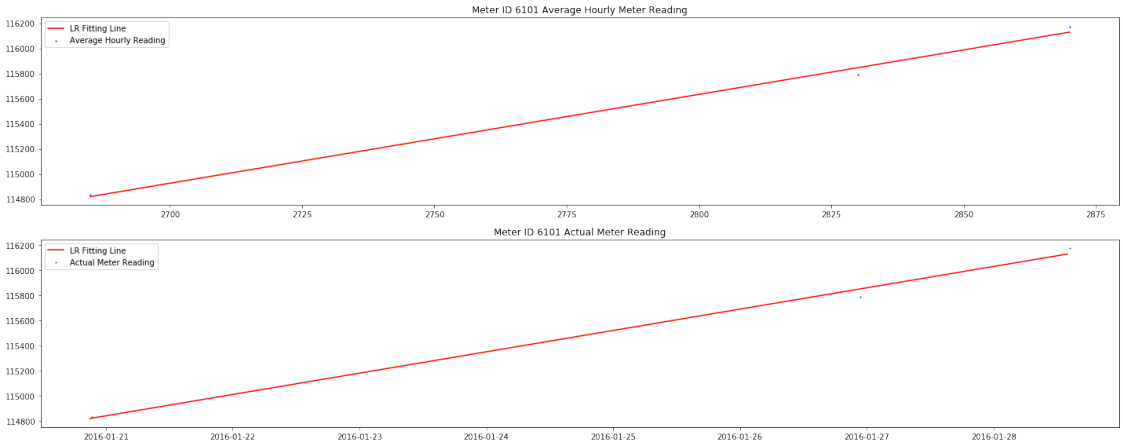


```
The accuracy score of fitting for meter ID 6101 is 0.9944513649608766
The next predicted average hourly reading for meter ID 6101 for the period
2016-04-01 00:00:00 to 01:00:00 is 126906.60650835533
The average hourly consumption for meter ID 6101 is 7.080738786287839
--------------------------------------------------------------------------------
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```
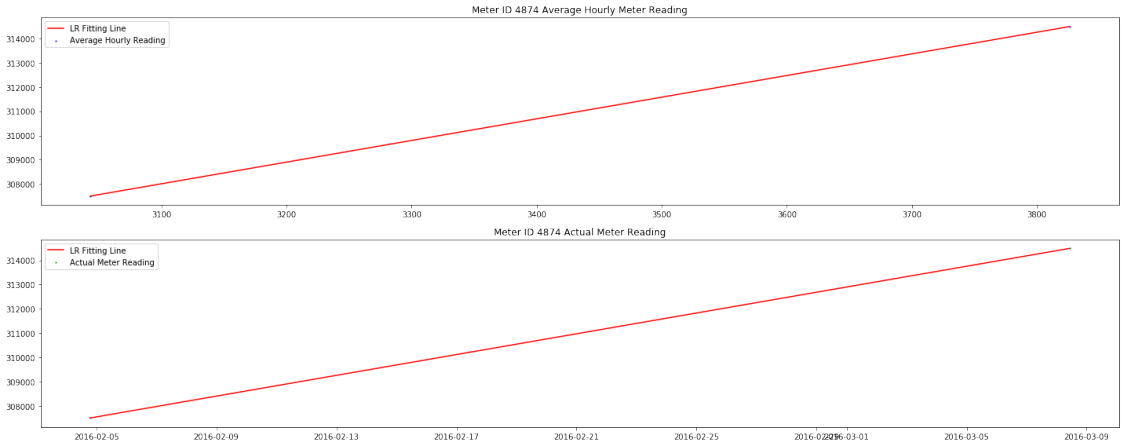
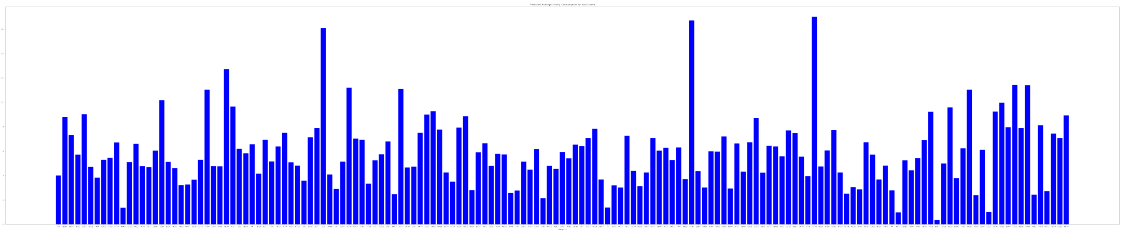




```
The accuracy score of fitting for meter ID 4874 is 1.0
The next predicted average hourly reading for meter ID 4874 for the period
2016-04-01 00:00:00 to 01:00:00 is 319537.9054916986
The average hourly consumption for meter ID 4874 is 8.922094508248847
--------------------------------------------------------------------------------
------------------------------
```

[19]:
```
# plot the predicted average hourly consumption for all homes

plt.figure(figsize=(100,20))
```

```
readingLst = [i for i in list(hour_dict.values())]
meterLst = [str(i) for i in list(hour_dict.keys())]
plt.bar(meterLst,readingLst,color="b",label="Predicted Average Hourly␣
 ↪Consumption for each home using Linear Regression")
plt.xlabel("Meter ID")
plt.ylabel("Predicted Average Hourly Consumption")
plt.title("Predicted Average Hourly Consumption for each home")
```

[19]: `Text(0.5, 1.0, 'Predicted Average Hourly Consumption for each home')`



```
print("The total predicted hourly average consumption by using linear␣
 ↪regression that the gas company needs to supply is {}".
 ↪format(sum(readingLst)))
```

```
The total predicted hourly average consumption by using linear regression that
the gas company needs to supply is 932.7670550898765
```

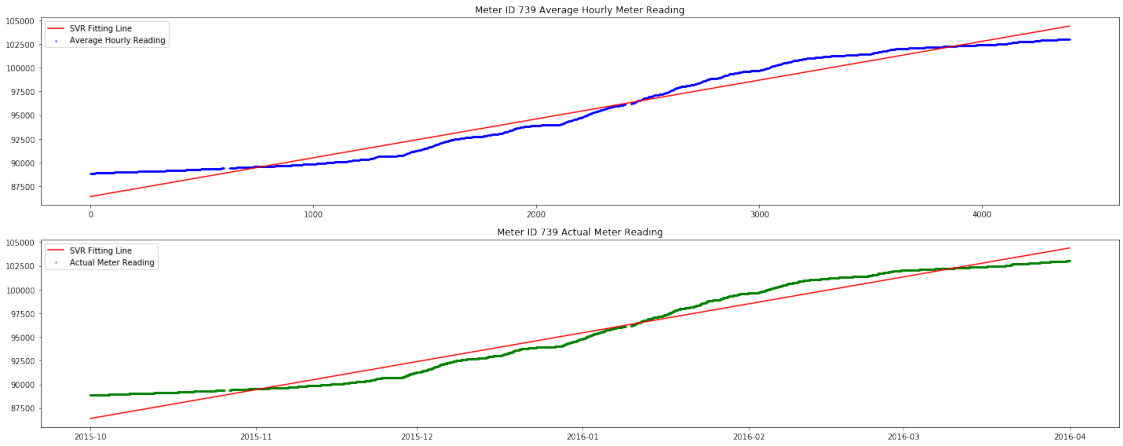
6.6 Question 2.3

Do the same as Question 2.2 above but use support vector regression (SVR).

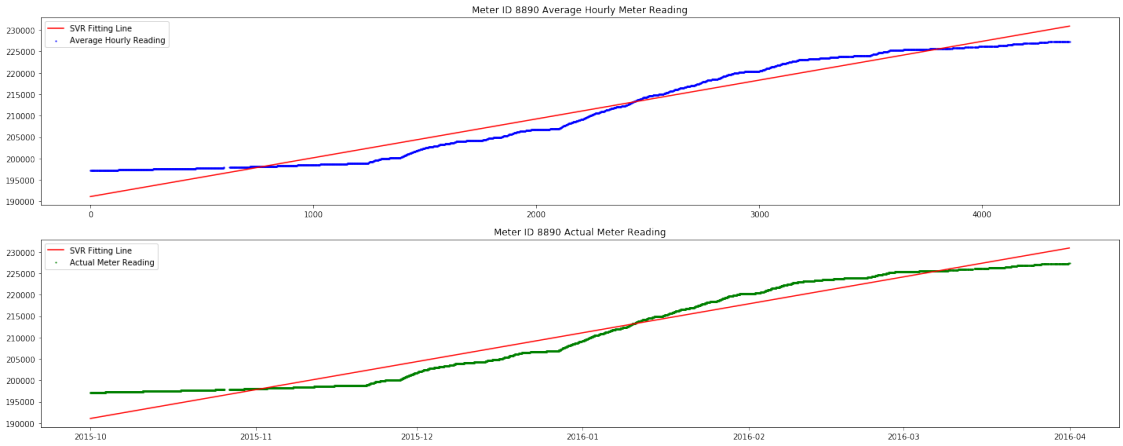
In this problem, we use linear kernel for for the support vector regression in order to compare with the previous linear regression

```
# build the model and do the prediction using support vector regression

time_arr = []
start_time = pd.Timestamp(year=2015, month=10, day=1, hour=0)

for i in range(4392):
    time_arr.append(start_time + pd.Timedelta(hours=i))

hour_dict = {}

for key in df:
    svm = SVR(kernel="linear").fit(np.array(df[key].dropna().index).
 ↪reshape(-1,1), df[key].dropna())

    time_arr0 = time_arr
```

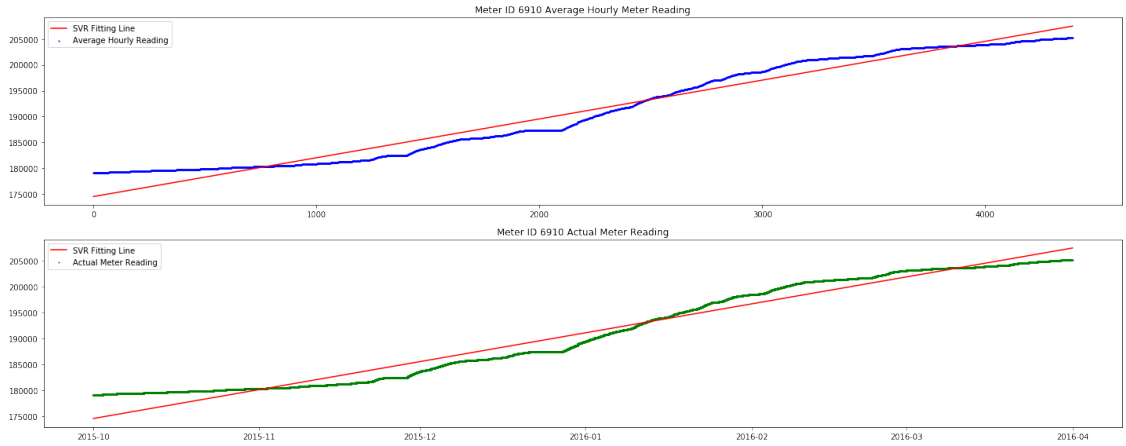
```
    index = df[key].index[df[key].apply(np.isnan)]
    index = list(index)
    time_arr0 = np.delete(time_arr, index)

    fig, axs = plt.subplots(2, 1, figsize=(20,8))
    axs[0].plot(np.array(df[key].dropna().index).reshape(-1,1), \
             svm.predict(np.array(df[key].dropna().index).reshape(-1,1)),␣
↪color='r')
    axs[0].scatter(range(4392), df[key], color='b', s=1)
    axs[0].set_title("Meter ID {} Average Hourly Meter Reading".format(key))

    axs[1].plot(time_arr0, \
             svm.predict(np.array(df[key].dropna().index).reshape(-1,1)),␣
↪color='r')
    axs[1].scatter(dictMeter_clean[key]["localminute"],␣
↪dictMeter_clean[key]["meter_value"], color='g', s=1)
    axs[1].set_title("Meter ID {} Actual Meter Reading".format(key))

    plt.tight_layout()
    axs[0].legend(["SVR Fitting Line", "Average Hourly Reading"])
    axs[1].legend(["SVR Fitting Line", "Actual Meter Reading"])
    plt.show()
    print("The accuracy score of fitting for meter ID {} is {}"\
          .format(key, svm.score(np.array(df[key].dropna().index).
↪reshape(-1,1), df[key].dropna())))
    print("The next predicted average hourly reading for meter ID {} for the␣
↪period 2016-04-01 00:00:00 to 01:00:00 is {}"\
          .format(key, svm.predict(np.array([[4392]]))[0]))
    print("The average hourly consumption for meter ID {} is {}".format(key,␣
↪(svm.predict(np.array([[4393]]))-svm.predict(np.array([[4392]])))[0]))
  ␣
↪print("----------------------------------------------------------------------------------------

    hour_dict[key] = (svm.predict(np.array([[4393]]))-svm.predict(np.
↪array([[4392]])))[0]
```



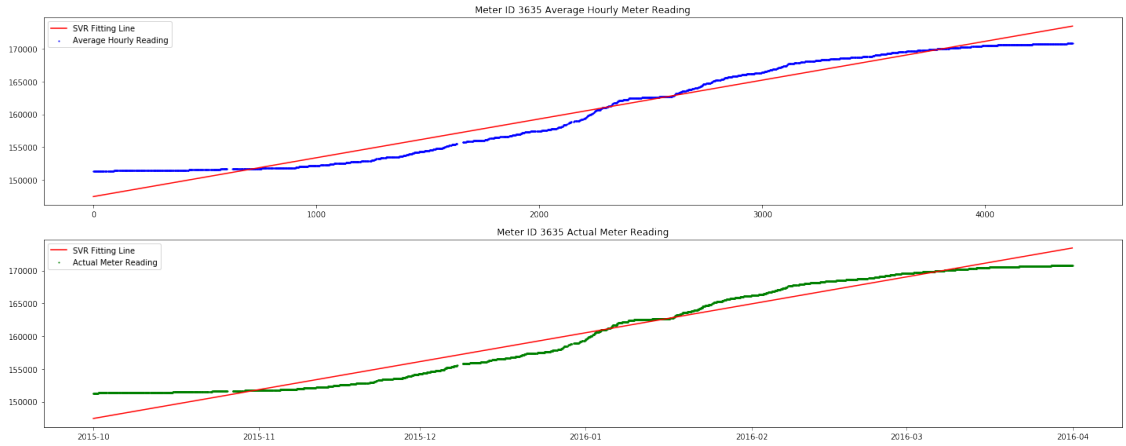
The accuracy score of fitting for meter ID 739 is 0.9645013398821167
The next predicted average hourly reading for meter ID 739 for the period 2016-04-01 00:00:00 to 01:00:00 is 104390.96168217706
The average hourly consumption for meter ID 739 is 4.095790863037109



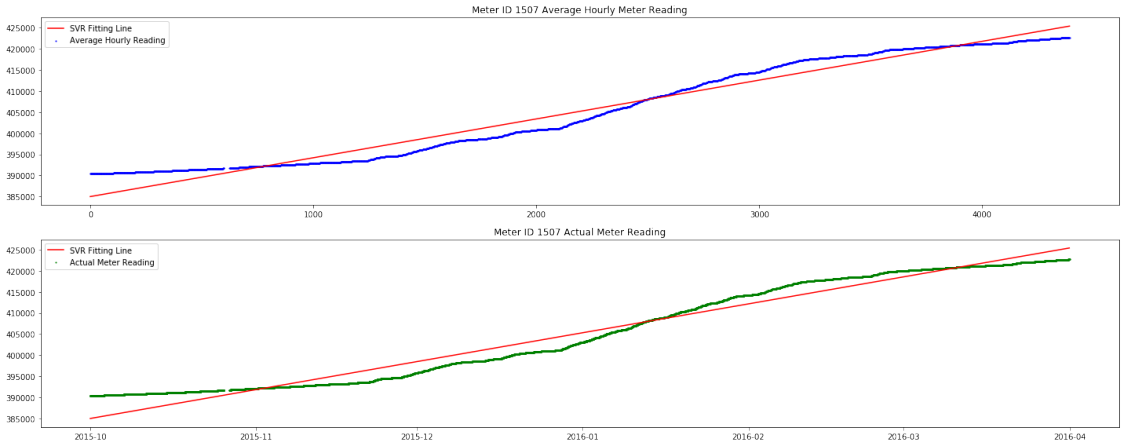
The accuracy score of fitting for meter ID 8890 is 0.9524174519397921
The next predicted average hourly reading for meter ID 8890 for the period 2016-04-01 00:00:00 to 01:00:00 is 230915.06391856214
The average hourly consumption for meter ID 8890 is 9.065238952636719



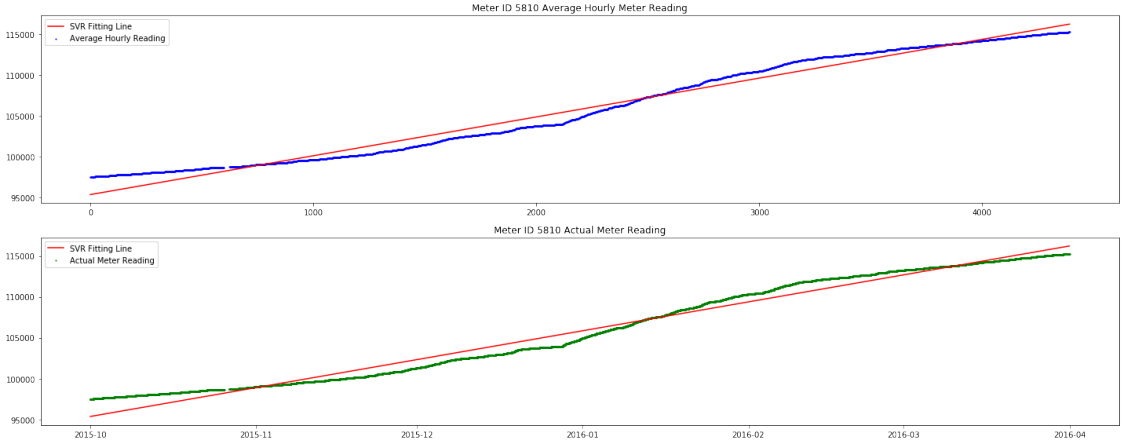
The accuracy score of fitting for meter ID 6910 is 0.9634516592059968
The next predicted average hourly reading for meter ID 6910 for the period 2016-04-01 00:00:00 to 01:00:00 is 207508.79242322006
The average hourly consumption for meter ID 6910 is 7.508733749389648



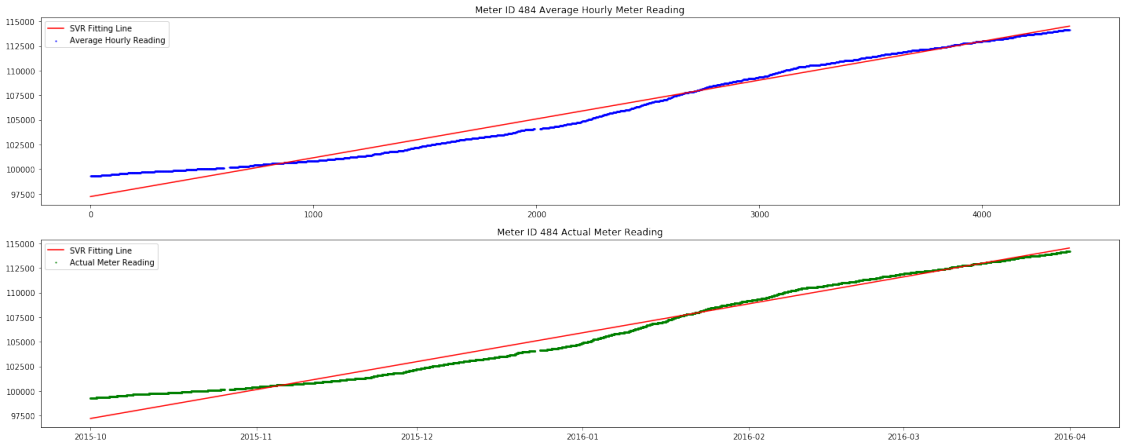
The accuracy score of fitting for meter ID 3635 is 0.958501794008241
The next predicted average hourly reading for meter ID 3635 for the period 2016-04-01 00:00:00 to 01:00:00 is 173451.1339698147
The average hourly consumption for meter ID 3635 is 5.920194625854492



The accuracy score of fitting for meter ID 1507 is 0.9639718759624063
The next predicted average hourly reading for meter ID 1507 for the period 2016-04-01 00:00:00 to 01:00:00 is 425422.0376407748
The average hourly consumption for meter ID 1507 is 9.208038330078125



The accuracy score of fitting for meter ID 5810 is 0.9778753262508689
The next predicted average hourly reading for meter ID 5810 for the period 2016-04-01 00:00:00 to 01:00:00 is 116233.8803257278
The average hourly consumption for meter ID 5810 is 4.752071380615234

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The accuracy score of fitting for meter ID 484 is 0.9767203953594925
The next predicted average hourly reading for meter ID 484 for the period
2016-04-01 00:00:00 to 01:00:00 is 114517.83557773214
The average hourly consumption for meter ID 484 is 3.9381370544433594
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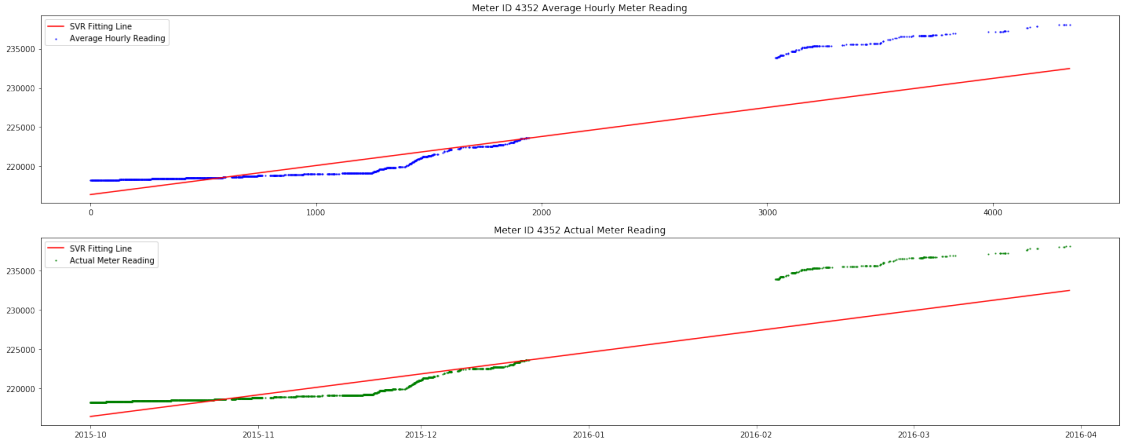


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The accuracy score of fitting for meter ID 4352 is 0.7931784797067262
The next predicted average hourly reading for meter ID 4352 for the period
2016-04-01 00:00:00 to 01:00:00 is 232668.2068471255
The average hourly consumption for meter ID 4352 is 3.7036871910095215
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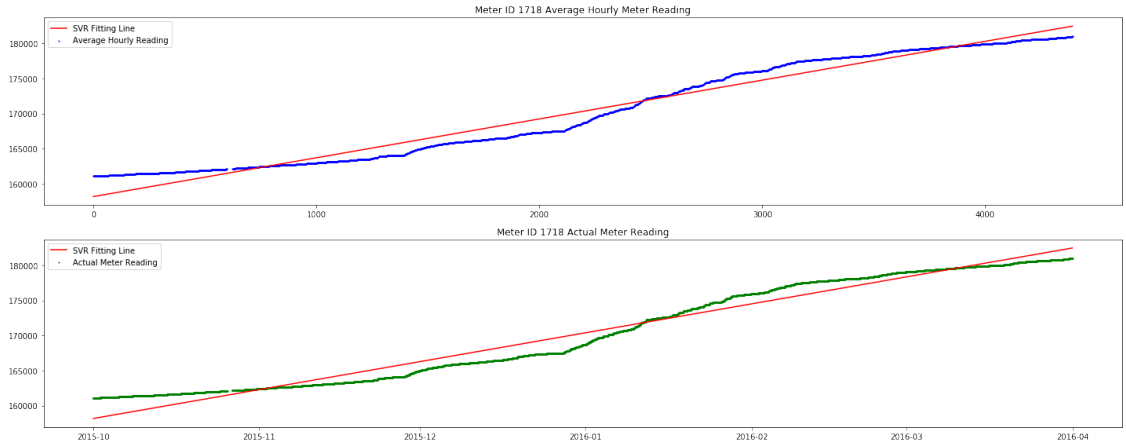


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The accuracy score of fitting for meter ID 1718 is 0.965854200925985
The next predicted average hourly reading for meter ID 1718 for the period
2016-04-01 00:00:00 to 01:00:00 is 182464.0521624377
The average hourly consumption for meter ID 1718 is 5.530239105224609
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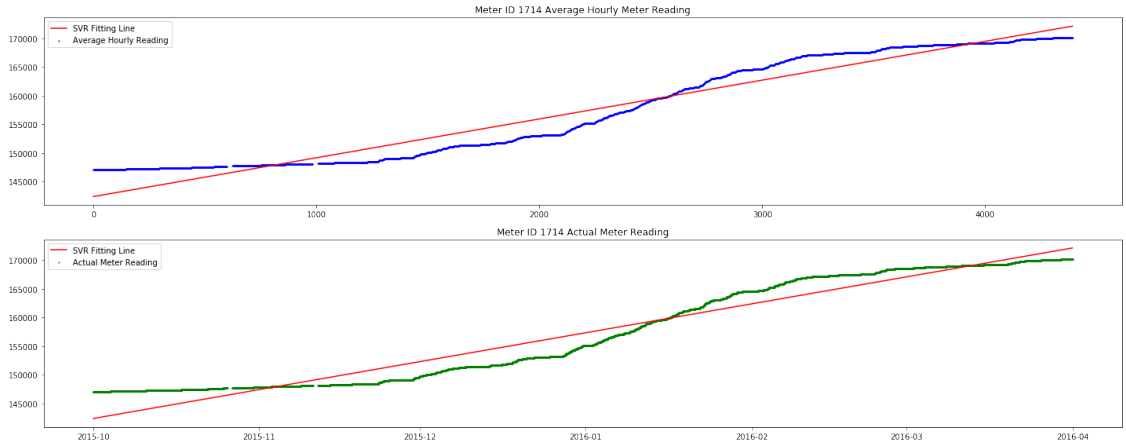


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The accuracy score of fitting for meter ID 1714 is 0.941411182919575
The next predicted average hourly reading for meter ID 1714 for the period
2016-04-01 00:00:00 to 01:00:00 is 172127.41539882688
The average hourly consumption for meter ID 1714 is 6.773741722106934
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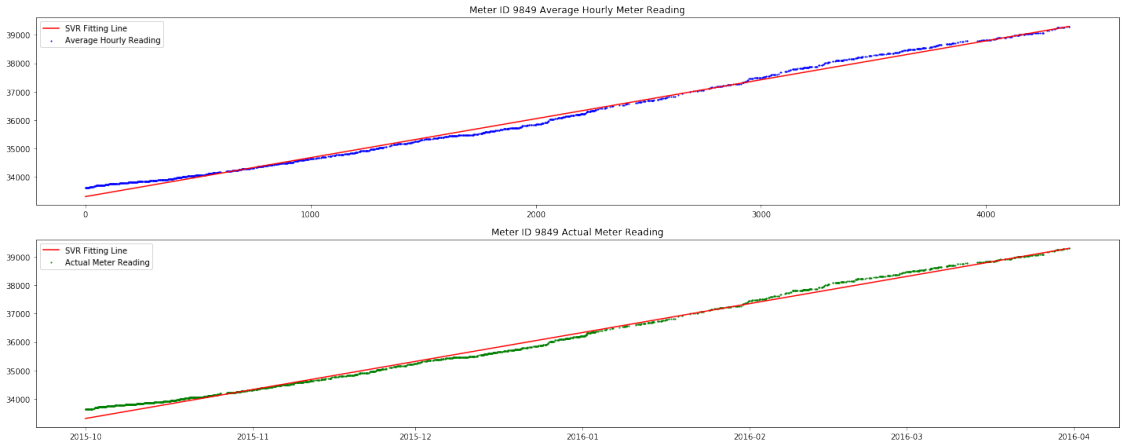
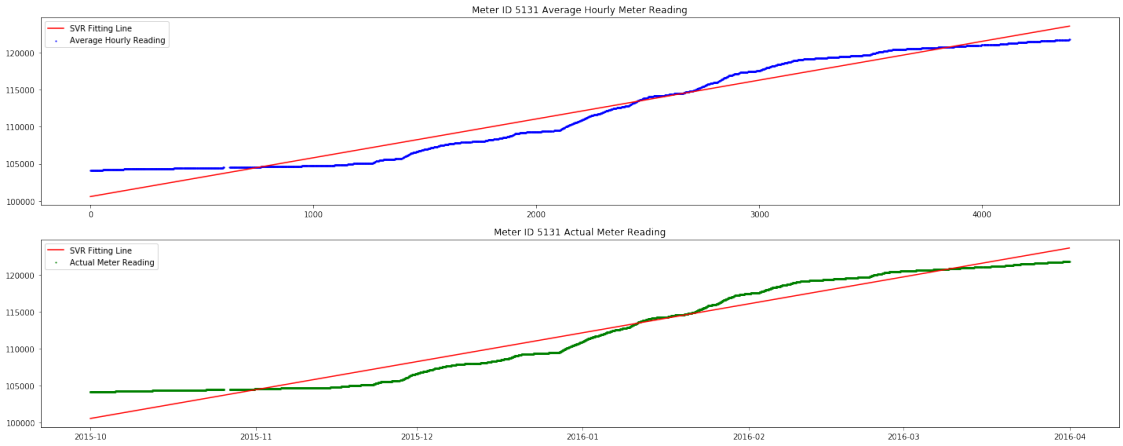
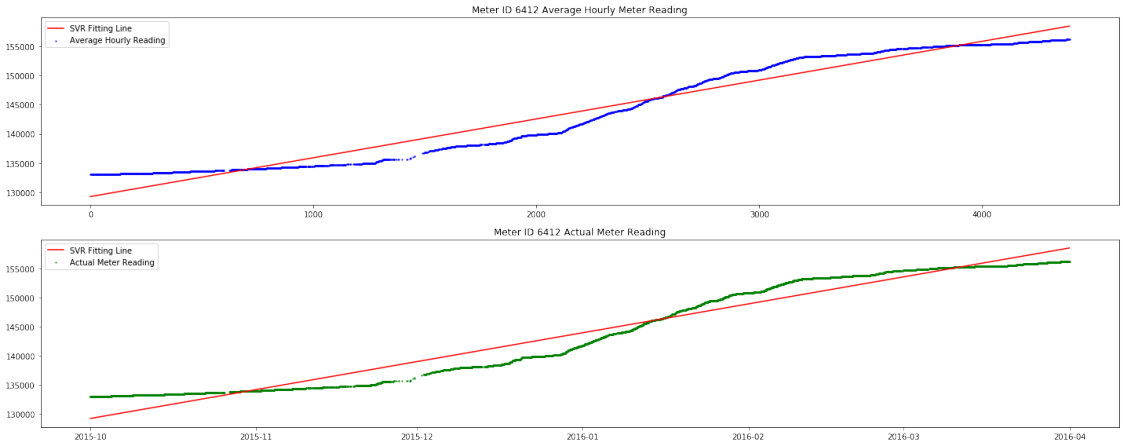


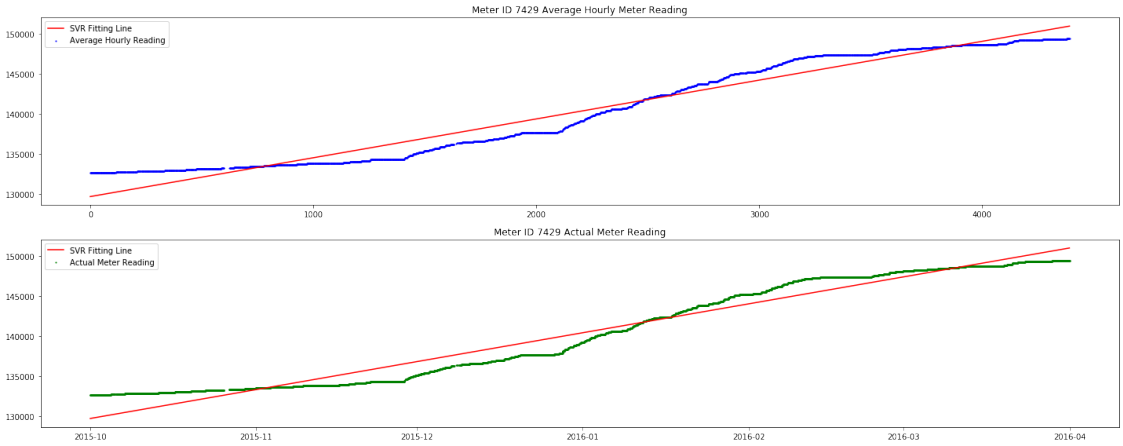
The accuracy score of fitting for meter ID 9849 is 0.993629382878019
The next predicted average hourly reading for meter ID 9849 for the period 2016-04-01 00:00:00 to 01:00:00 is 39327.14997712088
The average hourly consumption for meter ID 9849 is 1.3694686889648438



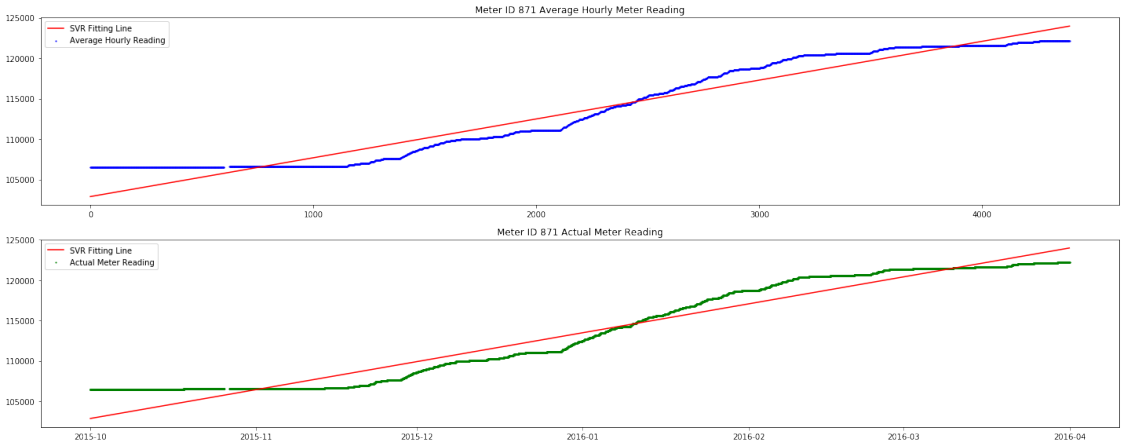
The accuracy score of fitting for meter ID 5131 is 0.9518115544373325
The next predicted average hourly reading for meter ID 5131 for the period 2016-04-01 00:00:00 to 01:00:00 is 123602.54794595981
The average hourly consumption for meter ID 5131 is 5.243293762207031



The accuracy score of fitting for meter ID 6412 is 0.9521130215571846
The next predicted average hourly reading for meter ID 6412 for the period 2016-04-01 00:00:00 to 01:00:00 is 158502.36968201832
The average hourly consumption for meter ID 6412 is 6.656610488891602



The accuracy score of fitting for meter ID 7429 is 0.9566108694394087
The next predicted average hourly reading for meter ID 7429 for the period 2016-04-01 00:00:00 to 01:00:00 is 150984.9329147935
The average hourly consumption for meter ID 7429 is 4.848243713378906

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The accuracy score of fitting for meter ID 871 is 0.9450170414250587
The next predicted average hourly reading for meter ID 871 for the period
2016-04-01 00:00:00 to 01:00:00 is 123974.22259137369
The average hourly consumption for meter ID 871 is 4.802143096923828
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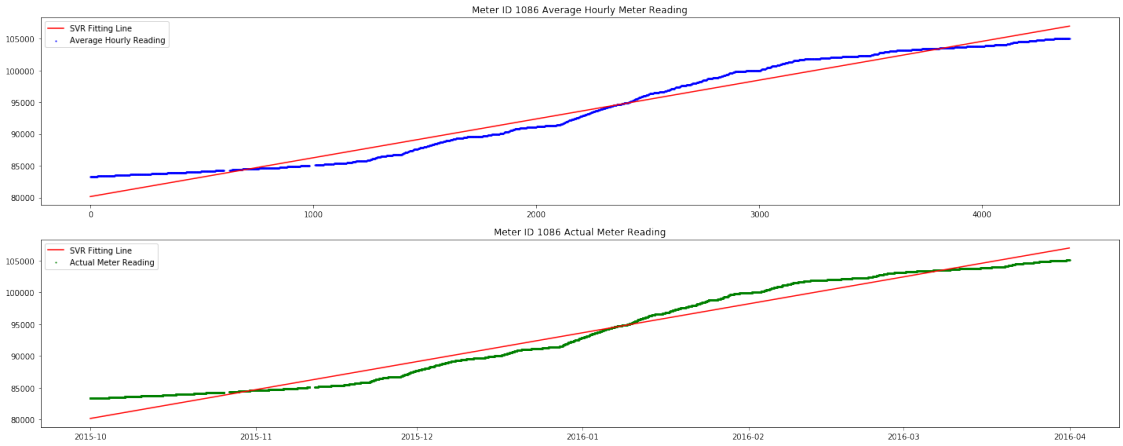


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The accuracy score of fitting for meter ID 1086 is 0.9692928517136318
The next predicted average hourly reading for meter ID 1086 for the period
2016-04-01 00:00:00 to 01:00:00 is 106990.65162425977
The average hourly consumption for meter ID 1086 is 6.110710144042969
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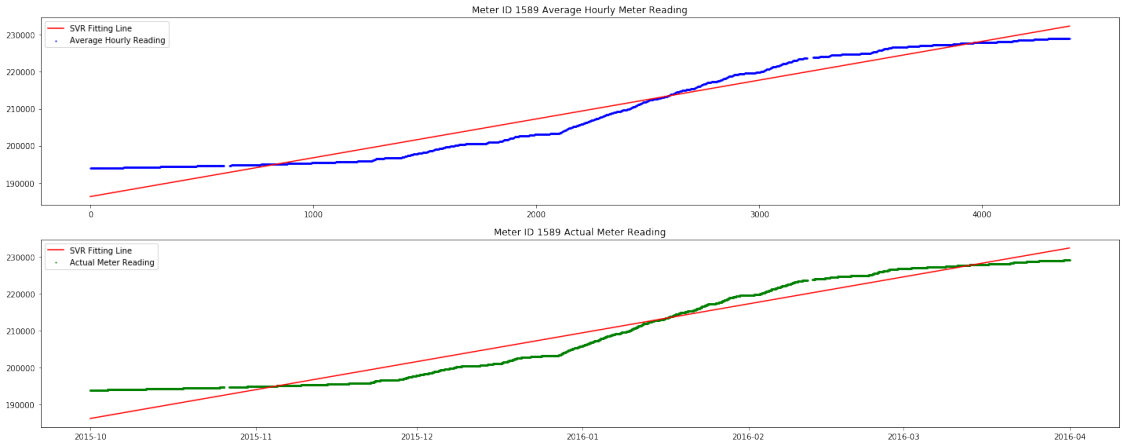
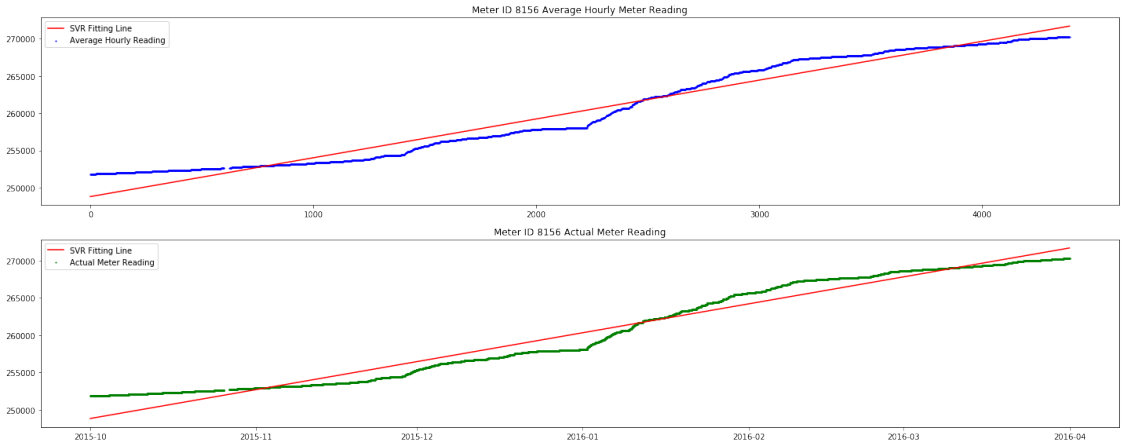
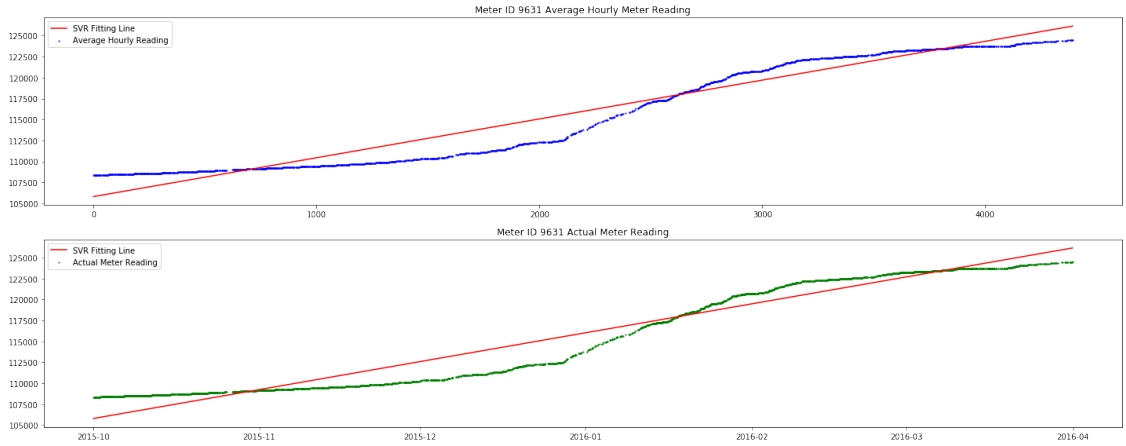


The accuracy score of fitting for meter ID 1589 is 0.9446490668744518
The next predicted average hourly reading for meter ID 1589 for the period 2016-04-01 00:00:00 to 01:00:00 is 232326.50695018802
The average hourly consumption for meter ID 1589 is 10.482259750366211



The accuracy score of fitting for meter ID 8156 is 0.9626493730516648
The next predicted average hourly reading for meter ID 8156 for the period 2016-04-01 00:00:00 to 01:00:00 is 271694.18959358695
The average hourly consumption for meter ID 8156 is 5.209249496459961




