4211_1.2

October 26, 2018

In [1]:
```
import pandas as pd
import numpy as np
import timeit
import datetime as dt
import matplotlib.pyplot as plt
```

In [2]:
```
gas_data = pd.read_csv("clean_df.csv")
len(gas_data)
```

Out[2]: 327075

In [3]:
```
#preprocessing data for easier computation in the following
start_time = timeit.default_timer()
gas_data.localminute = gas_data.localminute.str.slice(0,19)
gas_data.localminute = pd.to_datetime(gas_data.localminute, infer_datetime_format = Tru
                                      format = "%Y/%m/%d %I:%M:%S %p");
gas_data.localminute = gas_data.localminute.map(lambda x:x.replace(minute=0, second=0))
gas_data['meter_value']=gas_data['meter_value'].astype(float)
```

In [4]:
```
#gas_data=gas_data[gas_data['dataid']==35];
ind=0;
_hr=dt.timedelta(hours=1); #creating a constant timedelta object with value =1 hr for
temp_gas_hr=pd.DataFrame(columns=gas_data.columns);
temp_gas_hr=gas_data;
id_list=gas_data['dataid'].unique();#creating an id list for itertaion since only comp
                                   #is meanningful


missing_lm=[];
missing_id=[];
missing_val=[];

for _id in id_list:
    #generate hourly readings according to dataid
    temp_gas_data=gas_data[gas_data['dataid']==_id];
    temp_gas_data.reset_index(drop=True,inplace=True);

    for  row in temp_gas_data.itertuples():
        if(row.Index==0):
```

```
                    prev_row=pd.Series(data=[row.localminute,row.dataid,row.meter_value]
                                       ,index=['localminute','dataid','meter_value']);
                    #unable to predict datapoints before the first available datapoint
                else:
                    time_diff=row.localminute-prev_row.localminute;
                    #determine if there is any missing data before two consecutive available d
                    if(time_diff>_hr):
                        time_diff=int(time_diff.total_seconds()/3600);
                        #determine how many datapoints are missing
                        for j in range (1,time_diff):
                            if ((row.meter_value-prev_row.meter_value)>4):
                                #if the difference between two available datepoint is too larg
                                #this means that there is missing distinct datapoints in betwe
                                acc_reading=float((row.meter_value-prev_row.meter_value)/time_
                            else:
                                #if the difference is not large, the missing datapoint has val
                                #equals to the previous datapoint
                                acc_reading=0;
                            time_change=dt.timedelta(hours=j);
                            new_time=prev_row.localminute+time_change;
                            missing_lm.append(new_time);
                            missing_id.append(_id);
                            missing_val.append(float(prev_row.meter_value+acc_reading*j));

                    prev_row=pd.Series(data=[row.localminute,row.dataid,row.meter_value]
                                       ,index=['localminute','dataid','meter_value']);
                #make a copy the current available data for comparison in next iteration
```

In [5]:
```
#concatenate the missing data with original data
missing_data={'localminute':missing_lm,'dataid':missing_id,'meter_value':missing_val};
missing_data=pd.DataFrame(missing_data,columns=gas_data.columns);
temp_gas_hr=pd.concat([gas_data,missing_data]);
```

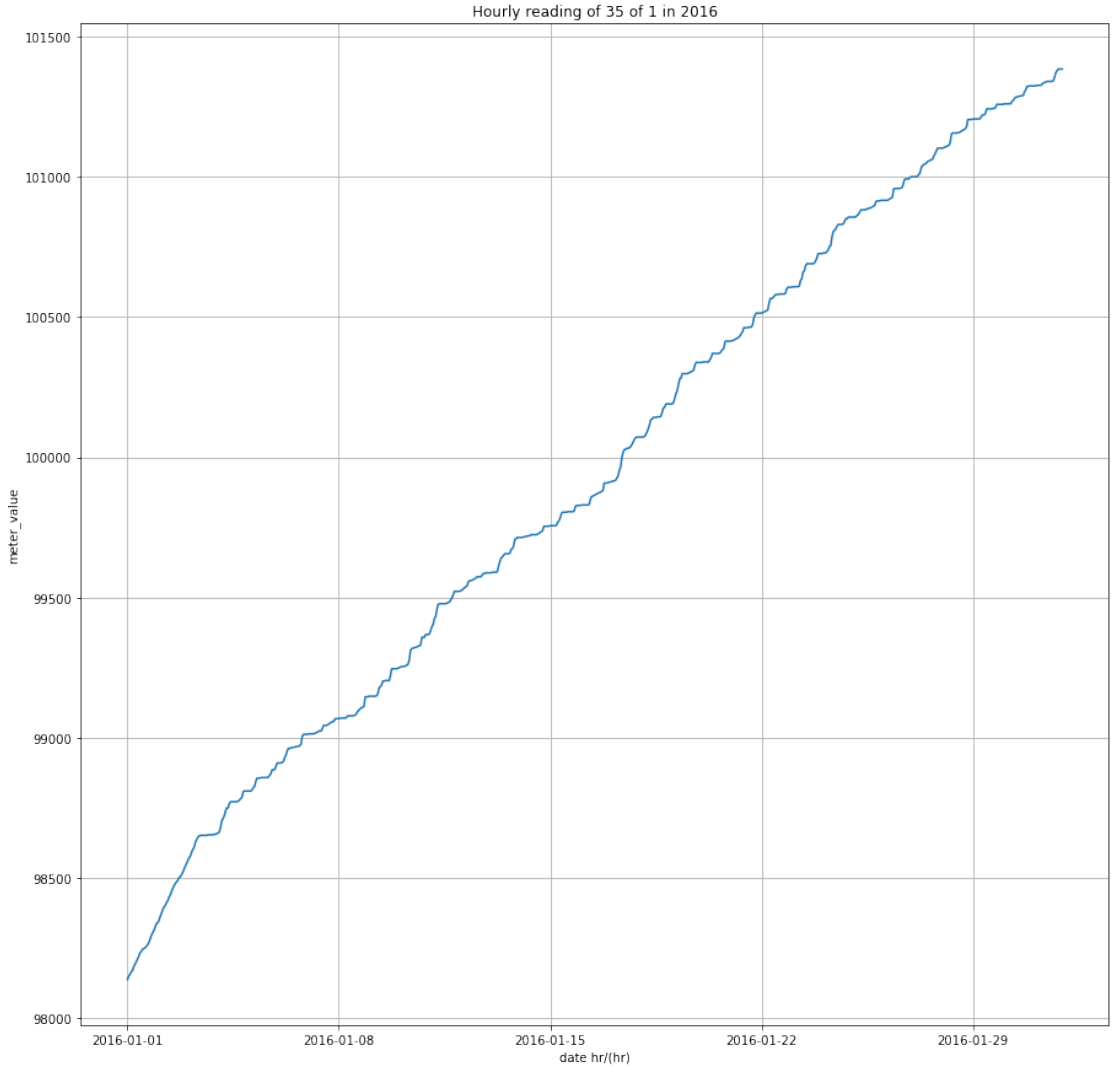
In [6]:
```
temp_gas_hr=temp_gas_hr.sort_values(by=['dataid','localminute']);
temp_gas_hr.drop_duplicates(['localminute','dataid'],keep='last',inplace=True);
#for the same hour, if there is multiple readings, keep the highest value
temp_gas_hr['meter_value']=temp_gas_hr['meter_value'].astype(int)
print("total: %ds" %(timeit.default_timer() - start_time))
```

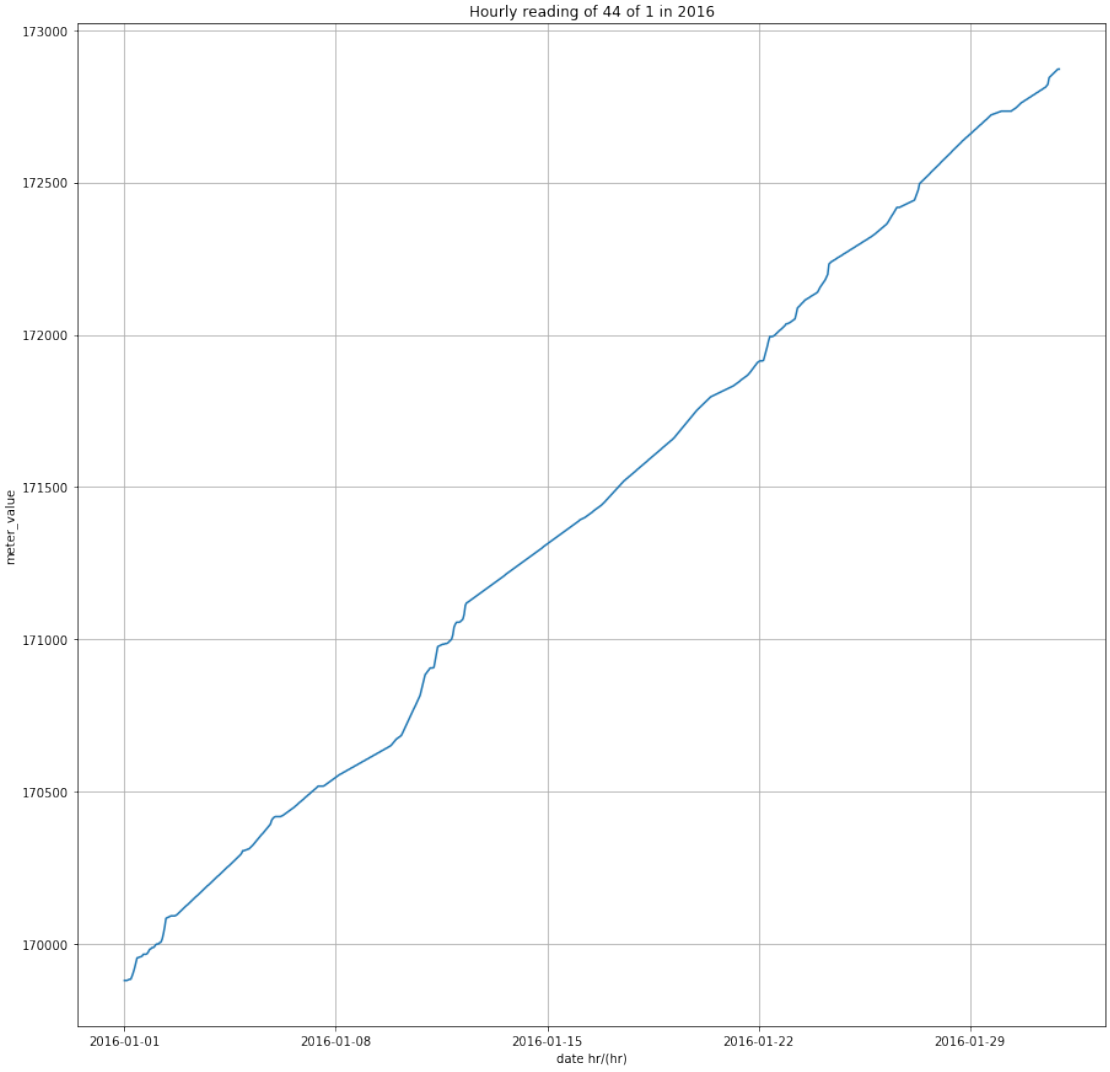
```
total: 844s
```

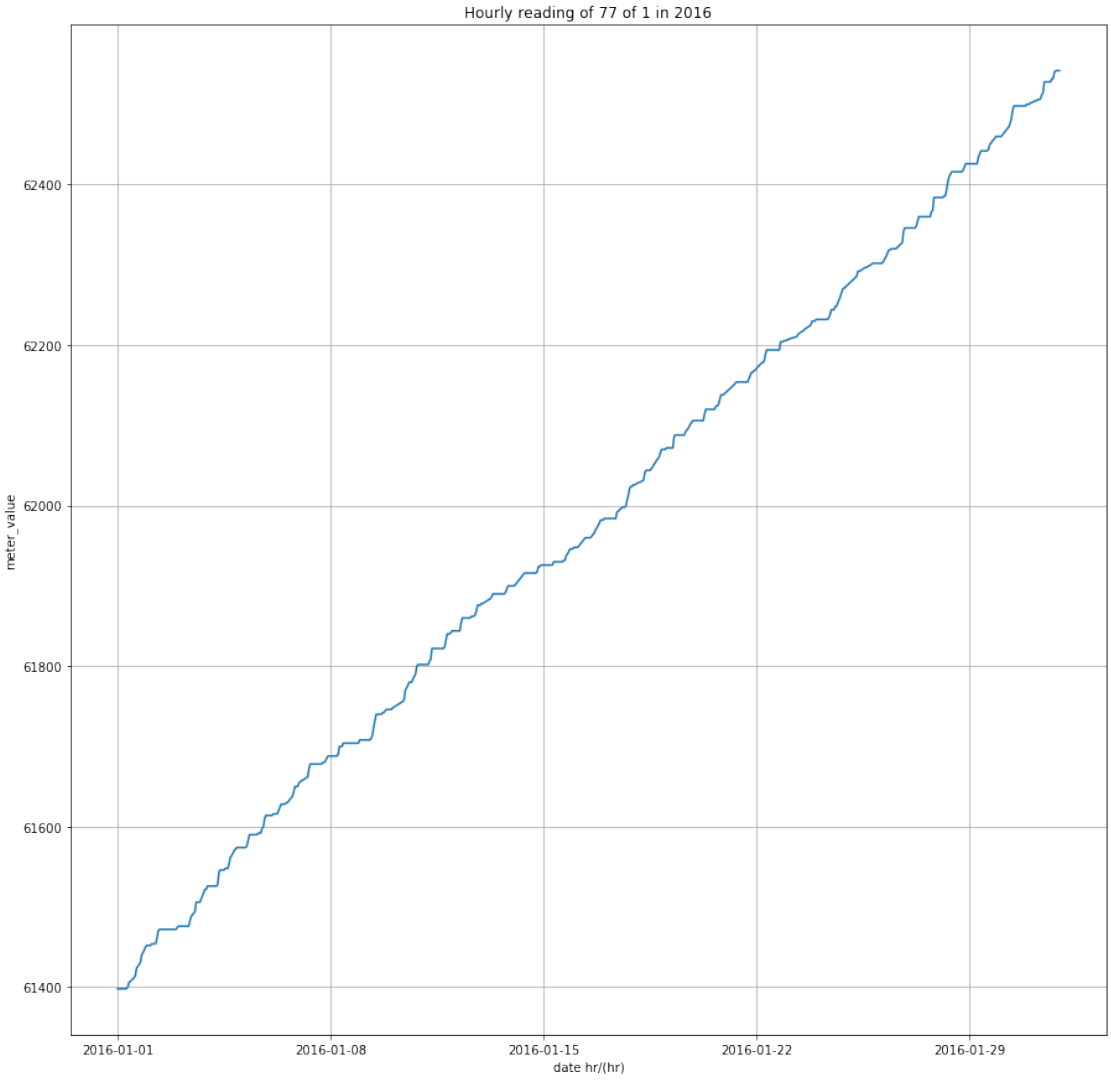
In [7]:
```
temp_gas_hr.to_csv('hourly_readings_final.csv',index=False);
```

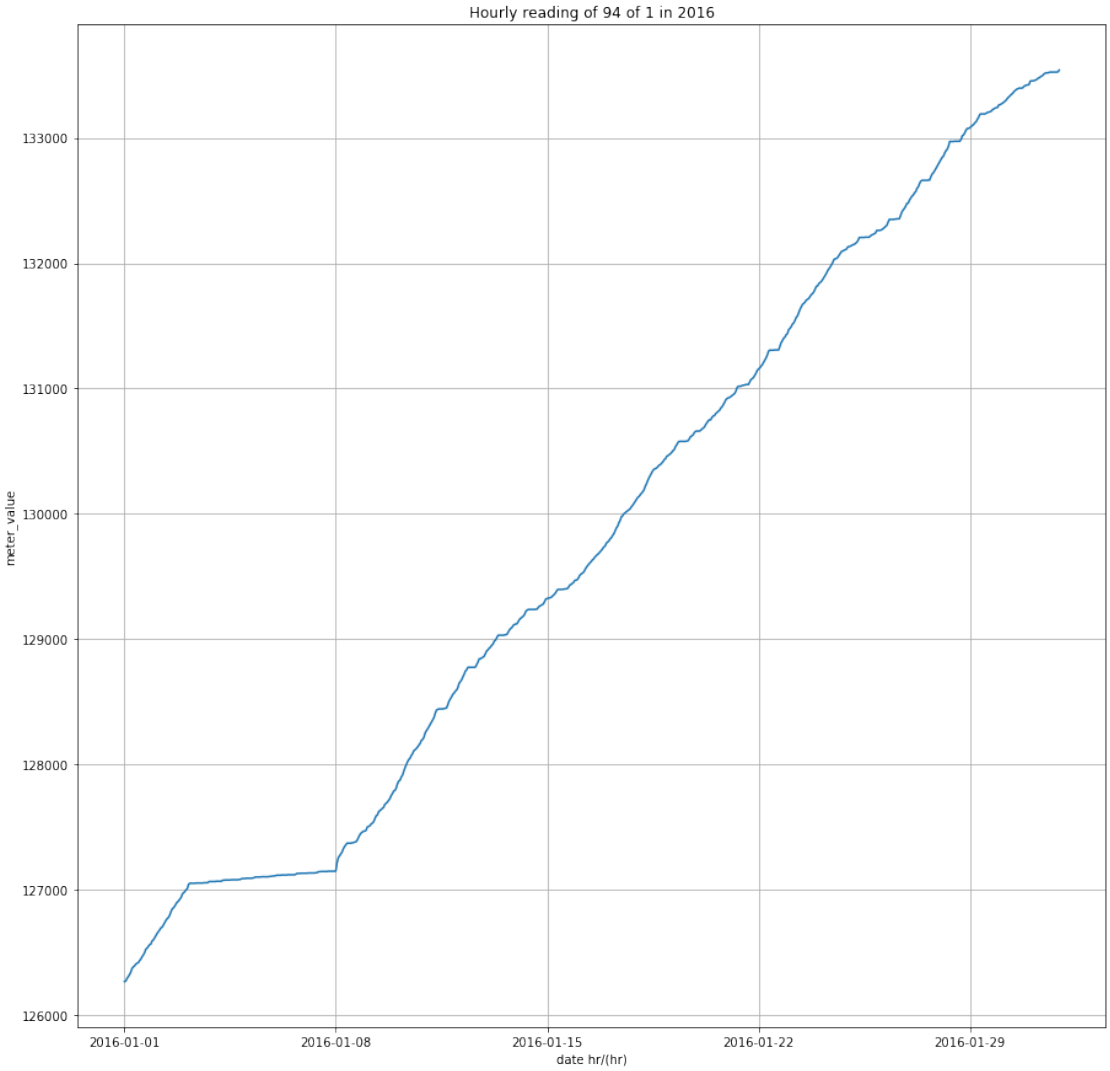
In [60]:
```
gas_hr=temp_gas_hr;
gas_hr=gas_hr[(gas_hr['localminute'].dt.year==2016)&(gas_hr['localminute'].dt.month==
mon=2;
for _id in id_list:
    mon=2;
```

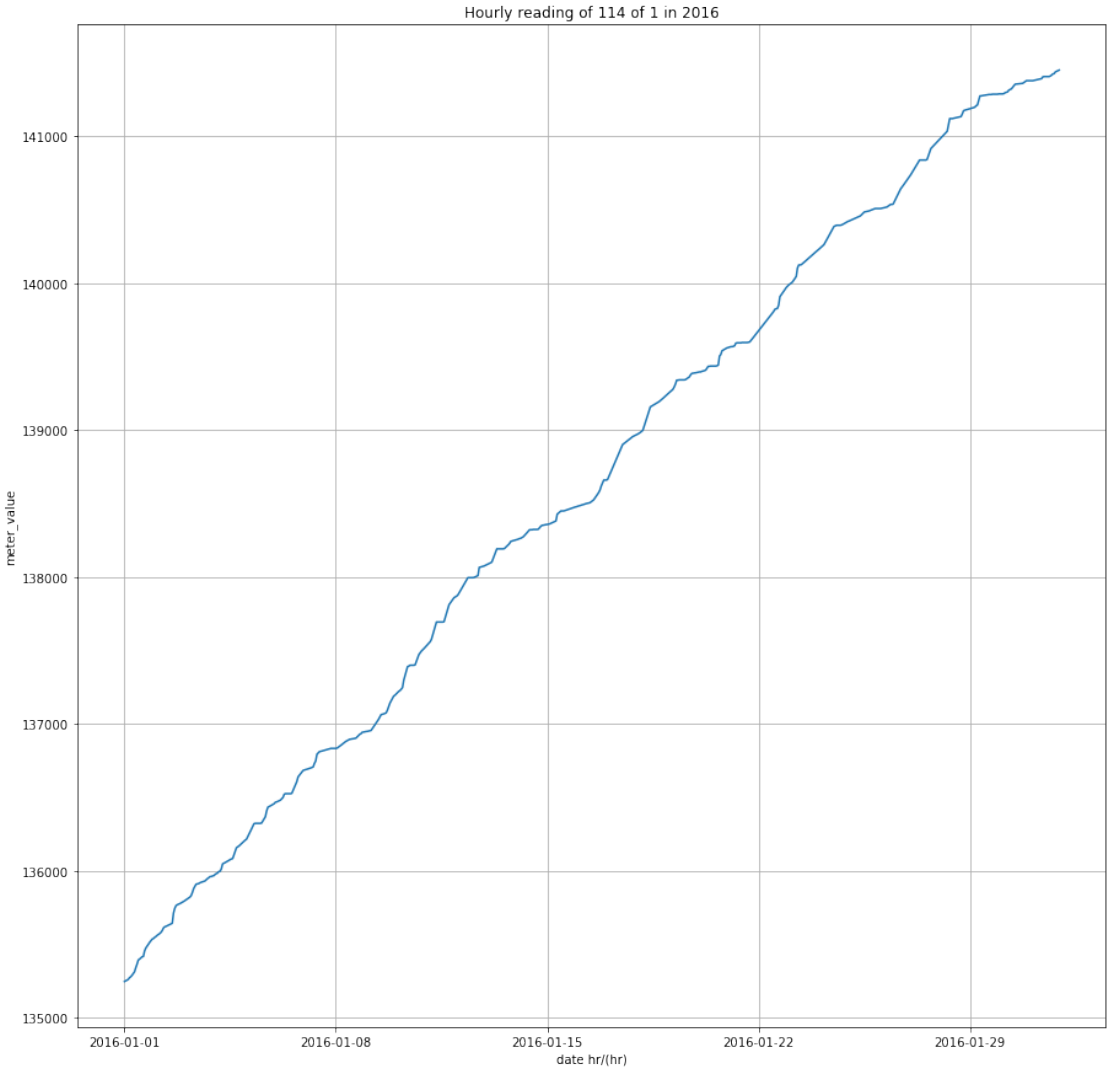
```
temp_id_hr=gas_hr[gas_hr['dataid']==_id];
while(len(temp_id_hr)==0):
    temp_id_hr=temp_gas_hr[(temp_gas_hr['localminute'].dt.year==2016)&(temp_gas_hr
                           &(temp_gas_hr['dataid']==_id)];
    mon=mon+1;
temp_id_hr=temp_id_hr.reset_index(drop=True);
t='Hourly reading of '+str(_id)+' of '+str(temp_id_hr.at[0,'localminute'].month)+
fig=plt.figure(figsize=(15,15));
plt.plot(temp_id_hr.localminute,temp_id_hr.meter_value);
plt.xlabel('date hr/(hr)');
plt.ylabel('meter_value'),
plt.title(t,loc='center');
plt.grid();
t_fig=t+'.png';
fig.savefig(t_fig);
plt.show();
```

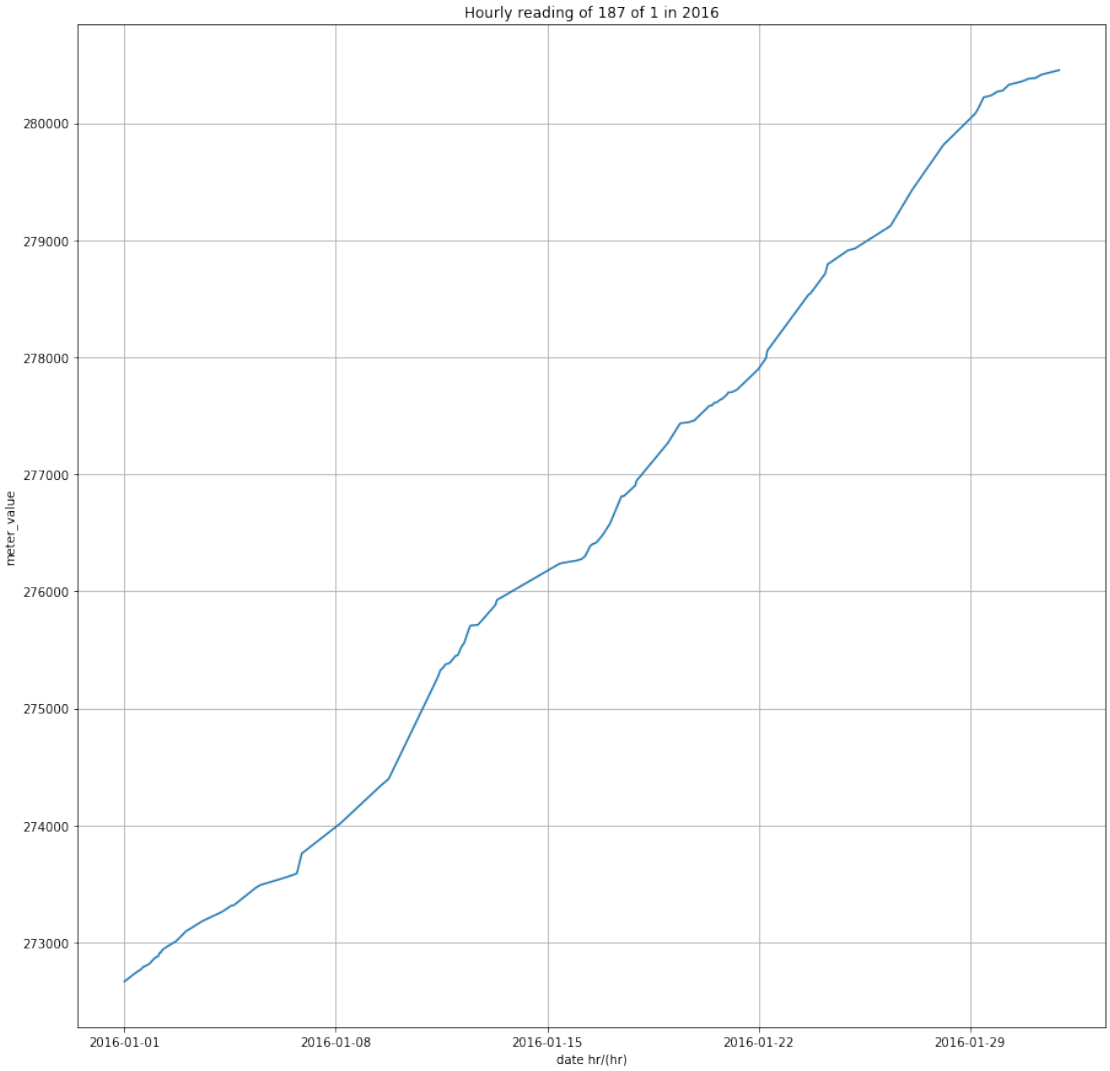


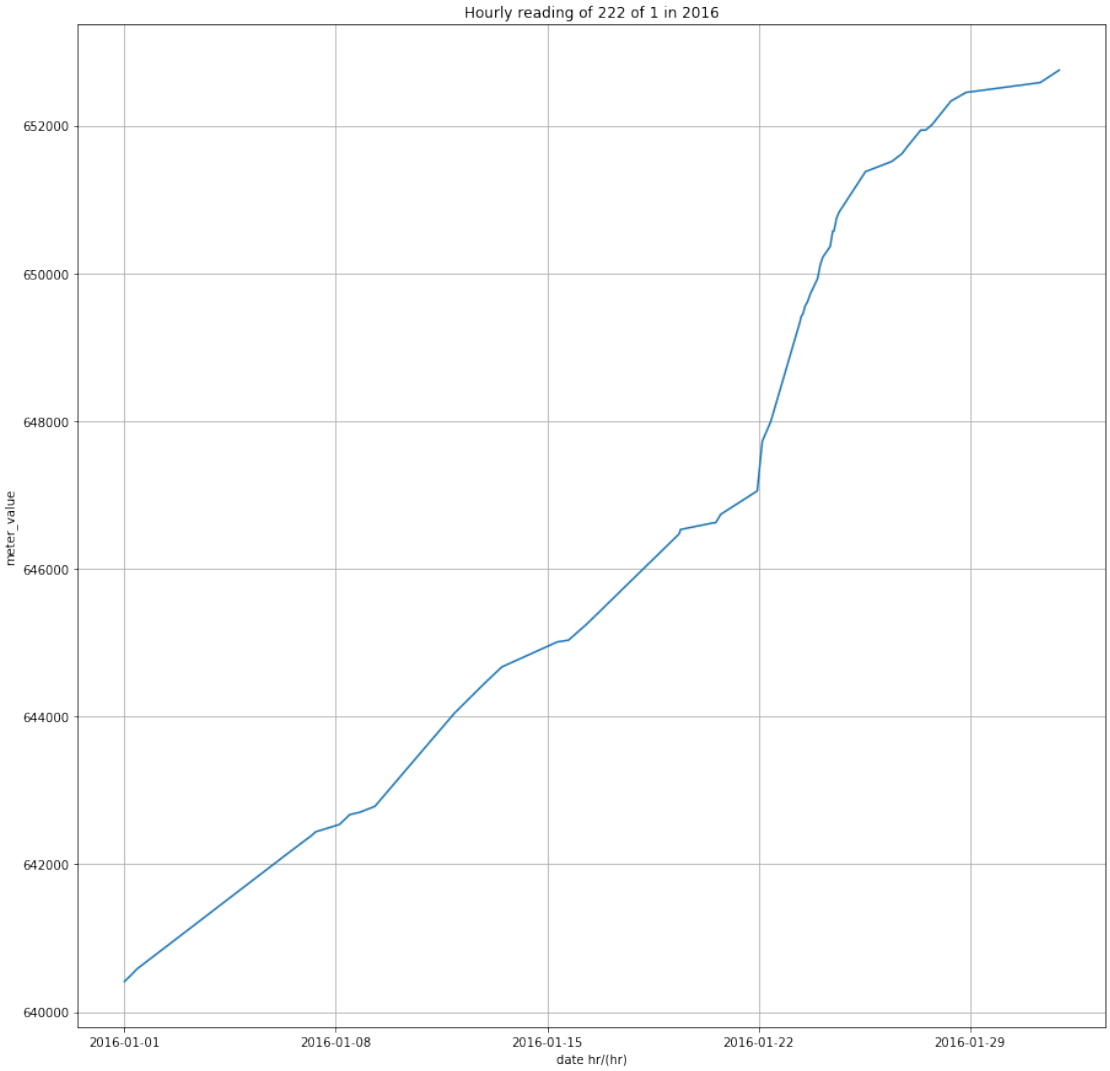

Hourly reading of 44 of 1 in 2016
meter_value
173000
172500
172000
171500
171000
170500
170000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

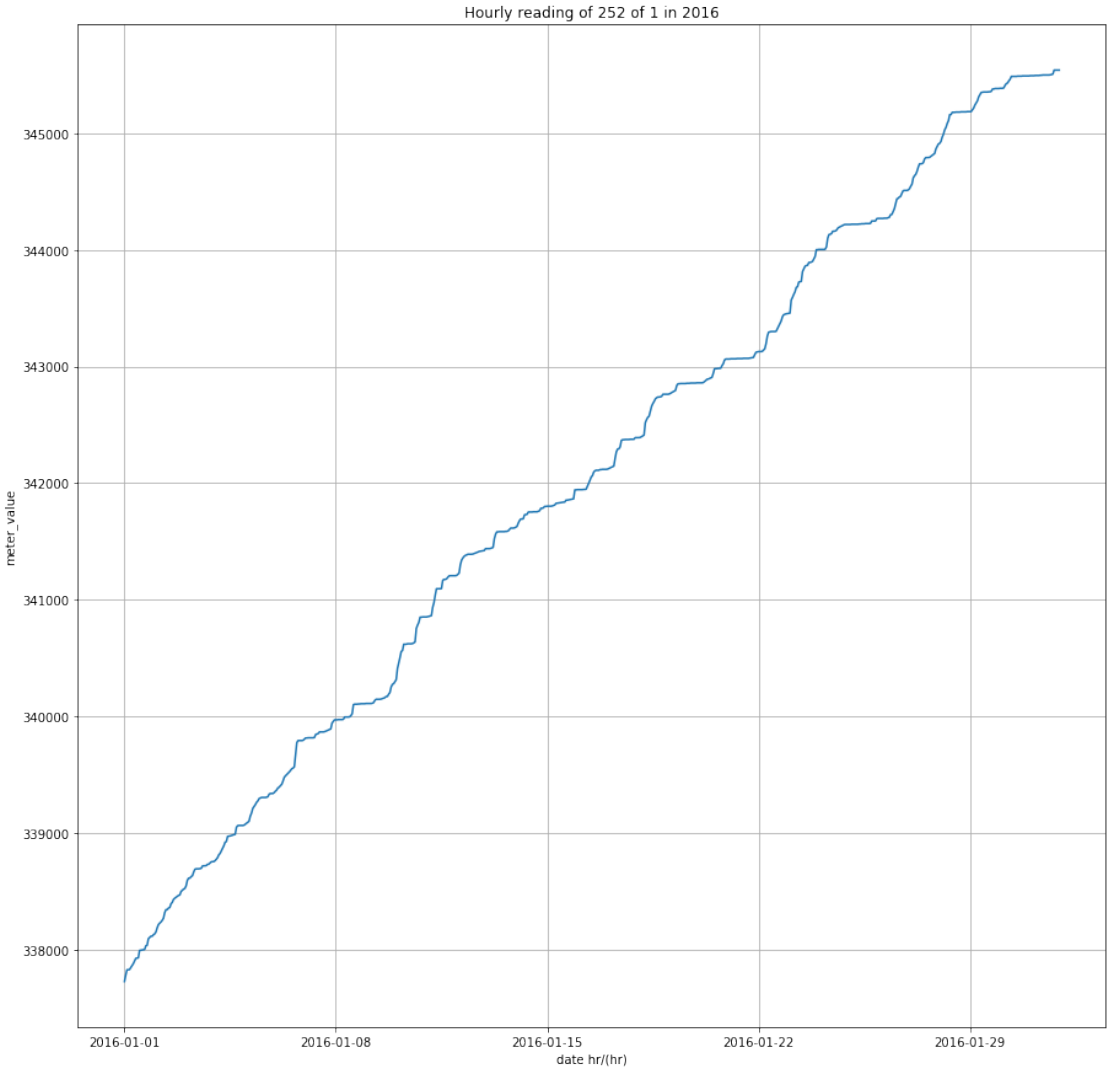

Hourly reading of 77 of 1 in 2016
meter_value
62400
62200
62000
61800
61600
61400
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

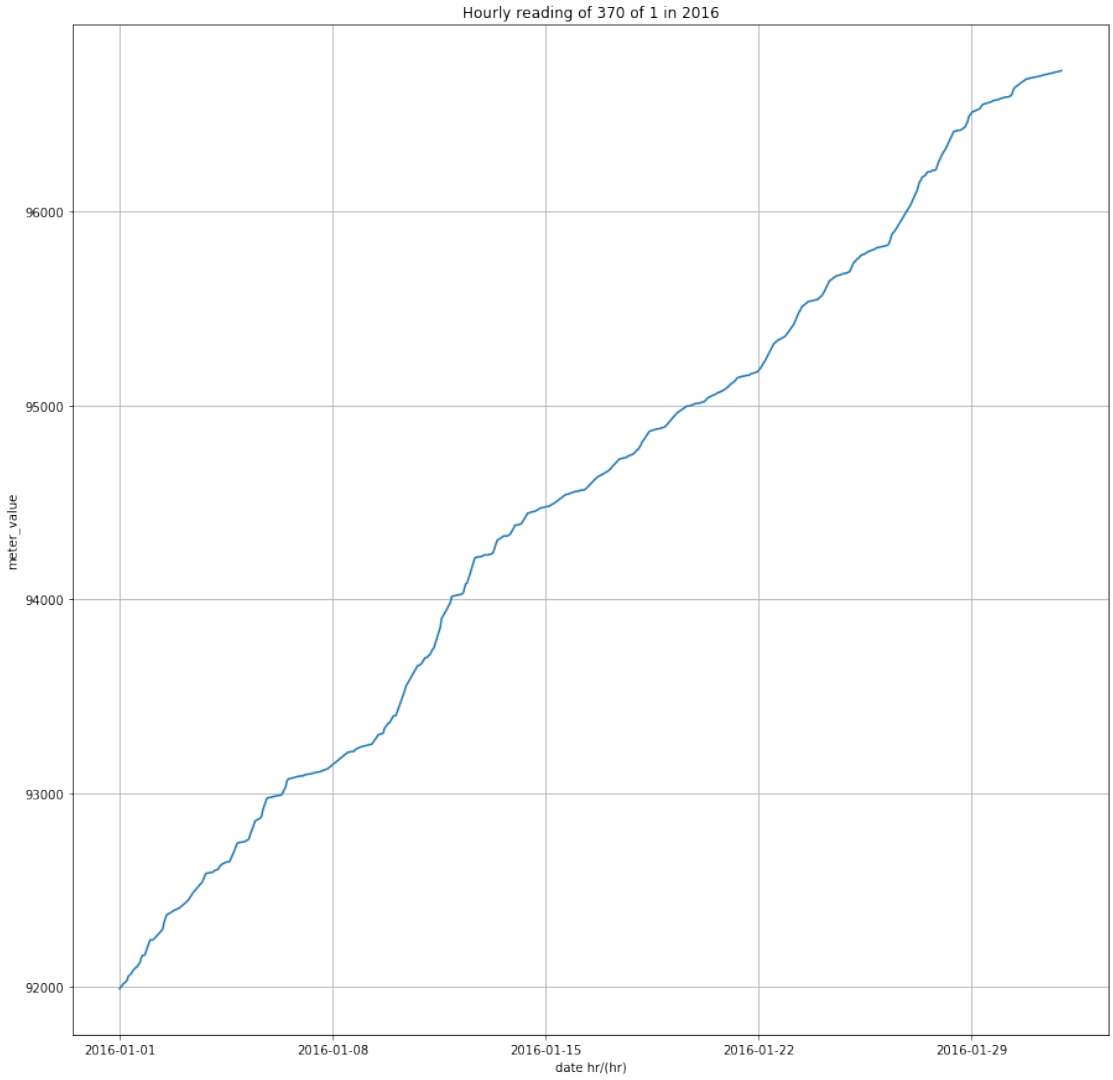

Hourly reading of 94 of 1 in 2016
meter_value
133000
132000
131000
130000
129000
128000
127000
126000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

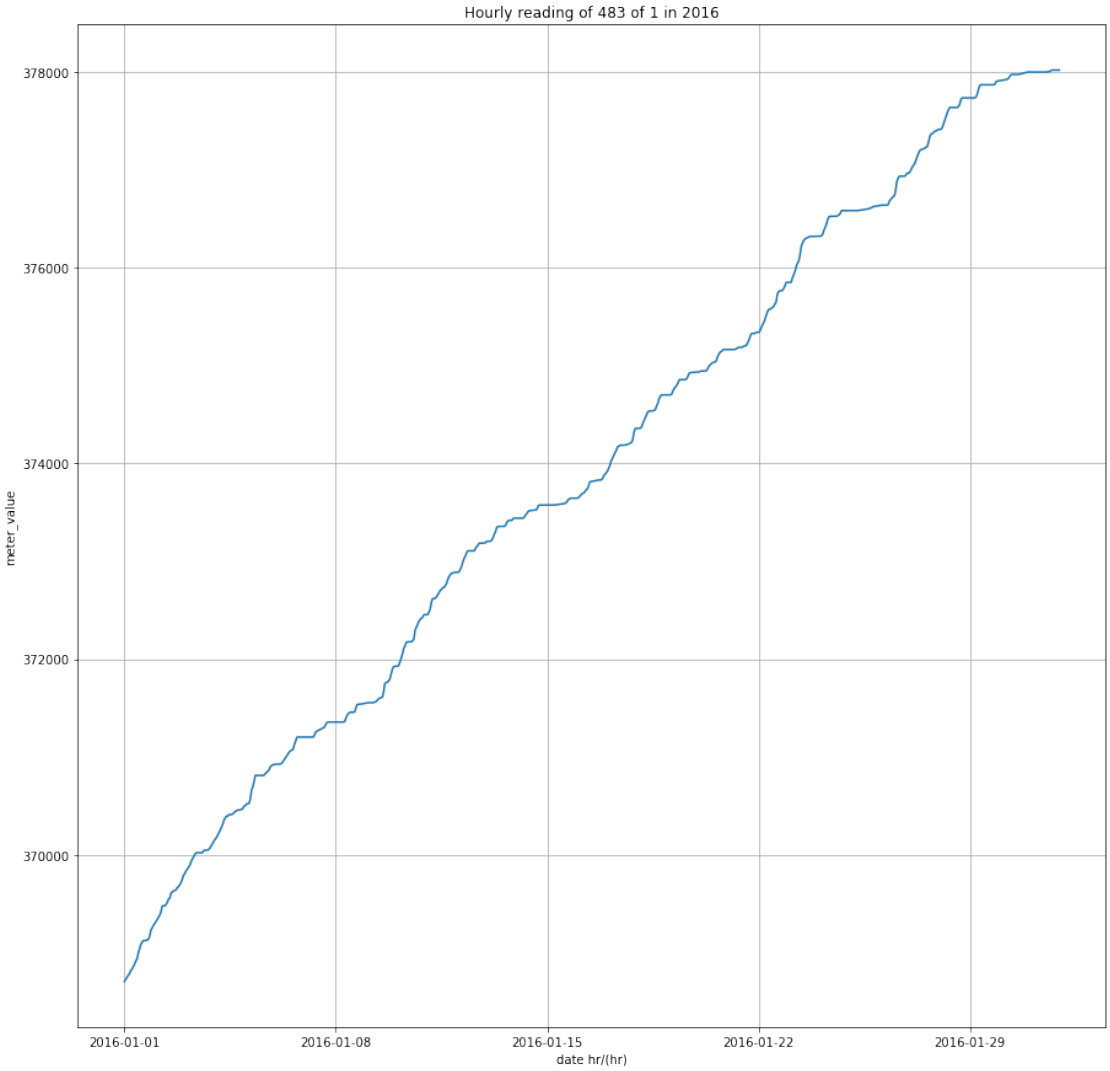

Hourly reading of 114 of 1 in 2016
141000
140000
139000
138000
137000
136000
135000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

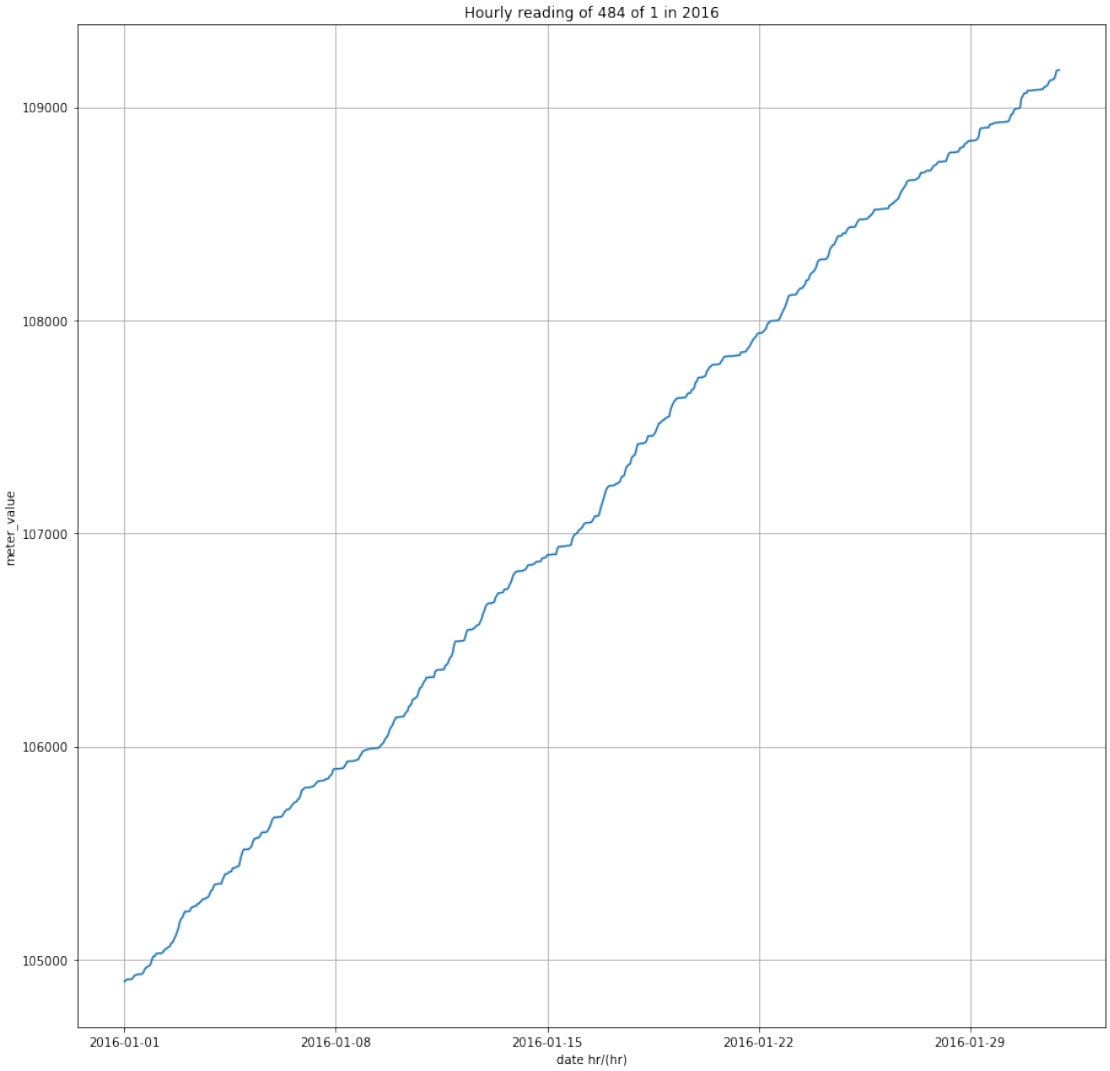

Hourly reading of 187 of 1 in 2016
meter_value
280000
279000
278000
277000
276000
275000
274000
273000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

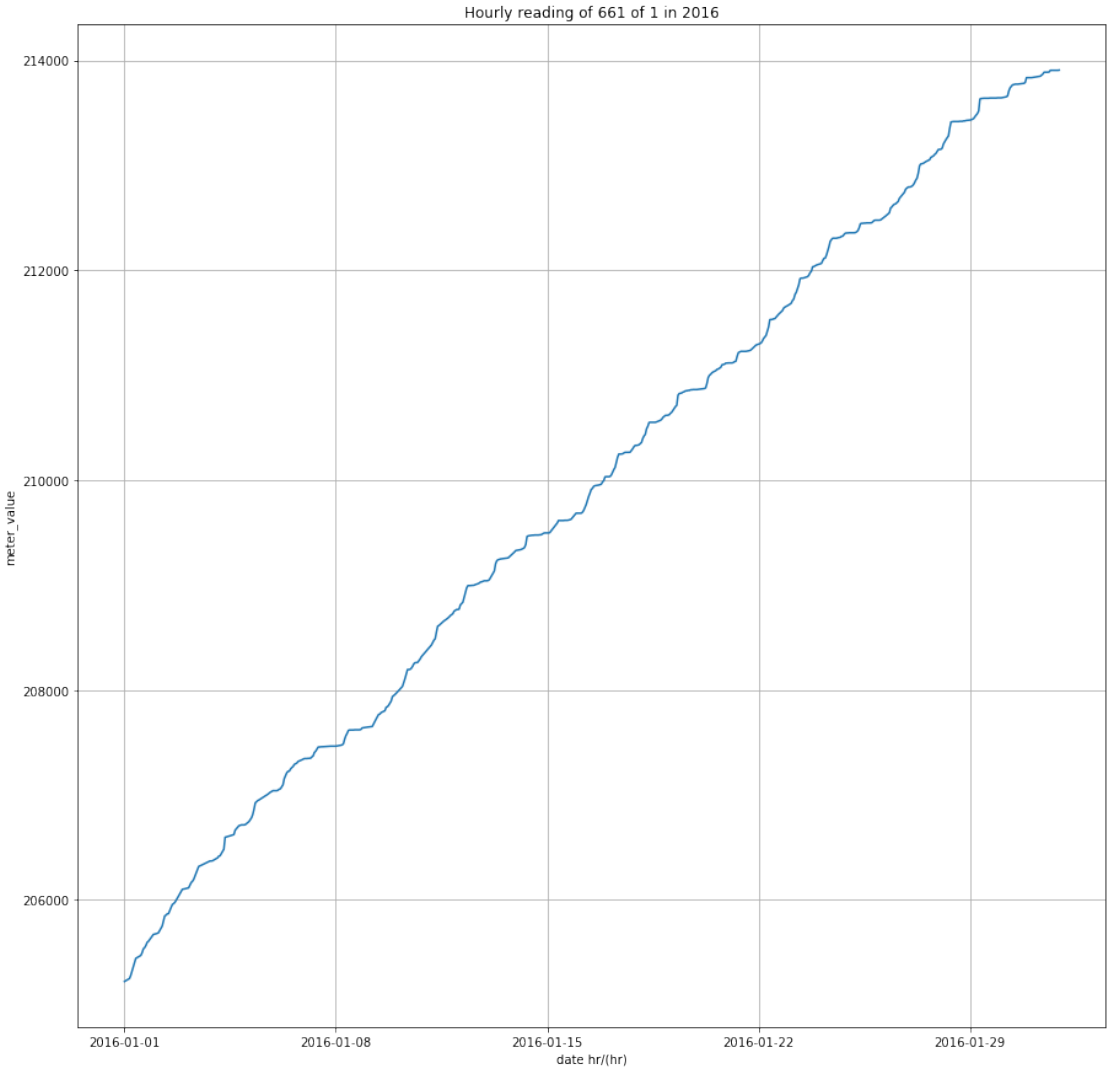

Hourly reading of 222 of 1 in 2016
652000
650000
648000
646000
644000
642000
640000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

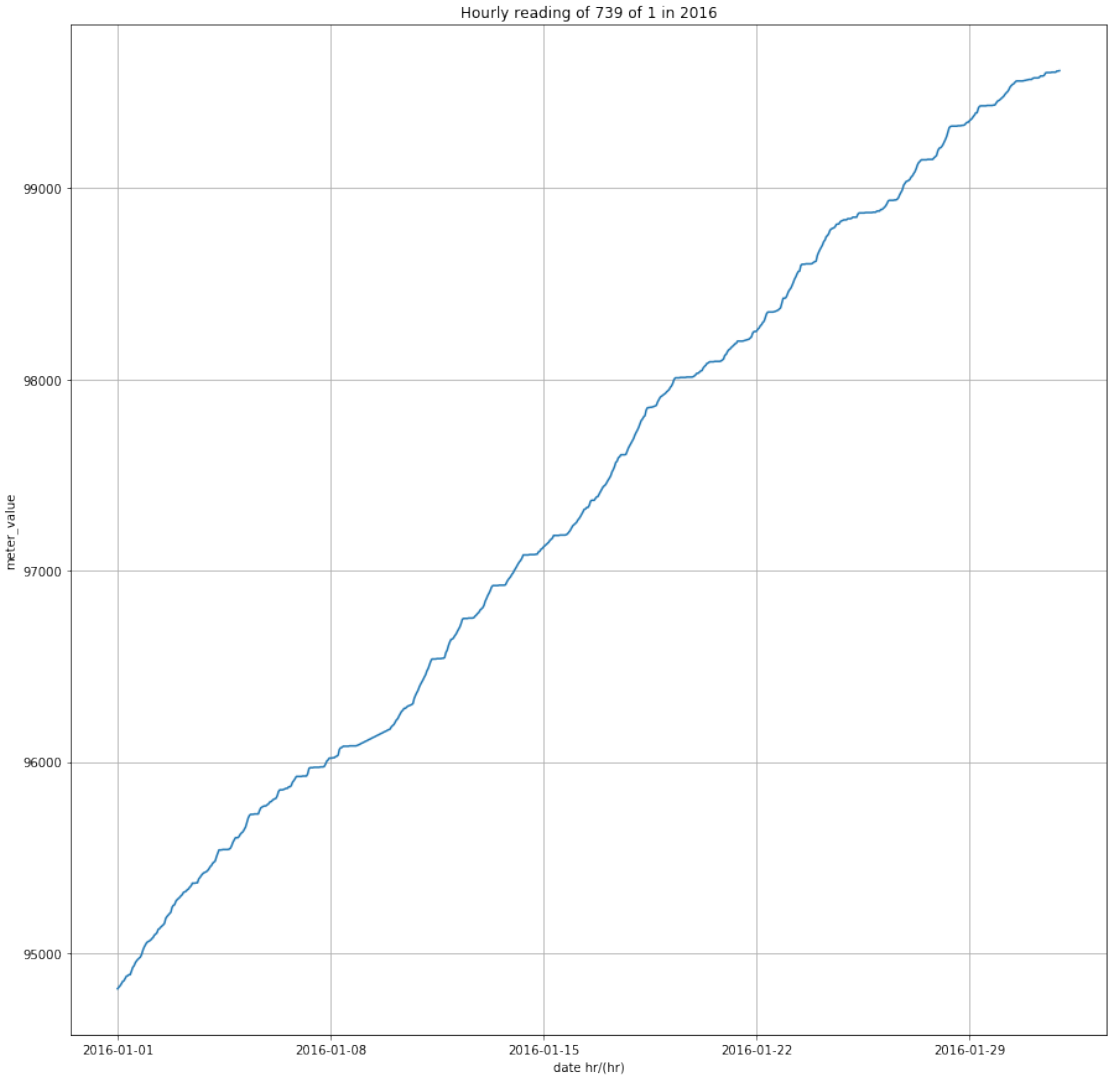

Hourly reading of 252 of 1 in 2016
meter_value
345000
344000
343000
342000
341000
340000
339000
338000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

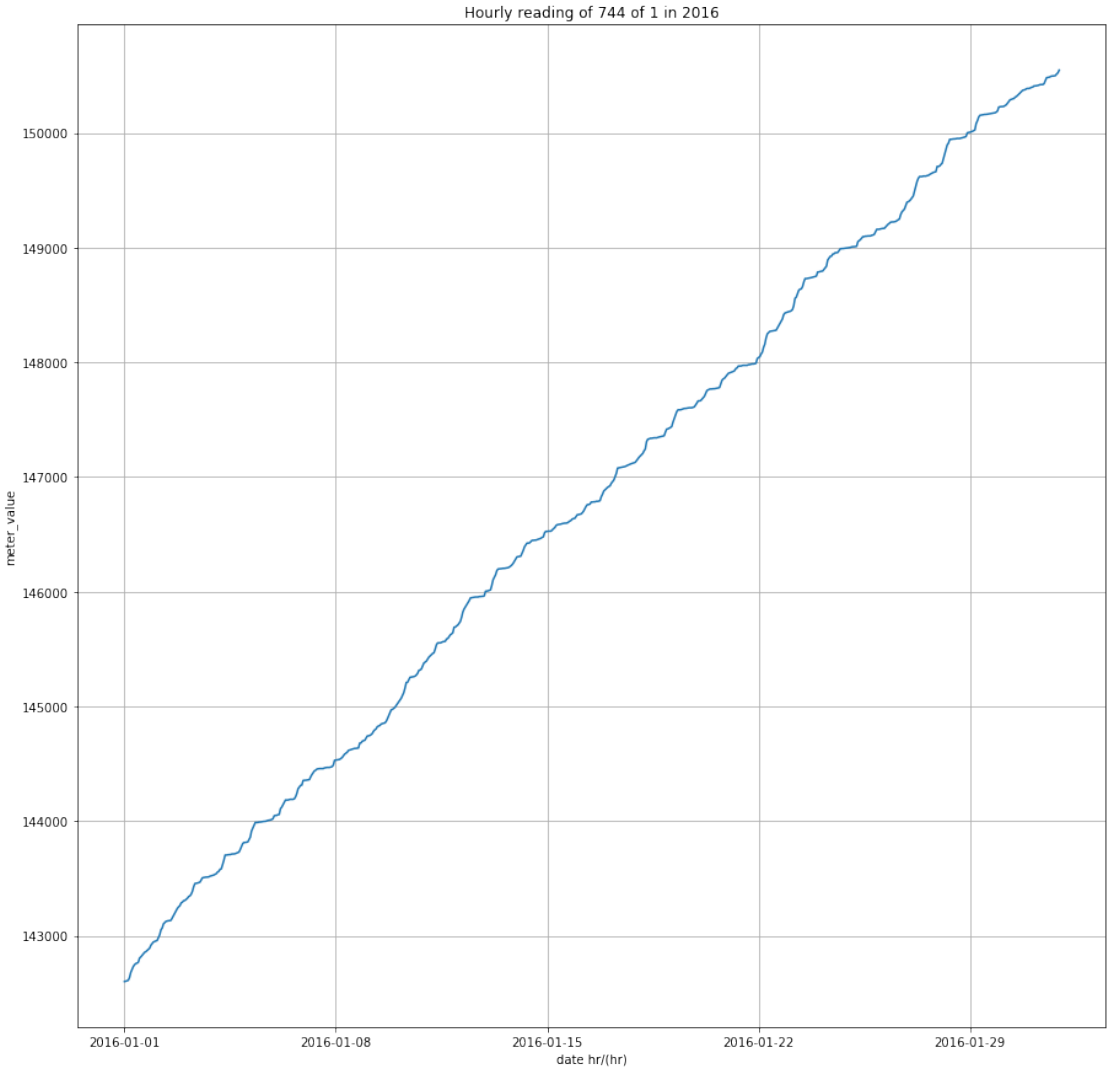

Hourly reading of 370 of 1 in 2016
96000
95000
94000
93000
92000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

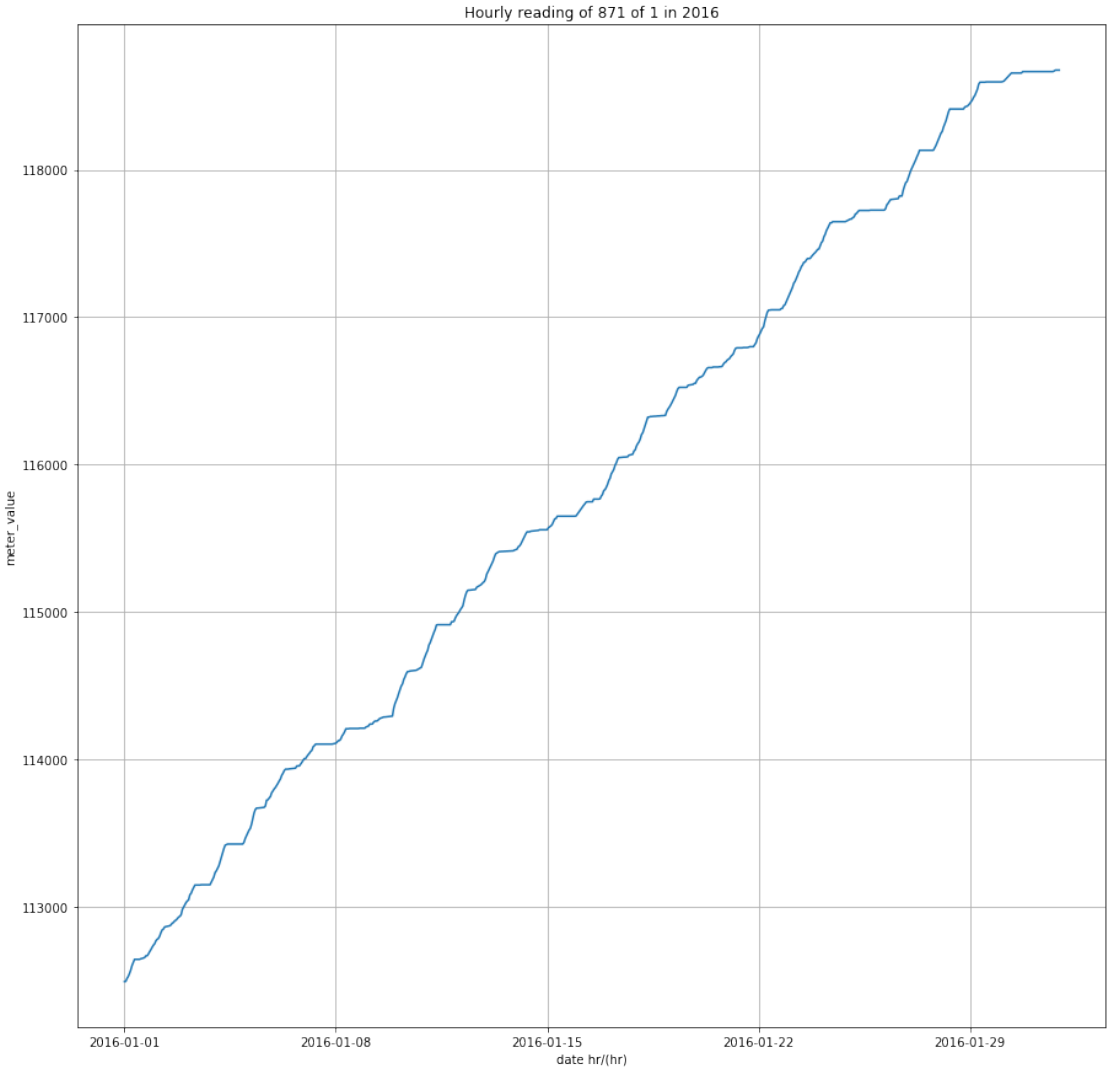

Hourly reading of 483 of 1 in 2016
meter_value
378000
376000
374000
372000
370000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

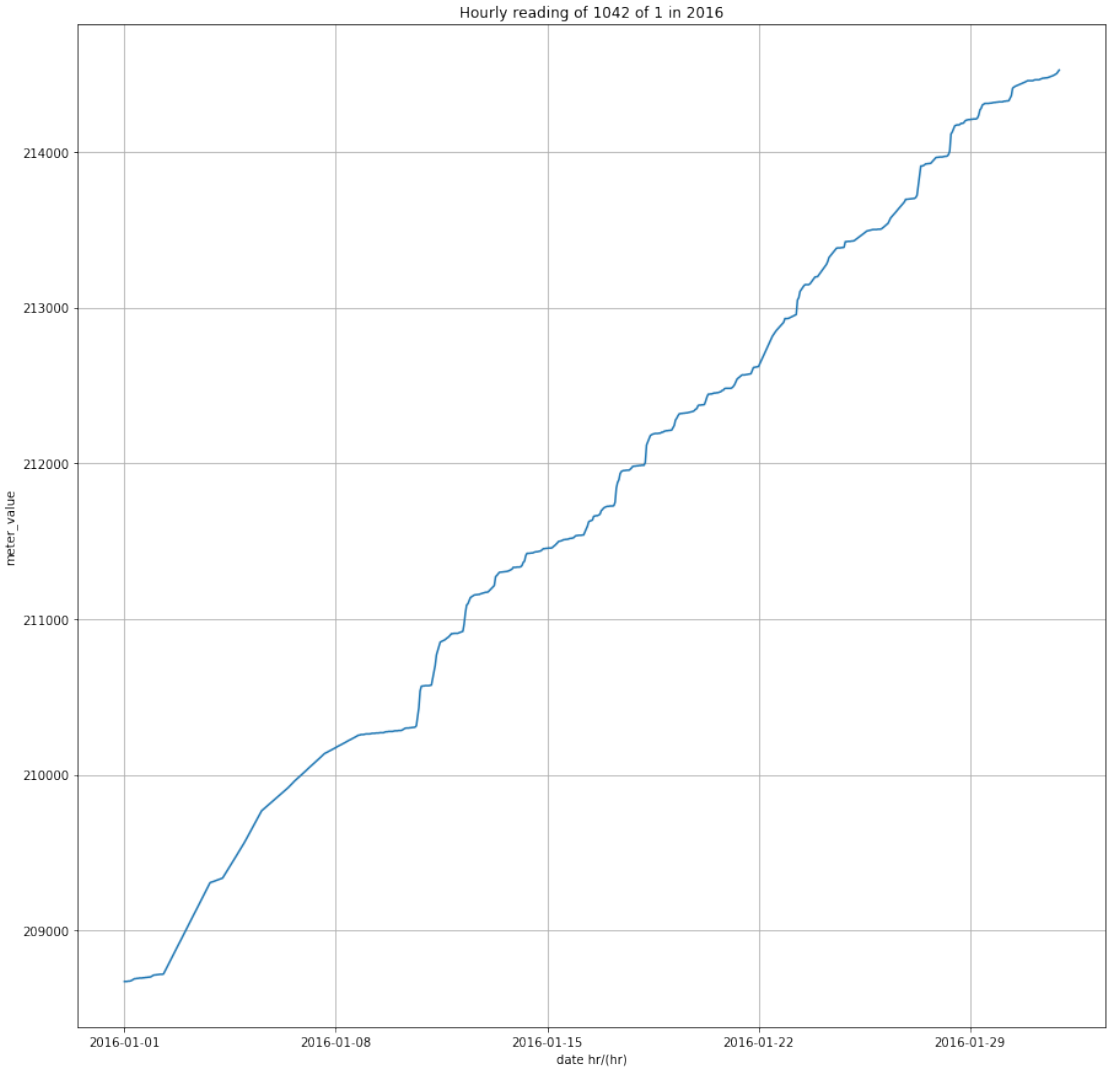

Hourly reading of 484 of 1 in 2016
meter_value
109000
108000
107000
106000
105000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

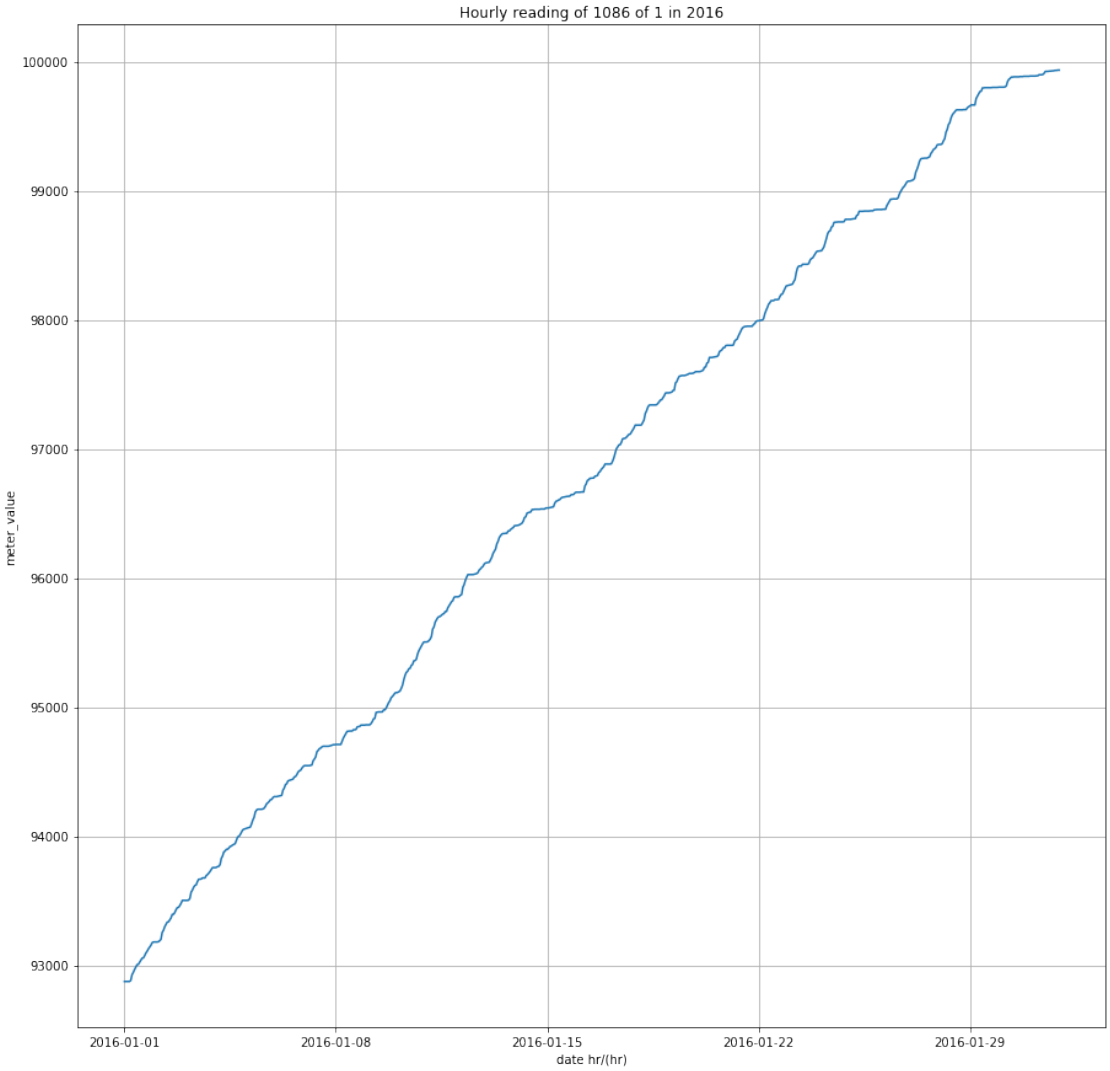

Hourly reading of 661 of 1 in 2016
214000
212000
210000
208000
206000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

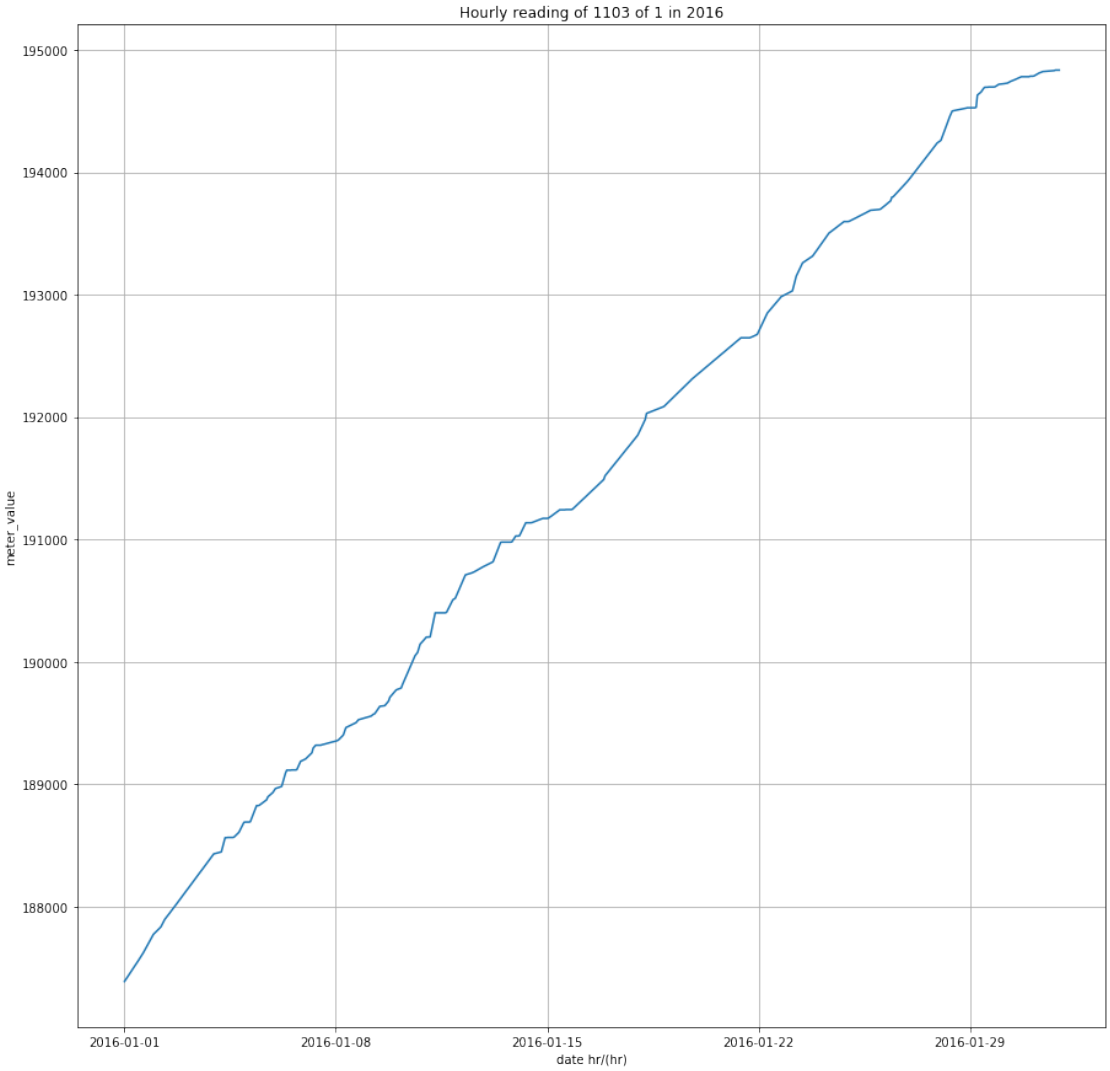

Hourly reading of 739 of 1 in 2016
meter_value
99000
98000
97000
96000
95000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