```
The accuracy score of fitting for meter ID 9631 is 0.9392069749124945
The next predicted average hourly reading for meter ID 9631 for the period
2016-04-01 00:00:00 to 01:00:00 is 126148.59072186961
The average hourly consumption for meter ID 9631 is 4.632796287536621
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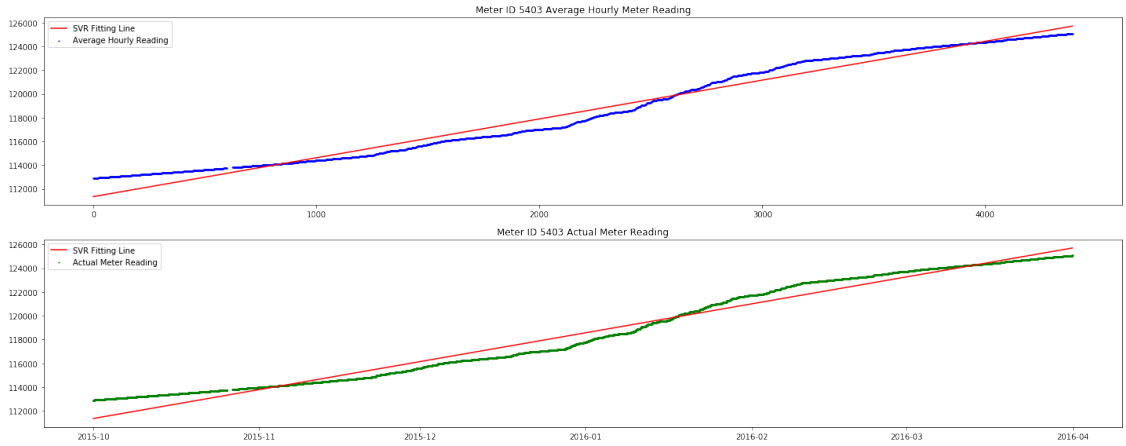


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The accuracy score of fitting for meter ID 5403 is 0.9746141172791625
The next predicted average hourly reading for meter ID 5403 for the period
2016-04-01 00:00:00 to 01:00:00 is 125705.13473510605
The average hourly consumption for meter ID 5403 is 3.2662811279296875
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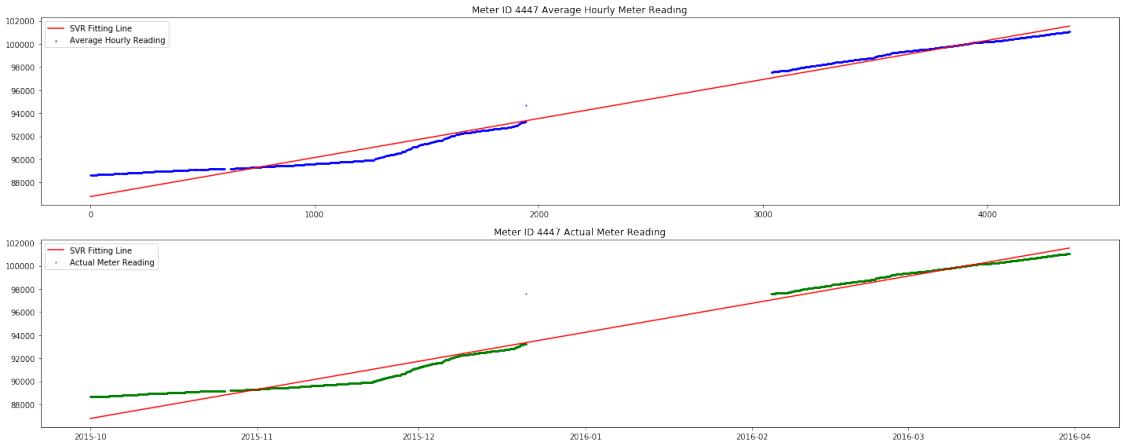


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The accuracy score of fitting for meter ID 4447 is 0.9803064164660741
The next predicted average hourly reading for meter ID 4447 for the period
2016-04-01 00:00:00 to 01:00:00 is 101628.1742422666
The average hourly consumption for meter ID 4447 is 3.3823232650756836
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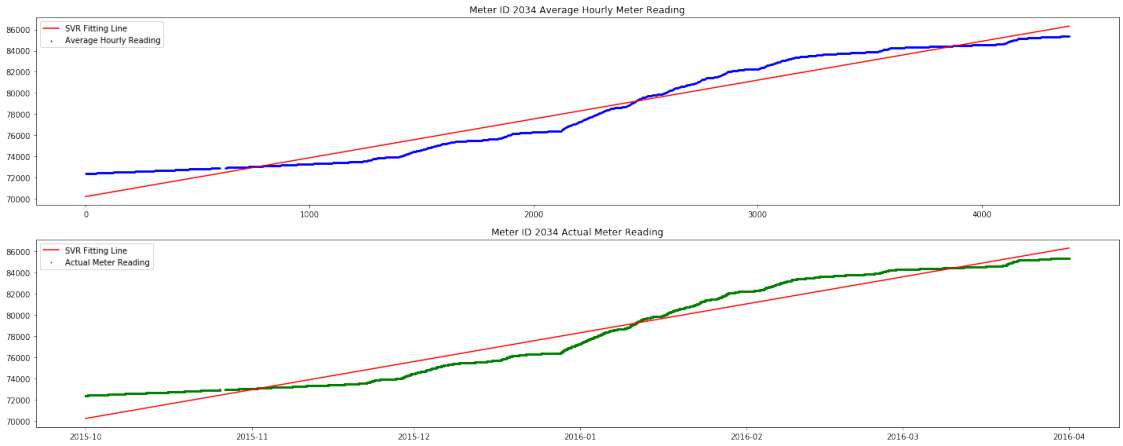


```
The accuracy score of fitting for meter ID 2034 is 0.9556728698598043
The next predicted average hourly reading for meter ID 2034 for the period
2016-04-01 00:00:00 to 01:00:00 is 86323.92836043873
The average hourly consumption for meter ID 2034 is 3.6699962615966797
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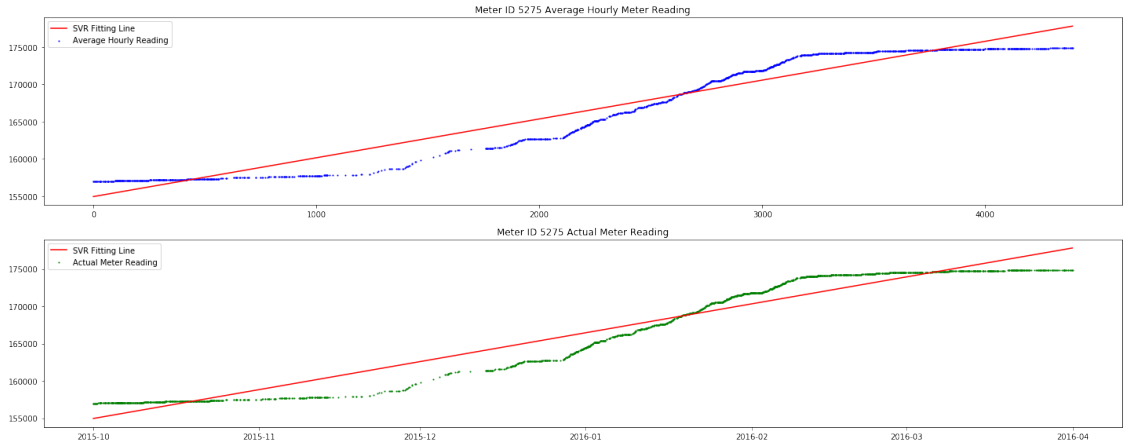
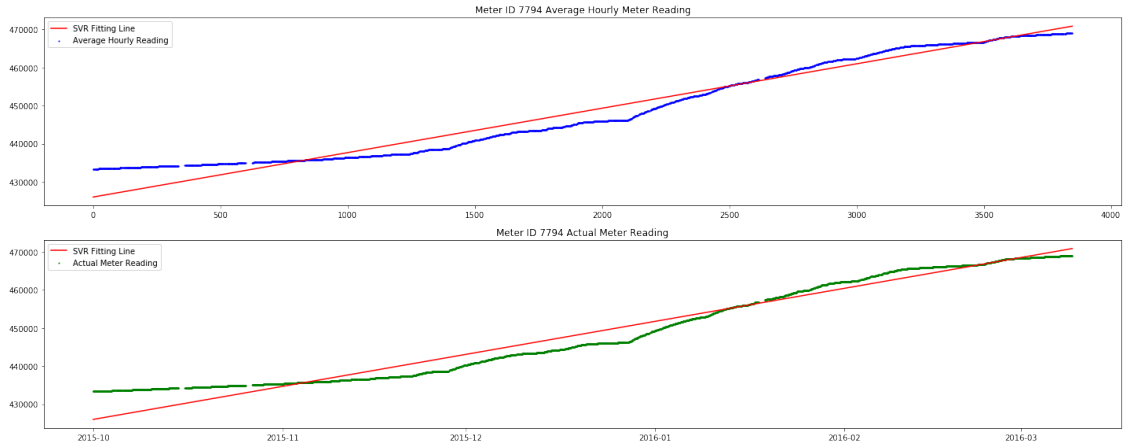
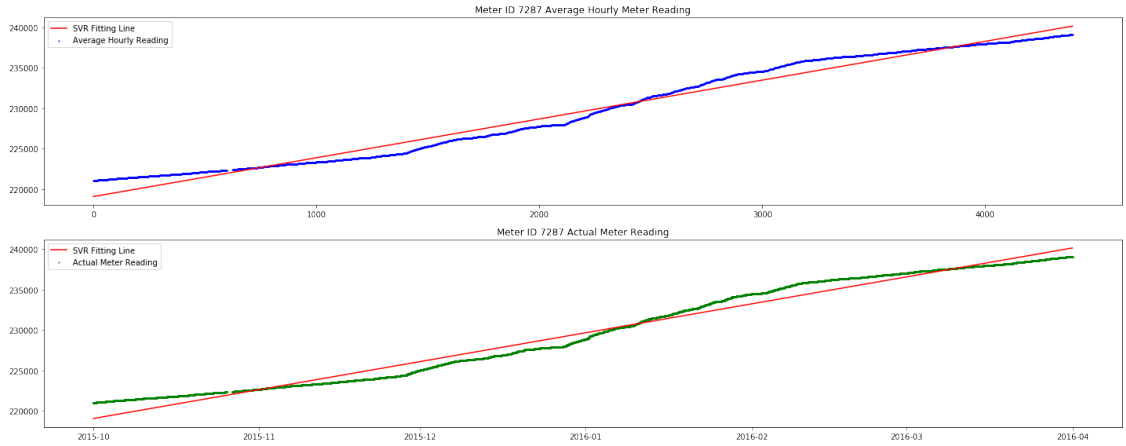


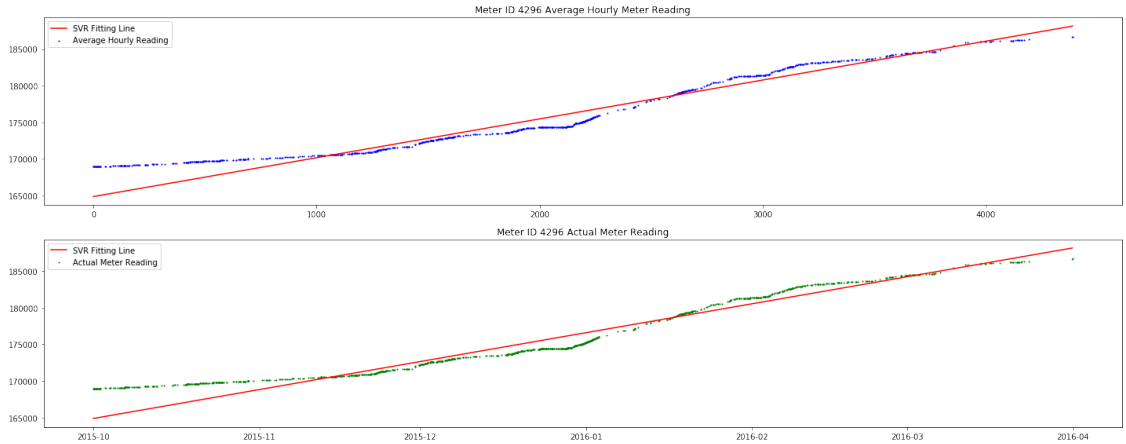
The accuracy score of fitting for meter ID 5275 is 0.9441056353366545
The next predicted average hourly reading for meter ID 5275 for the period 2016-04-01 00:00:00 to 01:00:00 is 177820.5710803276
The average hourly consumption for meter ID 5275 is 5.206254482269287



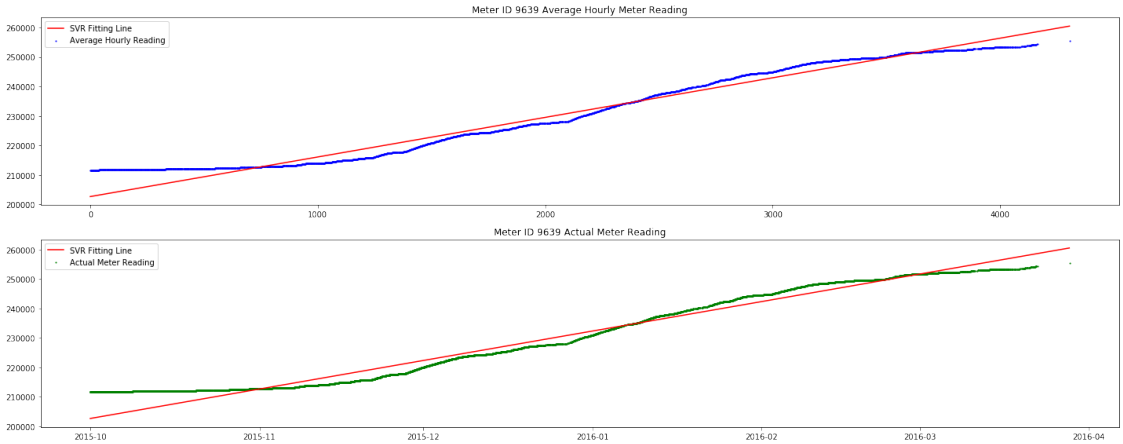
The accuracy score of fitting for meter ID 7794 is 0.9535196200535531
The next predicted average hourly reading for meter ID 7794 for the period 2016-04-01 00:00:00 to 01:00:00 is 477208.4859036412
The average hourly consumption for meter ID 7794 is 11.661591529846191



The accuracy score of fitting for meter ID 7287 is 0.9778288186501632
The next predicted average hourly reading for meter ID 7287 for the period 2016-04-01 00:00:00 to 01:00:00 is 240147.07476572267
The average hourly consumption for meter ID 7287 is 4.796911239624023



The accuracy score of fitting for meter ID 4296 is 0.9268912994018415
The next predicted average hourly reading for meter ID 4296 for the period 2016-04-01 00:00:00 to 01:00:00 is 188164.31809204124
The average hourly consumption for meter ID 4296 is 5.303687036037445




```
The accuracy score of fitting for meter ID 9639 is 0.9646244451375887
The next predicted average hourly reading for meter ID 9639 for the period
2016-04-01 00:00:00 to 01:00:00 is 261679.00943371508
The average hourly consumption for meter ID 9639 is 13.437736511230469
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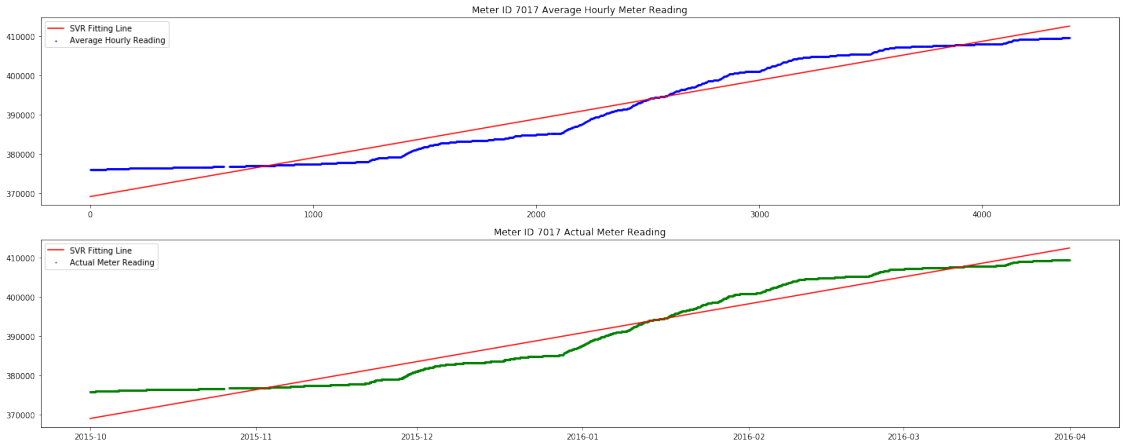


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The accuracy score of fitting for meter ID 7017 is 0.949397479685508
The next predicted average hourly reading for meter ID 7017 for the period
2016-04-01 00:00:00 to 01:00:00 is 412537.6650918933
The average hourly consumption for meter ID 7017 is 9.895995140075684
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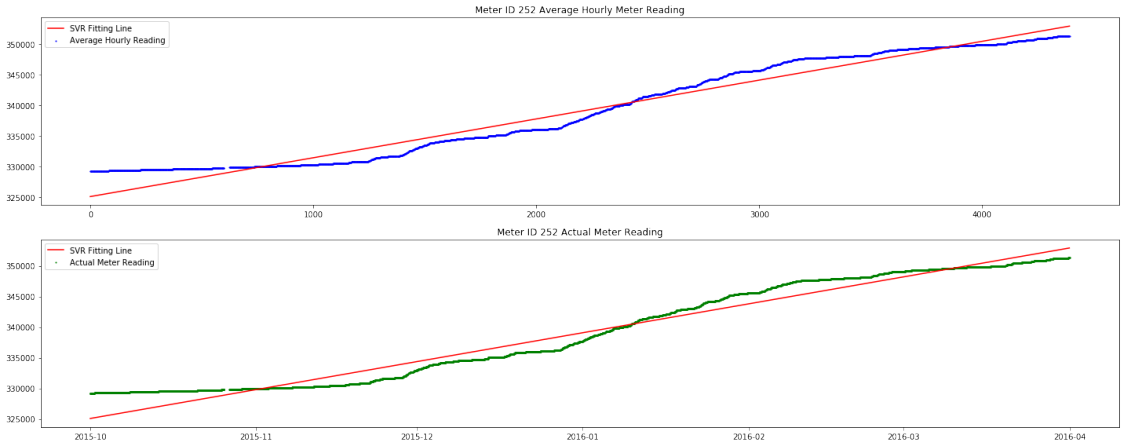
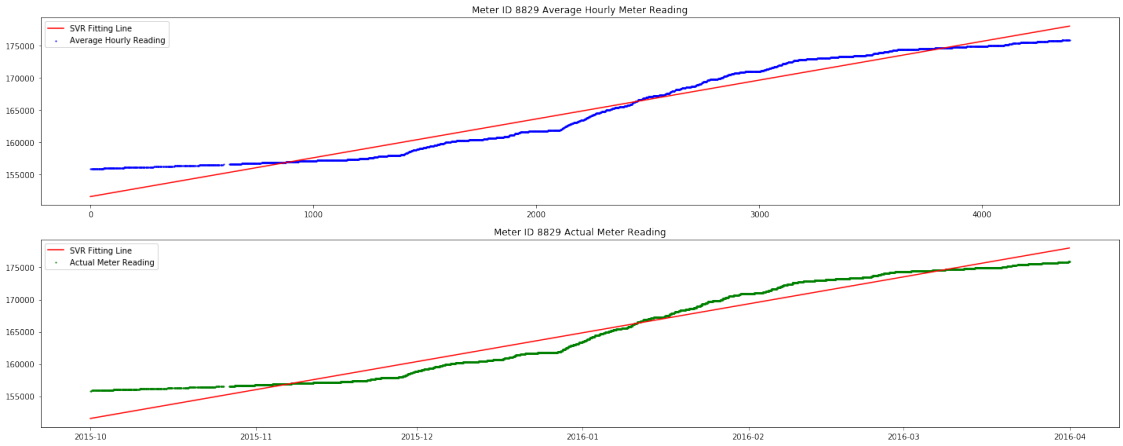
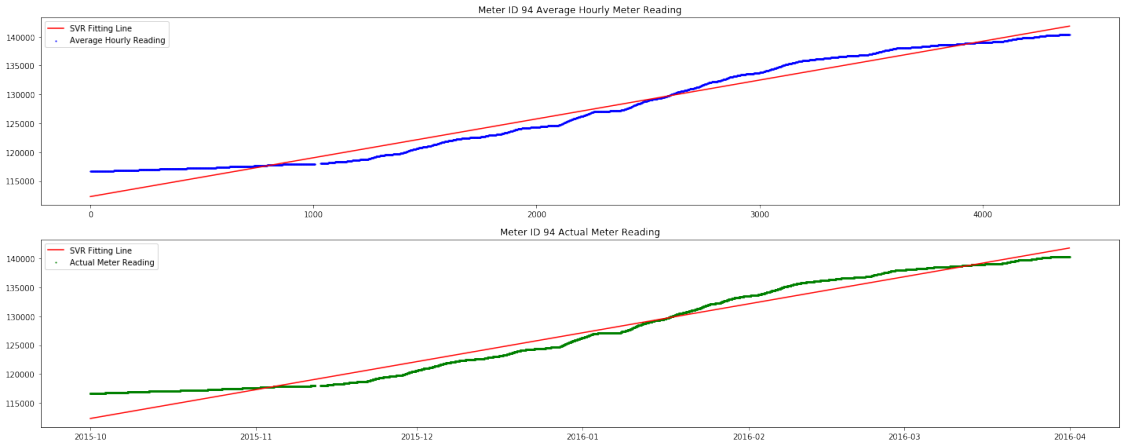


The accuracy score of fitting for meter ID 252 is 0.9607046110304841
The next predicted average hourly reading for meter ID 252 for the period 2016-04-01 00:00:00 to 01:00:00 is 352920.46995545056
The average hourly consumption for meter ID 252 is 6.33662223815918



The accuracy score of fitting for meter ID 8829 is 0.9531171966323002
The next predicted average hourly reading for meter ID 8829 for the period 2016-04-01 00:00:00 to 01:00:00 is 178011.45444410102
The average hourly consumption for meter ID 8829 is 6.029048919677734

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The accuracy score of fitting for meter ID 94 is 0.9667482978322882
The next predicted average hourly reading for meter ID 94 for the period
2016-04-01 00:00:00 to 01:00:00 is 141843.43705526498
The average hourly consumption for meter ID 94 is 6.72531795501709
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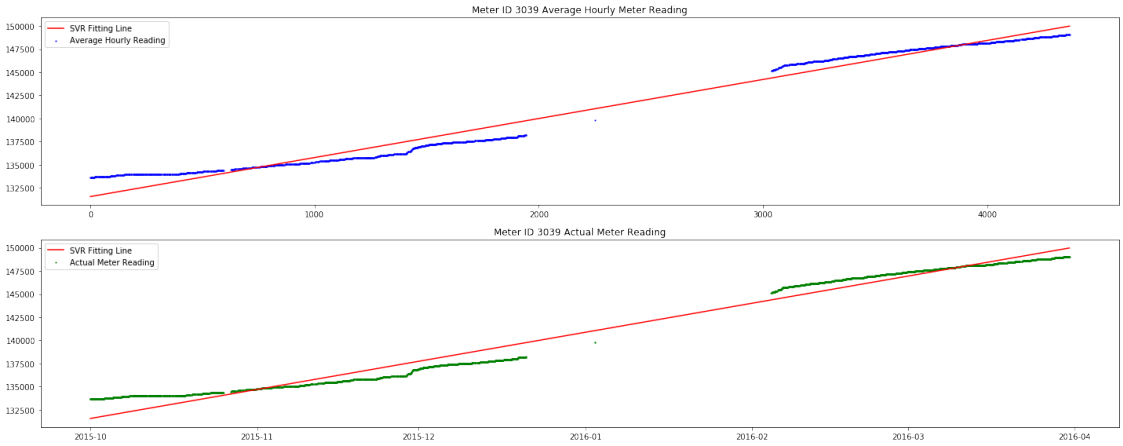


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The accuracy score of fitting for meter ID 3039 is 0.9764348500136592
The next predicted average hourly reading for meter ID 3039 for the period
2016-04-01 00:00:00 to 01:00:00 is 150091.4475271784
The average hourly consumption for meter ID 3039 is 4.220808982849121
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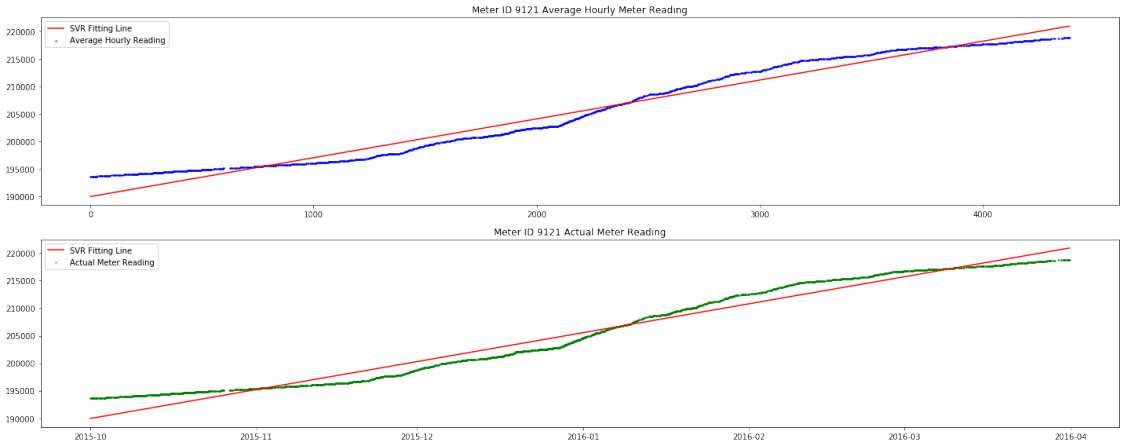


```
The accuracy score of fitting for meter ID 9121 is 0.9685991525058926
The next predicted average hourly reading for meter ID 9121 for the period
2016-04-01 00:00:00 to 01:00:00 is 220947.08725047577
The average hourly consumption for meter ID 9121 is 7.052098274230957
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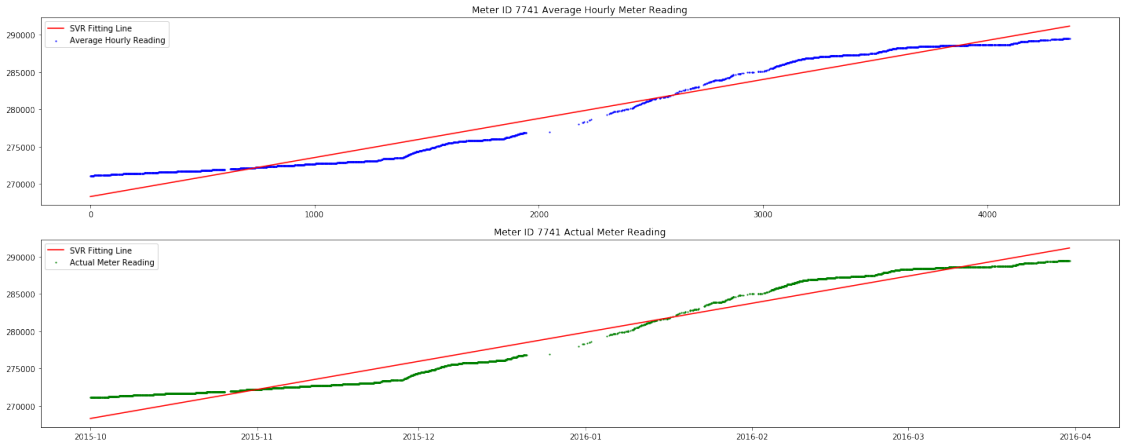