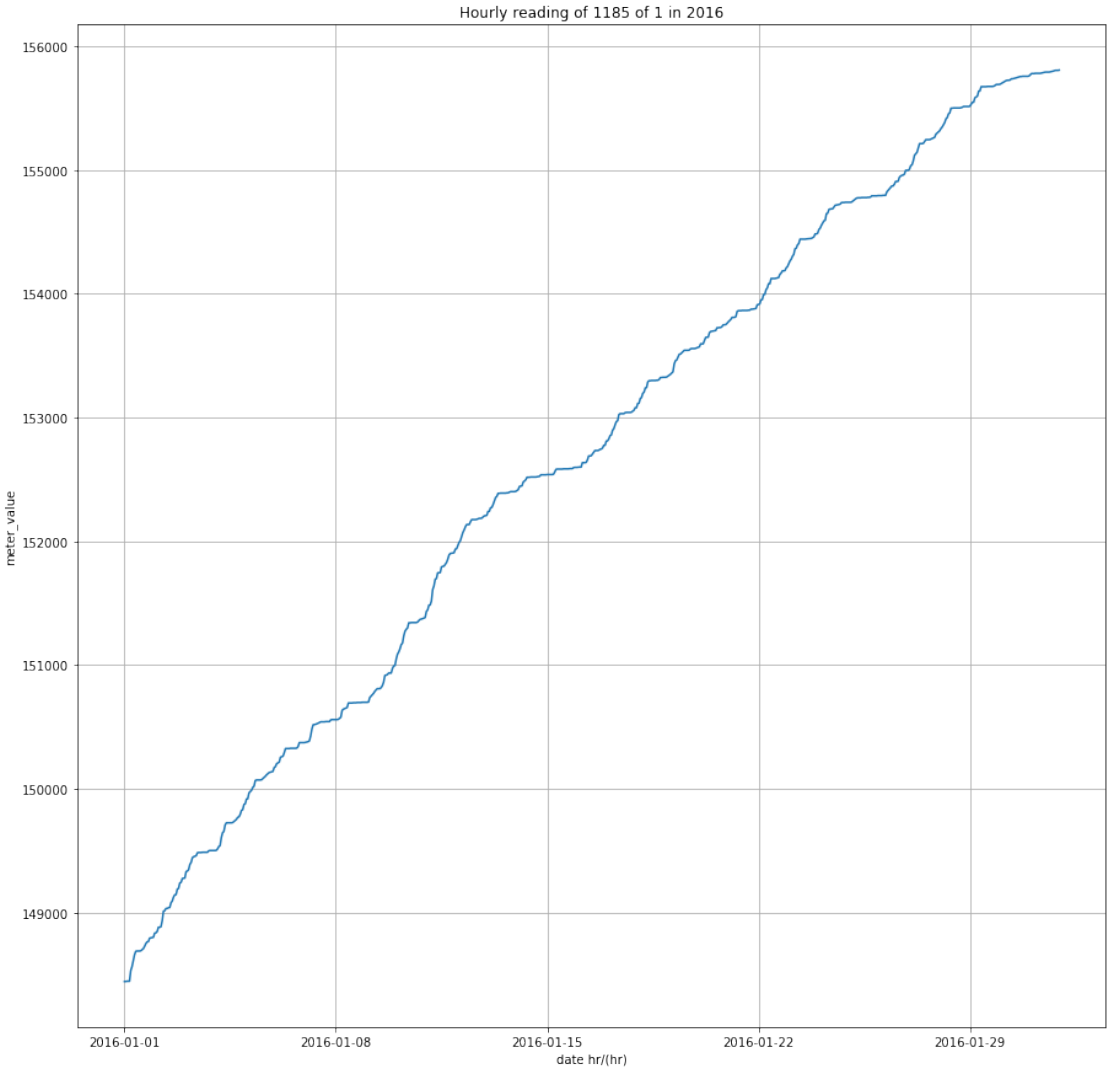

Hourly reading of 744 of 1 in 2016
meter_value
150000
149000
148000
147000
146000
145000
144000
143000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

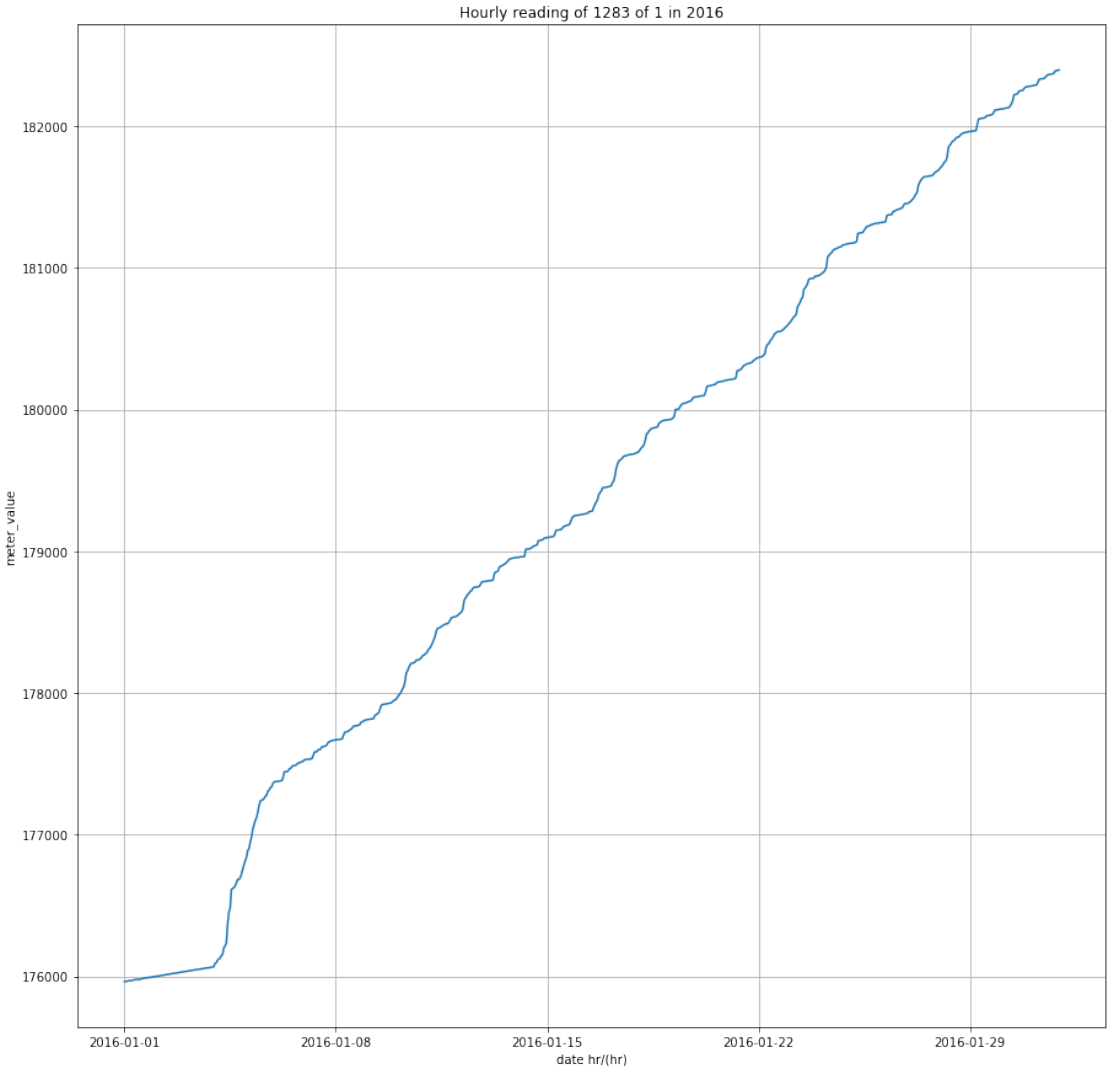

Hourly reading of 871 of 1 in 2016
meter_value
118000
117000
116000
115000
114000
113000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

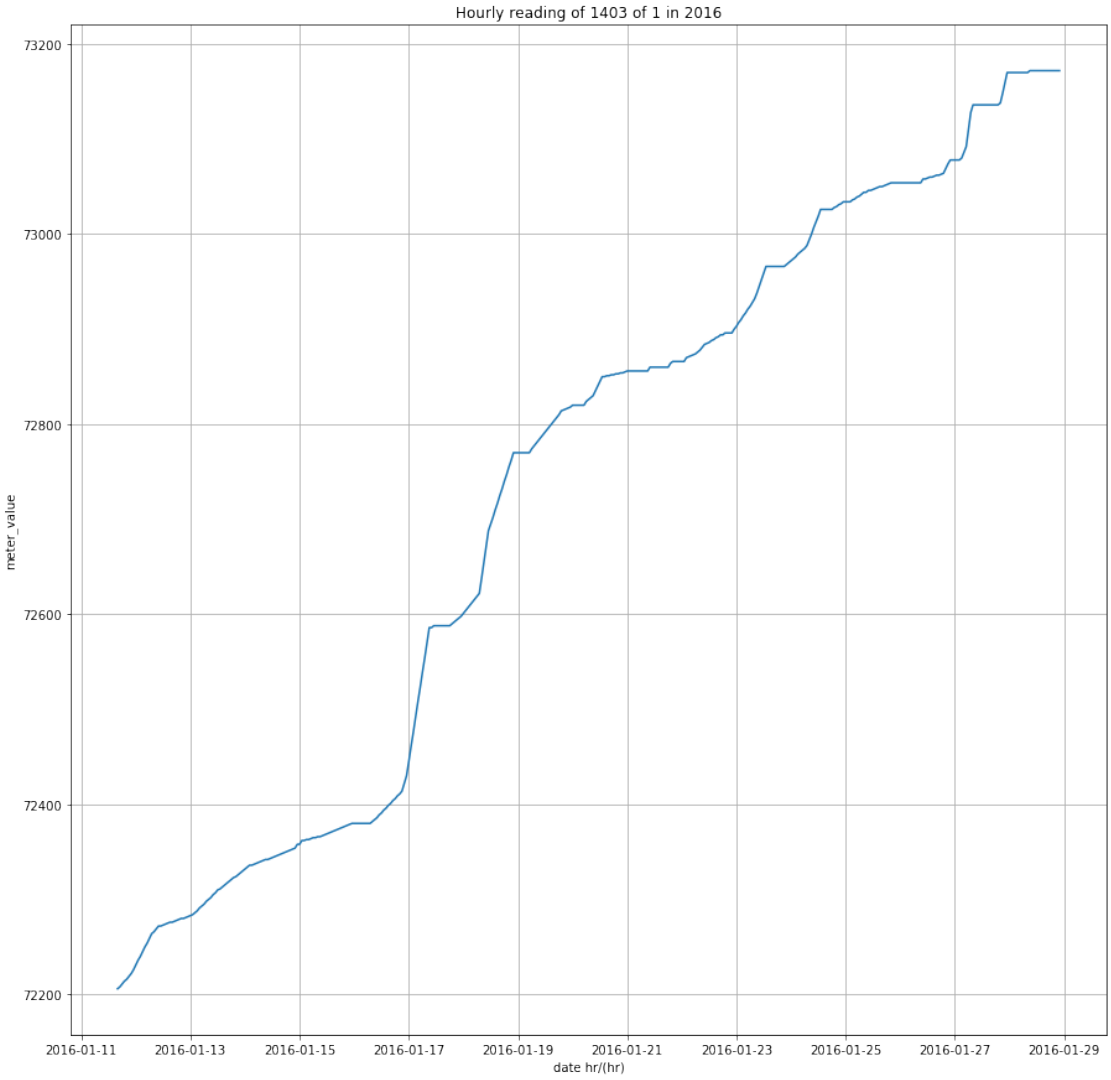

Hourly reading of 1042 of 1 in 2016
meter_value
214000
213000
212000
211000
210000
209000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

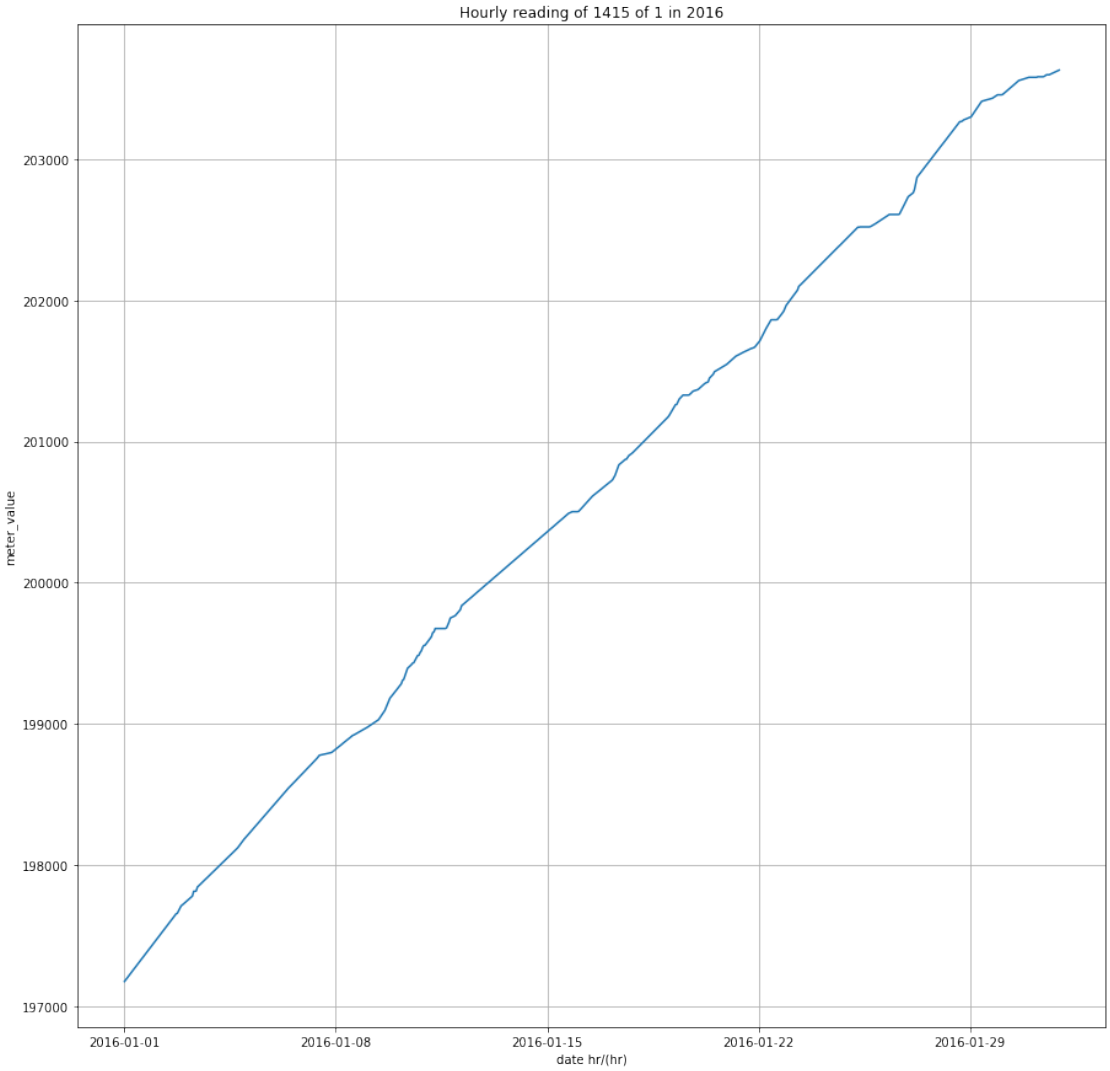

Hourly reading of 1086 of 1 in 2016
100000
99000
98000
97000
96000
95000
94000
93000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

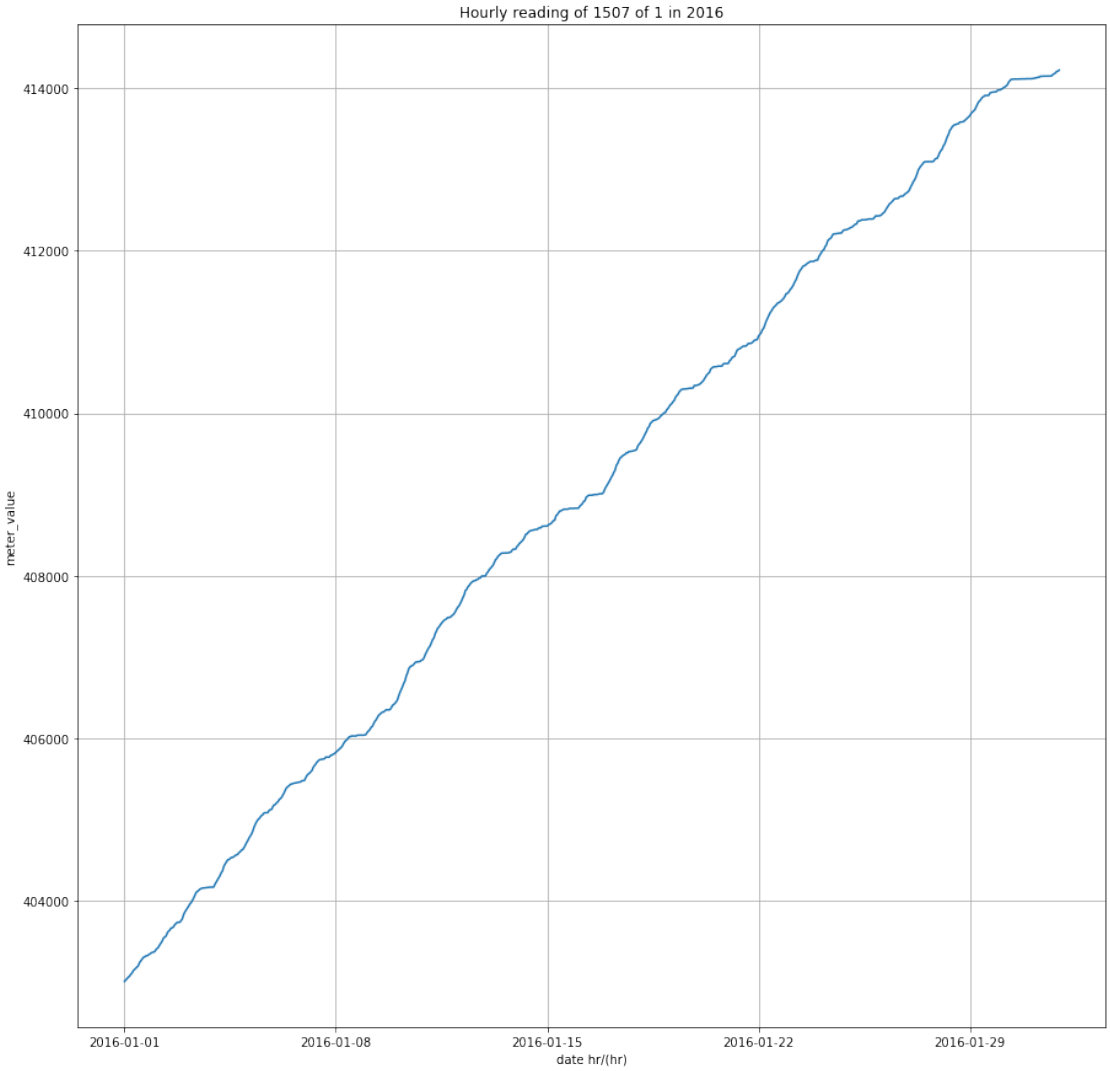

Hourly reading of 1103 of 1 in 2016
meter_value
195000
194000
193000
192000
191000
190000
189000
188000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

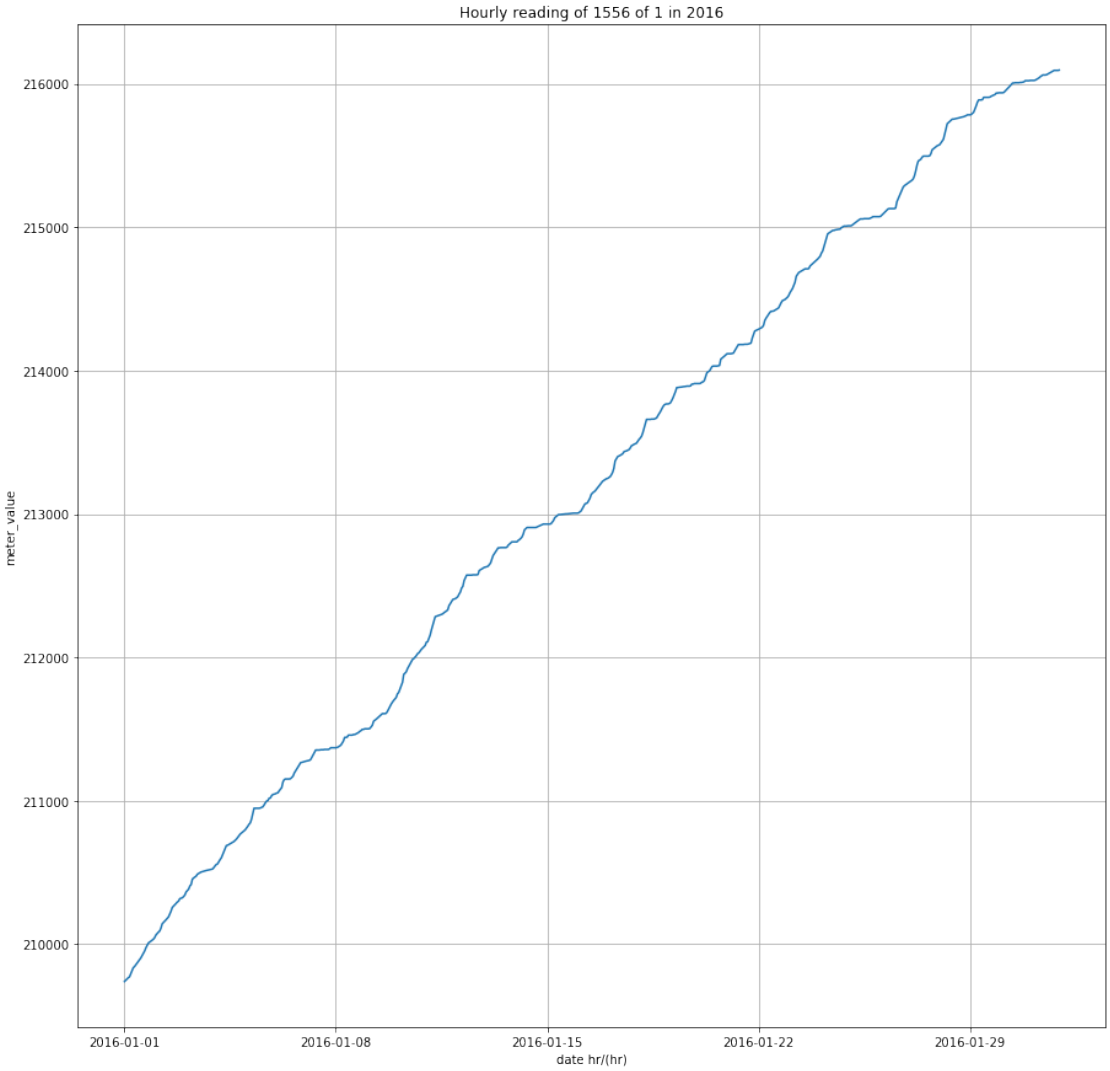

Hourly reading of 1185 of 1 in 2016
156000
155000
154000
153000
152000
151000
150000
149000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

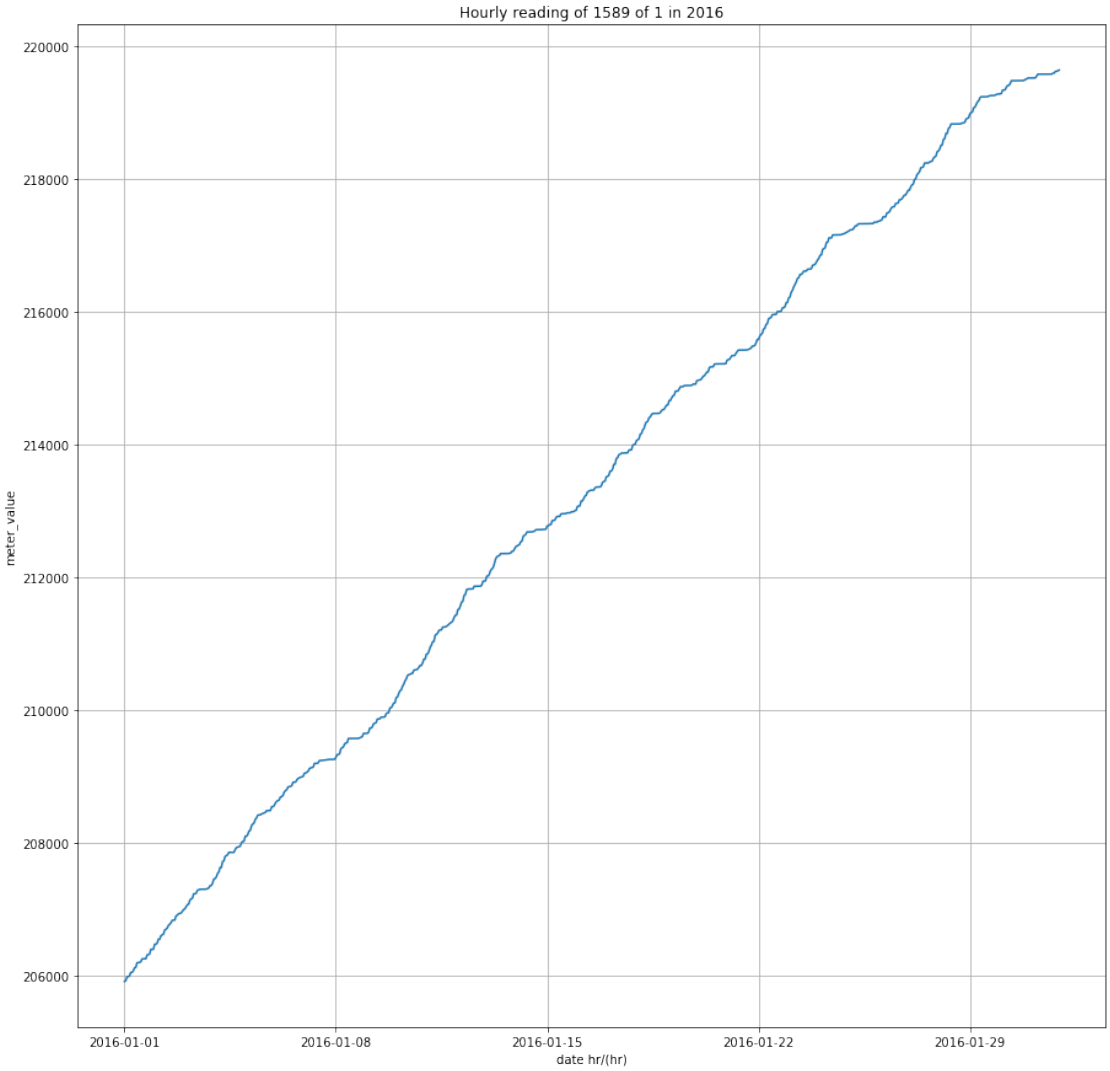

Hourly reading of 1283 of 1 in 2016
meter_value
182000
181000
180000
179000
178000
177000
176000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

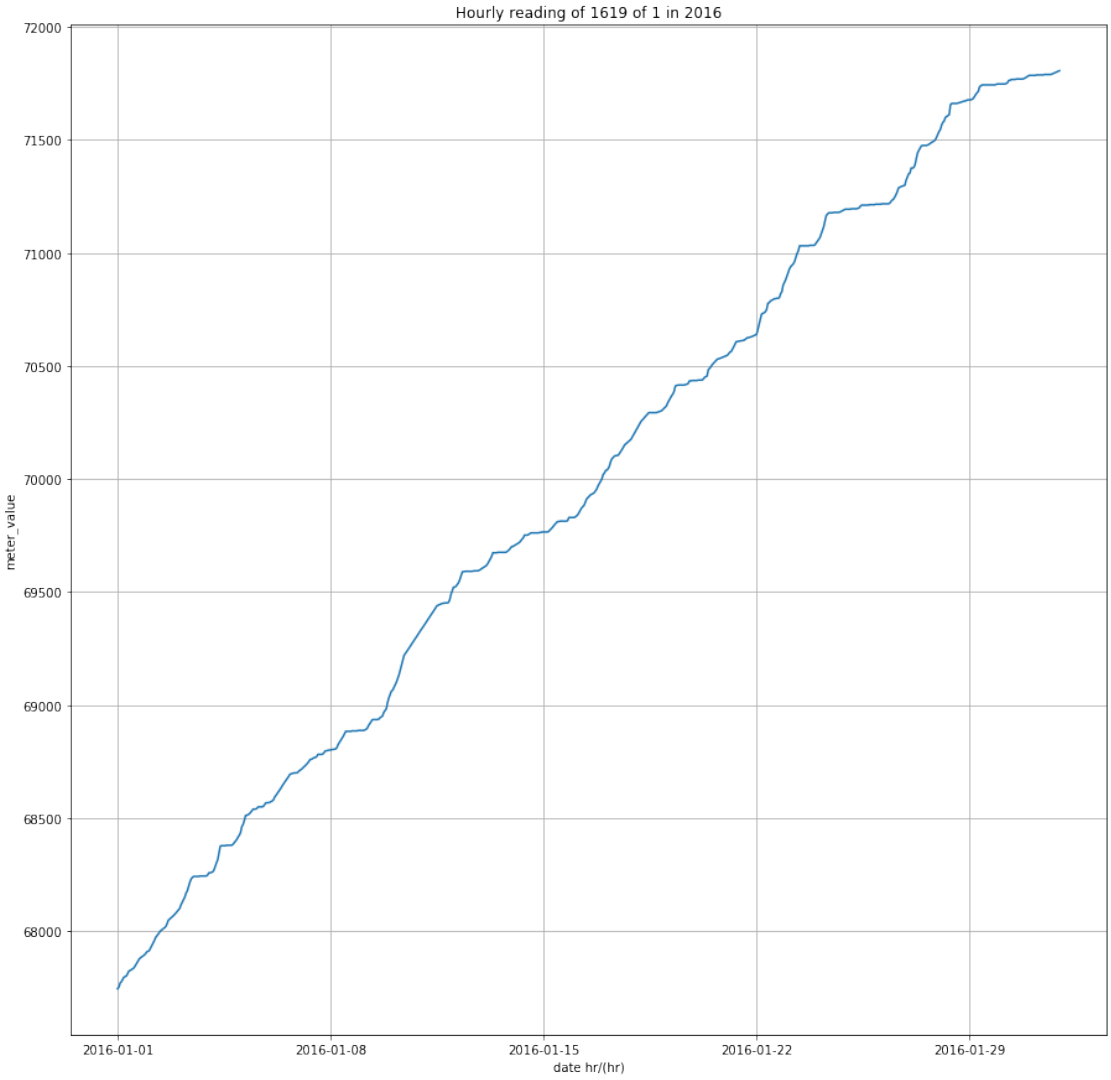

Hourly reading of 1403 of 1 in 2016
meter_value
73200
73000
72800
72600
72400
72200
2016-01-11
2016-01-13
2016-01-15
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
date hr/(hr)

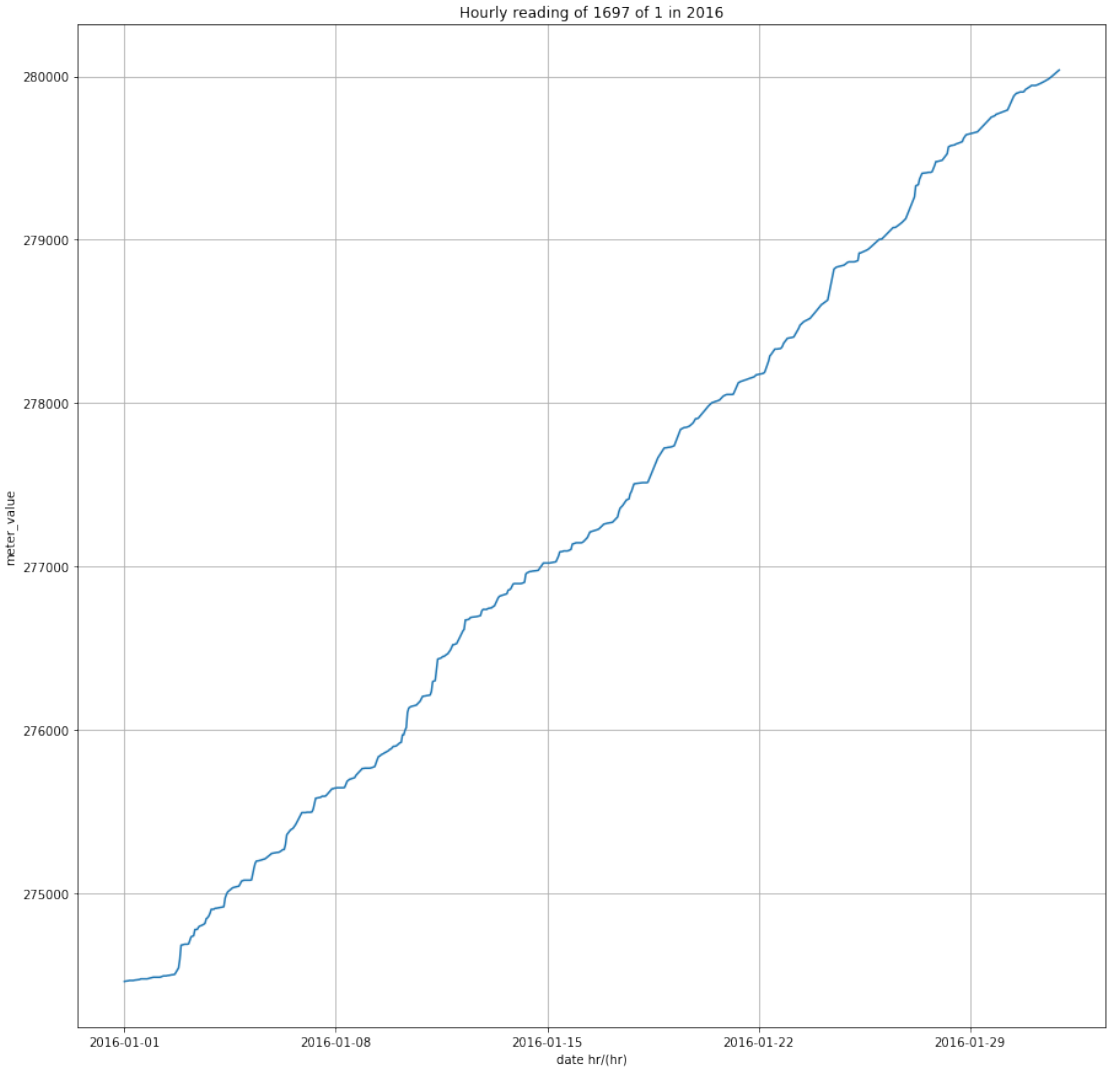

Hourly reading of 1415 of 1 in 2016
meter_value
203000
202000
201000
200000
199000
198000
197000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

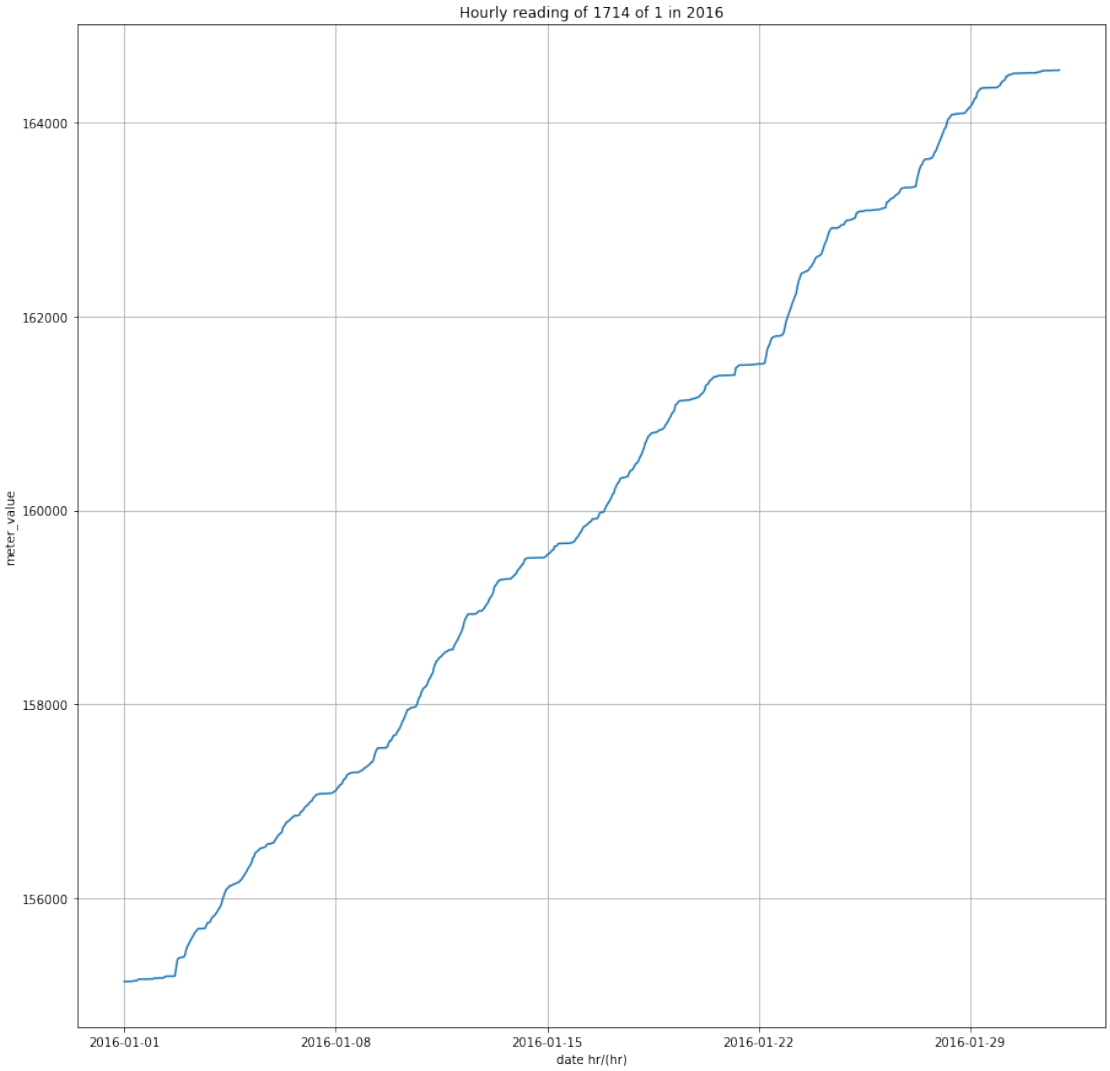

Hourly reading of 1507 of 1 in 2016
meter_value
414000
412000
410000
408000
406000
404000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

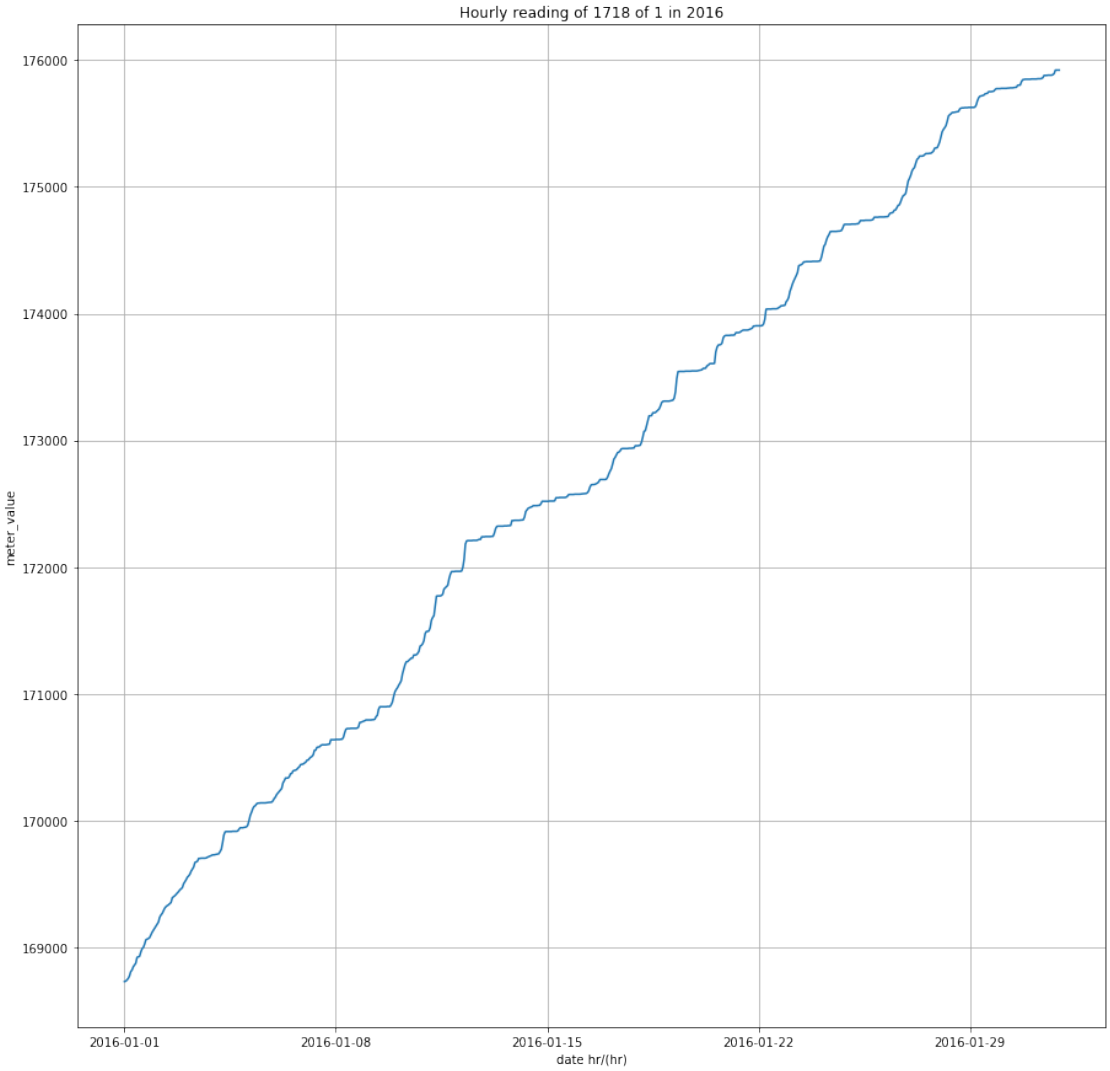

Hourly reading of 1556 of 1 in 2016
meter_value
216000
215000
214000
213000
212000
211000
210000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

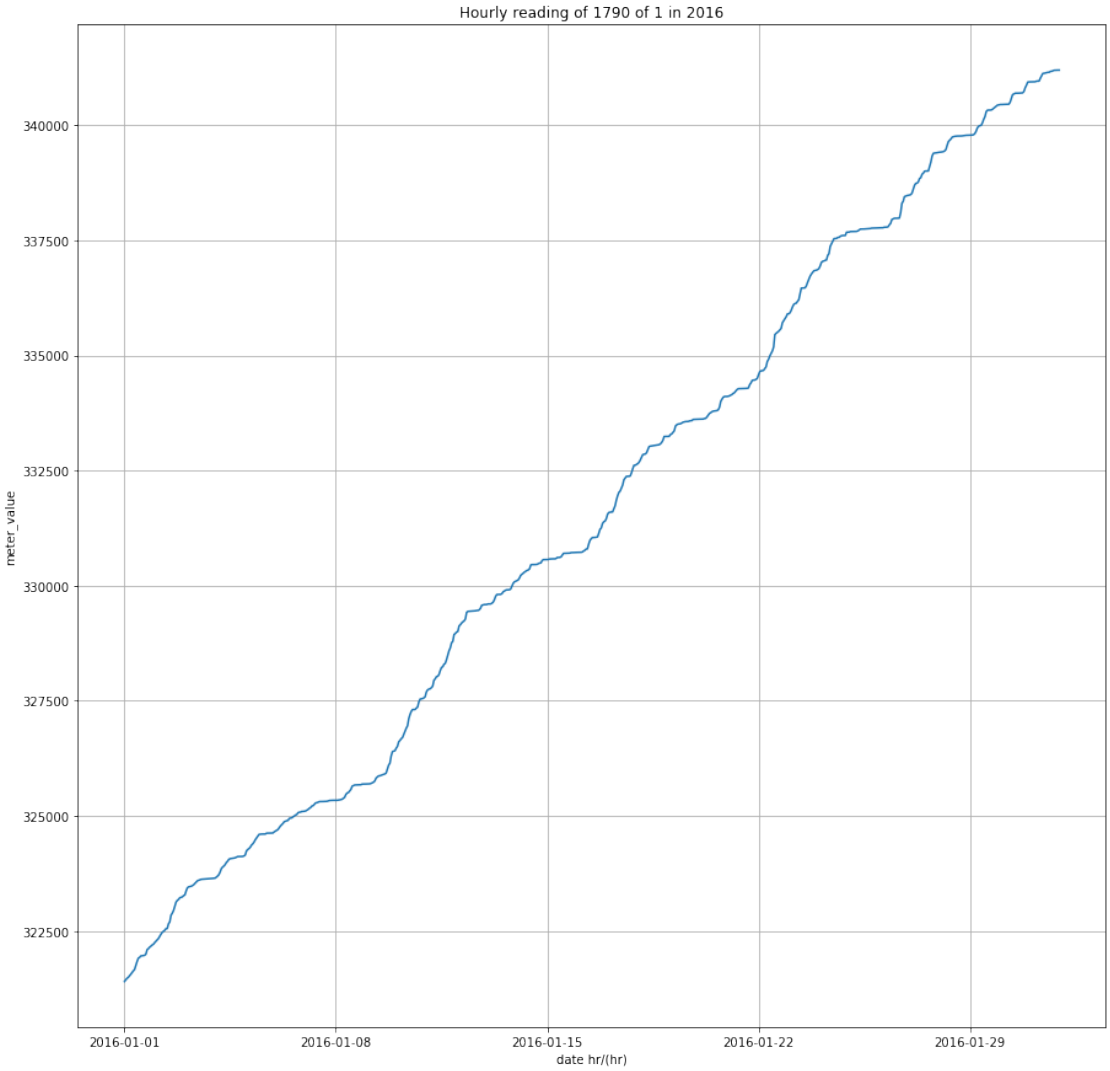

Hourly reading of 1589 of 1 in 2016
meter_value
220000
218000
216000
214000
212000
210000
208000
206000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

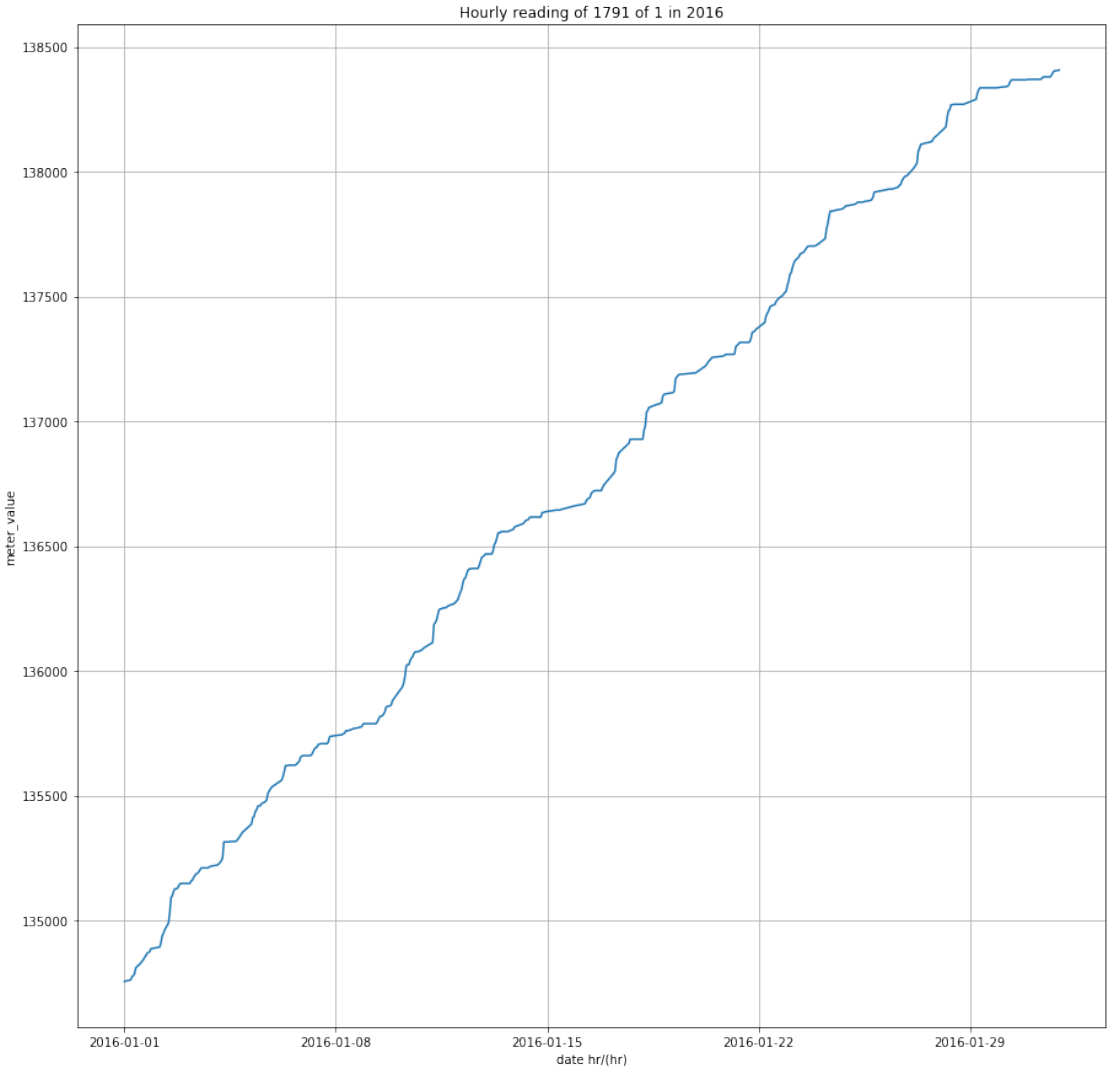

Hourly reading of 1619 of 1 in 2016
72000
71500
71000
70500
70000
69500
69000
68500
68000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

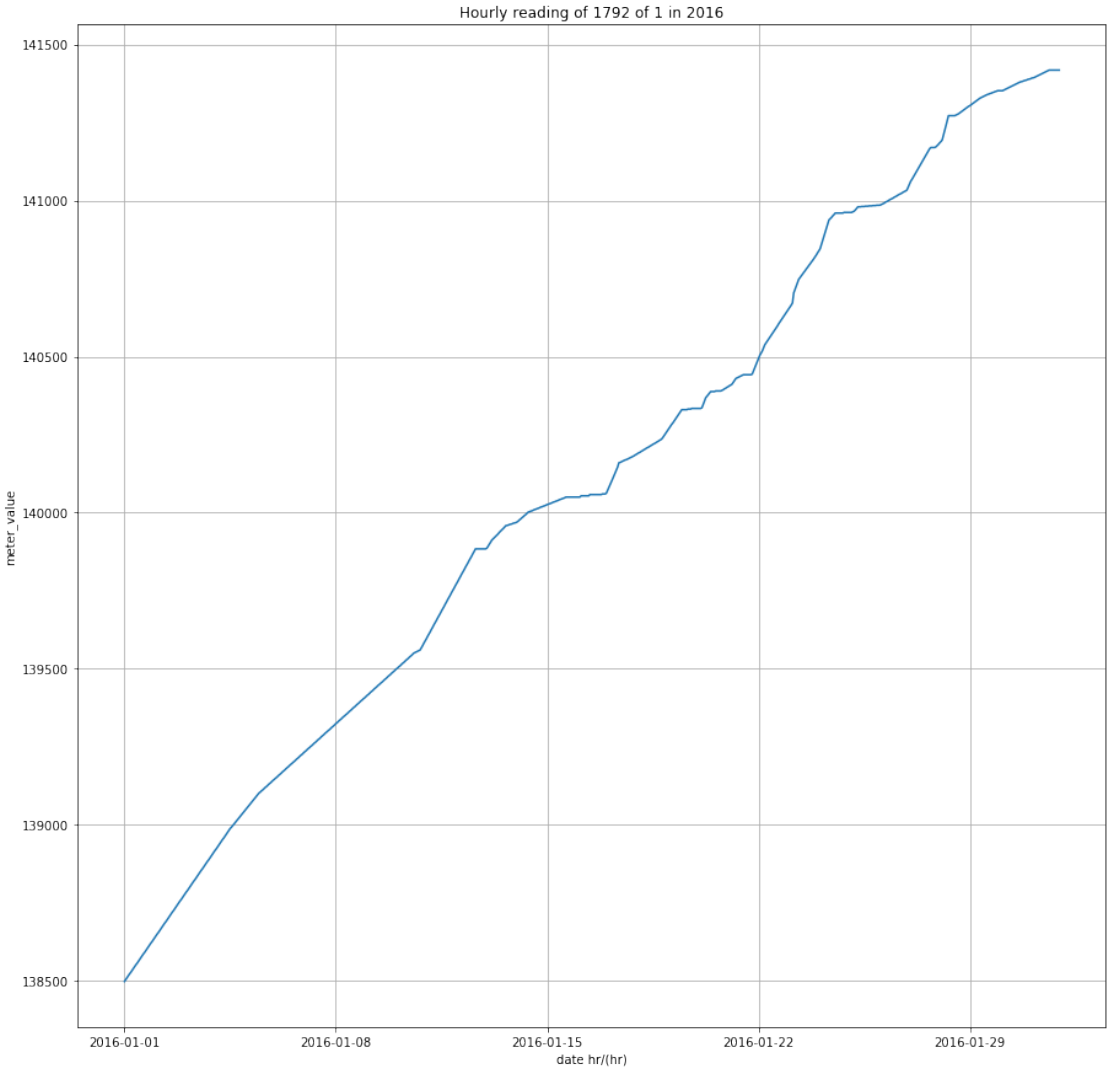

Hourly reading of 1697 of 1 in 2016
meter_value
280000
279000
278000
277000
276000
275000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

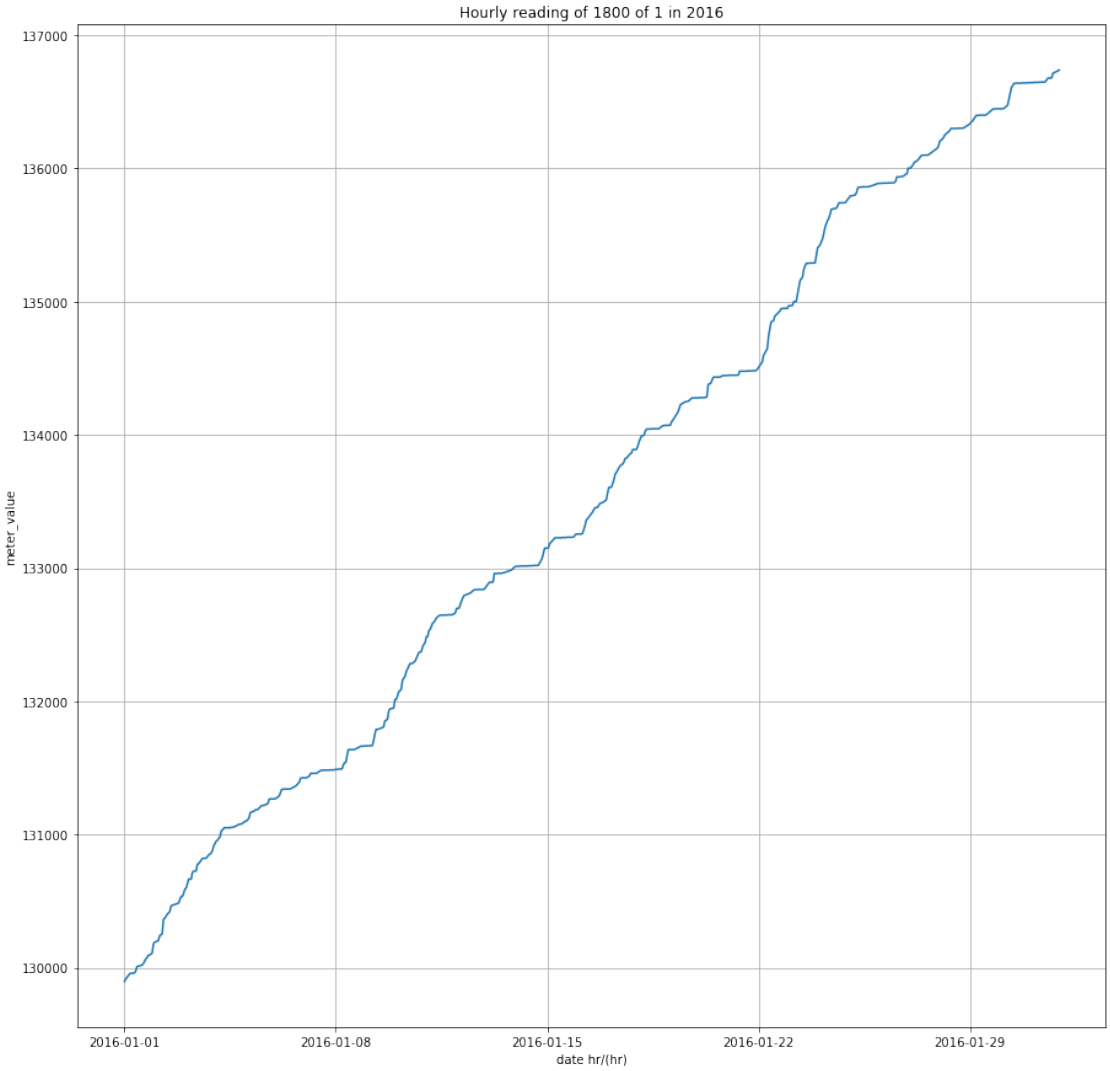

Hourly reading of 1714 of 1 in 2016
meter_value
164000
162000
160000
158000
156000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

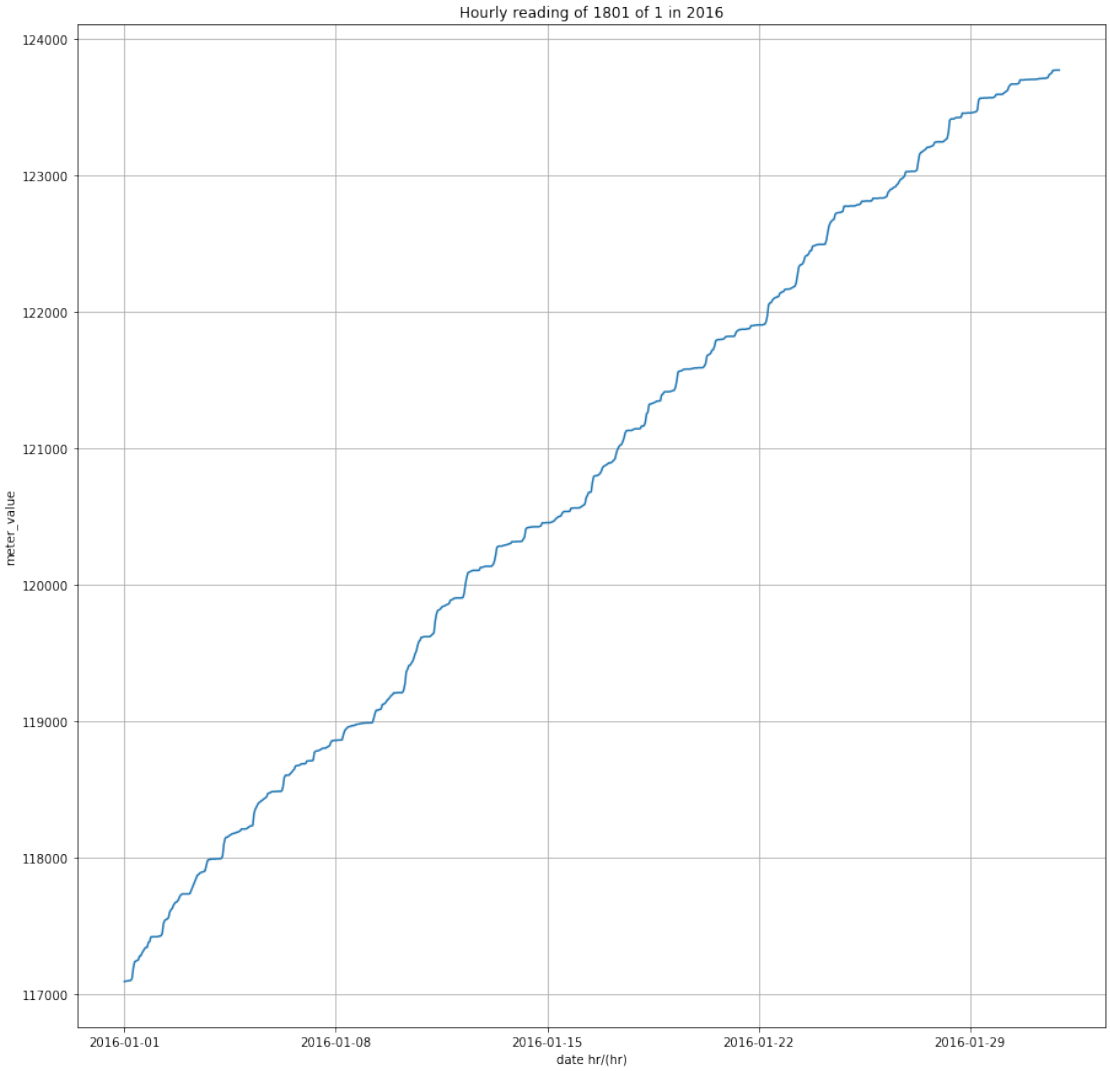

Hourly reading of 1718 of 1 in 2016
meter_value
176000
175000
174000
173000
172000
171000
170000
169000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

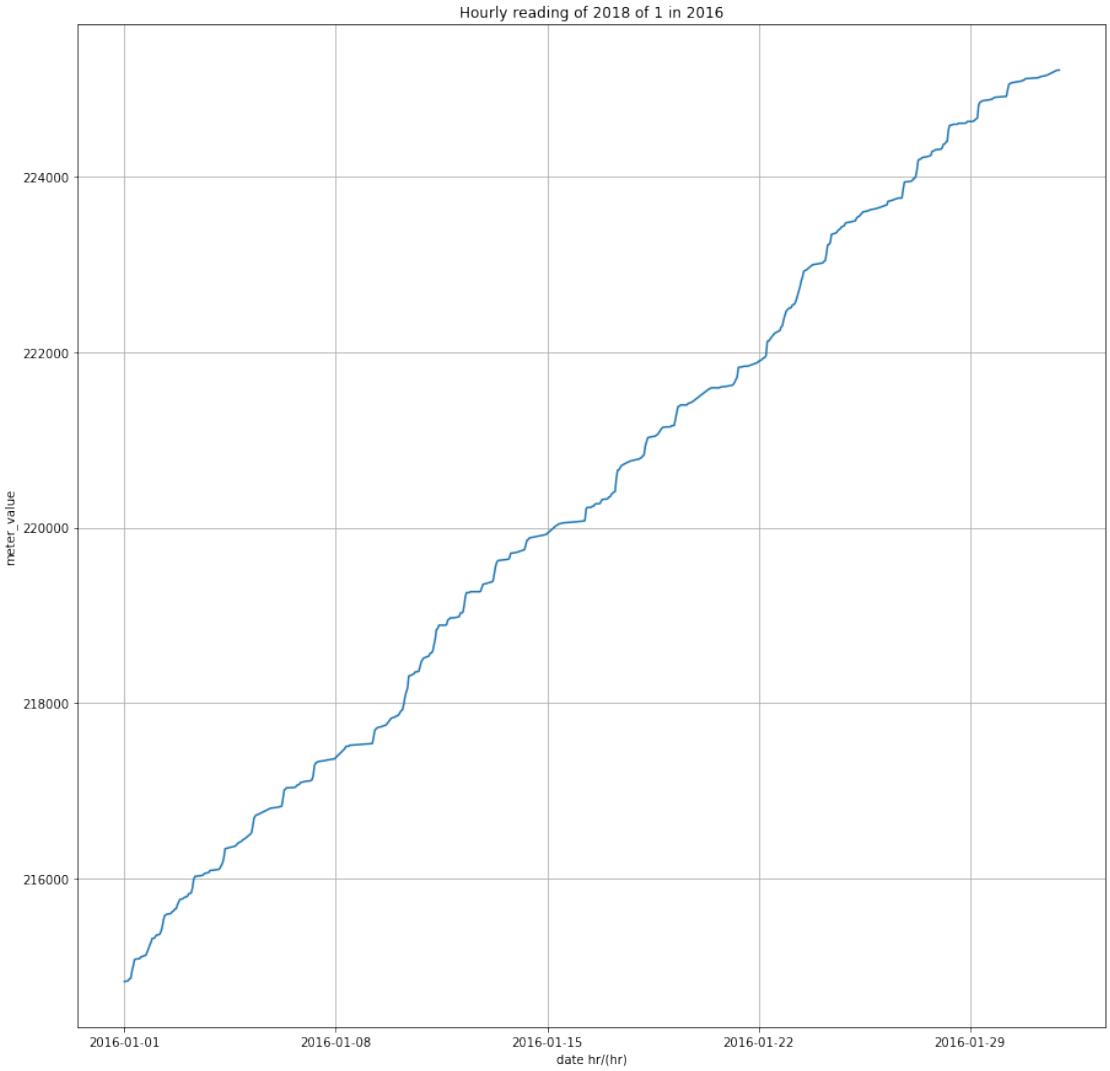

Hourly reading of 1790 of 1 in 2016
meter_value
340000
337500
335000
332500
330000
327500
325000
322500
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

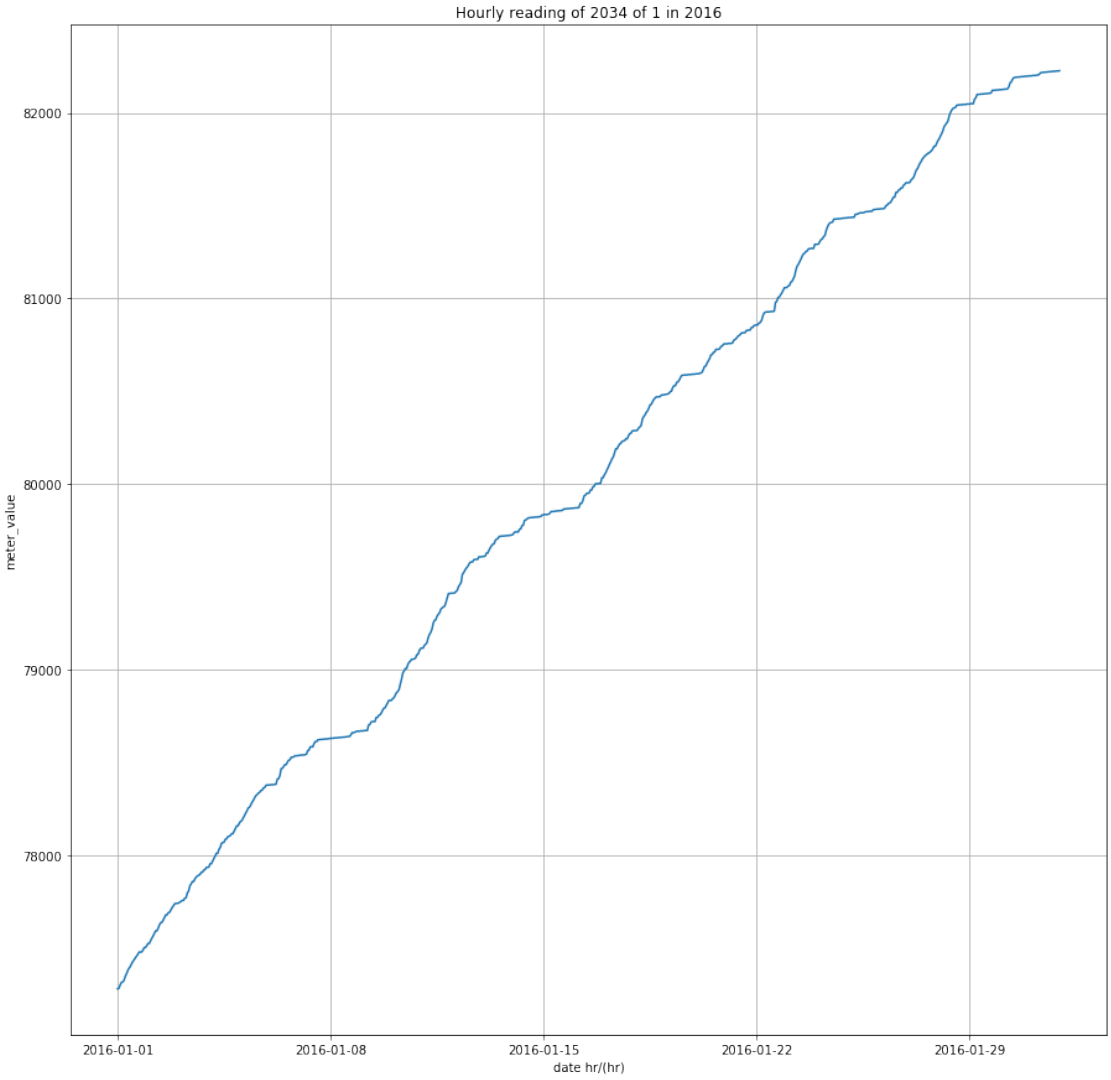

Hourly reading of 1791 of 1 in 2016
meter_value
138500
138000
137500
137000
136500
136000
135500
135000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

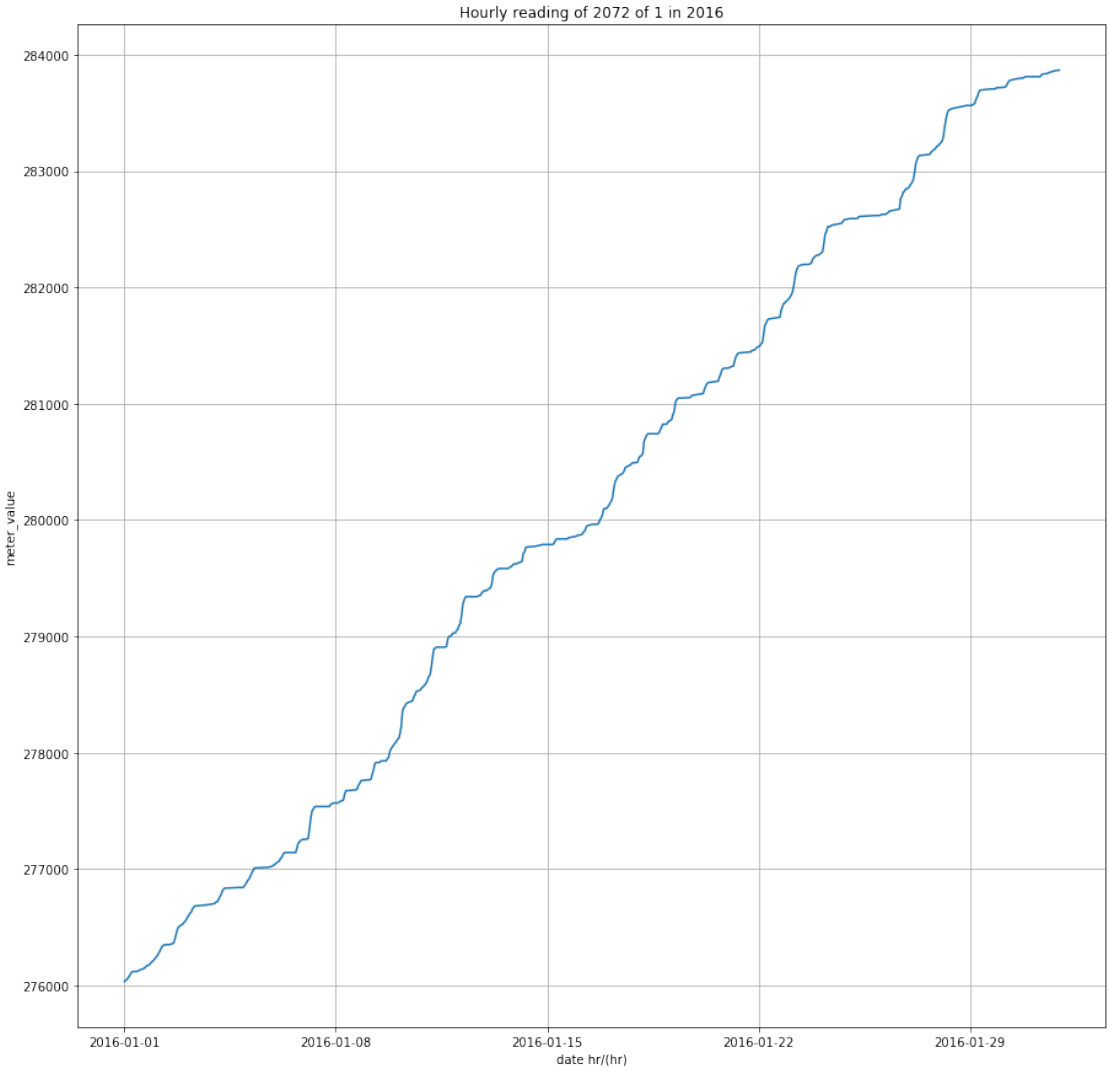

Hourly reading of 1792 of 1 in 2016
141500
141000
140500
140000
139500
139000
138500
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

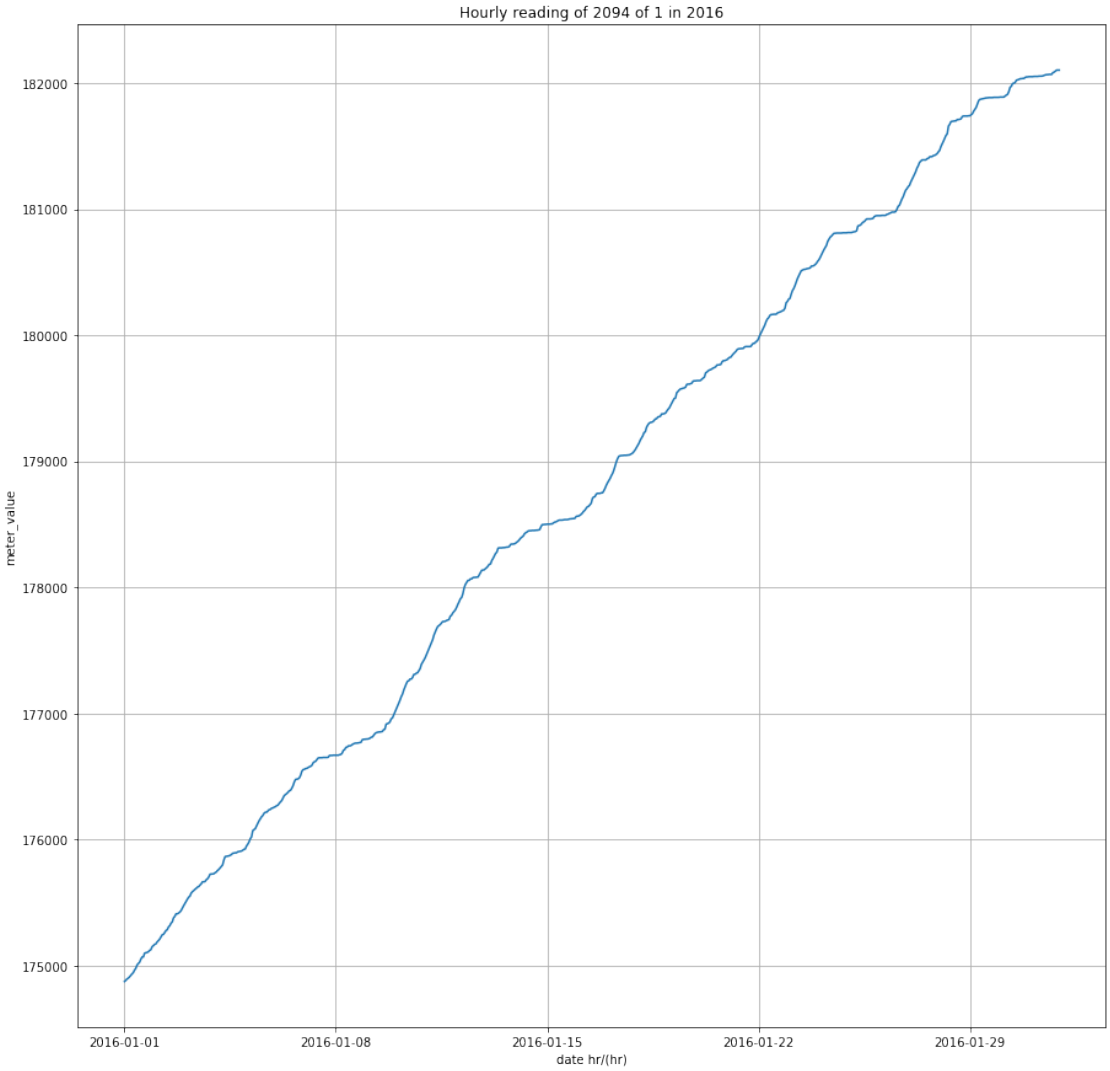

Hourly reading of 1800 of 1 in 2016
meter_value
137000
136000
135000
134000
133000
132000
131000
130000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

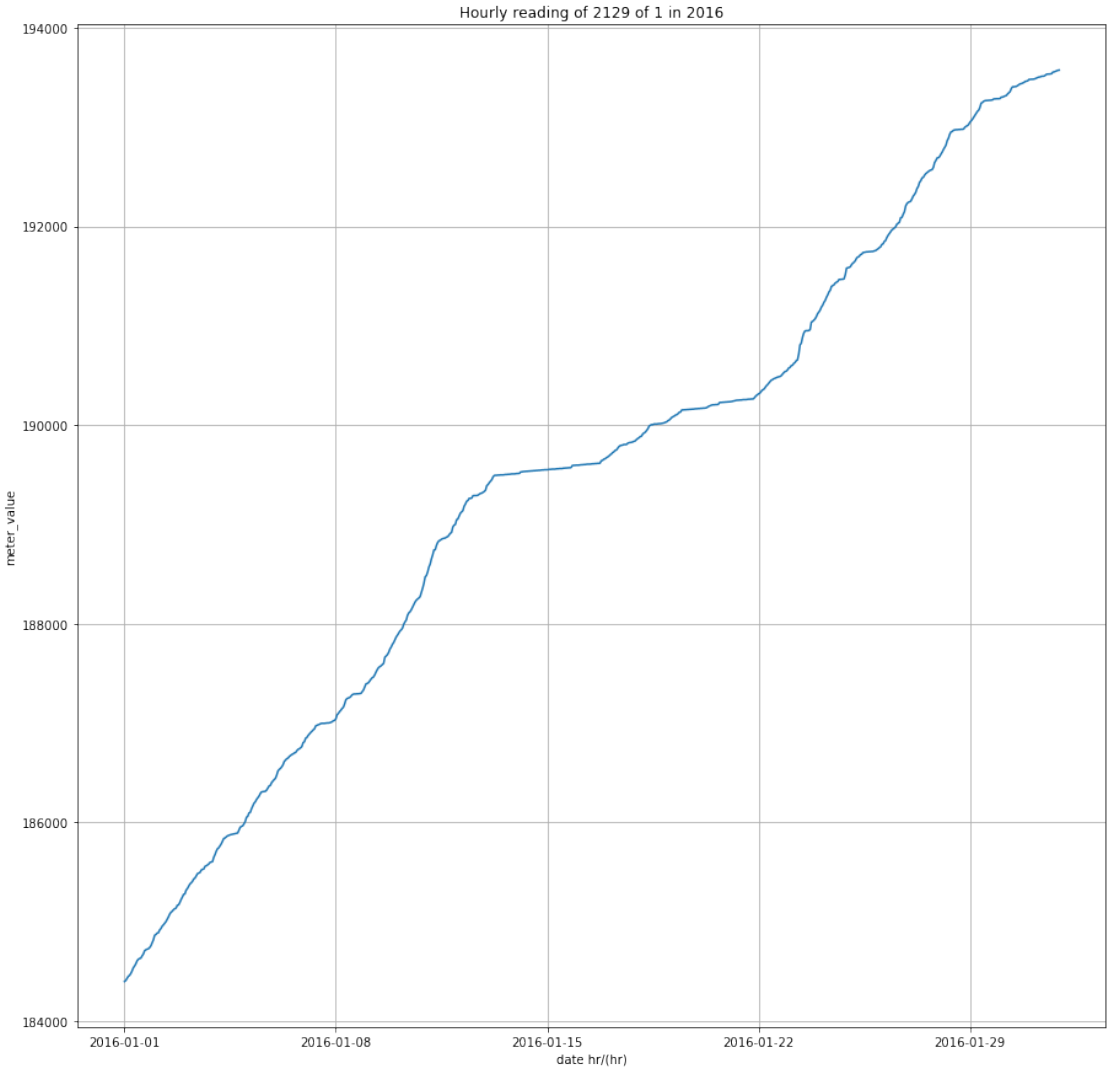

Hourly reading of 1801 of 1 in 2016
meter_value
124000
123000
122000
121000
120000
119000
118000
117000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

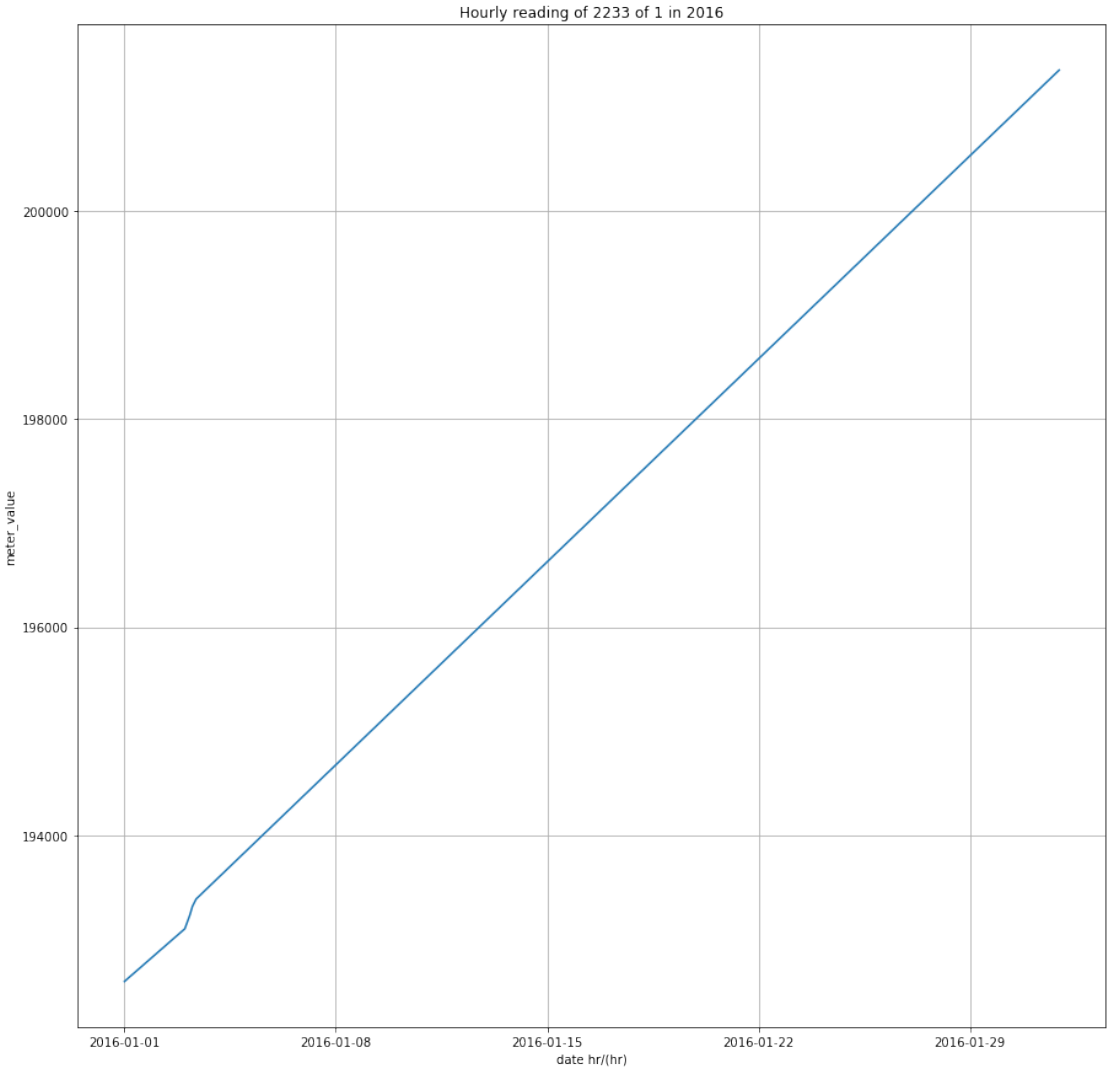

Hourly reading of 2018 of 1 in 2016
meter_value
224000
222000
220000
218000
216000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

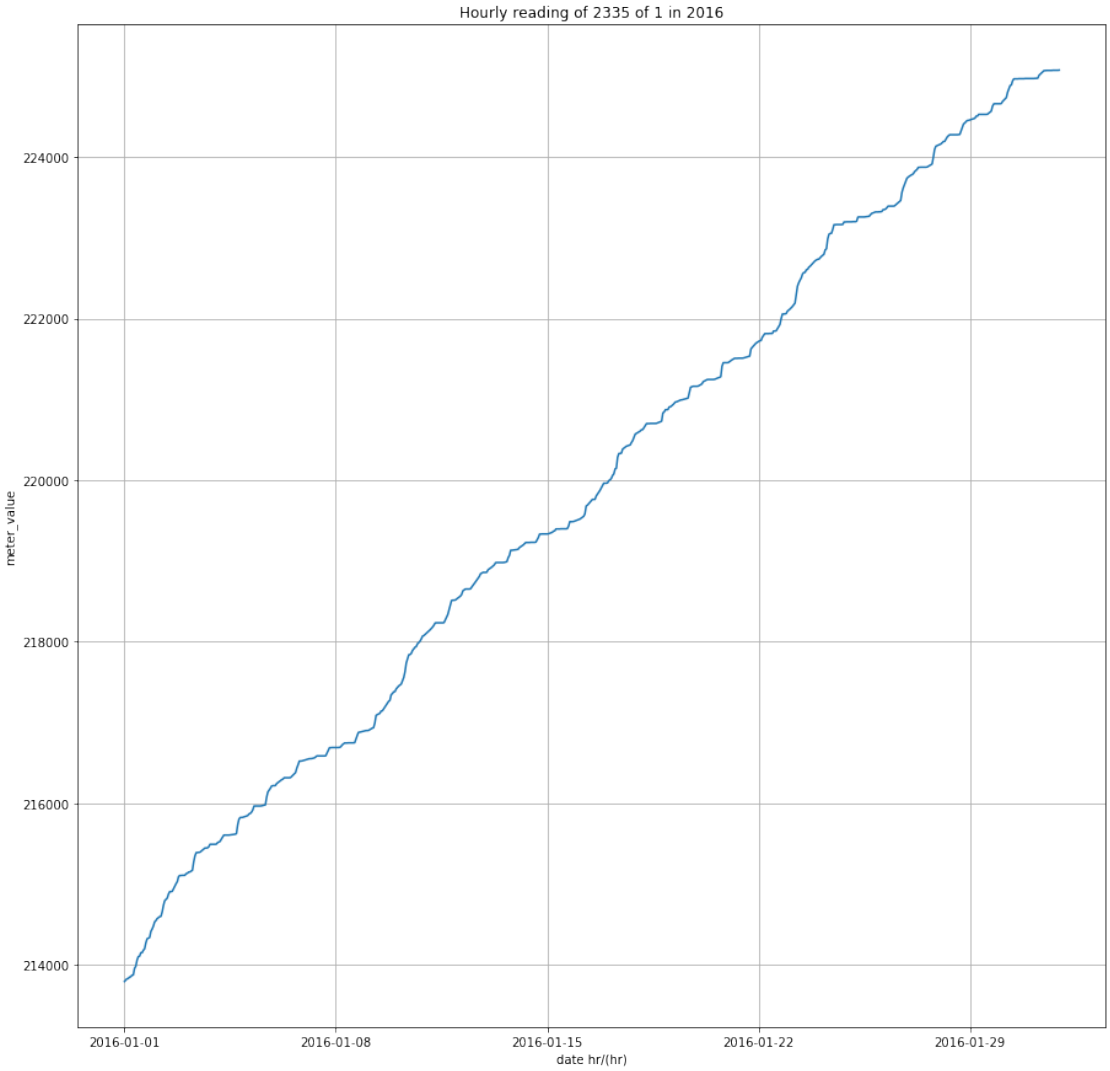

Hourly reading of 2034 of 1 in 2016
meter_value
82000
81000
80000
79000
78000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

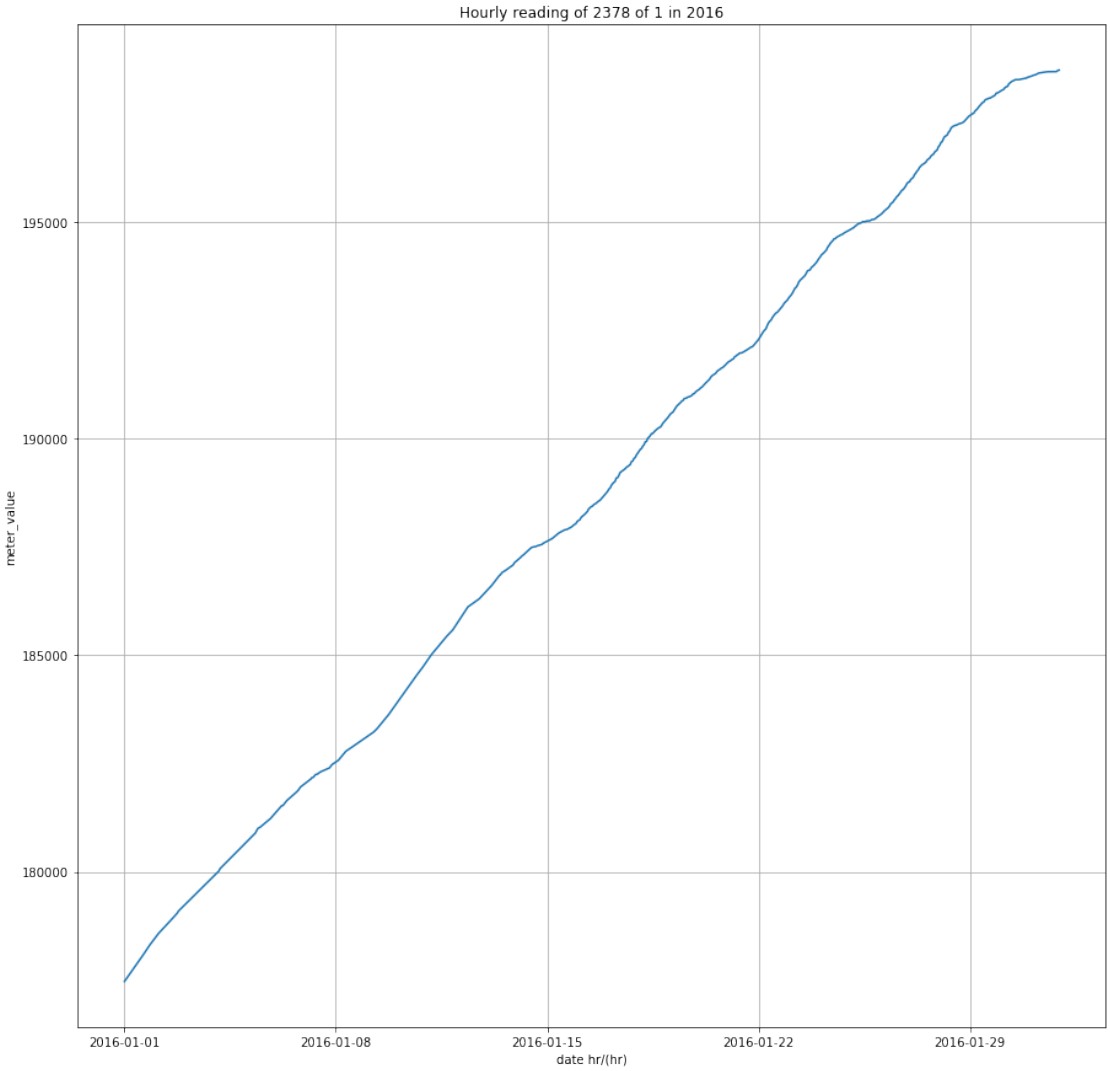

Hourly reading of 2072 of 1 in 2016
meter_value
284000
283000
282000
281000
280000
279000
278000
277000
276000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

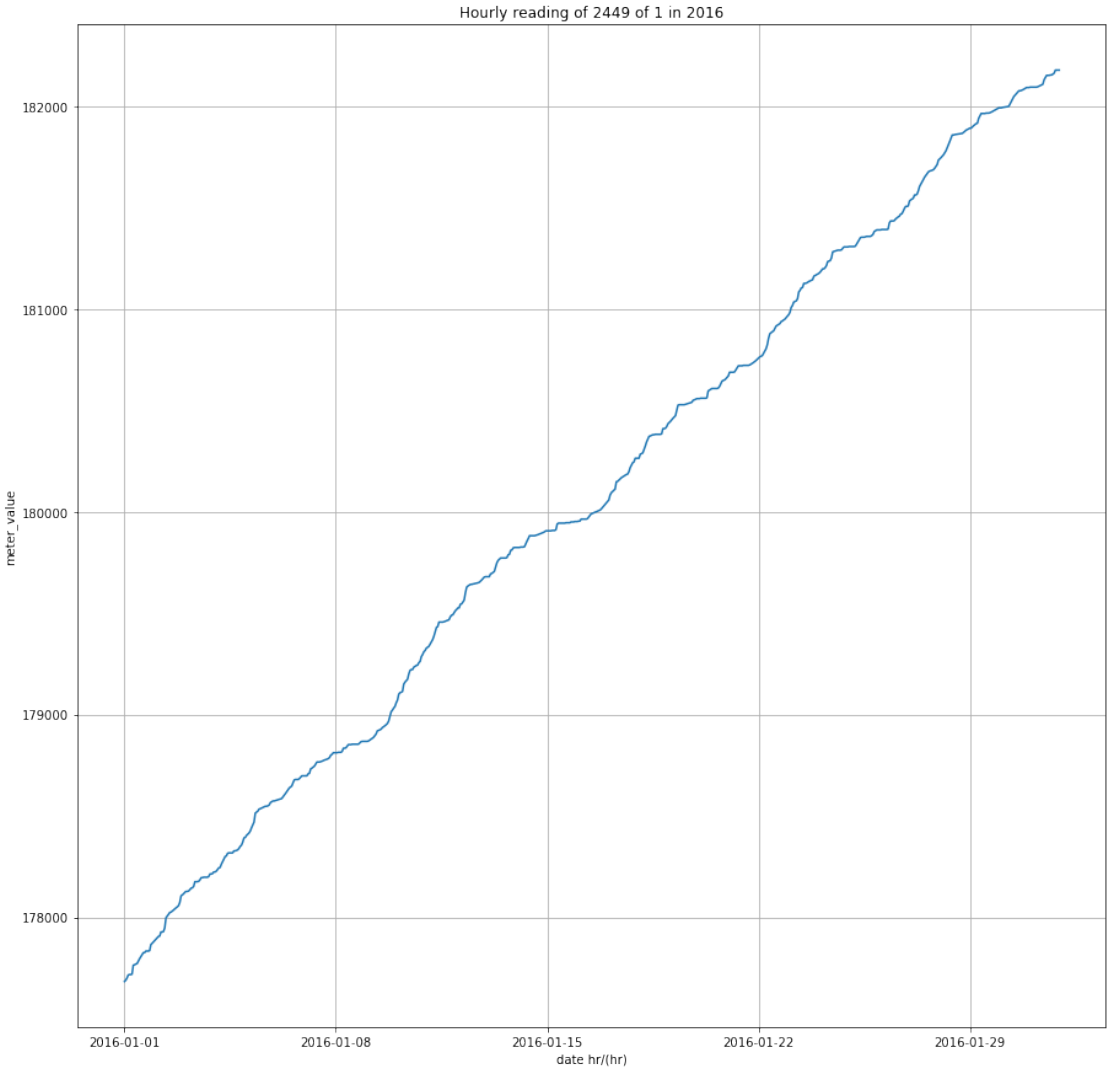

Hourly reading of 2094 of 1 in 2016
meter_value
182000
181000
180000
179000
178000
177000
176000
175000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

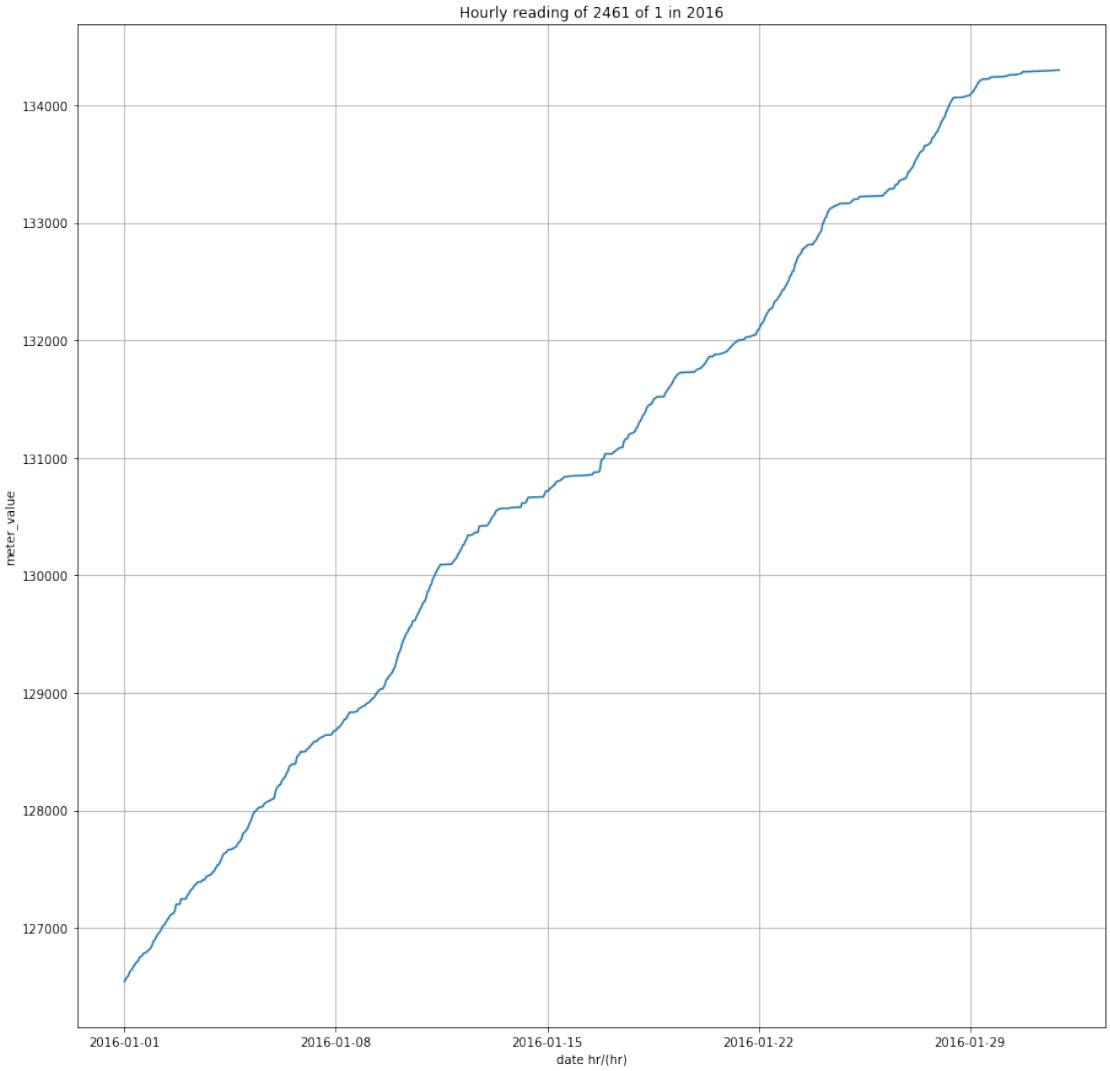

Hourly reading of 2129 of 1 in 2016
194000
192000
190000
188000
186000
184000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

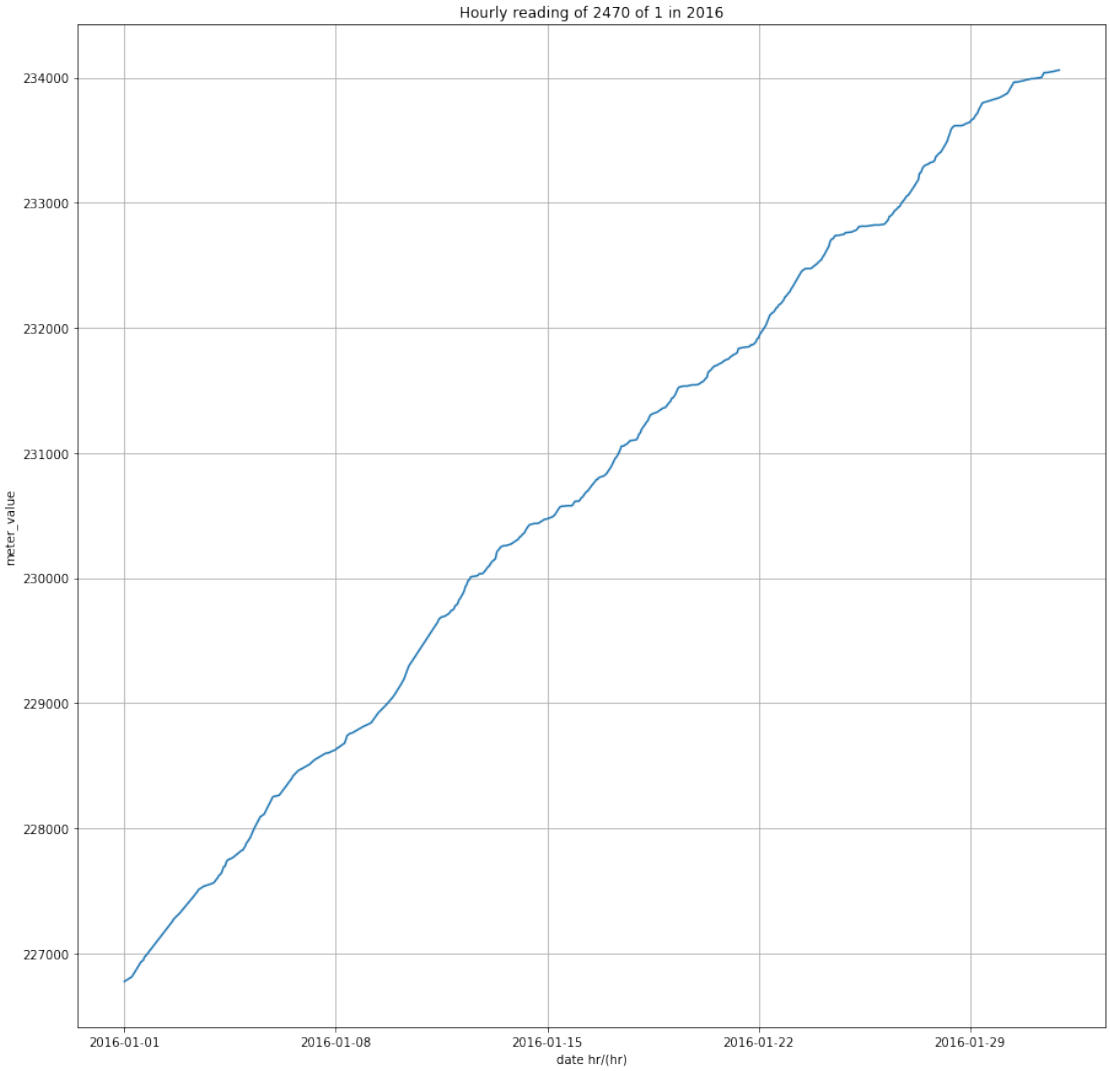

Hourly reading of 2233 of 1 in 2016
meter_value
200000
198000
196000
194000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

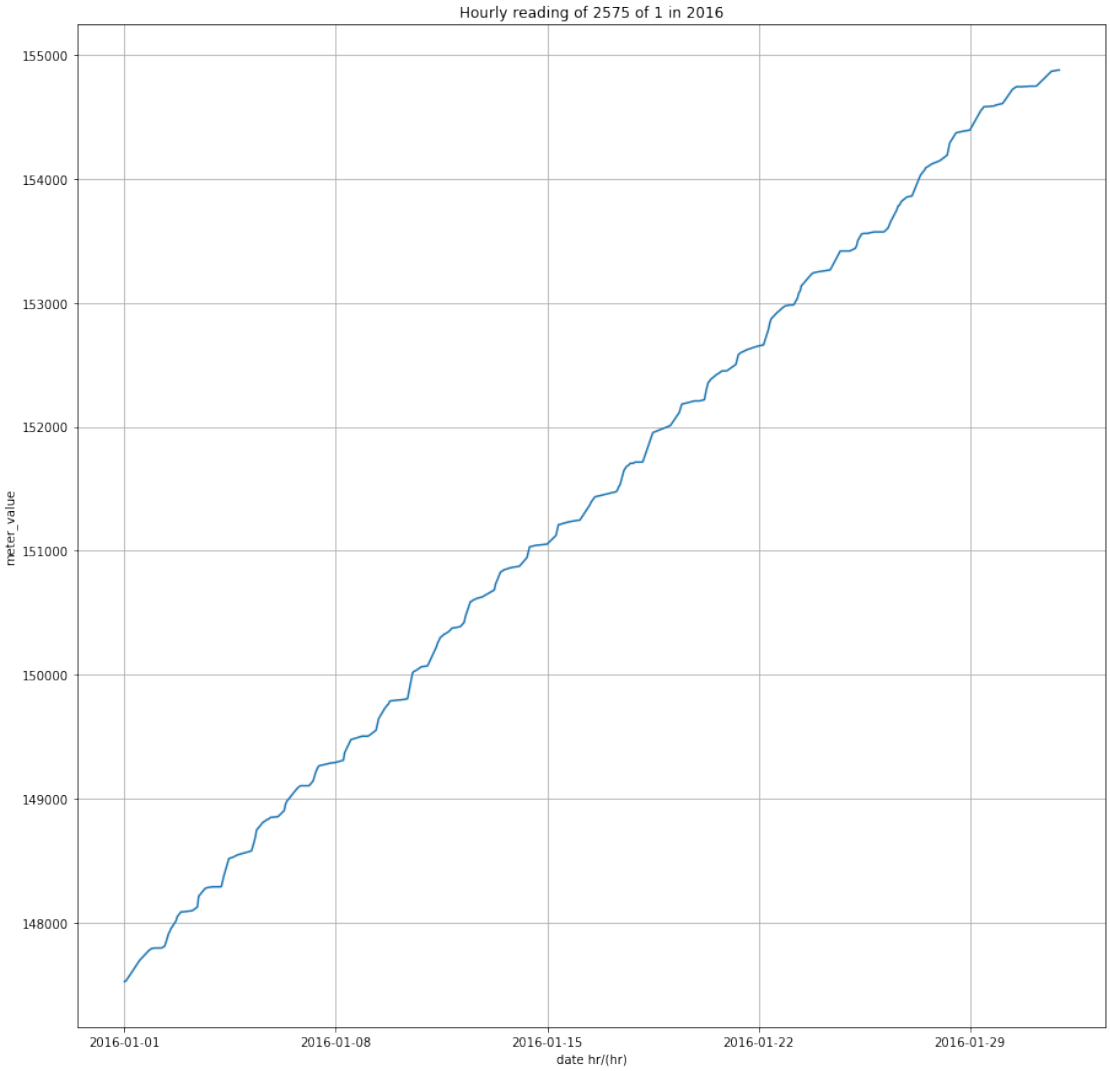

Hourly reading of 2335 of 1 in 2016
meter_value
224000
222000
220000
218000
216000
214000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

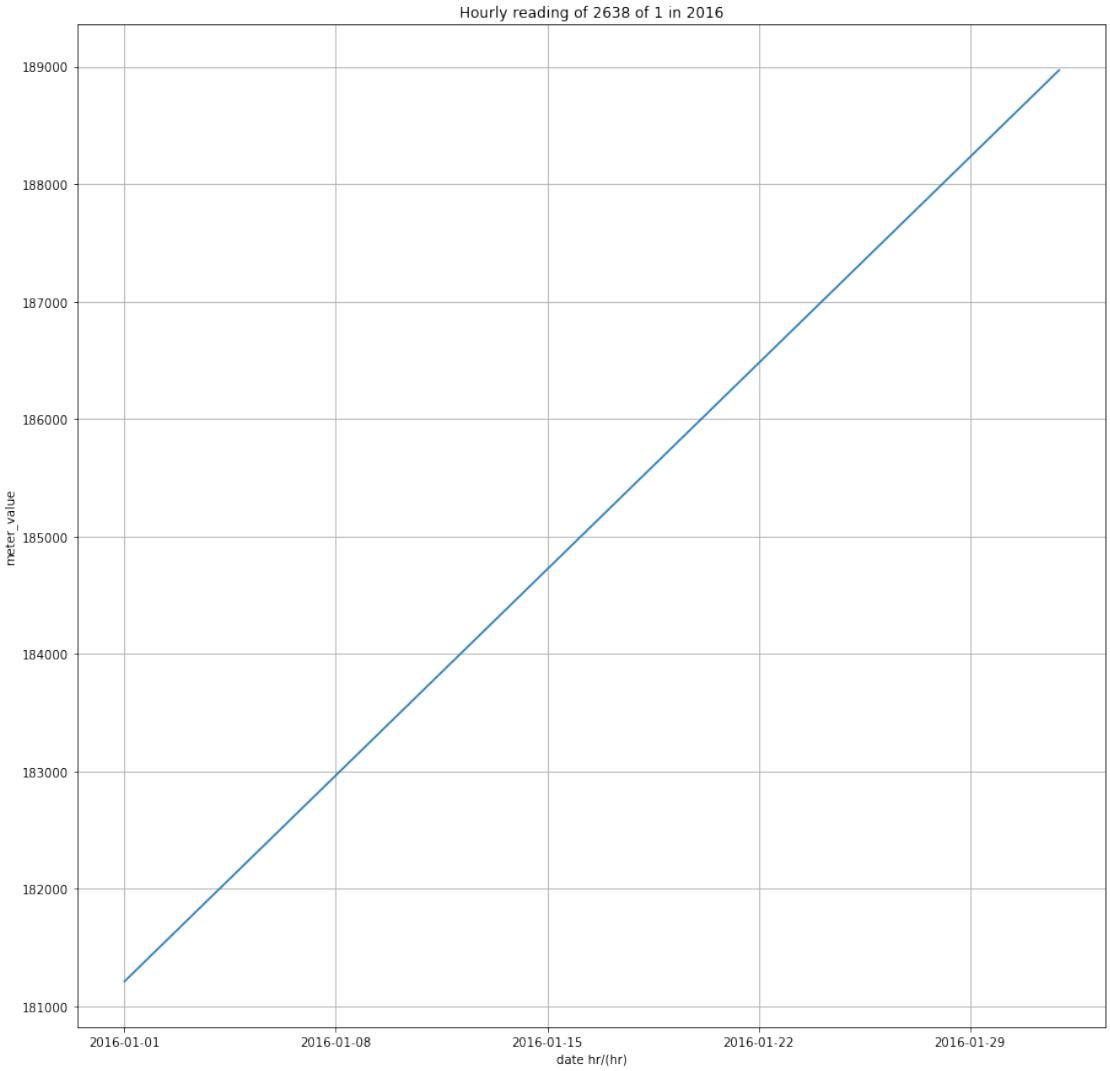

Hourly reading of 2378 of 1 in 2016
meter_value
195000
190000
185000
180000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

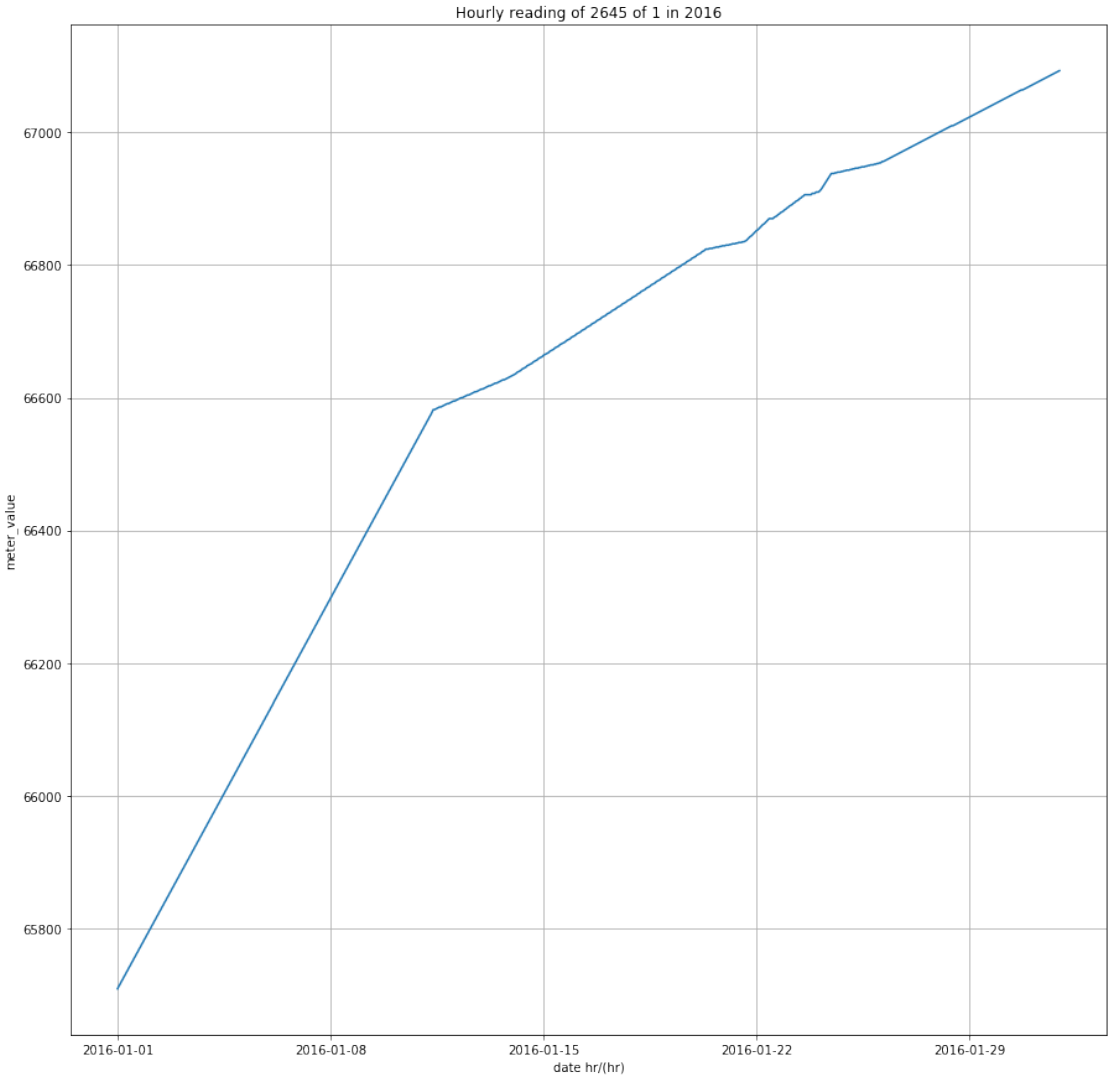

Hourly reading of 2449 of 1 in 2016
meter_value
182000
181000
180000
179000
178000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

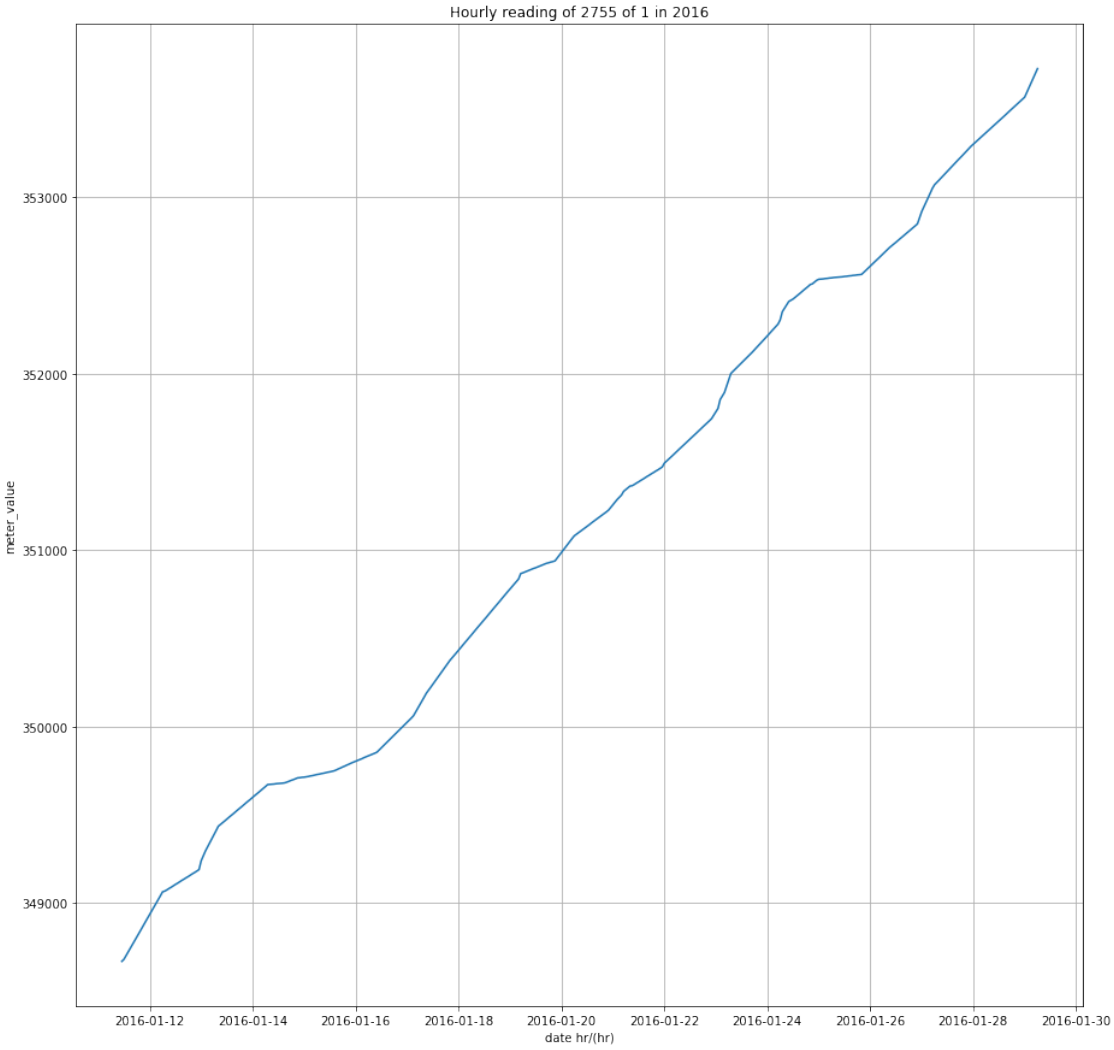

Hourly reading of 2461 of 1 in 2016
meter_value
134000
133000
132000
131000
130000
129000
128000
127000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

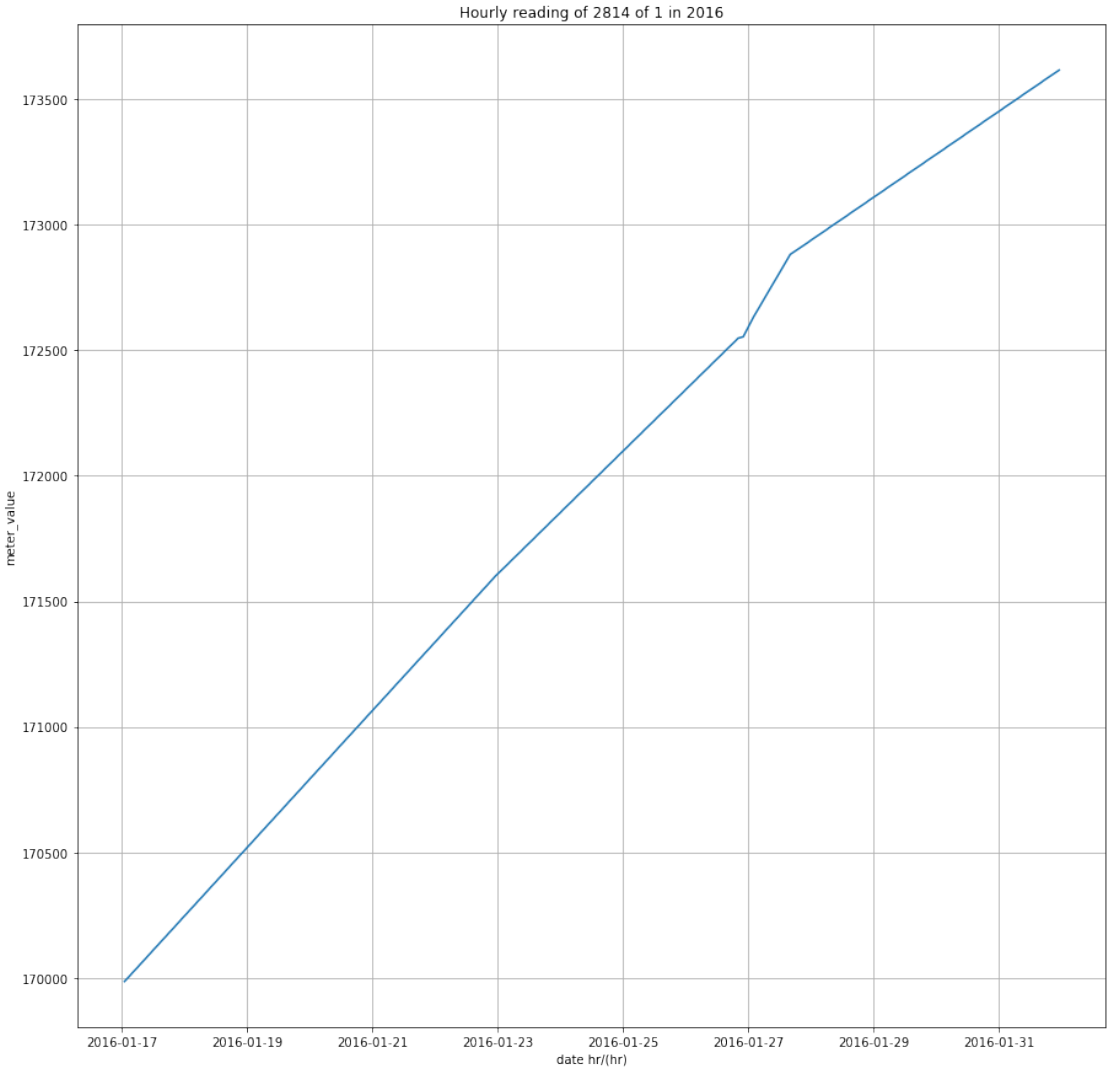

Hourly reading of 2470 of 1 in 2016
meter_value
234000
233000
232000
231000
230000
229000
228000
227000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

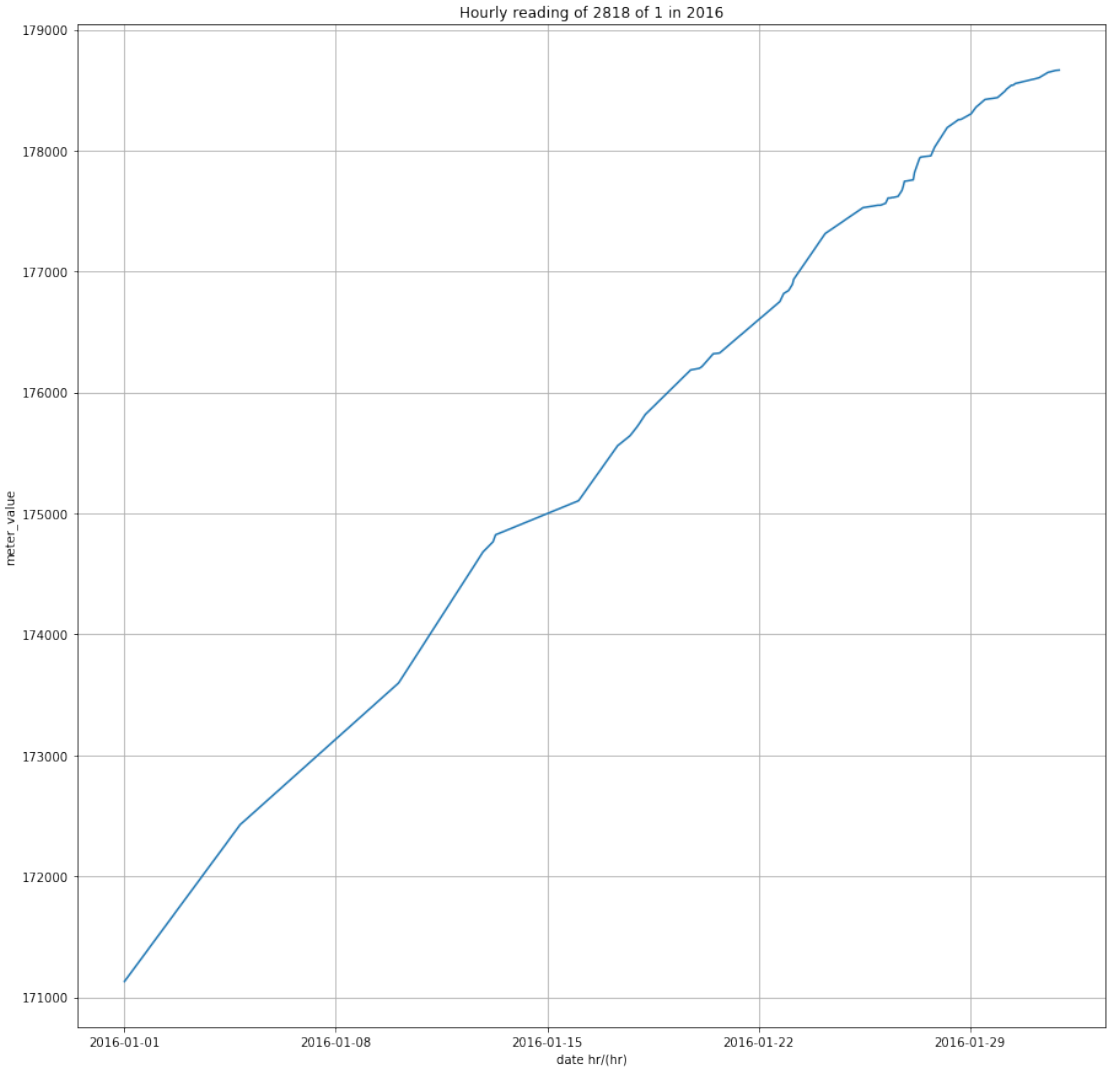

Hourly reading of 2575 of 1 in 2016
meter_value
155000
154000
153000
152000
151000
150000
149000
148000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

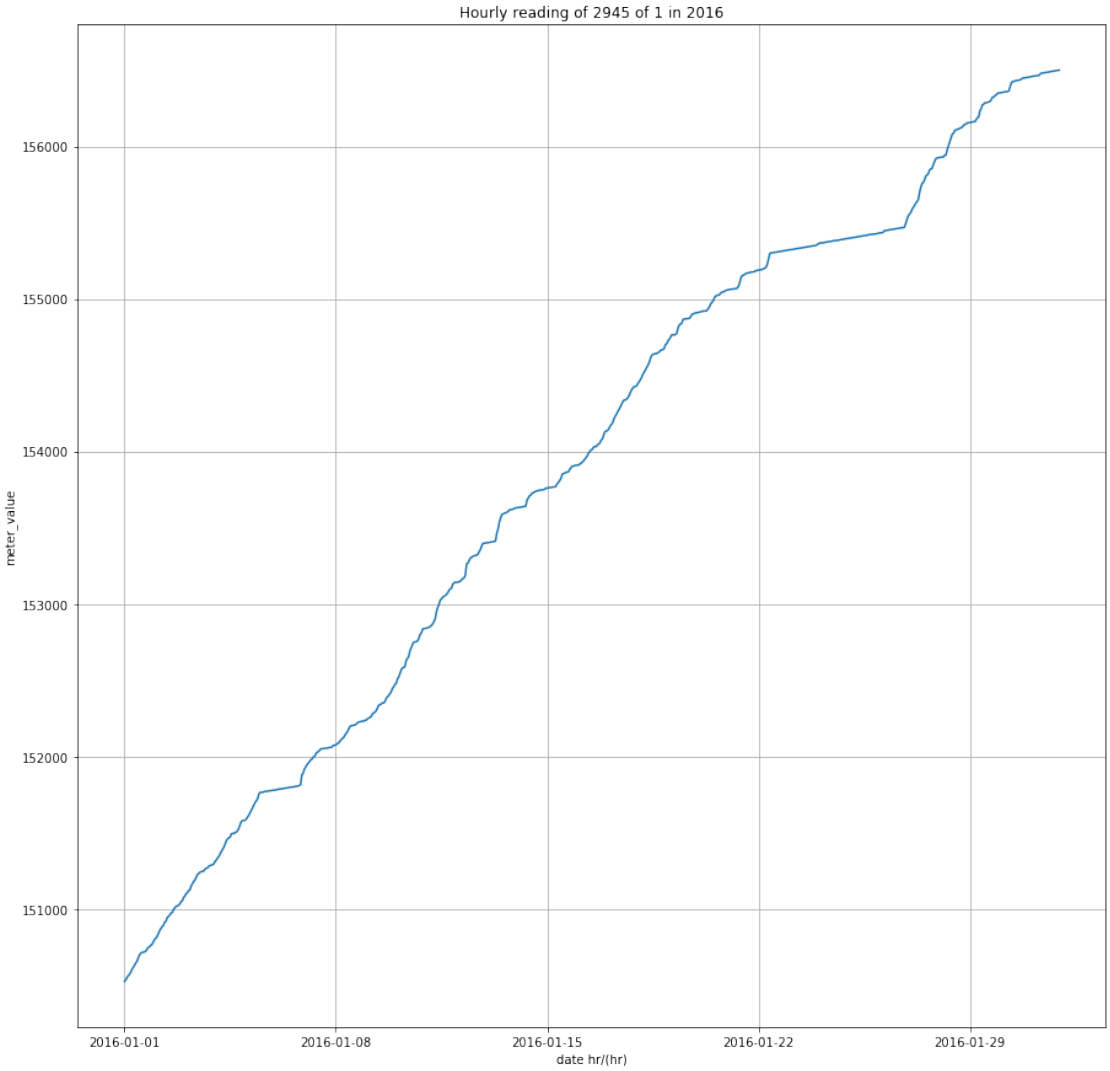

Hourly reading of 2638 of 1 in 2016
meter_value
189000
188000
187000
186000
185000
184000
183000
182000
181000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

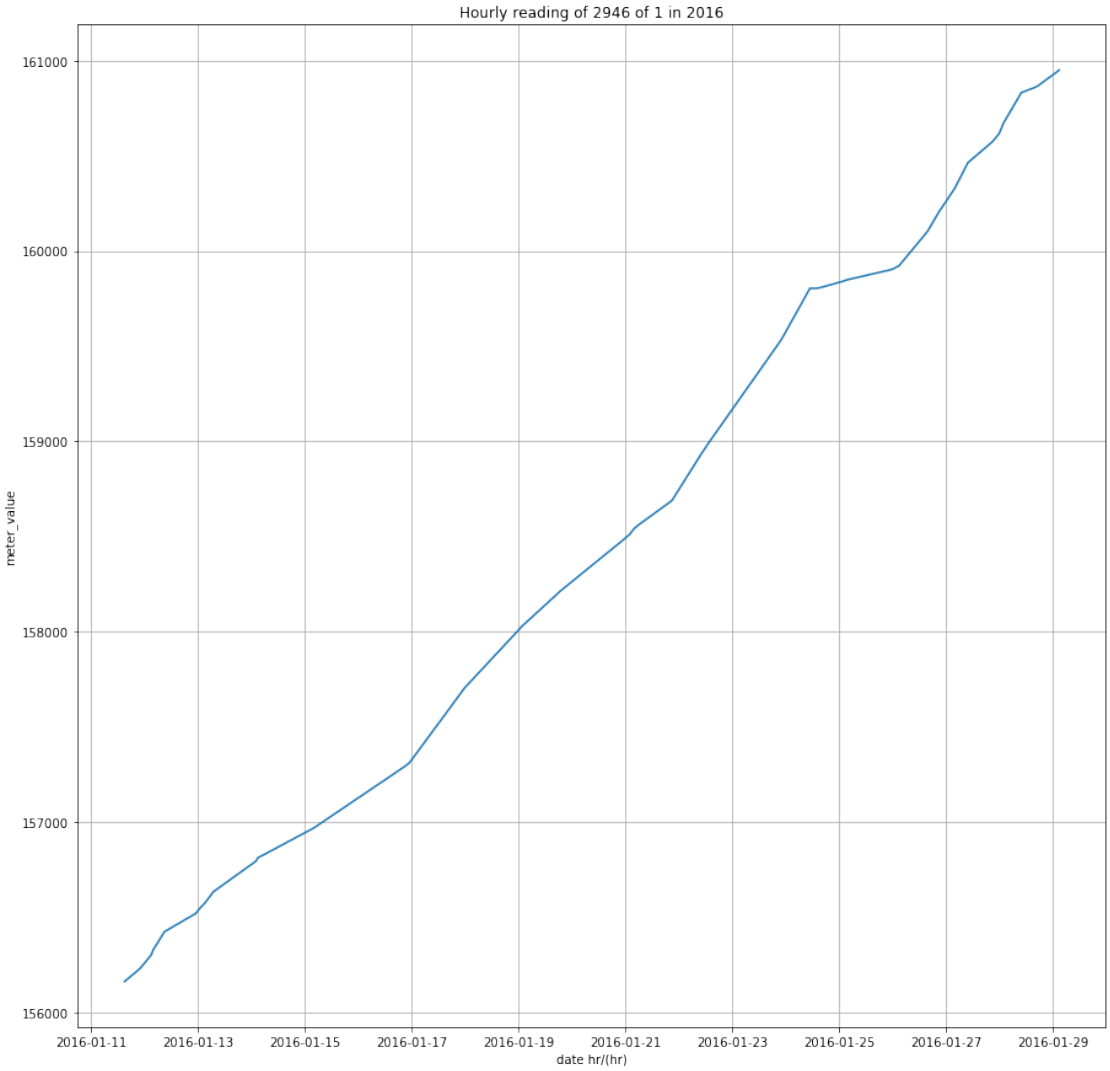

Hourly reading of 2645 of 1 in 2016
meter_value
67000
66800
66600
66400
66200
66000
65800
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

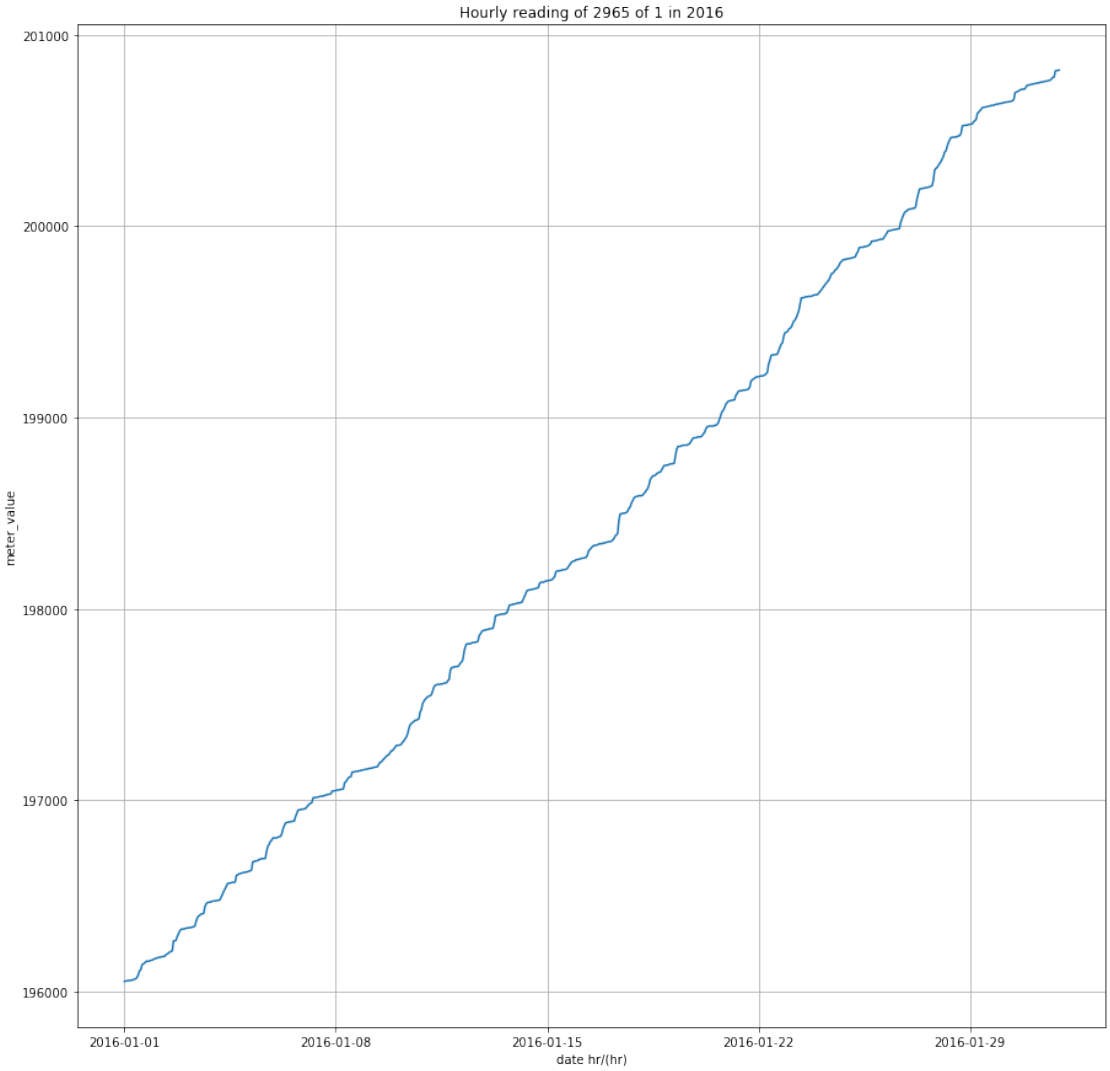

Hourly reading of 2755 of 1 in 2016
meter_value
353000
352000
351000
350000
349000
2016-01-12
2016-01-14
2016-01-16
2016-01-18
2016-01-20
2016-01-22
2016-01-24
2016-01-26
2016-01-28
2016-01-30
date hr/(hr)

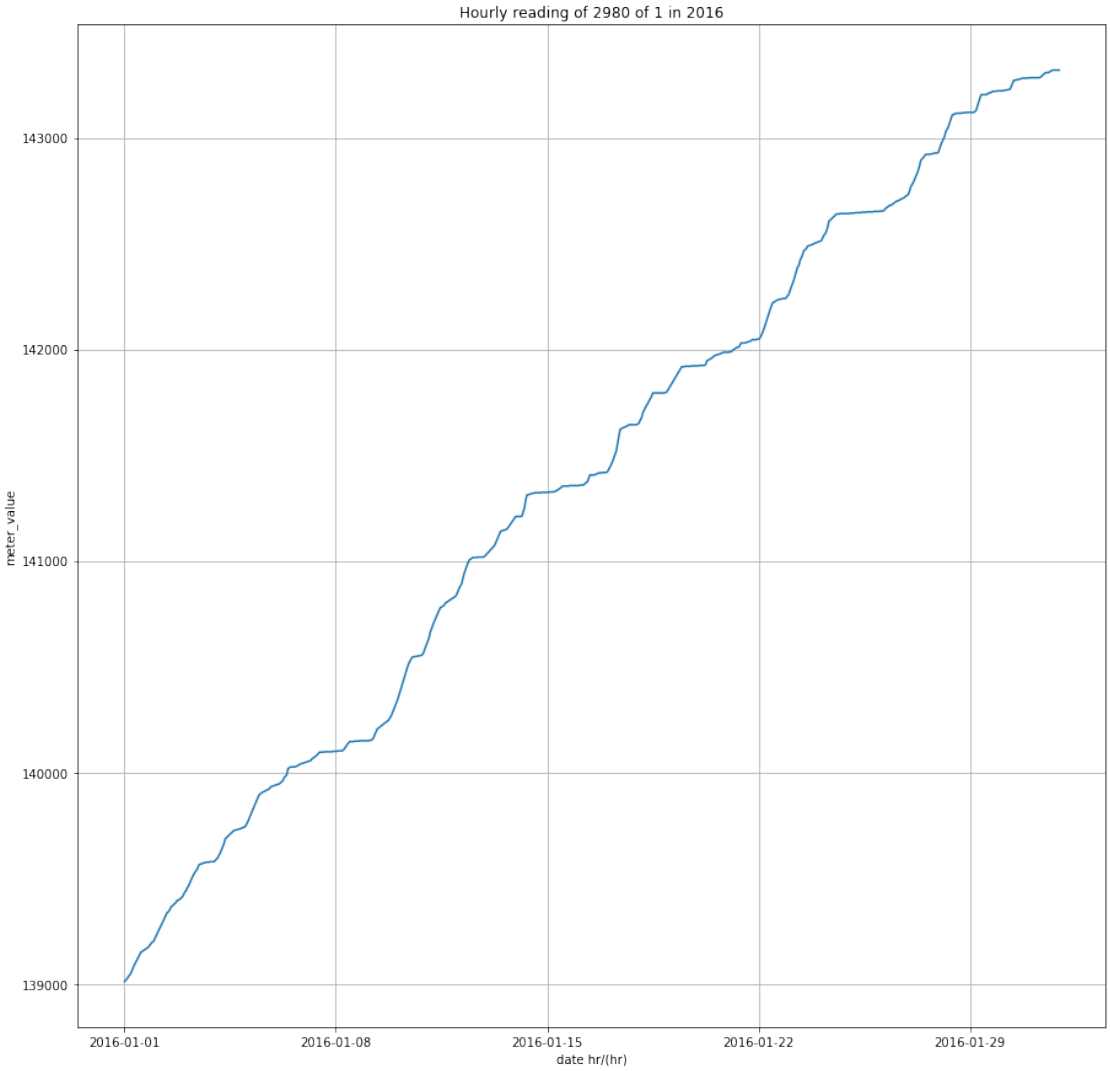

Hourly reading of 2814 of 1 in 2016
meter_value
173500
173000
172500
172000
171500
171000
170500
170000
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
2016-01-31
date hr/(hr)

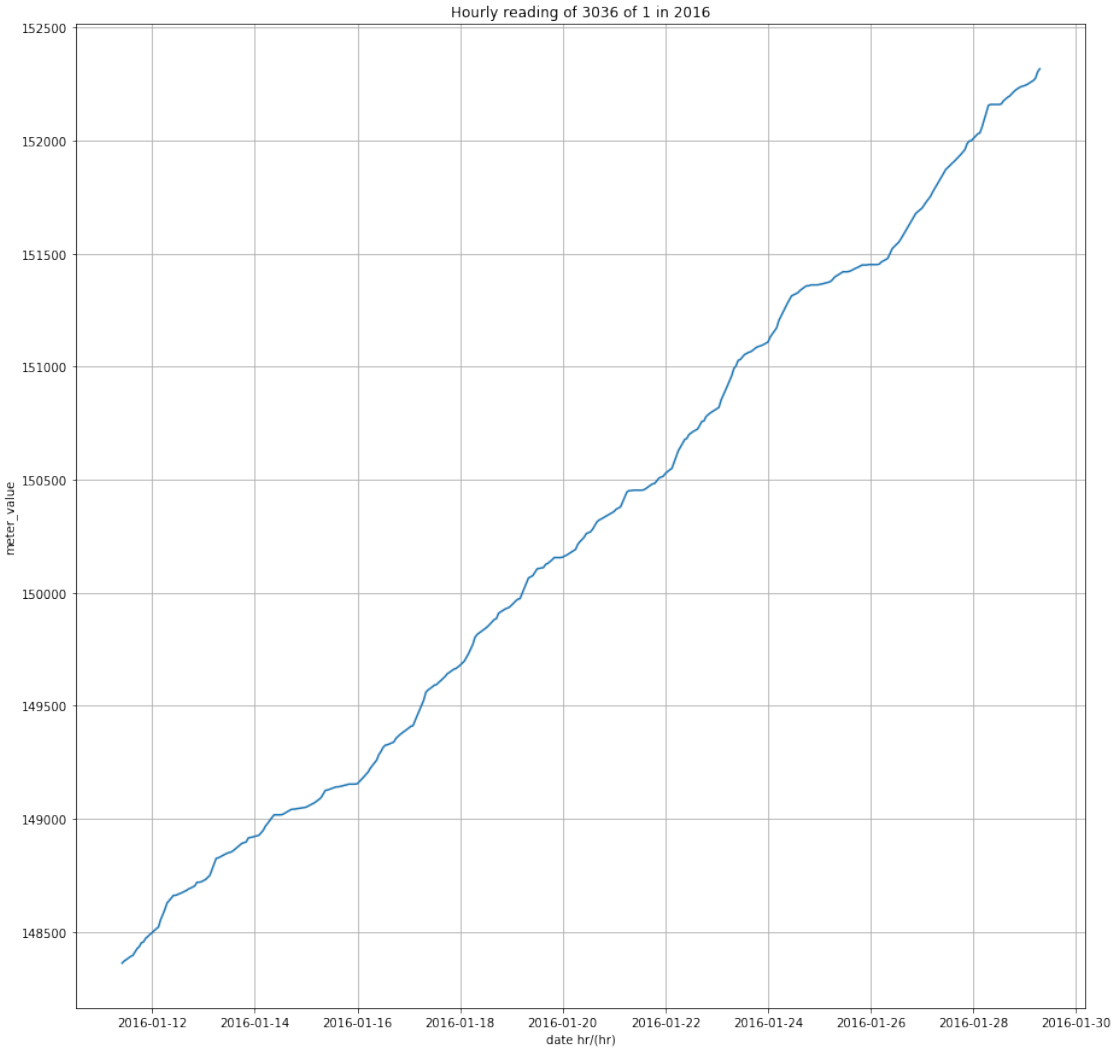

Hourly reading of 2818 of 1 in 2016
meter_value
179000
178000
177000
176000
175000
174000
173000
172000
171000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