```
The accuracy score of fitting for meter ID 7741 is 0.9654065174104564
The next predicted average hourly reading for meter ID 7741 for the period
2016-04-01 00:00:00 to 01:00:00 is 291280.1194777186
The average hourly consumption for meter ID 7741 is 5.2252302169799805
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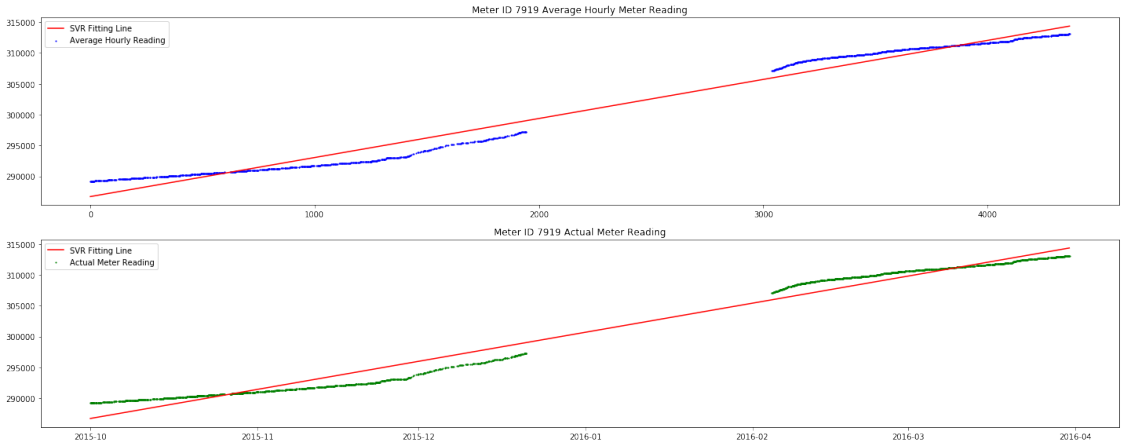
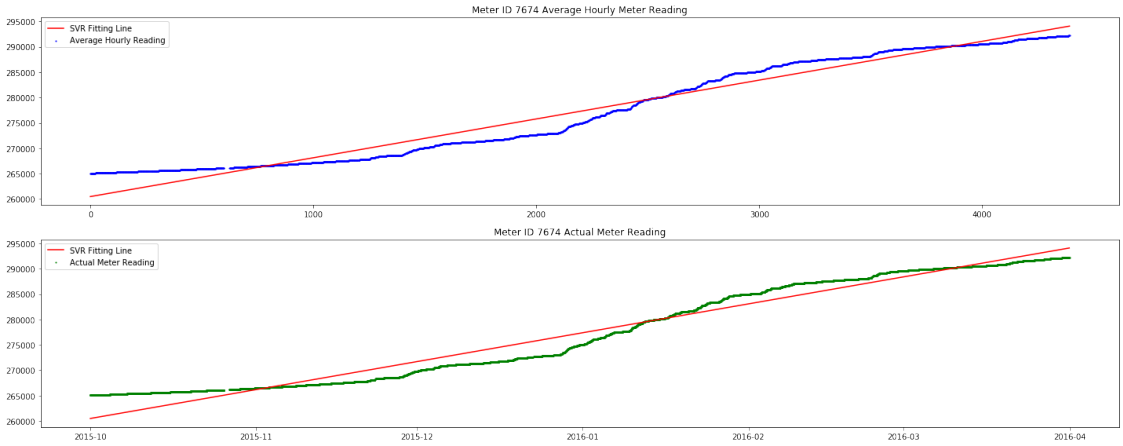
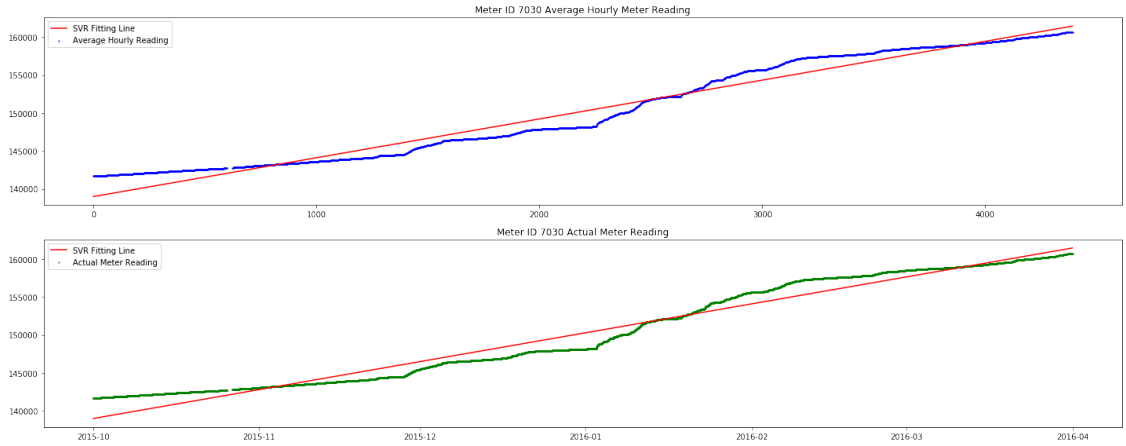


The accuracy score of fitting for meter ID 7919 is 0.9790548420745293
The next predicted average hourly reading for meter ID 7919 for the period 2016-04-01 00:00:00 to 01:00:00 is 314530.0713927339
The average hourly consumption for meter ID 7919 is 6.331072807312012



The accuracy score of fitting for meter ID 7674 is 0.9600438244666524
The next predicted average hourly reading for meter ID 7674 for the period 2016-04-01 00:00:00 to 01:00:00 is 294081.35469409515
The average hourly consumption for meter ID 7674 is 7.649402618408203




```
The accuracy score of fitting for meter ID 7030 is 0.9639914806703614
The next predicted average hourly reading for meter ID 7030 for the period
2016-04-01 00:00:00 to 01:00:00 is 161459.68266269963
The average hourly consumption for meter ID 7030 is 5.116523742675781
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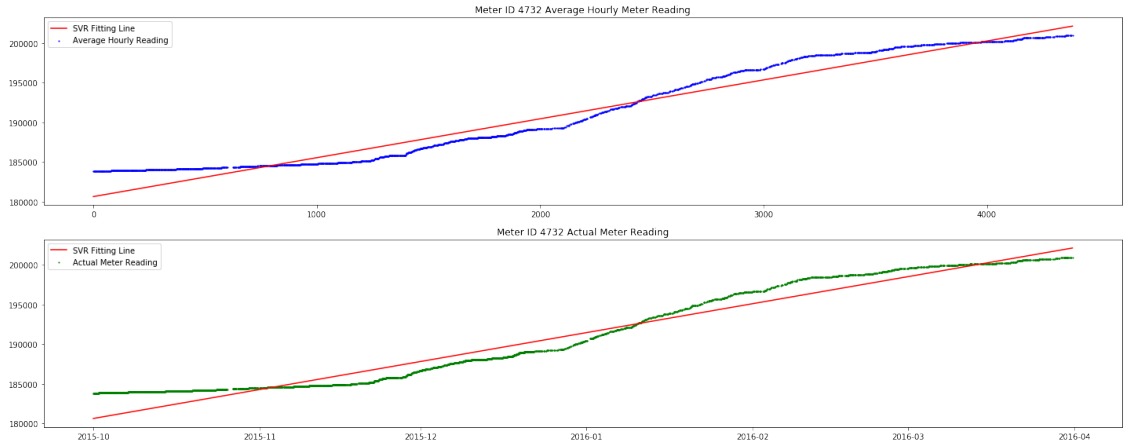


```
The accuracy score of fitting for meter ID 4732 is 0.9535728954064628
The next predicted average hourly reading for meter ID 4732 for the period
2016-04-01 00:00:00 to 01:00:00 is 202181.42885532608
The average hourly consumption for meter ID 4732 is 4.902933120727539
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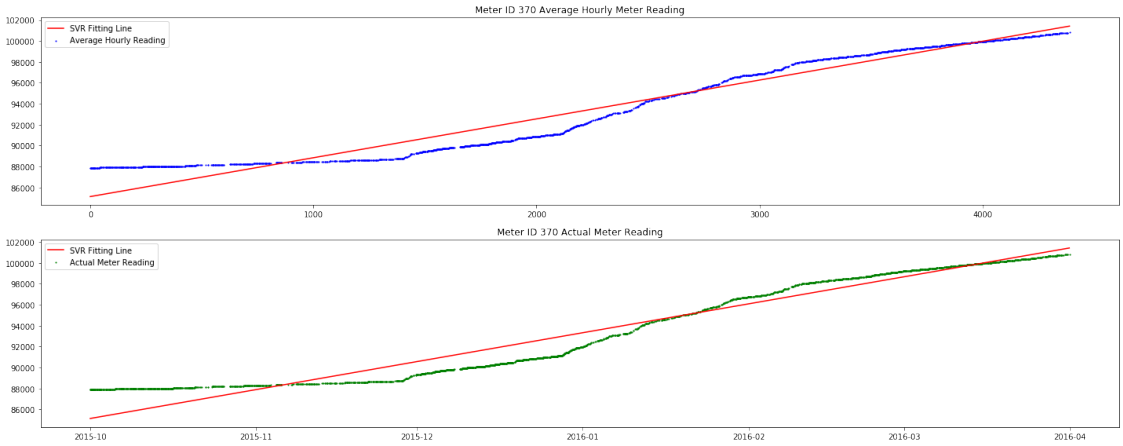


```
The accuracy score of fitting for meter ID 370 is 0.9373906325510671
The next predicted average hourly reading for meter ID 370 for the period
2016-04-01 00:00:00 to 01:00:00 is 101430.66650966146
The average hourly consumption for meter ID 370 is 3.71053409576416
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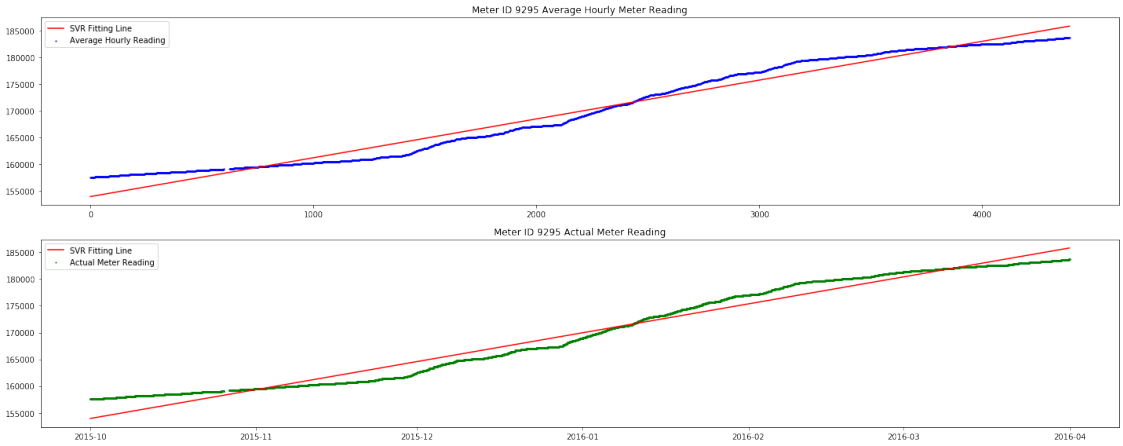


```
The accuracy score of fitting for meter ID 9295 is 0.9716744724321873
The next predicted average hourly reading for meter ID 9295 for the period
2016-04-01 00:00:00 to 01:00:00 is 185816.76036733334
The average hourly consumption for meter ID 9295 is 7.25798225402832
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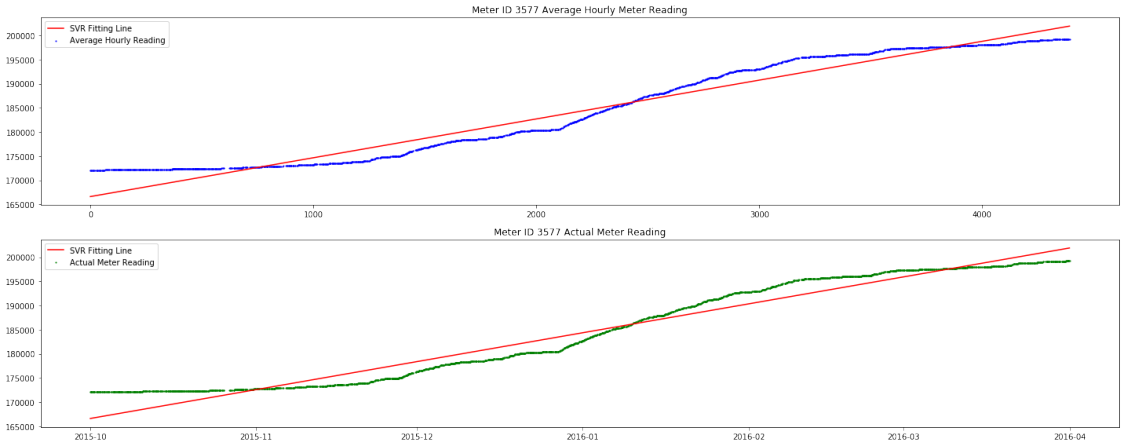


```
The accuracy score of fitting for meter ID 3577 is 0.9552810981460039
The next predicted average hourly reading for meter ID 3577 for the period
2016-04-01 00:00:00 to 01:00:00 is 201928.5803363081
The average hourly consumption for meter ID 3577 is 8.037132263183594
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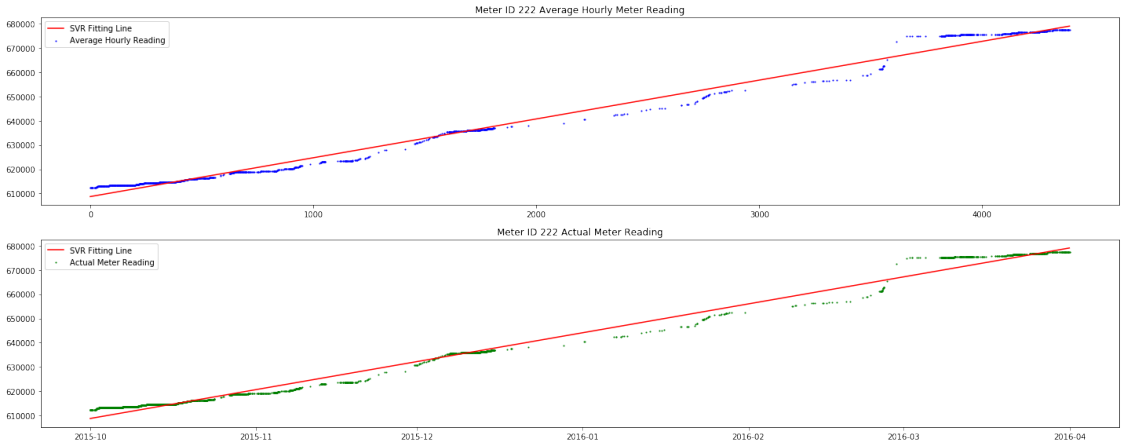


```
The accuracy score of fitting for meter ID 222 is 0.9909343866375113
The next predicted average hourly reading for meter ID 222 for the period
2016-04-01 00:00:00 to 01:00:00 is 679040.8798266742
The average hourly consumption for meter ID 222 is 16.00519895553589
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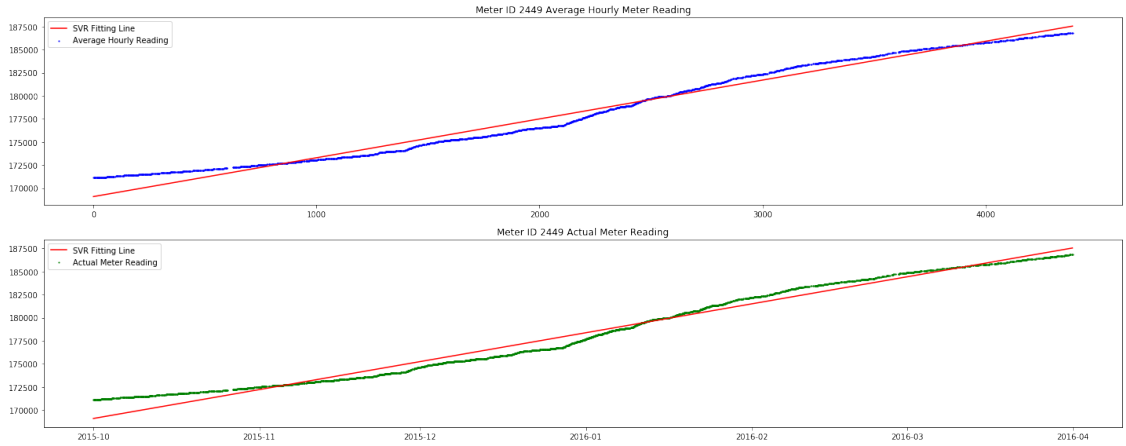


```
The accuracy score of fitting for meter ID 2449 is 0.9767306644156254
The next predicted average hourly reading for meter ID 2449 for the period
2016-04-01 00:00:00 to 01:00:00 is 187548.6543932094
The average hourly consumption for meter ID 2449 is 4.203220844268799
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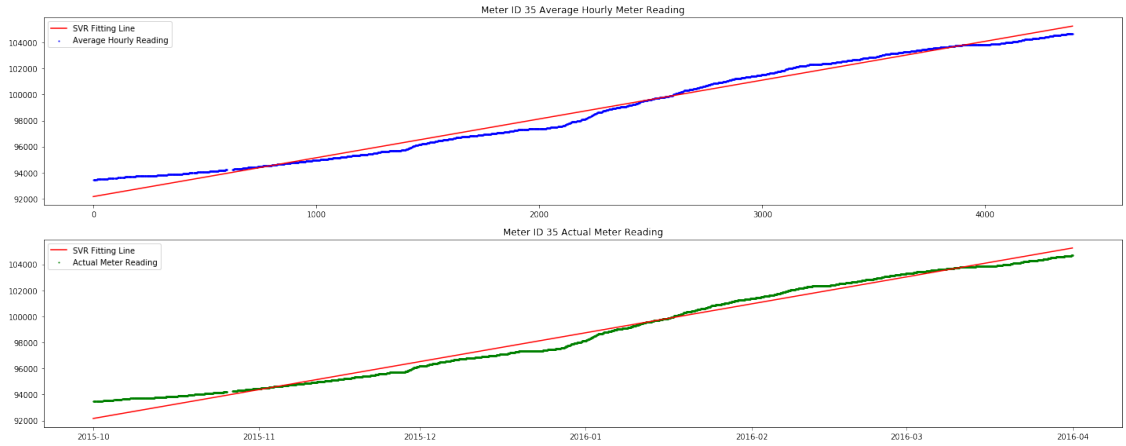


```
The accuracy score of fitting for meter ID 35 is 0.9838226610735024
The next predicted average hourly reading for meter ID 35 for the period
2016-04-01 00:00:00 to 01:00:00 is 105260.88012629477
The average hourly consumption for meter ID 35 is 2.9837265014648438
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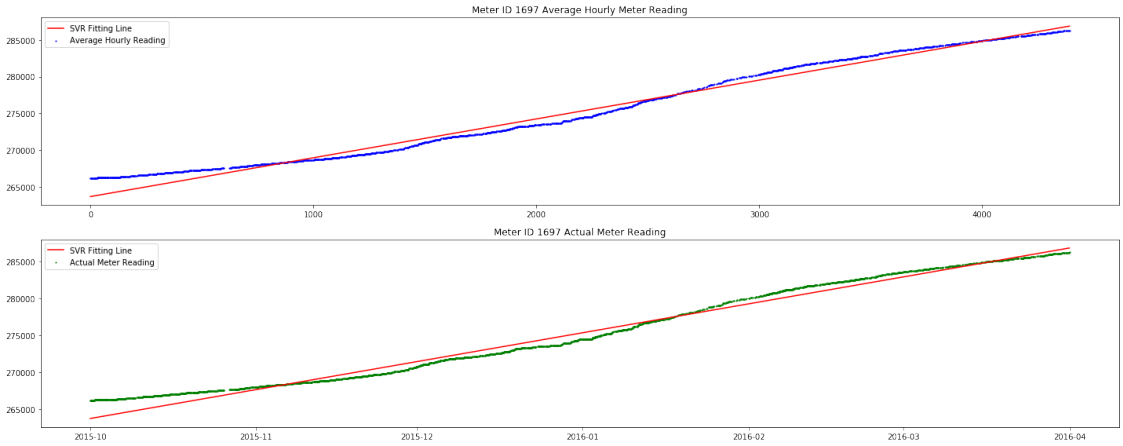
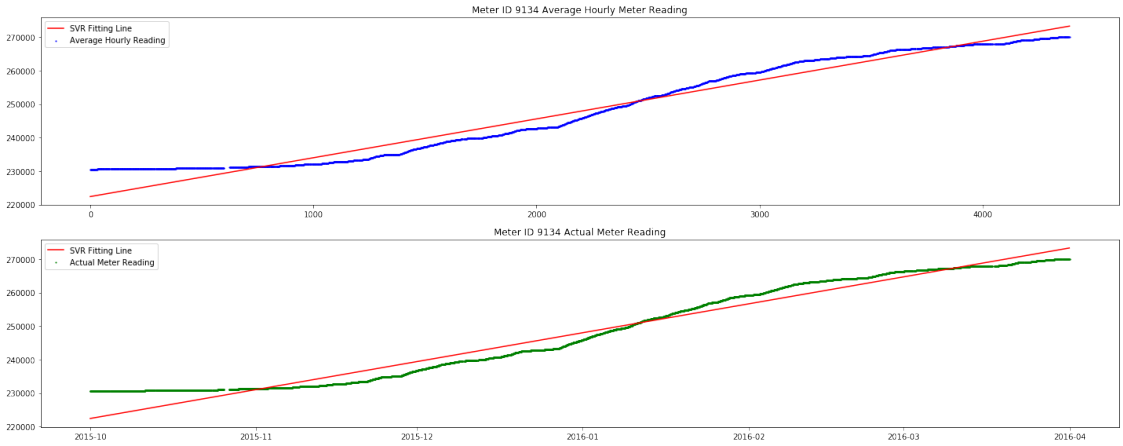
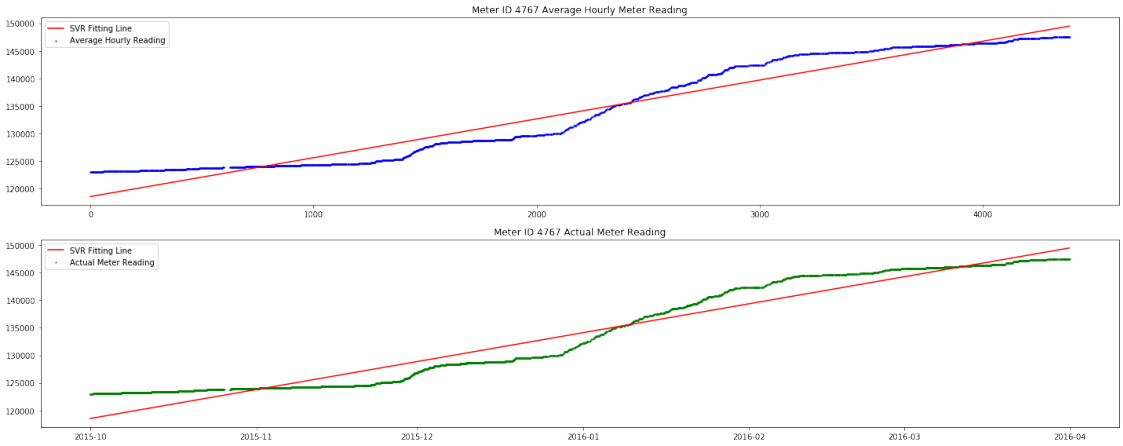


The accuracy score of fitting for meter ID 1697 is 0.9818957716833783
The next predicted average hourly reading for meter ID 1697 for the period 2016-04-01 00:00:00 to 01:00:00 is 286867.6322251164
The average hourly consumption for meter ID 1697 is 5.275699138641357



The accuracy score of fitting for meter ID 9134 is 0.9610291927204194
The next predicted average hourly reading for meter ID 9134 for the period 2016-04-01 00:00:00 to 01:00:00 is 273342.8368266701
The average hourly consumption for meter ID 9134 is 11.6012544631958




```
The accuracy score of fitting for meter ID 4767 is 0.9455930040795212
The next predicted average hourly reading for meter ID 4767 for the period
2016-04-01 00:00:00 to 01:00:00 is 149511.01428980578
The average hourly consumption for meter ID 4767 is 7.050931930541992
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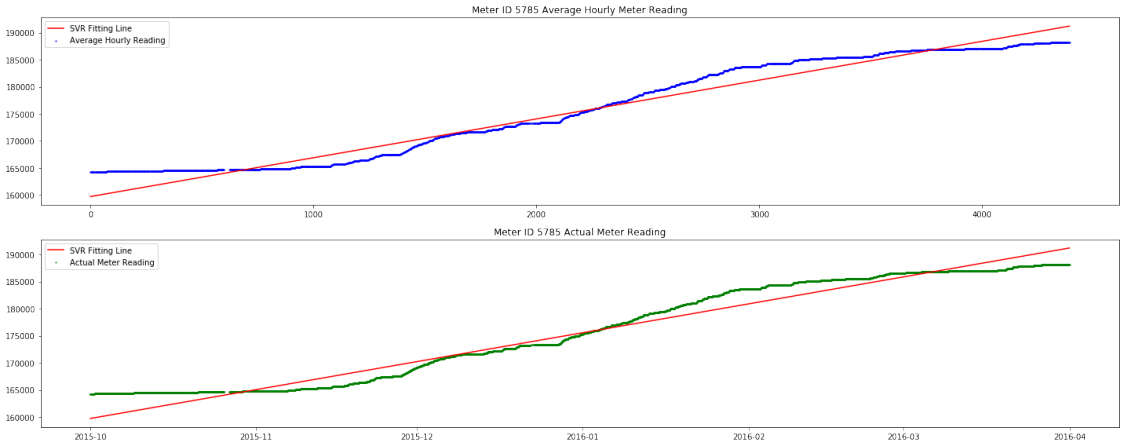


```
The accuracy score of fitting for meter ID 5785 is 0.9600413740162256
The next predicted average hourly reading for meter ID 5785 for the period
2016-04-01 00:00:00 to 01:00:00 is 191208.98788244126
The average hourly consumption for meter ID 5785 is 7.167854309082031
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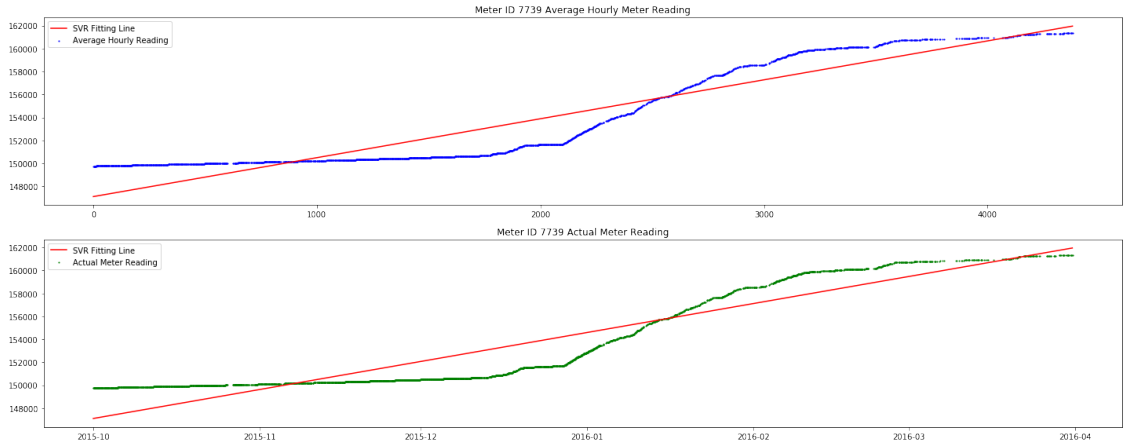
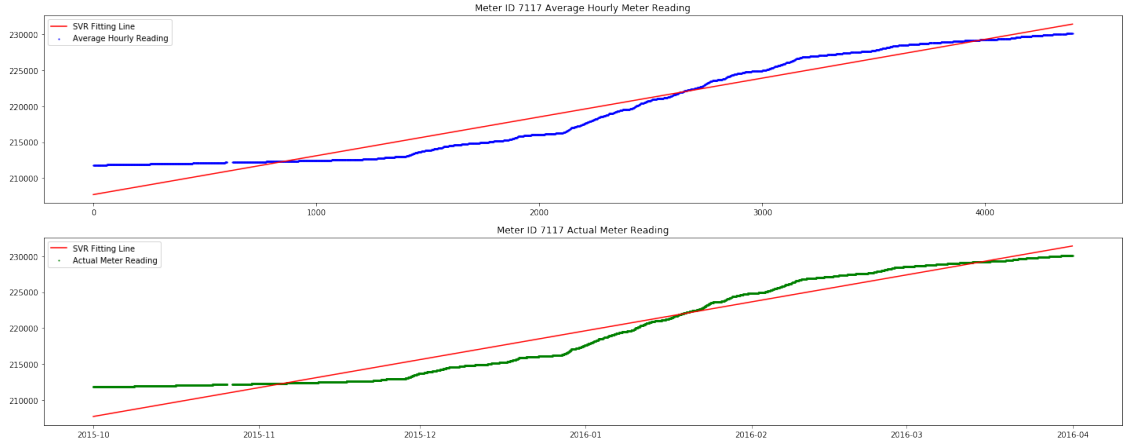
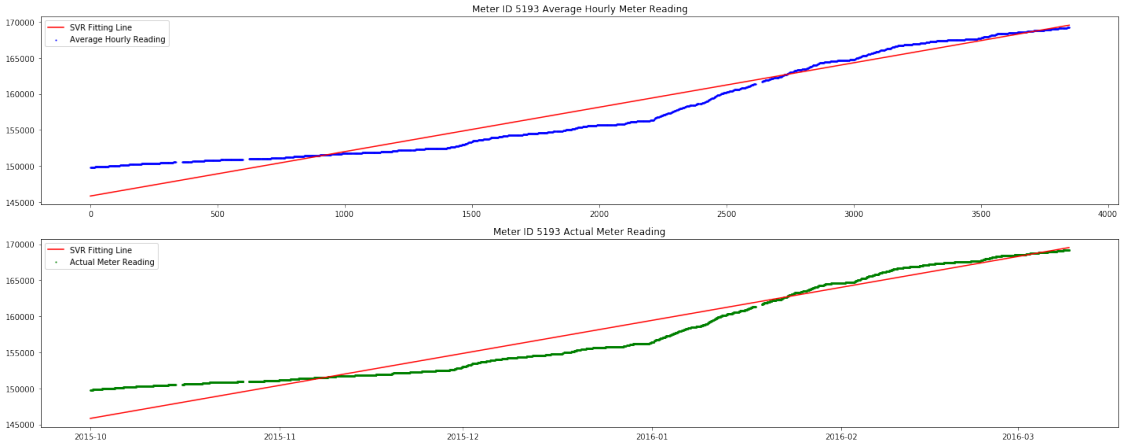


The accuracy score of fitting for meter ID 7739 is 0.8576810492300715
The next predicted average hourly reading for meter ID 7739 for the period 2016-04-01 00:00:00 to 01:00:00 is 162000.5607124442
The average hourly consumption for meter ID 7739 is 3.3914196491241455



The accuracy score of fitting for meter ID 7117 is 0.939251452231966
The next predicted average hourly reading for meter ID 7117 for the period 2016-04-01 00:00:00 to 01:00:00 is 231429.27389530768
The average hourly consumption for meter ID 7117 is 5.399937629699707




```
The accuracy score of fitting for meter ID 5193 is 0.9295650294903041
The next predicted average hourly reading for meter ID 5193 for the period
2016-04-01 00:00:00 to 01:00:00 is 172891.33638888795
The average hourly consumption for meter ID 5193 is 6.160237073898315
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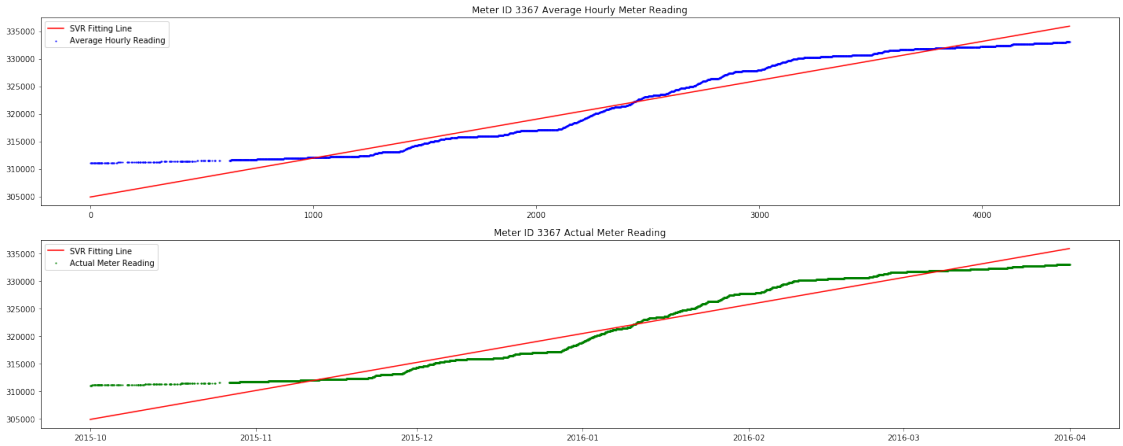


```
The accuracy score of fitting for meter ID 3367 is 0.9513469359292005
The next predicted average hourly reading for meter ID 3367 for the period
2016-04-01 00:00:00 to 01:00:00 is 335913.9782374007
The average hourly consumption for meter ID 3367 is 7.063726425170898
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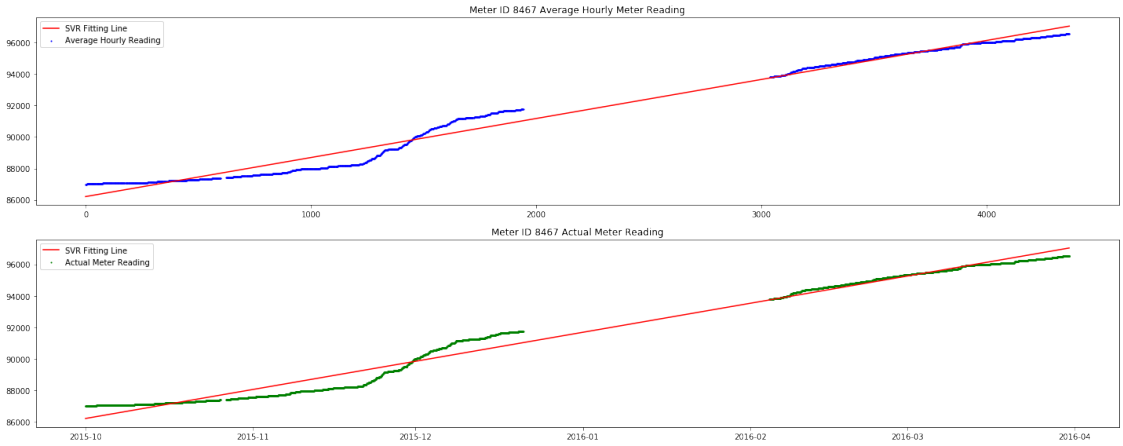


```
The accuracy score of fitting for meter ID 8467 is 0.9823502802094994
The next predicted average hourly reading for meter ID 8467 for the period
2016-04-01 00:00:00 to 01:00:00 is 97099.36745043869
The average hourly consumption for meter ID 8467 is 2.4786605834960938
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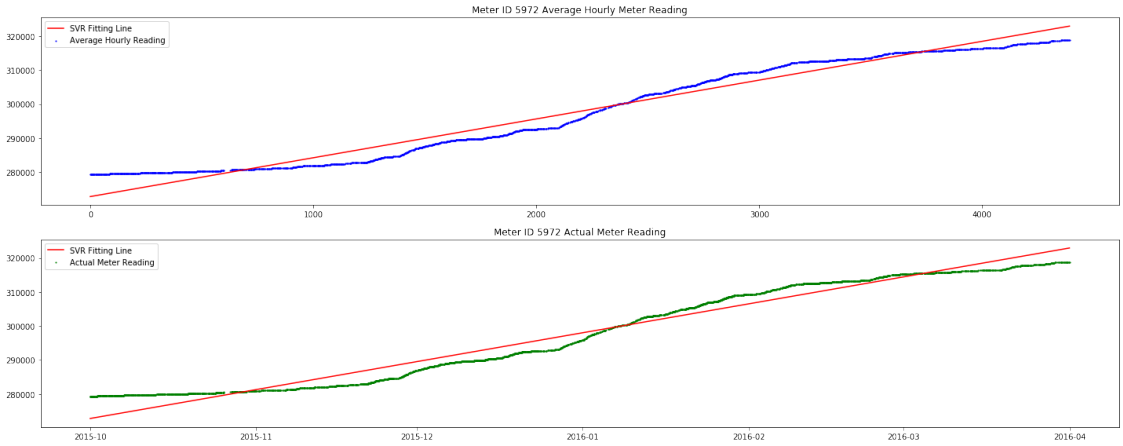