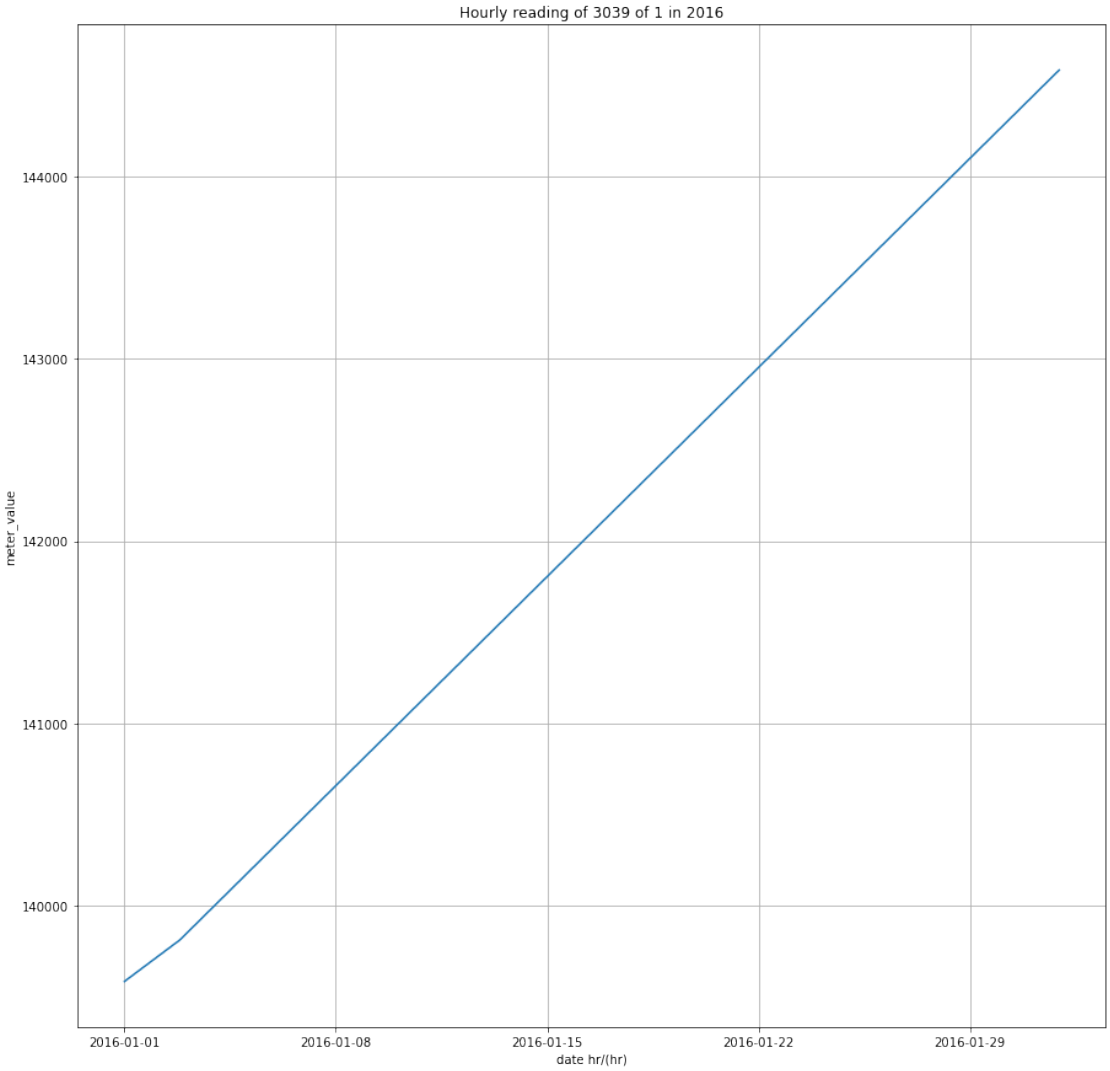

Hourly reading of 2945 of 1 in 2016
meter_value
156000
155000
154000
153000
152000
151000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

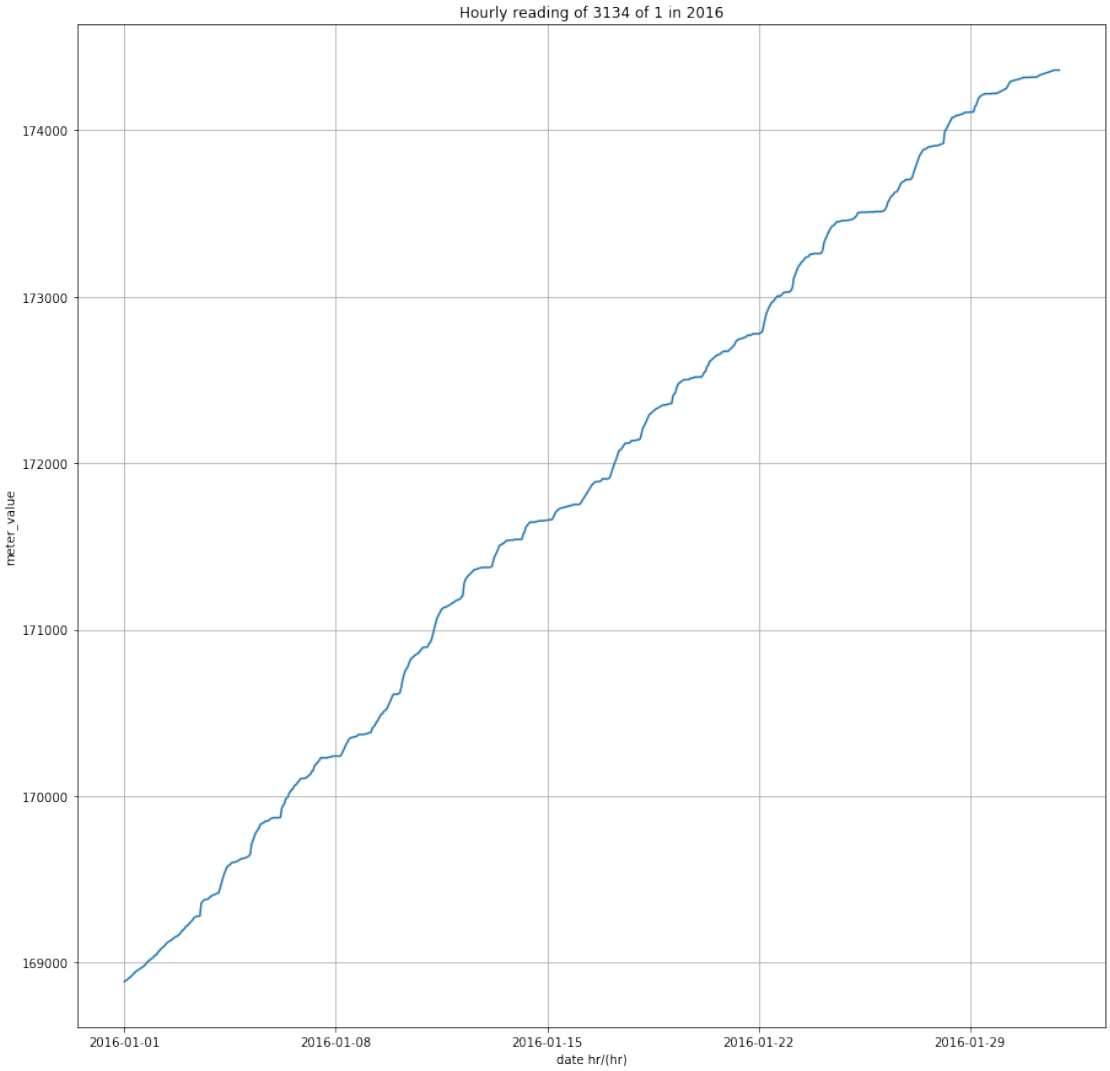

Hourly reading of 2946 of 1 in 2016
meter_value
161000
160000
159000
158000
157000
156000
2016-01-11
2016-01-13
2016-01-15
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
date hr/(hr)

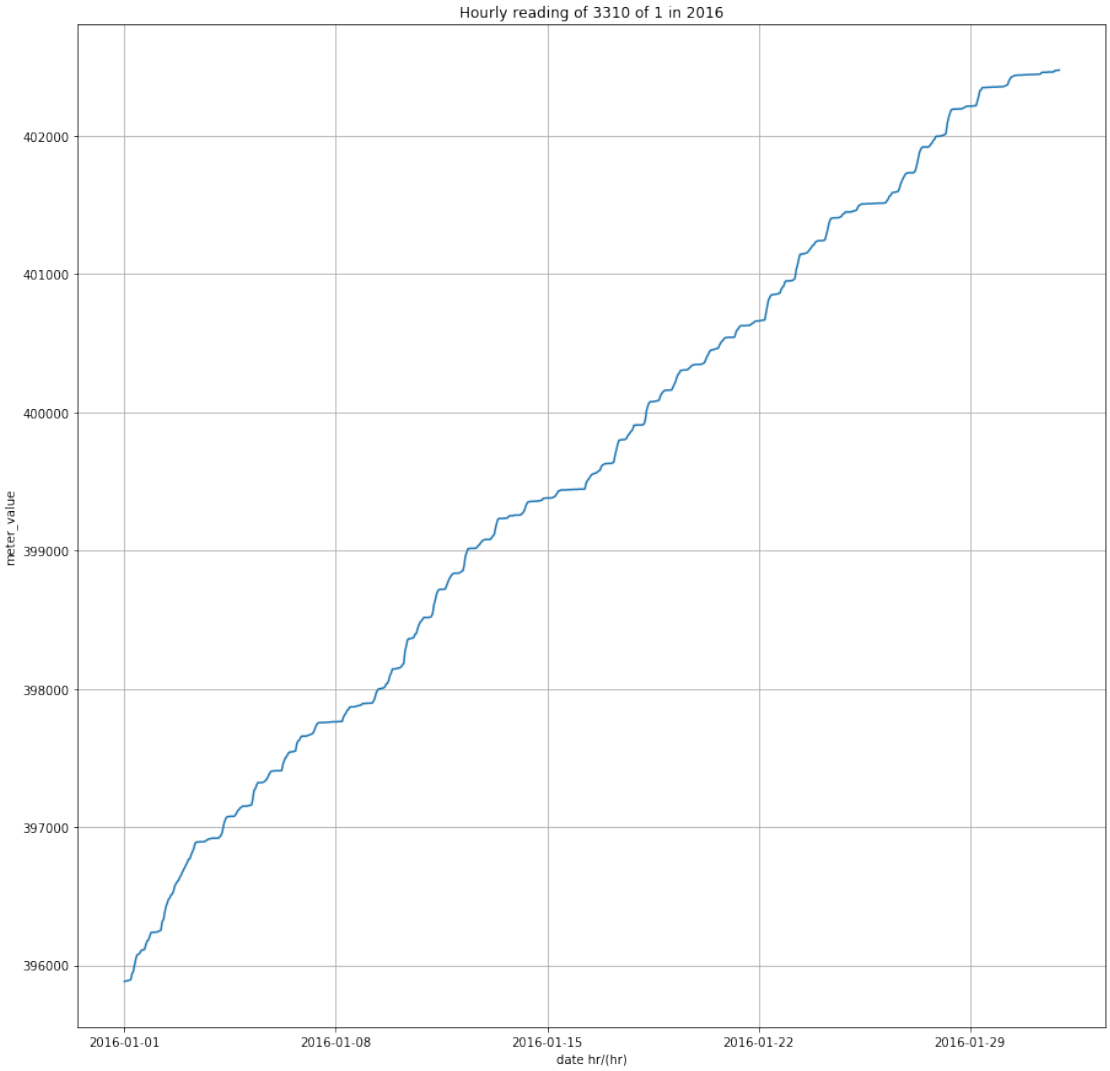

Hourly reading of 2965 of 1 in 2016
meter_value
201000
200000
199000
198000
197000
196000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

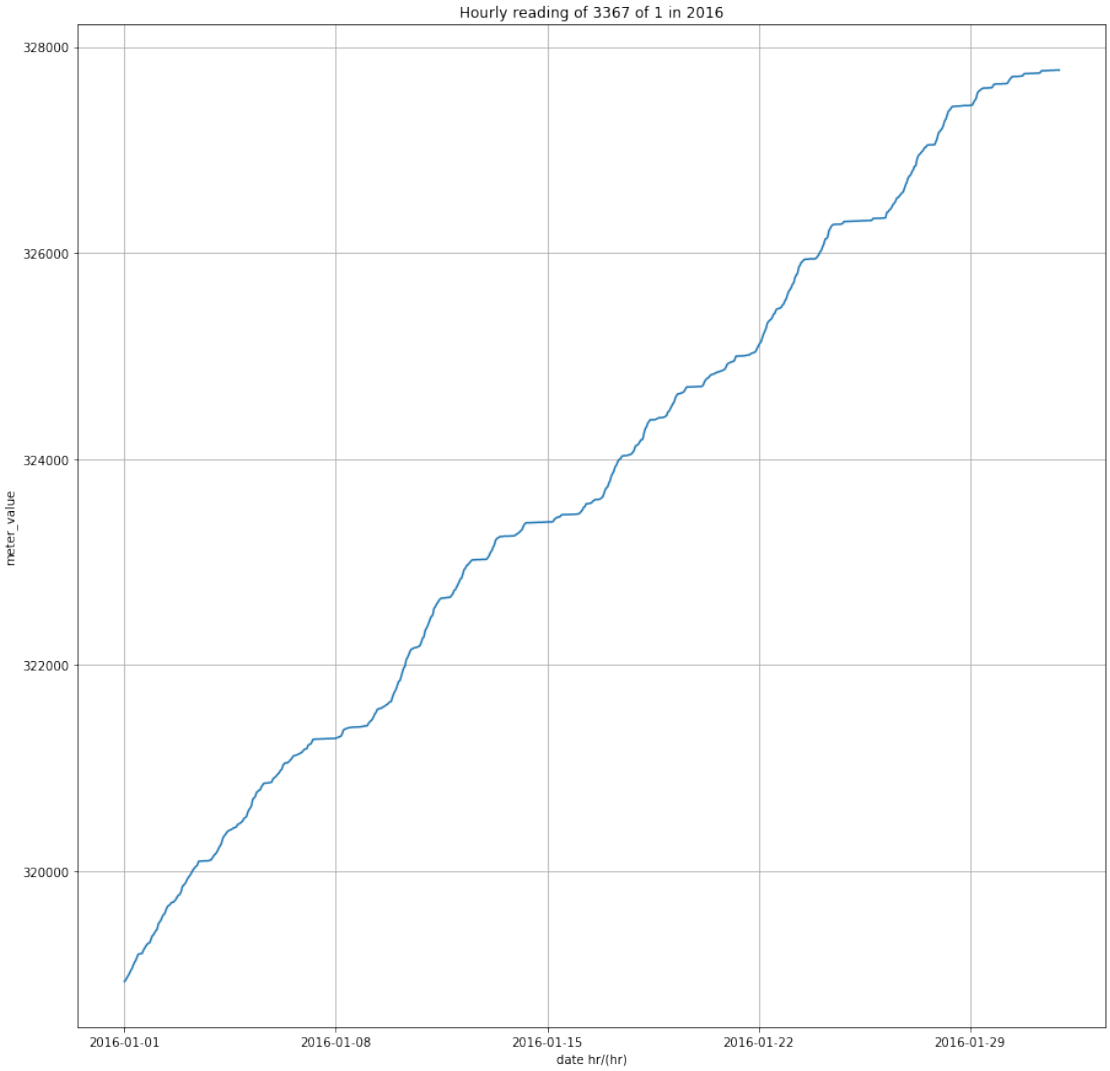

Hourly reading of 2980 of 1 in 2016
143000
142000
141000
140000
139000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

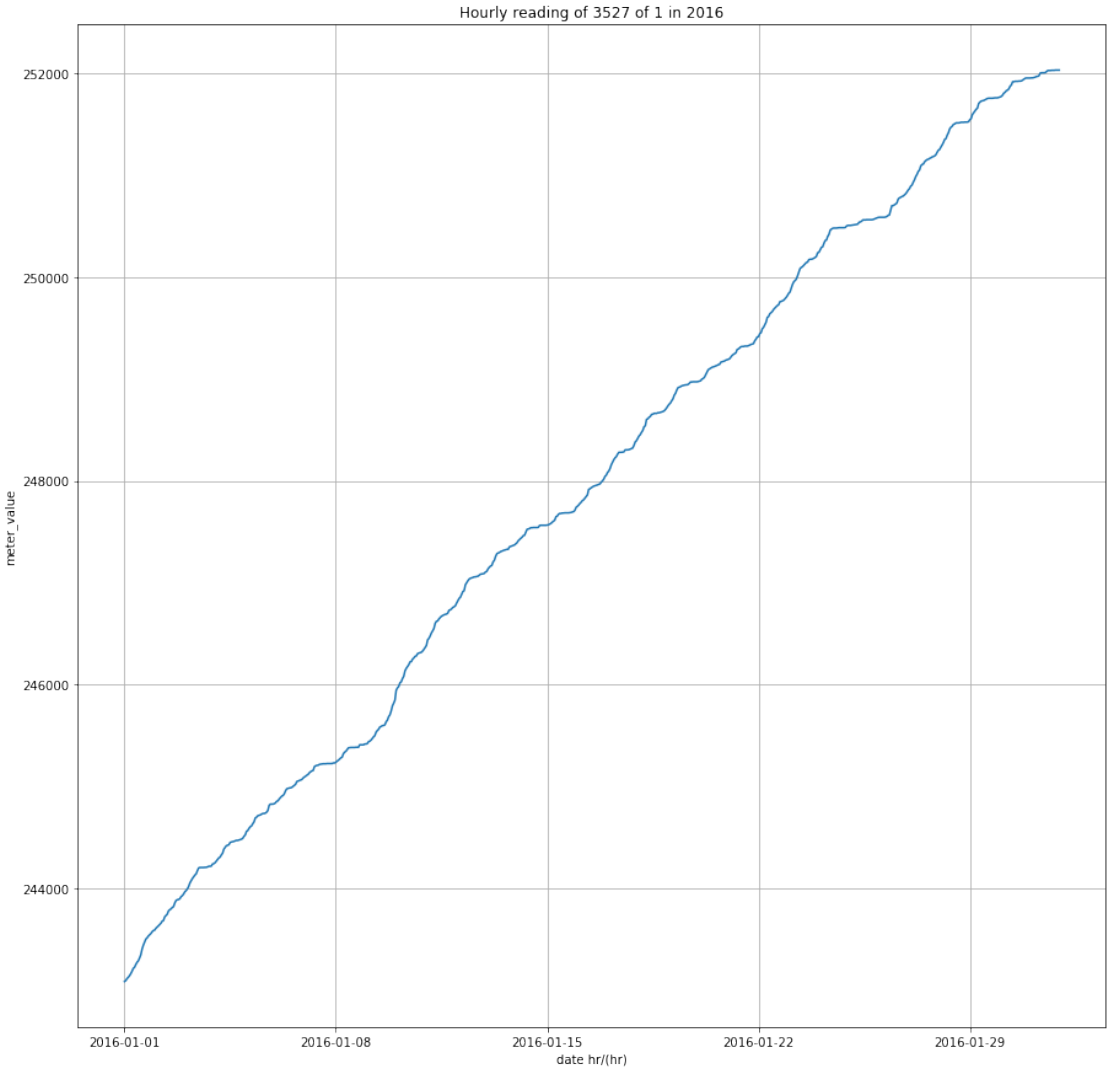

Hourly reading of 3036 of 1 in 2016
meter_value
152500
152000
151500
151000
150500
150000
149500
149000
148500
2016-01-12
2016-01-14
2016-01-16
2016-01-18
2016-01-20
2016-01-22
2016-01-24
2016-01-26
2016-01-28
2016-01-30
date hr/(hr)

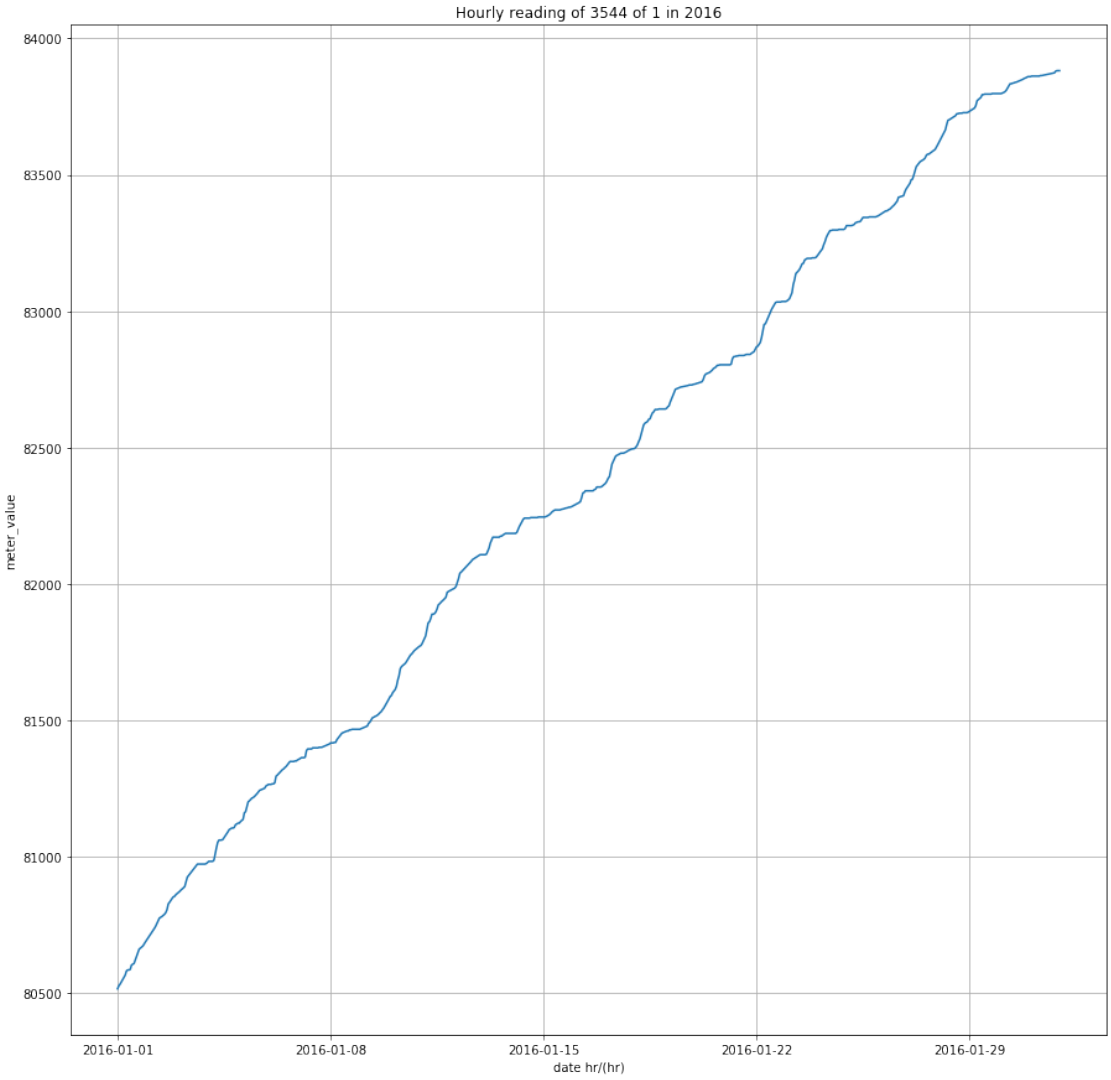

Hourly reading of 3039 of 1 in 2016
144000
143000
142000
141000
140000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

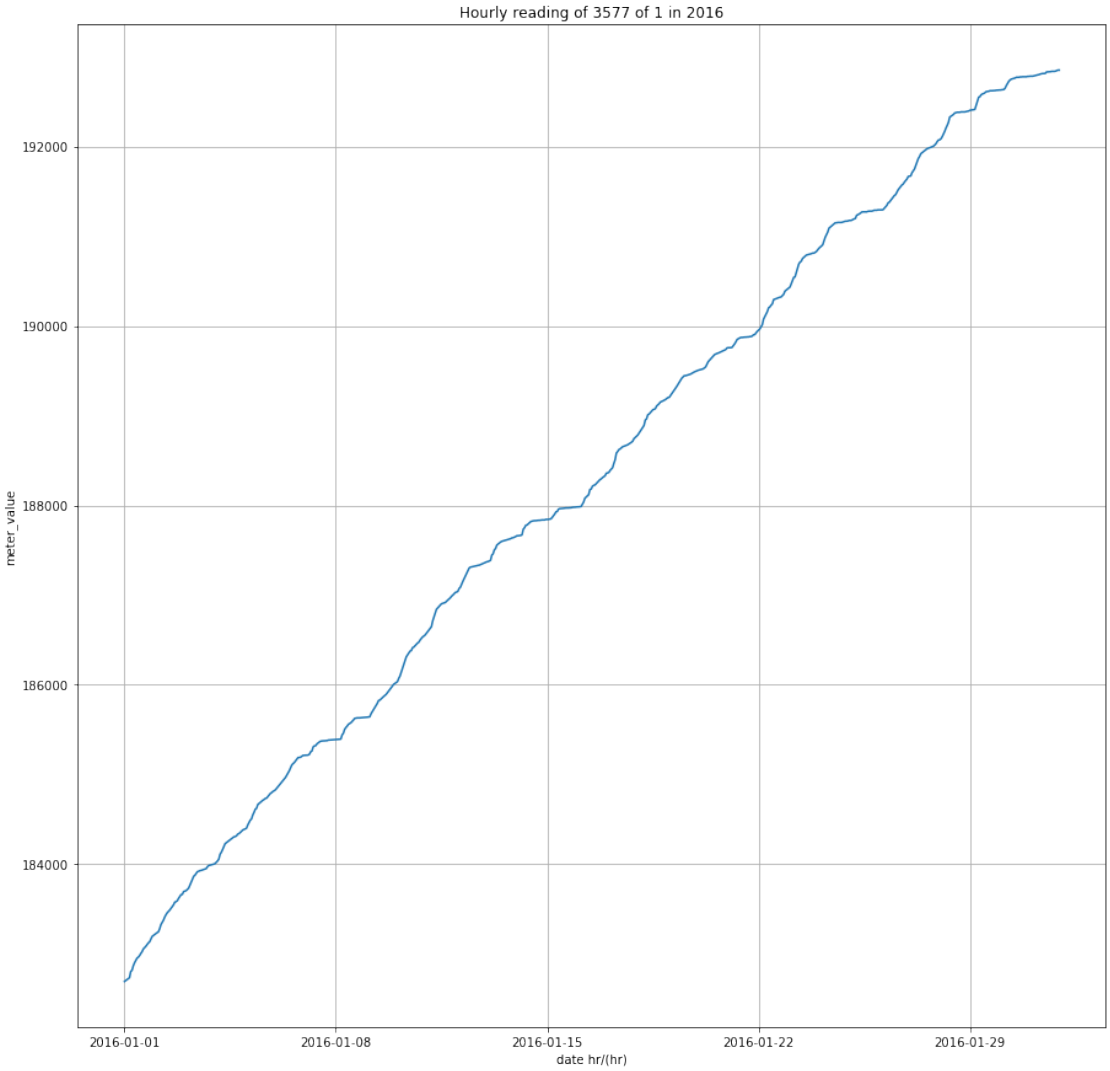

Hourly reading of 3134 of 1 in 2016
meter_value
174000
173000
172000
171000
170000
169000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

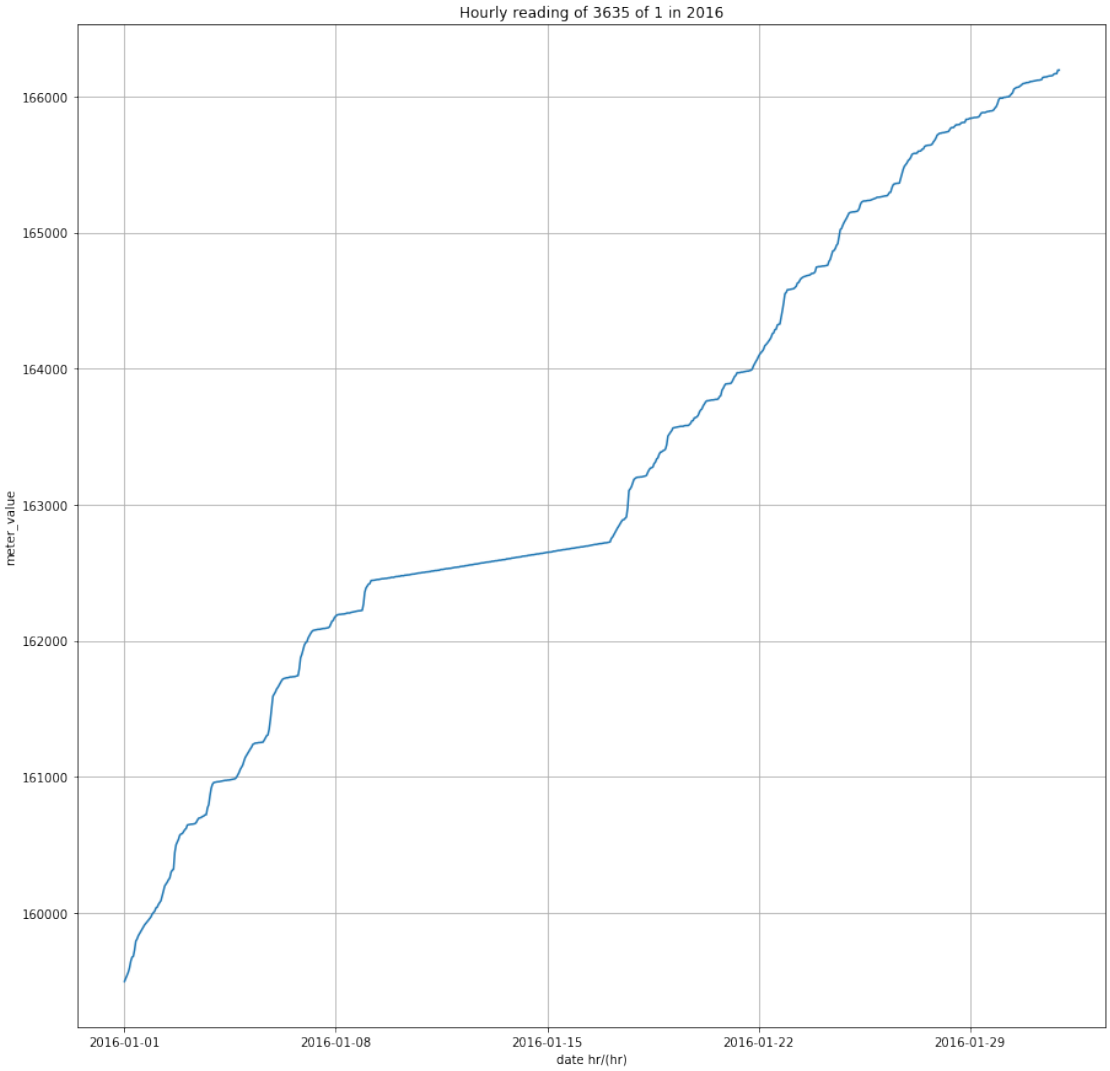

Hourly reading of 3310 of 1 in 2016
meter_value
402000
401000
400000
399000
398000
397000
396000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

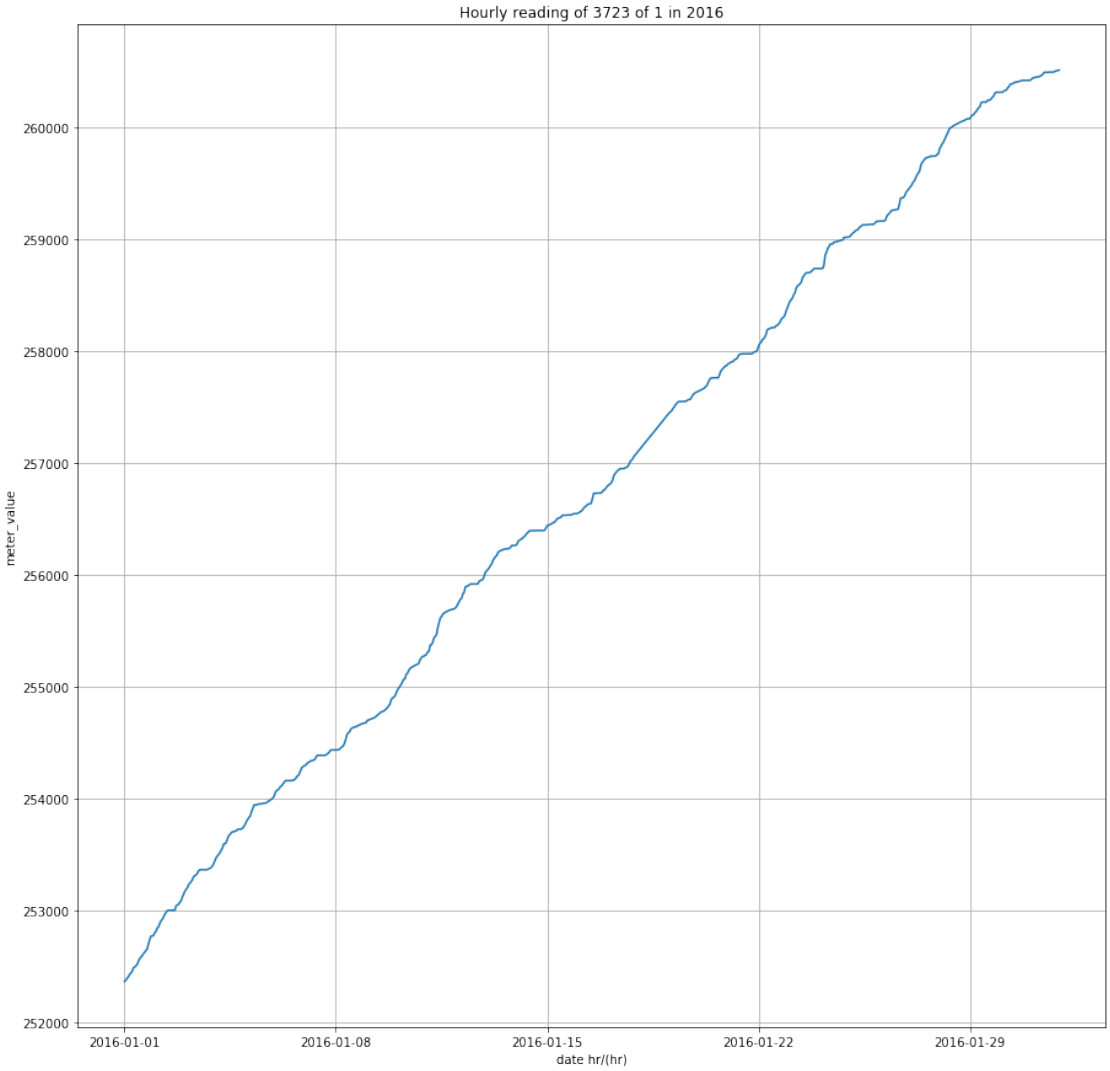

Hourly reading of 3367 of 1 in 2016
328000
326000
324000
322000
320000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

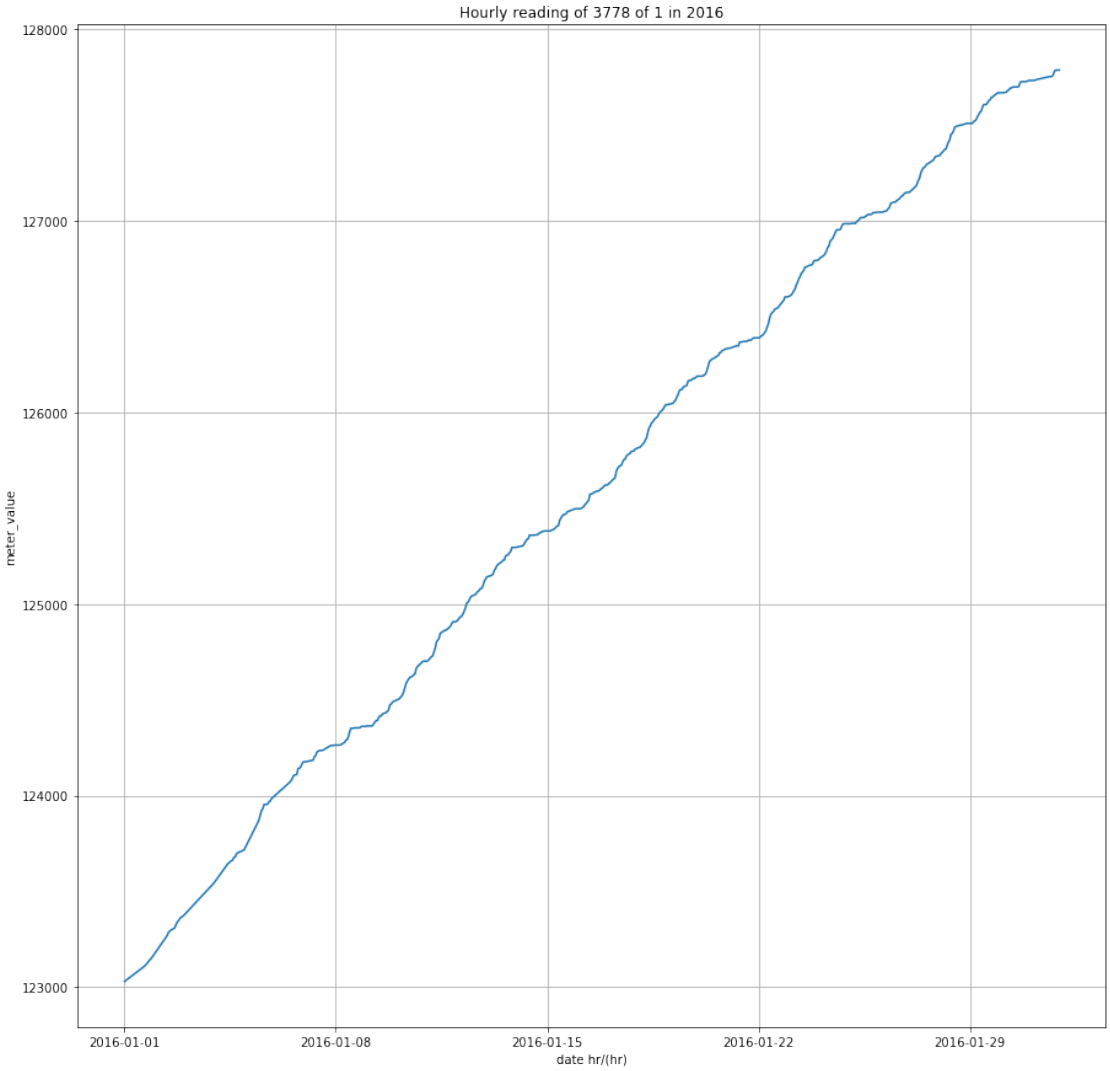

Hourly reading of 3527 of 1 in 2016
meter_value
252000
250000
248000
246000
244000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

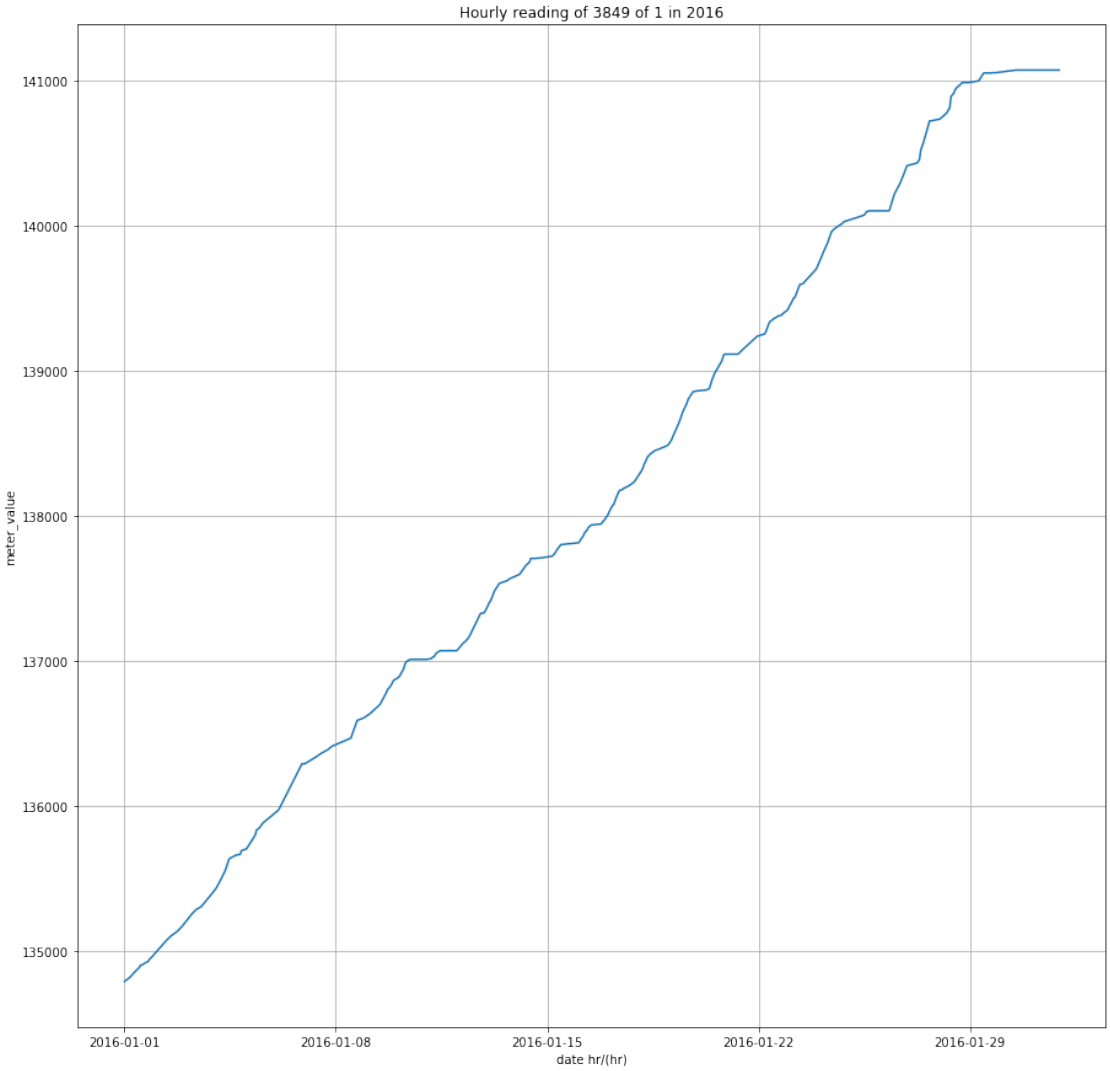

Hourly reading of 3544 of 1 in 2016
84000
83500
83000
82500
82000
81500
81000
80500
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

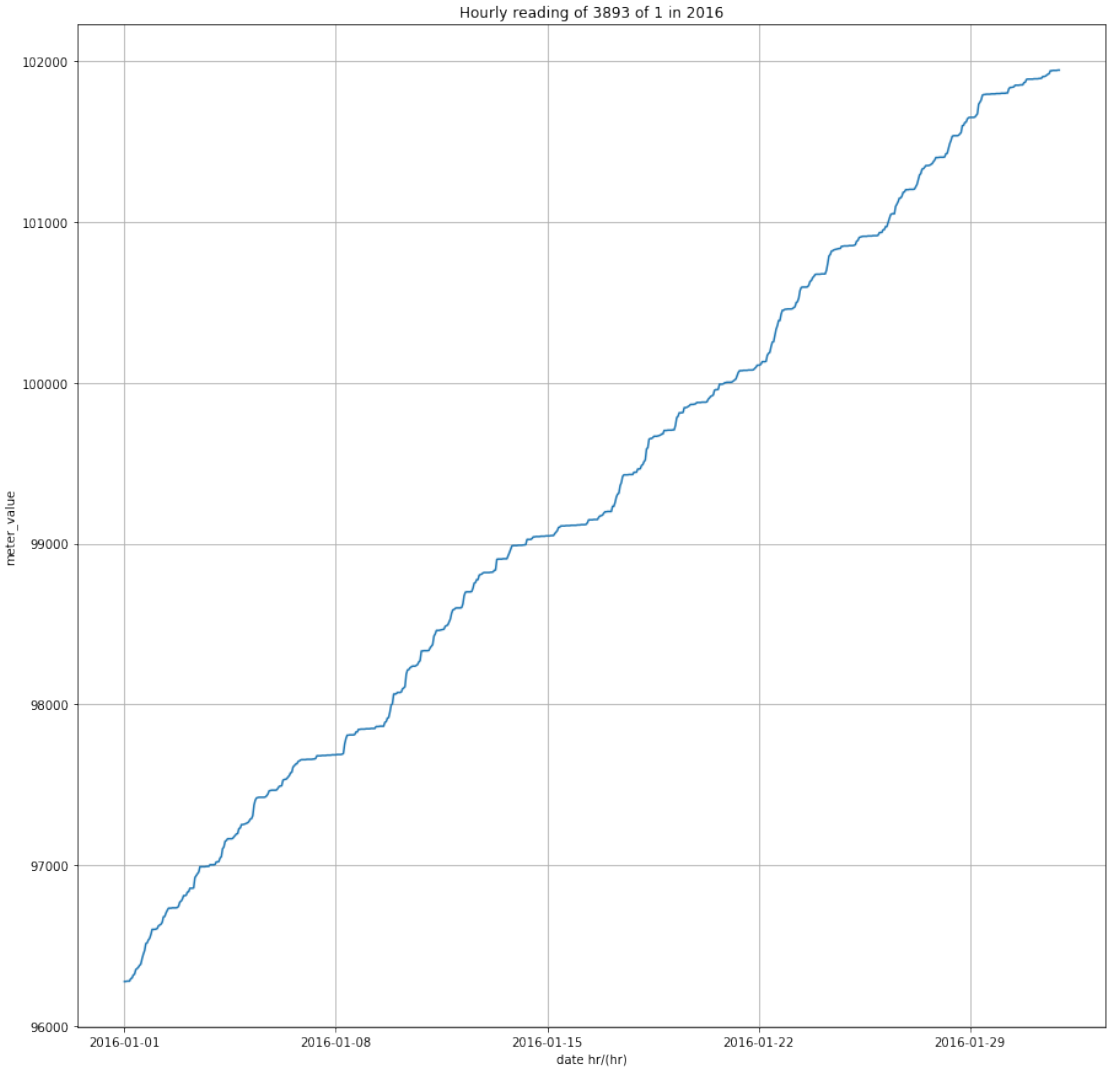

Hourly reading of 3577 of 1 in 2016
192000
190000
188000
186000
184000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

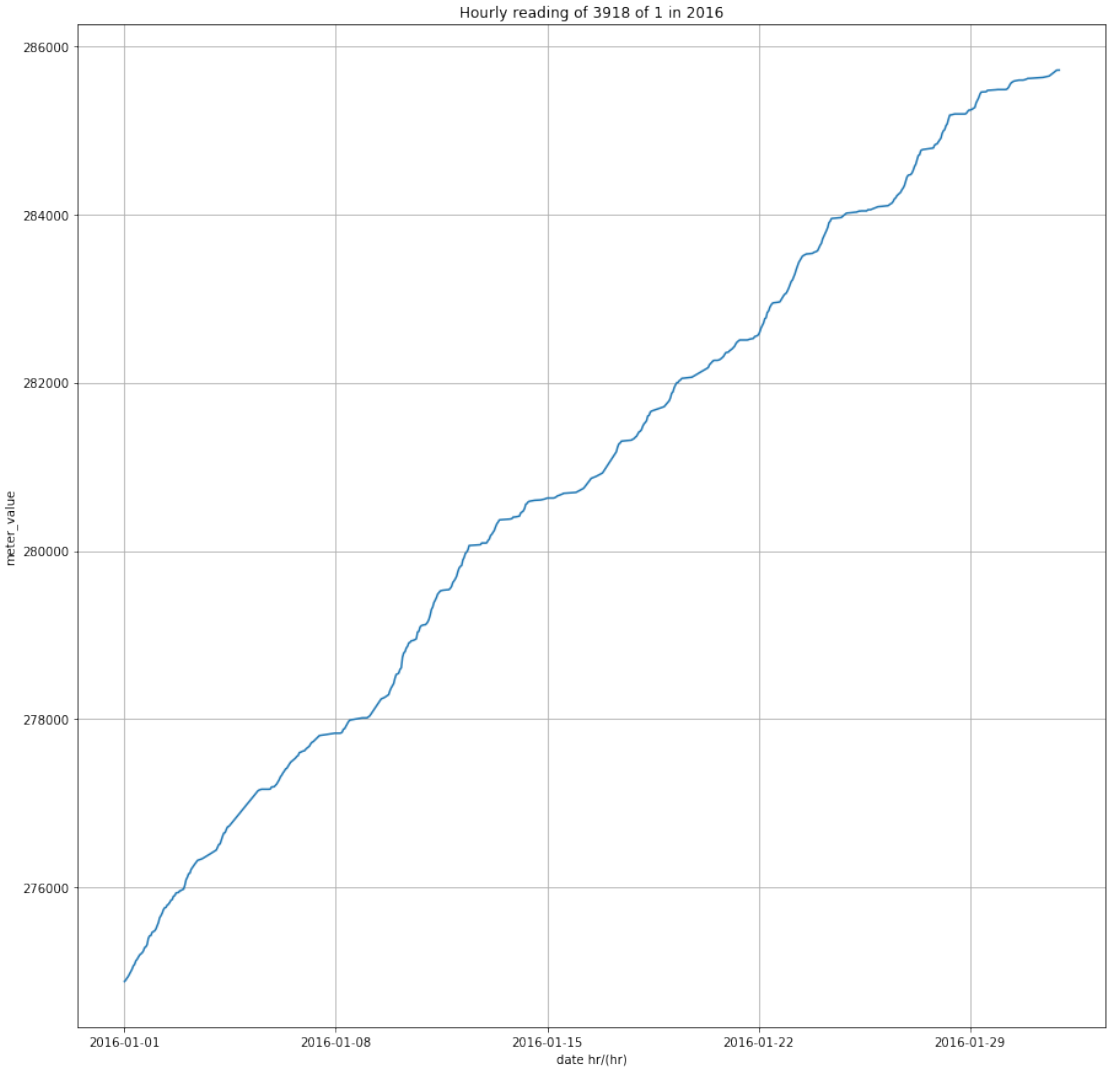

Hourly reading of 3635 of 1 in 2016
meter_value
166000
165000
164000
163000
162000
161000
160000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

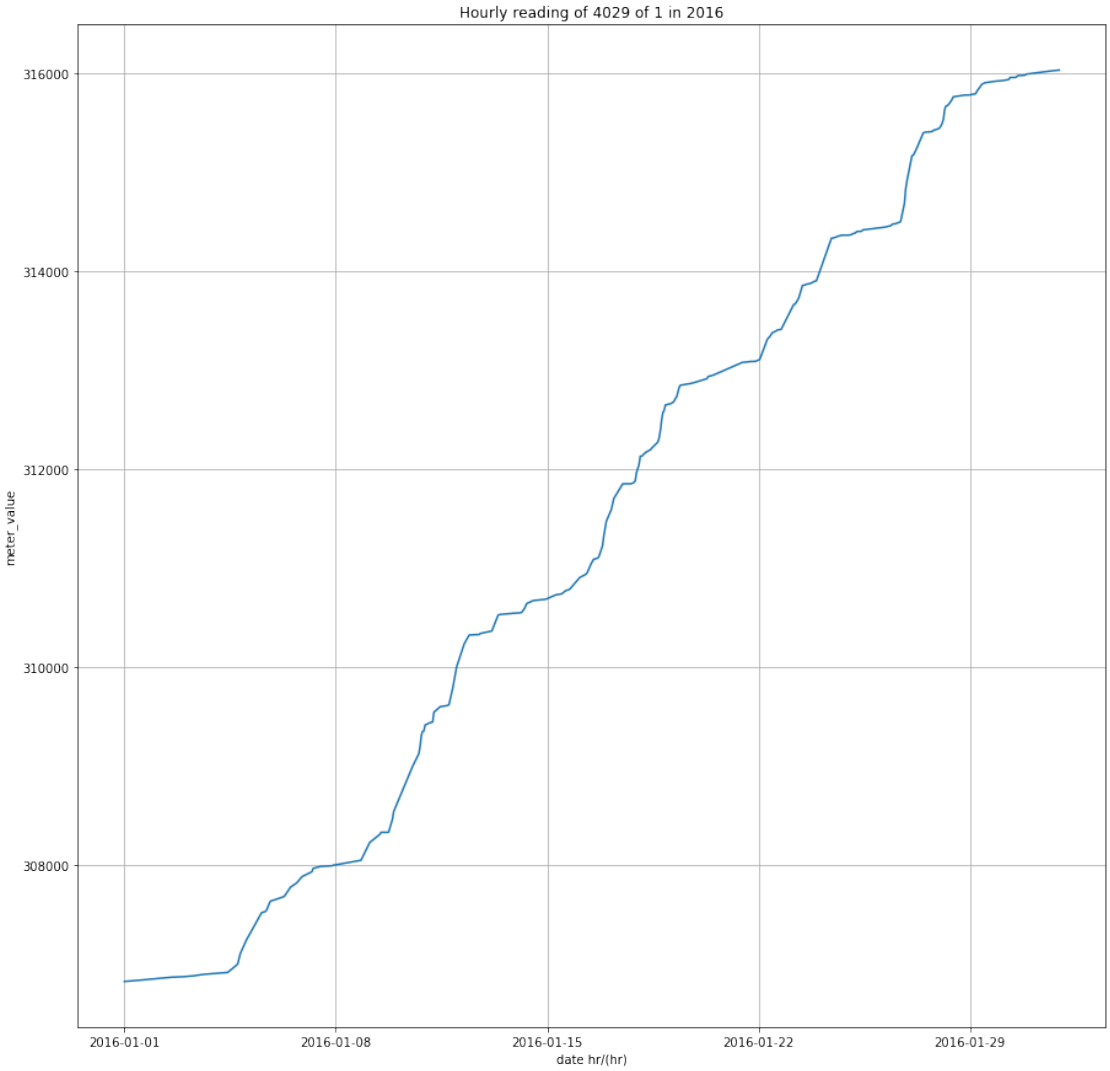

Hourly reading of 3723 of 1 in 2016
meter_value
260000
259000
258000
257000
256000
255000
254000
253000
252000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

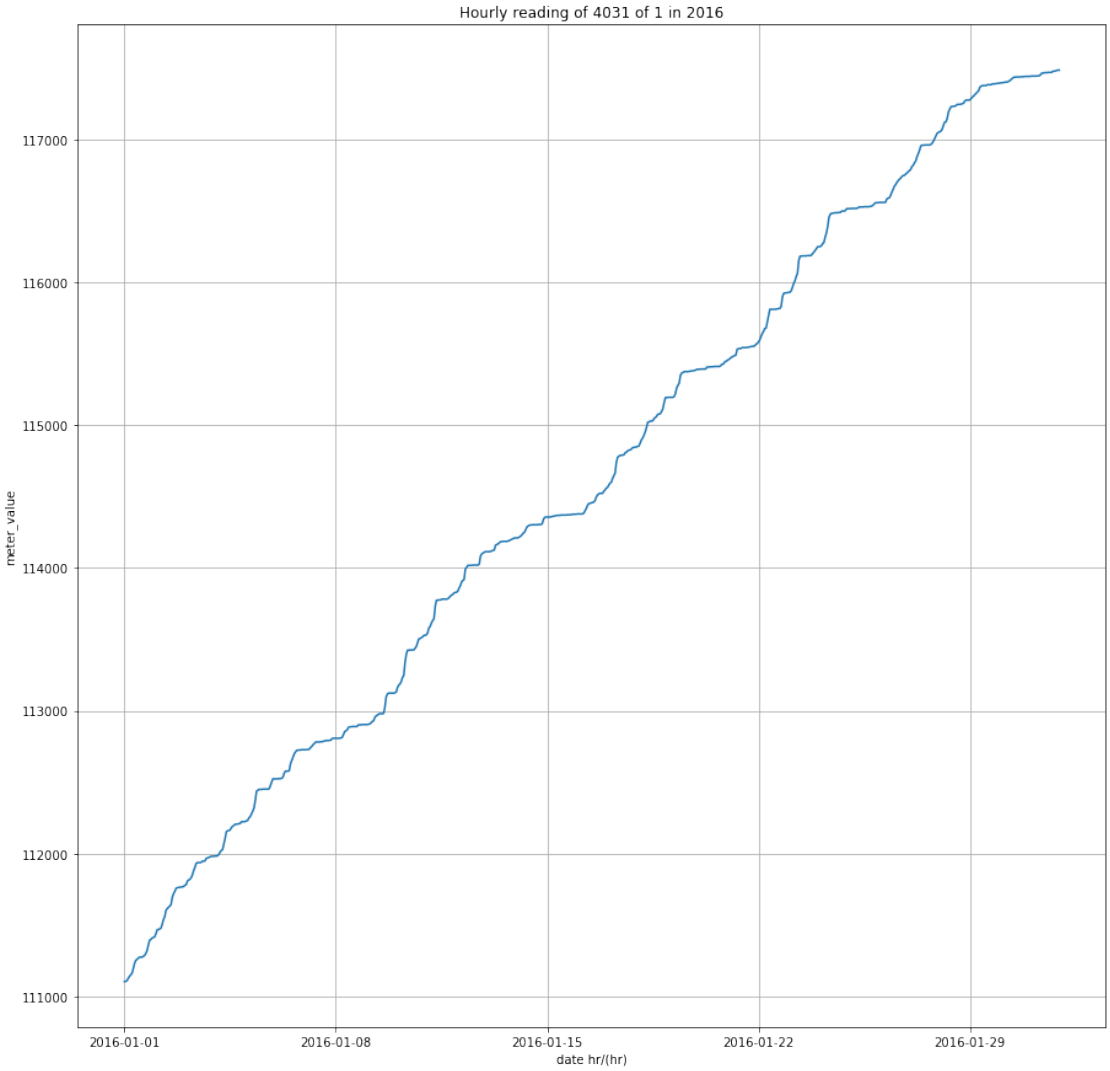

Hourly reading of 3778 of 1 in 2016
meter_value
128000
127000
126000
125000
124000
123000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

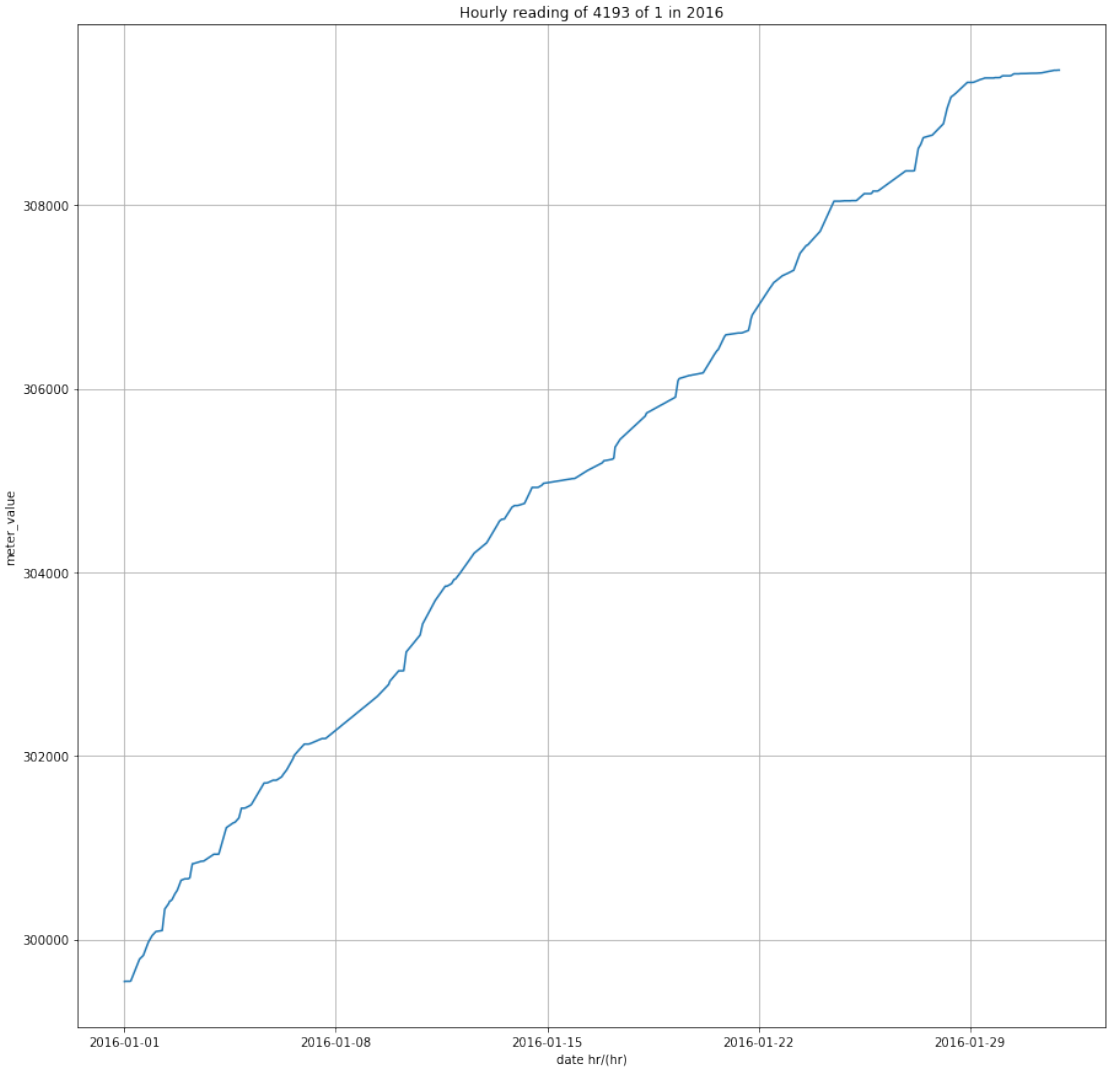

Hourly reading of 3849 of 1 in 2016
meter_value
141000
140000
139000
138000
137000
136000
135000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

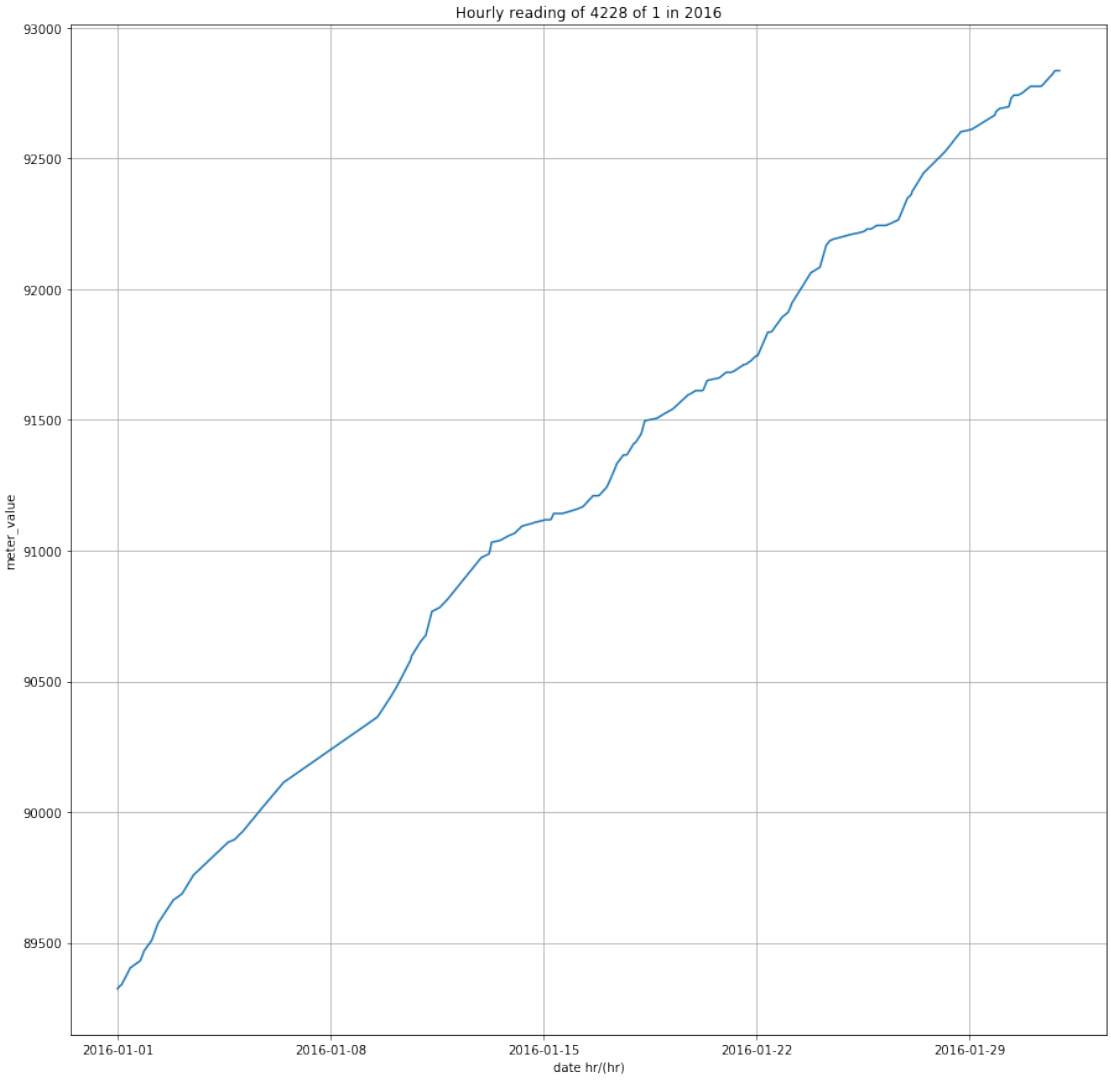

Hourly reading of 3893 of 1 in 2016
meter_value
102000
101000
100000
99000
98000
97000
96000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

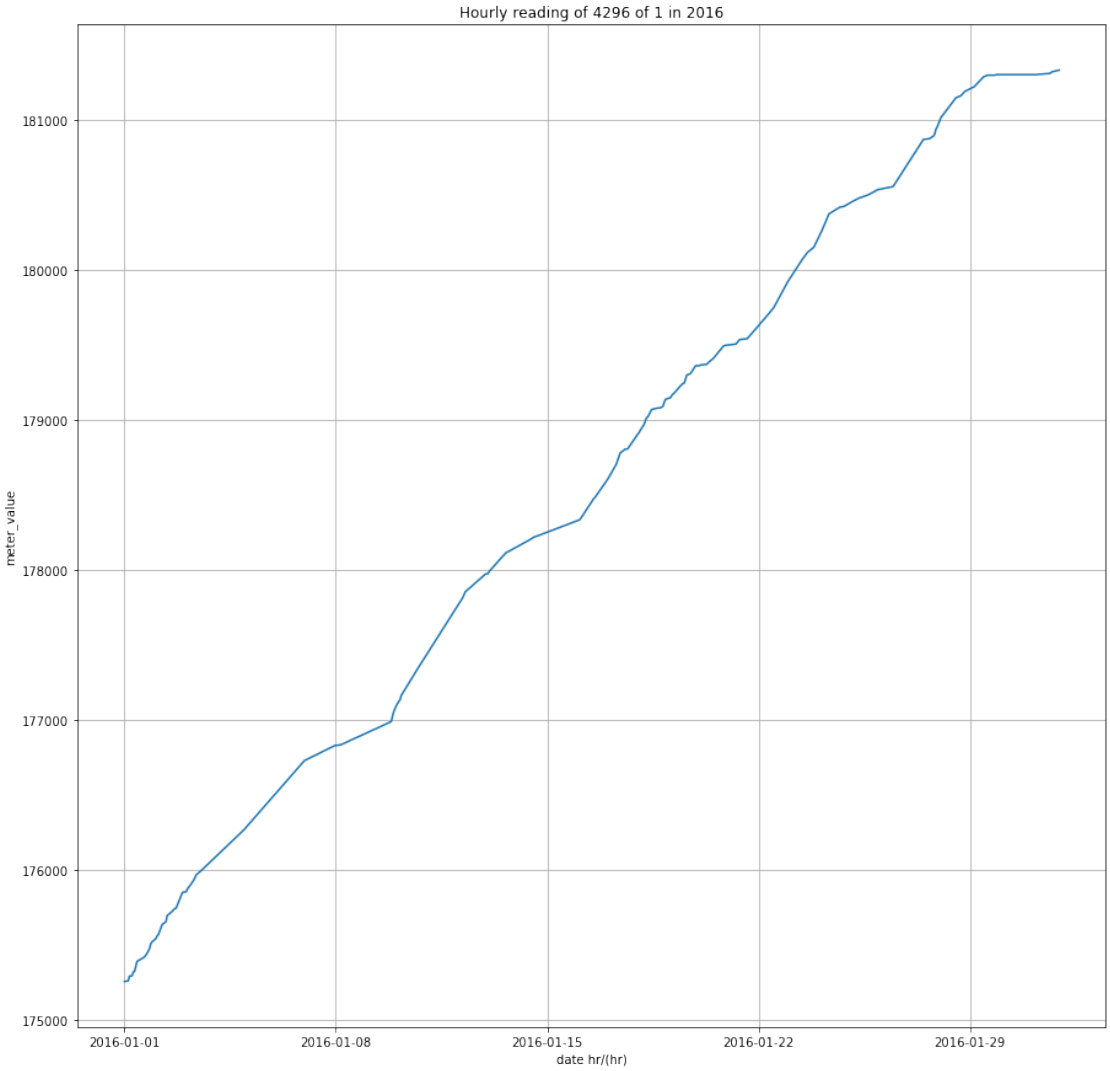

Hourly reading of 3918 of 1 in 2016
meter_value
286000
284000
282000
280000
278000
276000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

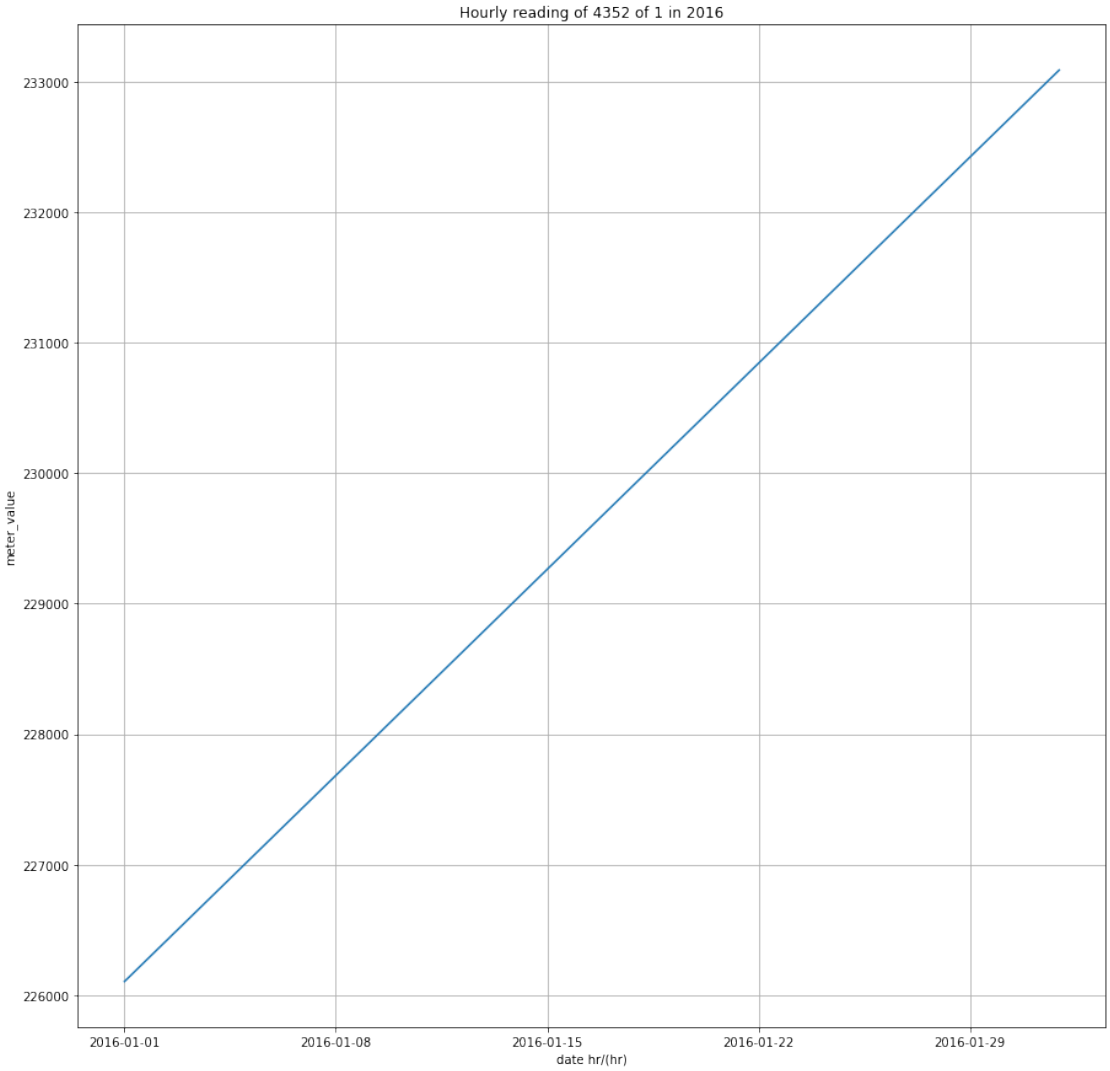

Hourly reading of 4029 of 1 in 2016
316000
314000
312000
310000
308000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

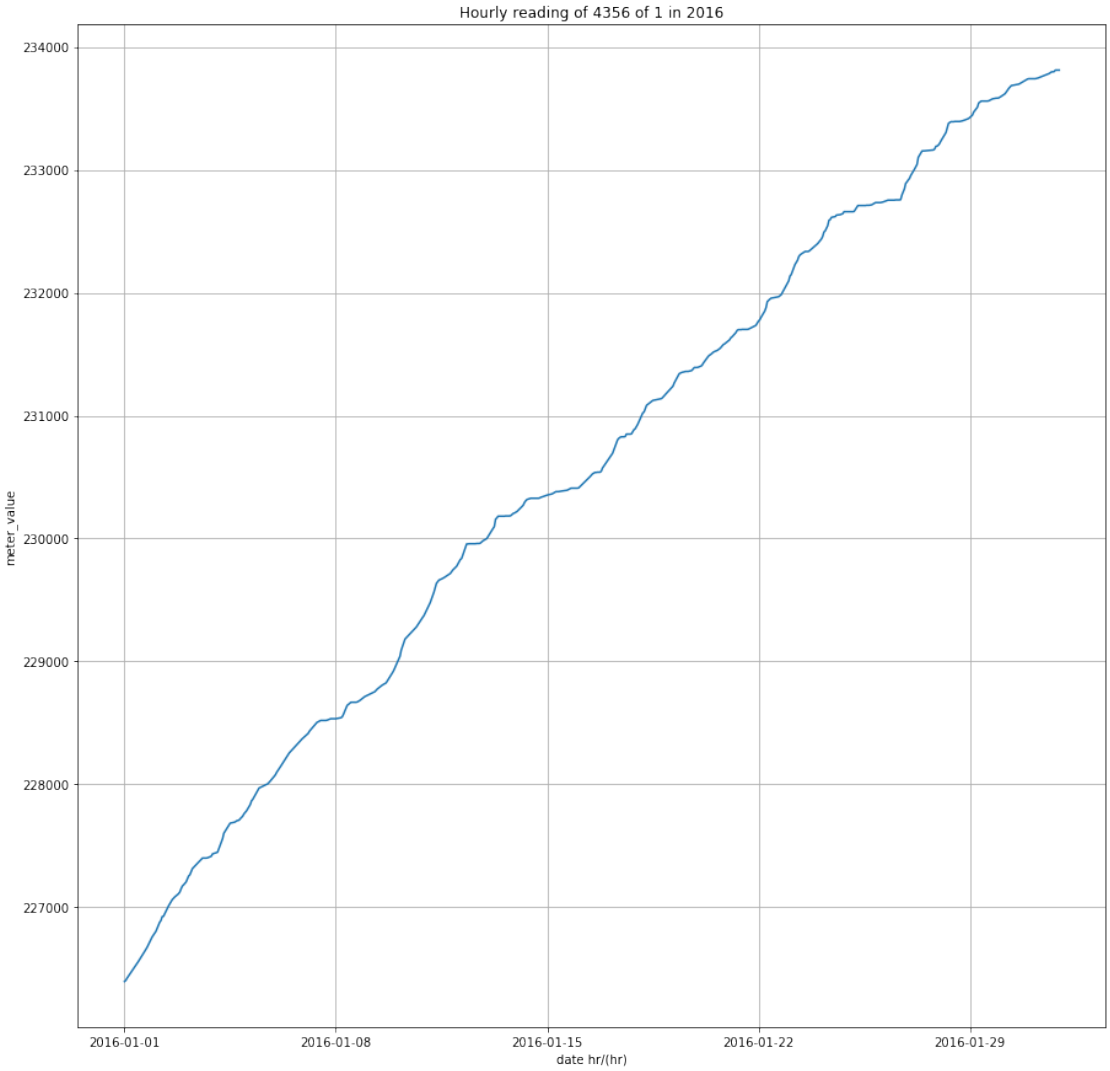

Hourly reading of 4031 of 1 in 2016
meter_value
117000
116000
115000
114000
113000
112000
111000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