```
The accuracy score of fitting for meter ID 5972 is 0.9617334620902085
The next predicted average hourly reading for meter ID 5972 for the period
2016-04-01 00:00:00 to 01:00:00 is 322950.1743678512
The average hourly consumption for meter ID 5972 is 11.421070098876953
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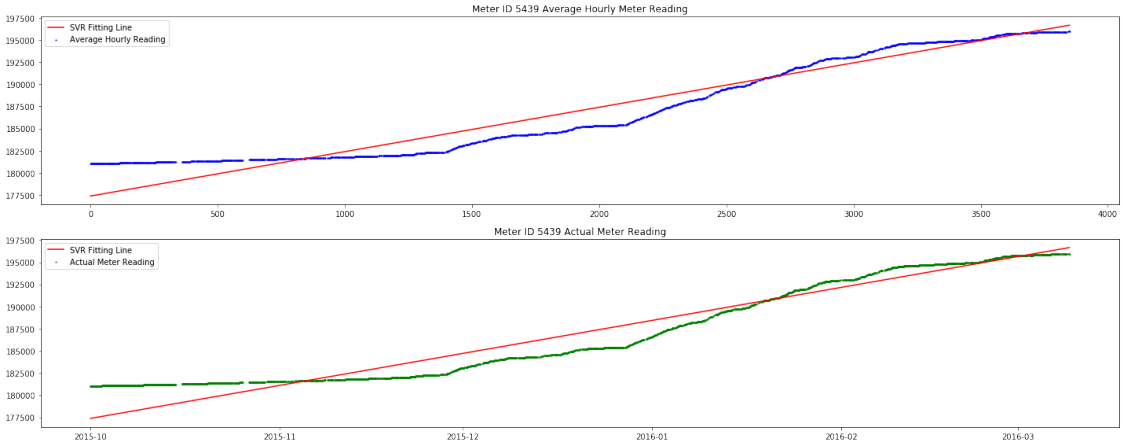


```
The accuracy score of fitting for meter ID 5439 is 0.9224938894914064
The next predicted average hourly reading for meter ID 5439 for the period
2016-04-01 00:00:00 to 01:00:00 is 199373.5612763593
The average hourly consumption for meter ID 5439 is 5.00618839263916
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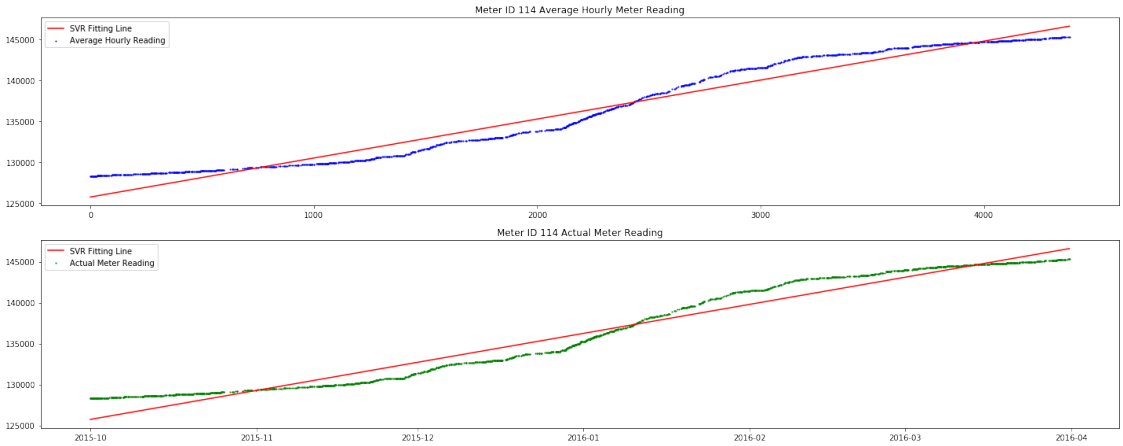


```
The accuracy score of fitting for meter ID 114 is 0.9616711991304752
The next predicted average hourly reading for meter ID 114 for the period
2016-04-01 00:00:00 to 01:00:00 is 146649.0266378281
The average hourly consumption for meter ID 114 is 4.759824275970459
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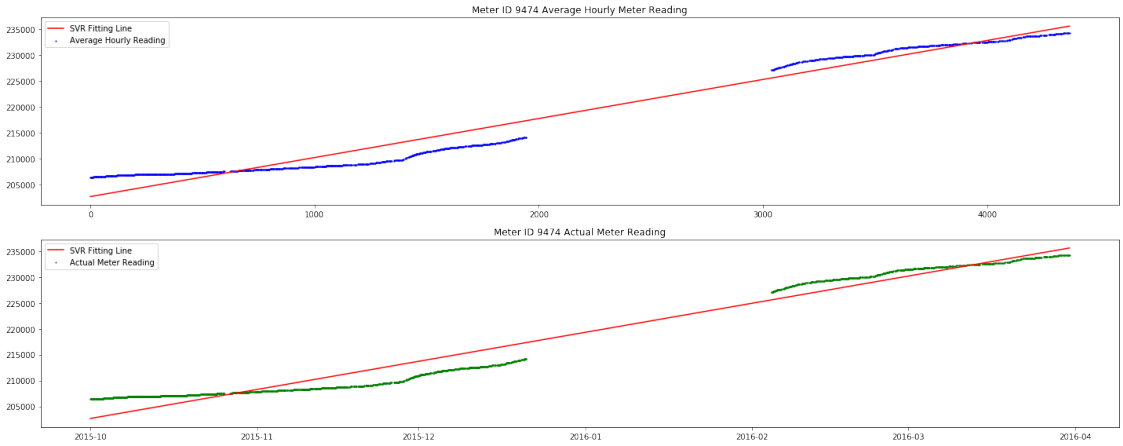


```
The accuracy score of fitting for meter ID 9474 is 0.9621544169904425
The next predicted average hourly reading for meter ID 9474 for the period
2016-04-01 00:00:00 to 01:00:00 is 235776.1744964529
The average hourly consumption for meter ID 9474 is 7.5345330238342285
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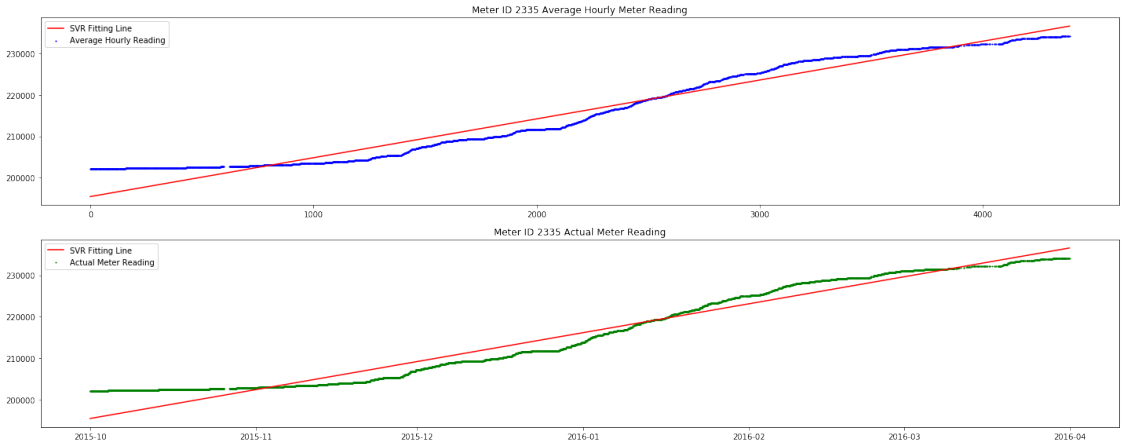


```
The accuracy score of fitting for meter ID 2335 is 0.9536892636057396
The next predicted average hourly reading for meter ID 2335 for the period
2016-04-01 00:00:00 to 01:00:00 is 236616.88919246127
The average hourly consumption for meter ID 2335 is 9.375221252441406
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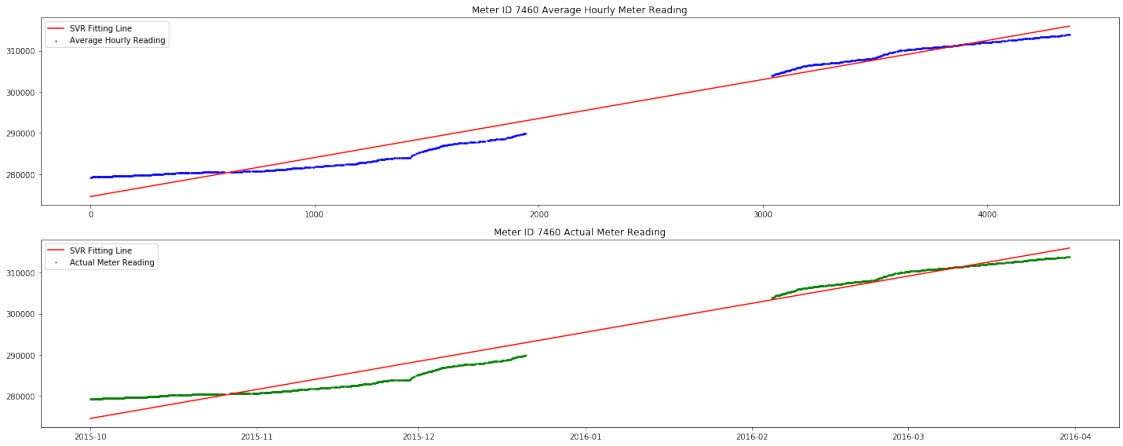
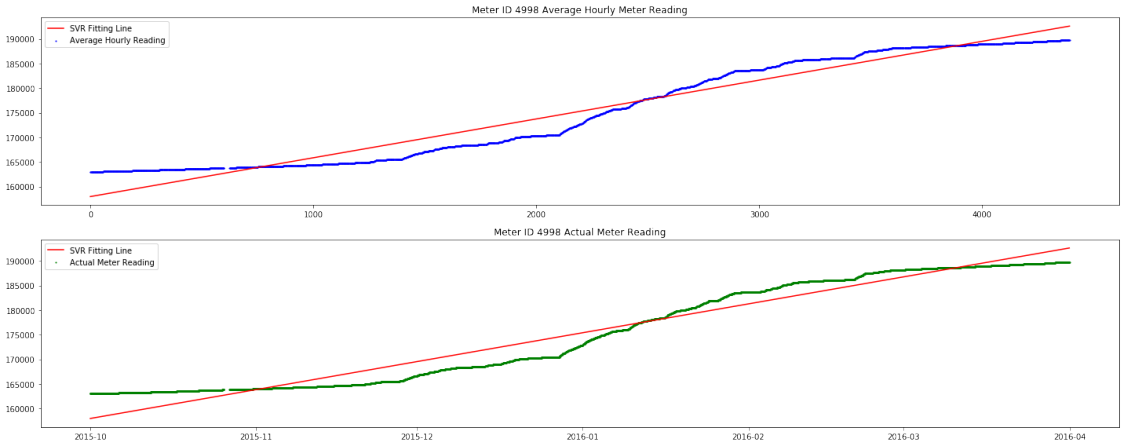
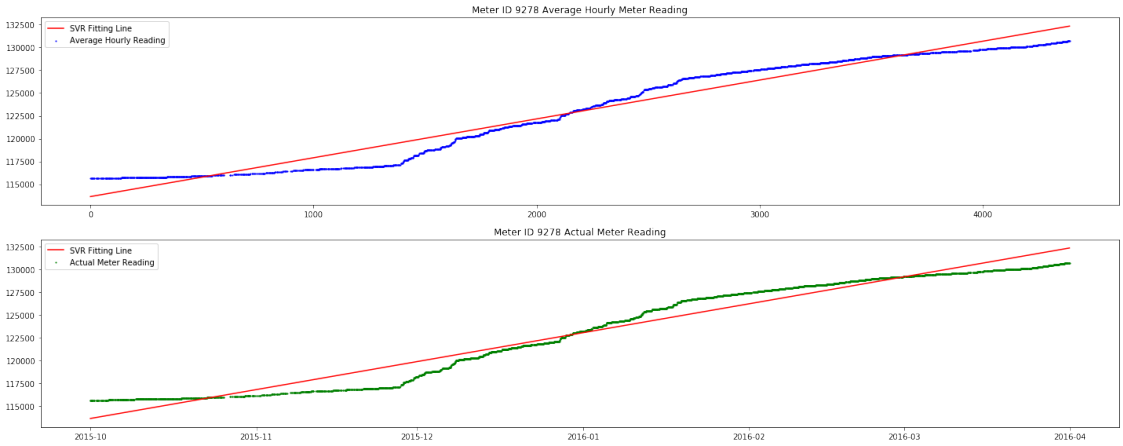


The accuracy score of fitting for meter ID 7460 is 0.9722169190918641
The next predicted average hourly reading for meter ID 7460 for the period 2016-04-01 00:00:00 to 01:00:00 is 316230.18044359575
The average hourly consumption for meter ID 7460 is 9.492619514465332



The accuracy score of fitting for meter ID 4998 is 0.9478364795388086
The next predicted average hourly reading for meter ID 4998 for the period 2016-04-01 00:00:00 to 01:00:00 is 192612.55458021892
The average hourly consumption for meter ID 4998 is 7.889751434326172




```
The accuracy score of fitting for meter ID 9278 is 0.9576728880593087
The next predicted average hourly reading for meter ID 9278 for the period
2016-04-01 00:00:00 to 01:00:00 is 132353.85147713253
The average hourly consumption for meter ID 9278 is 4.260112762451172
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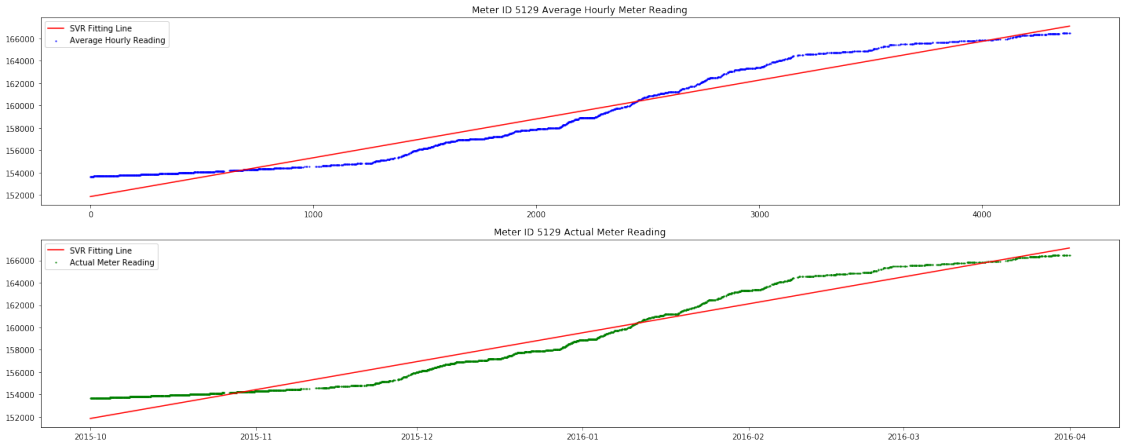


```
The accuracy score of fitting for meter ID 5129 is 0.9555461540902579
The next predicted average hourly reading for meter ID 5129 for the period
2016-04-01 00:00:00 to 01:00:00 is 167108.41606584407
The average hourly consumption for meter ID 5129 is 3.4724888801574707
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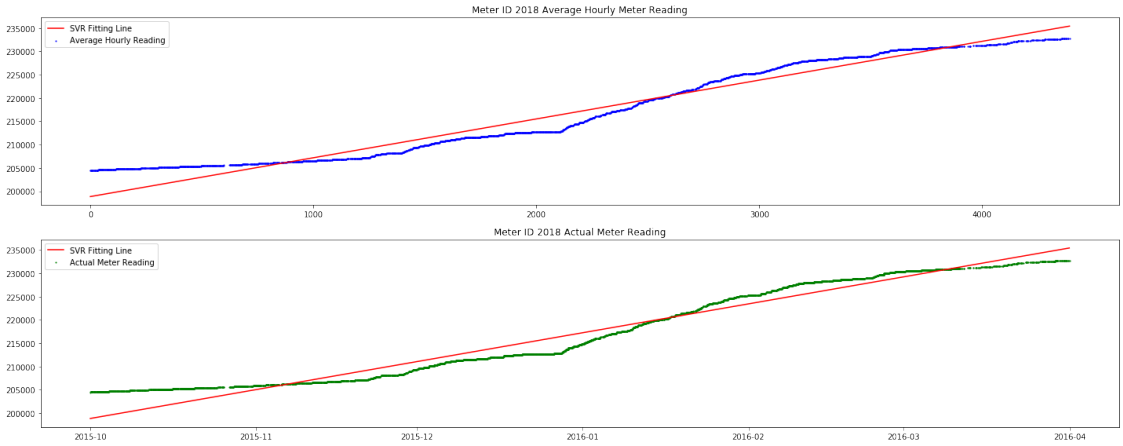
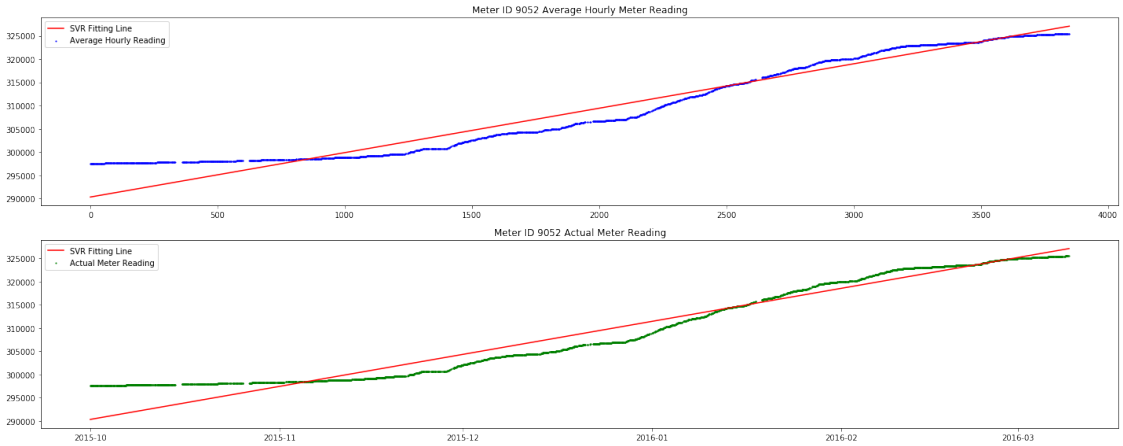
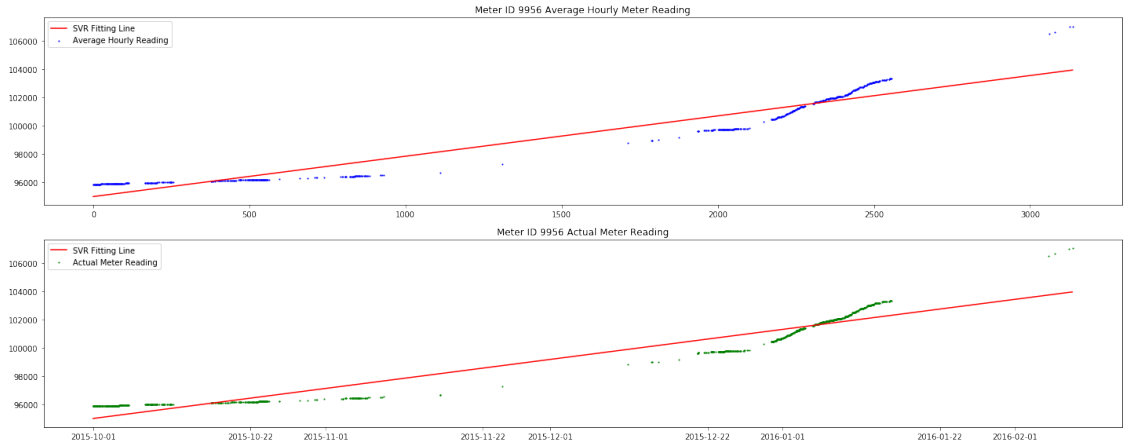


The accuracy score of fitting for meter ID 2018 is 0.9526780612313946
The next predicted average hourly reading for meter ID 2018 for the period 2016-04-01 00:00:00 to 01:00:00 is 235441.3373103986
The average hourly consumption for meter ID 2018 is 8.33193588256836



The accuracy score of fitting for meter ID 9052 is 0.9395182439678076
The next predicted average hourly reading for meter ID 9052 for the period 2016-04-01 00:00:00 to 01:00:00 is 332294.33546158613
The average hourly consumption for meter ID 9052 is 9.553800106048584




```
The accuracy score of fitting for meter ID 9956 is 0.9371572966534205
The next predicted average hourly reading for meter ID 9956 for the period
2016-04-01 00:00:00 to 01:00:00 is 107544.15980242135
The average hourly consumption for meter ID 9956 is 2.8575141429901123
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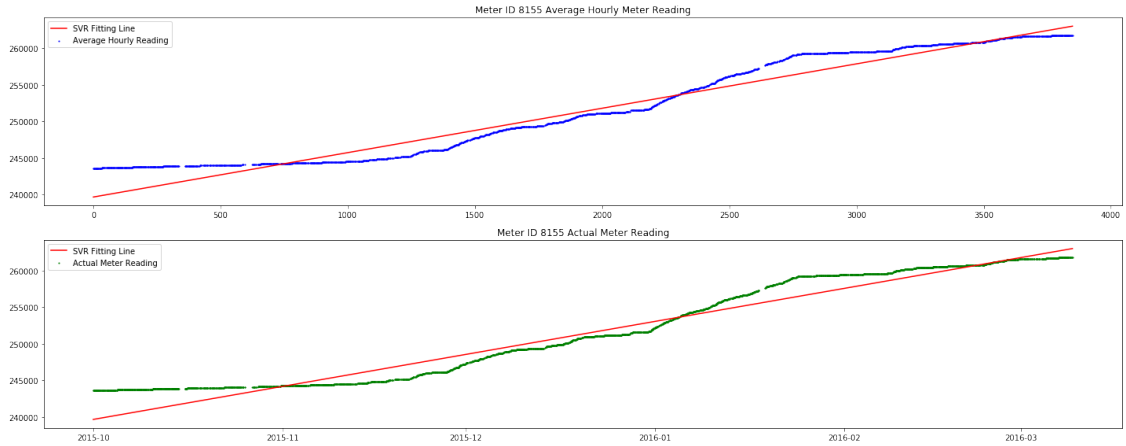


```
The accuracy score of fitting for meter ID 8155 is 0.9494534941694496
The next predicted average hourly reading for meter ID 8155 for the period
2016-04-01 00:00:00 to 01:00:00 is 266315.0500558749
The average hourly consumption for meter ID 8155 is 6.066286563873291
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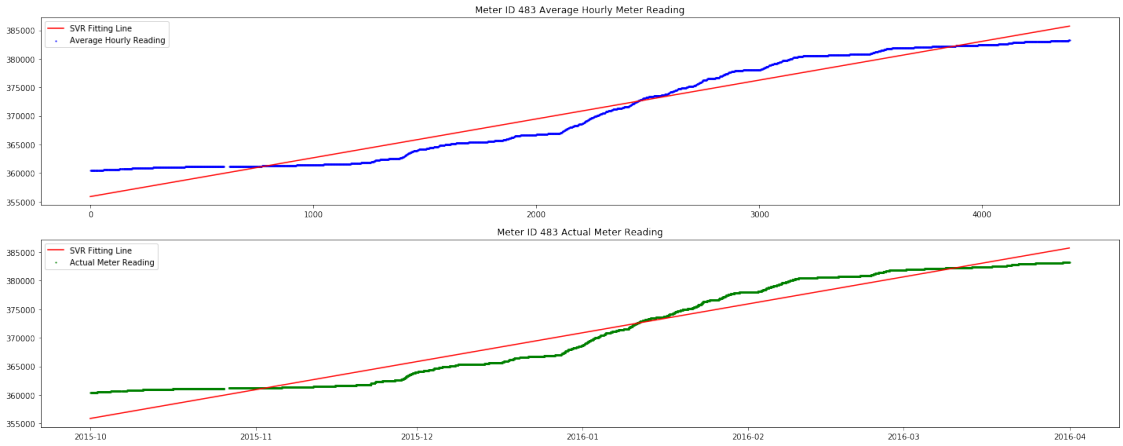
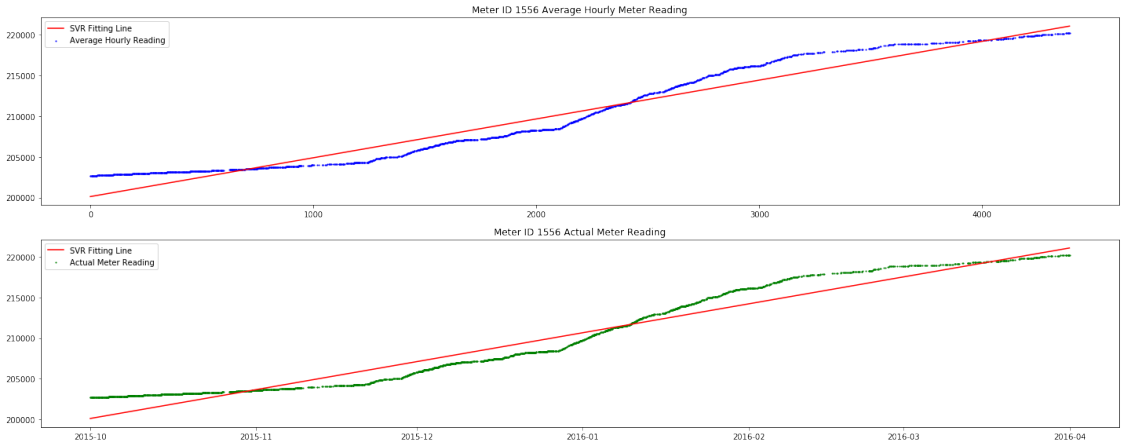
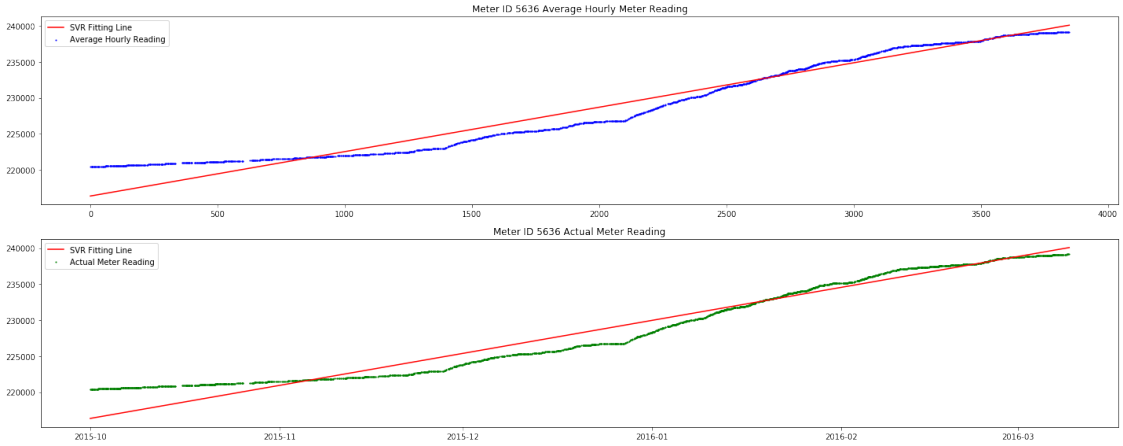


The accuracy score of fitting for meter ID 483 is 0.94480082577702
The next predicted average hourly reading for meter ID 483 for the period 2016-04-01 00:00:00 to 01:00:00 is 385728.61818754027
The average hourly consumption for meter ID 483 is 6.792768478393555



The accuracy score of fitting for meter ID 1556 is 0.9485339526448174
The next predicted average hourly reading for meter ID 1556 for the period 2016-04-01 00:00:00 to 01:00:00 is 221068.32363797678
The average hourly consumption for meter ID 1556 is 4.767588376998901




```
The accuracy score of fitting for meter ID 5636 is 0.9496372823300808
The next predicted average hourly reading for meter ID 5636 for the period
2016-04-01 00:00:00 to 01:00:00 is 243442.34145849268
The average hourly consumption for meter ID 5636 is 6.166603326797485
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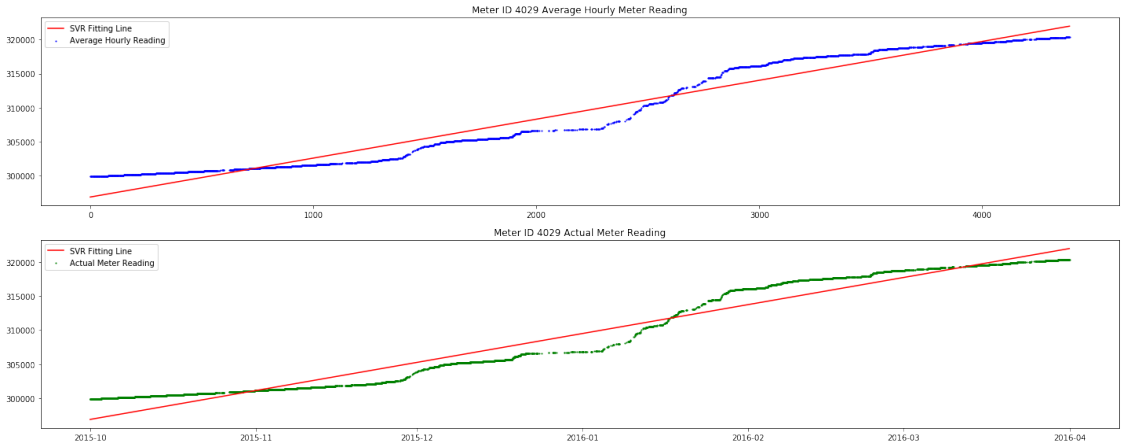


```
The accuracy score of fitting for meter ID 4029 is 0.9590478674379749
The next predicted average hourly reading for meter ID 4029 for the period
2016-04-01 00:00:00 to 01:00:00 is 321966.6889340597
The average hourly consumption for meter ID 4029 is 5.710289001464844
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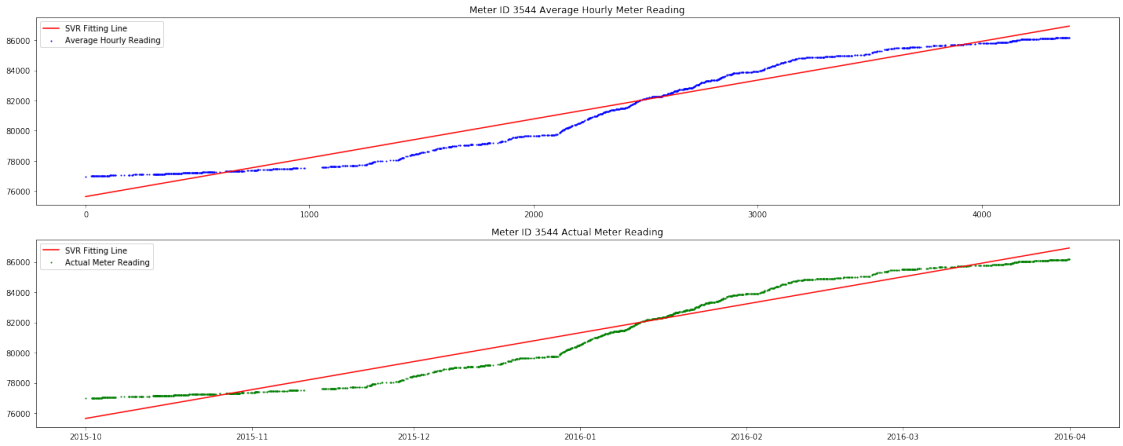


```
The accuracy score of fitting for meter ID 3544 is 0.9567671776836973
The next predicted average hourly reading for meter ID 3544 for the period
2016-04-01 00:00:00 to 01:00:00 is 86926.16471309958
The average hourly consumption for meter ID 3544 is 2.5695362091064453
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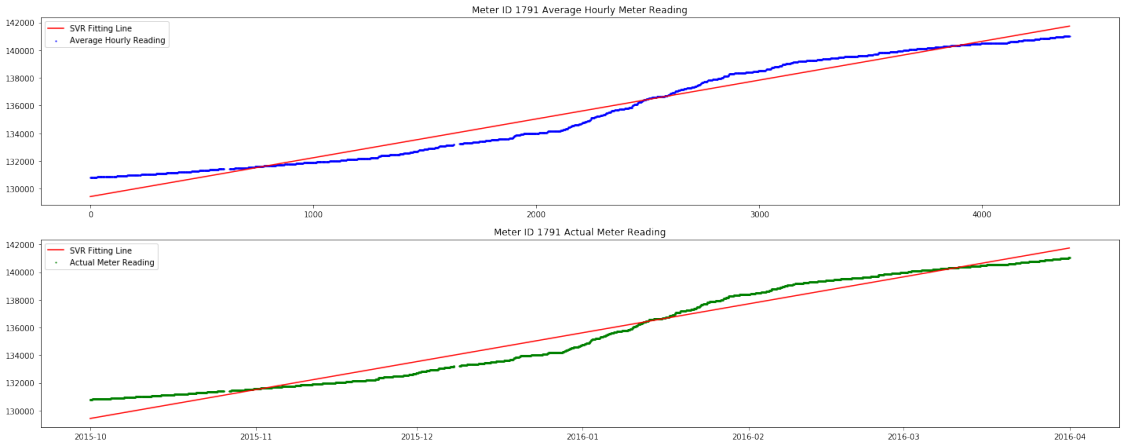


```
The accuracy score of fitting for meter ID 1791 is 0.9658720314903435
The next predicted average hourly reading for meter ID 1791 for the period
2016-04-01 00:00:00 to 01:00:00 is 141740.5427749951
The average hourly consumption for meter ID 1791 is 2.802119255065918
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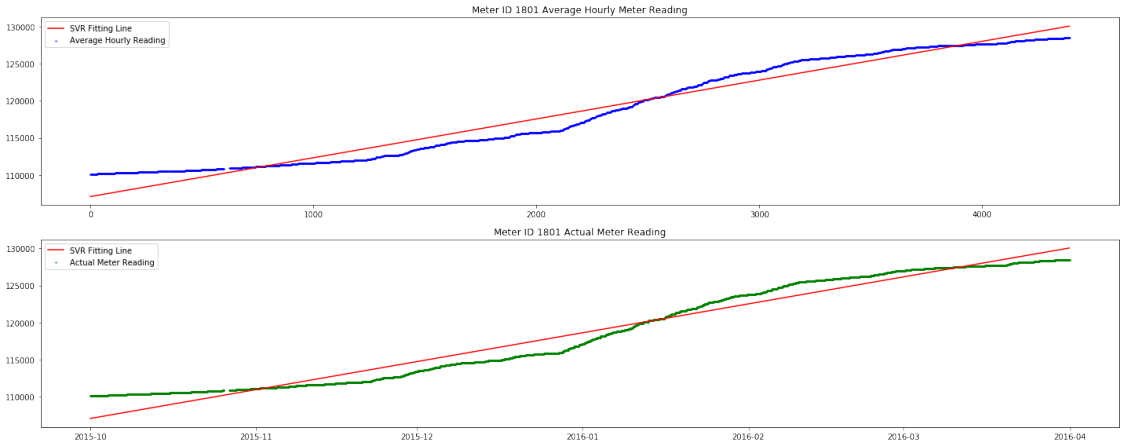


```
The accuracy score of fitting for meter ID 1801 is 0.9619311968210714
The next predicted average hourly reading for meter ID 1801 for the period
2016-04-01 00:00:00 to 01:00:00 is 130063.99205317826
The average hourly consumption for meter ID 1801 is 5.233783721923828
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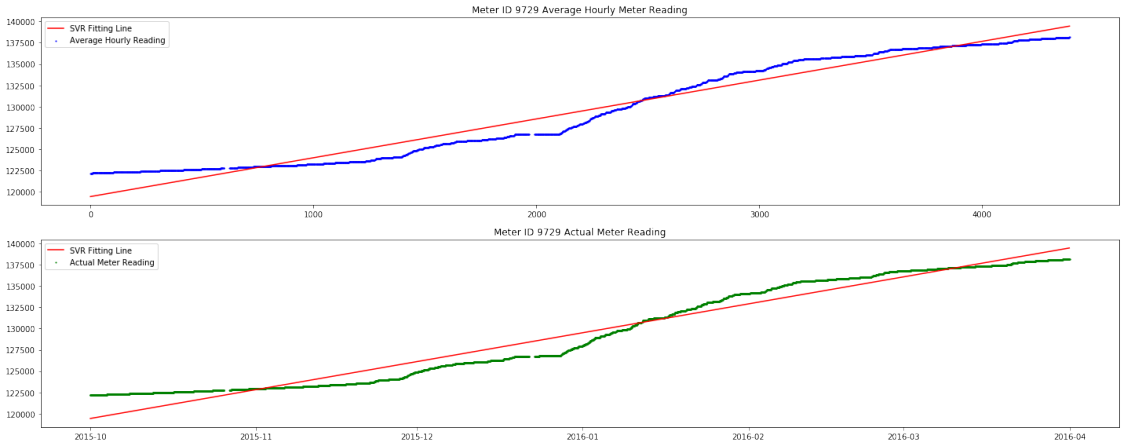


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The accuracy score of fitting for meter ID 9729 is 0.9585209072370758
The next predicted average hourly reading for meter ID 9729 for the period
2016-04-01 00:00:00 to 01:00:00 is 139463.26177546947
The average hourly consumption for meter ID 9729 is 4.558452606201172
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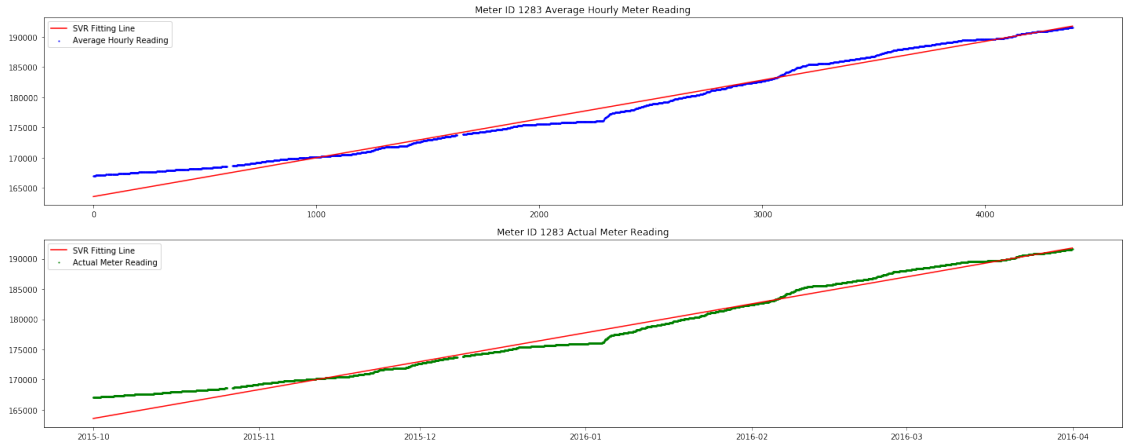


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The accuracy score of fitting for meter ID 1283 is 0.9789895574143427
The next predicted average hourly reading for meter ID 1283 for the period
2016-04-01 00:00:00 to 01:00:00 is 191797.77711267484
The average hourly consumption for meter ID 1283 is 6.426816940307617
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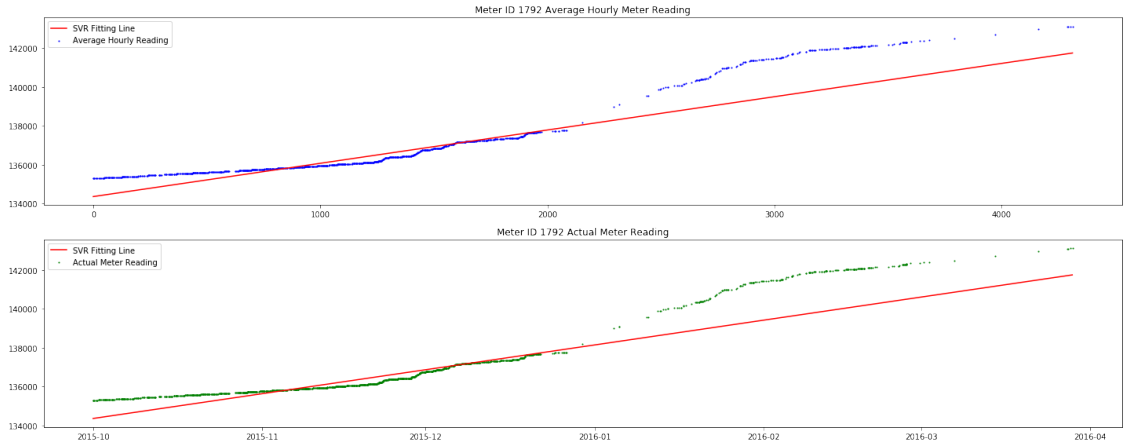