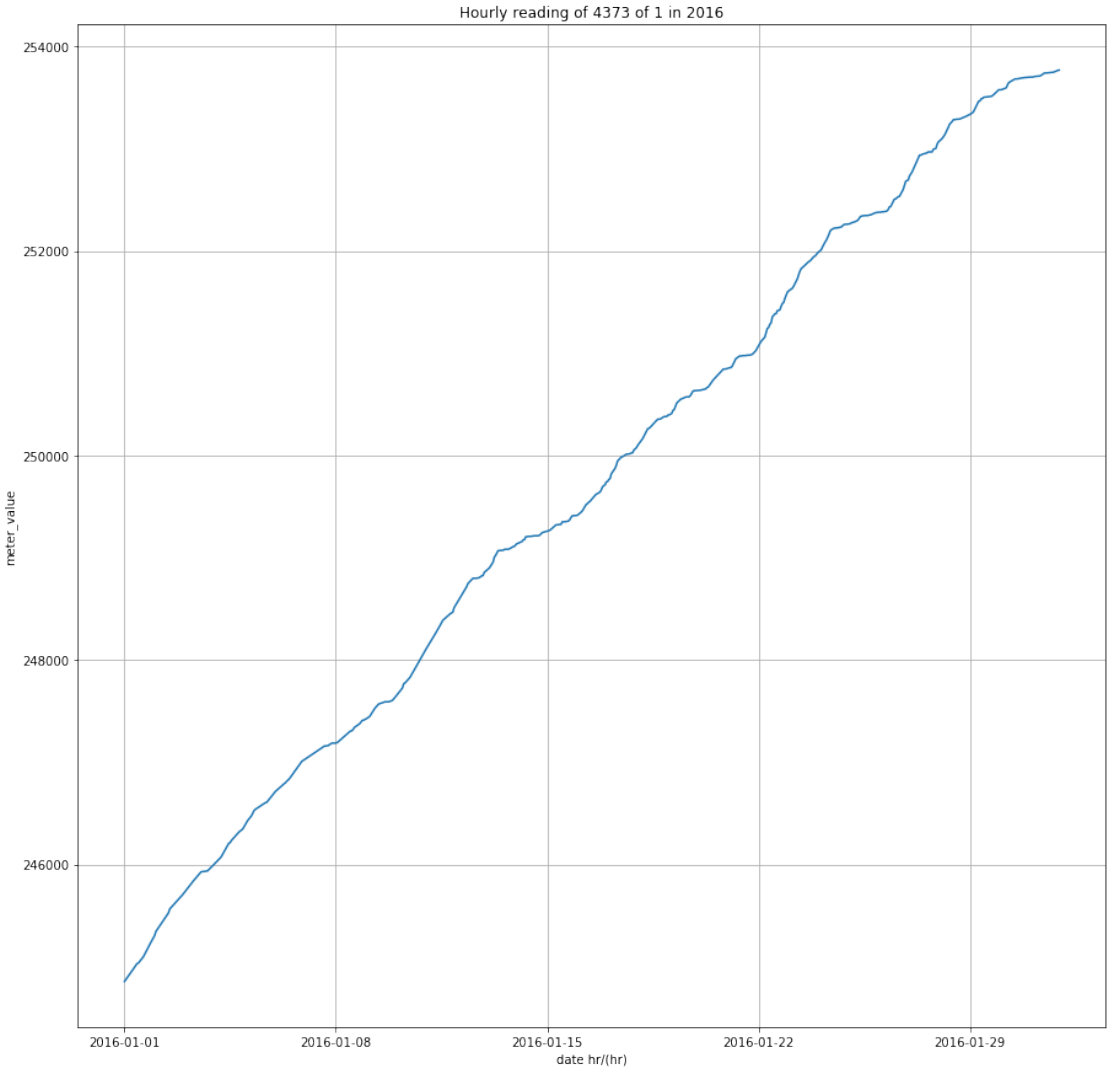

Hourly reading of 4193 of 1 in 2016
meter_value
308000
306000
304000
302000
300000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

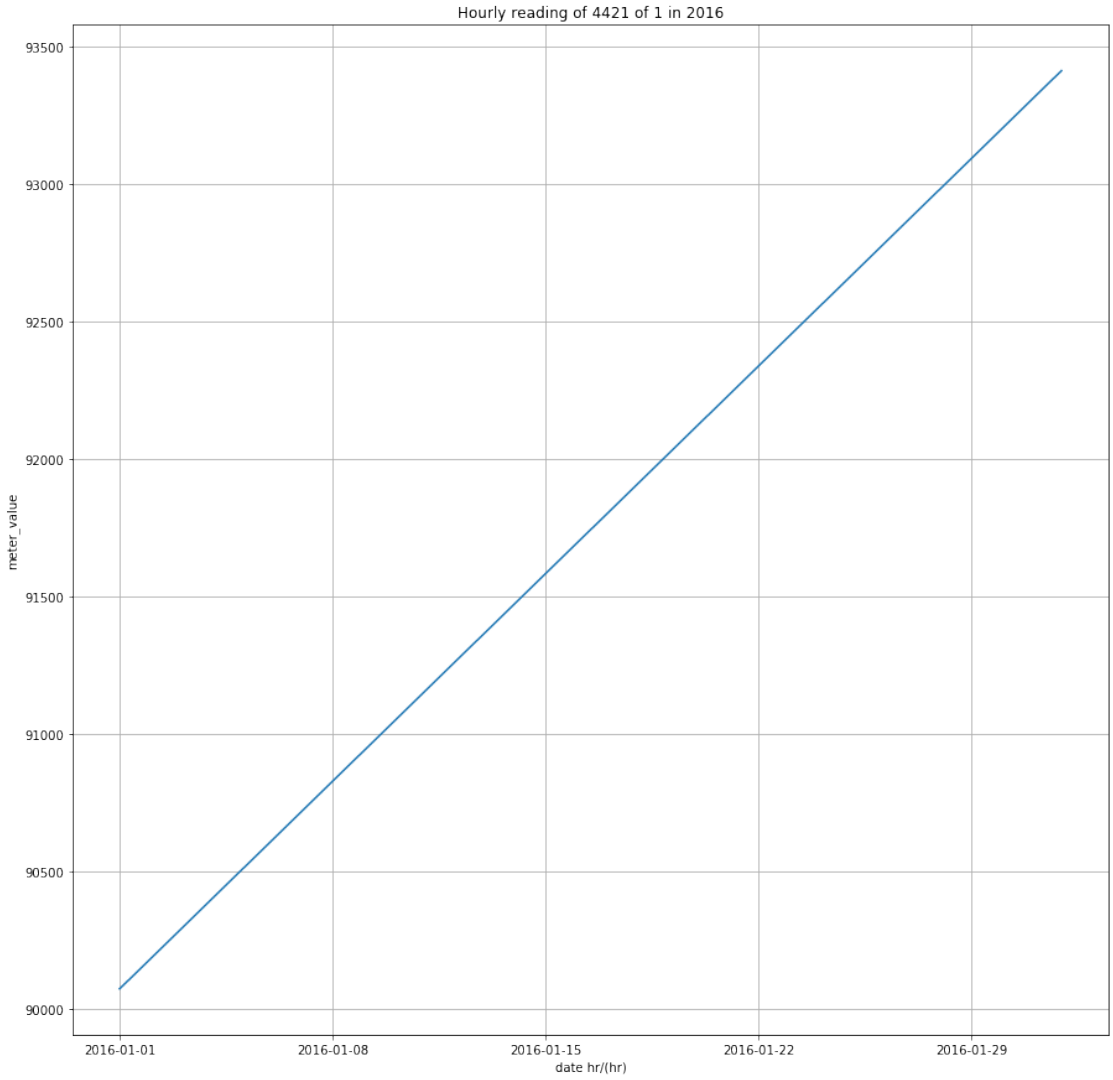

Hourly reading of 4228 of 1 in 2016
93000
92500
92000
91500
91000
90500
90000
89500
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

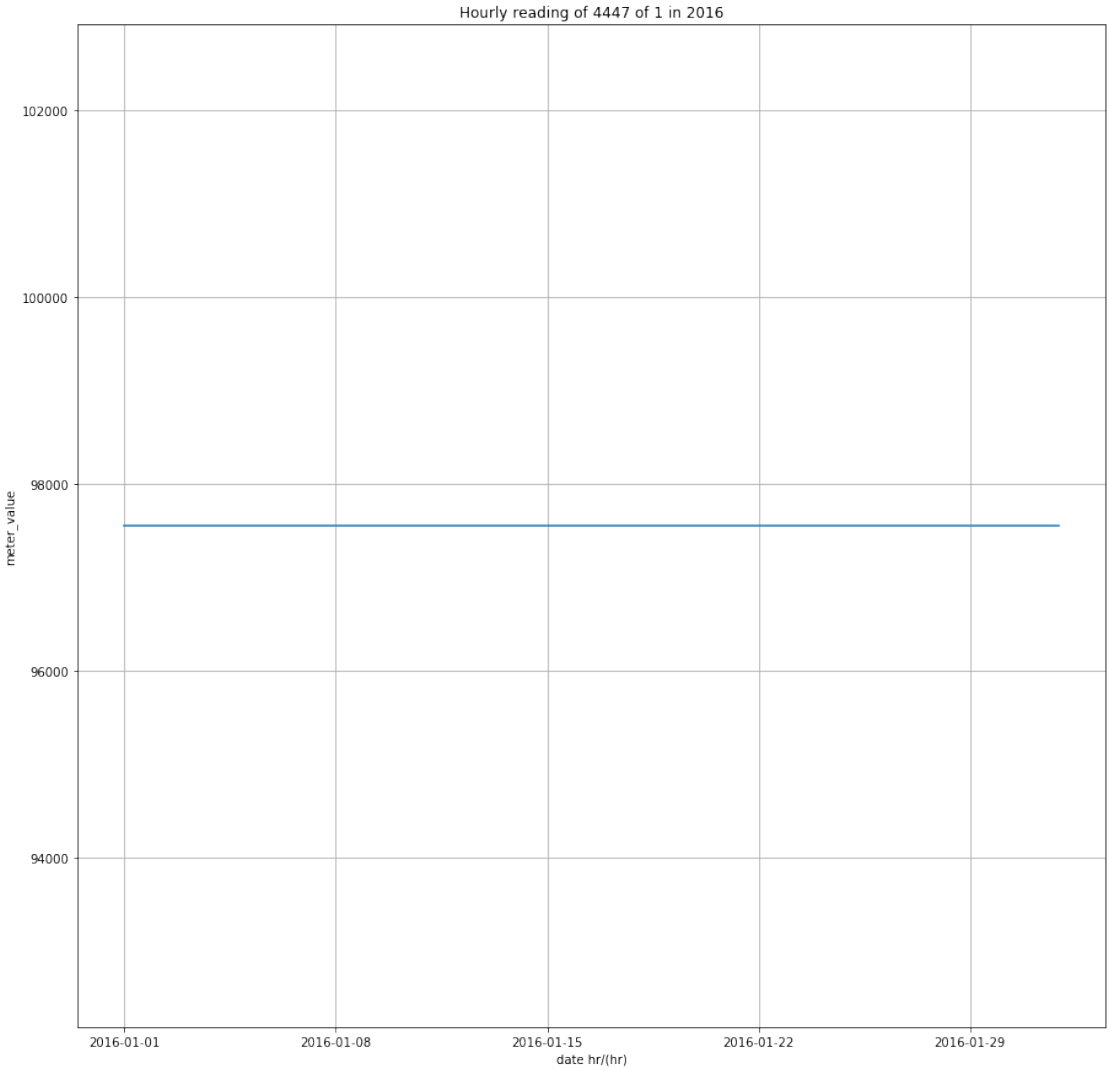

Hourly reading of 4296 of 1 in 2016
meter_value
181000
180000
179000
178000
177000
176000
175000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

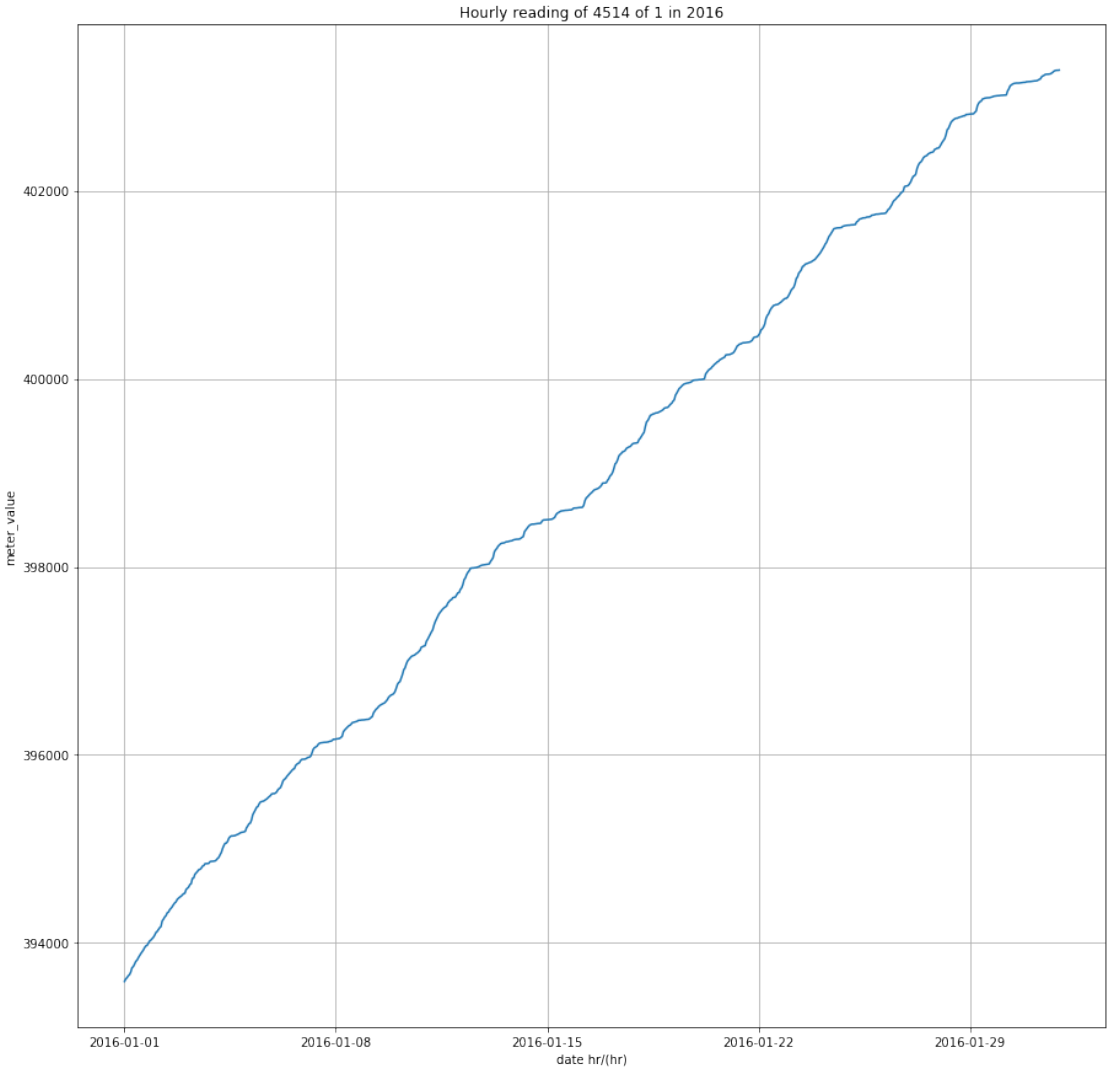

Hourly reading of 4352 of 1 in 2016
meter_value
233000
232000
231000
230000
229000
228000
227000
226000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

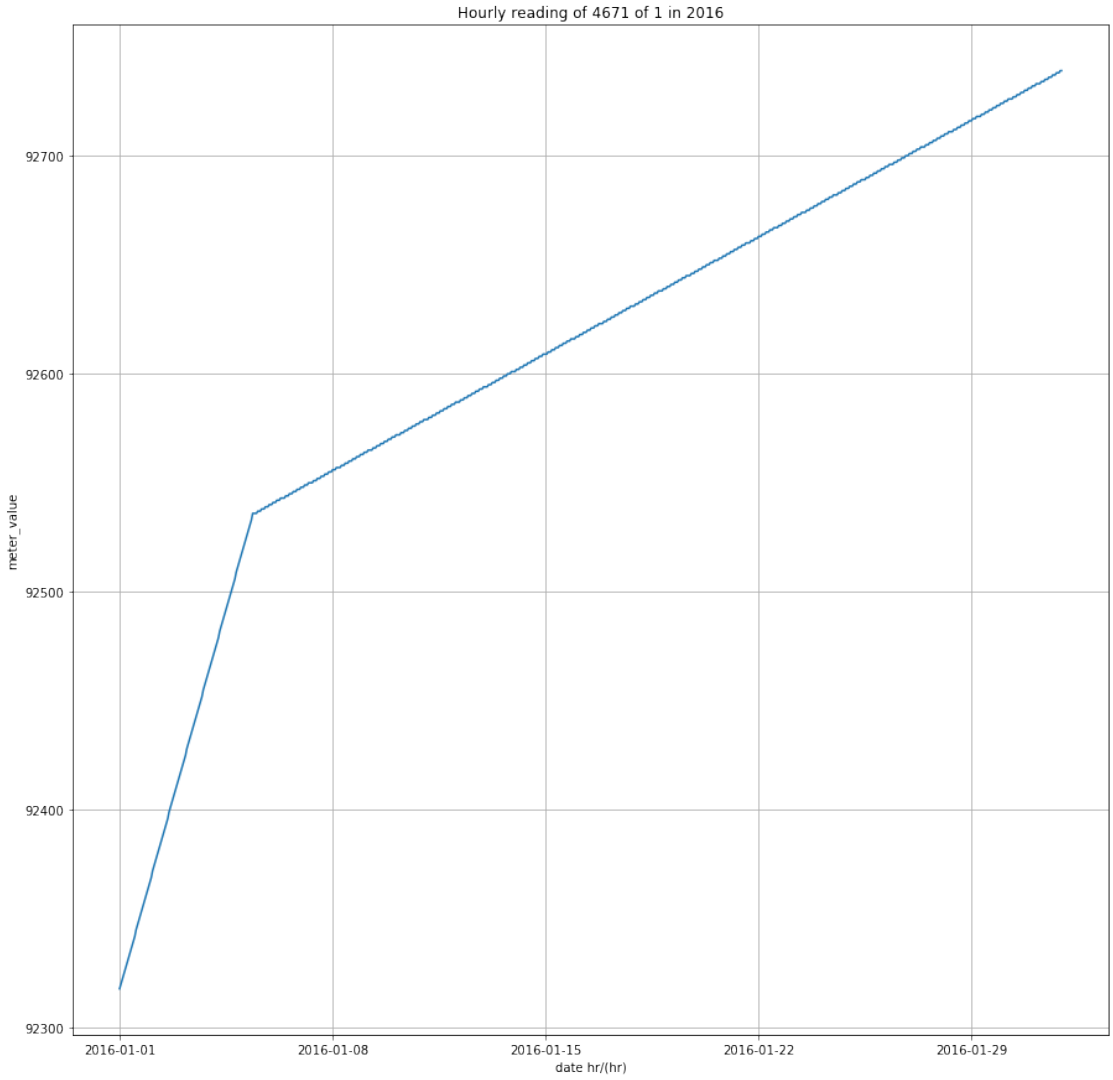

Hourly reading of 4356 of 1 in 2016
meter_value
234000
233000
232000
231000
230000
229000
228000
227000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

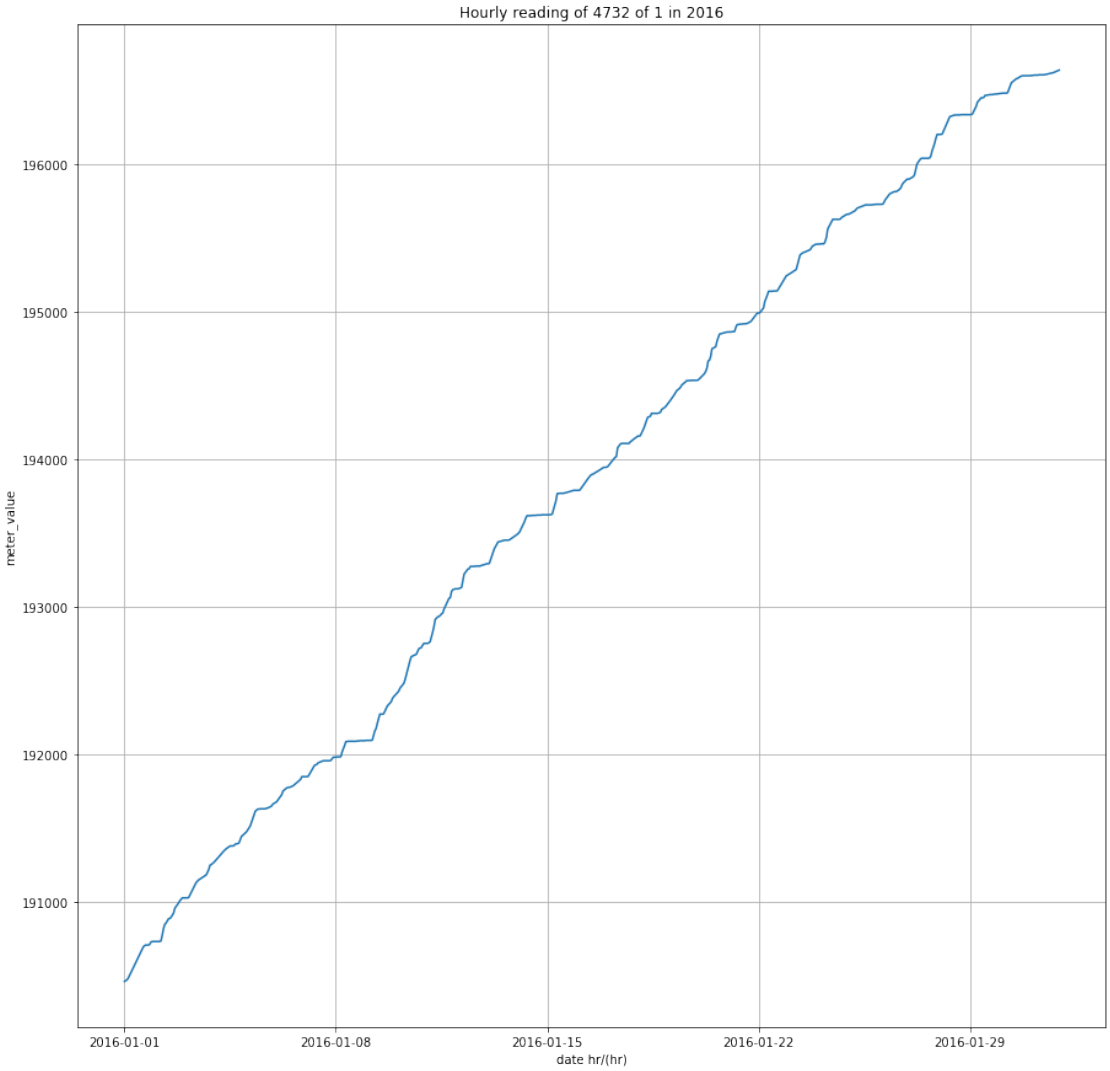

Hourly reading of 4373 of 1 in 2016
254000
252000
250000
248000
246000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

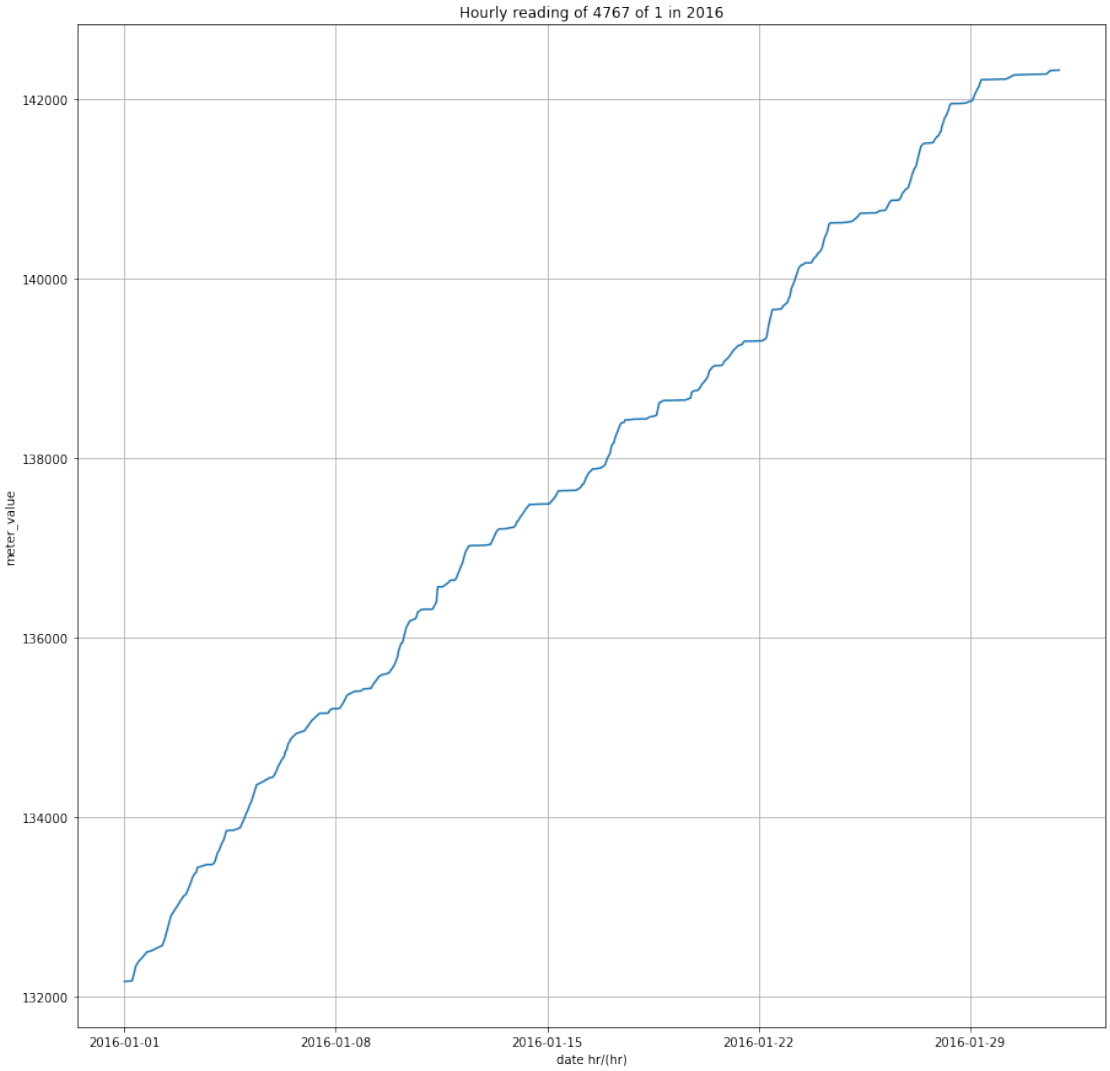

Hourly reading of 4421 of 1 in 2016
93500
93000
92500
92000
91500
91000
90500
90000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

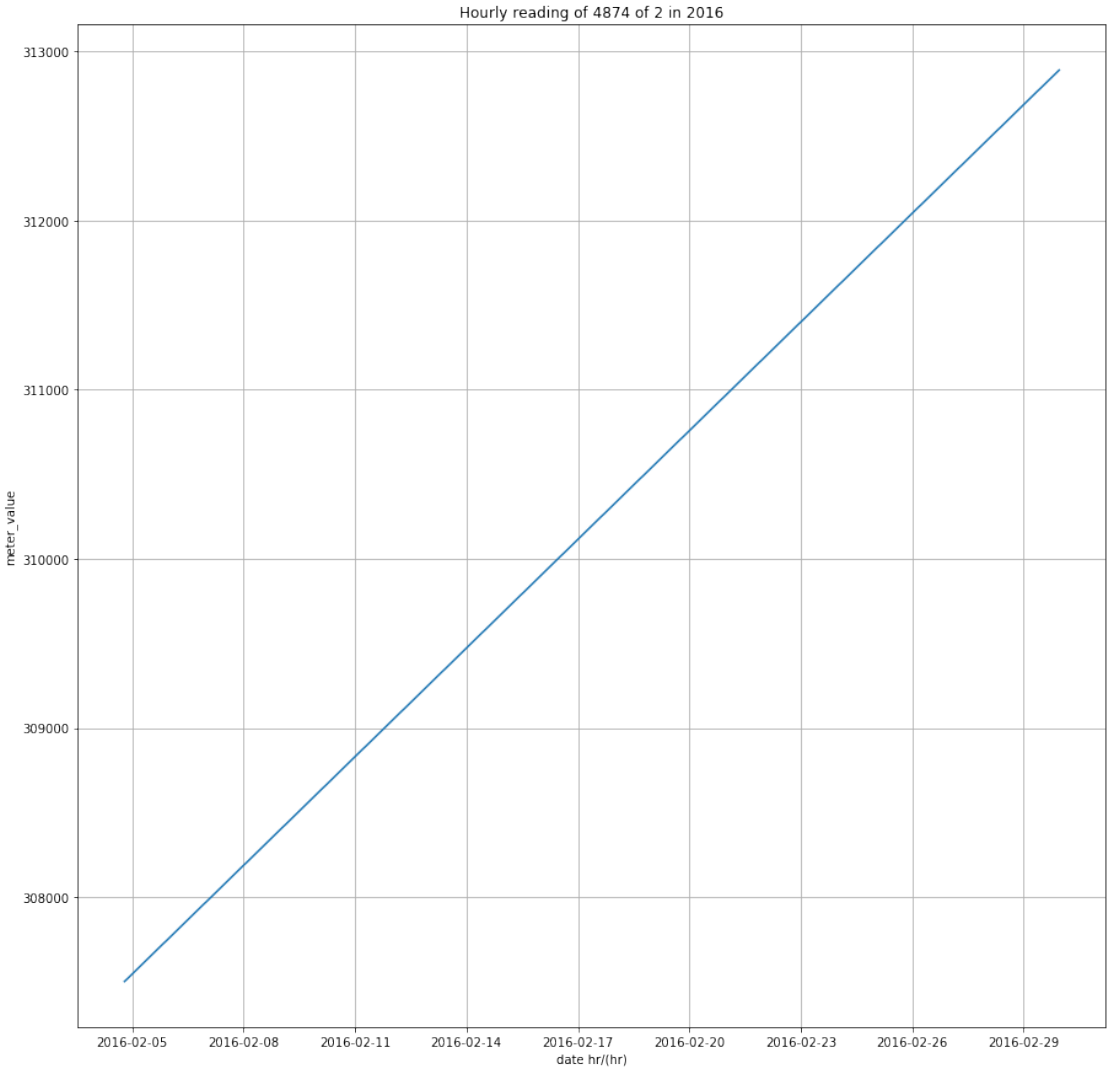

Hourly reading of 4447 of 1 in 2016
meter_value
102000
100000
98000
96000
94000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

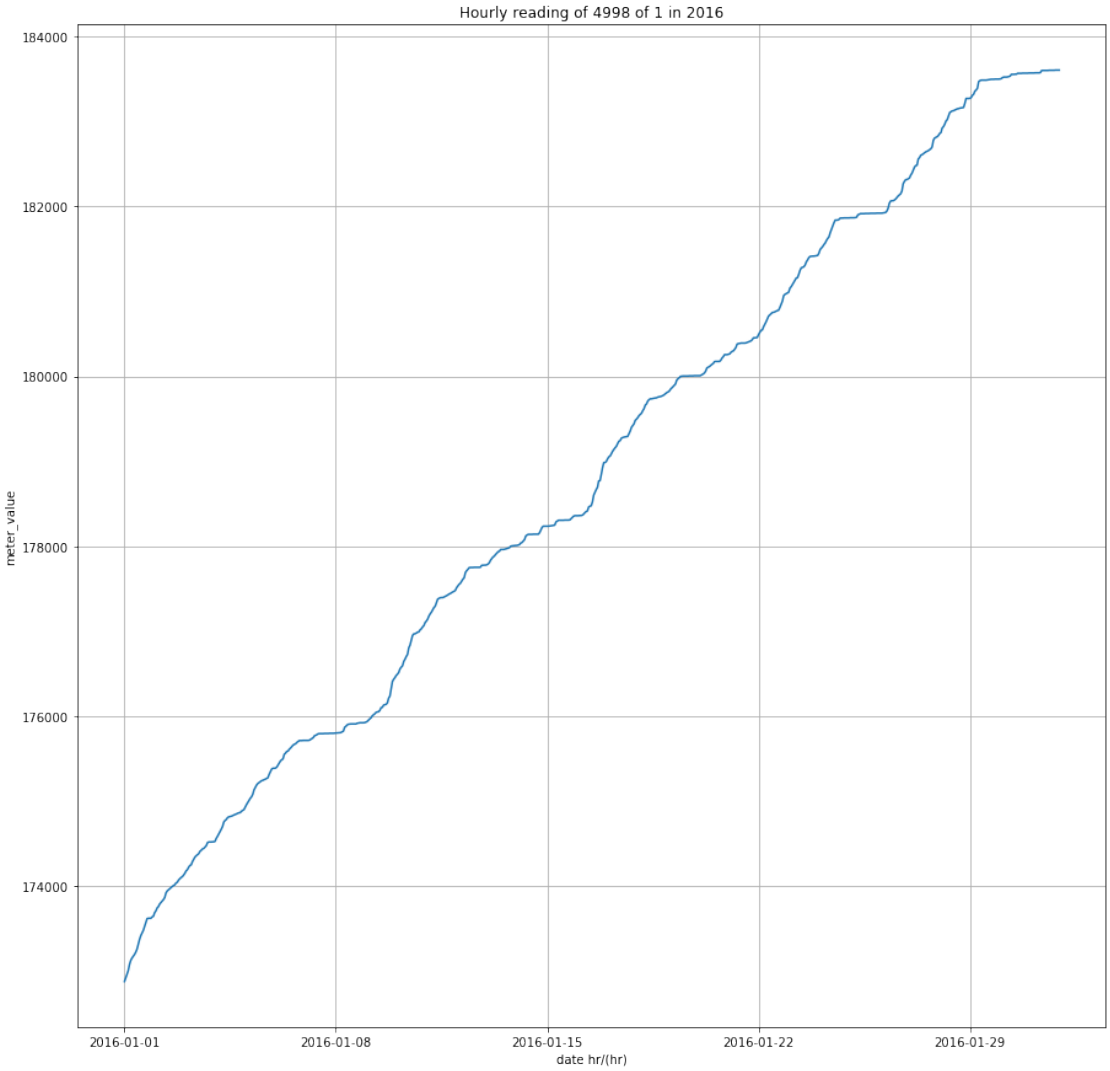

Hourly reading of 4514 of 1 in 2016
meter_value
402000
400000
398000
396000
394000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

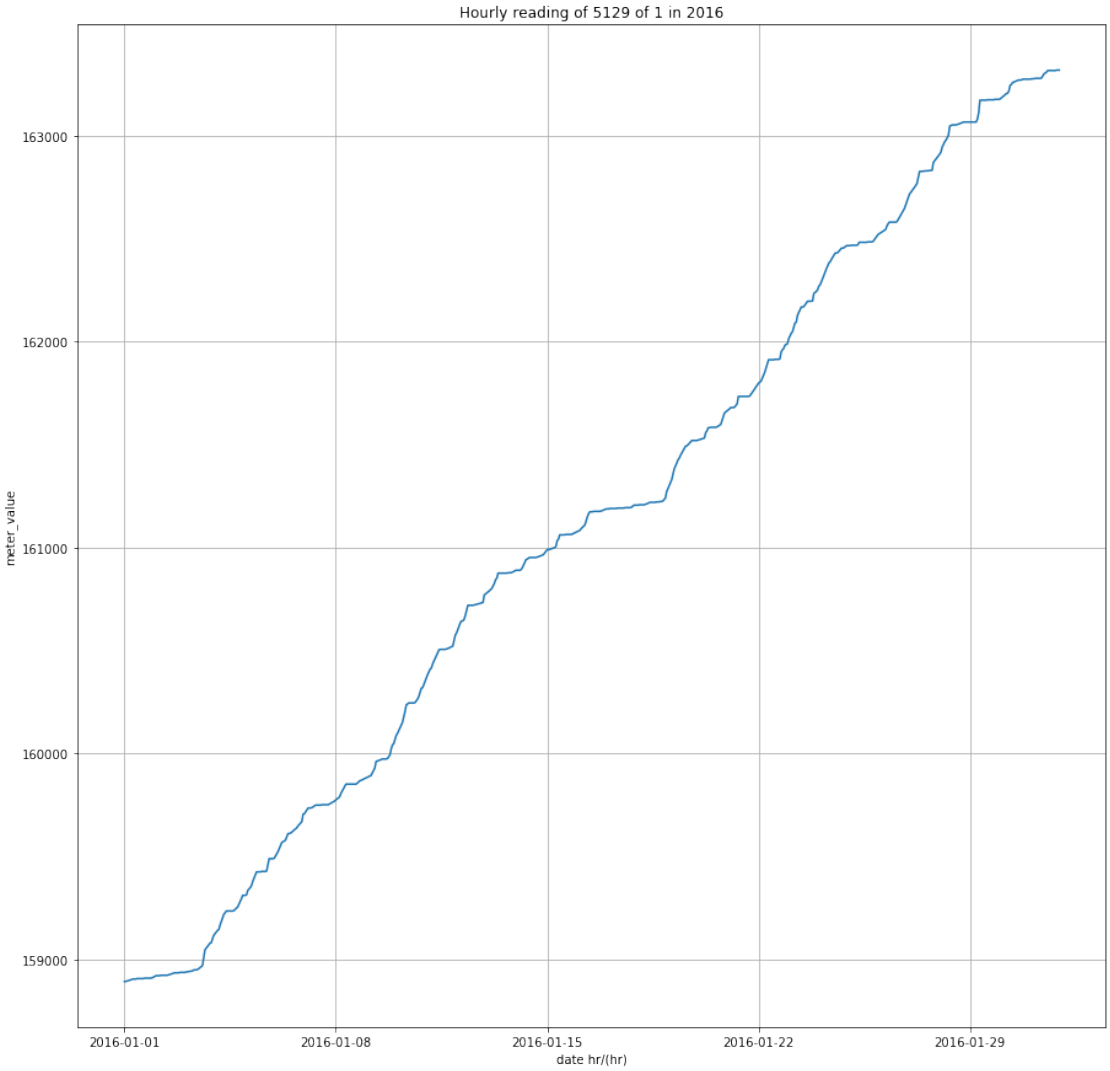

Hourly reading of 4671 of 1 in 2016
meter_value
92700
92600
92500
92400
92300
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

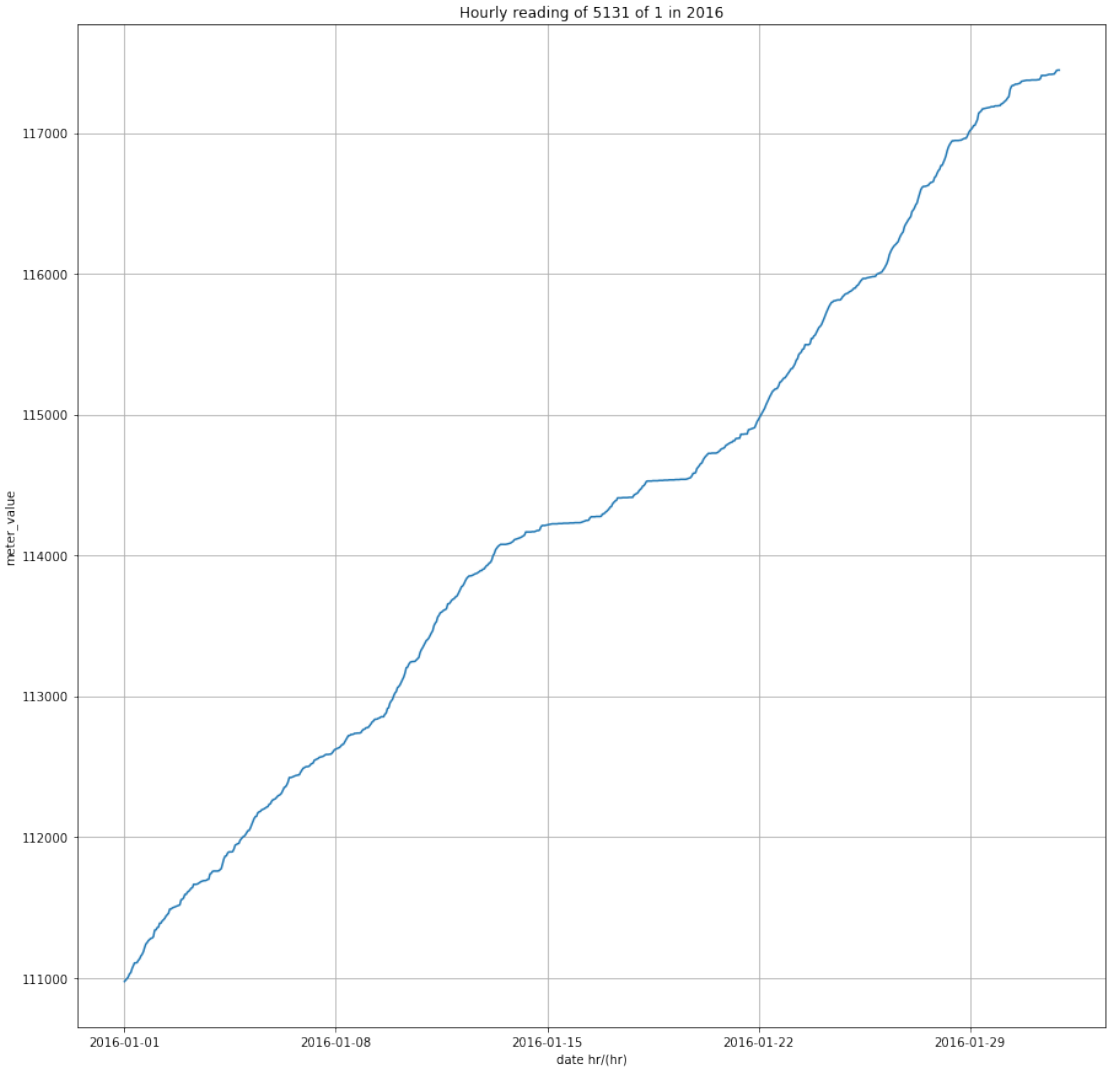

Hourly reading of 4732 of 1 in 2016
196000
195000
194000
193000
192000
191000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

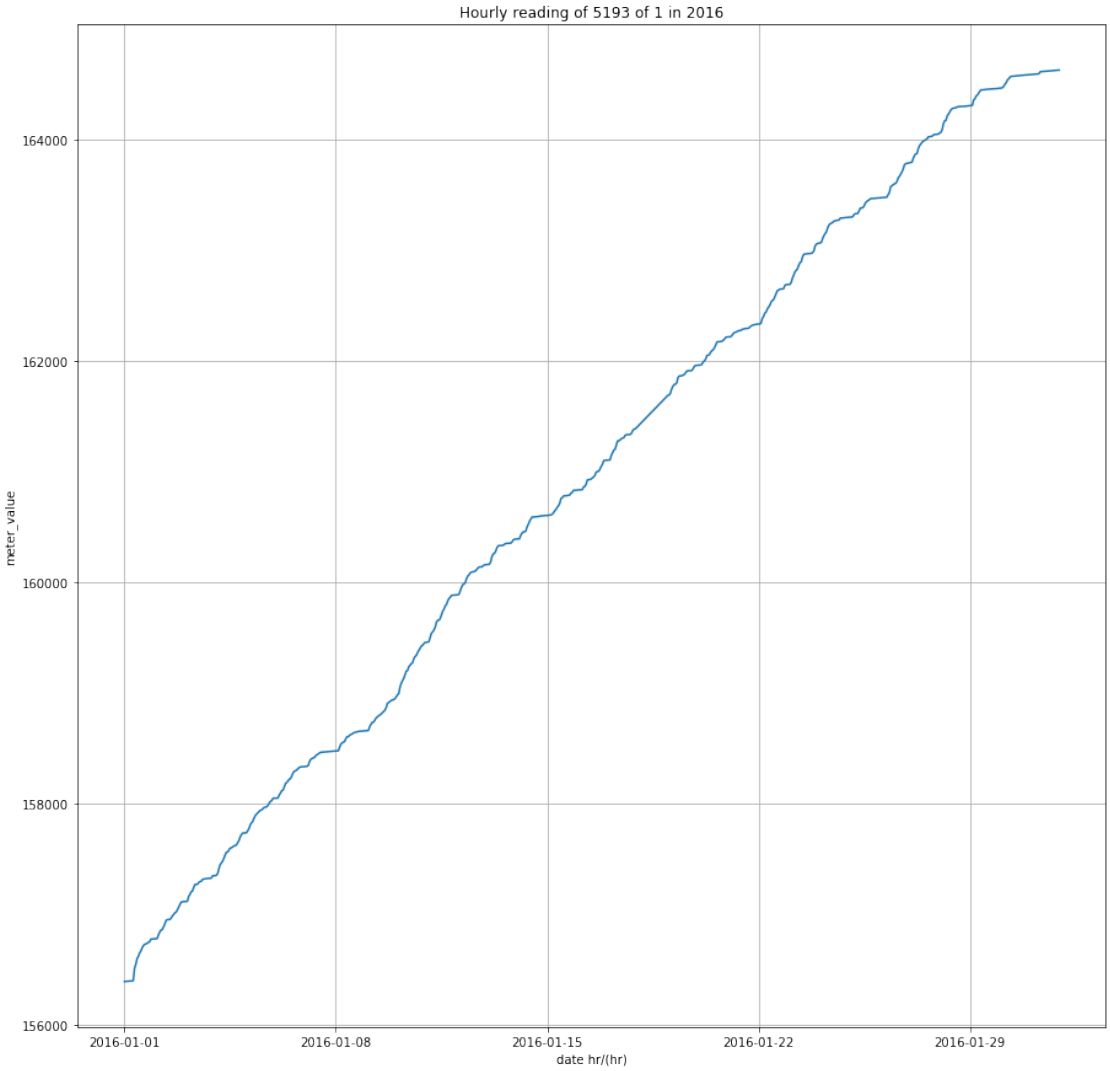

Hourly reading of 4767 of 1 in 2016
meter_value
142000
140000
138000
136000
134000
132000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

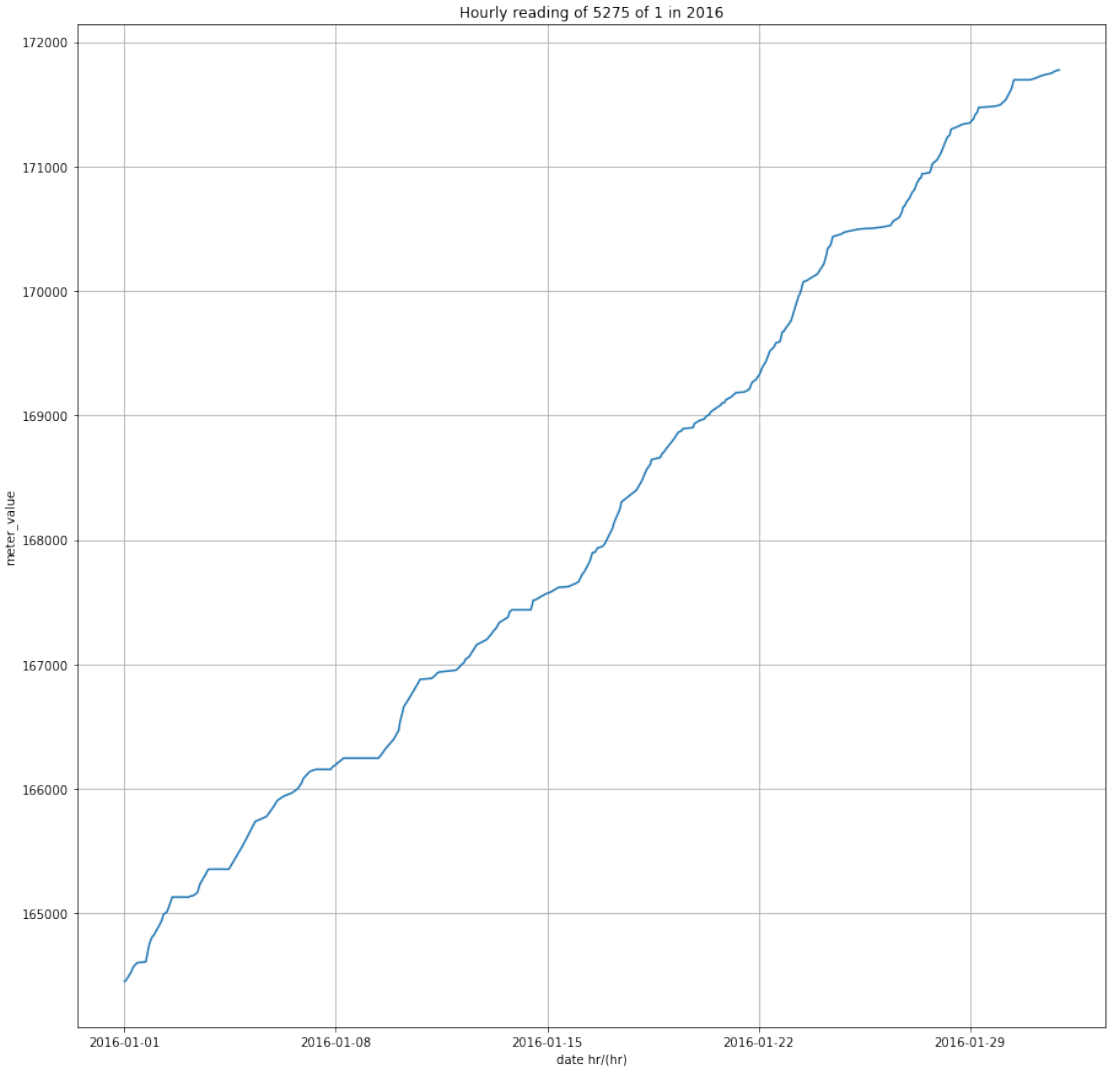

Hourly reading of 4874 of 2 in 2016
313000
312000
311000
310000
309000
308000
meter_value
2016-02-05
2016-02-08
2016-02-11
2016-02-14
2016-02-17
2016-02-20
2016-02-23
2016-02-26
2016-02-29
date hr/(hr)

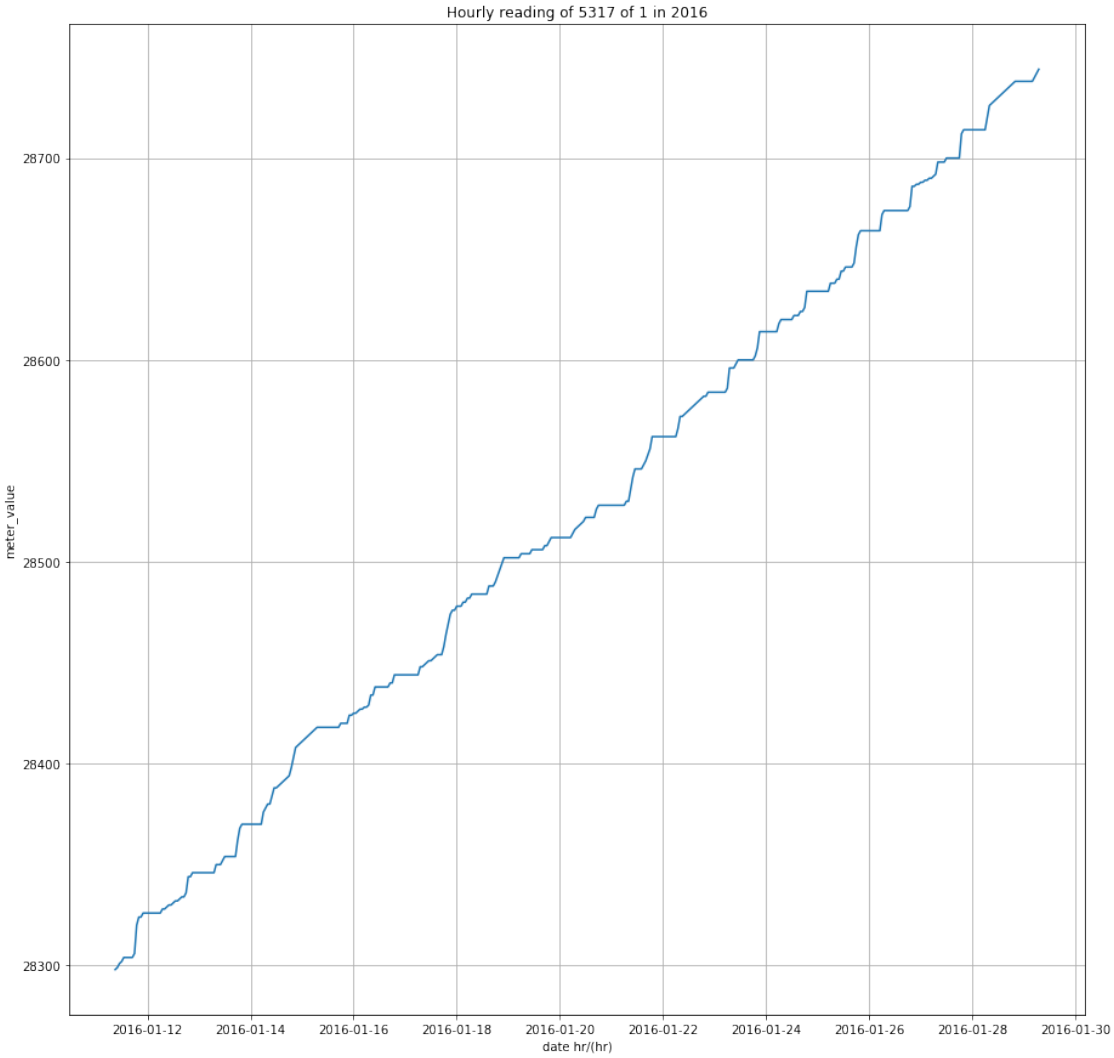

Hourly reading of 4998 of 1 in 2016
184000
182000
180000
178000
176000
174000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

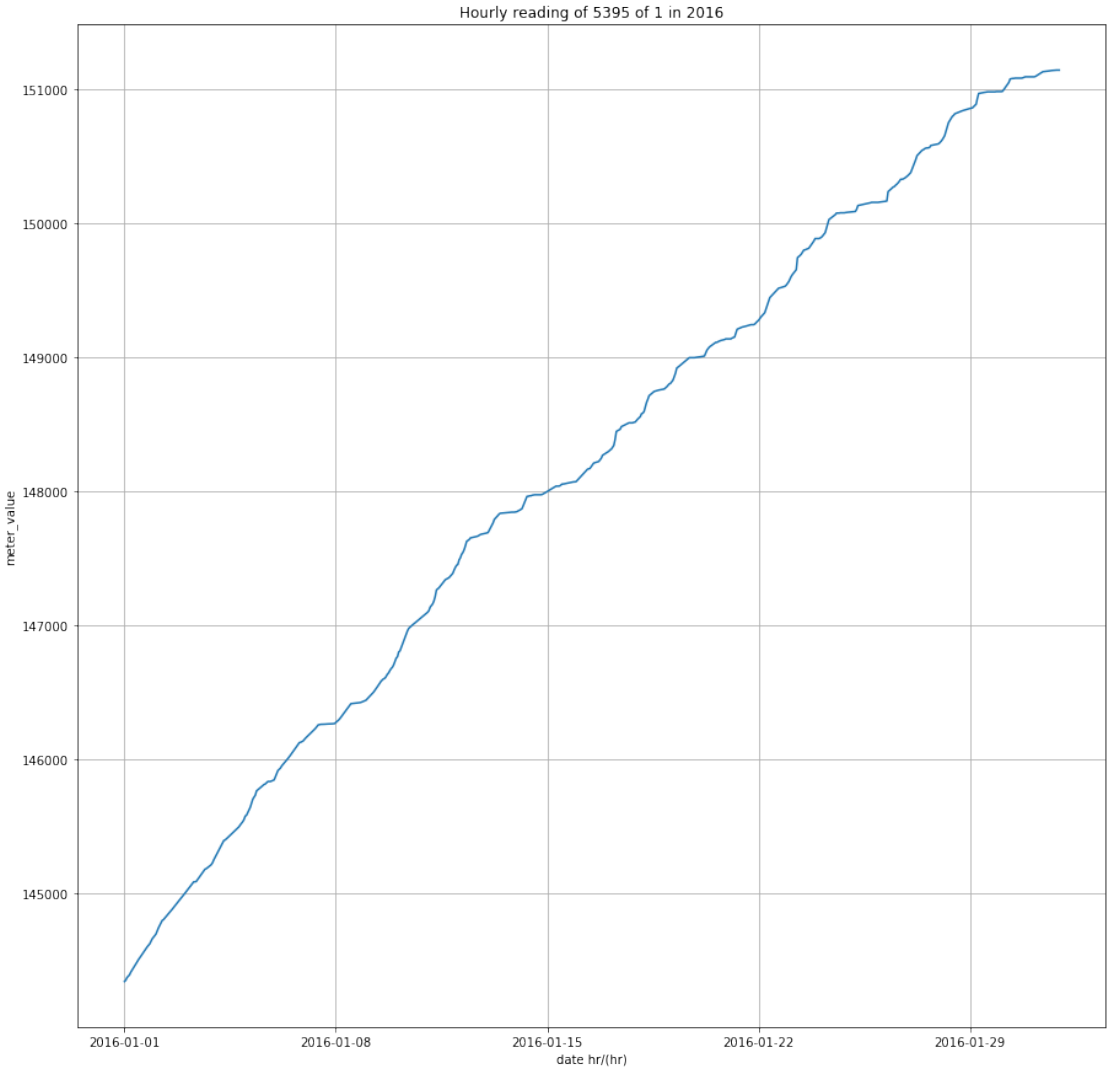

Hourly reading of 5129 of 1 in 2016
meter_value
163000
162000
161000
160000
159000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

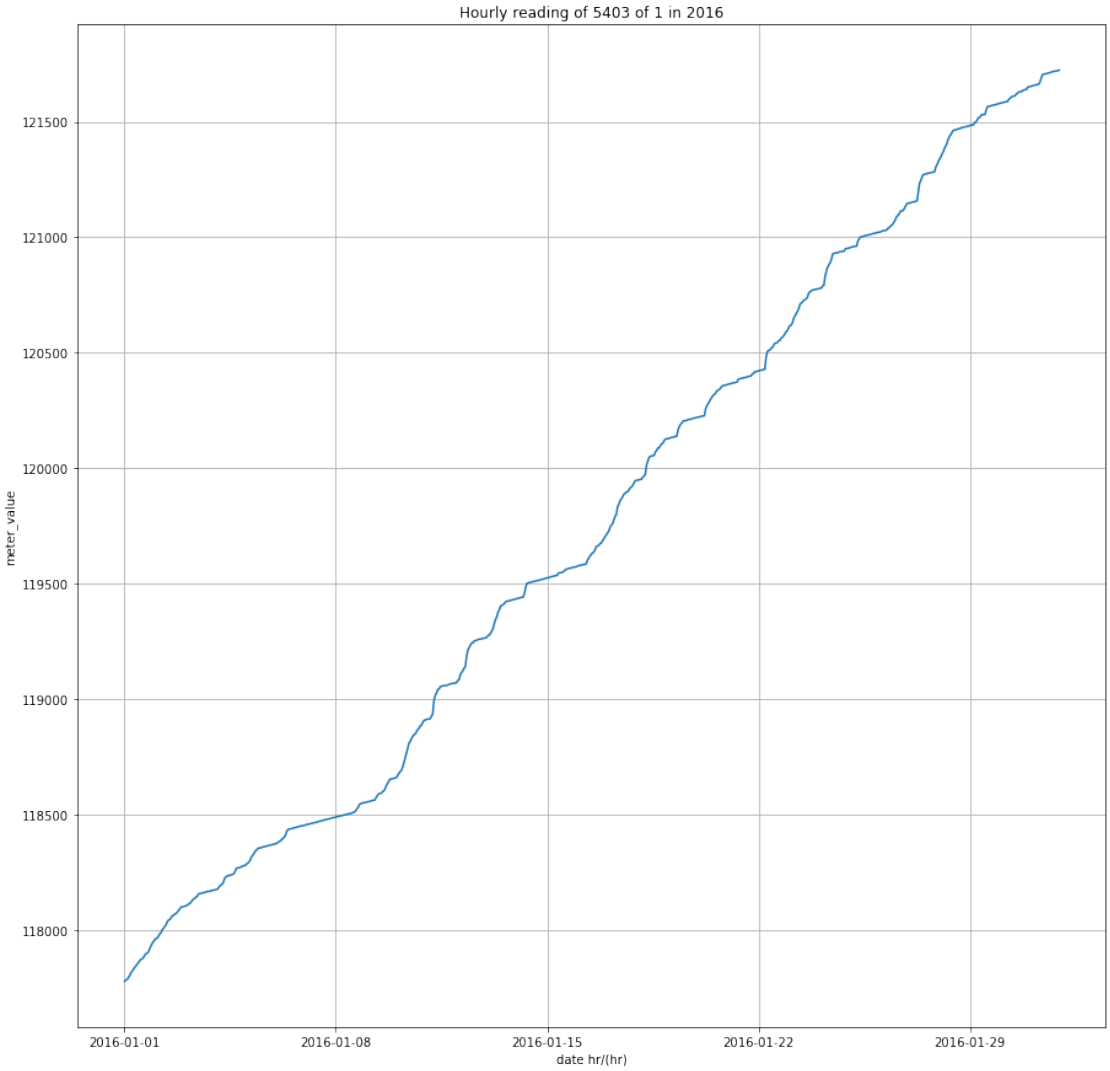

Hourly reading of 5131 of 1 in 2016
meter_value
117000
116000
115000
114000
113000
112000
111000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

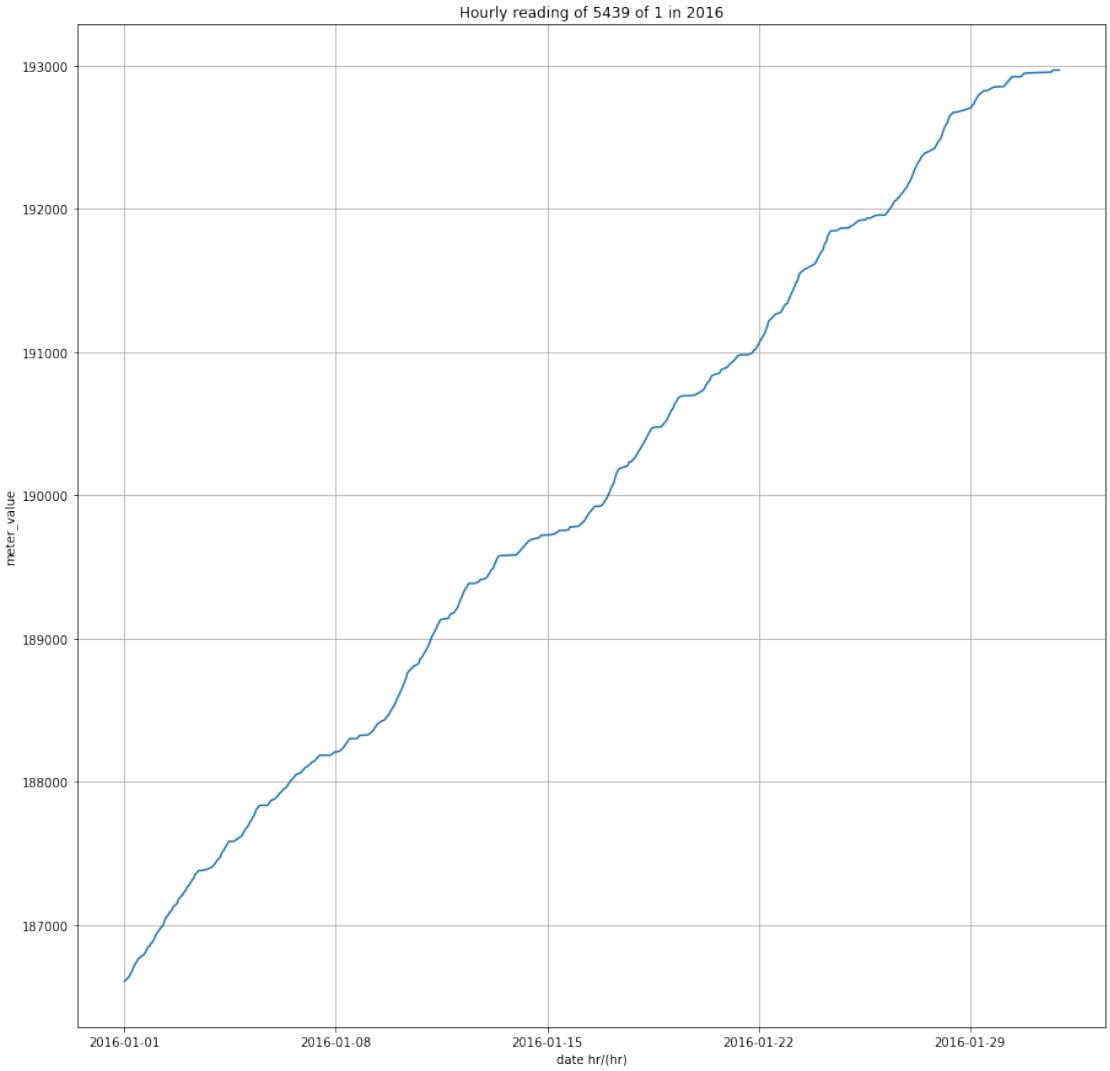

Hourly reading of 5193 of 1 in 2016
meter_value
164000
162000
160000
158000
156000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

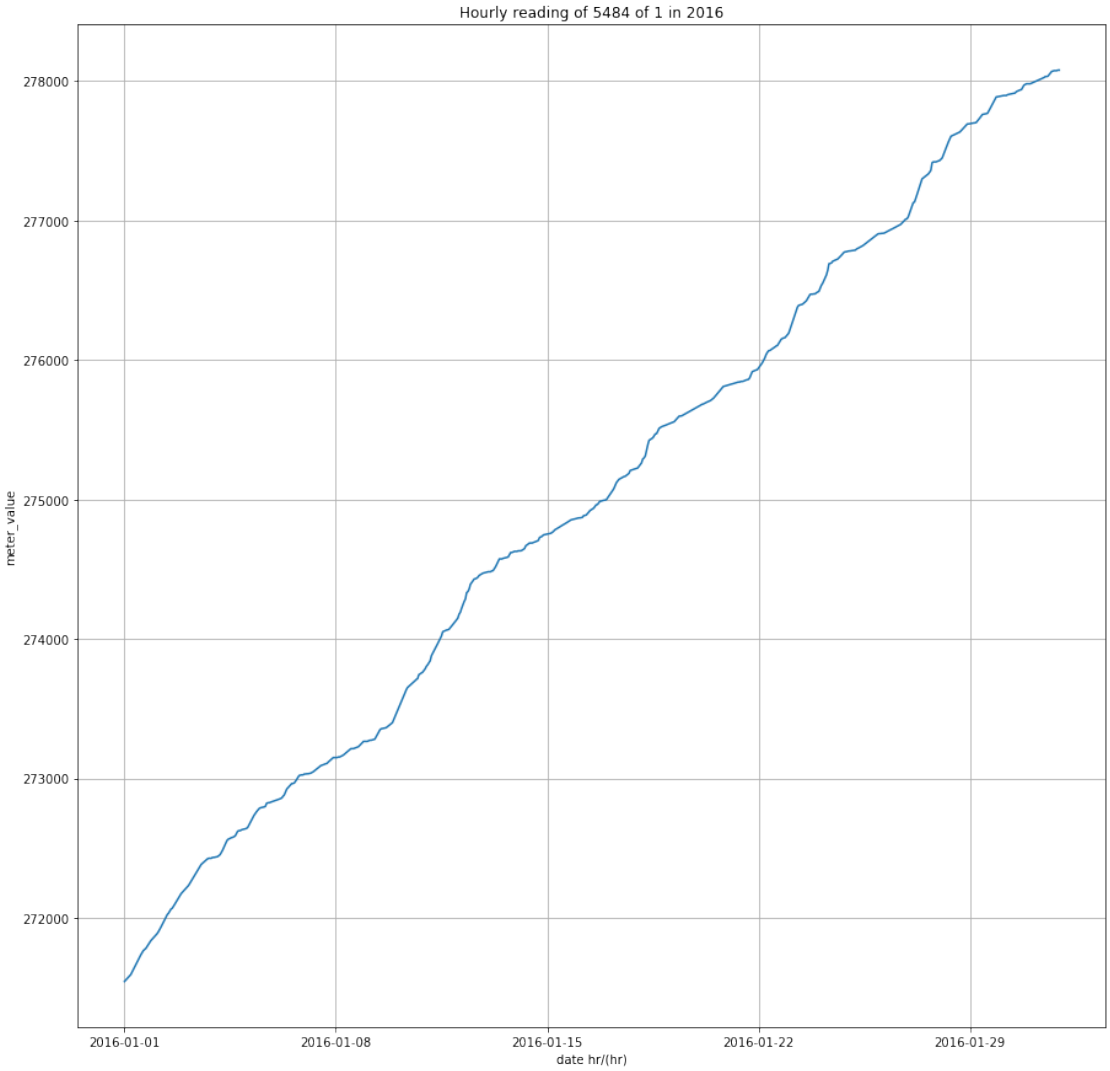

Hourly reading of 5275 of 1 in 2016
meter_value
172000
171000
170000
169000
168000
167000
166000
165000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

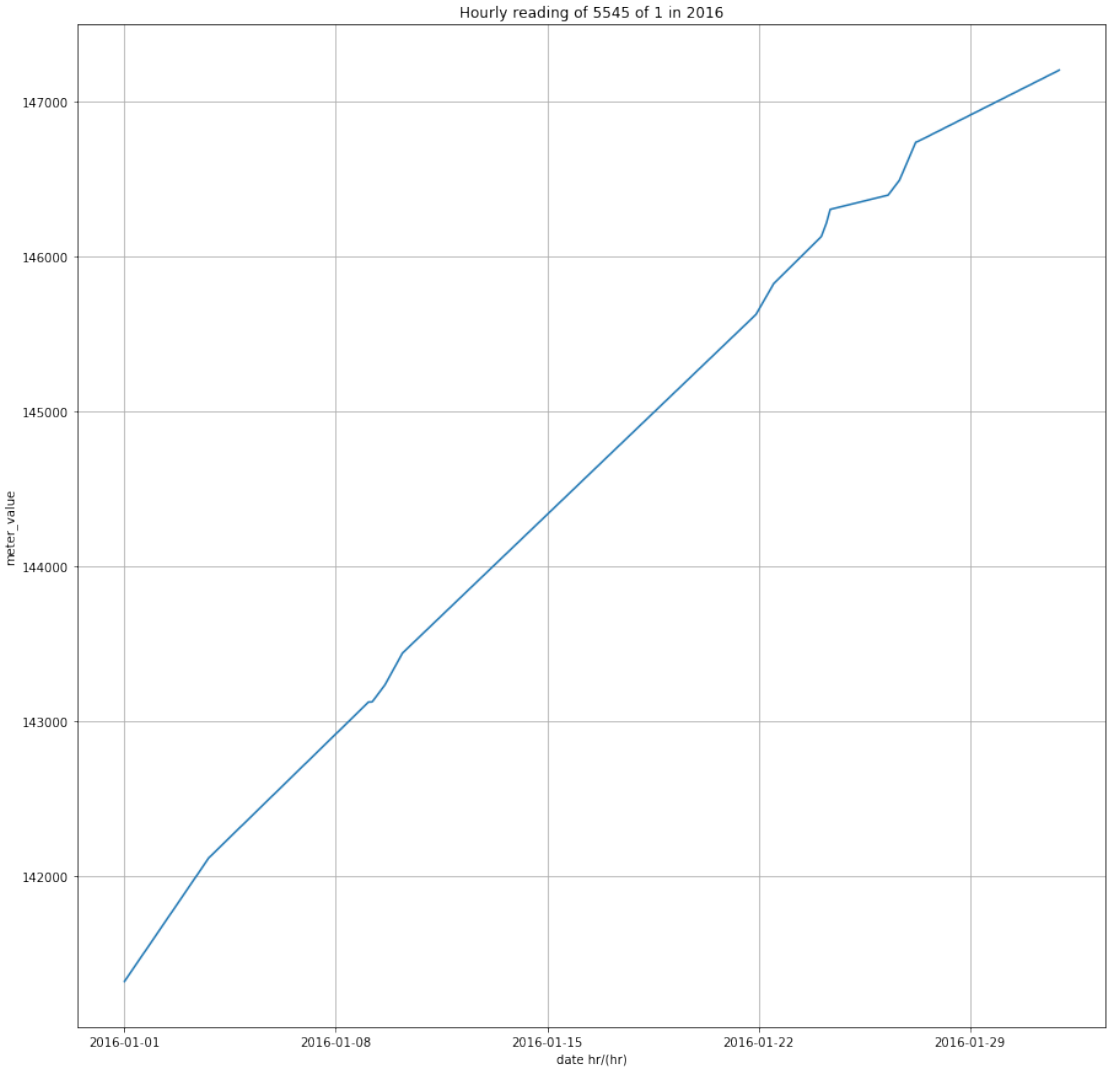

Hourly reading of 5317 of 1 in 2016
meter_value
28700
28600
28500
28400
28300
2016-01-12
2016-01-14
2016-01-16
2016-01-18
2016-01-20
2016-01-22
2016-01-24
2016-01-26
2016-01-28
2016-01-30
date hr/(hr)

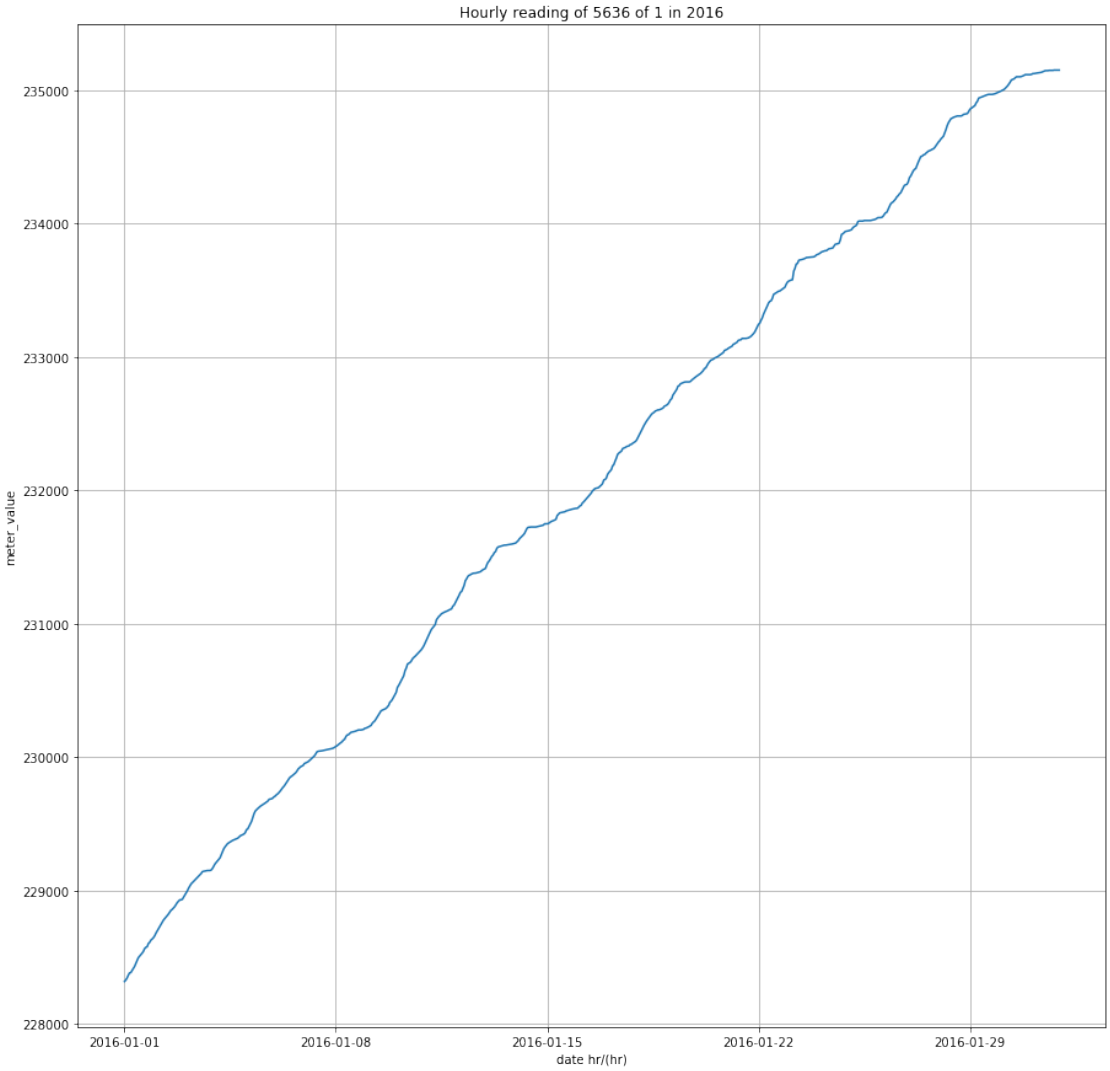

Hourly reading of 5395 of 1 in 2016
meter_value
151000
150000
149000
148000
147000
146000
145000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

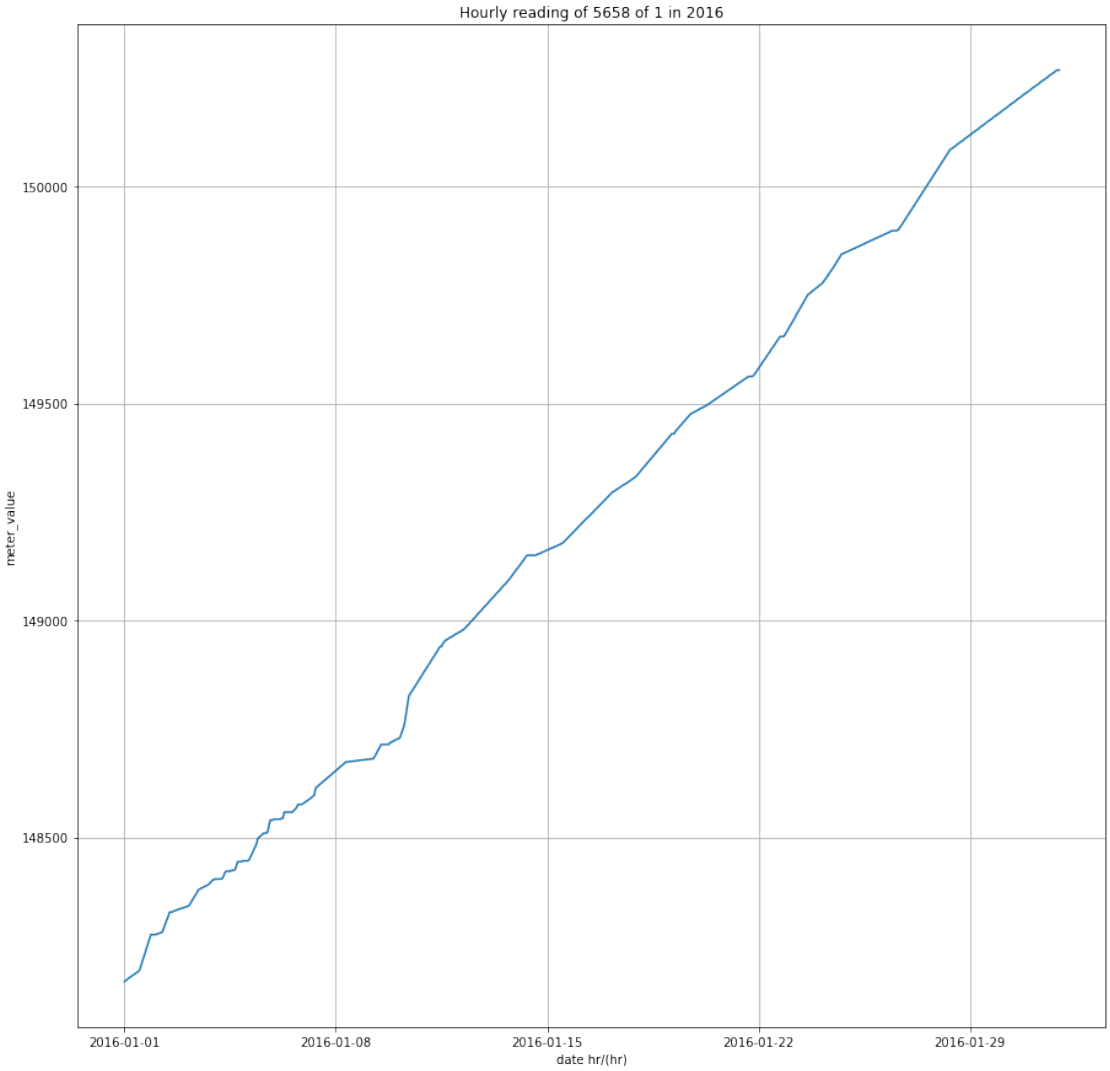

Hourly reading of 5403 of 1 in 2016
meter_value
121500
121000
120500
120000
119500
119000
118500
118000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

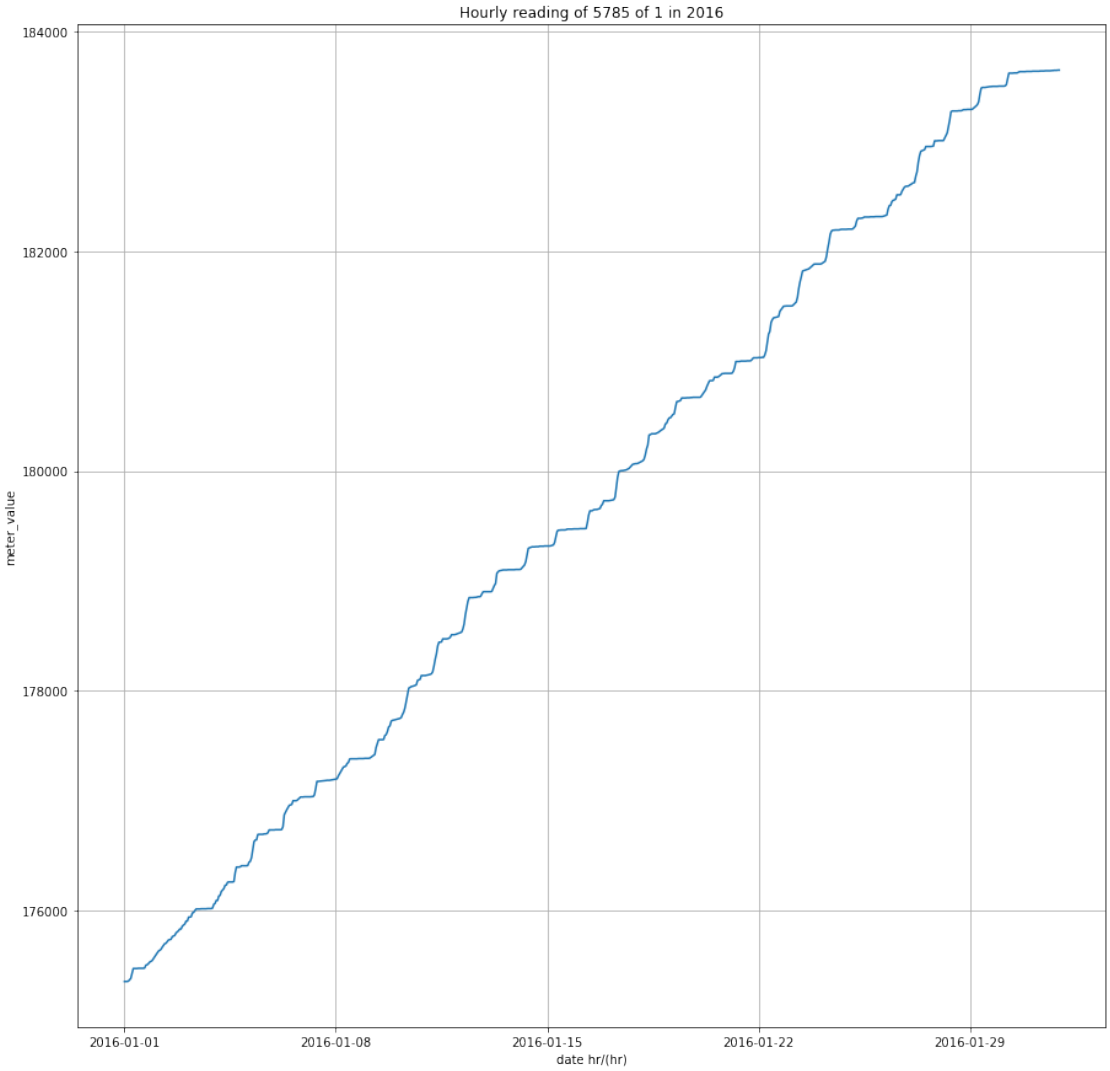

Hourly reading of 5439 of 1 in 2016
193000
192000
191000
190000
189000
188000
187000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

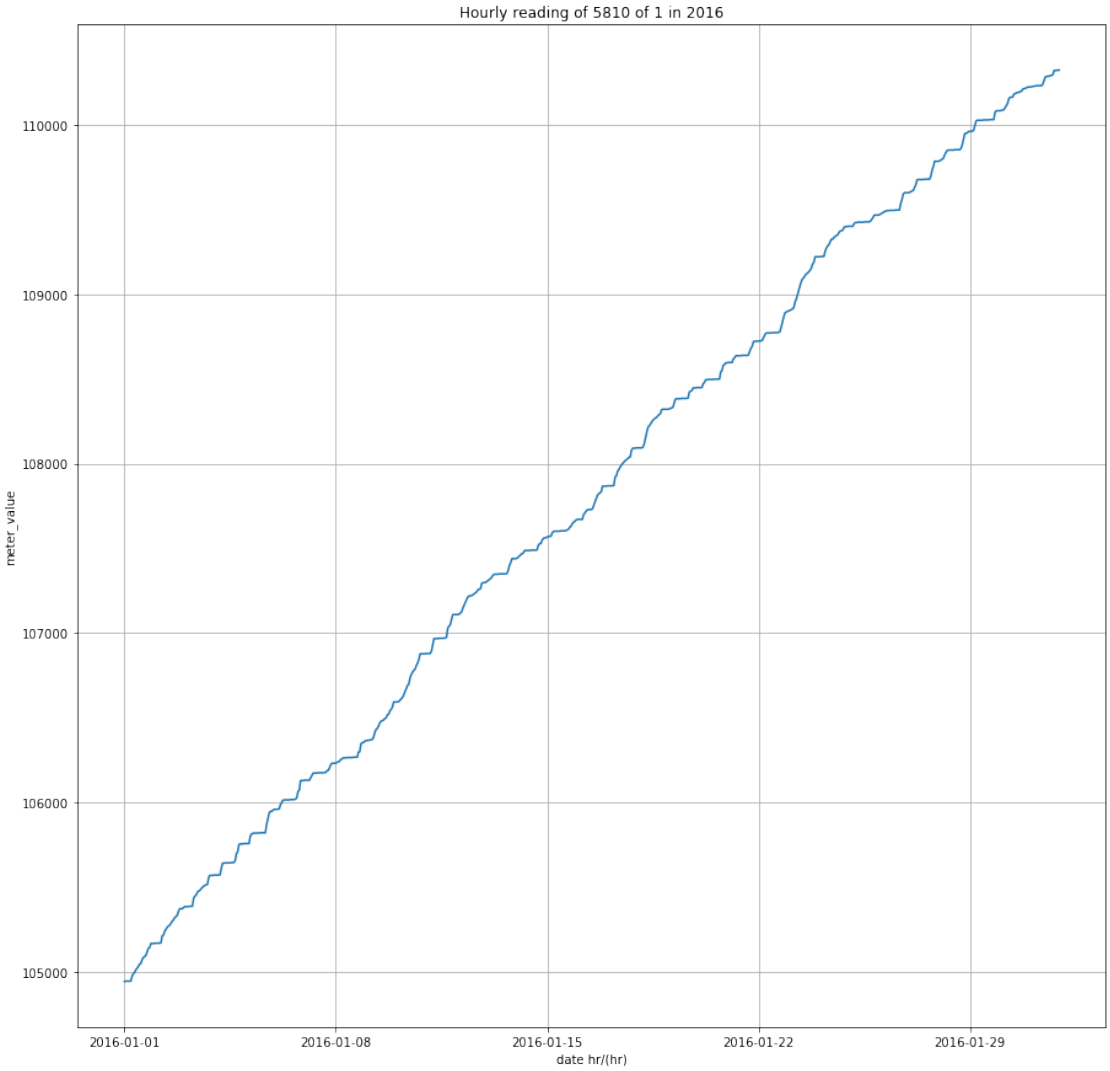

Hourly reading of 5484 of 1 in 2016
meter_value
278000
277000
276000
275000
274000
273000
272000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

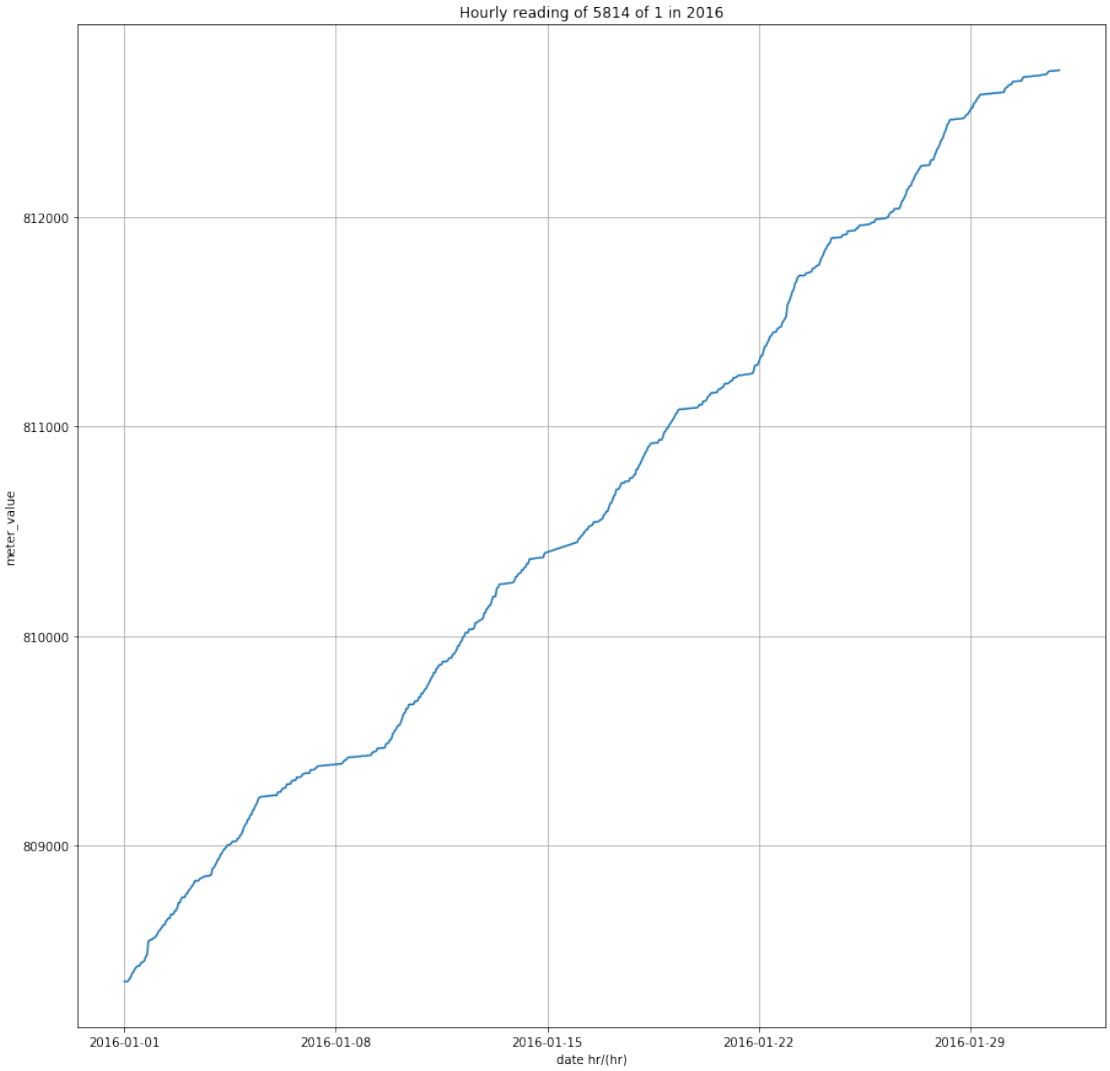

Hourly reading of 5545 of 1 in 2016
147000
146000
145000
144000
143000
142000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

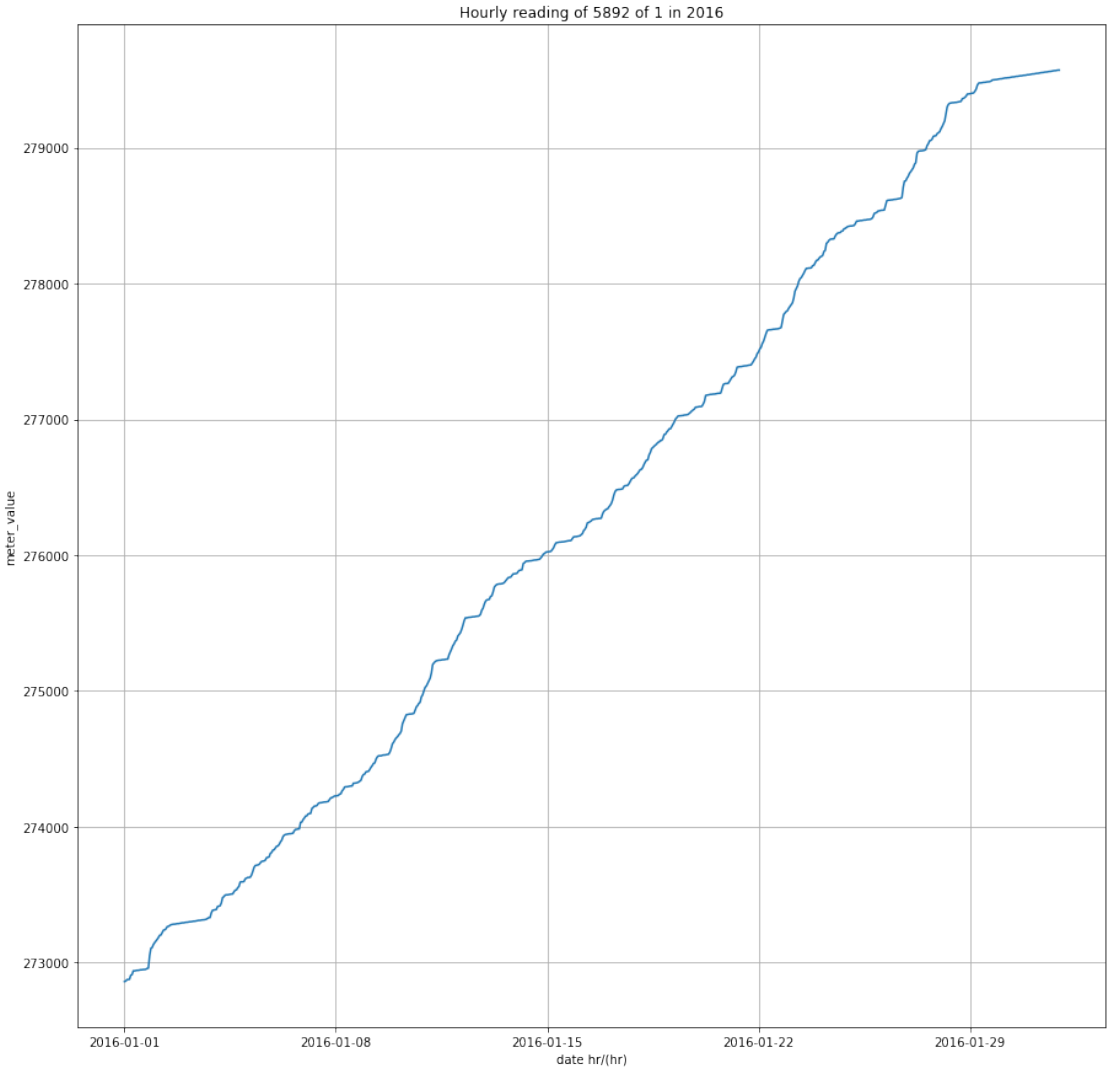

Hourly reading of 5636 of 1 in 2016
meter_value
235000
234000
233000
232000
231000
230000
229000
228000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

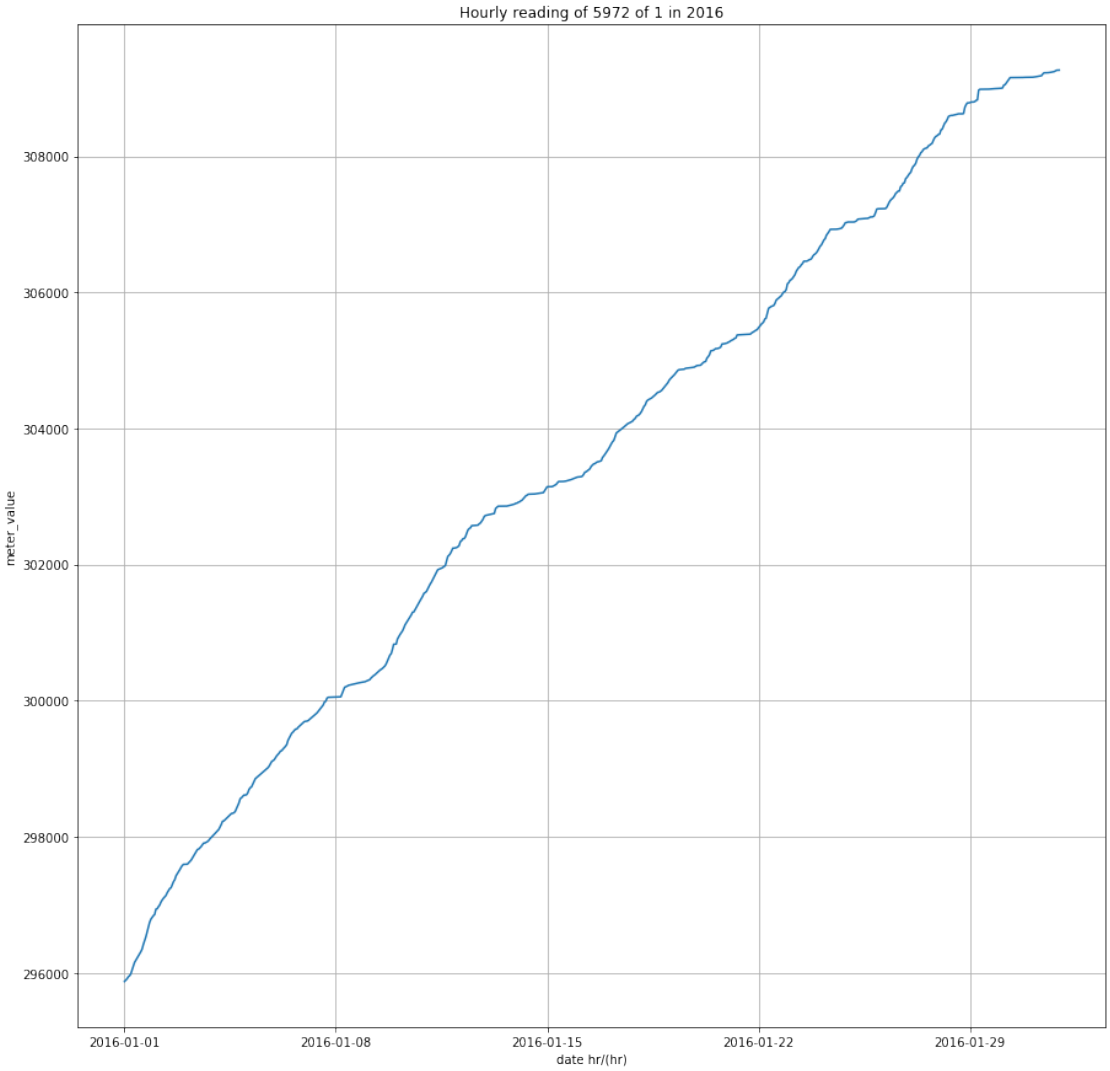

Hourly reading of 5658 of 1 in 2016
150000
149500
149000
148500
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

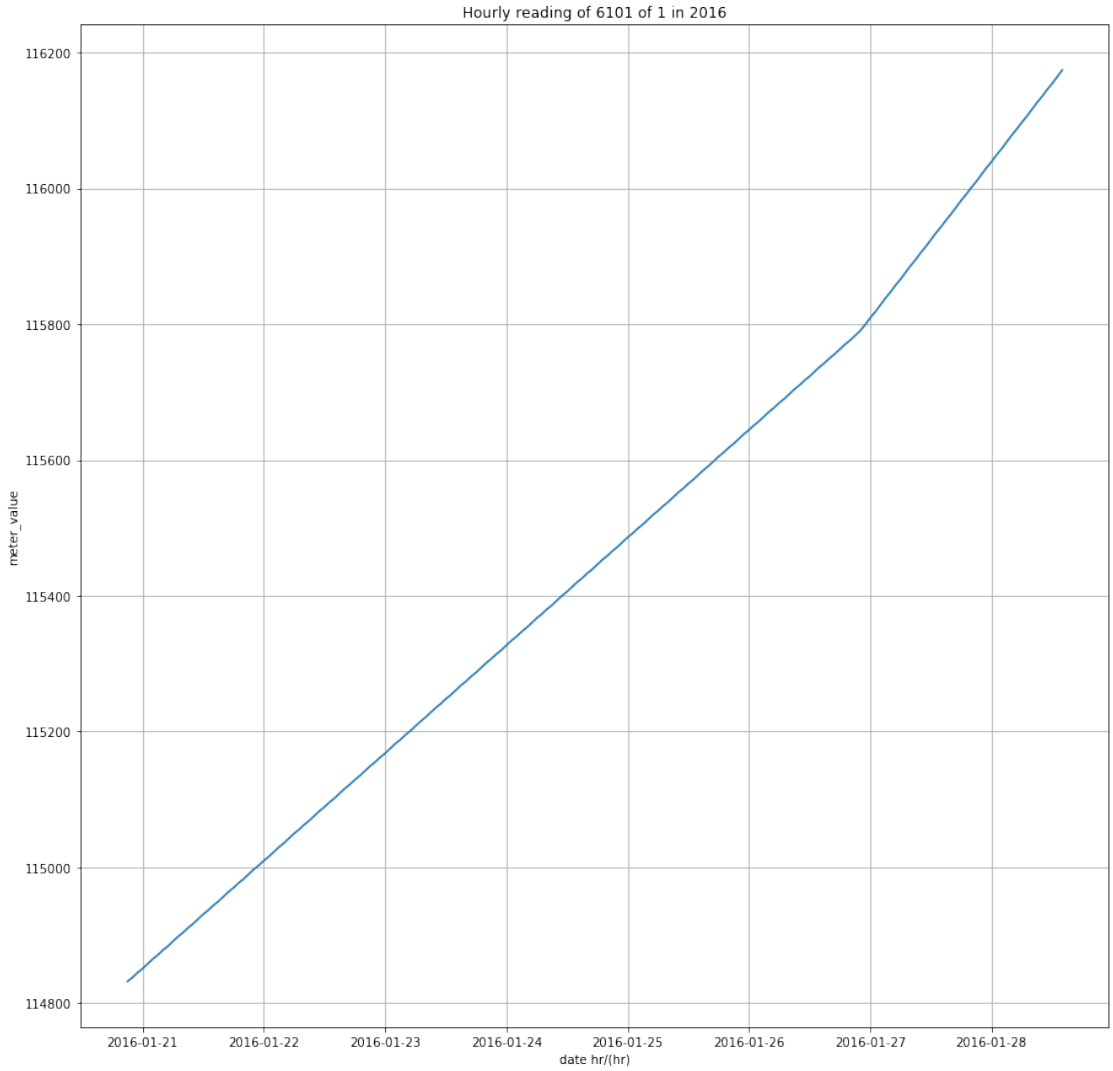

Hourly reading of 5785 of 1 in 2016
184000
182000
180000
178000
176000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

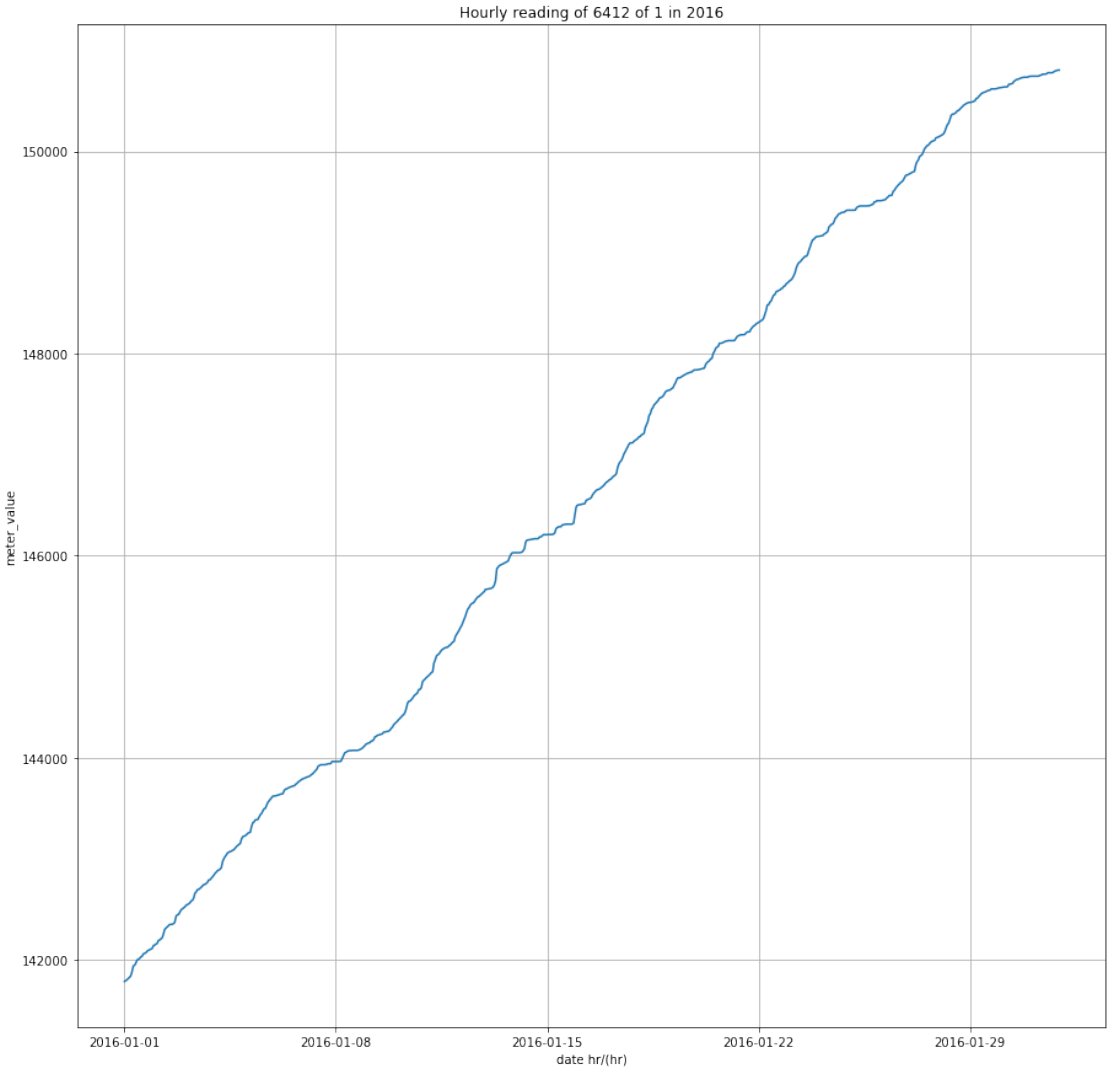

Hourly reading of 5810 of 1 in 2016
meter_value
110000
109000
108000
107000
106000
105000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

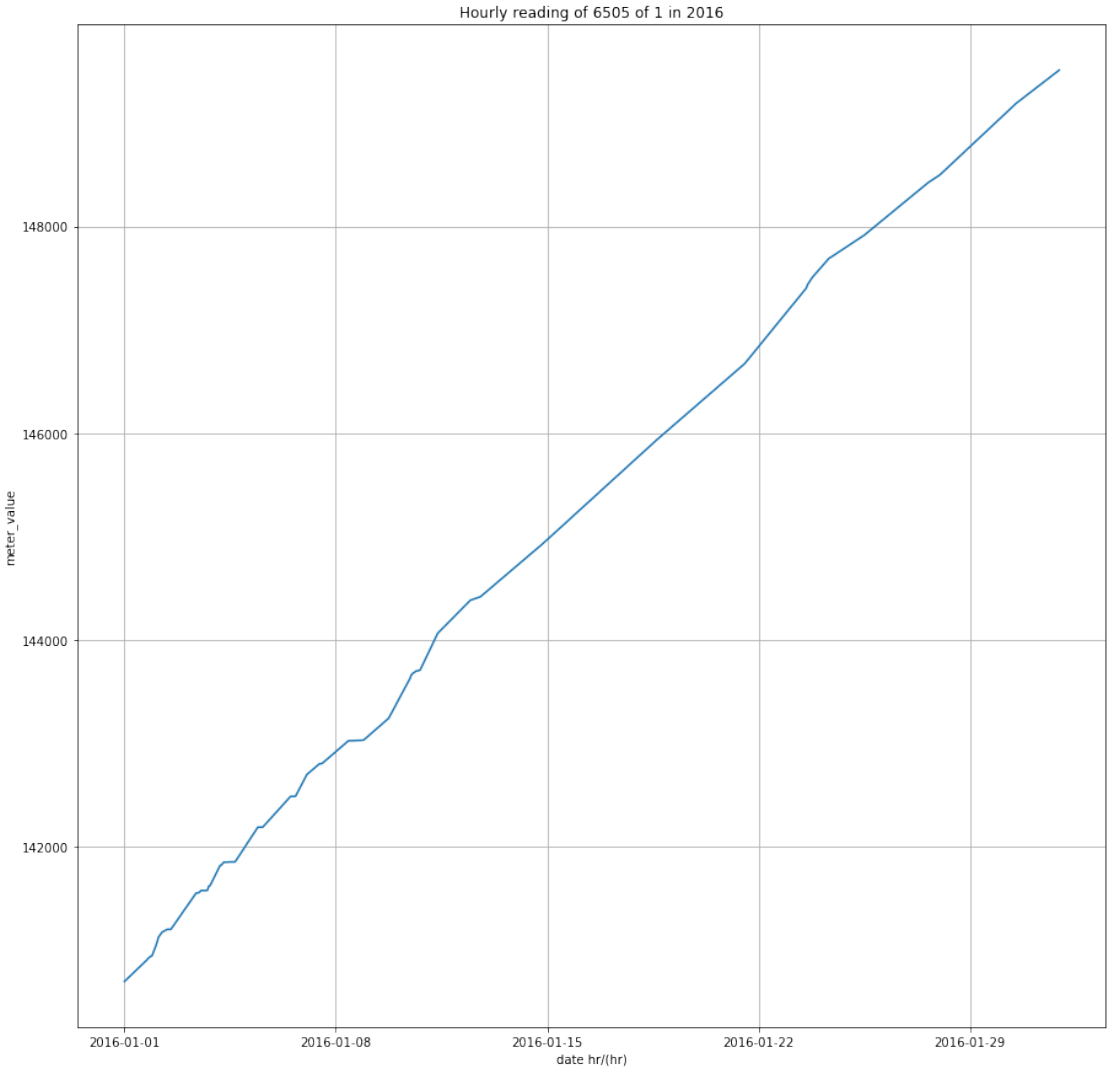

Hourly reading of 5814 of 1 in 2016
812000
811000
810000
809000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

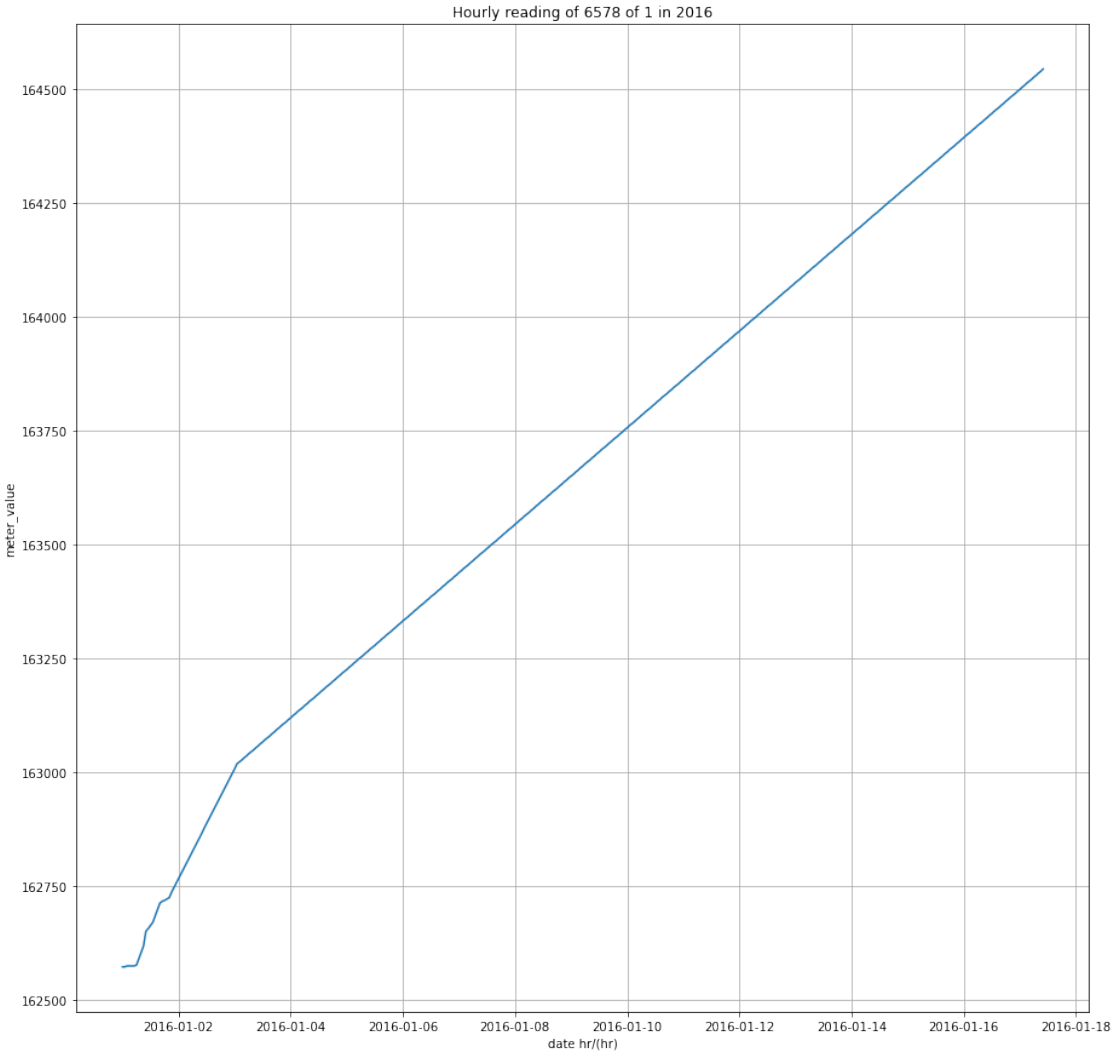

Hourly reading of 5892 of 1 in 2016
meter_value
279000
278000
277000
276000
275000
274000
273000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

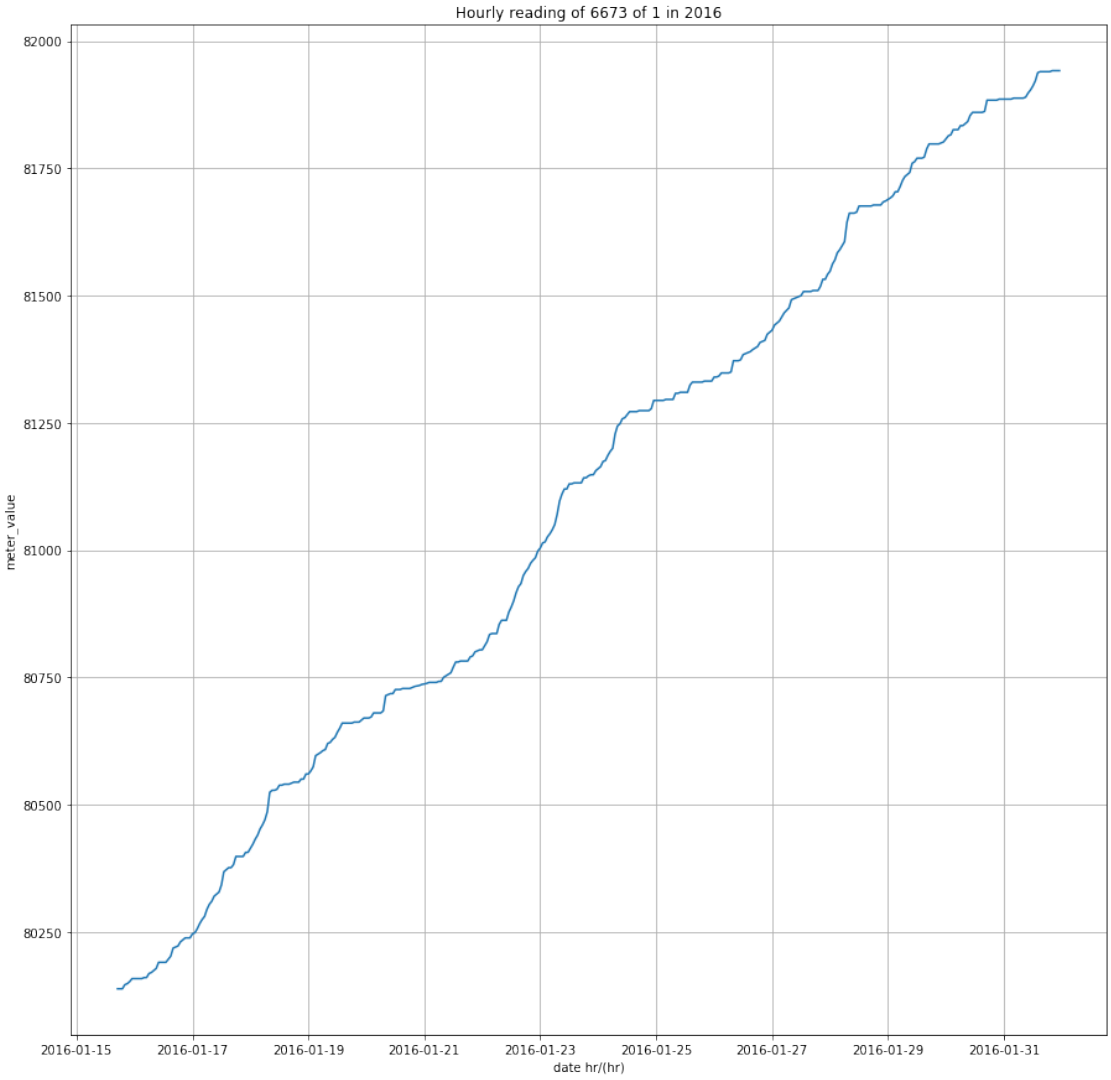

Hourly reading of 5972 of 1 in 2016
meter_value
308000
306000
304000
302000
300000
298000
296000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

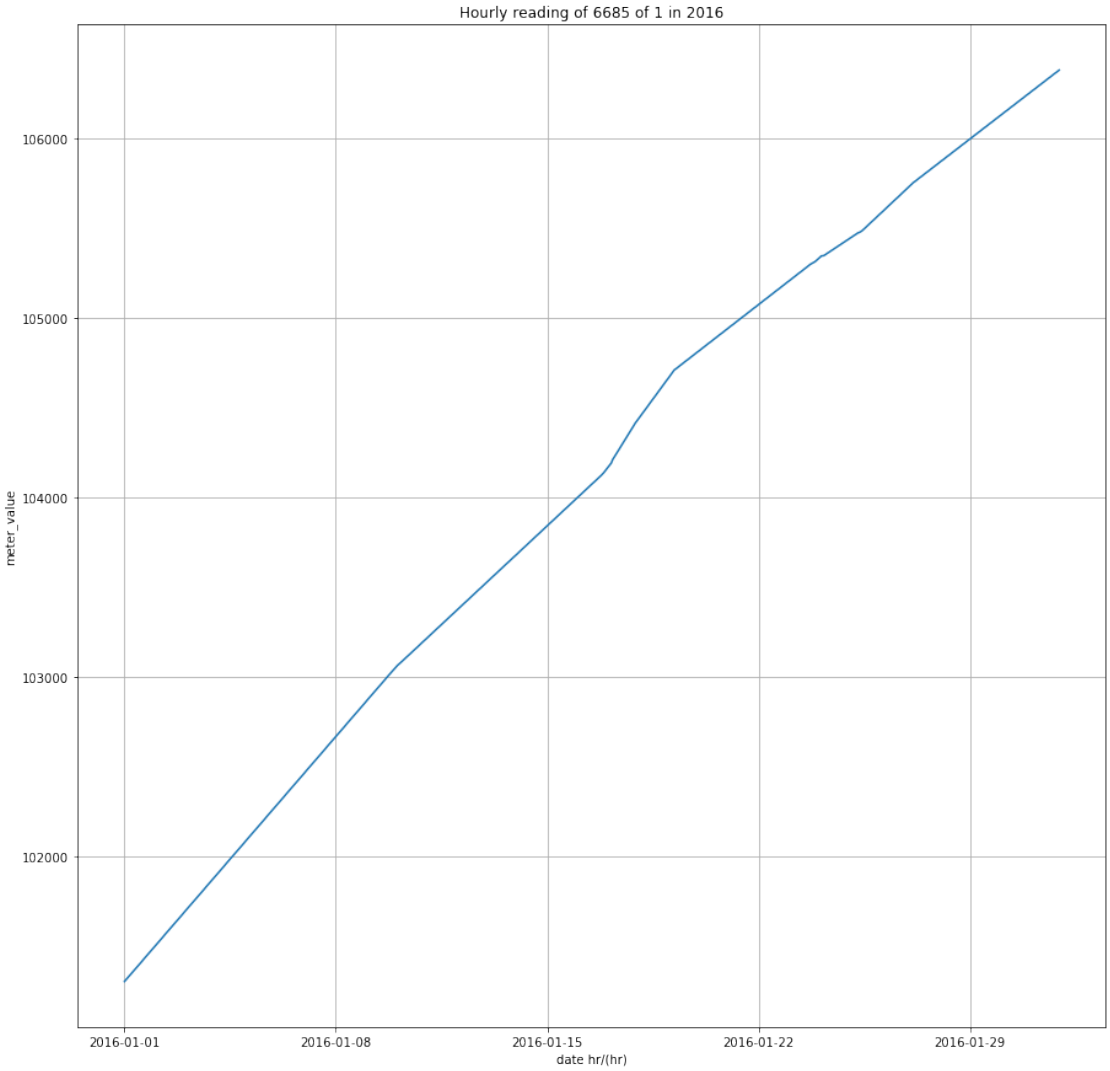

Hourly reading of 6101 of 1 in 2016
116200
116000
115800
115600
115400
115200
115000
114800
meter_value
2016-01-21
2016-01-22
2016-01-23
2016-01-24
2016-01-25
2016-01-26
2016-01-27
2016-01-28
date hr/(hr)

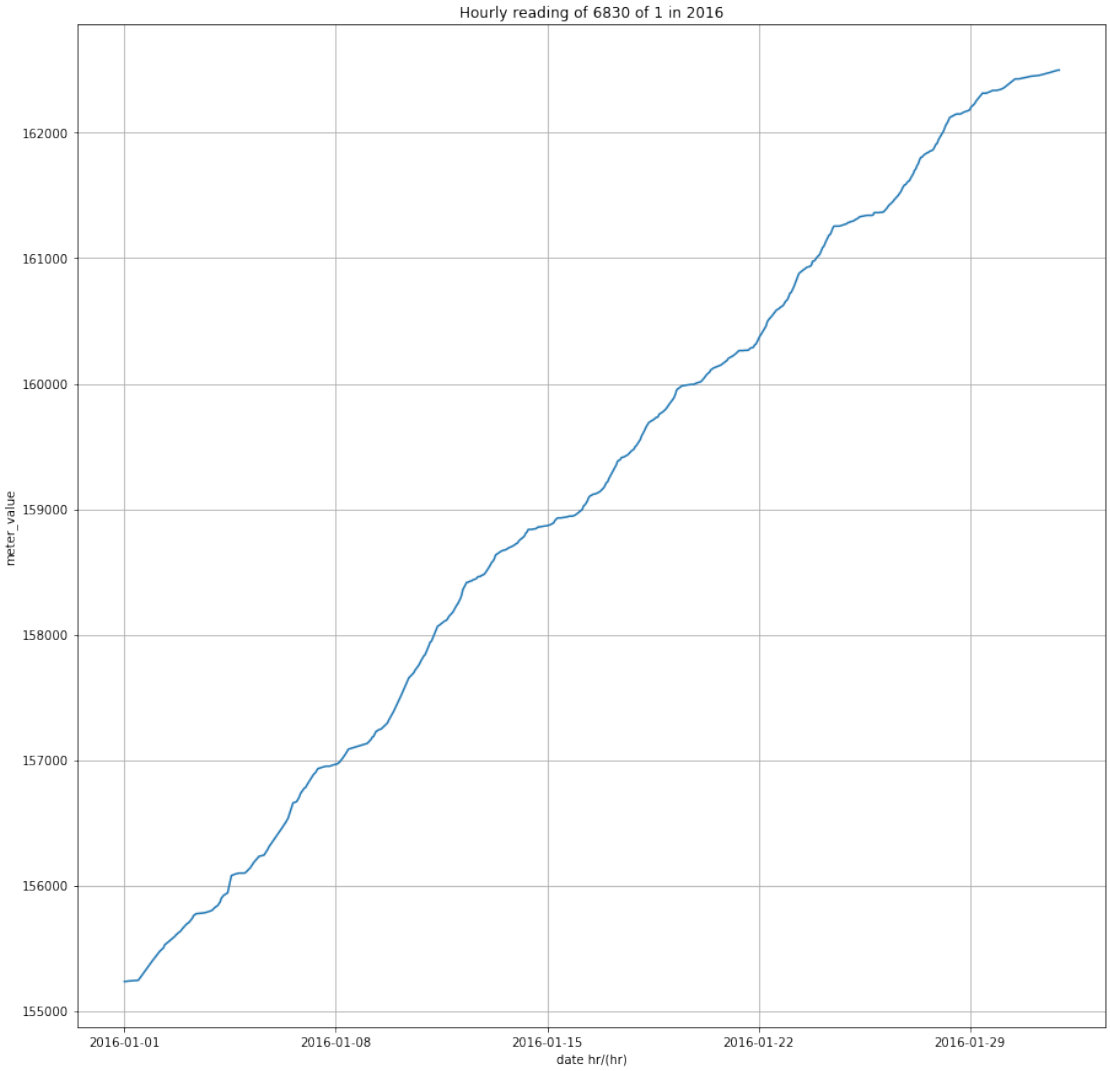

Hourly reading of 6412 of 1 in 2016
150000
148000
146000
144000
142000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

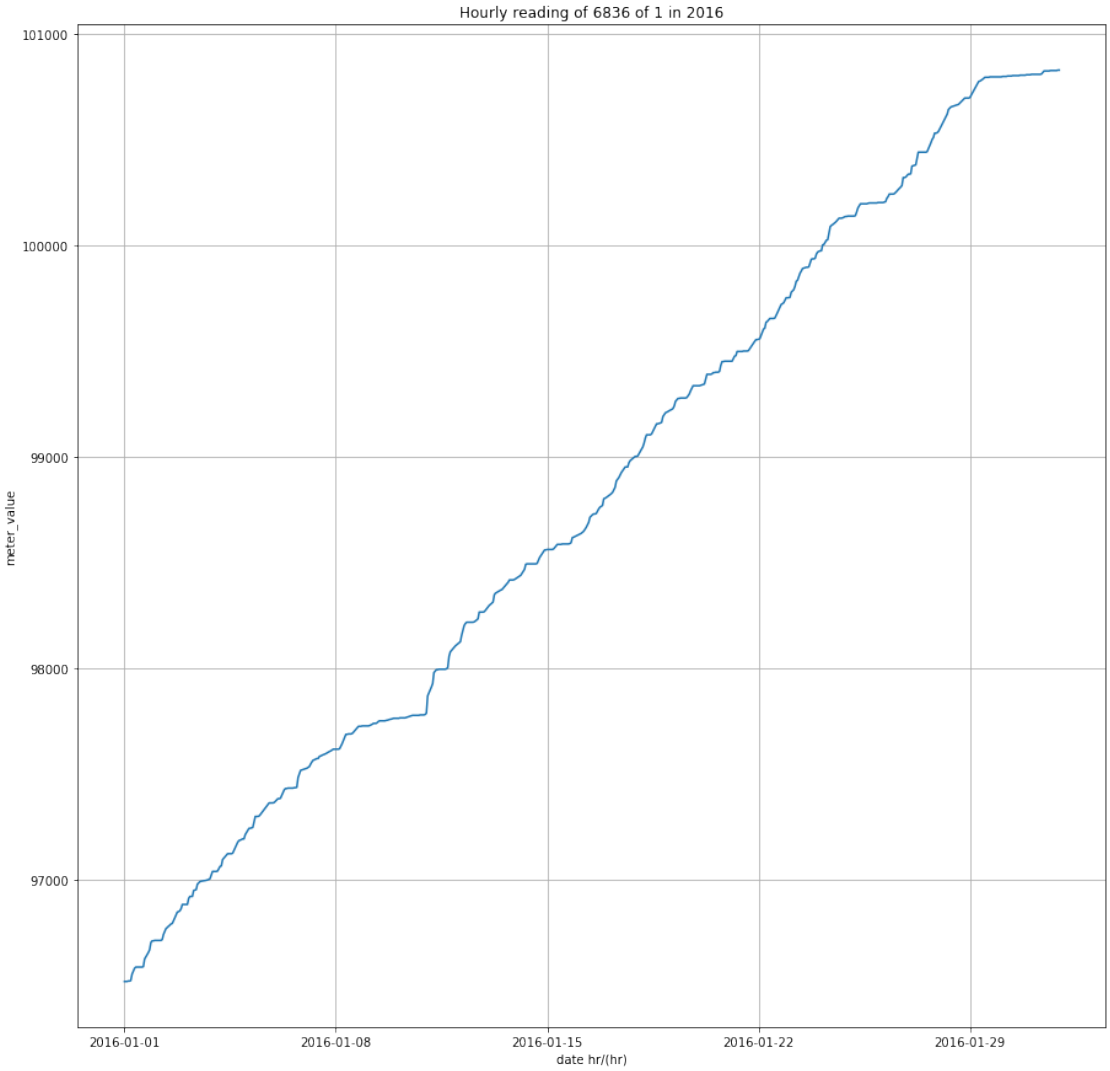

Hourly reading of 6505 of 1 in 2016
148000
146000
144000
142000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

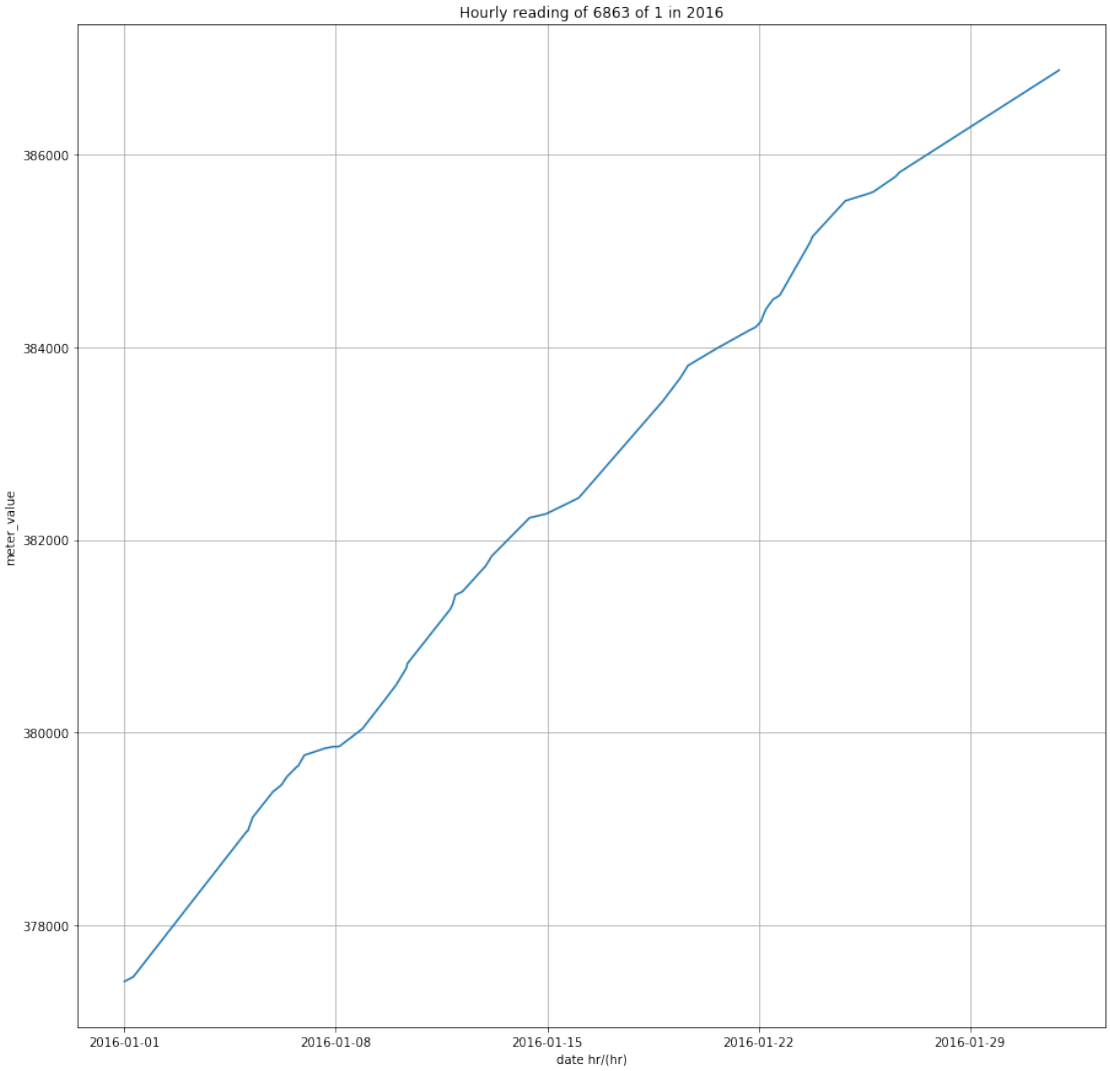

Hourly reading of 6578 of 1 in 2016
meter_value
164500
164250
164000
163750
163500
163250
163000
162750
162500
2016-01-02
2016-01-04
2016-01-06
2016-01-08
2016-01-10
2016-01-12
2016-01-14
2016-01-16
2016-01-18
date hr/(hr)

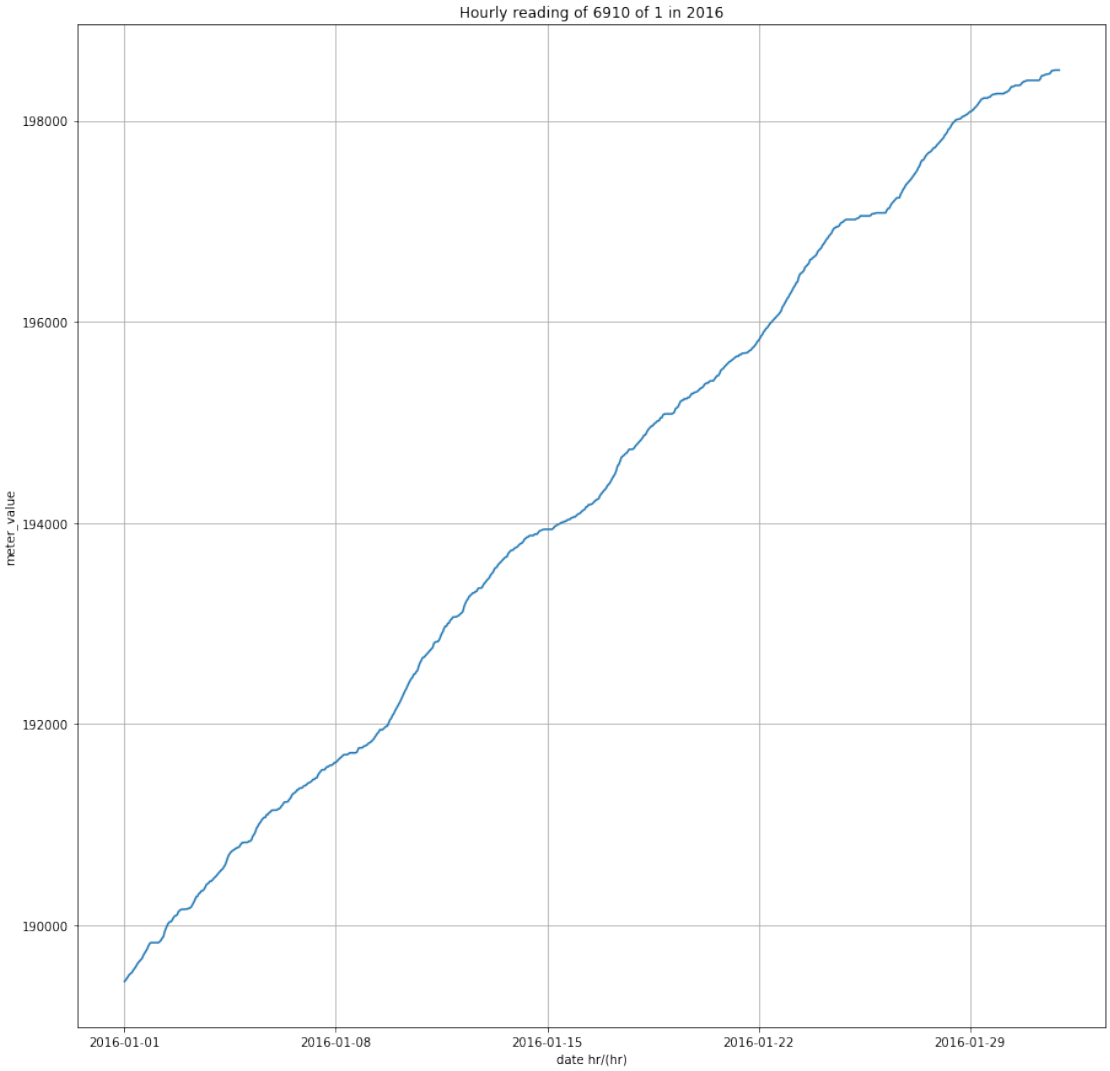

Hourly reading of 6673 of 1 in 2016
meter_value
82000
81750
81500
81250
81000
80750
80500
80250
2016-01-15
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
2016-01-31
date hr/(hr)

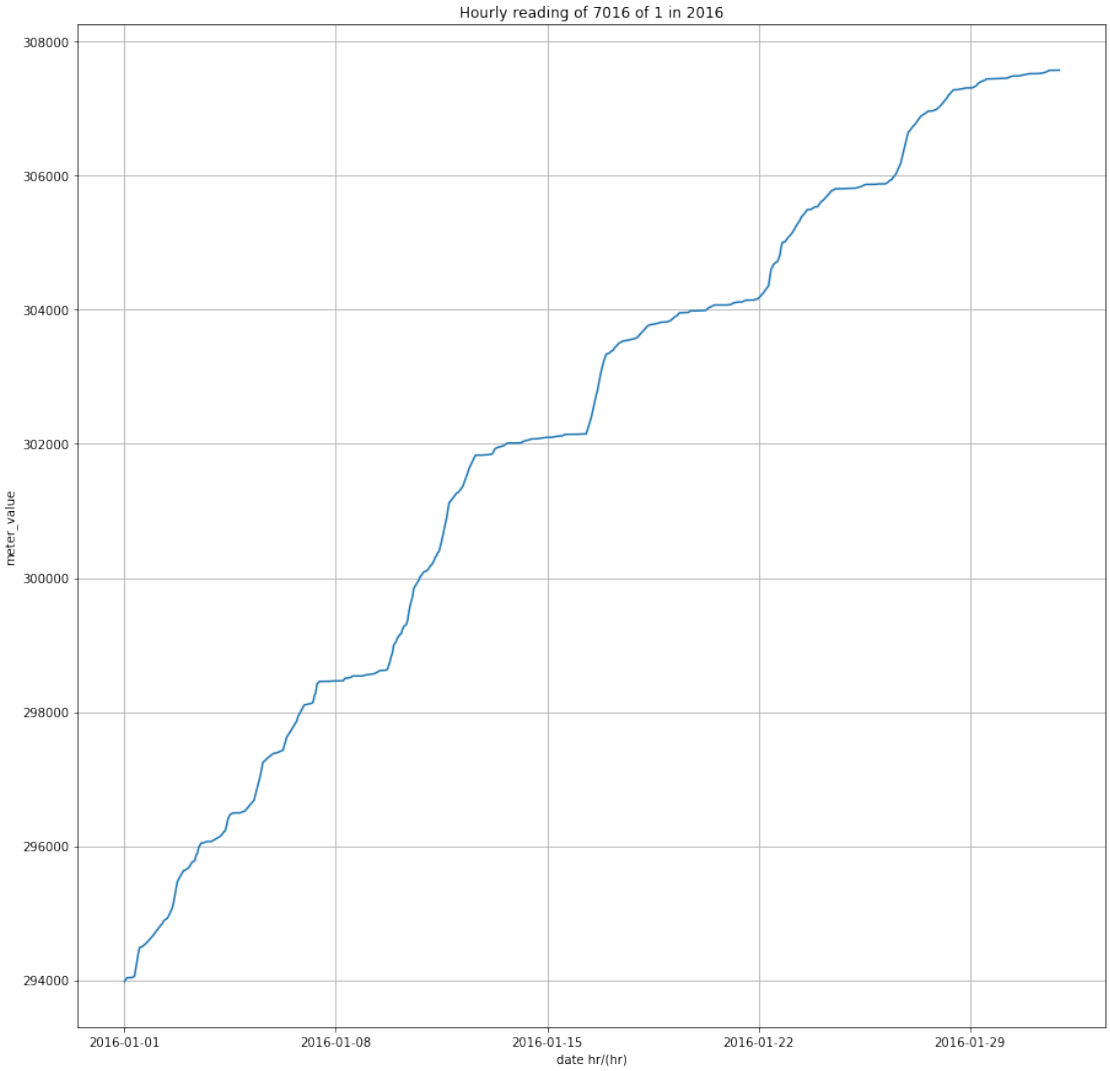

Hourly reading of 6685 of 1 in 2016
meter_value
106000
105000
104000
103000
102000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

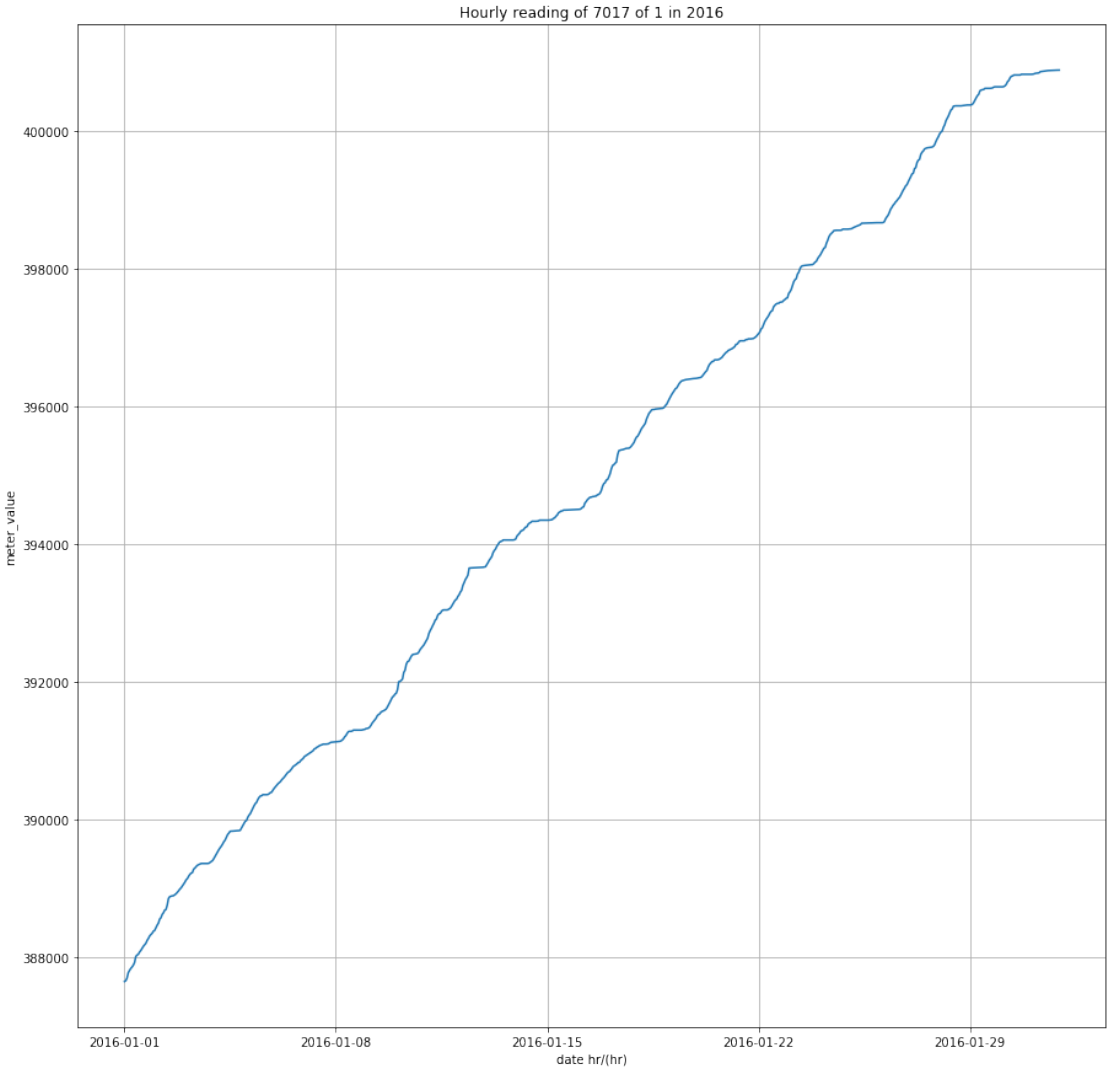

Hourly reading of 6830 of 1 in 2016
meter_value
162000
161000
160000
159000
158000
157000
156000
155000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