```
The accuracy score of fitting for meter ID 1792 is 0.849343695588213
The next predicted average hourly reading for meter ID 1792 for the period
2016-04-01 00:00:00 to 01:00:00 is 141879.8494472737
The average hourly consumption for meter ID 1792 is 1.710221290588379
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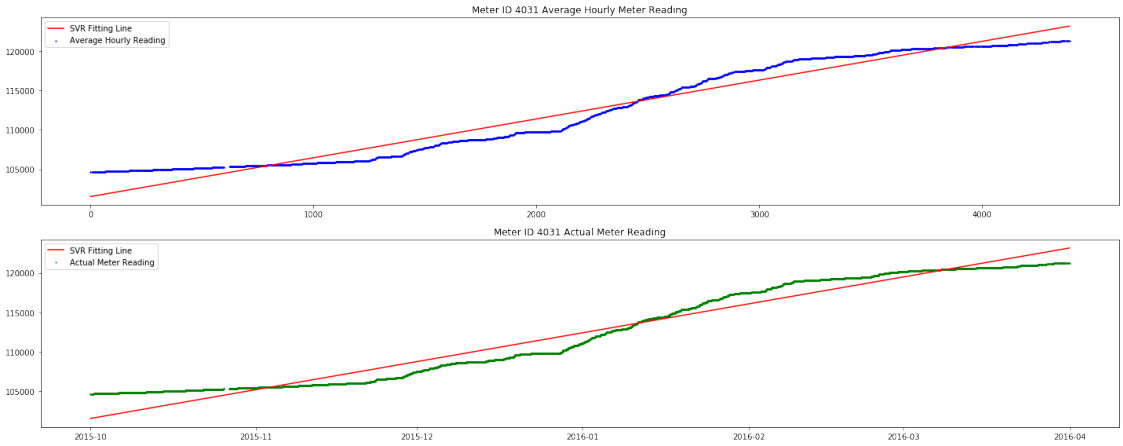
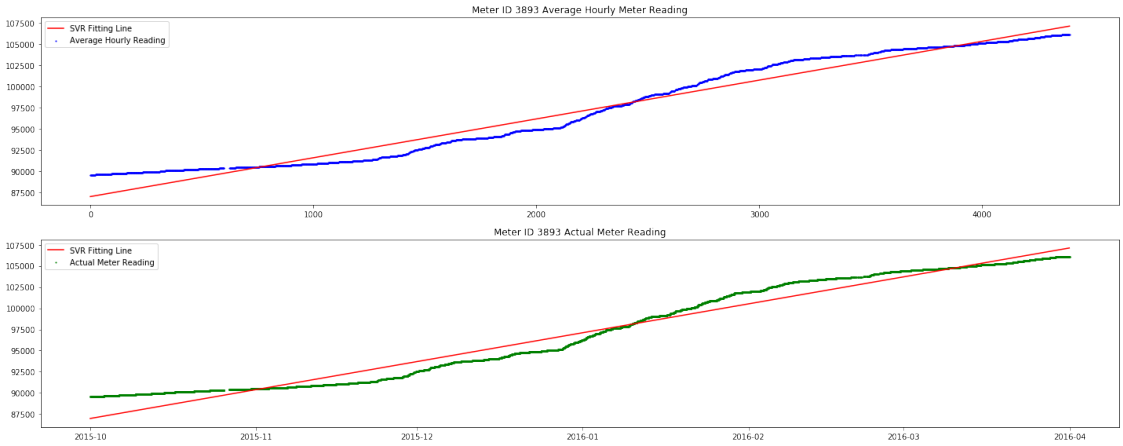
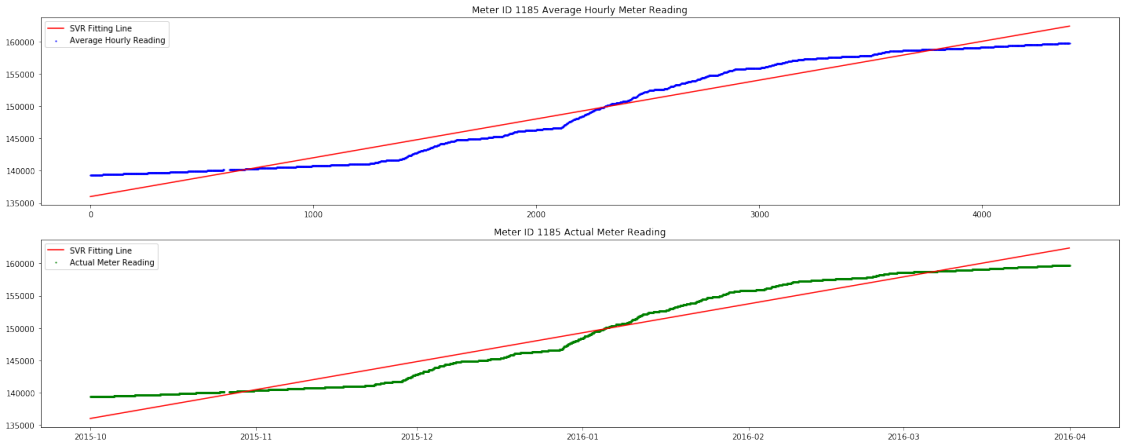


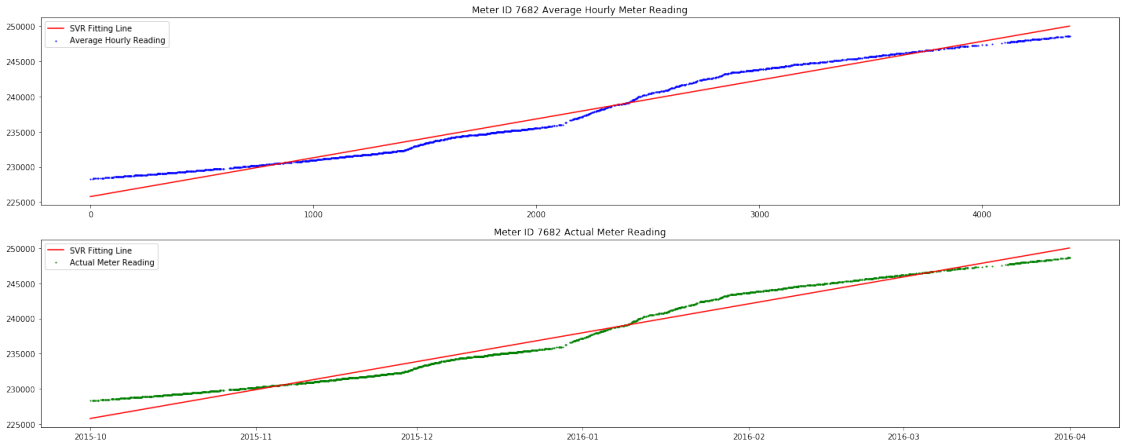
The accuracy score of fitting for meter ID 4031 is 0.9534920827921407
The next predicted average hourly reading for meter ID 4031 for the period 2016-04-01 00:00:00 to 01:00:00 is 123156.07112660506
The average hourly consumption for meter ID 4031 is 4.92242431640625



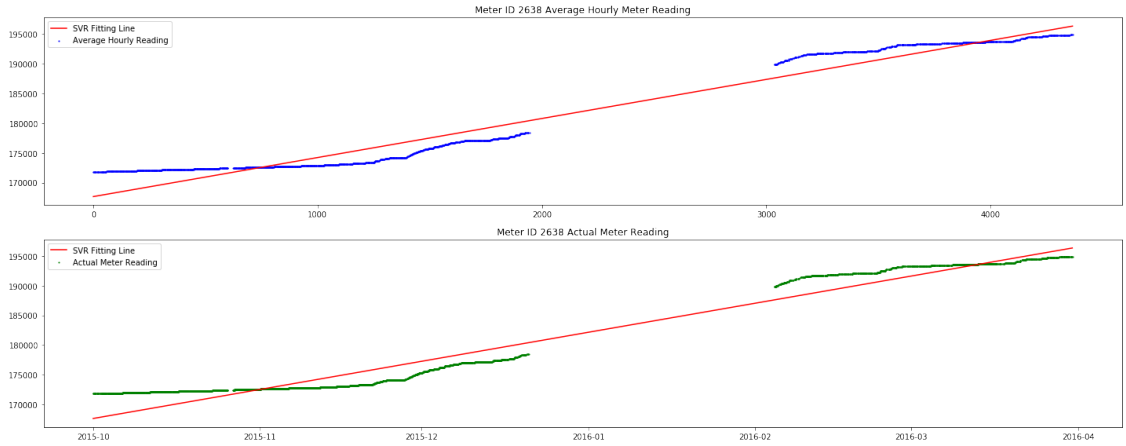
The accuracy score of fitting for meter ID 3893 is 0.9647891372113843
The next predicted average hourly reading for meter ID 3893 for the period 2016-04-01 00:00:00 to 01:00:00 is 107121.84248002723
The average hourly consumption for meter ID 3893 is 4.5867919921875



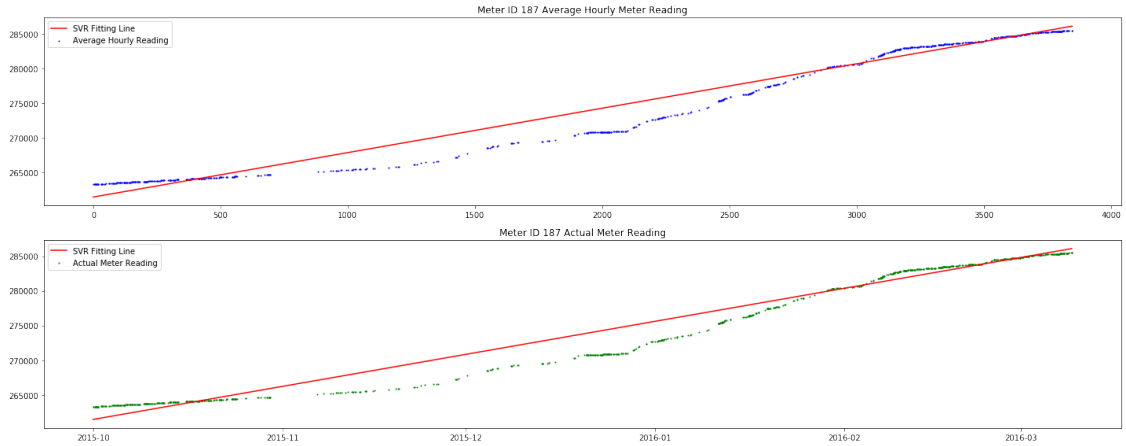
The accuracy score of fitting for meter ID 1185 is 0.9552560876790815
The next predicted average hourly reading for meter ID 1185 for the period 2016-04-01 00:00:00 to 01:00:00 is 162385.8986528397
The average hourly consumption for meter ID 1185 is 6.00956916809082



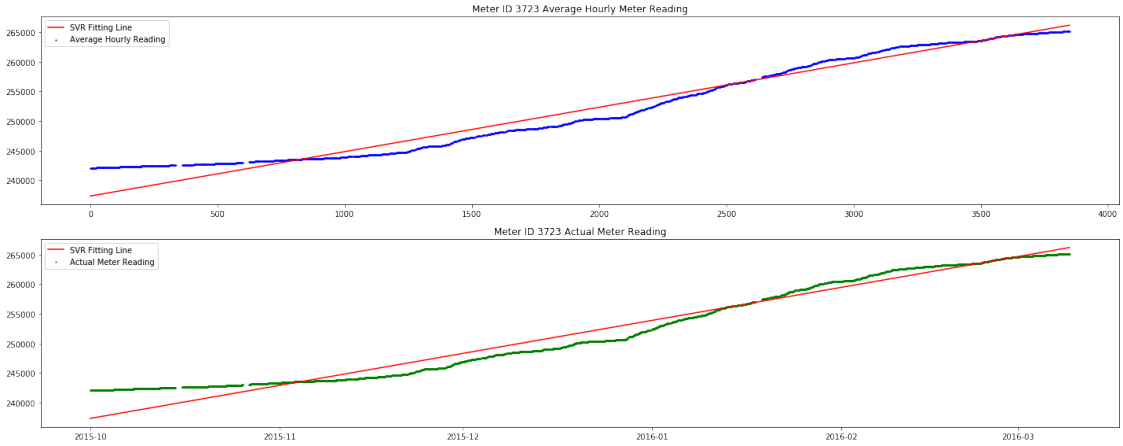
The accuracy score of fitting for meter ID 7682 is 0.9747734604638169
The next predicted average hourly reading for meter ID 7682 for the period 2016-04-01 00:00:00 to 01:00:00 is 250011.03454838038
The average hourly consumption for meter ID 7682 is 5.514039516448975



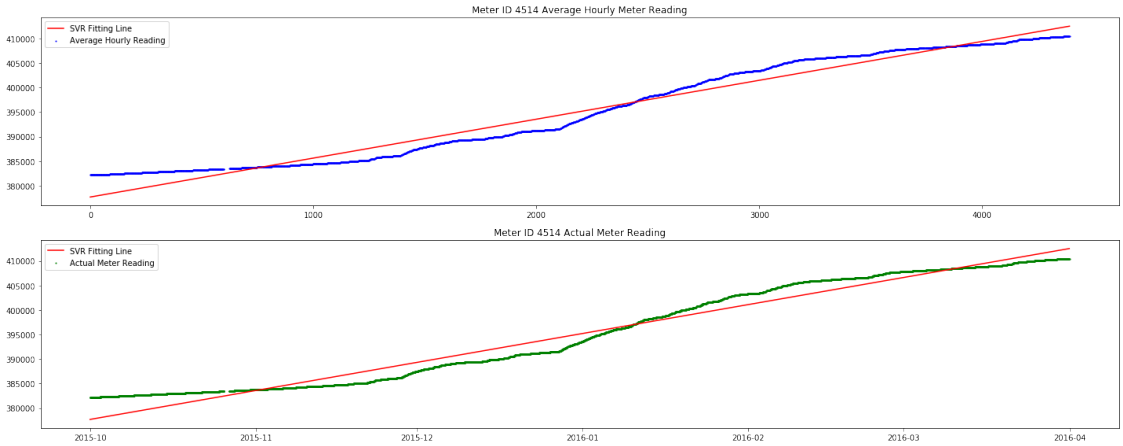
The accuracy score of fitting for meter ID 2638 is 0.9583021765440146
The next predicted average hourly reading for meter ID 2638 for the period 2016-04-01 00:00:00 to 01:00:00 is 196491.27257056526
The average hourly consumption for meter ID 2638 is 6.563323974609375



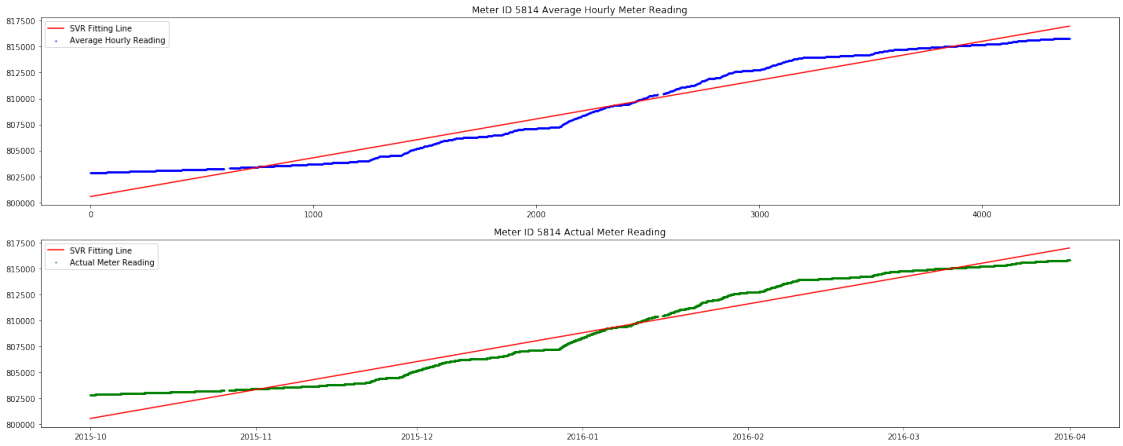
The accuracy score of fitting for meter ID 187 is 0.9624712559992326
The next predicted average hourly reading for meter ID 187 for the period 2016-04-01 00:00:00 to 01:00:00 is 289587.2678372632
The average hourly consumption for meter ID 187 is 6.402957439422607



The accuracy score of fitting for meter ID 3723 is 0.9582293833449403
The next predicted average hourly reading for meter ID 3723 for the period 2016-04-01 00:00:00 to 01:00:00 is 270257.325724344
The average hourly consumption for meter ID 3723 is 7.49220085144043



The accuracy score of fitting for meter ID 4514 is 0.9652500529046187
The next predicted average hourly reading for meter ID 4514 for the period 2016-04-01 00:00:00 to 01:00:00 is 412535.12724938325
The average hourly consumption for meter ID 4514 is 7.9350738525390625

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The accuracy score of fitting for meter ID 5814 is 0.9632858534300954
The next predicted average hourly reading for meter ID 5814 for the period
2016-04-01 00:00:00 to 01:00:00 is 816981.3105844024
The average hourly consumption for meter ID 5814 is 3.738130569458008
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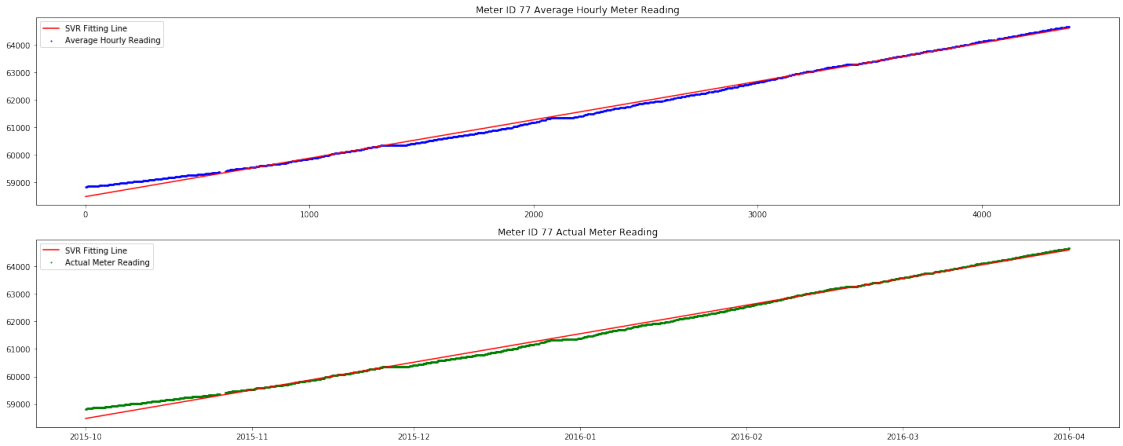


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The accuracy score of fitting for meter ID 77 is 0.9960193550816948
The next predicted average hourly reading for meter ID 77 for the period
2016-04-01 00:00:00 to 01:00:00 is 64601.93092119618
The average hourly consumption for meter ID 77 is 1.3948631286621094
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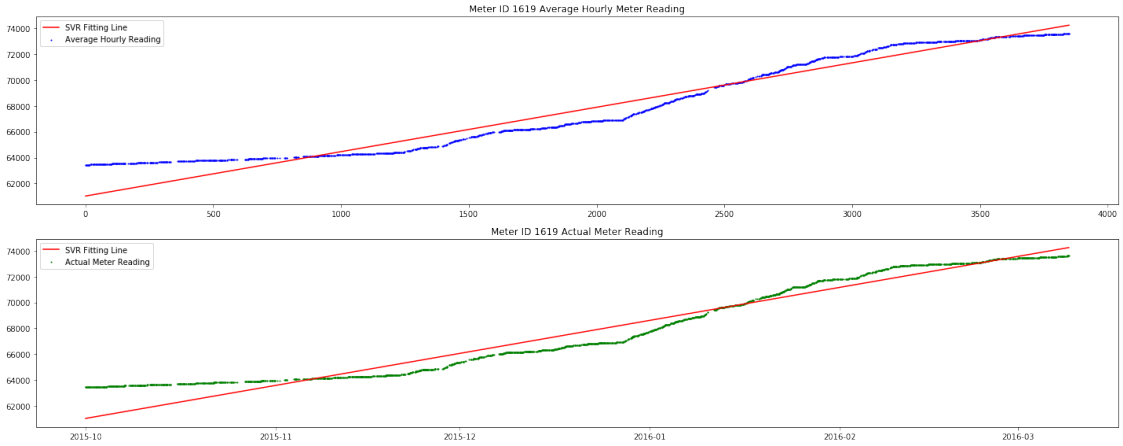
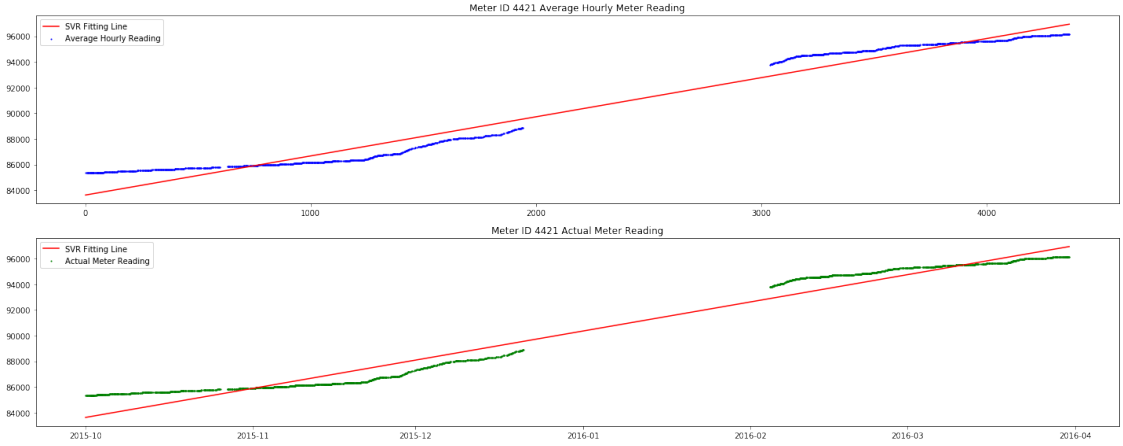
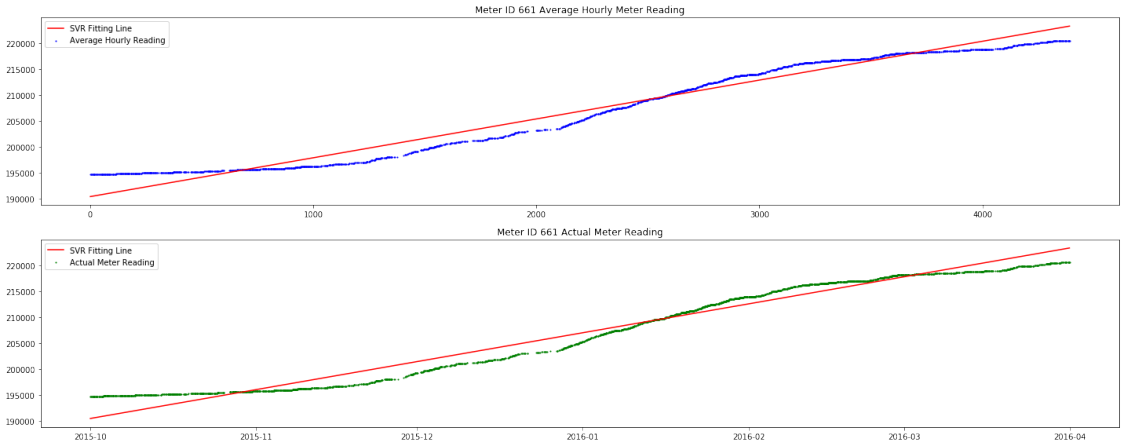


The accuracy score of fitting for meter ID 1619 is 0.9405129819139775
The next predicted average hourly reading for meter ID 1619 for the period 2016-04-01 00:00:00 to 01:00:00 is 76115.24730893465
The average hourly consumption for meter ID 1619 is 3.435739517211914



The accuracy score of fitting for meter ID 4421 is 0.967860731417948
The next predicted average hourly reading for meter ID 4421 for the period 2016-04-01 00:00:00 to 01:00:00 is 97025.67606600633
The average hourly consumption for meter ID 4421 is 3.052196502685547

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The accuracy score of fitting for meter ID 661 is 0.9666741856995498
The next predicted average hourly reading for meter ID 661 for the period
2016-04-01 00:00:00 to 01:00:00 is 223351.29383094978
The average hourly consumption for meter ID 661 is 7.5001068115234375
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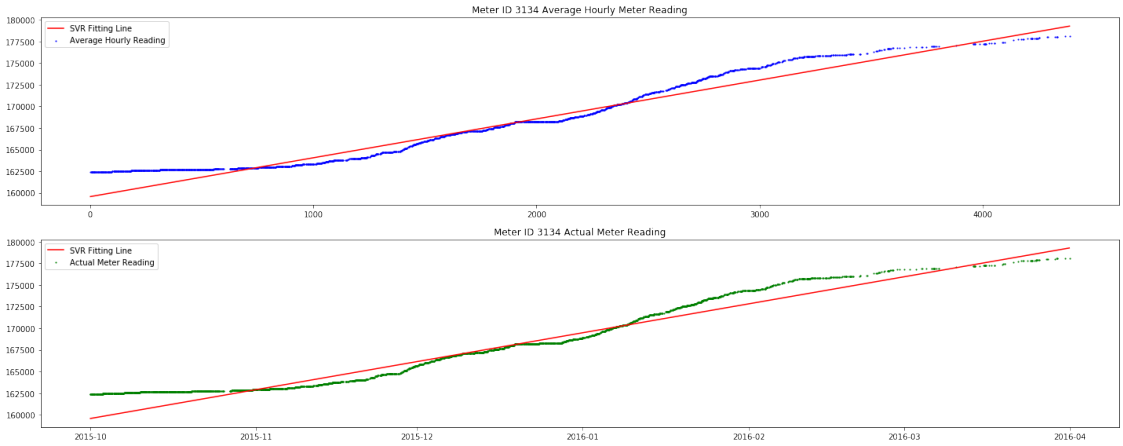


```
The accuracy score of fitting for meter ID 3134 is 0.9443986086046156
The next predicted average hourly reading for meter ID 3134 for the period
2016-04-01 00:00:00 to 01:00:00 is 179284.49027761788
The average hourly consumption for meter ID 3134 is 4.488649368286133
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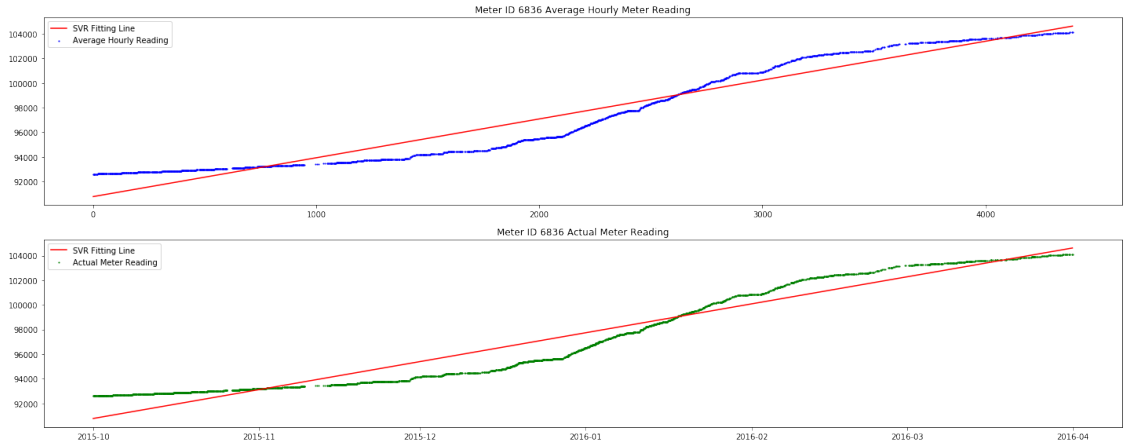


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The accuracy score of fitting for meter ID 6836 is 0.930849017010223
The next predicted average hourly reading for meter ID 6836 for the period
2016-04-01 00:00:00 to 01:00:00 is 104630.61111102367
The average hourly consumption for meter ID 6836 is 3.1555559635162354
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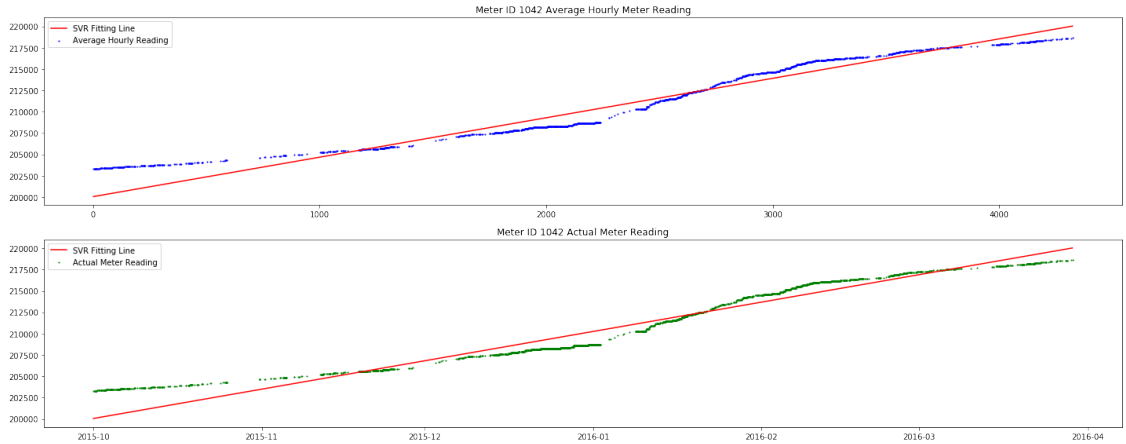


```
The accuracy score of fitting for meter ID 1042 is 0.9388149299705041
The next predicted average hourly reading for meter ID 1042 for the period
2016-04-01 00:00:00 to 01:00:00 is 220343.21394781547
The average hourly consumption for meter ID 1042 is 4.6209306716918945
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The accuracy score of fitting for meter ID 4373 is 0.9565005811505178
The next predicted average hourly reading for meter ID 4373 for the period
2016-04-01 00:00:00 to 01:00:00 is 263275.57927003724
The average hourly consumption for meter ID 4373 is 7.041459083557129
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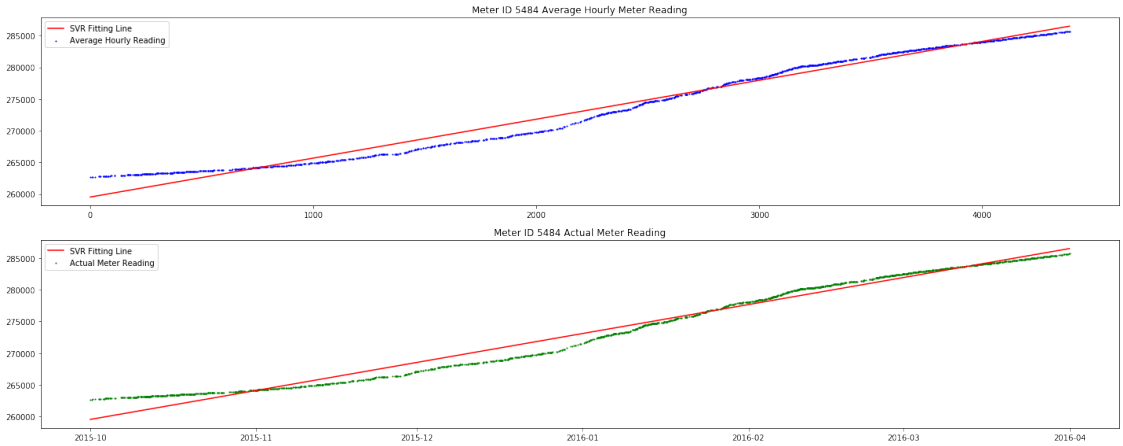


```
The accuracy score of fitting for meter ID 5484 is 0.9796422345528001
The next predicted average hourly reading for meter ID 5484 for the period
2016-04-01 00:00:00 to 01:00:00 is 286505.0477252834
The average hourly consumption for meter ID 5484 is 6.140532493591309
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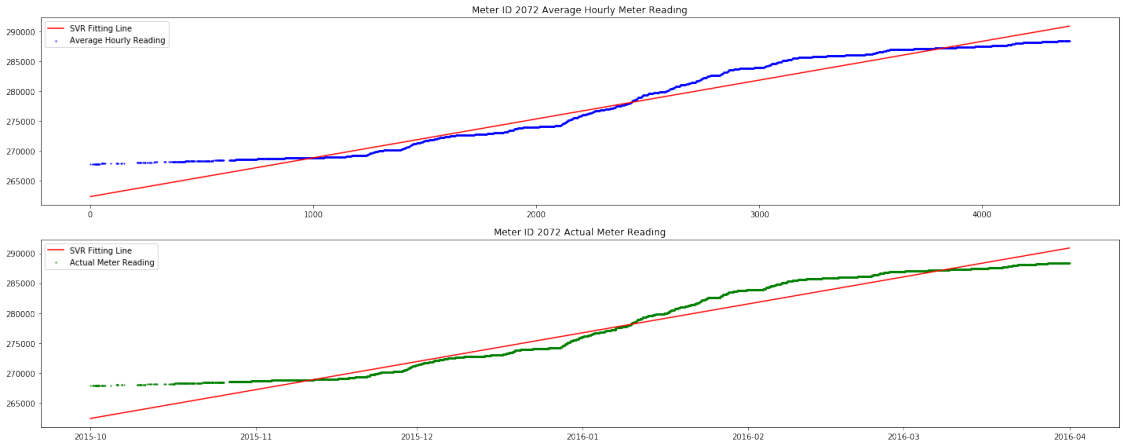
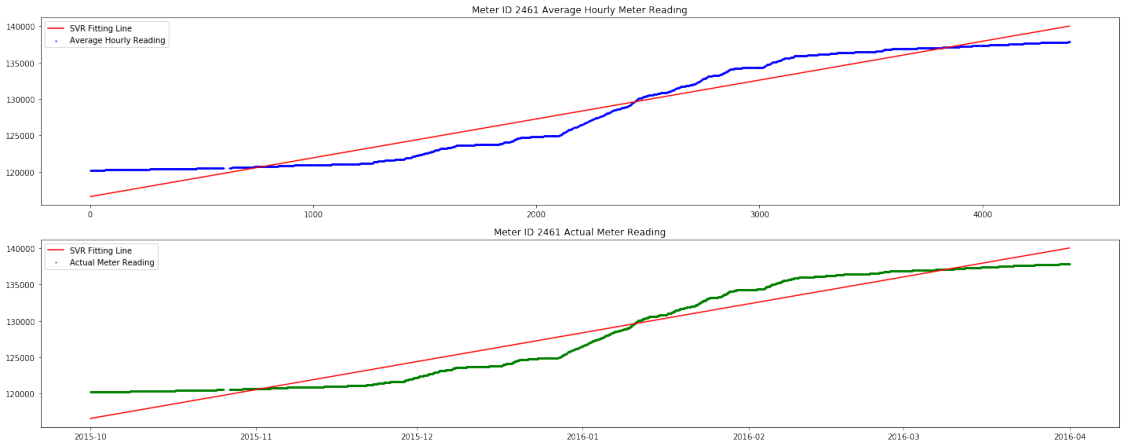
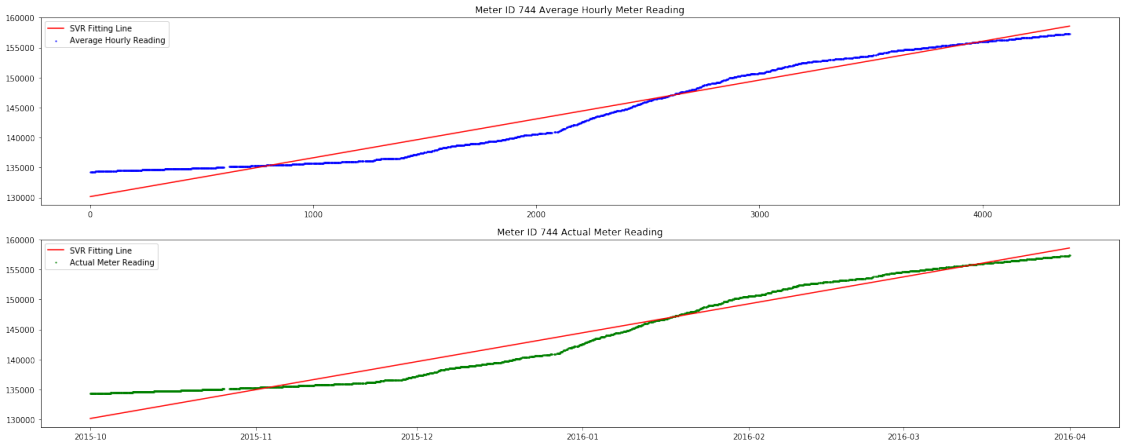


The accuracy score of fitting for meter ID 2072 is 0.955886539737445
The next predicted average hourly reading for meter ID 2072 for the period 2016-04-01 00:00:00 to 01:00:00 is 290897.5452447989
The average hourly consumption for meter ID 2072 is 6.498125076293945



The accuracy score of fitting for meter ID 2461 is 0.9354031607733243
The next predicted average hourly reading for meter ID 2461 for the period 2016-04-01 00:00:00 to 01:00:00 is 140029.90116986688
The average hourly consumption for meter ID 2461 is 5.336650848388672