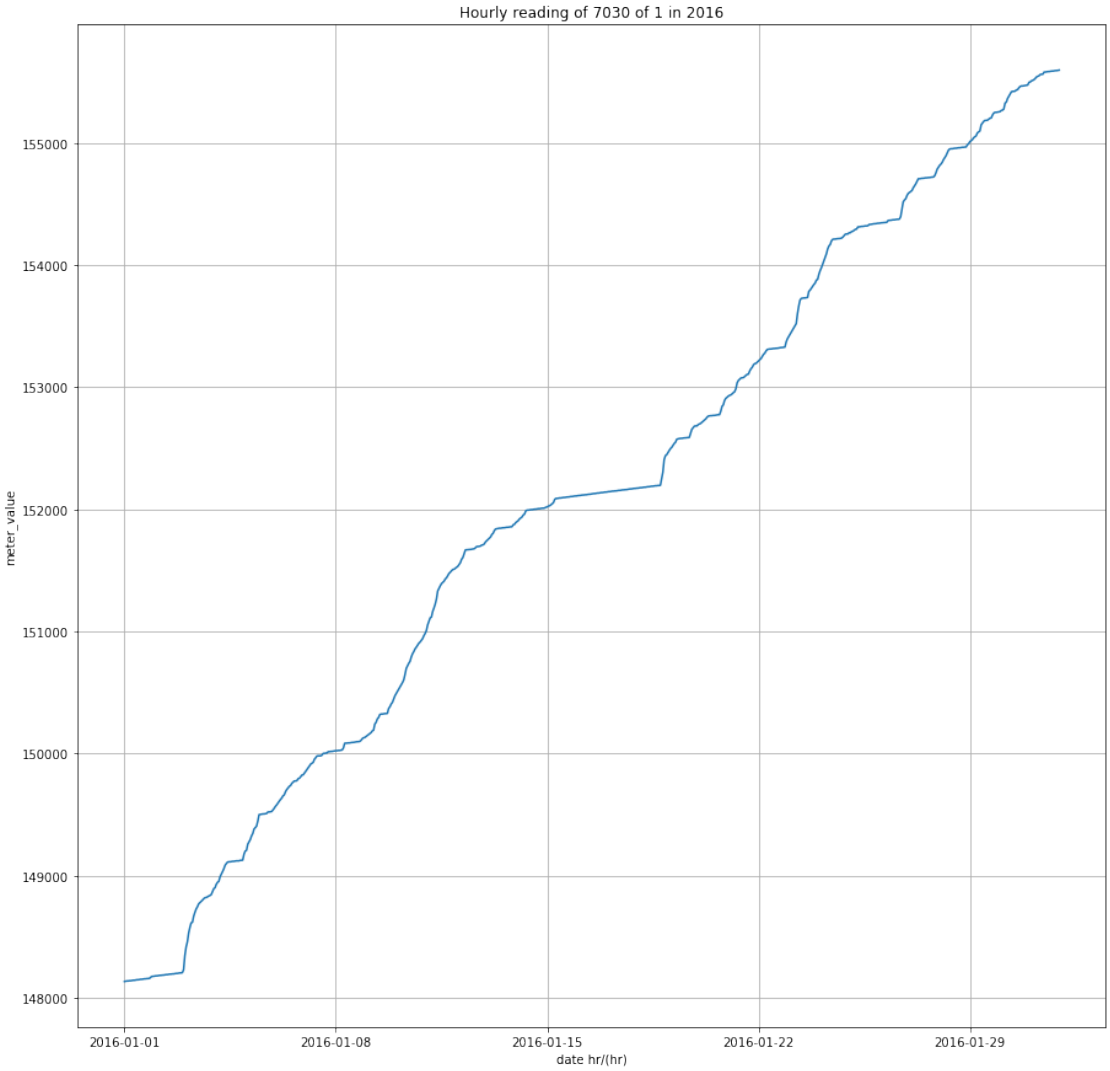

Hourly reading of 6836 of 1 in 2016
101000
100000
99000
98000
97000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

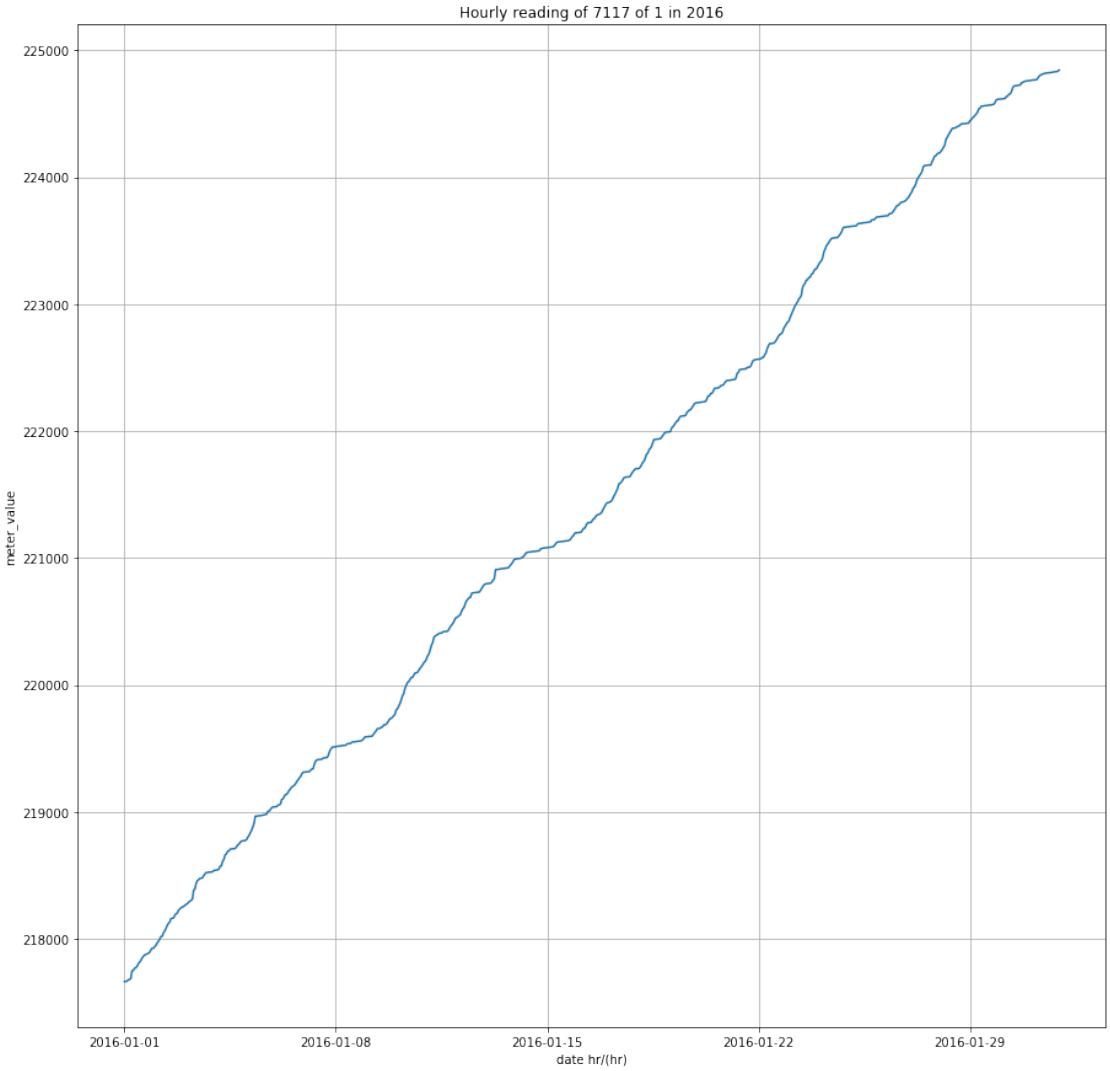

Hourly reading of 6863 of 1 in 2016
386000
384000
382000
380000
378000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

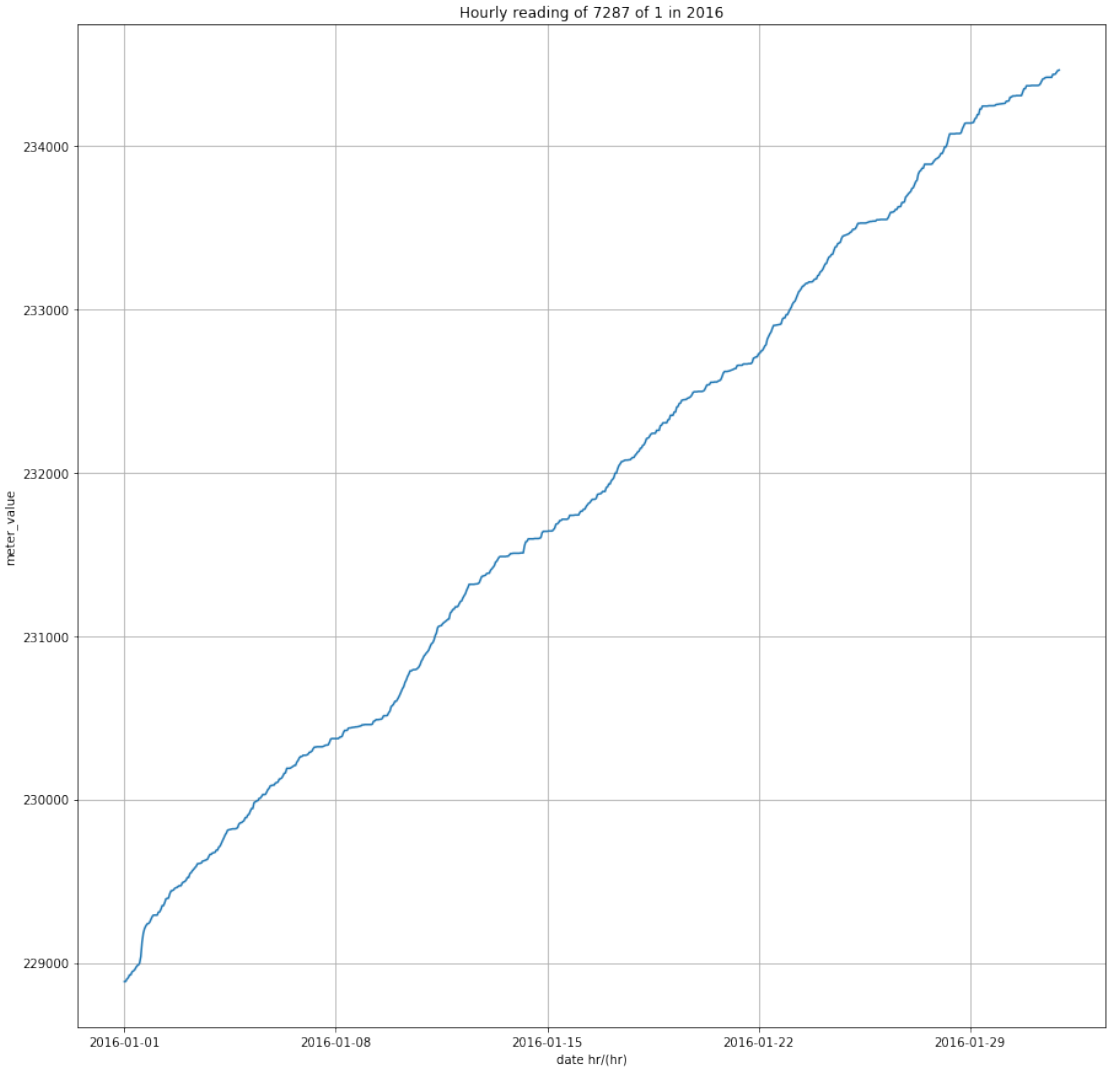

Hourly reading of 6910 of 1 in 2016
198000
196000
194000
192000
190000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

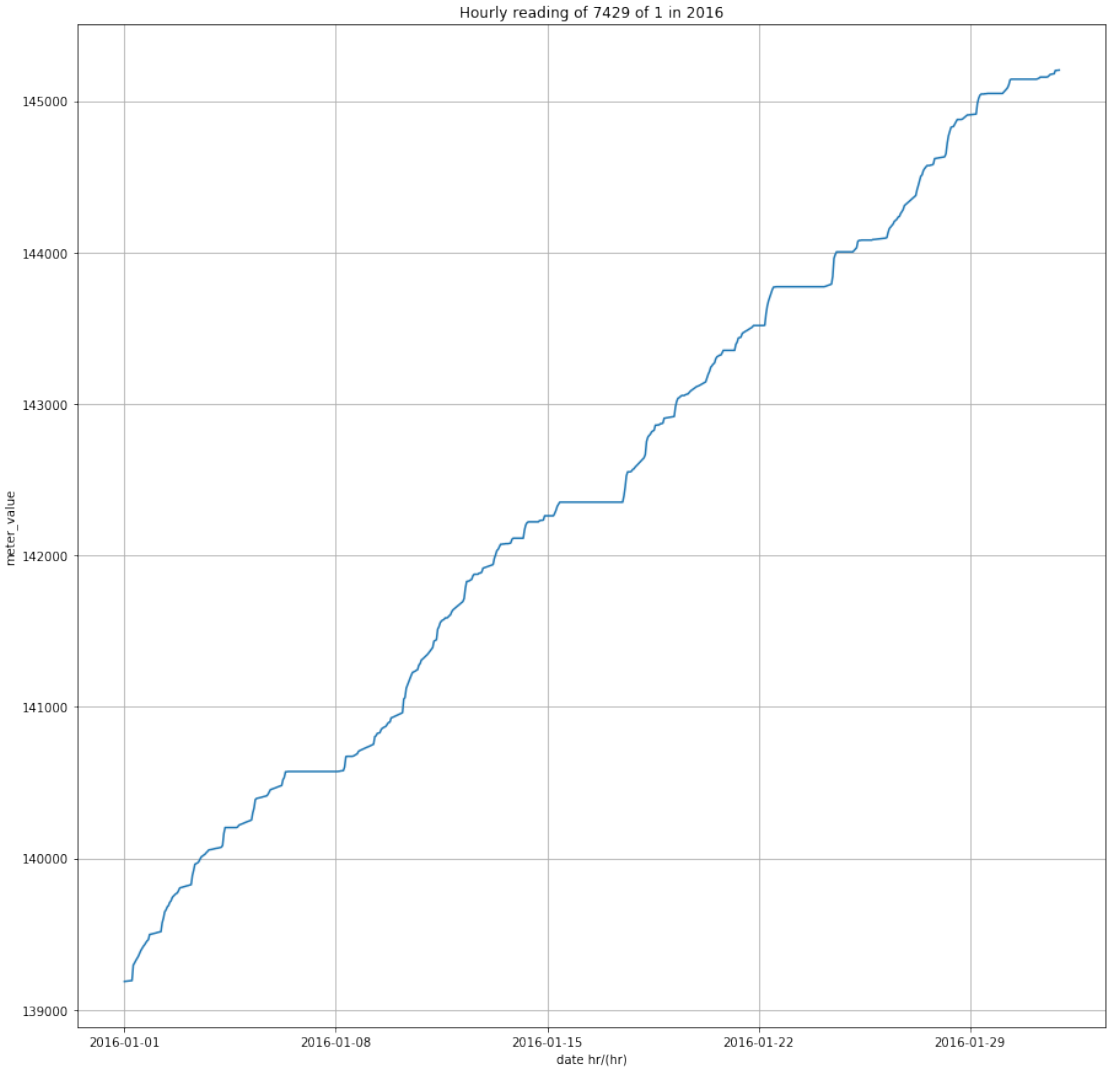

Hourly reading of 7016 of 1 in 2016
meter_value
308000
306000
304000
302000
300000
298000
296000
294000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

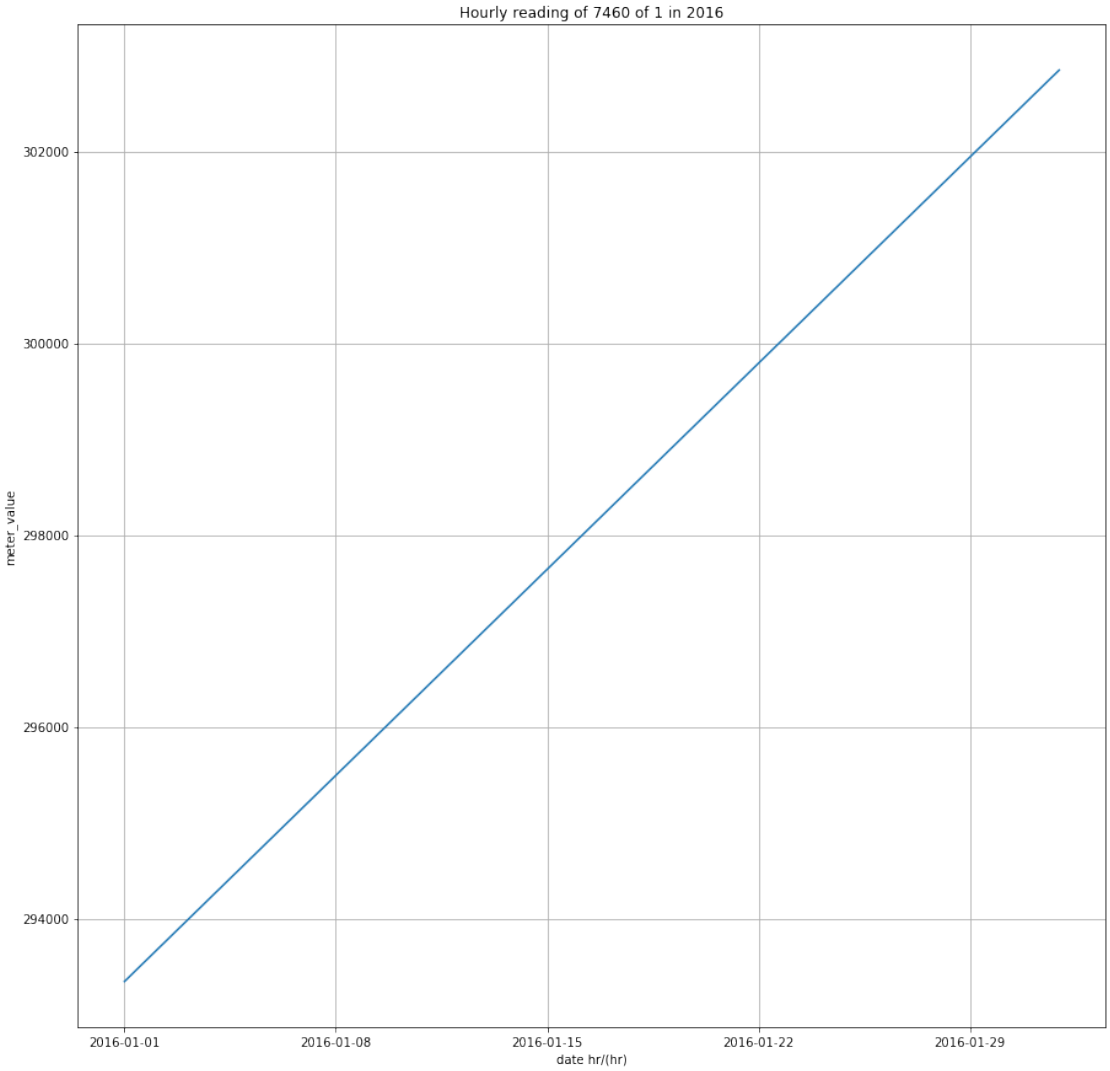

Hourly reading of 7017 of 1 in 2016
meter_value
400000
398000
396000
394000
392000
390000
388000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

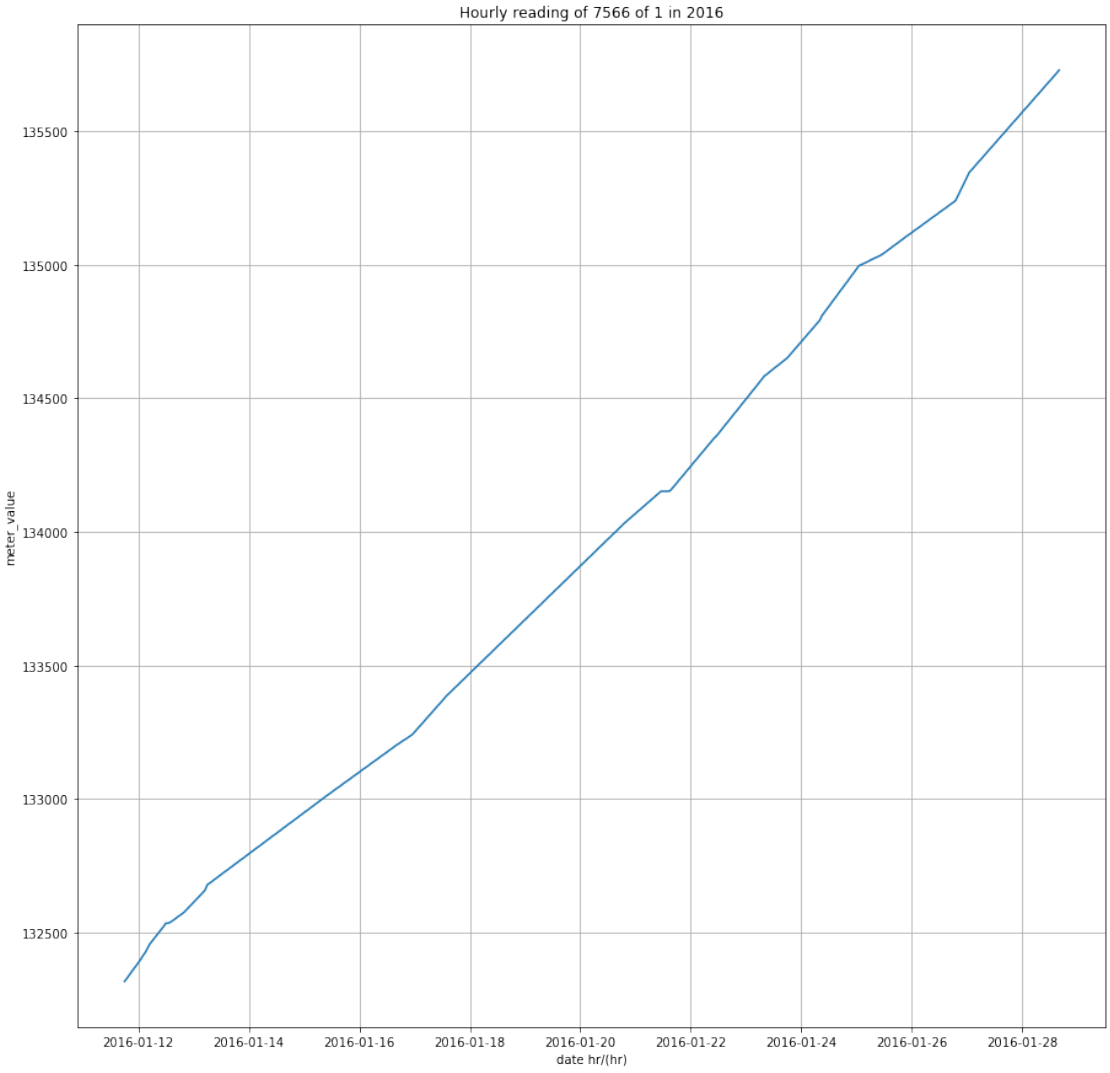

Hourly reading of 7030 of 1 in 2016
meter_value
155000
154000
153000
152000
151000
150000
149000
148000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

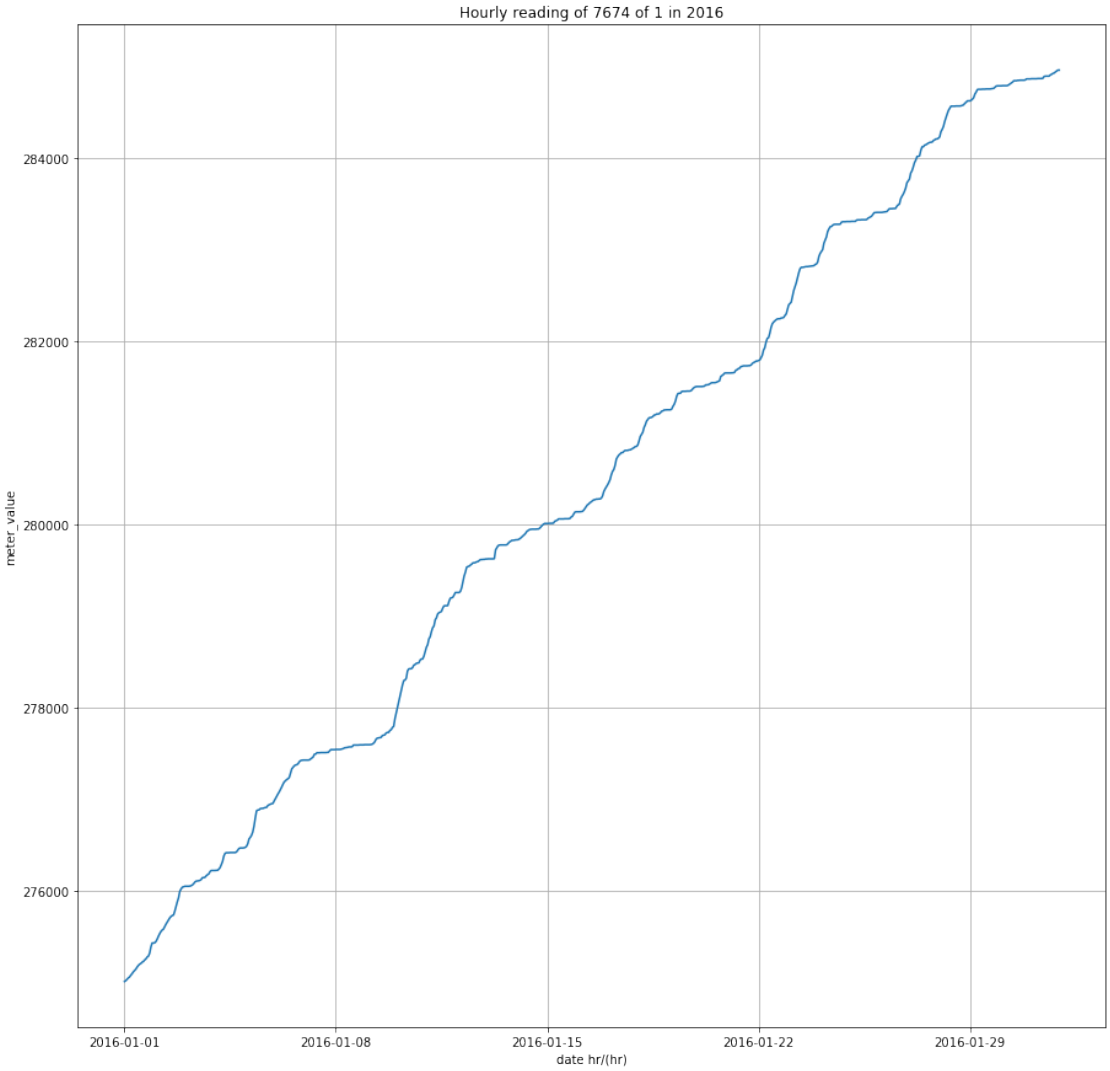

Hourly reading of 7117 of 1 in 2016
meter_value
225000
224000
223000
222000
221000
220000
219000
218000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

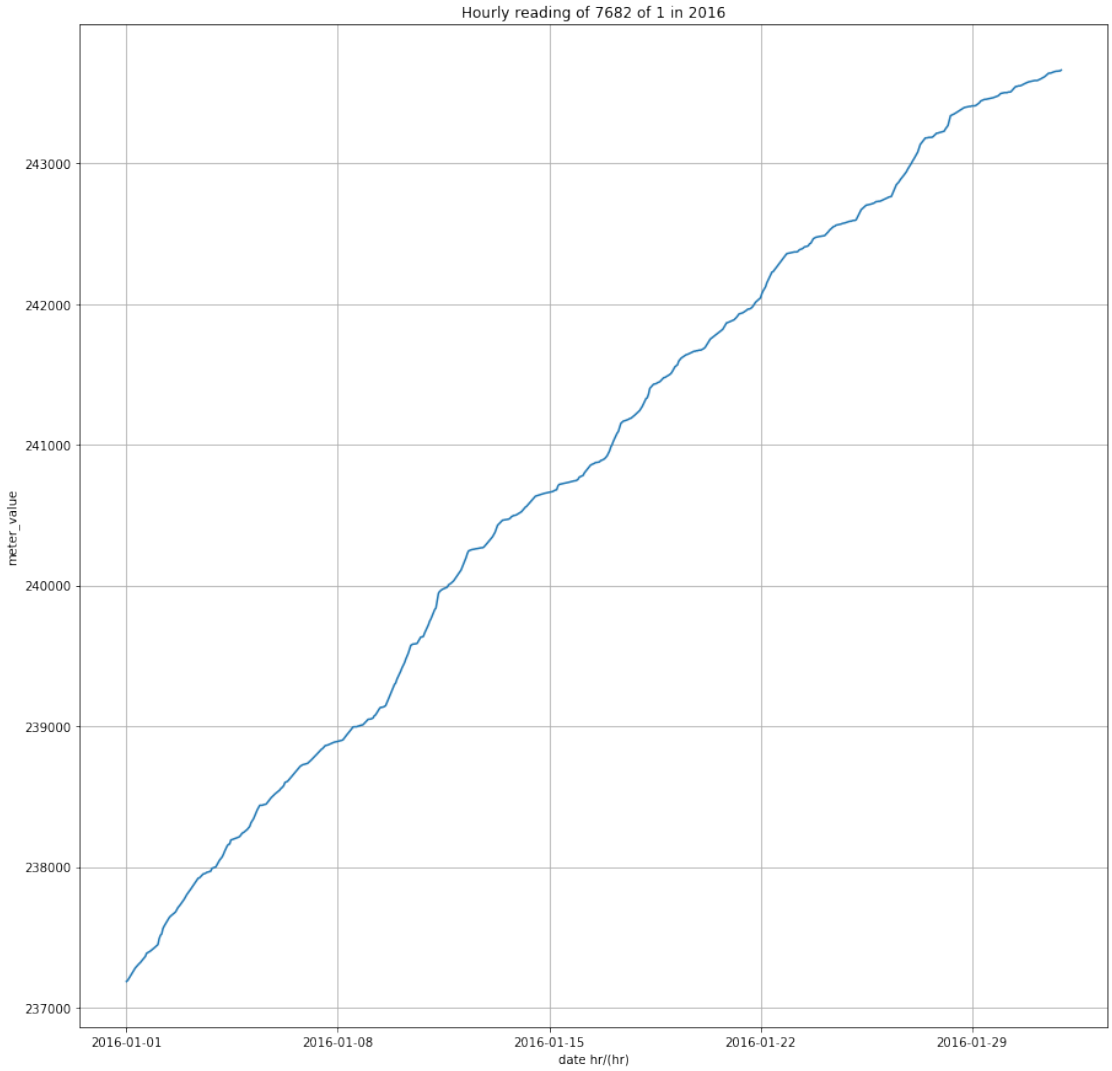

Hourly reading of 7287 of 1 in 2016
meter_value
234000
233000
232000
231000
230000
229000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

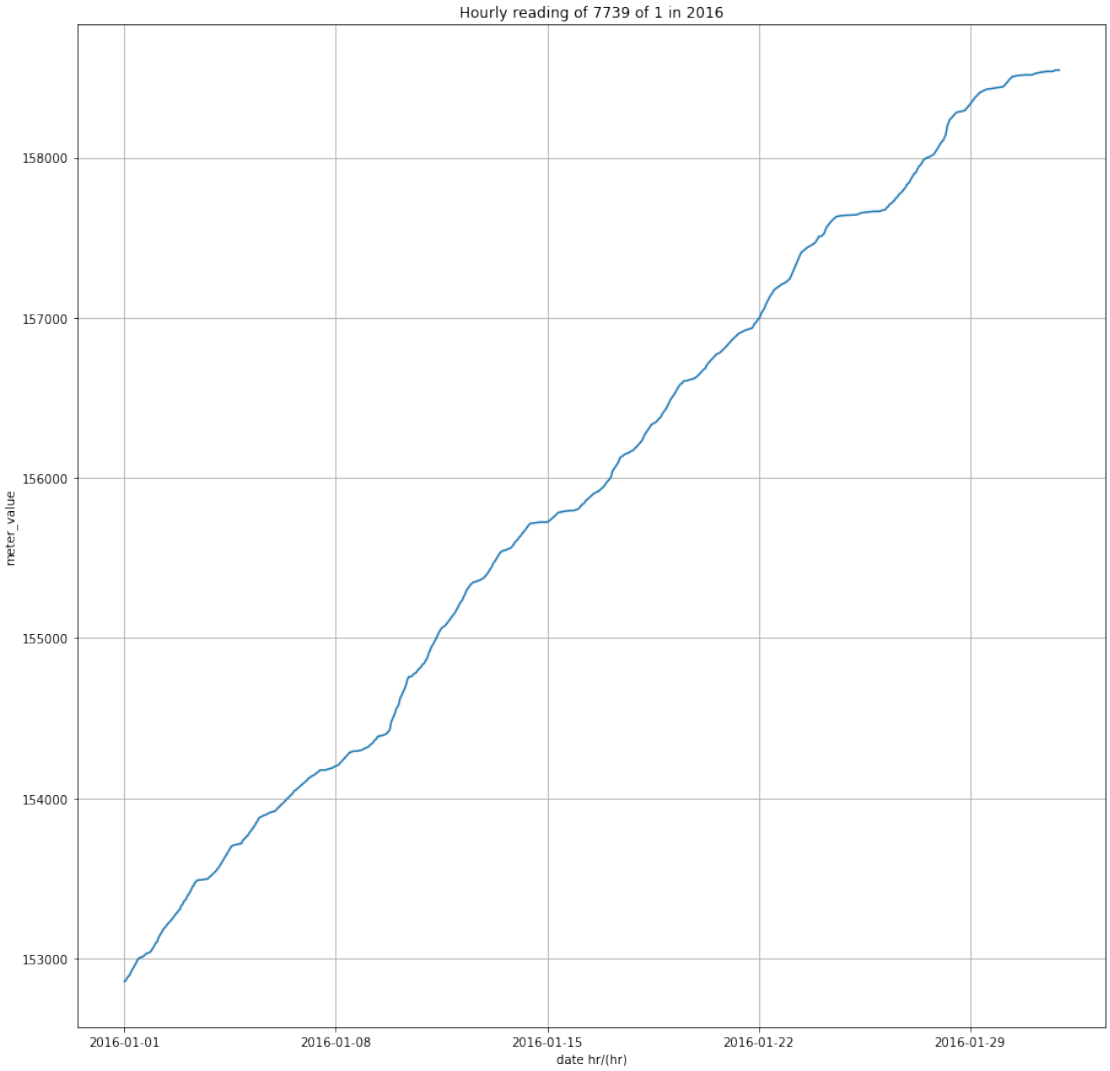

Hourly reading of 7429 of 1 in 2016
meter_value
145000
144000
143000
142000
141000
140000
139000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

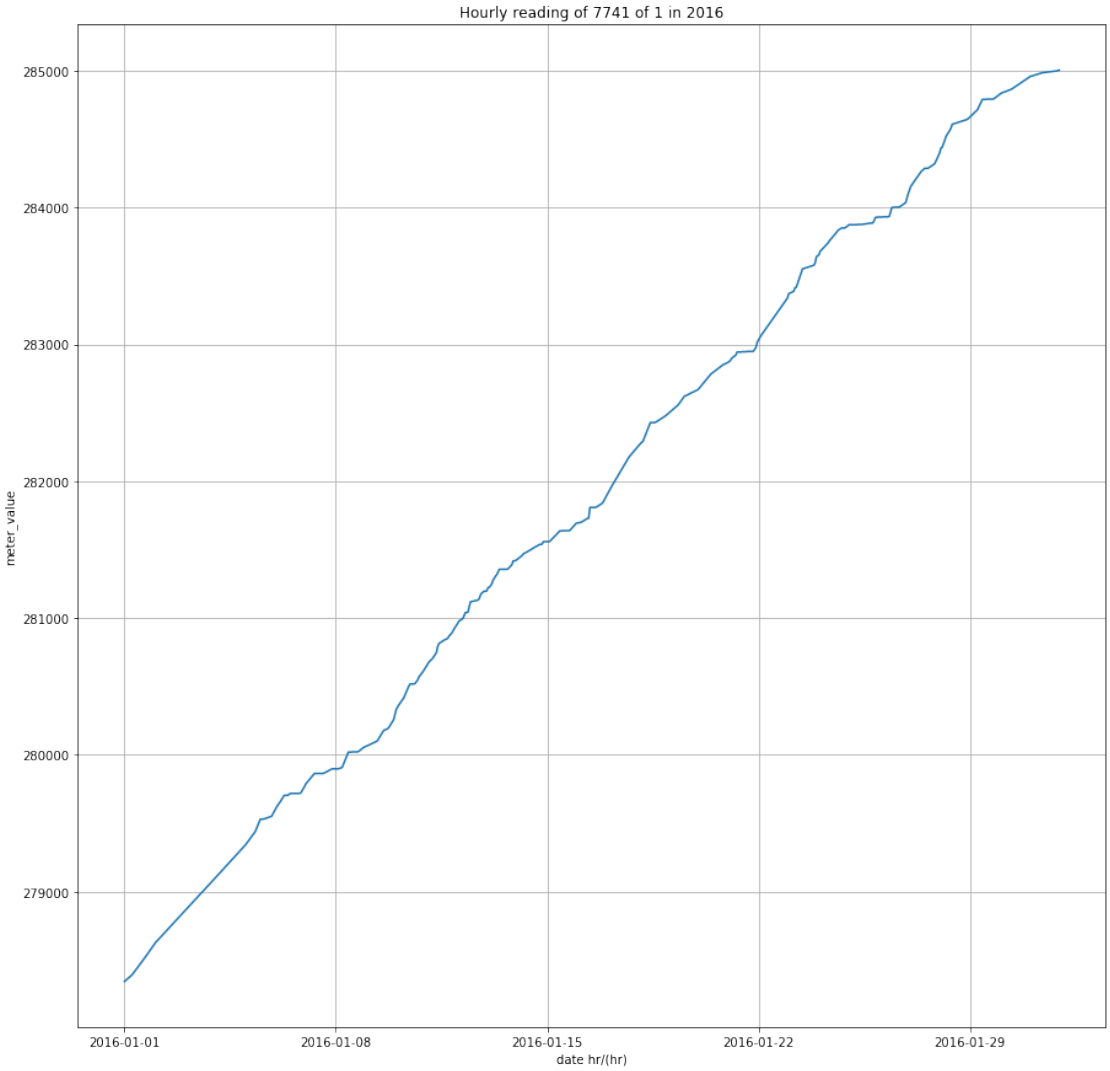

Hourly reading of 7460 of 1 in 2016
meter_value
302000
300000
298000
296000
294000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

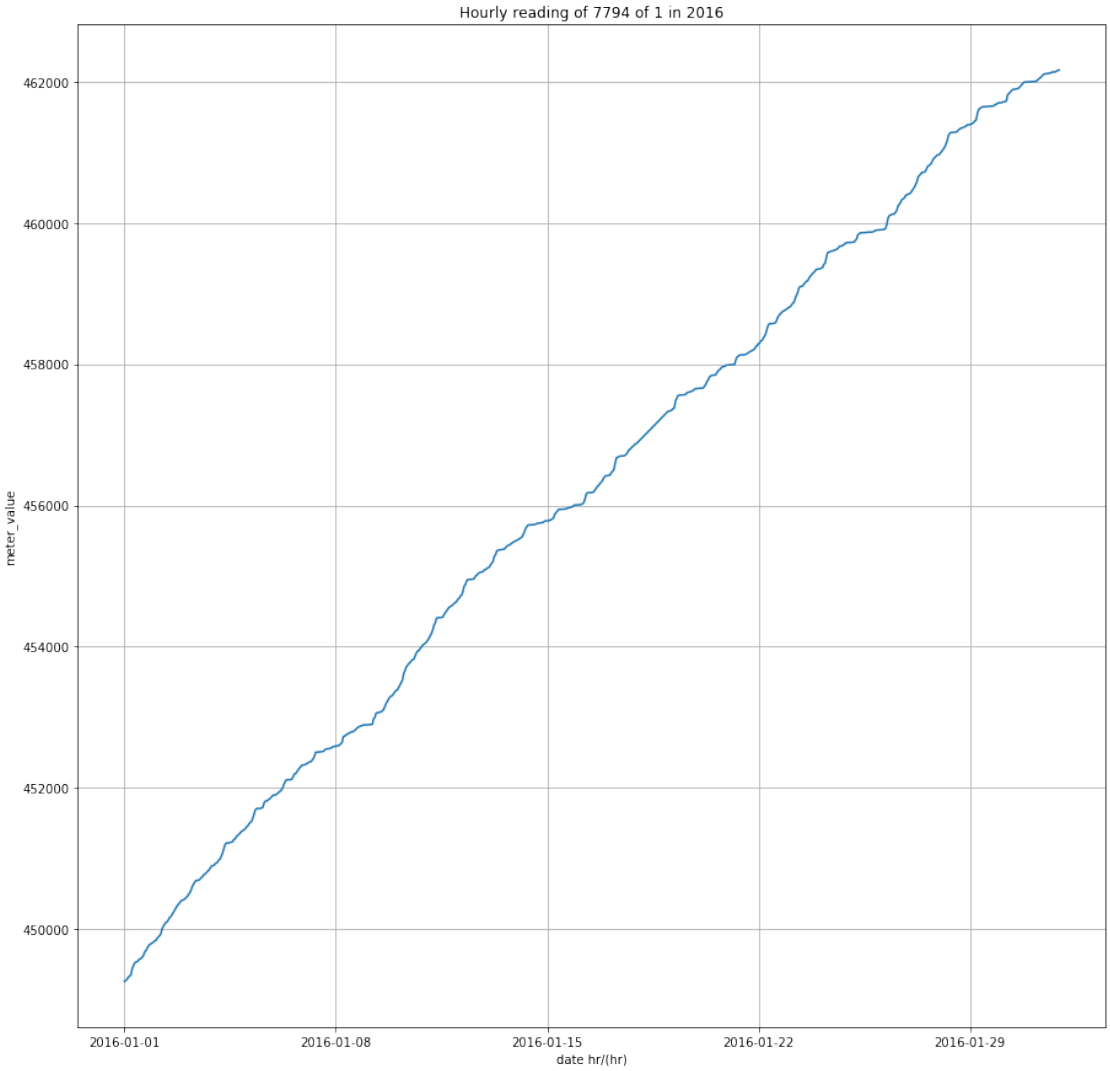

Hourly reading of 7566 of 1 in 2016
meter_value
135500
135000
134500
134000
133500
133000
132500
2016-01-12
2016-01-14
2016-01-16
2016-01-18
2016-01-20
2016-01-22
2016-01-24
2016-01-26
2016-01-28
date hr/(hr)

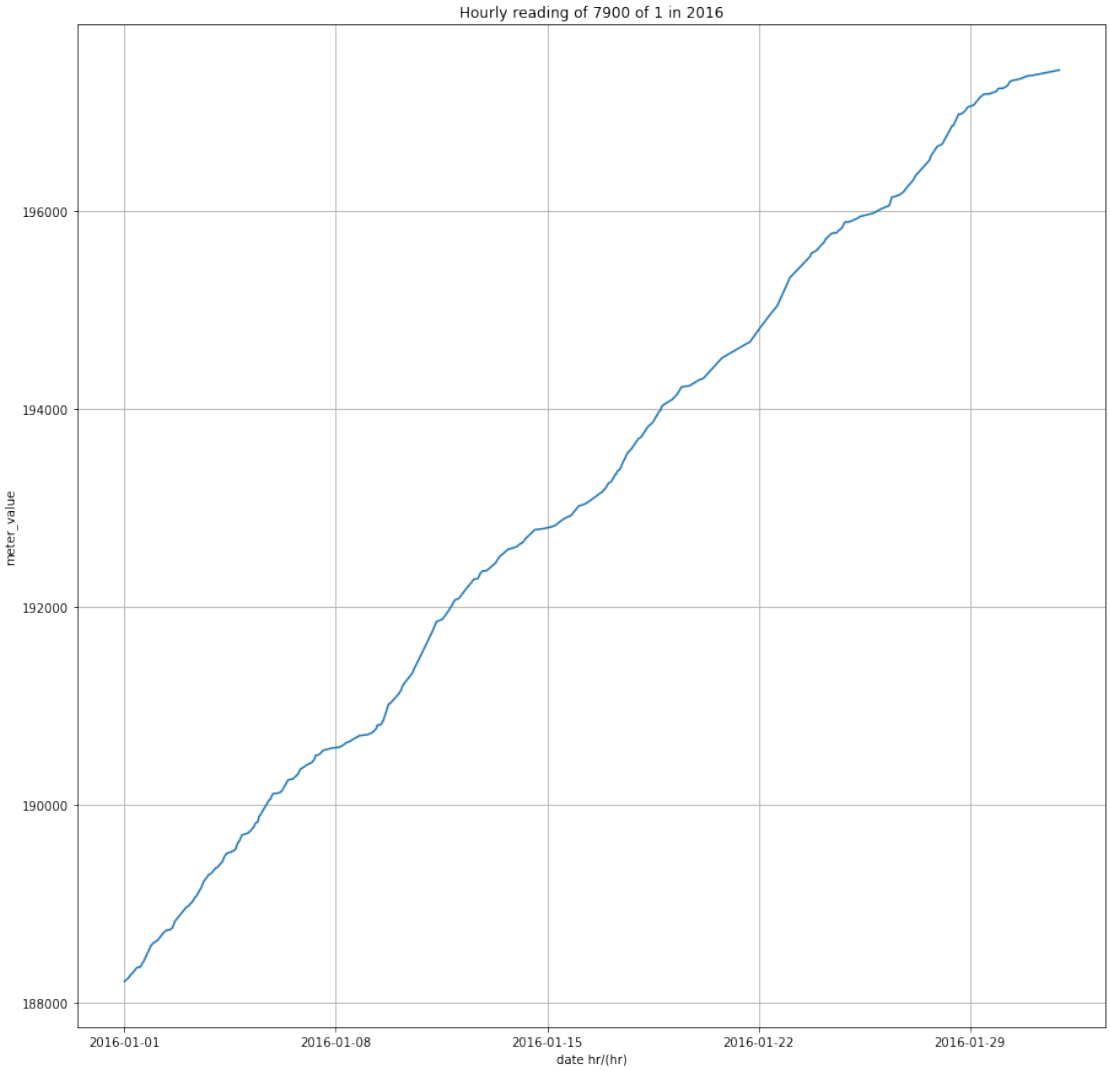

Hourly reading of 7674 of 1 in 2016
meter_value
284000
282000
280000
278000
276000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

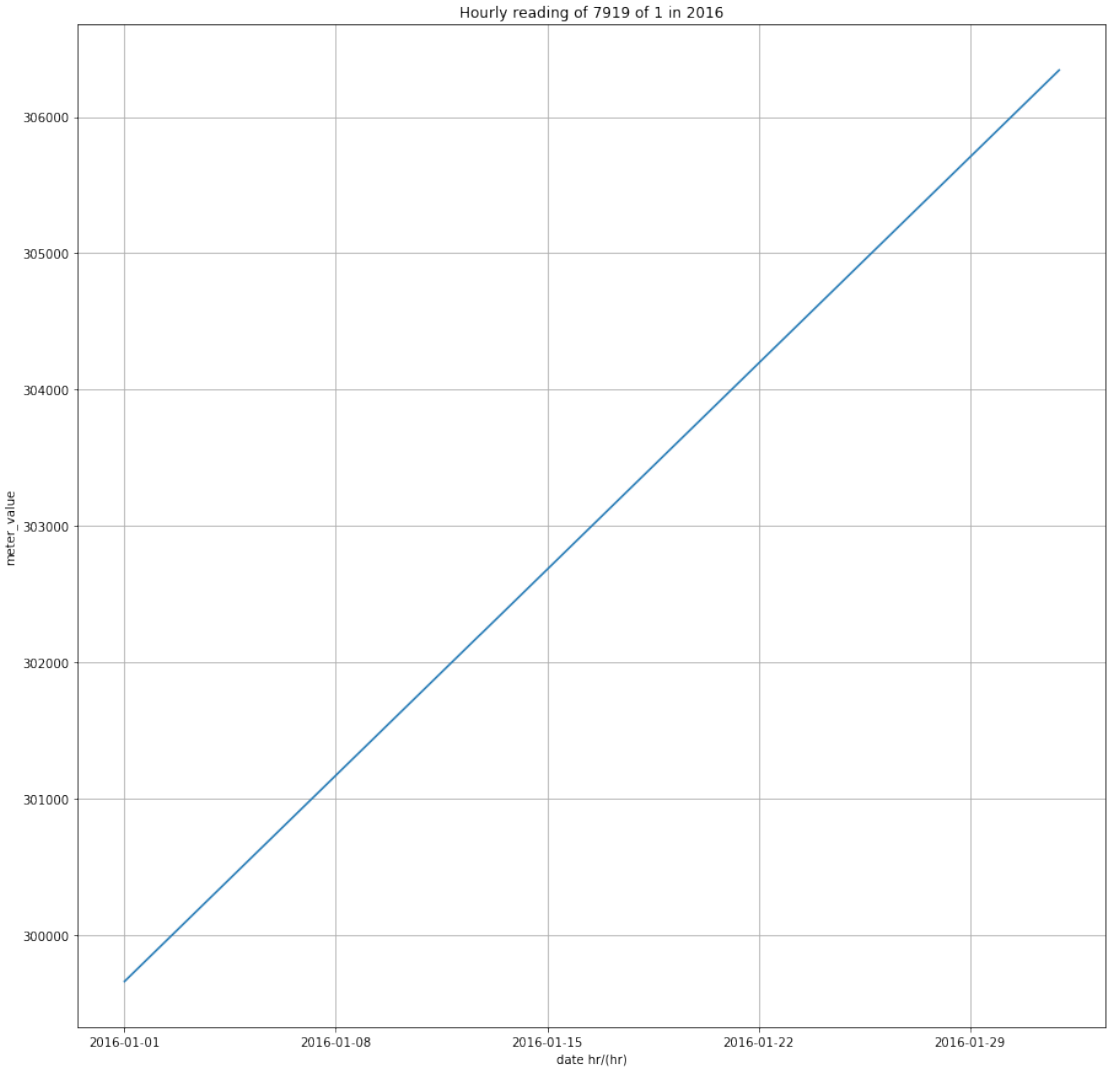

Hourly reading of 7682 of 1 in 2016
meter_value
243000
242000
241000
240000
239000
238000
237000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

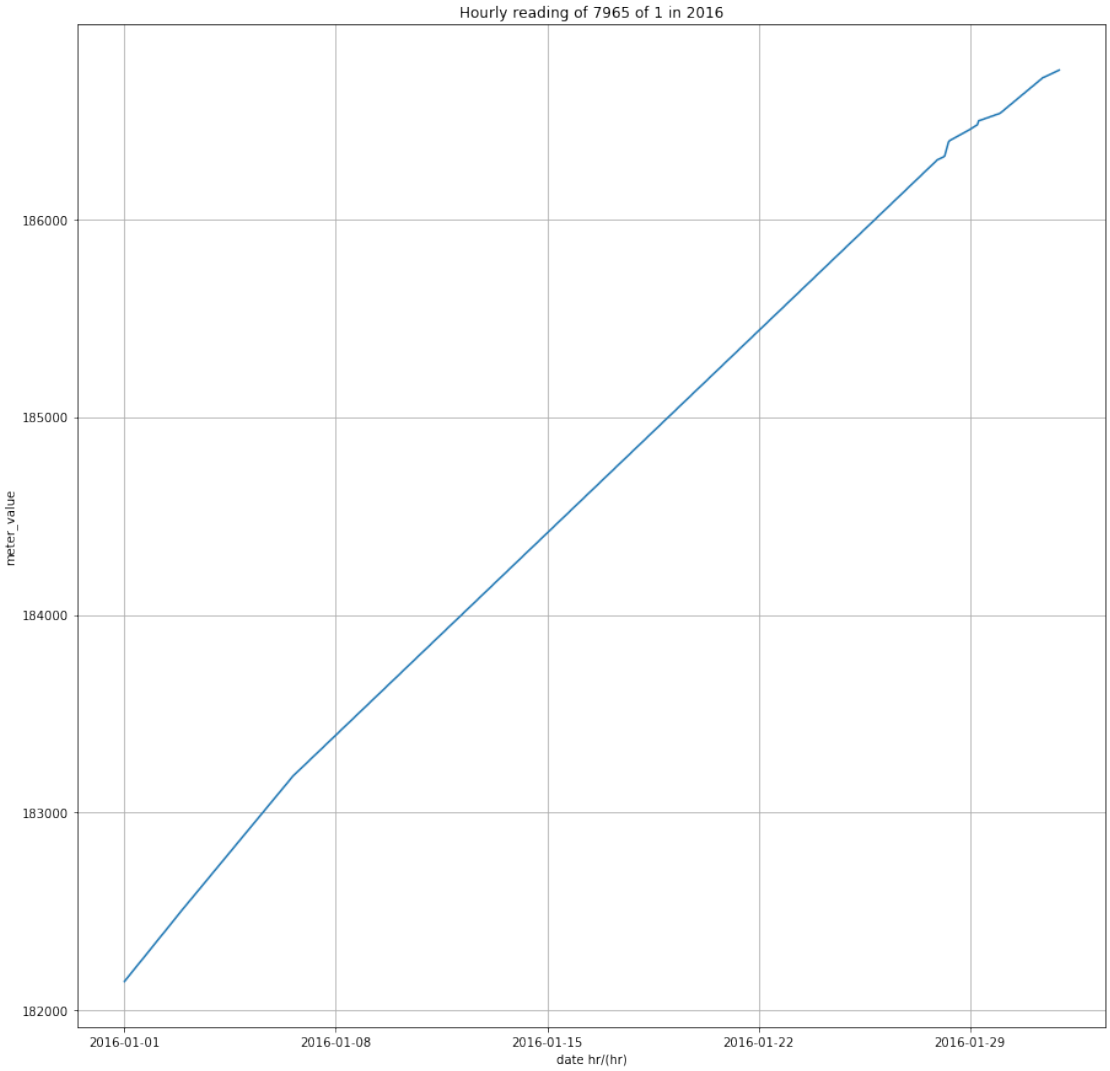

Hourly reading of 7739 of 1 in 2016
meter_value
158000
157000
156000
155000
154000
153000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

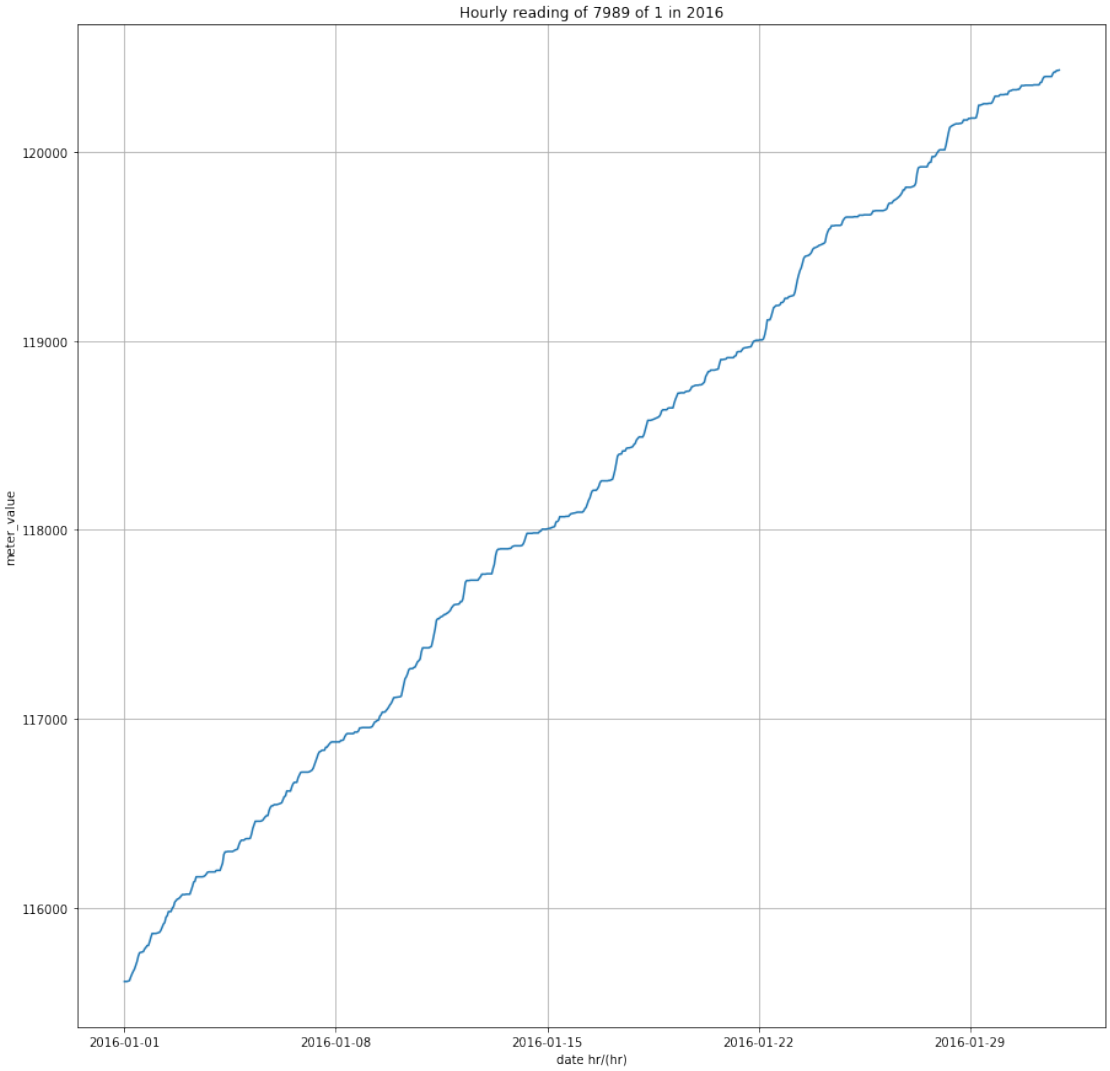

Hourly reading of 7741 of 1 in 2016
meter_value
285000
284000
283000
282000
281000
280000
279000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

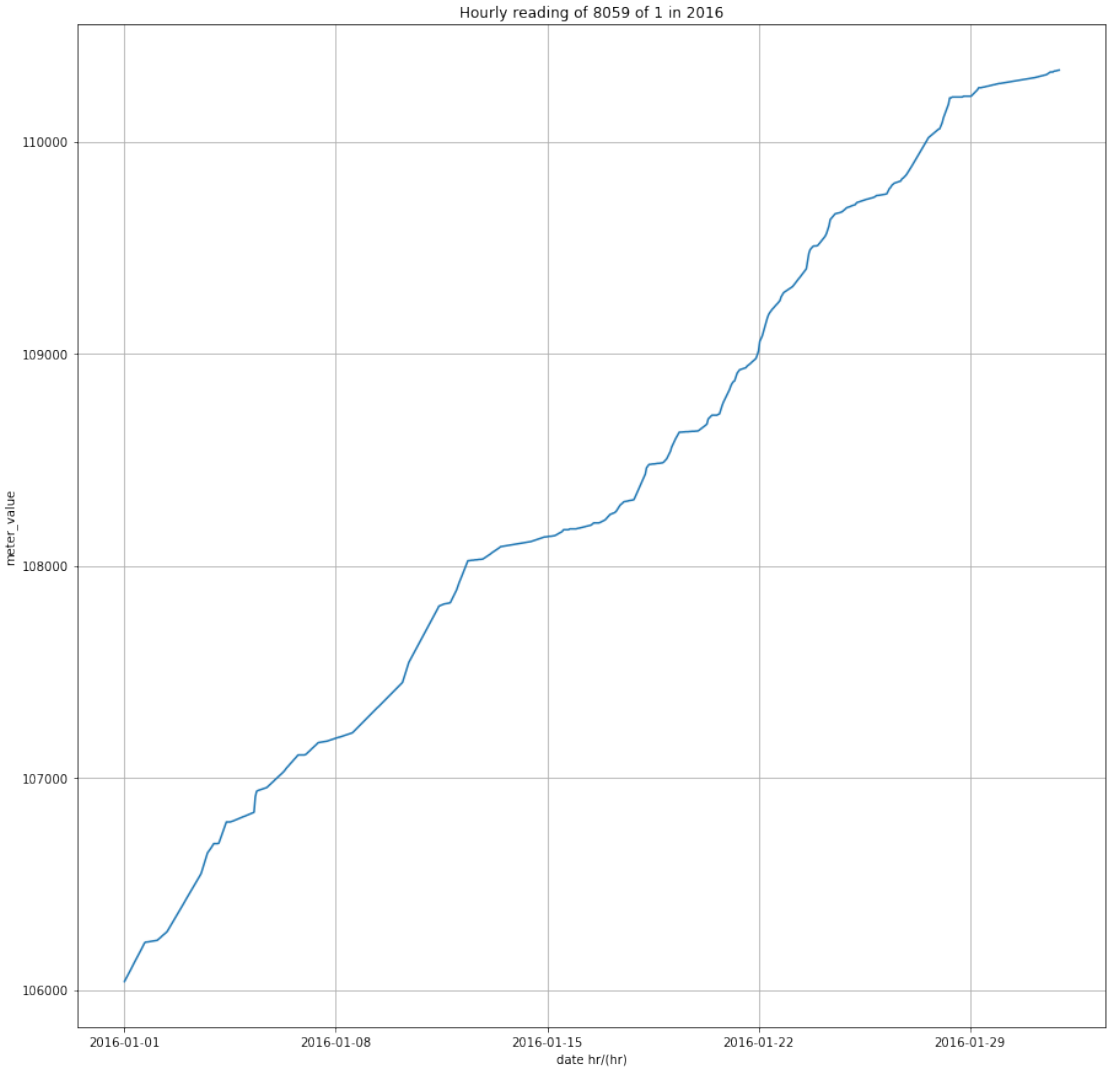

Hourly reading of 7794 of 1 in 2016
462000
460000
458000
456000
454000
452000
450000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

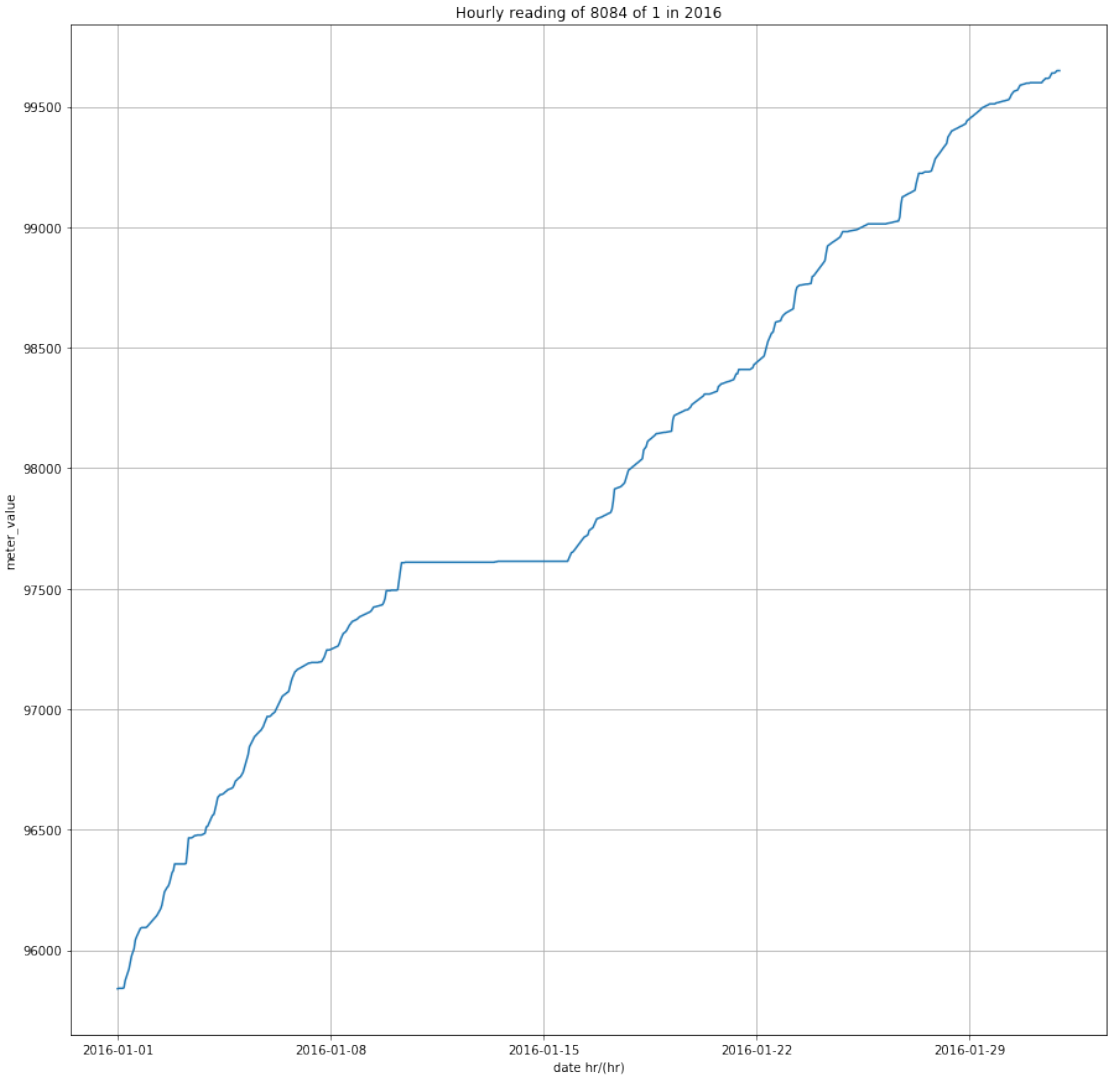

Hourly reading of 7900 of 1 in 2016
meter_value
196000
194000
192000
190000
188000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

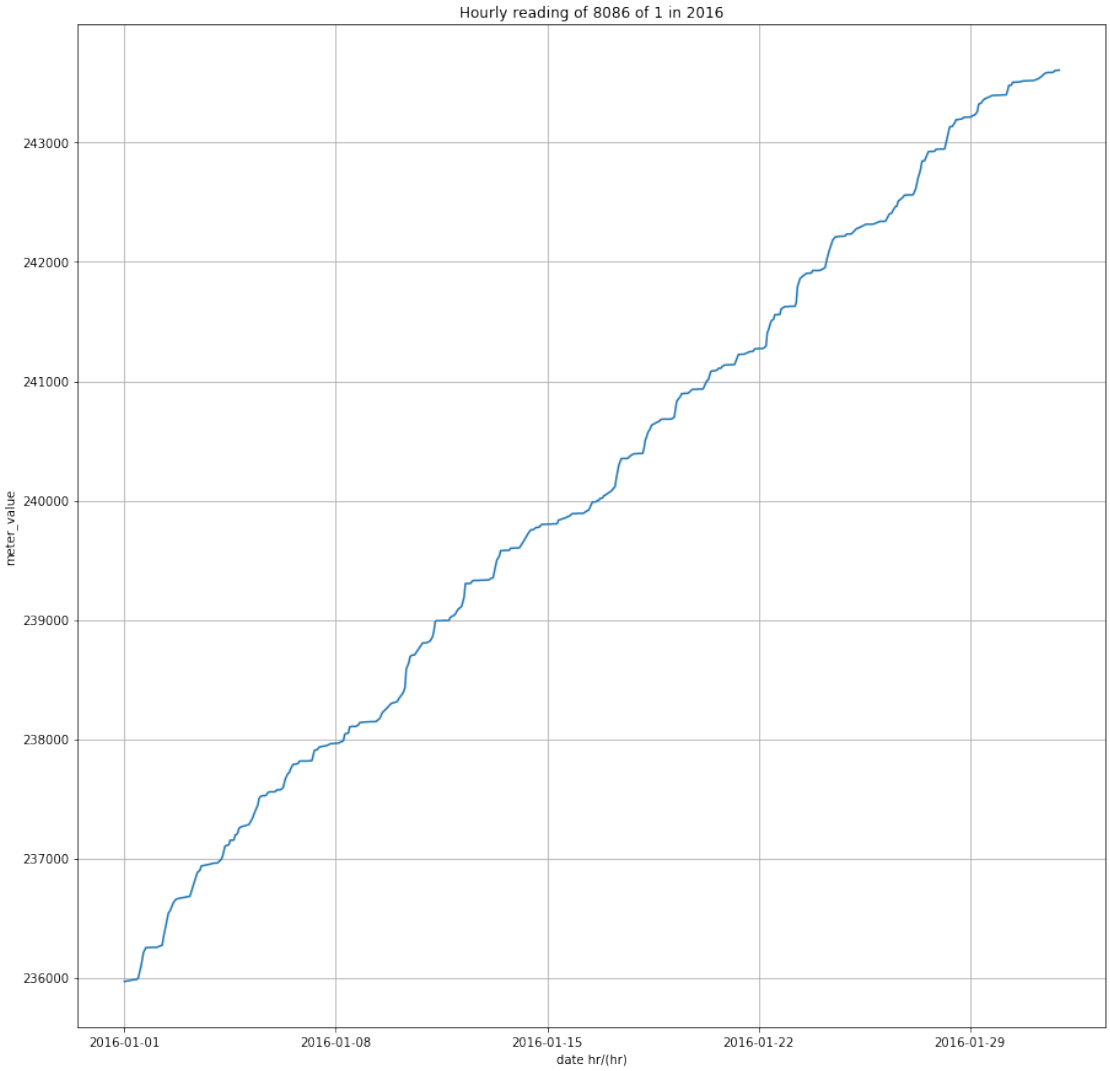

Hourly reading of 7919 of 1 in 2016
306000
305000
304000
303000
302000
301000
300000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

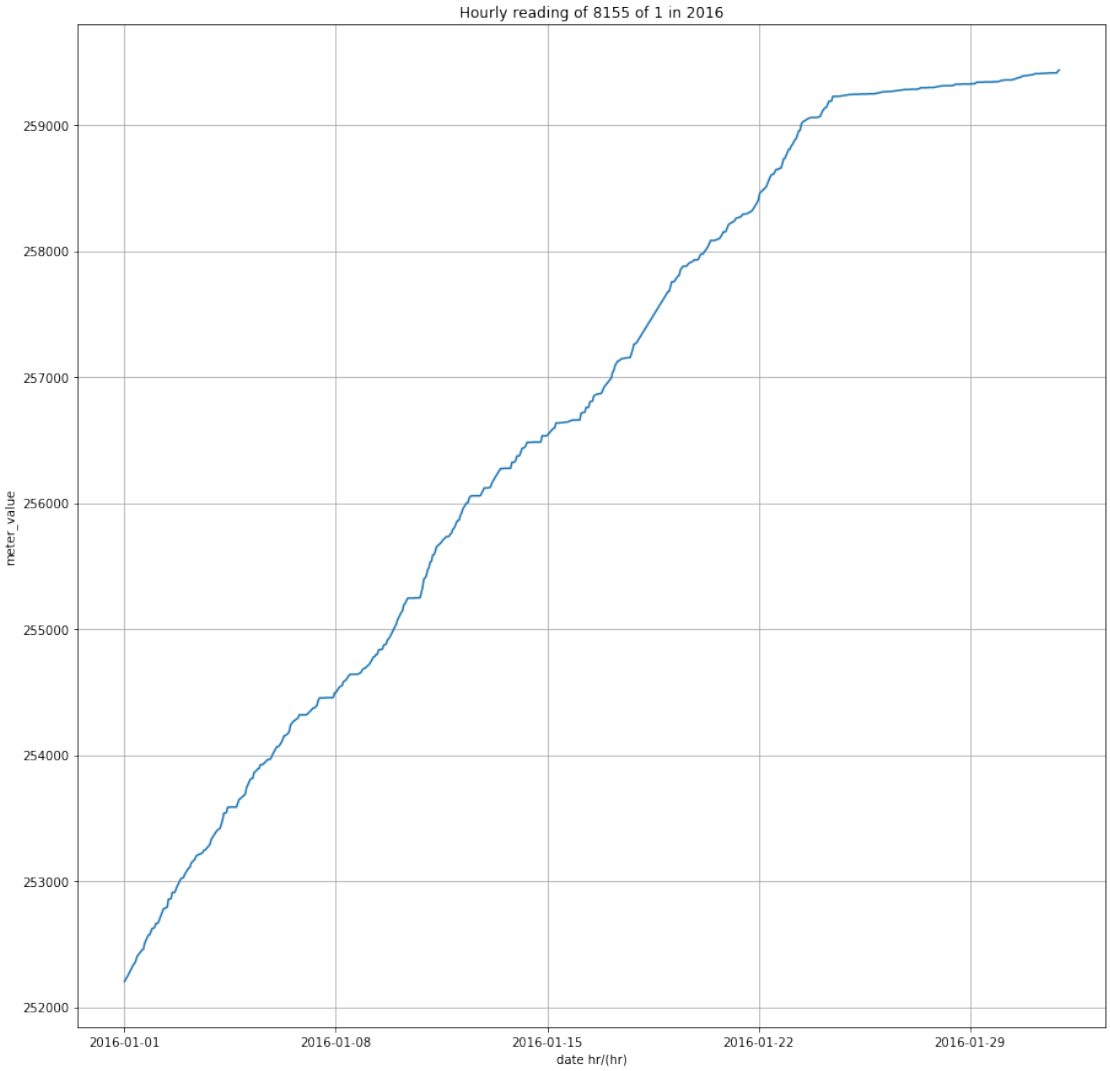

Hourly reading of 7965 of 1 in 2016
meter_value
186000
185000
184000
183000
182000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

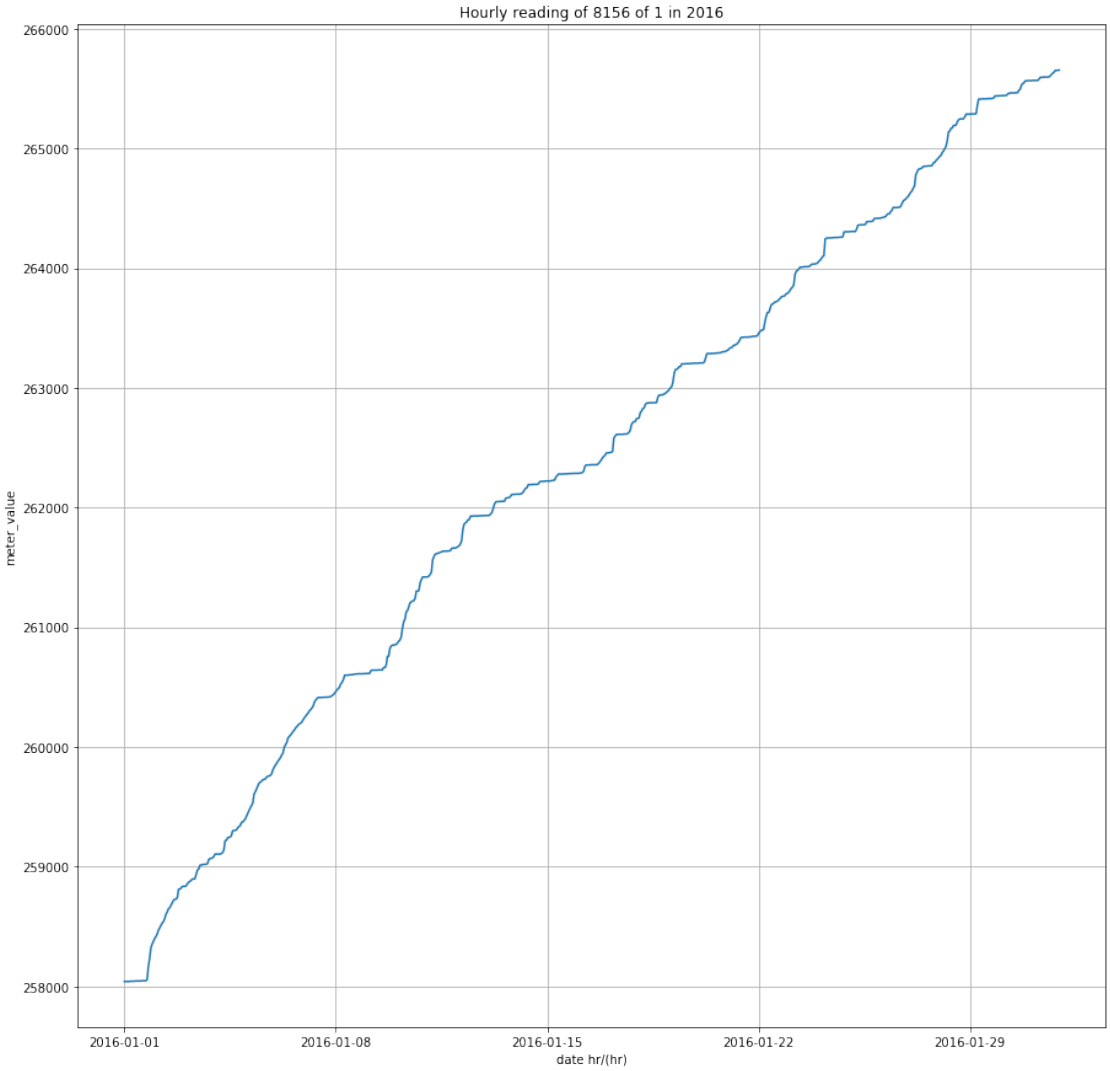

Hourly reading of 7989 of 1 in 2016
meter_value
120000
119000
118000
117000
116000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

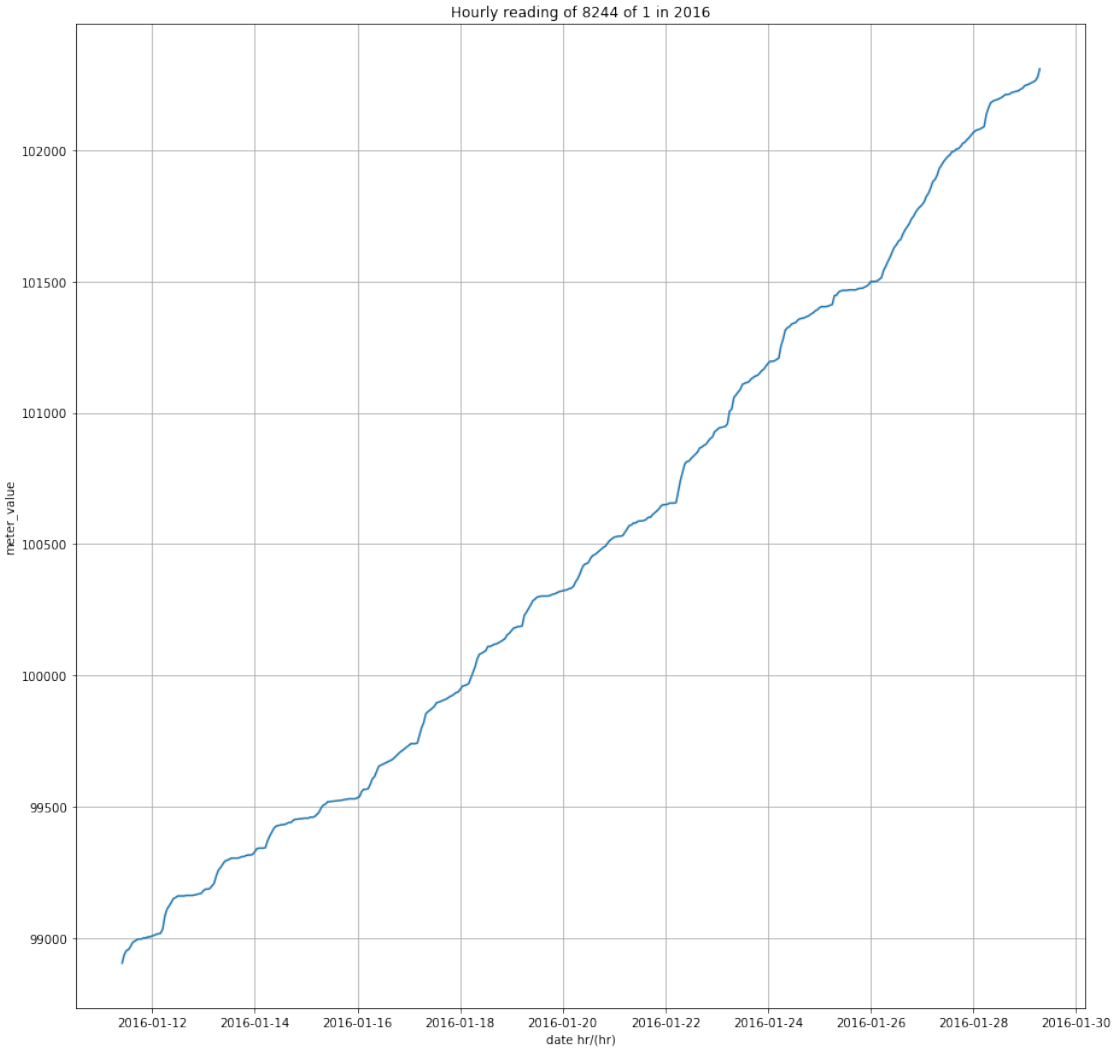

Hourly reading of 8059 of 1 in 2016
meter_value
110000
109000
108000
107000
106000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

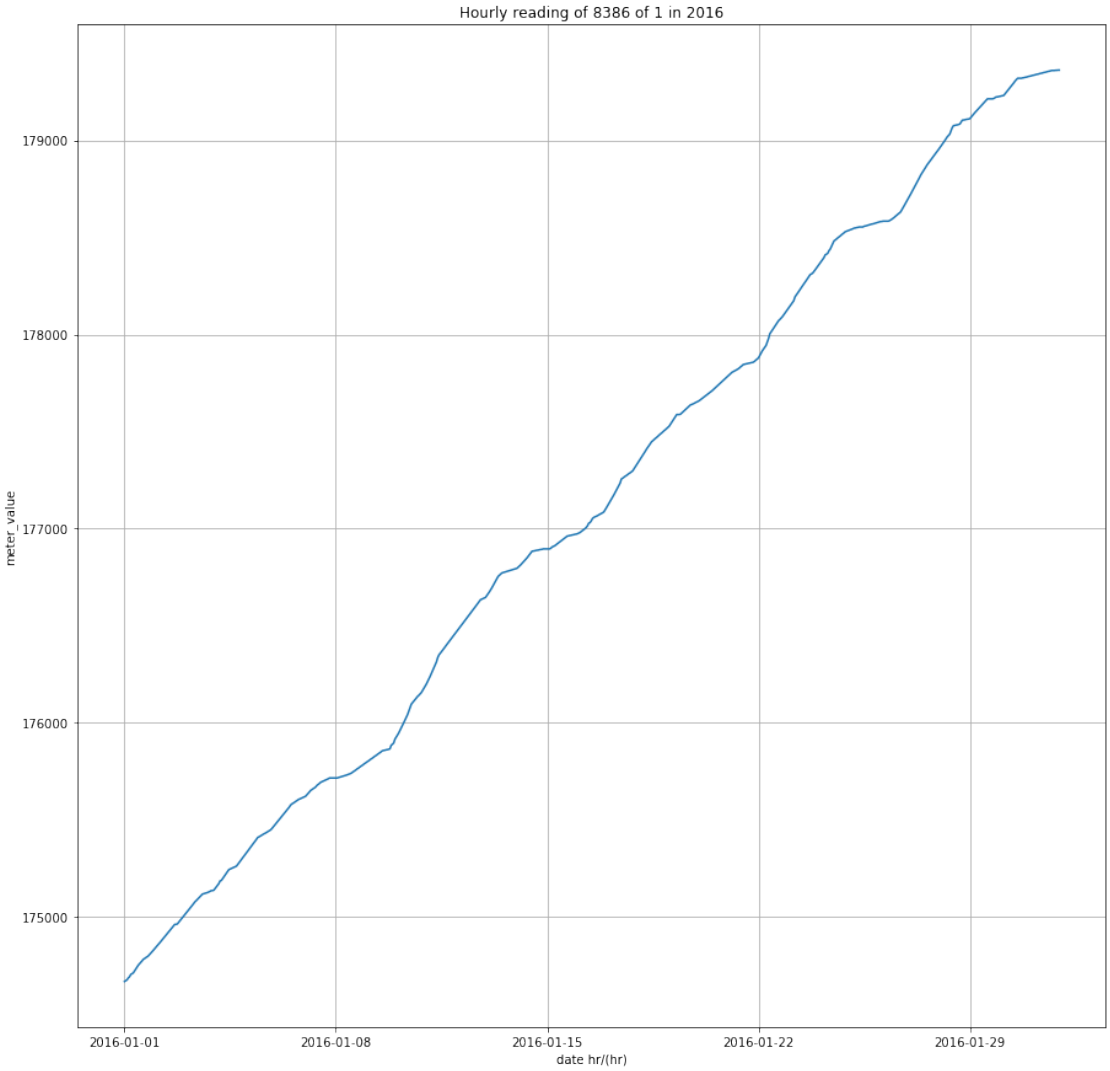

Hourly reading of 8084 of 1 in 2016
meter_value
99500
99000
98500
98000
97500
97000
96500
96000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

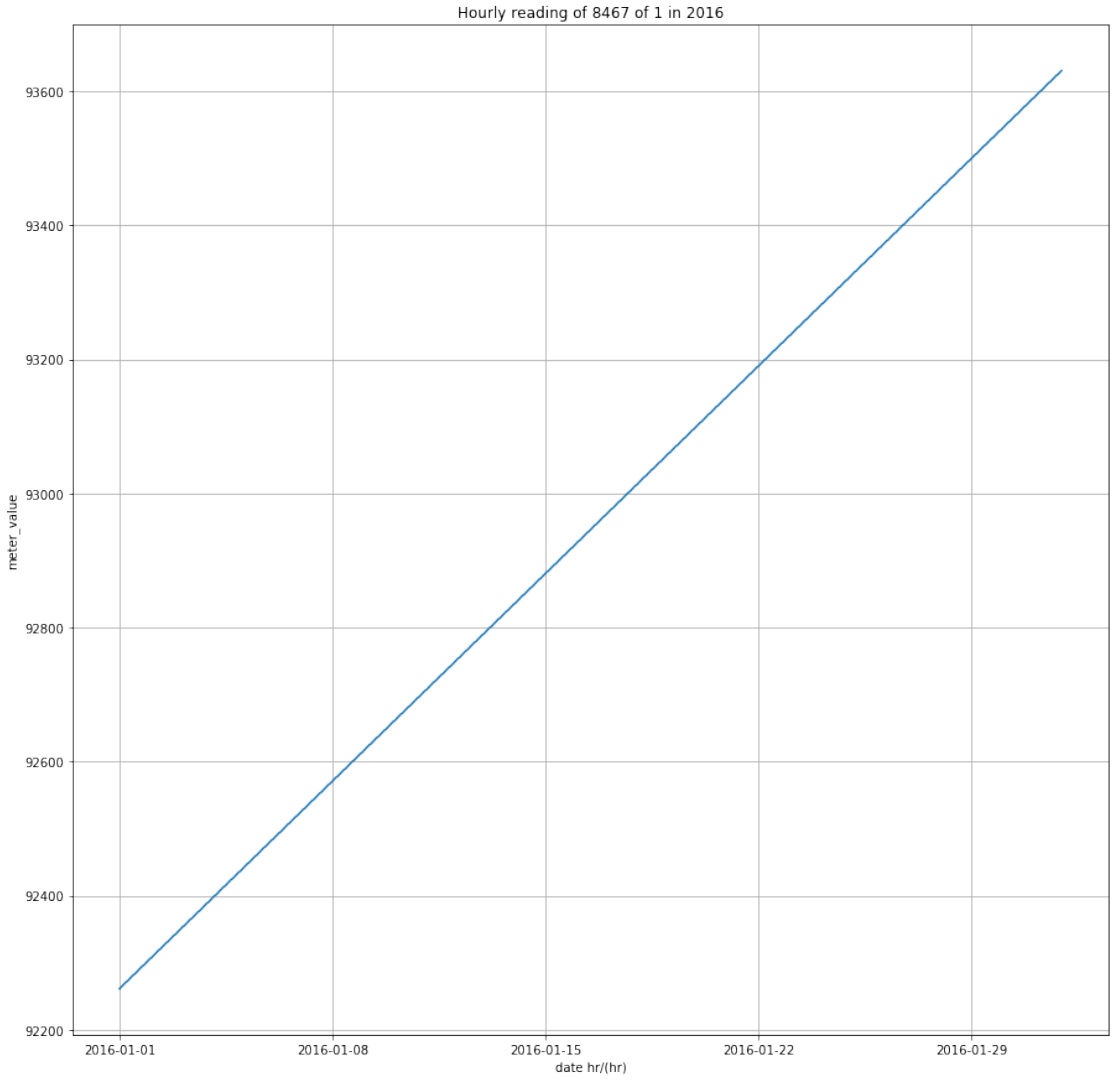

Hourly reading of 8086 of 1 in 2016
meter_value
243000
242000
241000
240000
239000
238000
237000
236000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

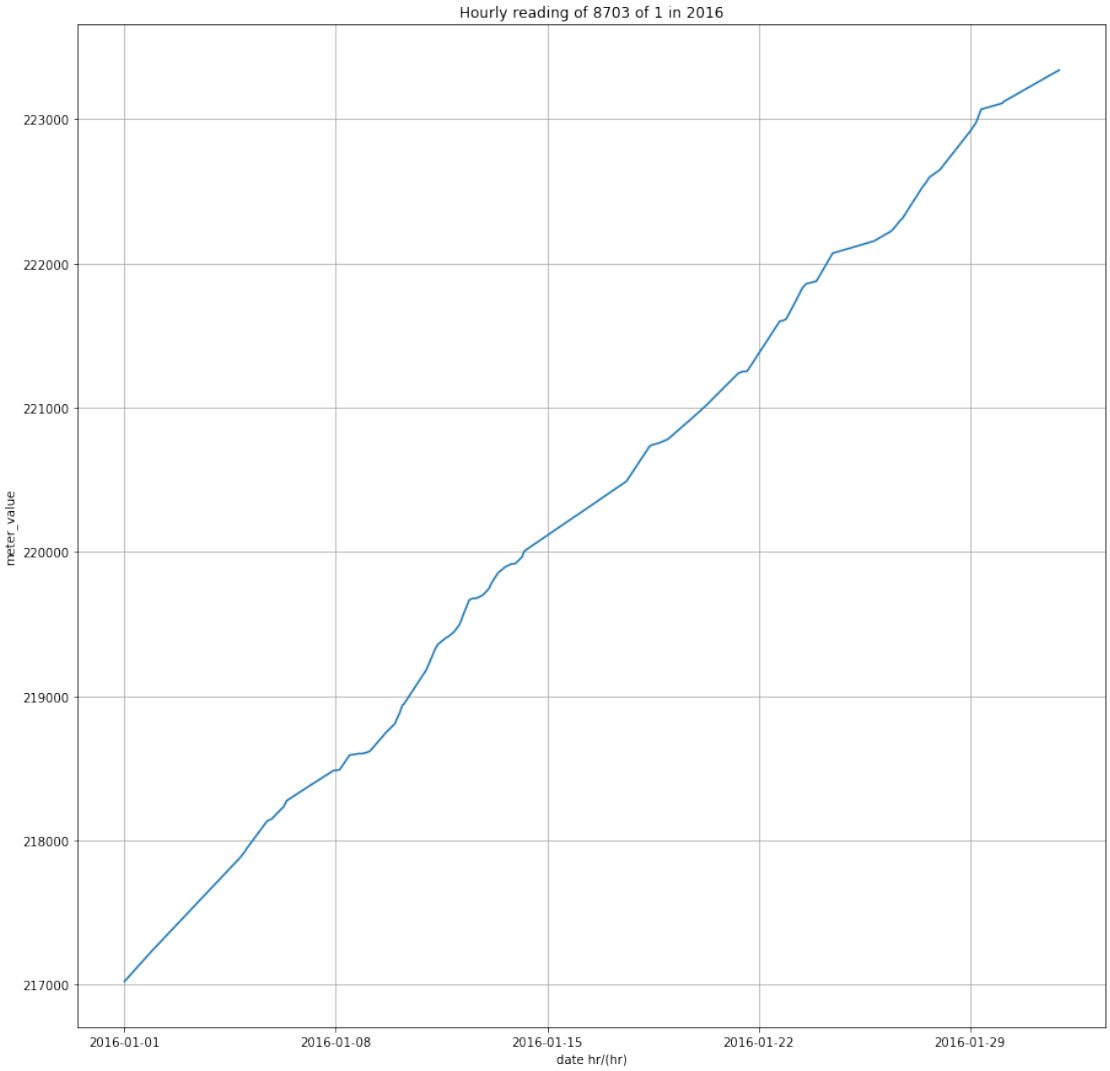

Hourly reading of 8155 of 1 in 2016
meter_value
259000
258000
257000
256000
255000
254000
253000
252000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

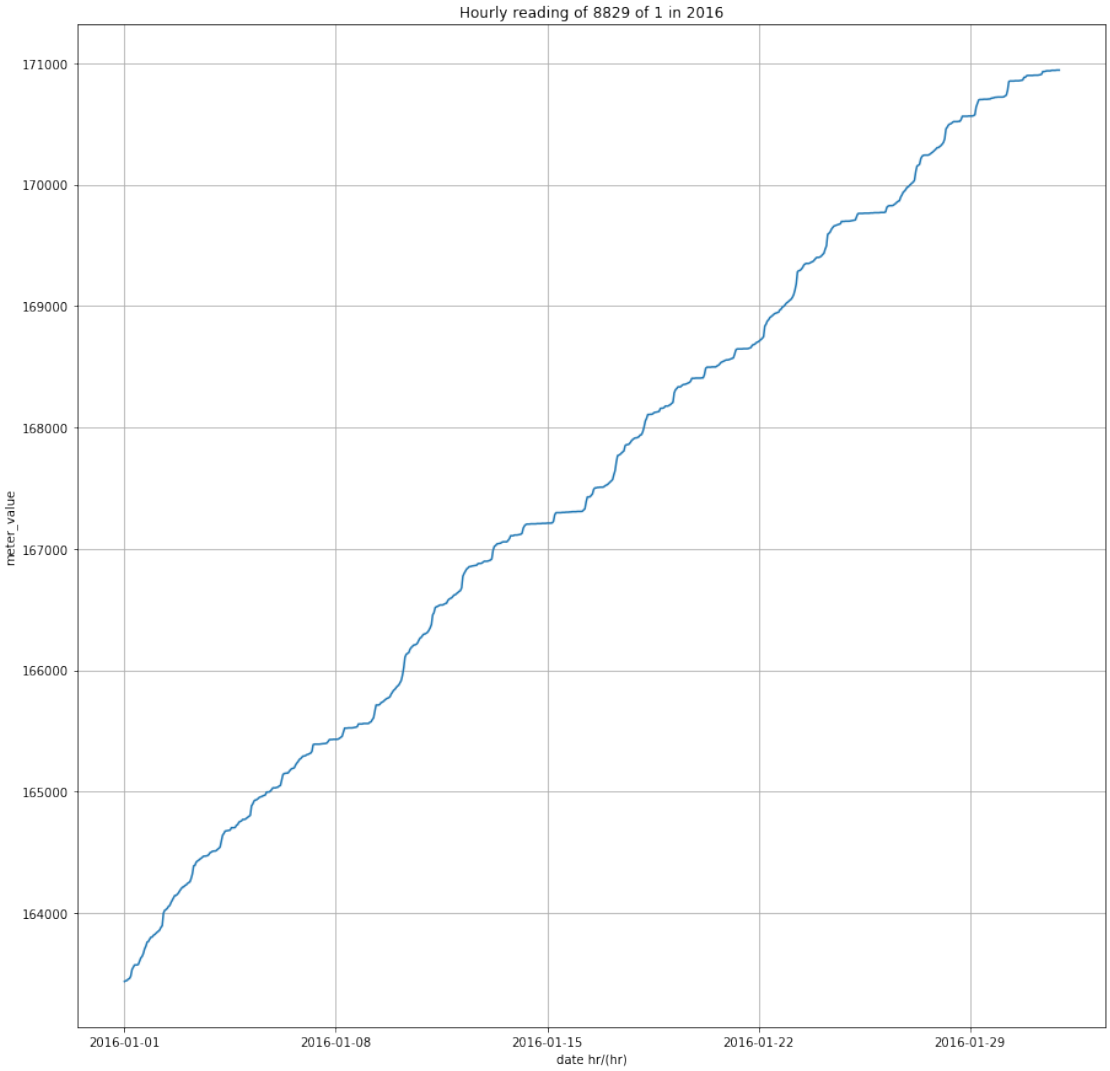

Hourly reading of 8156 of 1 in 2016
meter_value
266000
265000
264000
263000
262000
261000
260000
259000
258000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

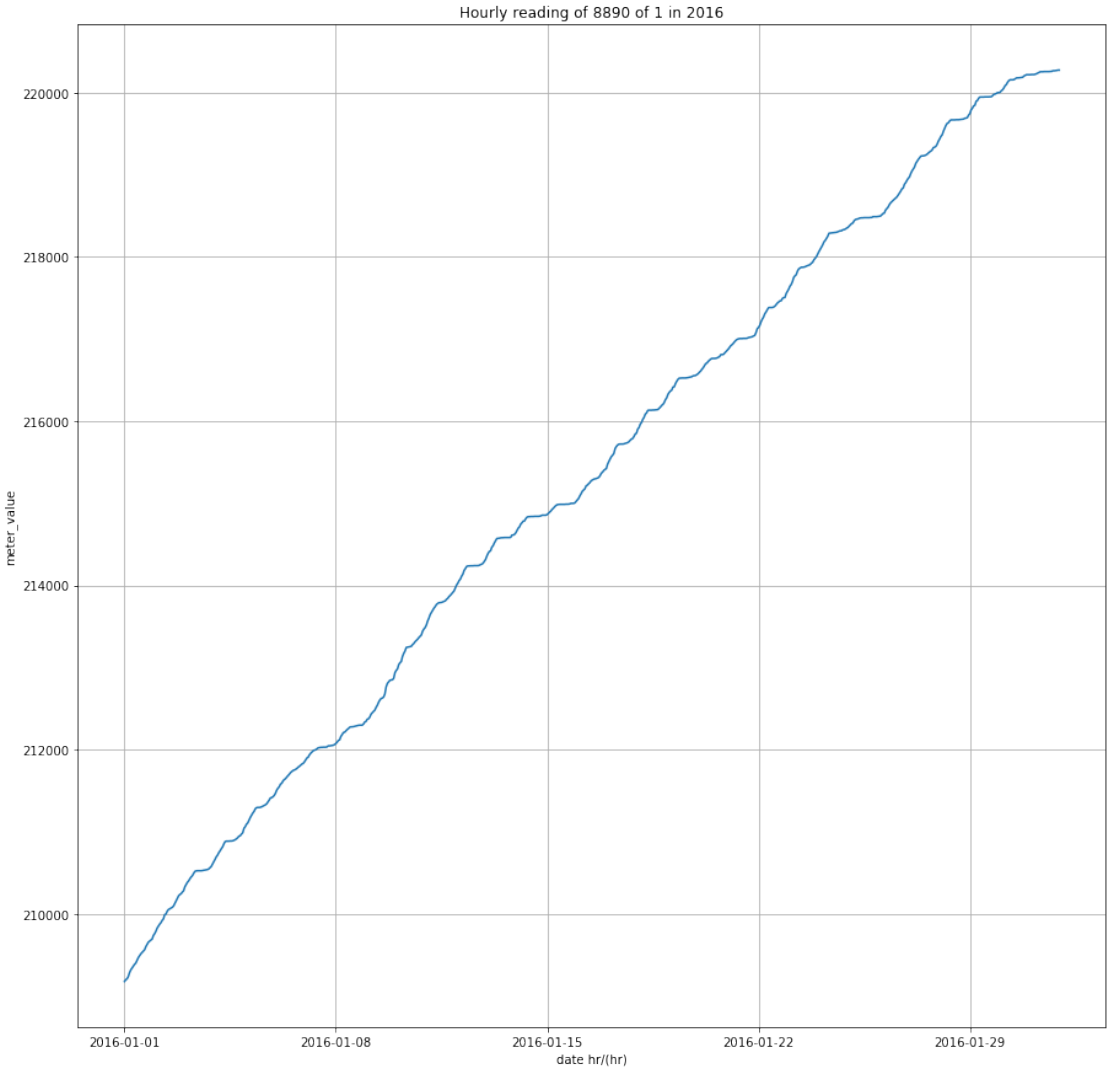

Hourly reading of 8244 of 1 in 2016
meter_value
102000
101500
101000
100500
100000
99500
99000
2016-01-12
2016-01-14
2016-01-16
2016-01-18
2016-01-20
2016-01-22
2016-01-24
2016-01-26
2016-01-28
2016-01-30
date hr/(hr)

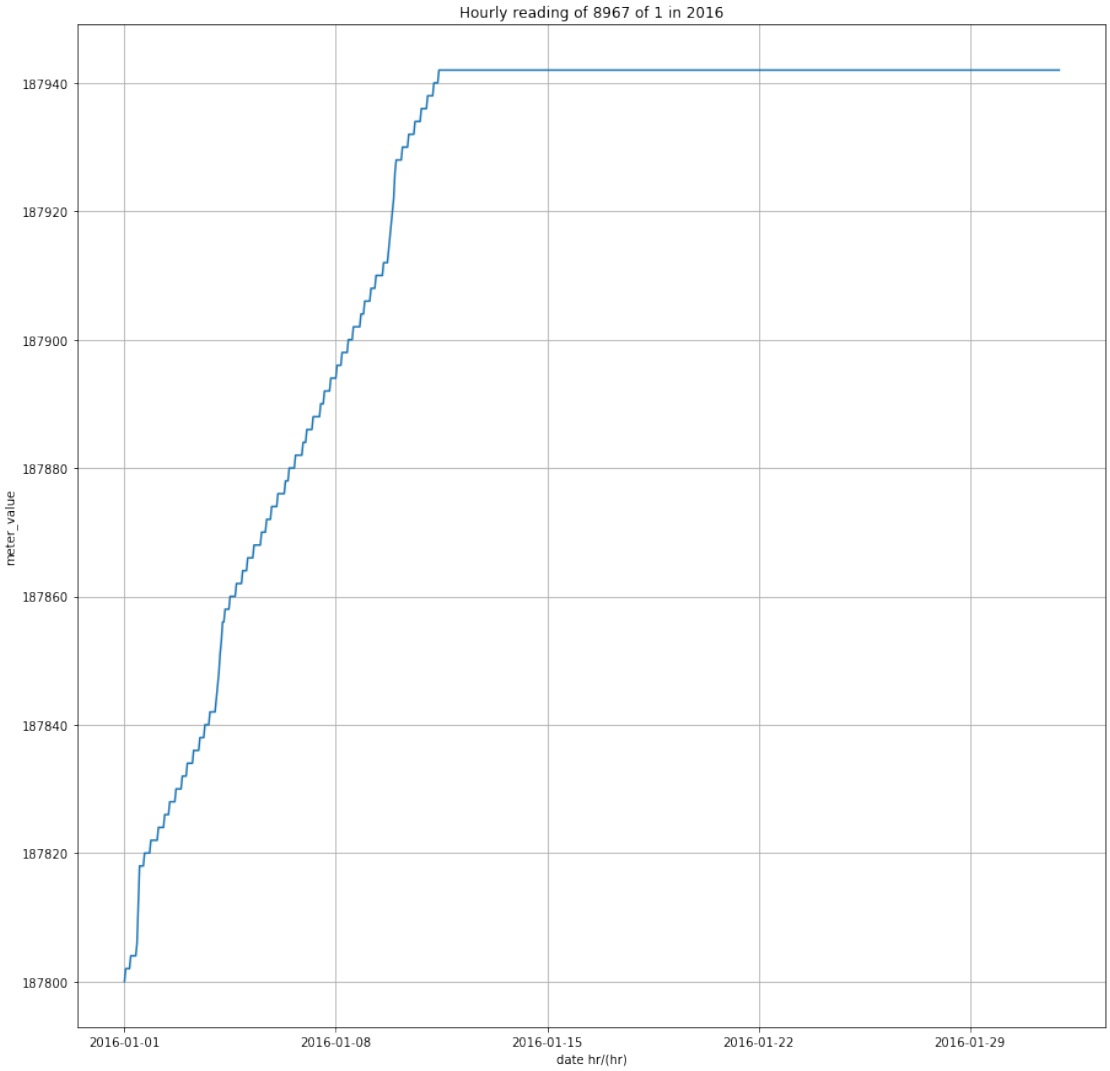

Hourly reading of 8386 of 1 in 2016
meter_value
179000
178000
177000
176000
175000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

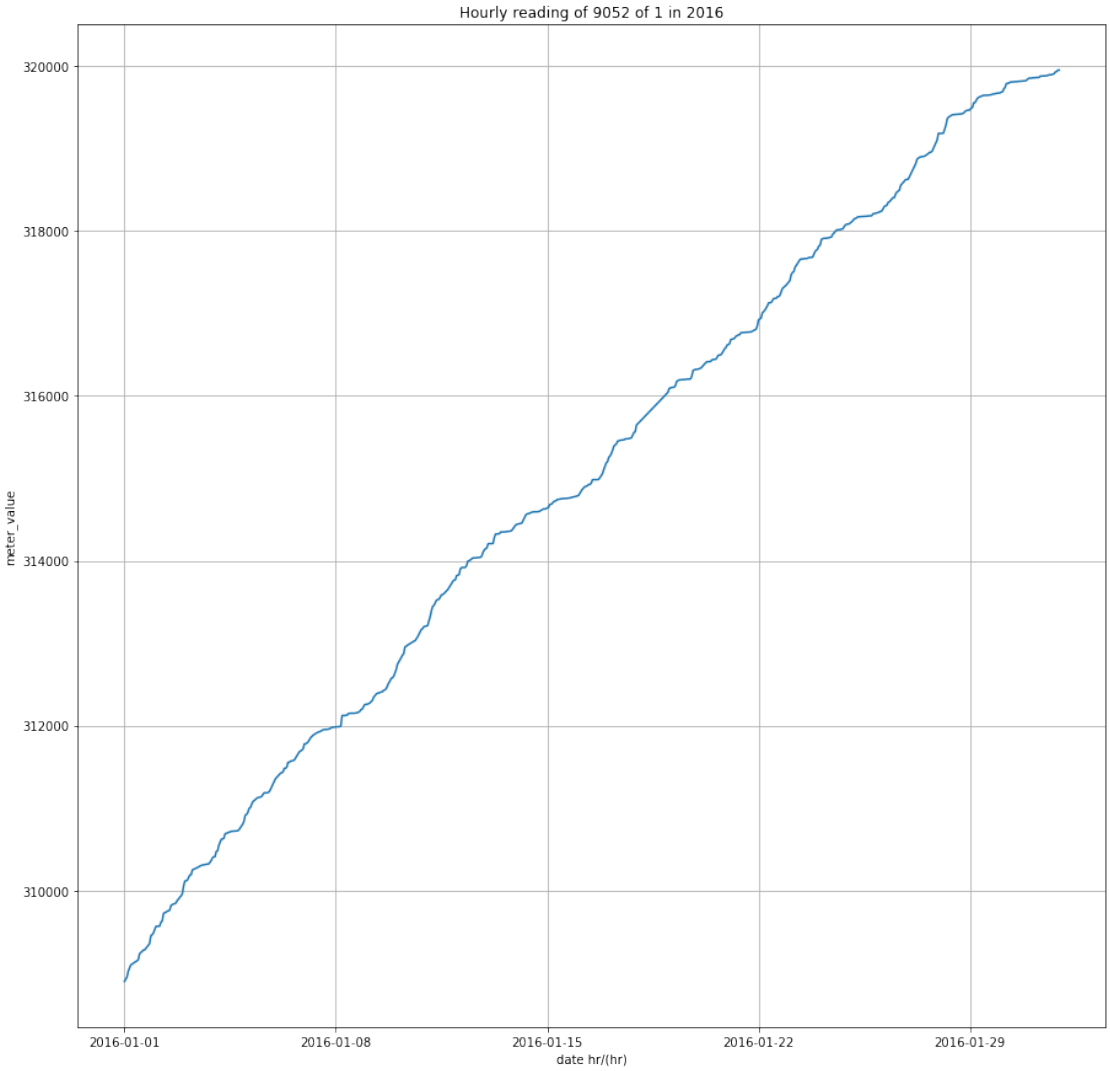

Hourly reading of 8467 of 1 in 2016
93600
93400
93200
93000
92800
92600
92400
92200
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

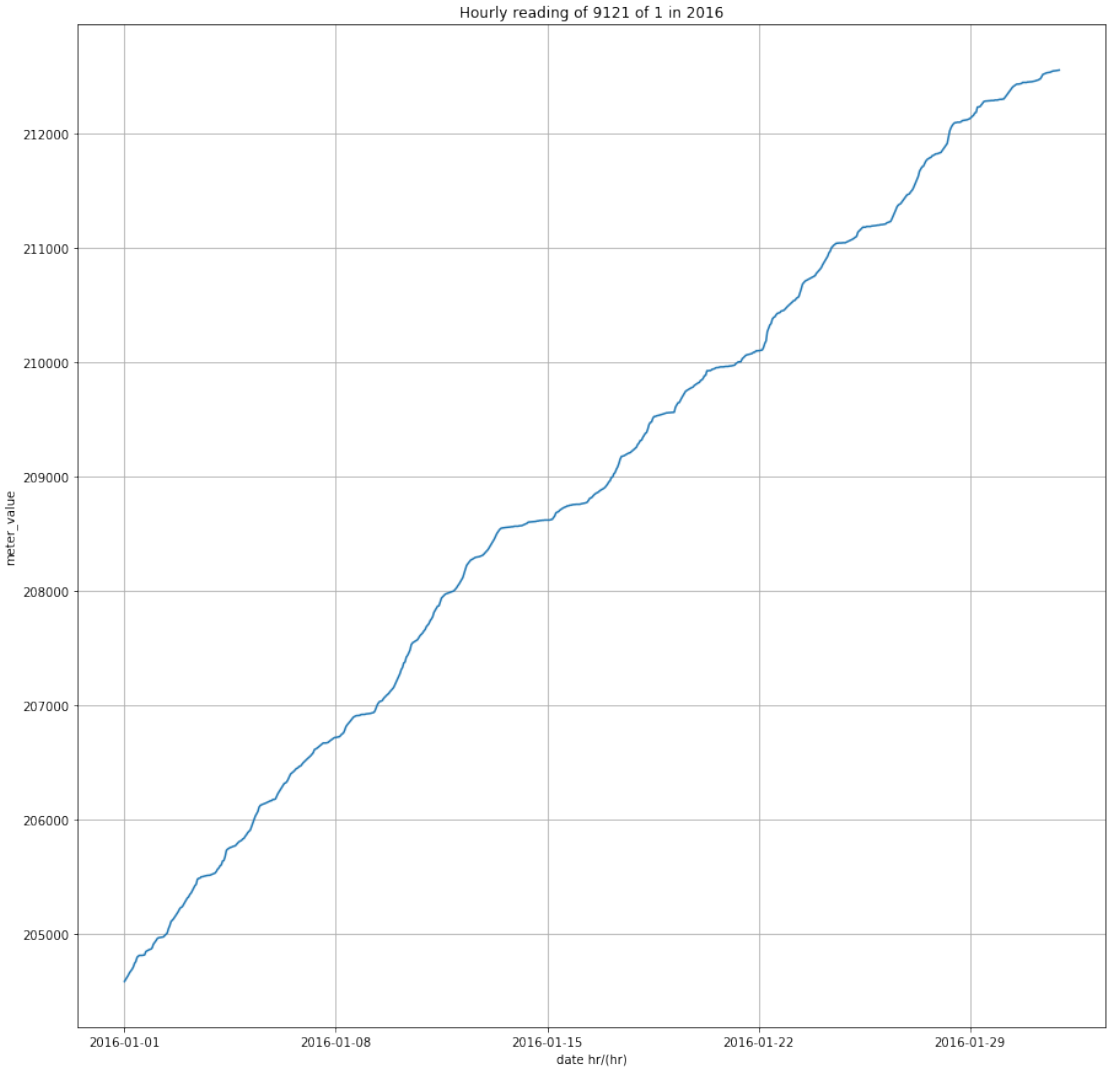

Hourly reading of 8703 of 1 in 2016
meter_value
223000
222000
221000
220000
219000
218000
217000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

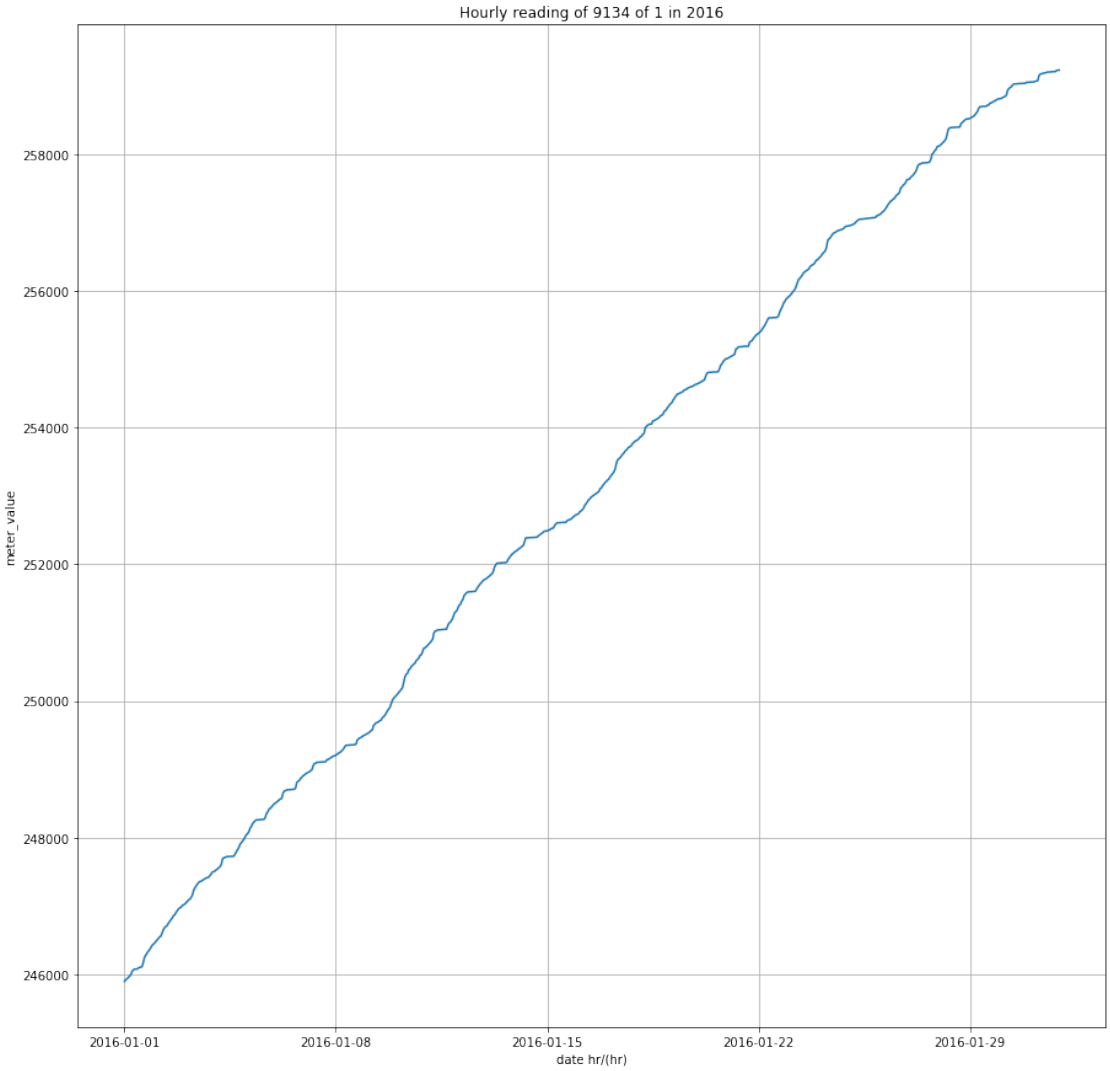

Hourly reading of 8829 of 1 in 2016
meter_value
171000
170000
169000
168000
167000
166000
165000
164000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

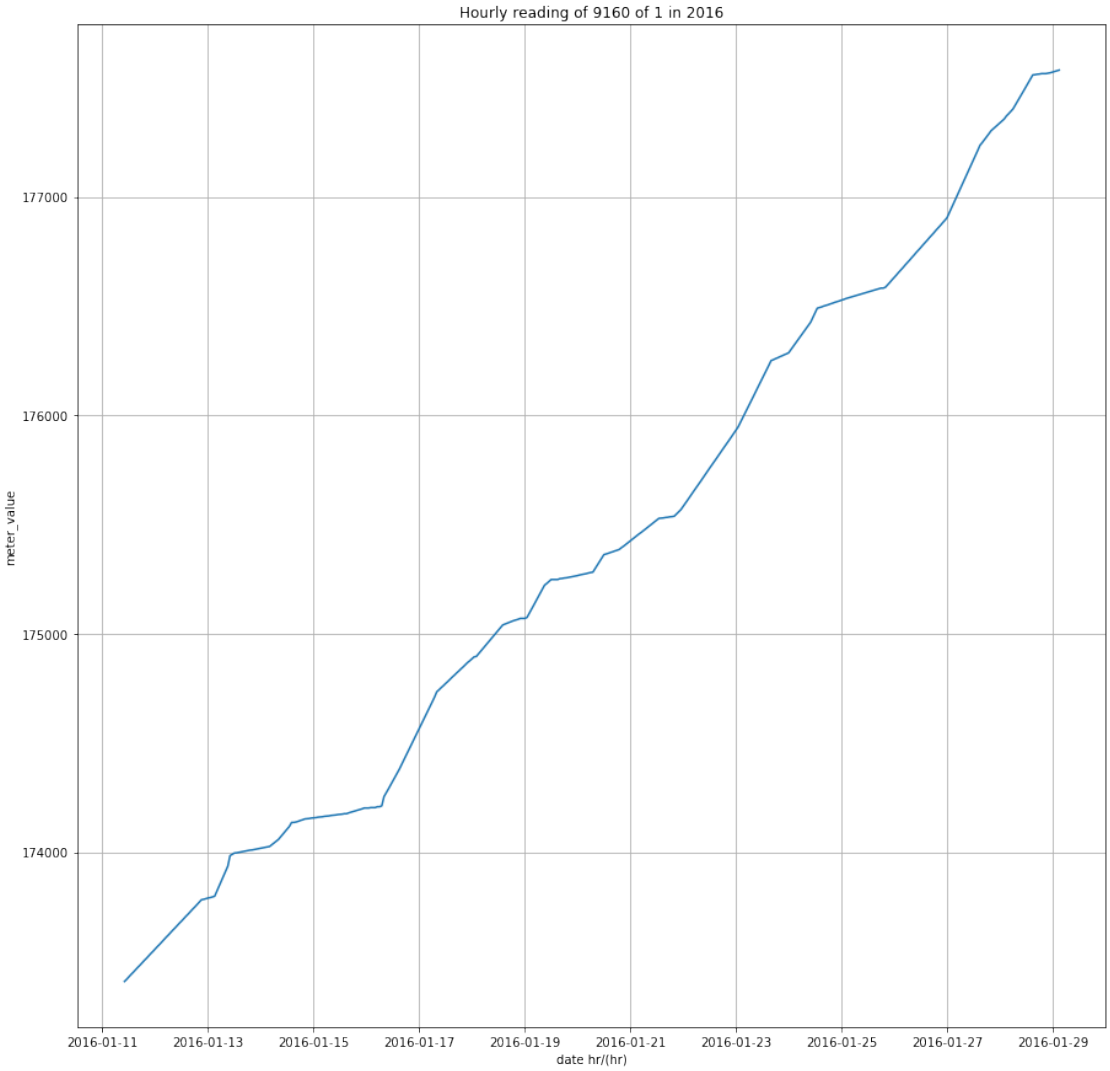

Hourly reading of 8890 of 1 in 2016
meter_value
220000
218000
216000
214000
212000
210000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

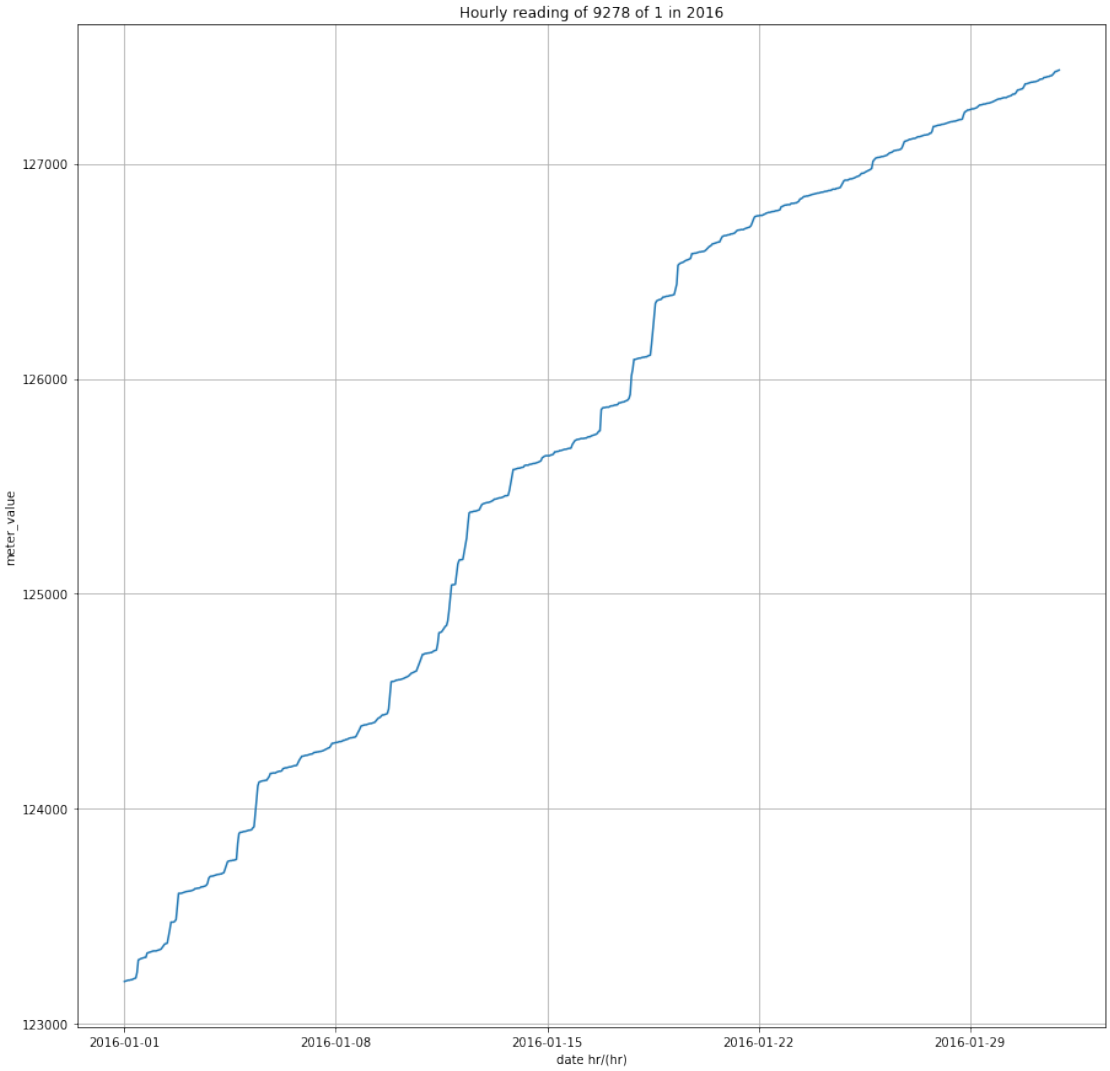

Hourly reading of 8967 of 1 in 2016
meter_value
187940
187920
187900
187880
187860
187840
187820
187800
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

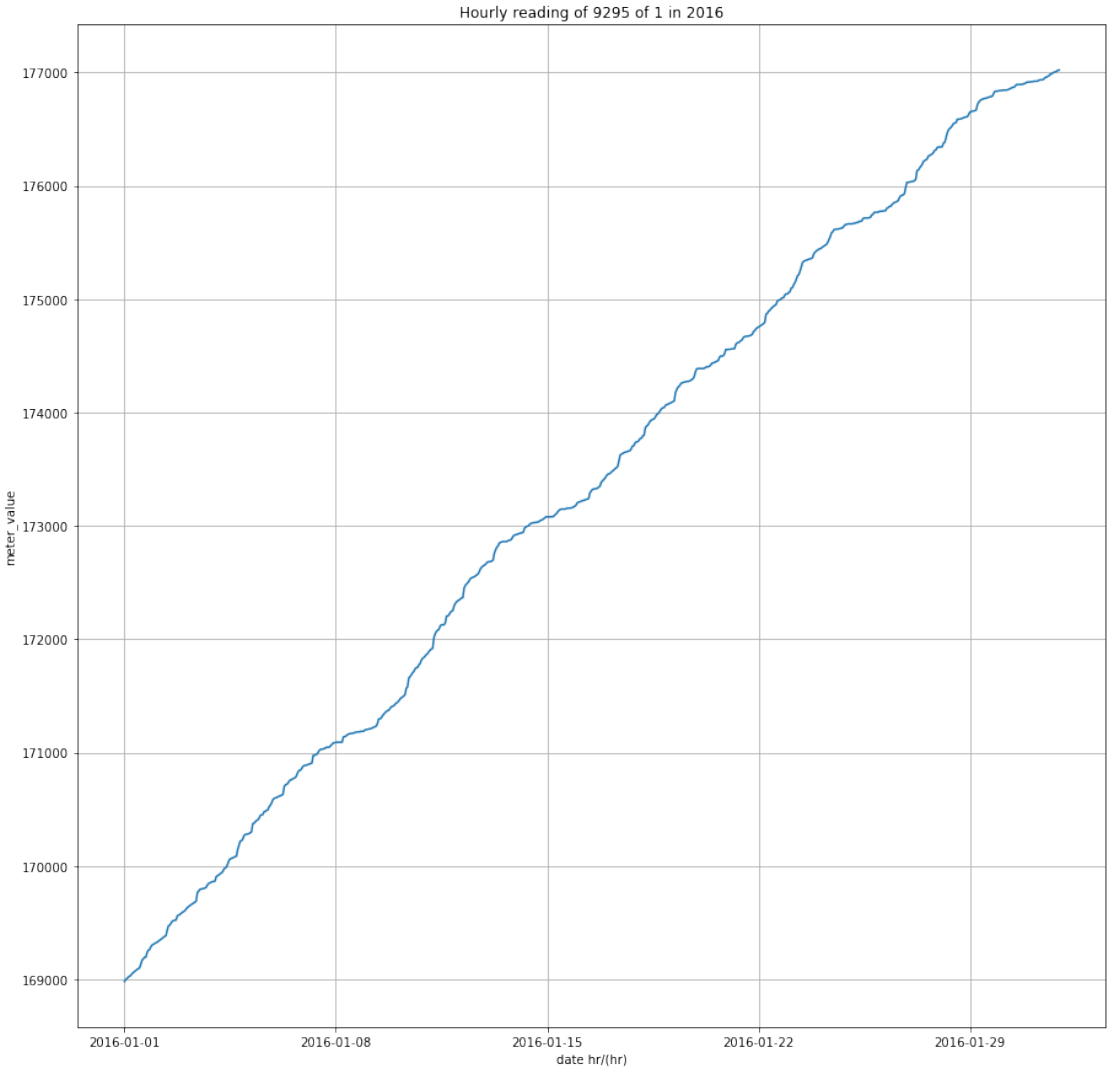

Hourly reading of 9052 of 1 in 2016
320000
318000
316000
314000
312000
310000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

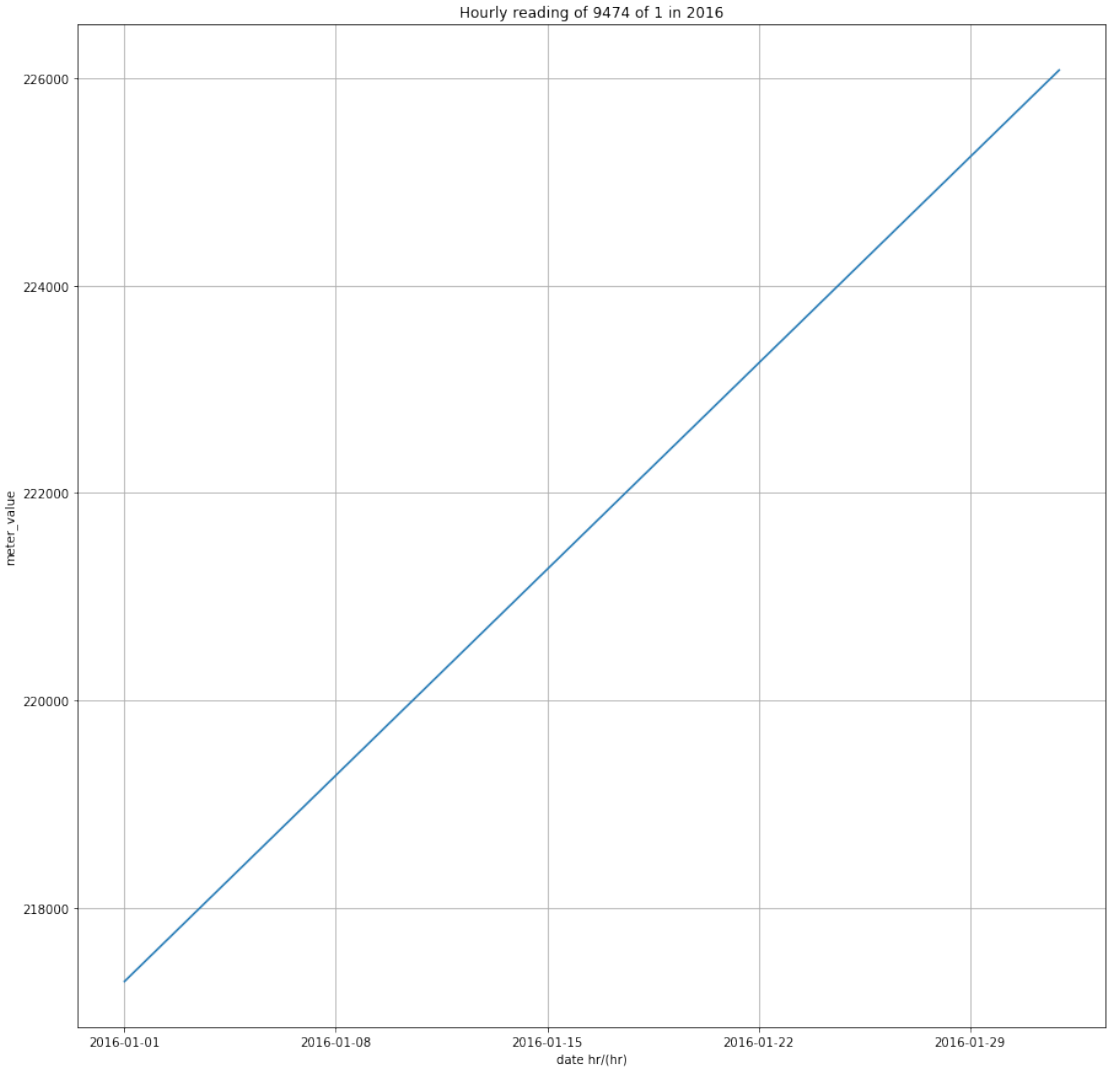

Hourly reading of 9121 of 1 in 2016
meter_value
212000
211000
210000
209000
208000
207000
206000
205000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

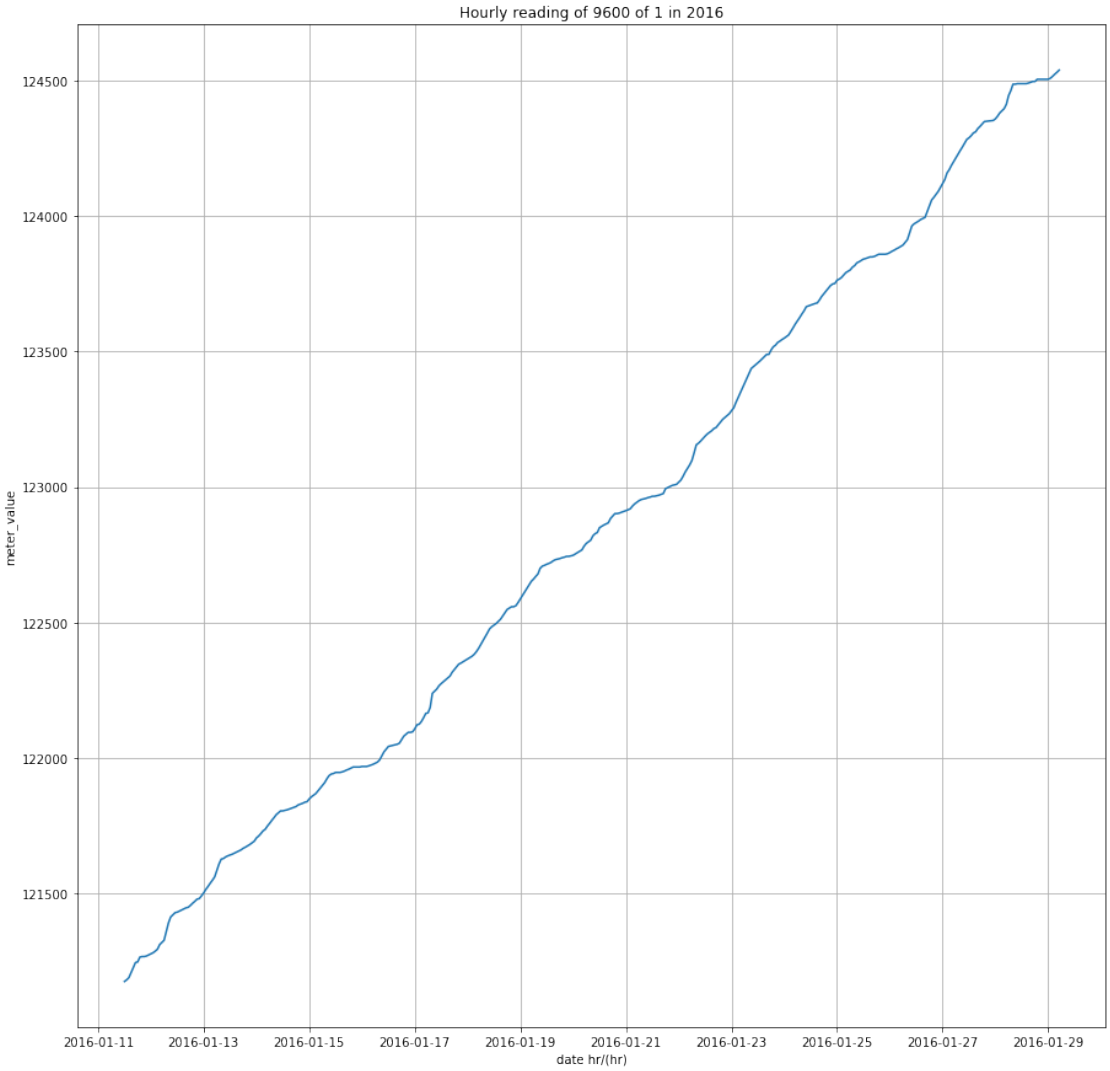

Hourly reading of 9134 of 1 in 2016
meter_value
258000
256000
254000
252000
250000
248000
246000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

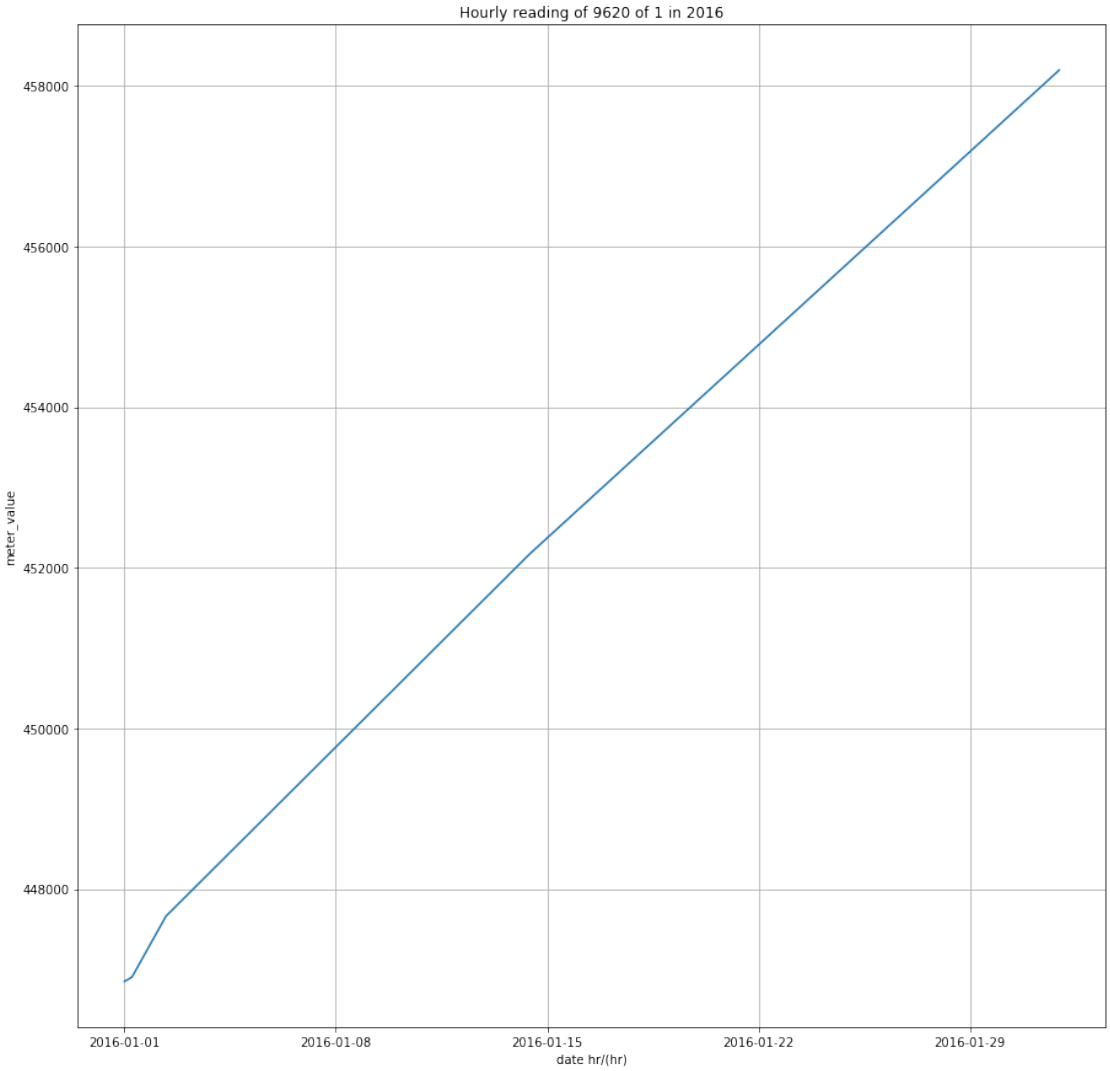

Hourly reading of 9160 of 1 in 2016
meter_value
177000
176000
175000
174000
2016-01-11
2016-01-13
2016-01-15
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
date hr/(hr)

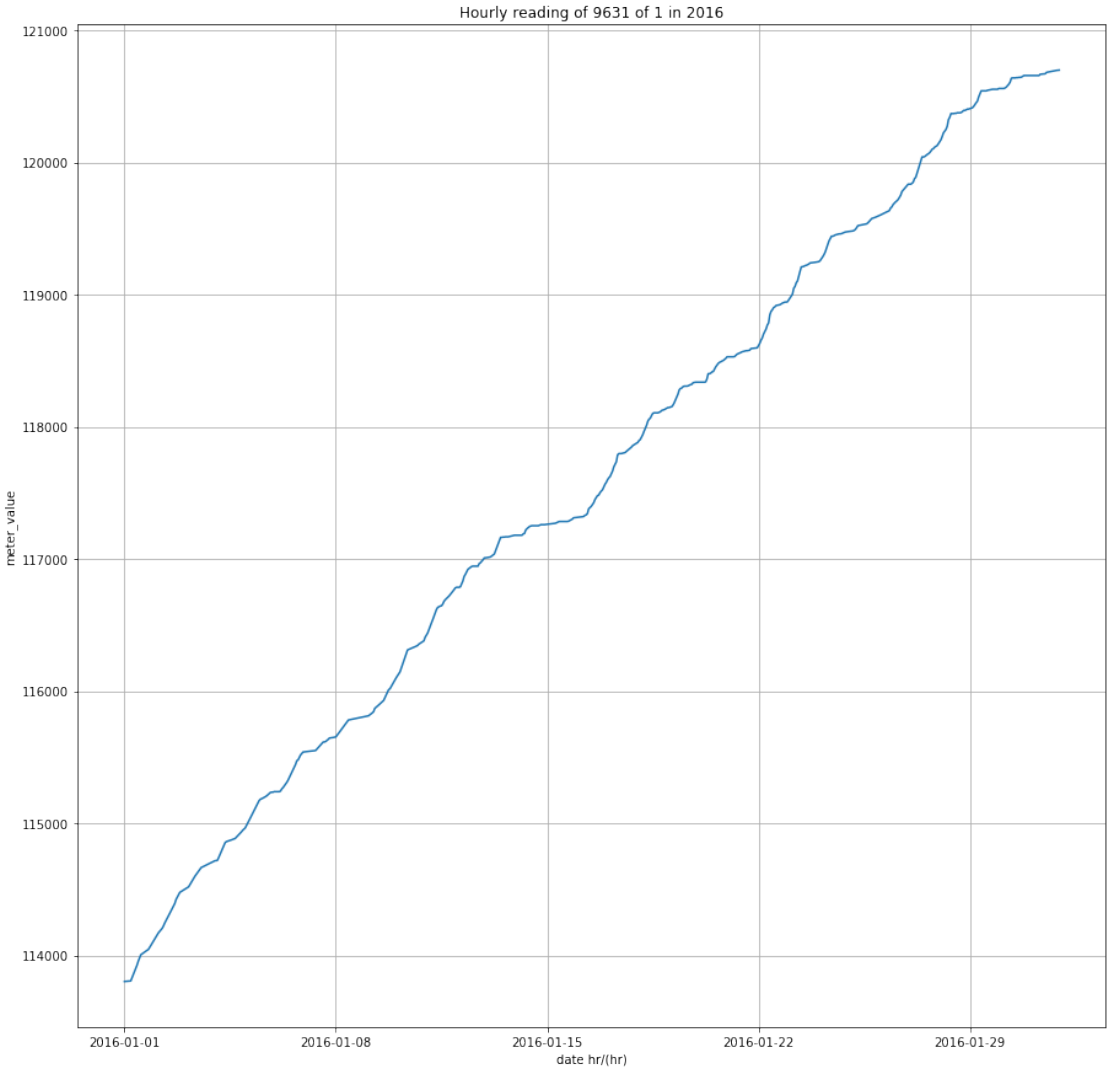

Hourly reading of 9278 of 1 in 2016
meter_value
127000
126000
125000
124000
123000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

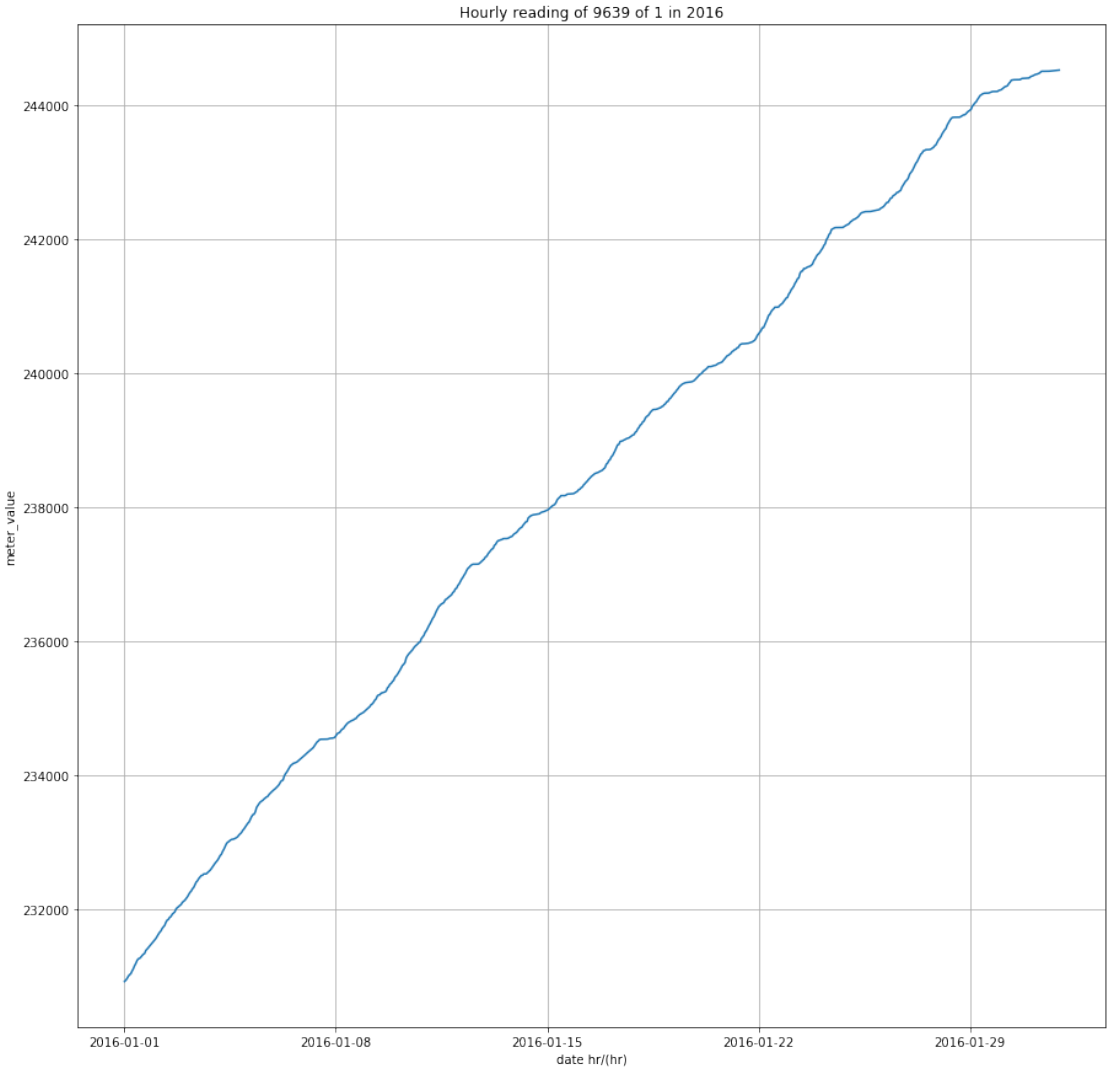

Hourly reading of 9295 of 1 in 2016
meter_value
177000
176000
175000
174000
173000
172000
171000
170000
169000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