```
The accuracy score of fitting for meter ID 744 is 0.9554190366927728
The next predicted average hourly reading for meter ID 744 for the period
2016-04-01 00:00:00 to 01:00:00 is 158601.58555307525
The average hourly consumption for meter ID 744 is 6.479130744934082
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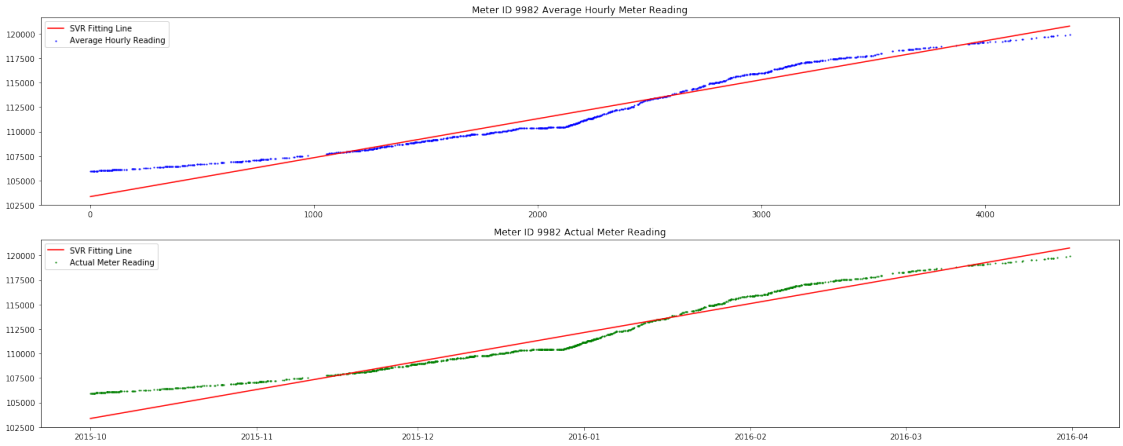


```
The accuracy score of fitting for meter ID 9982 is 0.9462383893218023
The next predicted average hourly reading for meter ID 9982 for the period
2016-04-01 00:00:00 to 01:00:00 is 120811.21038900645
The average hourly consumption for meter ID 9982 is 3.9725334644317627
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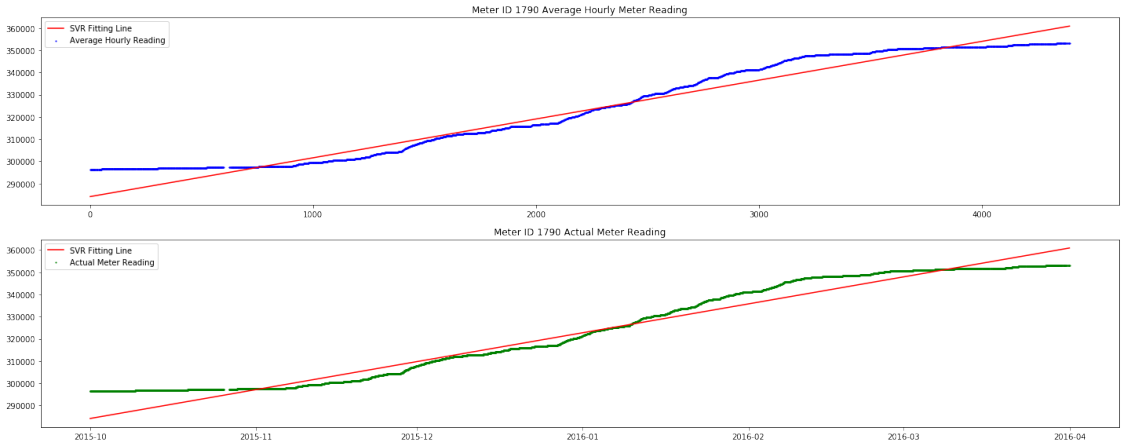
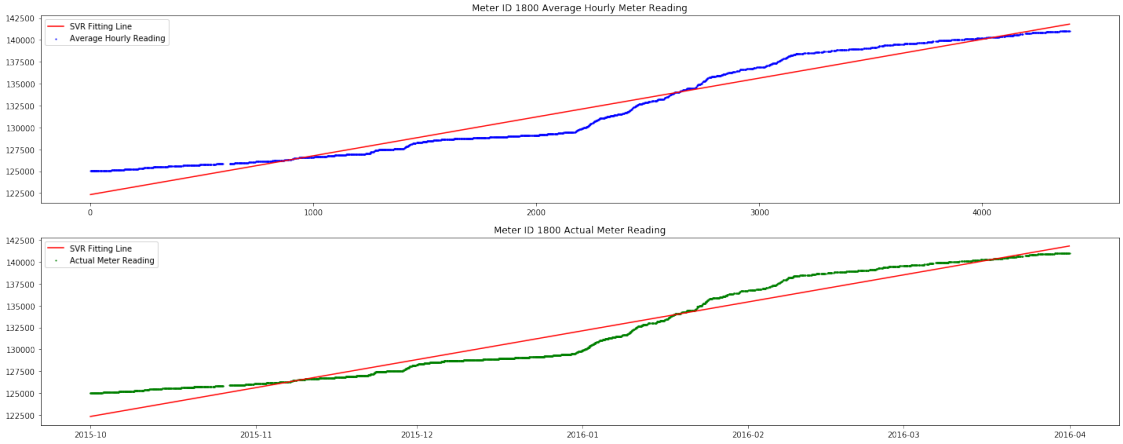
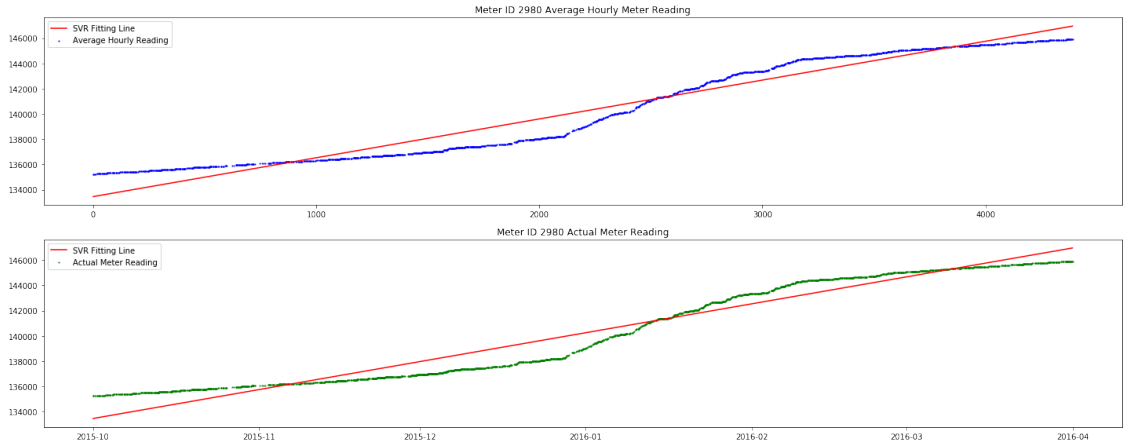


The accuracy score of fitting for meter ID 1790 is 0.9570884393586091
The next predicted average hourly reading for meter ID 1790 for the period 2016-04-01 00:00:00 to 01:00:00 is 360944.37478032045
The average hourly consumption for meter ID 1790 is 17.49405860900879



The accuracy score of fitting for meter ID 1800 is 0.9439596426252427
The next predicted average hourly reading for meter ID 1800 for the period 2016-04-01 00:00:00 to 01:00:00 is 141817.9903228238
The average hourly consumption for meter ID 1800 is 4.438708305358887

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The accuracy score of fitting for meter ID 2980 is 0.9432142106208554
The next predicted average hourly reading for meter ID 2980 for the period
2016-04-01 00:00:00 to 01:00:00 is 146962.00234865228
The average hourly consumption for meter ID 2980 is 3.075664520263672
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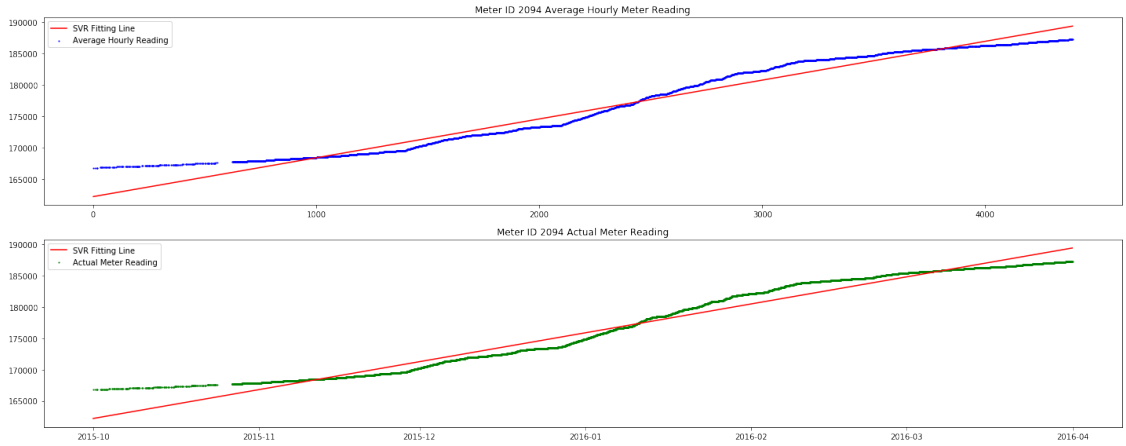


```
The accuracy score of fitting for meter ID 2094 is 0.9657338390127861
The next predicted average hourly reading for meter ID 2094 for the period
2016-04-01 00:00:00 to 01:00:00 is 189406.1520682678
The average hourly consumption for meter ID 2094 is 6.192747116088867
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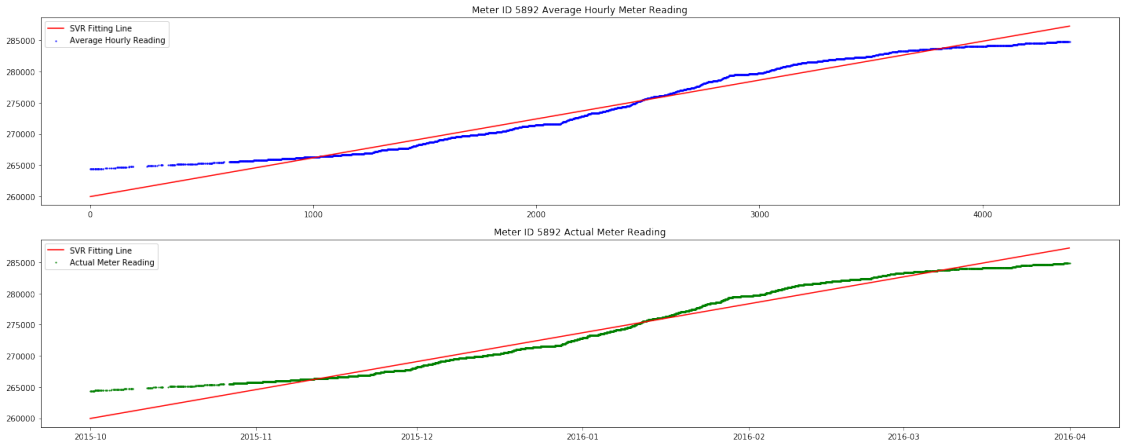
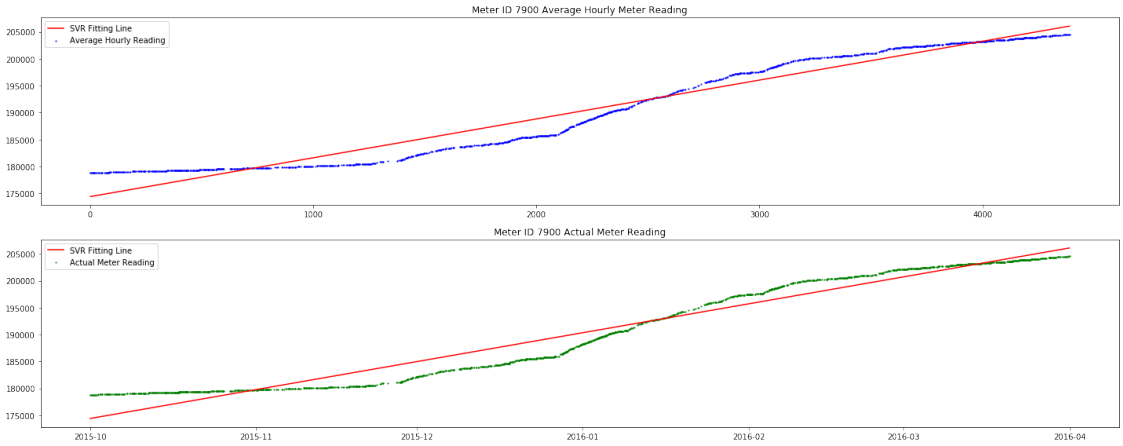
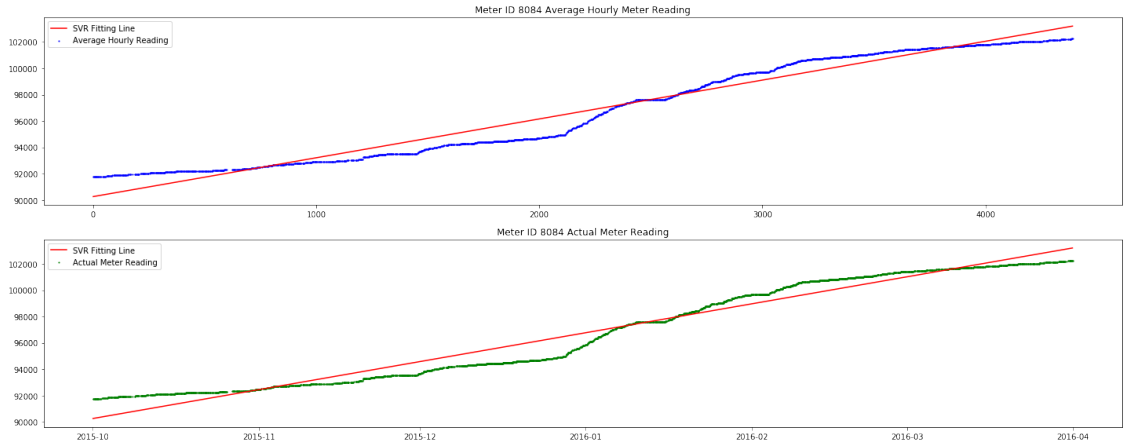


The accuracy score of fitting for meter ID 5892 is 0.968686732947893
The next predicted average hourly reading for meter ID 5892 for the period 2016-04-01 00:00:00 to 01:00:00 is 287296.6109647443
The average hourly consumption for meter ID 5892 is 6.227766990661621



The accuracy score of fitting for meter ID 7900 is 0.9533317525037784
The next predicted average hourly reading for meter ID 7900 for the period 2016-04-01 00:00:00 to 01:00:00 is 206090.88001278776
The average hourly consumption for meter ID 7900 is 7.212852954864502

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The accuracy score of fitting for meter ID 8084 is 0.958733324224346
The next predicted average hourly reading for meter ID 8084 for the period
2016-04-01 00:00:00 to 01:00:00 is 103208.05722070878
The average hourly consumption for meter ID 8084 is 2.948248863220215
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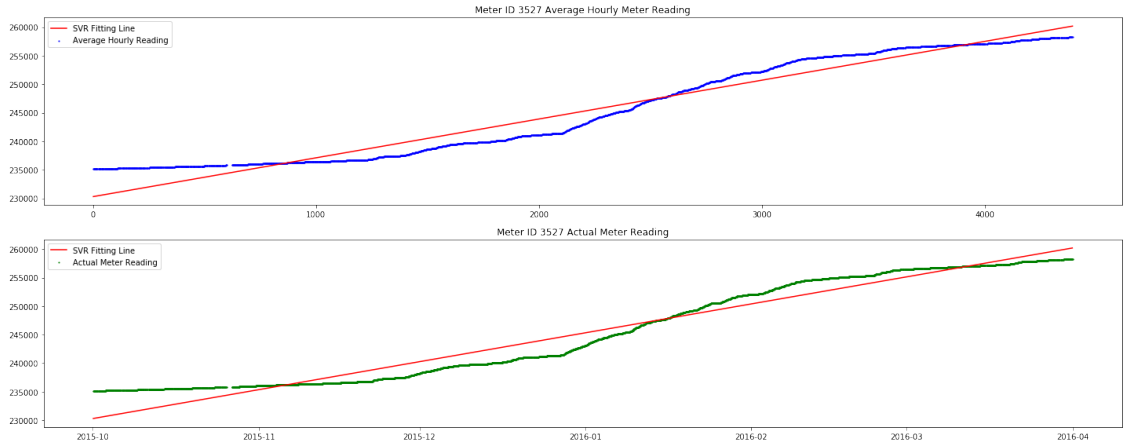


```
The accuracy score of fitting for meter ID 3527 is 0.9475380547922435
The next predicted average hourly reading for meter ID 3527 for the period
2016-04-01 00:00:00 to 01:00:00 is 260191.95658077594
The average hourly consumption for meter ID 3527 is 6.809037208557129
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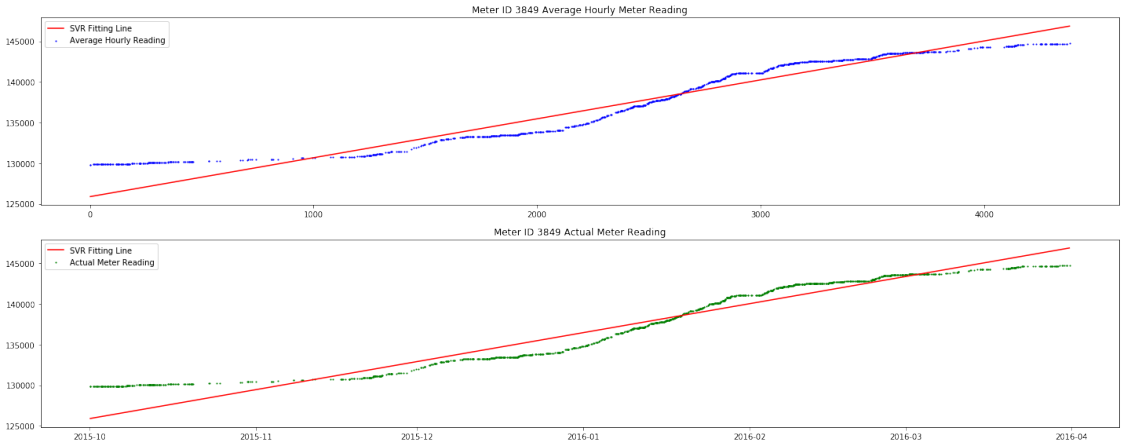


```
The accuracy score of fitting for meter ID 3849 is 0.92133474684618
The next predicted average hourly reading for meter ID 3849 for the period
2016-04-01 00:00:00 to 01:00:00 is 146914.35928727372
The average hourly consumption for meter ID 3849 is 4.786303520202637
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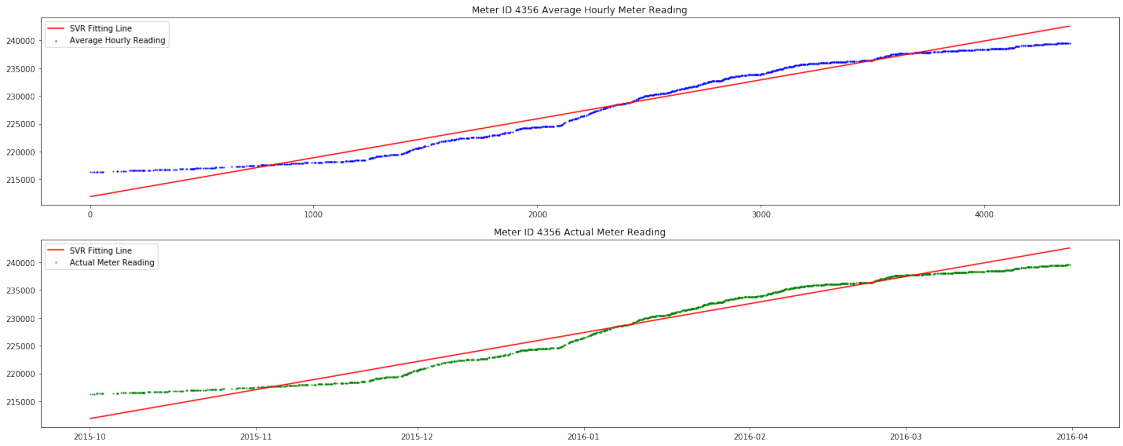


```
The accuracy score of fitting for meter ID 4356 is 0.9656831835944556
The next predicted average hourly reading for meter ID 4356 for the period
2016-04-01 00:00:00 to 01:00:00 is 242660.70035216713
The average hourly consumption for meter ID 4356 is 7.012286186218262
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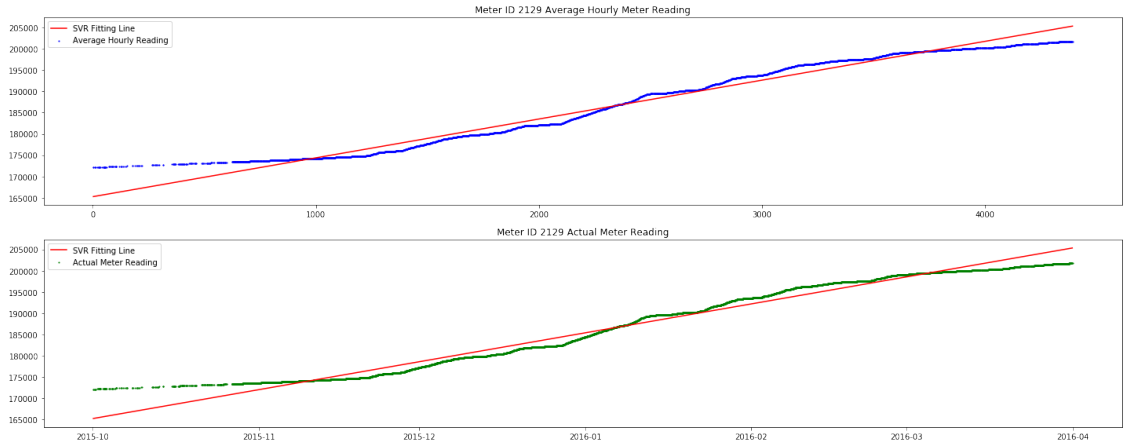
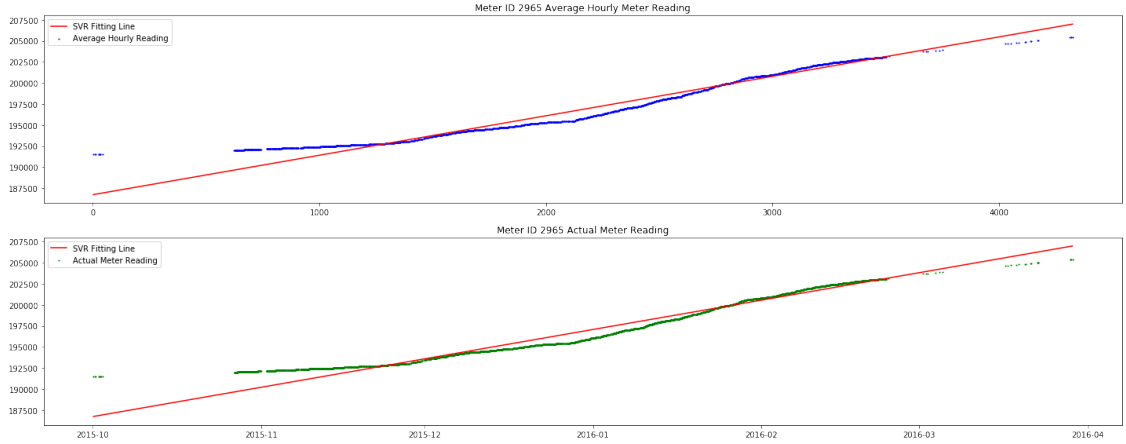
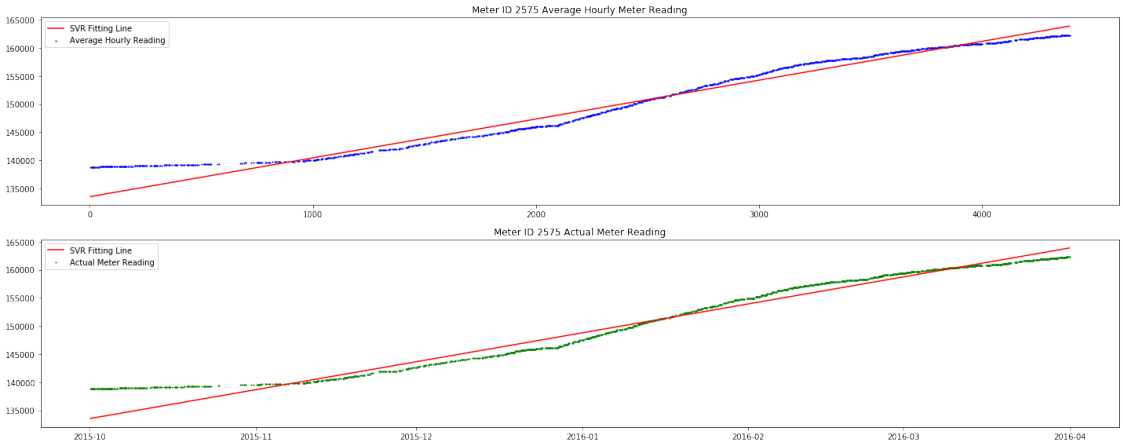


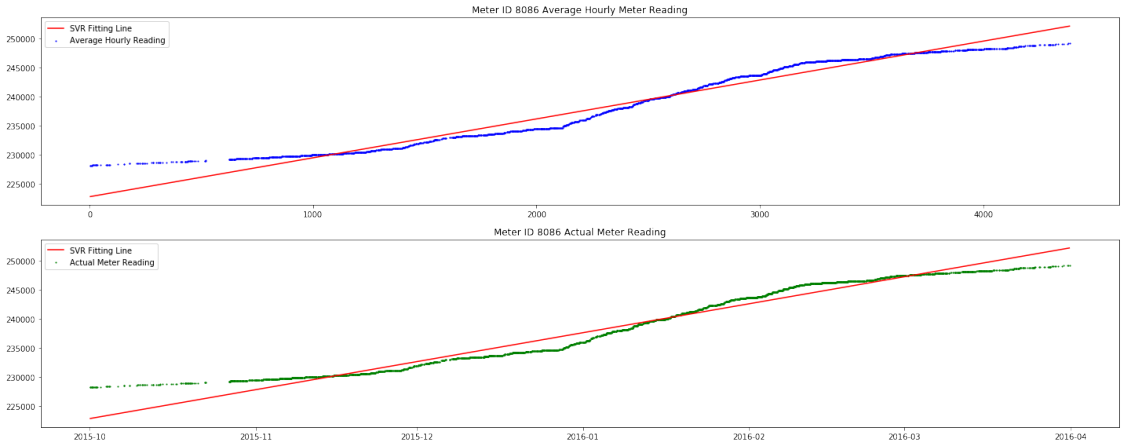
The accuracy score of fitting for meter ID 2129 is 0.9720097268009833
The next predicted average hourly reading for meter ID 2129 for the period 2016-04-01 00:00:00 to 01:00:00 is 205337.8343433857
The average hourly consumption for meter ID 2129 is 9.128002166748047



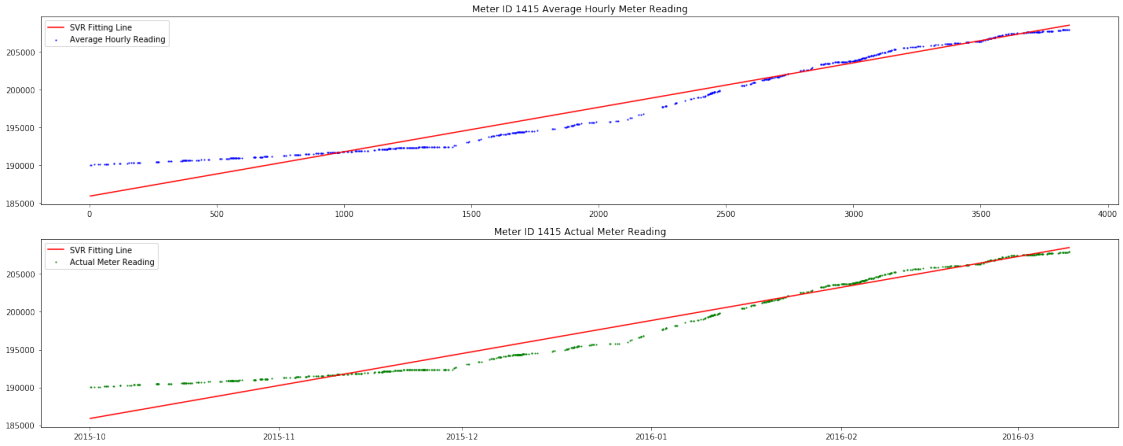
The accuracy score of fitting for meter ID 2965 is 0.9483021075006752
The next predicted average hourly reading for meter ID 2965 for the period 2016-04-01 00:00:00 to 01:00:00 is 207301.6099395473
The average hourly consumption for meter ID 2965 is 4.684715270996094



The accuracy score of fitting for meter ID 2575 is 0.962232852042952
The next predicted average hourly reading for meter ID 2575 for the period 2016-04-01 00:00:00 to 01:00:00 is 163879.9794454702
The average hourly consumption for meter ID 2575 is 6.909577369689941



The accuracy score of fitting for meter ID 8086 is 0.9629045375060512
The next predicted average hourly reading for meter ID 8086 for the period 2016-04-01 00:00:00 to 01:00:00 is 252191.7155889347
The average hourly consumption for meter ID 8086 is 6.6911516189575195

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The accuracy score of fitting for meter ID 1415 is 0.9626921037607015
The next predicted average hourly reading for meter ID 1415 for the period
2016-04-01 00:00:00 to 01:00:00 is 211681.32979198056
The average hourly consumption for meter ID 1415 is 5.8743685483932495
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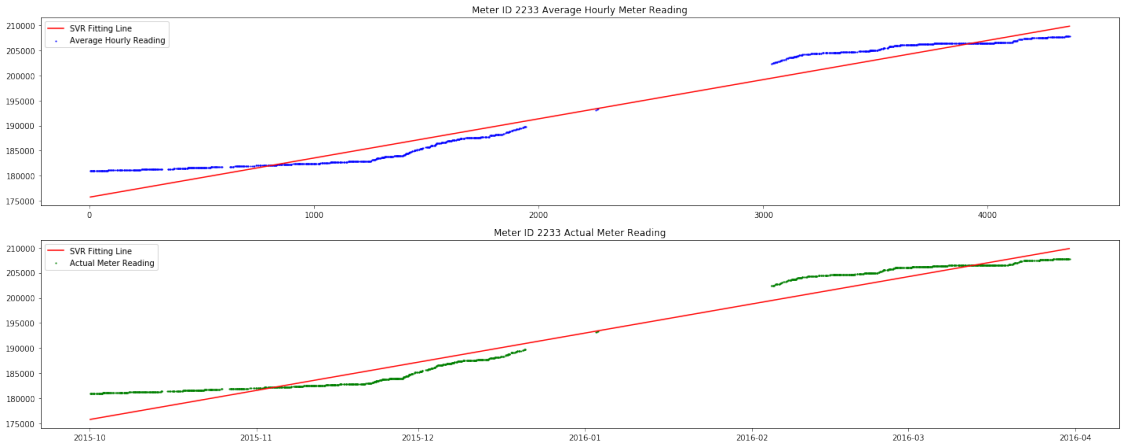


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The accuracy score of fitting for meter ID 2233 is 0.9611831665569786
The next predicted average hourly reading for meter ID 2233 for the period
2016-04-01 00:00:00 to 01:00:00 is 210058.8120260263
The average hourly consumption for meter ID 2233 is 7.81858491897583
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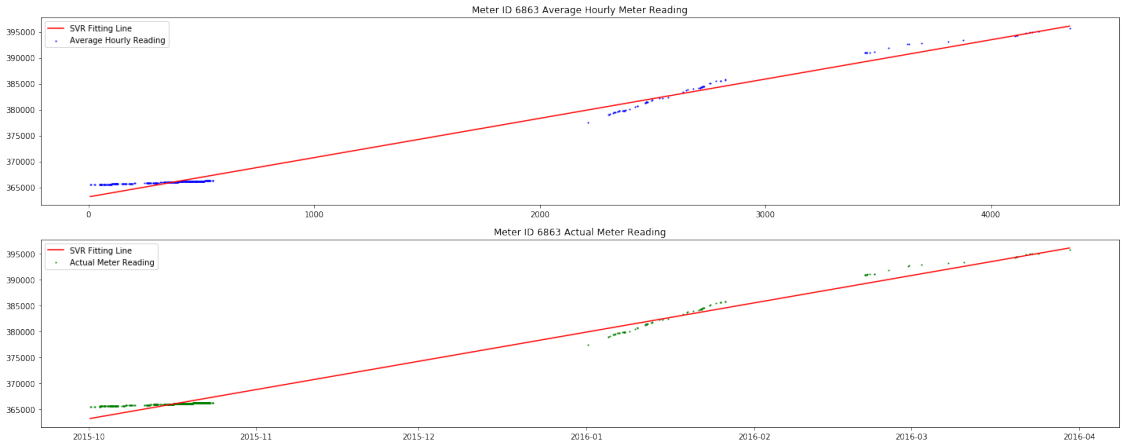


```
The accuracy score of fitting for meter ID 6863 is 0.9858675105829189
The next predicted average hourly reading for meter ID 6863 for the period
2016-04-01 00:00:00 to 01:00:00 is 396449.8743551184
The average hourly consumption for meter ID 6863 is 7.582571271806955
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The accuracy score of fitting for meter ID 2470 is 0.9362568862703712
The next predicted average hourly reading for meter ID 2470 for the period
2016-04-01 00:00:00 to 01:00:00 is 242047.8235475642
The average hourly consumption for meter ID 2470 is 6.038661003112793
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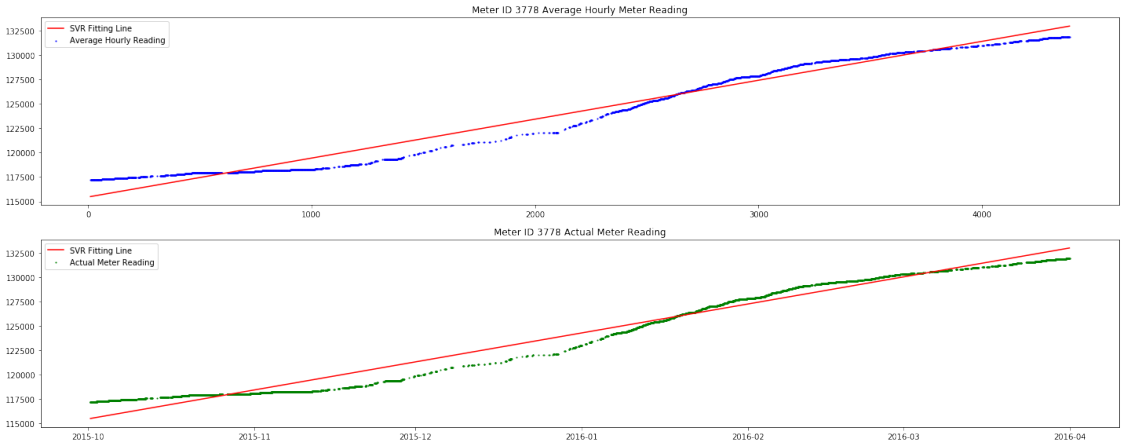


```
The accuracy score of fitting for meter ID 3778 is 0.9749993318606983
The next predicted average hourly reading for meter ID 3778 for the period
2016-04-01 00:00:00 to 01:00:00 is 132984.4452625601
The average hourly consumption for meter ID 3778 is 3.9915075302124023
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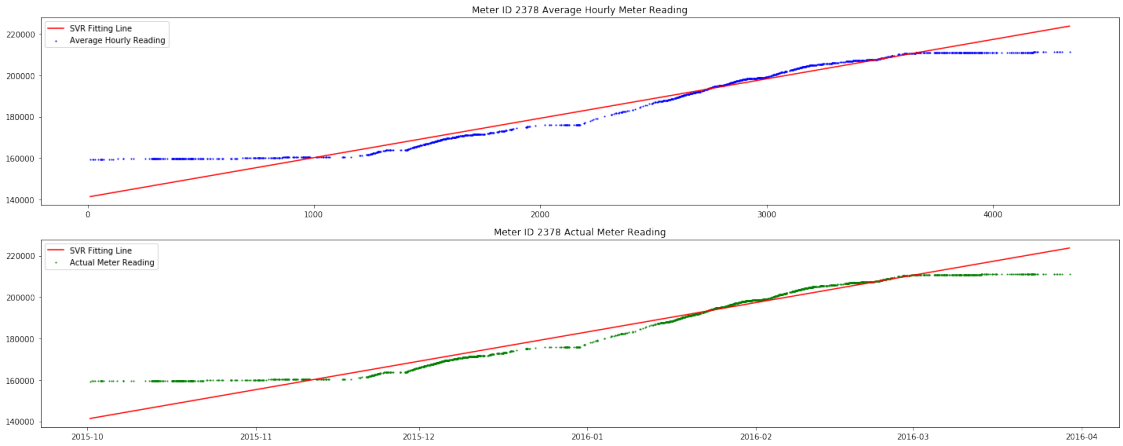


```
The accuracy score of fitting for meter ID 2378 is 0.9430731235126045
The next predicted average hourly reading for meter ID 2378 for the period
2016-04-01 00:00:00 to 01:00:00 is 224729.85512983578
The average hourly consumption for meter ID 2378 is 19.02713108062744
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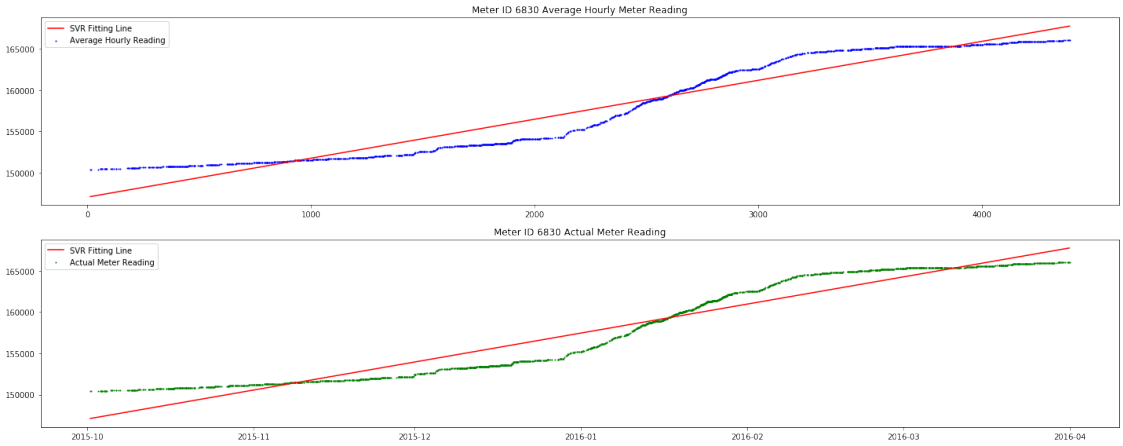
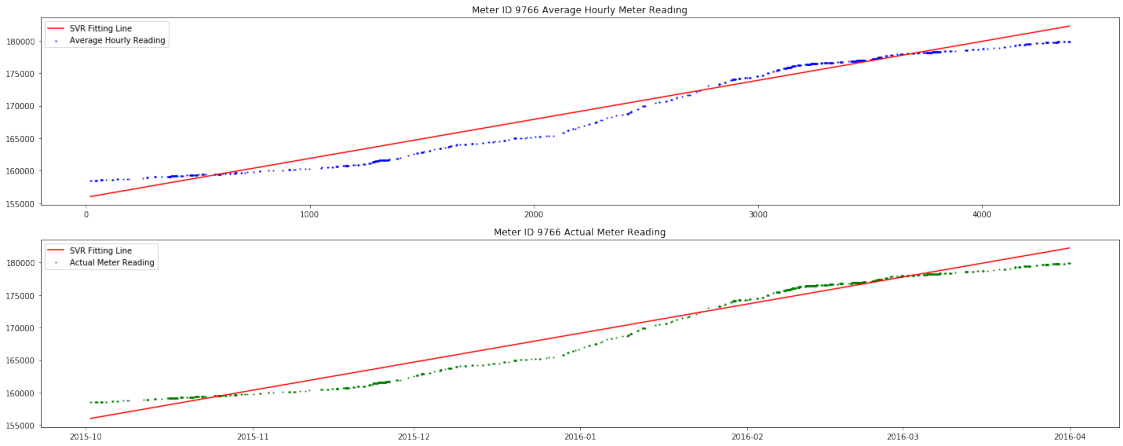
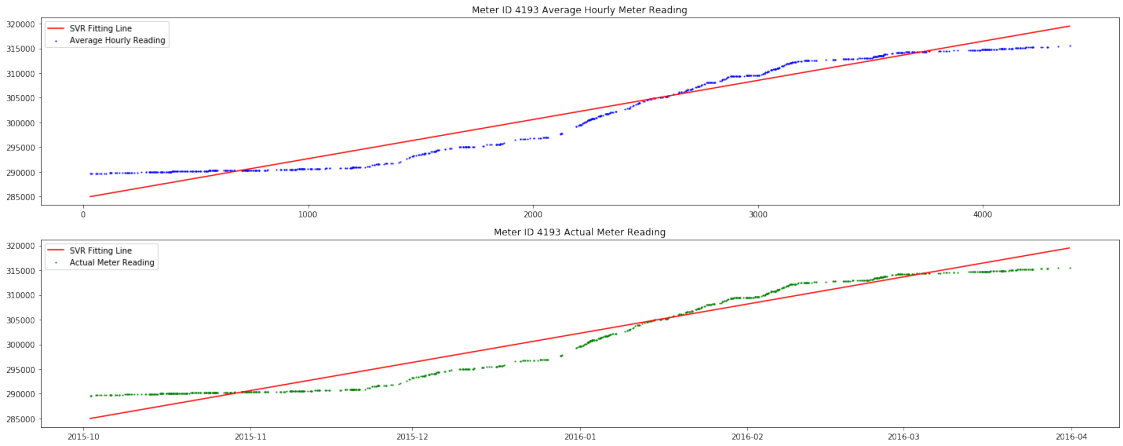


The accuracy score of fitting for meter ID 6830 is 0.9339903467796131
The next predicted average hourly reading for meter ID 6830 for the period 2016-04-01 00:00:00 to 01:00:00 is 167776.16593867954
The average hourly consumption for meter ID 6830 is 4.7214460372924805



The accuracy score of fitting for meter ID 9766 is 0.9685213915688745
The next predicted average hourly reading for meter ID 9766 for the period 2016-04-01 00:00:00 to 01:00:00 is 182257.26072472072
The average hourly consumption for meter ID 9766 is 6.001940727233887




```
The accuracy score of fitting for meter ID 4193 is 0.9511070658822359
The next predicted average hourly reading for meter ID 4193 for the period
2016-04-01 00:00:00 to 01:00:00 is 319554.42757167714
The average hourly consumption for meter ID 4193 is 7.9242799282073975
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The accuracy score of fitting for meter ID 8703 is 0.980453599882458
The next predicted average hourly reading for meter ID 8703 for the period
2016-04-01 00:00:00 to 01:00:00 is 227730.43953911363
The average hourly consumption for meter ID 8703 is 4.169001340866089
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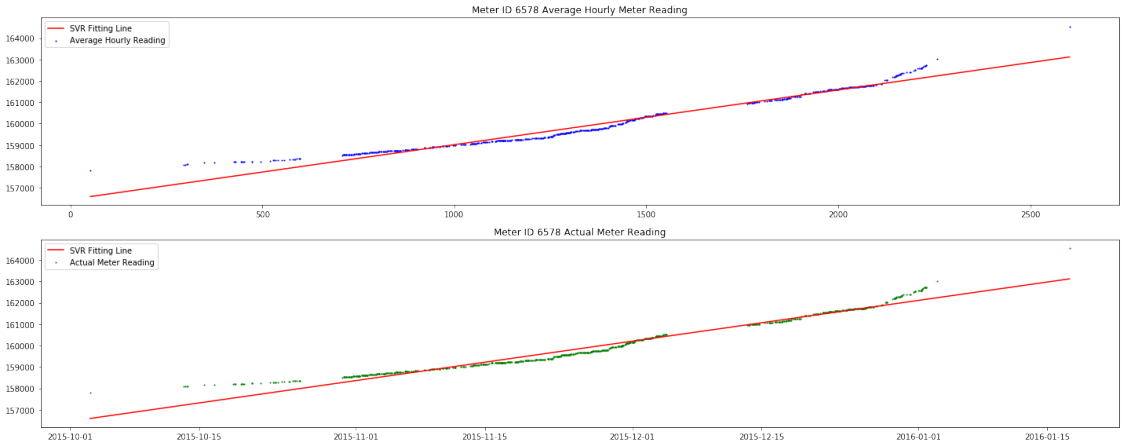


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The accuracy score of fitting for meter ID 6578 is 0.9684714853553349
The next predicted average hourly reading for meter ID 6578 for the period
2016-04-01 00:00:00 to 01:00:00 is 167702.7200910357
The average hourly consumption for meter ID 6578 is 2.5607306361198425
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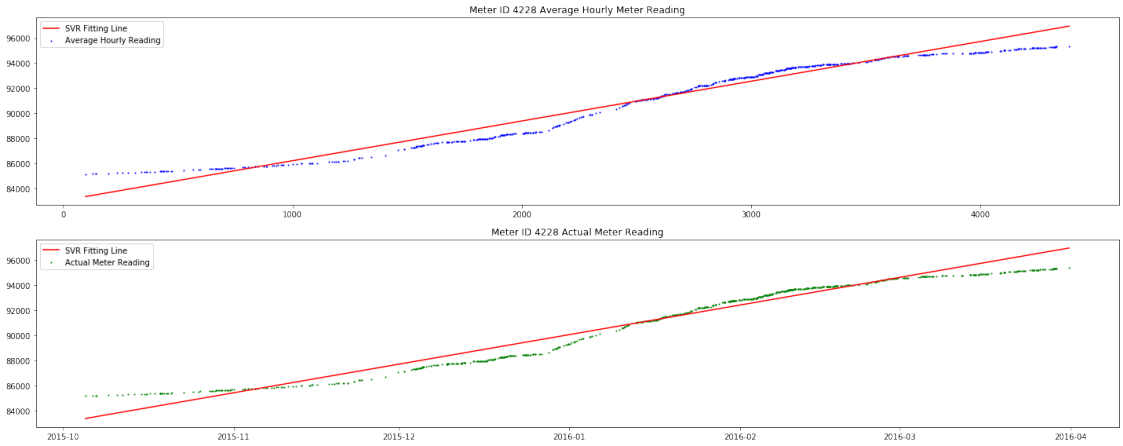


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The accuracy score of fitting for meter ID 4228 is 0.9590943552356627
The next predicted average hourly reading for meter ID 4228 for the period
2016-04-01 00:00:00 to 01:00:00 is 96973.97070691234
The average hourly consumption for meter ID 4228 is 3.169494867324829
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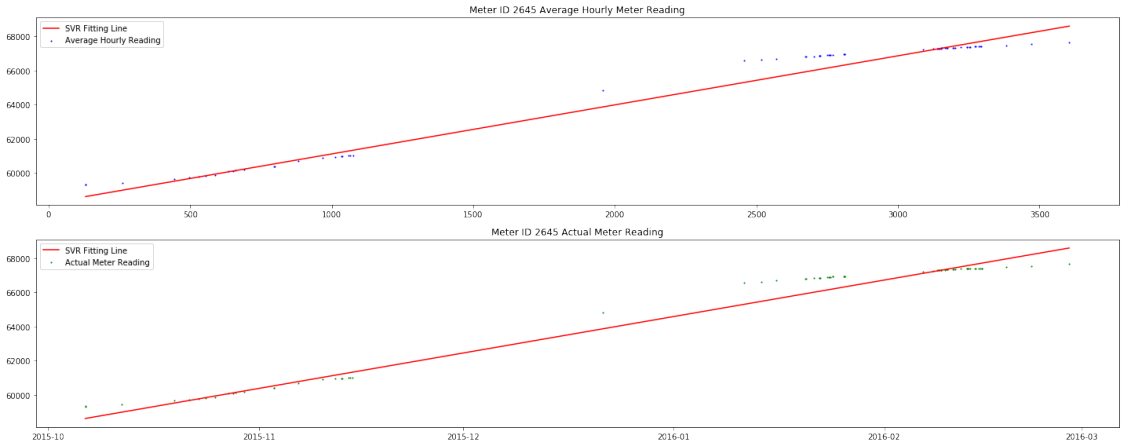


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The accuracy score of fitting for meter ID 2645 is 0.9764978948823688
The next predicted average hourly reading for meter ID 2645 for the period
2016-04-01 00:00:00 to 01:00:00 is 70874.74831462067
The average hourly consumption for meter ID 2645 is 2.8788121938705444
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The accuracy score of fitting for meter ID 6505 is 0.9186268810674851
The next predicted average hourly reading for meter ID 6505 for the period
2016-04-01 00:00:00 to 01:00:00 is 157279.40707061245
The average hourly consumption for meter ID 6505 is 7.476094722747803
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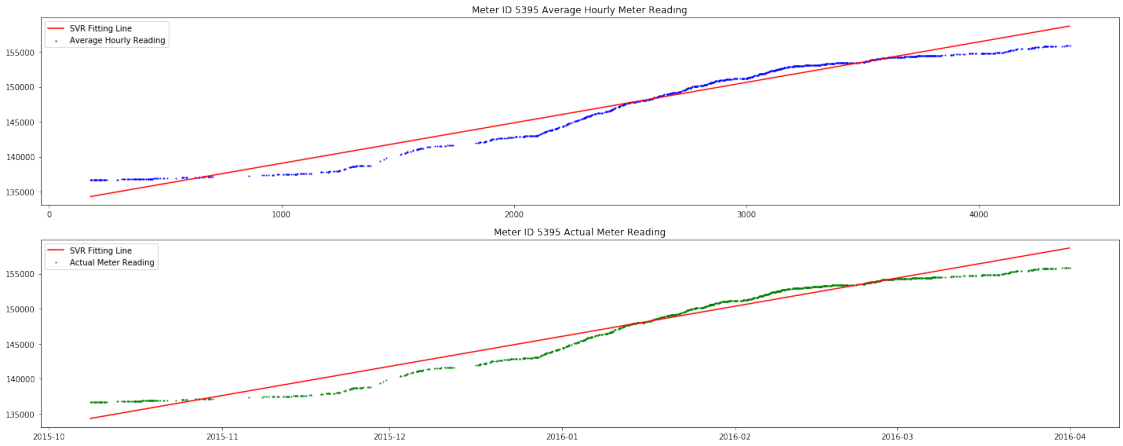
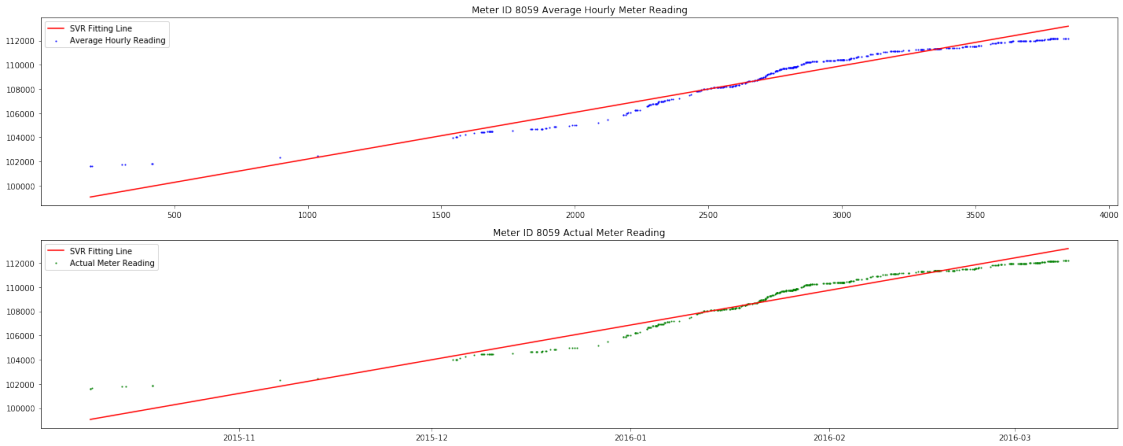
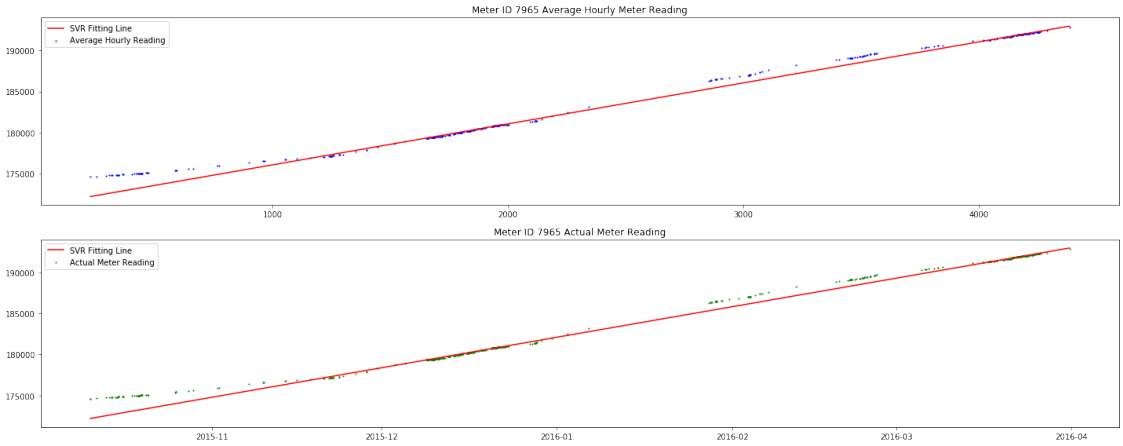


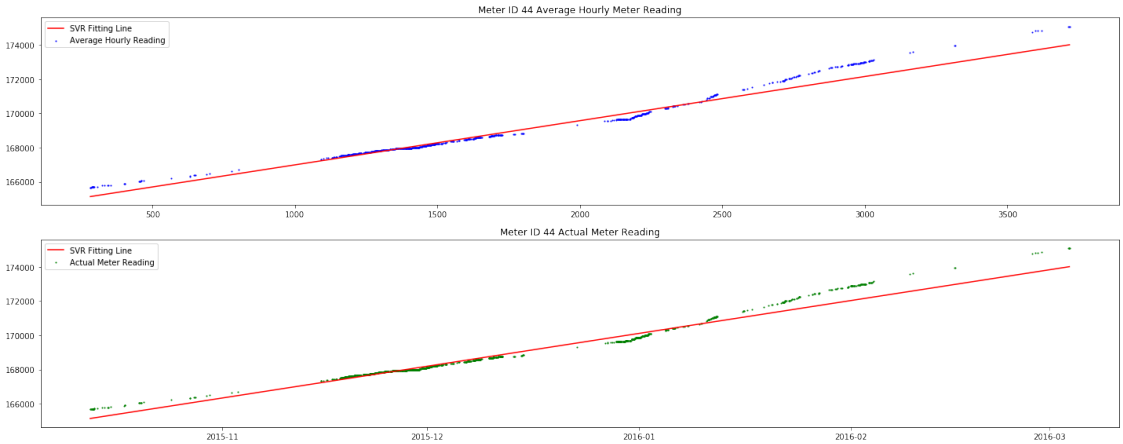
The accuracy score of fitting for meter ID 5395 is 0.9569863223800646
The next predicted average hourly reading for meter ID 5395 for the period 2016-04-01 00:00:00 to 01:00:00 is 158693.26257048466
The average hourly consumption for meter ID 5395 is 5.784931182861328



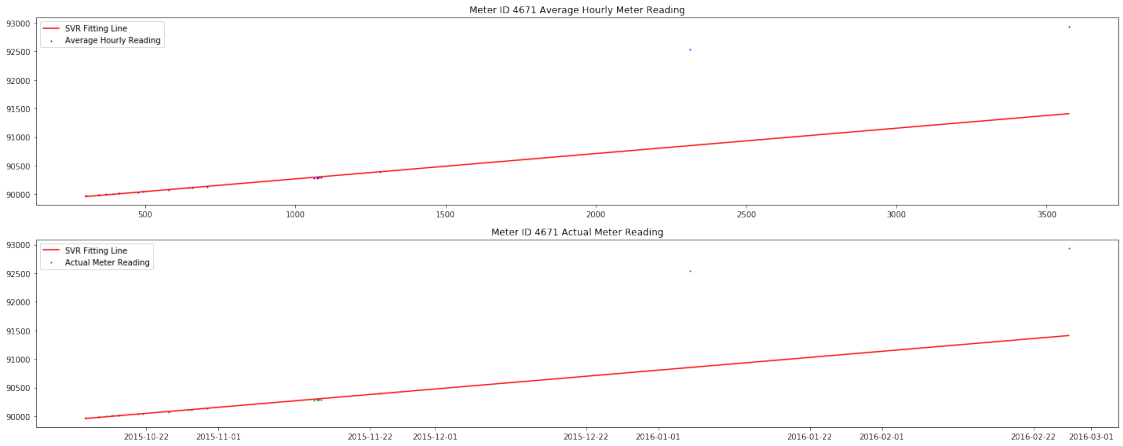
The accuracy score of fitting for meter ID 8059 is 0.9456731581872727
The next predicted average hourly reading for meter ID 8059 for the period 2016-04-01 00:00:00 to 01:00:00 is 115292.73453225238
The average hourly consumption for meter ID 8059 is 3.858513355255127



The accuracy score of fitting for meter ID 7965 is 0.9875821042835741
The next predicted average hourly reading for meter ID 7965 for the period 2016-04-01 00:00:00 to 01:00:00 is 192999.65285266883
The average hourly consumption for meter ID 7965 is 4.98960268497467



The accuracy score of fitting for meter ID 44 is 0.9674944756417693
The next predicted average hourly reading for meter ID 44 for the period 2016-04-01 00:00:00 to 01:00:00 is 175743.64536487867
The average hourly consumption for meter ID 44 is 2.5796844959259033

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The accuracy score of fitting for meter ID 4671 is 0.5952351490185547
The next predicted average hourly reading for meter ID 4671 for the period
2016-04-01 00:00:00 to 01:00:00 is 91773.5056600002
The average hourly consumption for meter ID 4671 is 0.4433962255716324
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The accuracy score of fitting for meter ID 6685 is 0.9828336593902172
The next predicted average hourly reading for meter ID 6685 for the period
2016-04-01 00:00:00 to 01:00:00 is 113680.53031039645
The average hourly consumption for meter ID 6685 is 5.366889834403992
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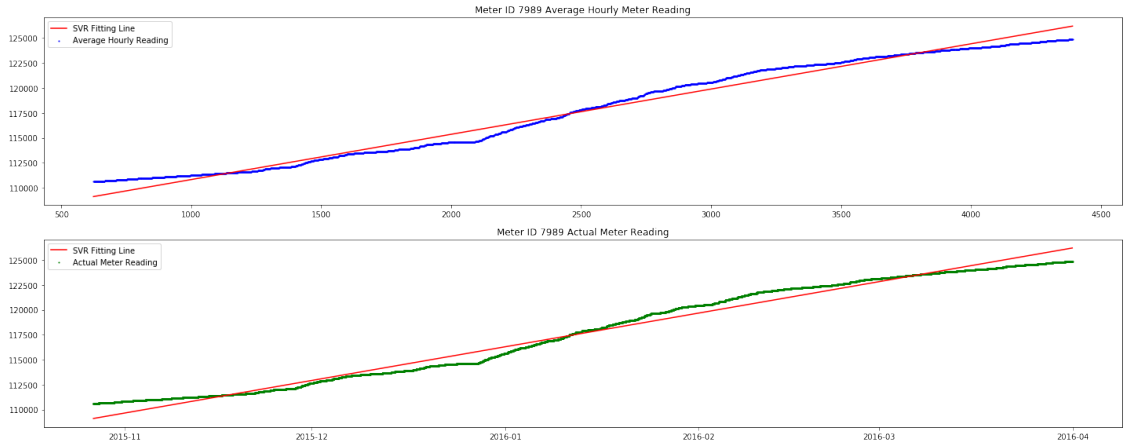


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The accuracy score of fitting for meter ID 7989 is 0.9815191922514613
The next predicted average hourly reading for meter ID 7989 for the period
2016-04-01 00:00:00 to 01:00:00 is 126193.0127675661
The average hourly consumption for meter ID 7989 is 4.532506942749023
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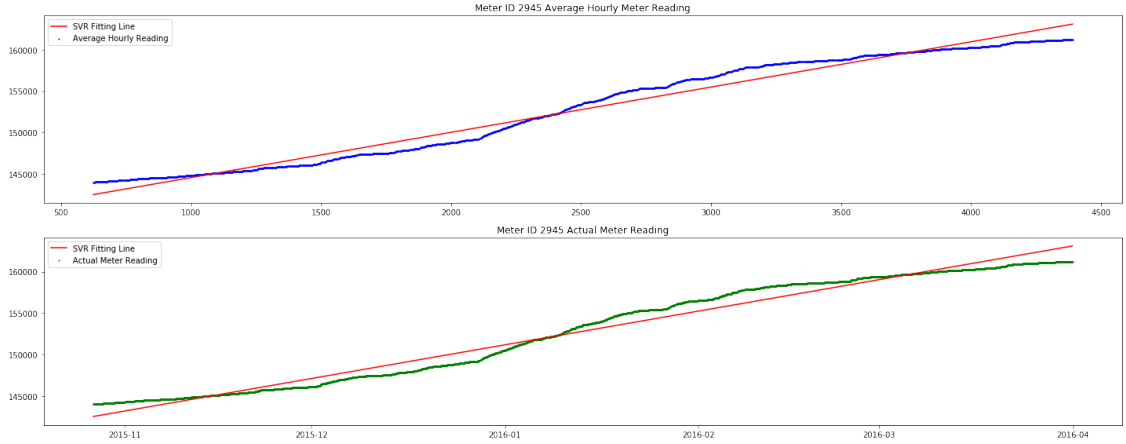


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The accuracy score of fitting for meter ID 2945 is 0.9744436532855547
The next predicted average hourly reading for meter ID 2945 for the period
2016-04-01 00:00:00 to 01:00:00 is 163100.23432537593
The average hourly consumption for meter ID 2945 is 5.460216522216797
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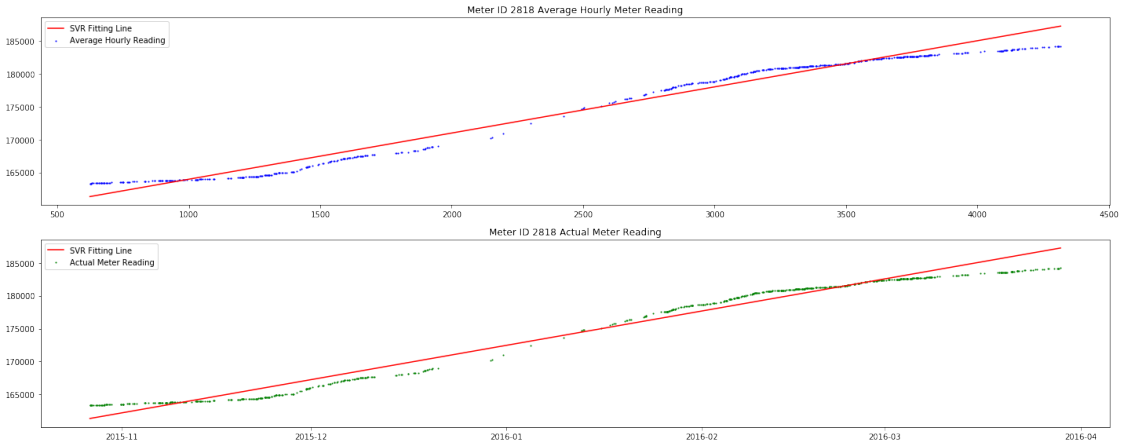
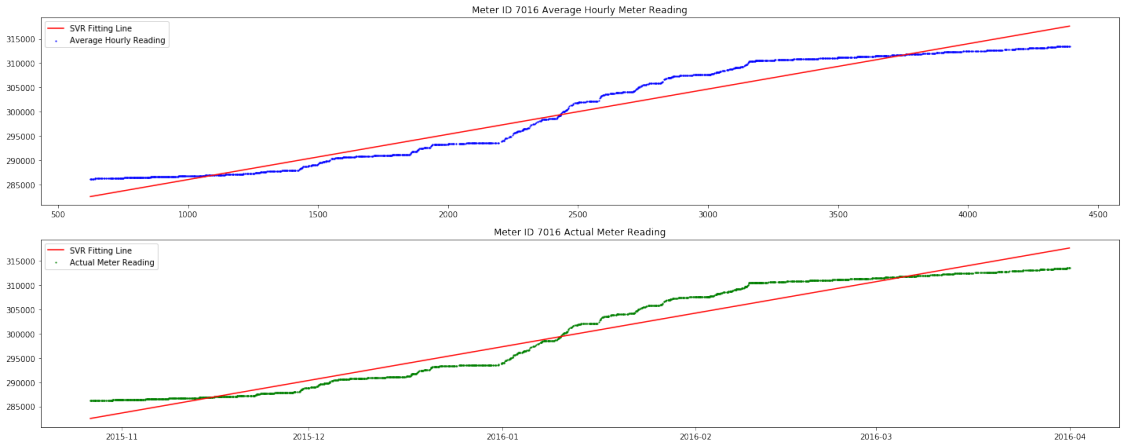
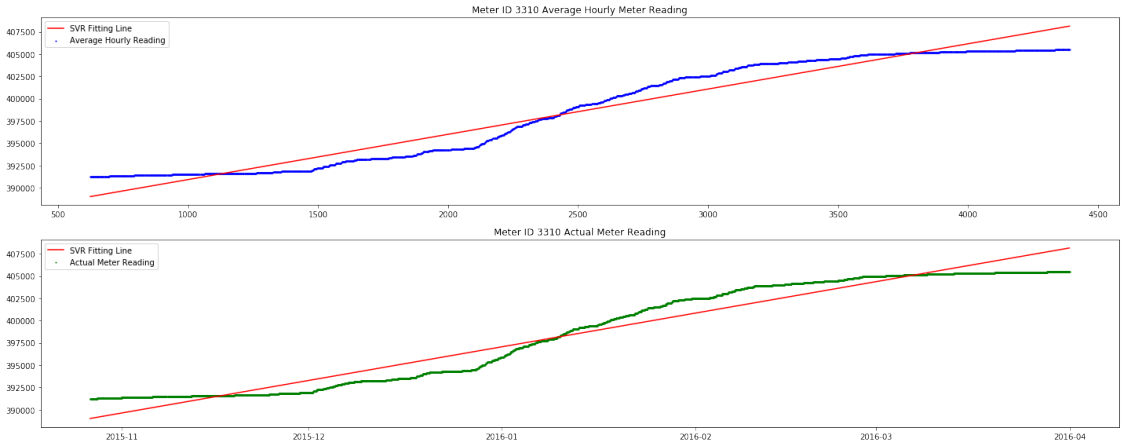


The accuracy score of fitting for meter ID 2818 is 0.9776890149404185
The next predicted average hourly reading for meter ID 2818 for the period 2016-04-01 00:00:00 to 01:00:00 is 187799.53831764305
The average hourly consumption for meter ID 2818 is 7.024197101593018

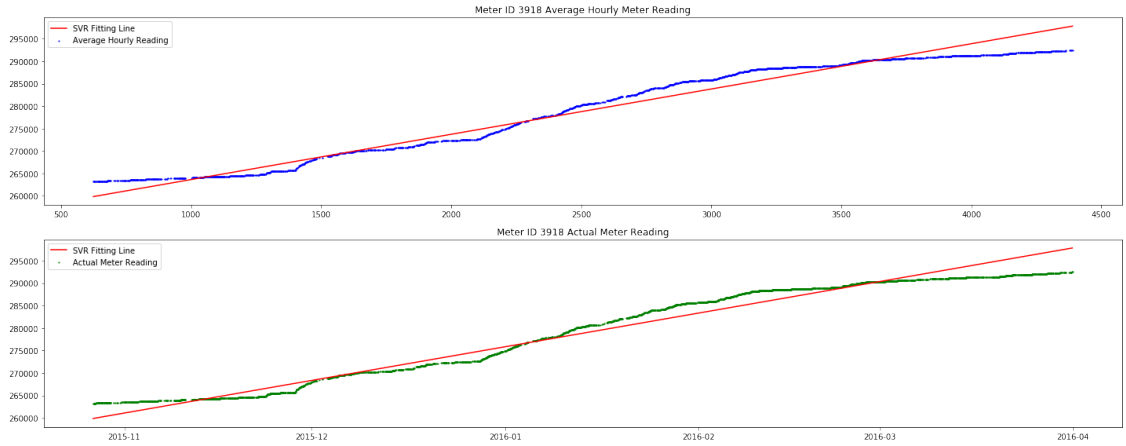


The accuracy score of fitting for meter ID 7016 is 0.9513396547393582
The next predicted average hourly reading for meter ID 7016 for the period 2016-04-01 00:00:00 to 01:00:00 is 317637.2253941286
The average hourly consumption for meter ID 7016 is 9.318483352661133

The accuracy score of fitting for meter ID 8967 is 0.8366066266261984
The next predicted average hourly reading for meter ID 8967 for the period 2016-04-01 00:00:00 to 01:00:00 is 188494.8557825674
The average hourly consumption for meter ID 8967 is 0.3643040657043457



The accuracy score of fitting for meter ID 3310 is 0.9469597846426553
The next predicted average hourly reading for meter ID 3310 for the period 2016-04-01 00:00:00 to 01:00:00 is 408144.5432798887
The average hourly consumption for meter ID 3310 is 5.075326919555664




```
The accuracy score of fitting for meter ID 3918 is 0.9646191756140756
The next predicted average hourly reading for meter ID 3918 for the period
2016-04-01 00:00:00 to 01:00:00 is 297864.2359061475
The average hourly consumption for meter ID 3918 is 10.088804244995117
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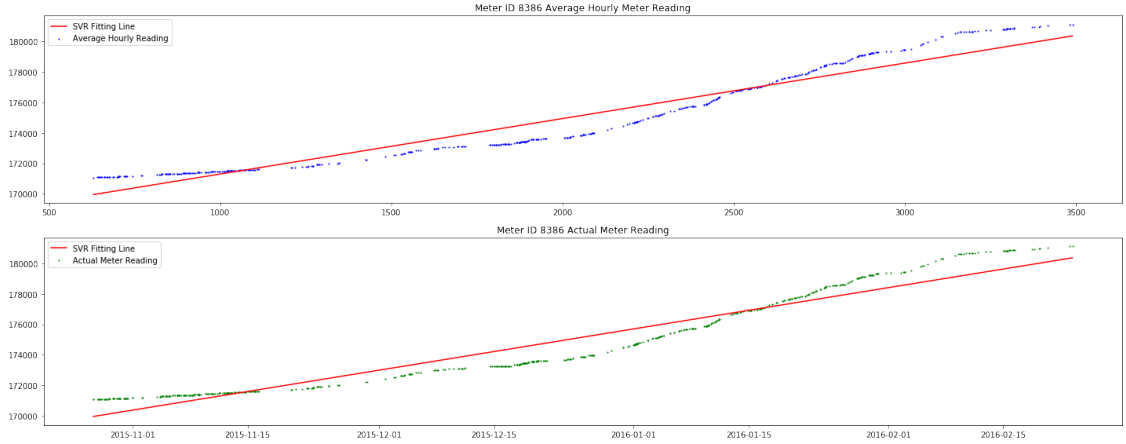


```
The accuracy score of fitting for meter ID 8386 is 0.9344982025132856
The next predicted average hourly reading for meter ID 8386 for the period
2016-04-01 00:00:00 to 01:00:00 is 183651.43571430648
The average hourly consumption for meter ID 8386 is 3.6415343284606934
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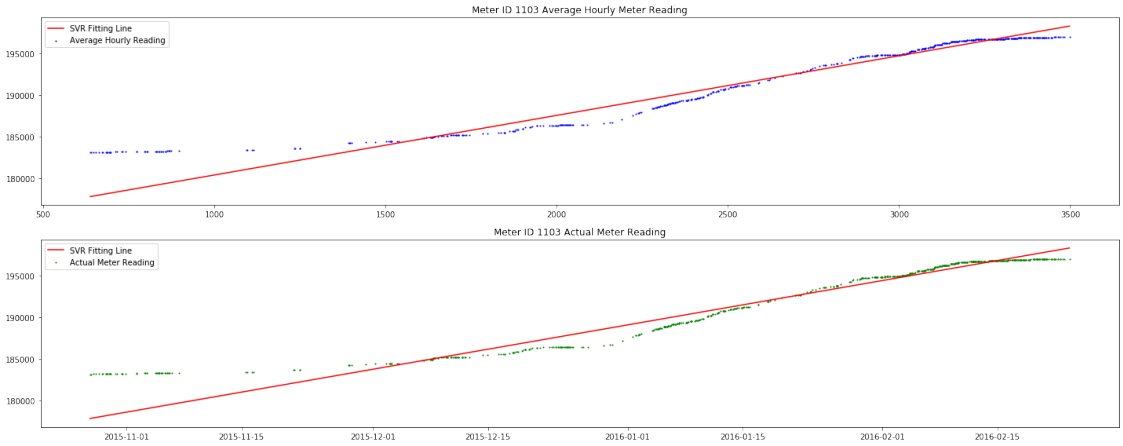


```
The accuracy score of fitting for meter ID 1103 is 0.9189856468458939
The next predicted average hourly reading for meter ID 1103 for the period
2016-04-01 00:00:00 to 01:00:00 is 204734.28961667253
The average hourly consumption for meter ID 1103 is 7.173224210739136
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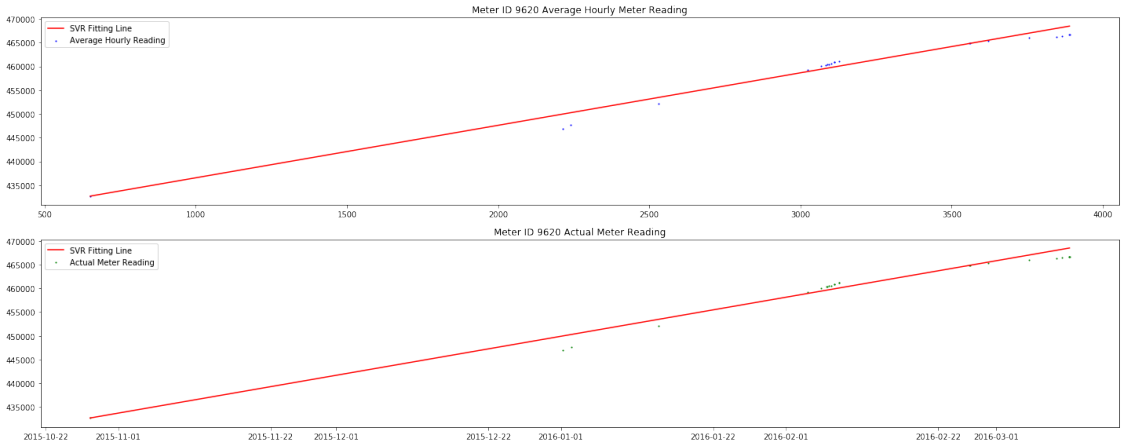


```
The accuracy score of fitting for meter ID 9620 is 0.9732374020965491
The next predicted average hourly reading for meter ID 9620 for the period
2016-04-01 00:00:00 to 01:00:00 is 474057.79669876414
The average hourly consumption for meter ID 9620 is 11.058459430932999
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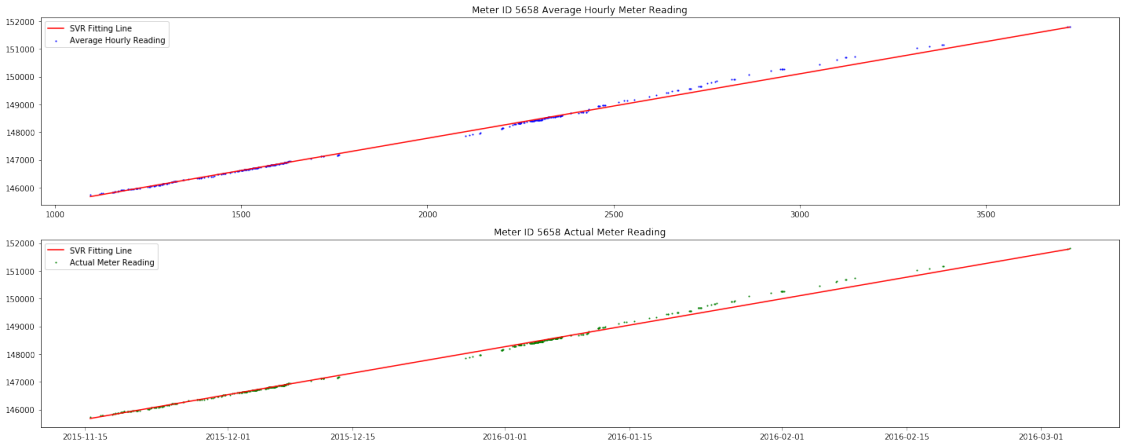


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The accuracy score of fitting for meter ID 5658 is 0.9963866194578208
The next predicted average hourly reading for meter ID 5658 for the period
2016-04-01 00:00:00 to 01:00:00 is 153331.96999764143
The average hourly consumption for meter ID 5658 is 2.3209853172302246
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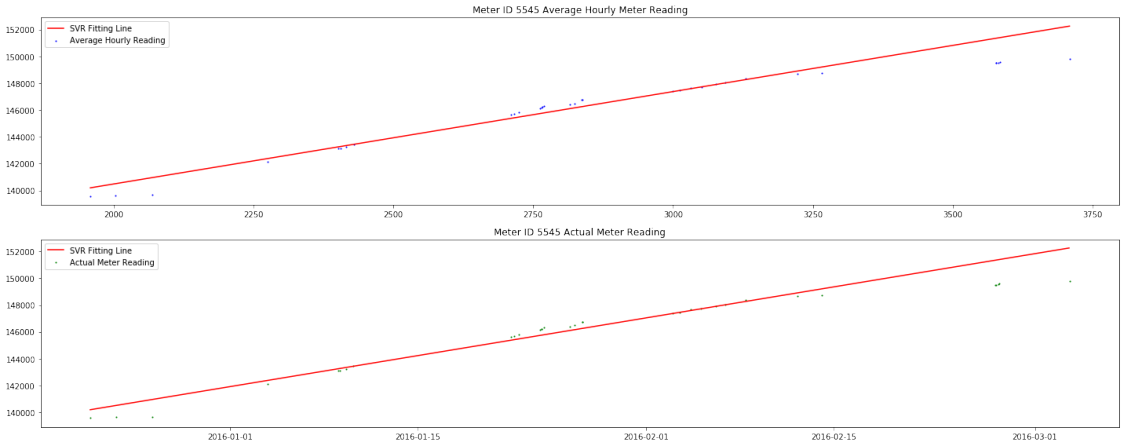


```
The accuracy score of fitting for meter ID 5545 is 0.9099319931001216
The next predicted average hourly reading for meter ID 5545 for the period
2016-04-01 00:00:00 to 01:00:00 is 156955.50651801066
The average hourly consumption for meter ID 5545 is 6.885077193379402
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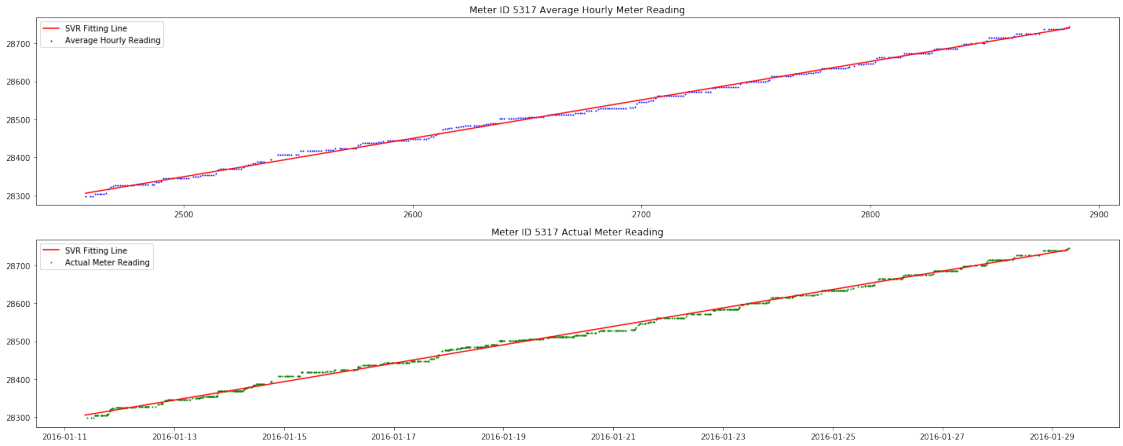


```
The accuracy score of fitting for meter ID 5317 is 0.9975088957586543
The next predicted average hourly reading for meter ID 5317 for the period
2016-04-01 00:00:00 to 01:00:00 is 30260.681769088707
The average hourly consumption for meter ID 5317 is 1.0103334784507751
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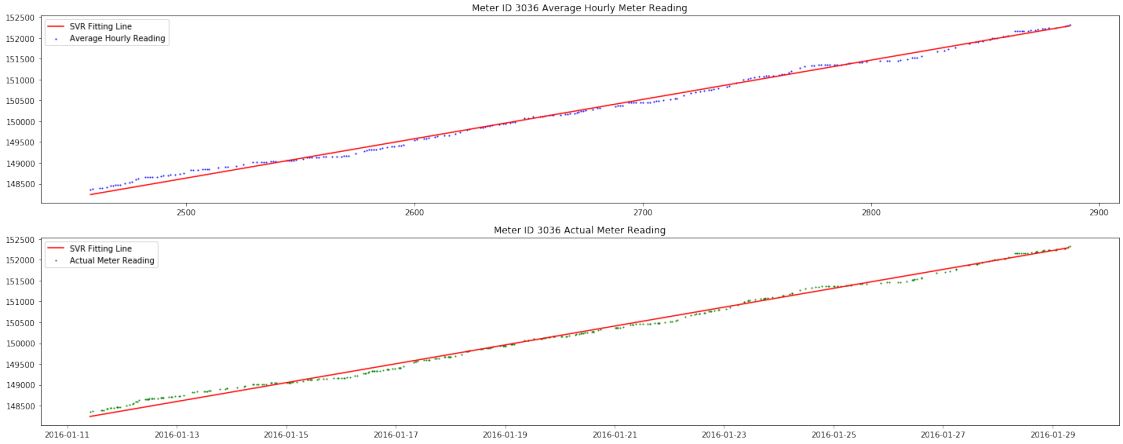


```
The accuracy score of fitting for meter ID 3036 is 0.9951032291193233
The next predicted average hourly reading for meter ID 3036 for the period
2016-04-01 00:00:00 to 01:00:00 is 166477.8078757075
The average hourly consumption for meter ID 3036 is 9.429493129253387
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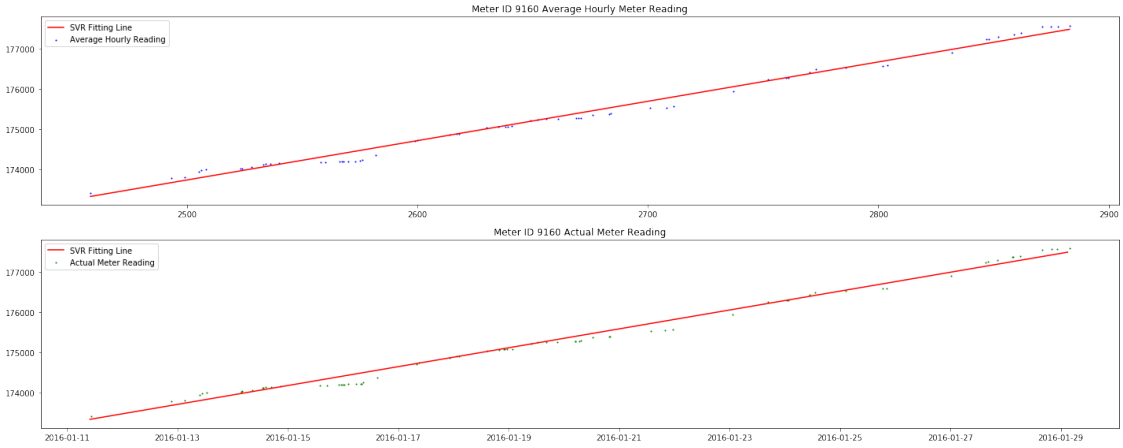
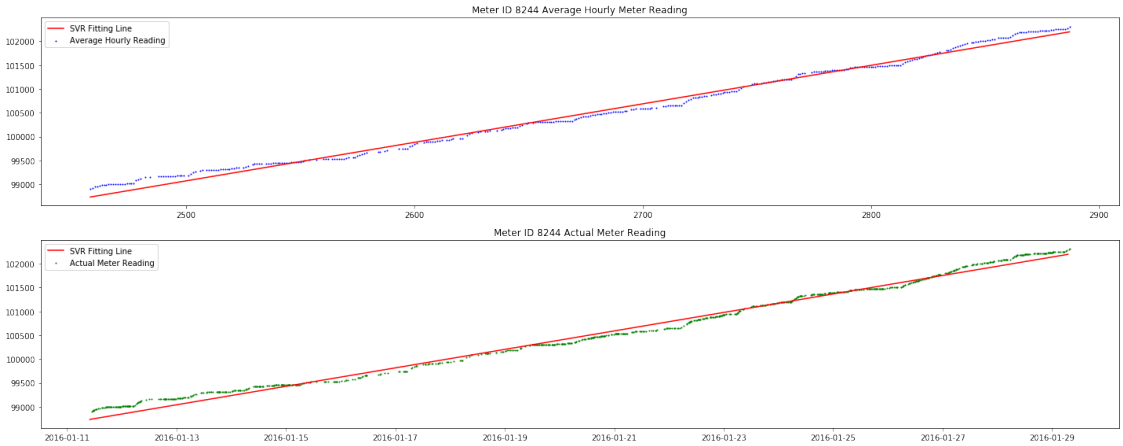
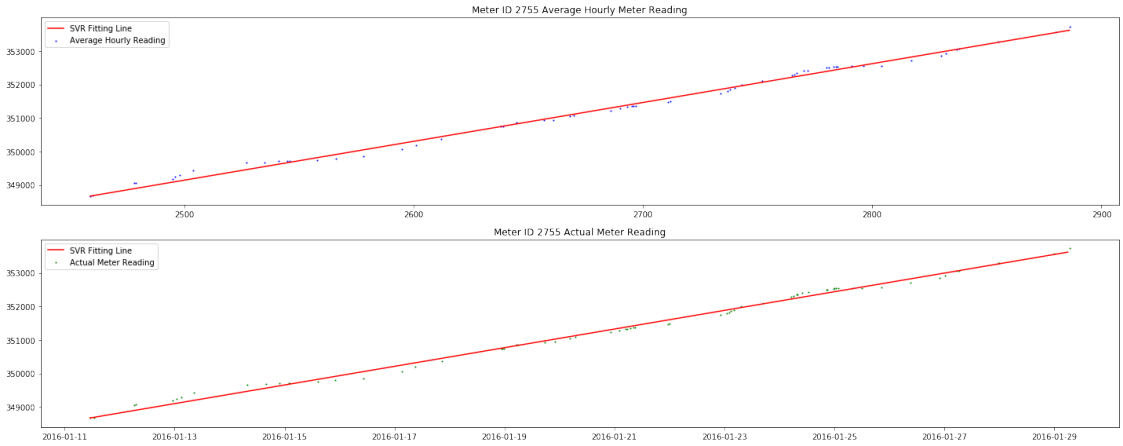


The accuracy score of fitting for meter ID 9160 is 0.9888821886603578
The next predicted average hourly reading for meter ID 9160 for the period 2016-04-01 00:00:00 to 01:00:00 is 192263.48136626862
The average hourly consumption for meter ID 9160 is 9.790062114596367



The accuracy score of fitting for meter ID 8244 is 0.9914023980389914
The next predicted average hourly reading for meter ID 8244 for the period 2016-04-01 00:00:00 to 01:00:00 is 114354.4503271039
The average hourly consumption for meter ID 8244 is 8.077124238014221




```
The accuracy score of fitting for meter ID 2755 is 0.9945429627830104
The next predicted average hourly reading for meter ID 2755 for the period
2016-04-01 00:00:00 to 01:00:00 is 371076.90106051334
The average hourly consumption for meter ID 2755 is 11.591511949896812
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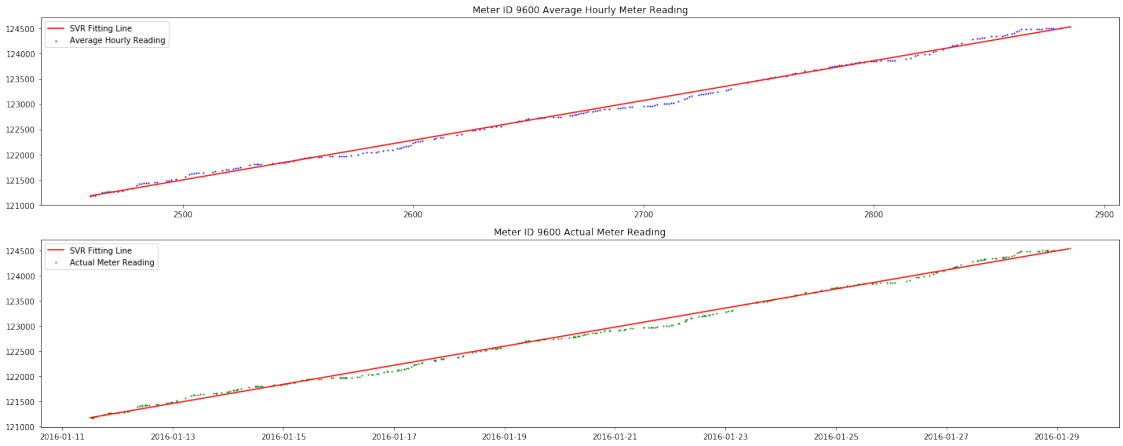


```
The accuracy score of fitting for meter ID 9600 is 0.9959522877524482
The next predicted average hourly reading for meter ID 9600 for the period
2016-04-01 00:00:00 to 01:00:00 is 136426.5615384936
The average hourly consumption for meter ID 9600 is 7.892307639122009
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```

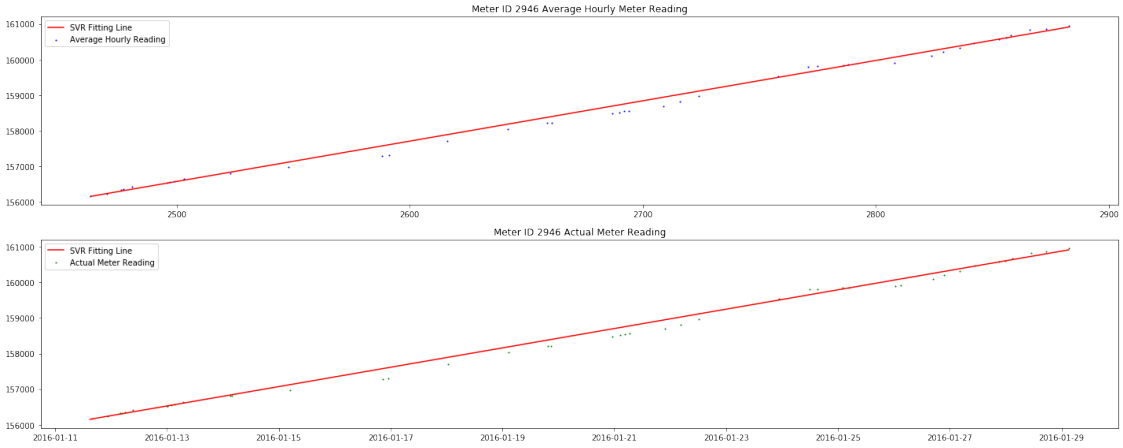


```
The accuracy score of fitting for meter ID 2946 is 0.9928500581808067
The next predicted average hourly reading for meter ID 2946 for the period
2016-04-01 00:00:00 to 01:00:00 is 178020.4540470131
The average hourly consumption for meter ID 2946 is 11.336292423307896
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```

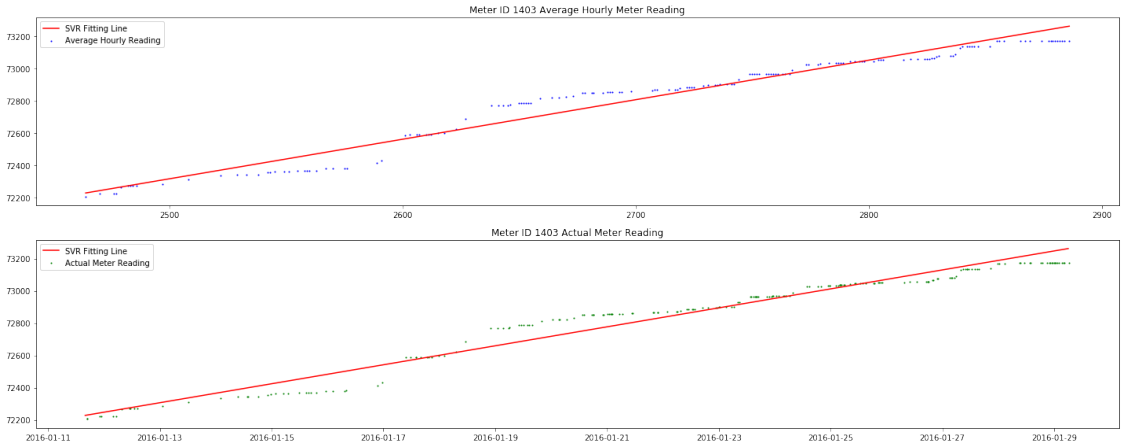


```
The accuracy score of fitting for meter ID 1403 is 0.9596992572887958
The next predicted average hourly reading for meter ID 1403 for the period
2016-04-01 00:00:00 to 01:00:00 is 76952.33840786226
The average hourly consumption for meter ID 1403 is 2.4503310918807983
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```
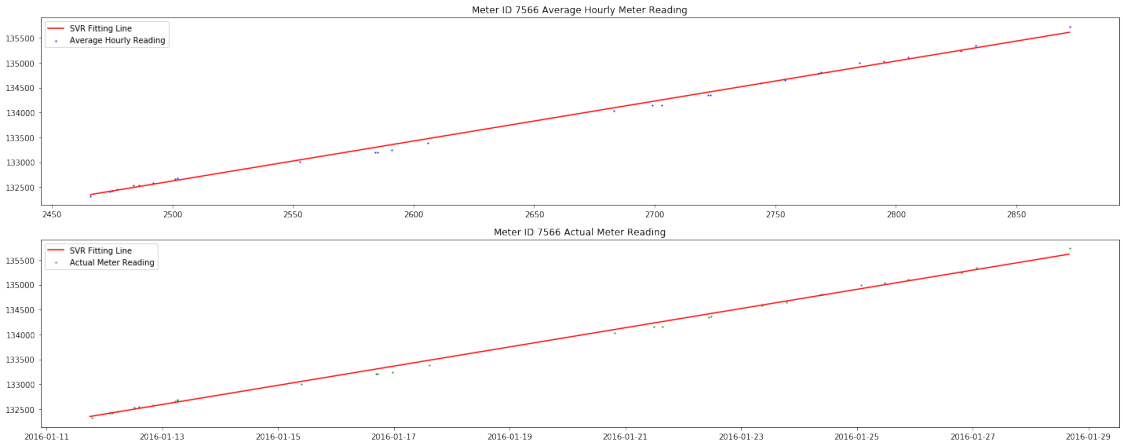
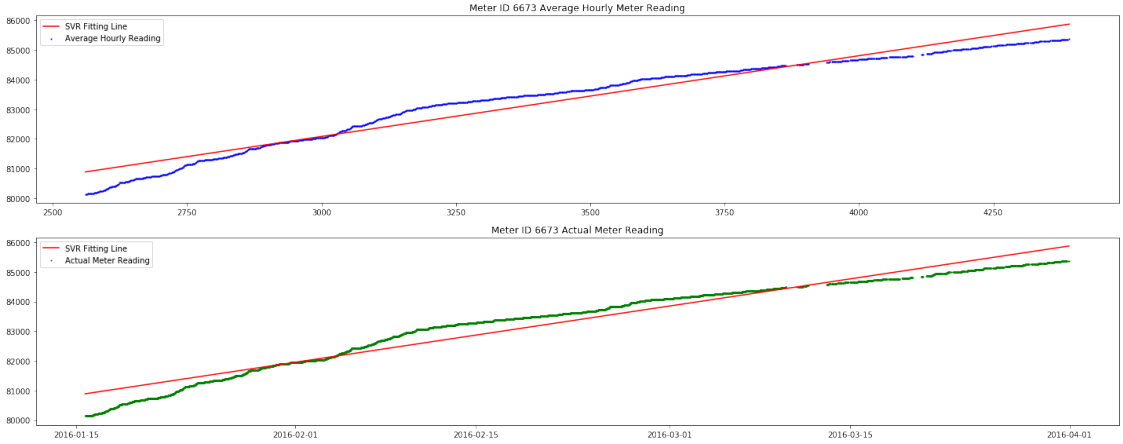
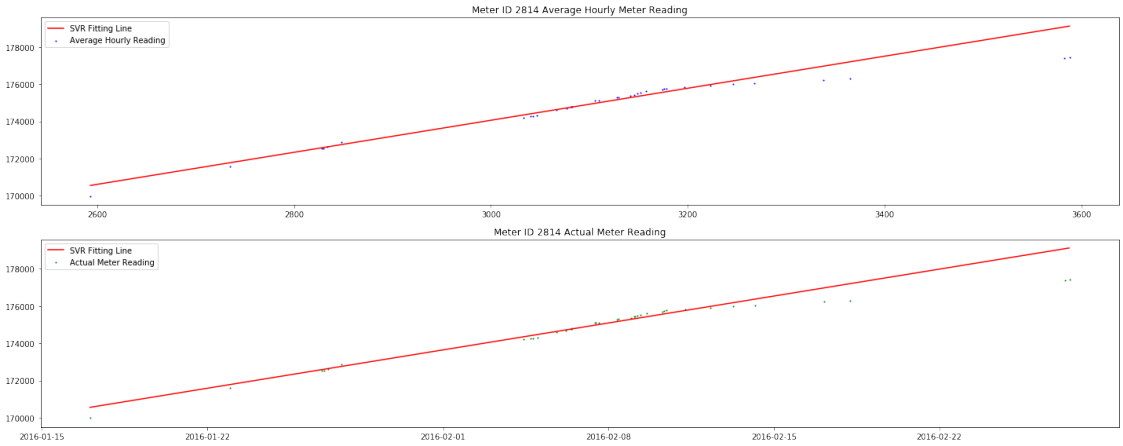



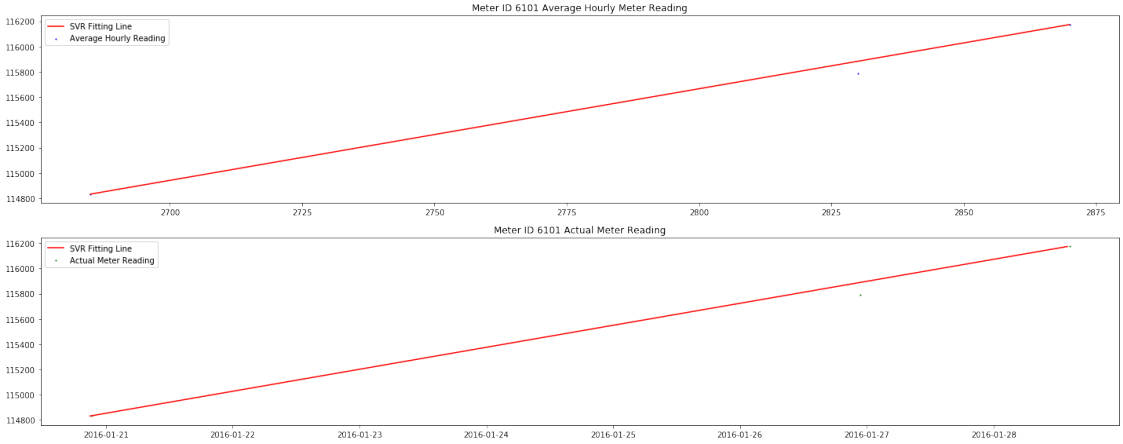
The accuracy score of fitting for meter ID 7566 is 0.9970640620152089
The next predicted average hourly reading for meter ID 7566 for the period 2016-04-01 00:00:00 to 01:00:00 is 147835.24074075714
The average hourly consumption for meter ID 7566 is 8.040740743279457



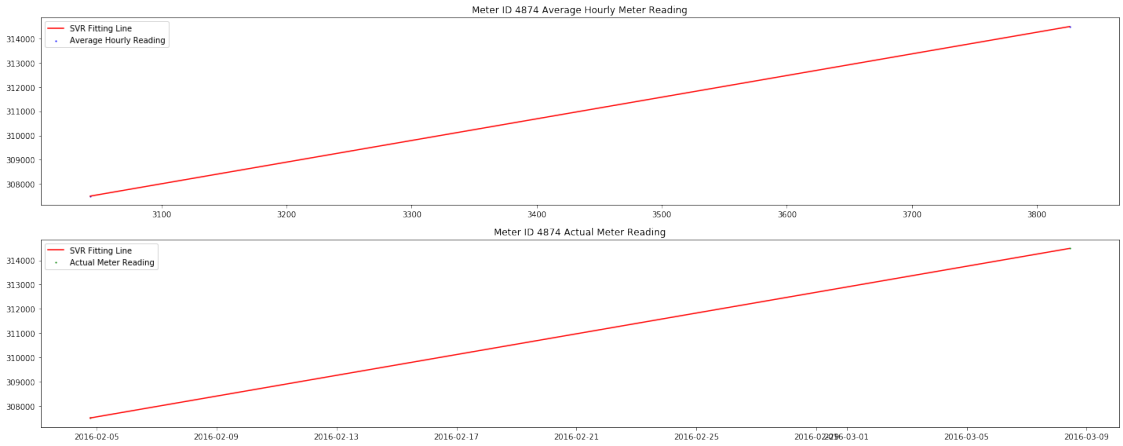
The accuracy score of fitting for meter ID 6673 is 0.9512726655228663
The next predicted average hourly reading for meter ID 6673 for the period 2016-04-01 00:00:00 to 01:00:00 is 85874.18747444396
The average hourly consumption for meter ID 6673 is 2.722792625427246



The accuracy score of fitting for meter ID 2814 is 0.903288752697468
The next predicted average hourly reading for meter ID 2814 for the period 2016-04-01 00:00:00 to 01:00:00 is 186040.23870967855
The average hourly consumption for meter ID 2814 is 8.604838714003563



The accuracy score of fitting for meter ID 6101 is 0.9908029607563736
The next predicted average hourly reading for meter ID 6101 for the period 2016-04-01 00:00:00 to 01:00:00 is 127214.57027027445
The average hourly consumption for meter ID 6101 is 7.254054052755237




```
The accuracy score of fitting for meter ID 4874 is 0.9999999991803984
The next predicted average hourly reading for meter ID 4874 for the period
2016-04-01 00:00:00 to 01:00:00 is 319537.6609195403
The average hourly consumption for meter ID 4874 is 8.921839080401696
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```
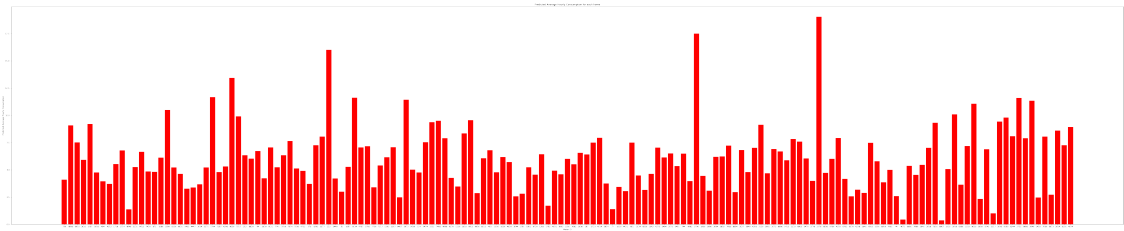

[22]:
```
# plot the predicted average hourly consumption for all homes

plt.figure(figsize=(100,20))
readingLst = [i for i in list(hour_dict.values())]
meterLst = [str(i) for i in list(hour_dict.keys())]
plt.bar(meterLst,readingLst,color="r",label="Predicted Average Hourly␣
 ↪Consumption for each home using Support Vector Regression")
plt.xlabel("Meter ID")
plt.ylabel("Predicted Average Hourly Consumption")
plt.title("Predicted Average Hourly Consumption for each home")
```

[22]:
```
Text(0.5, 1.0, 'Predicted Average Hourly Consumption for each home')
```



[23]:
```

```

```
print("The total predicted hourly average consumption by using linear␣
 ↪regression that the gas company needs to supply is {}".
 ↪format(sum(readingLst)))
```

```
The total predicted hourly average consumption by using linear regression that
the gas company needs to supply is 956.8221150800819
```

[ ]: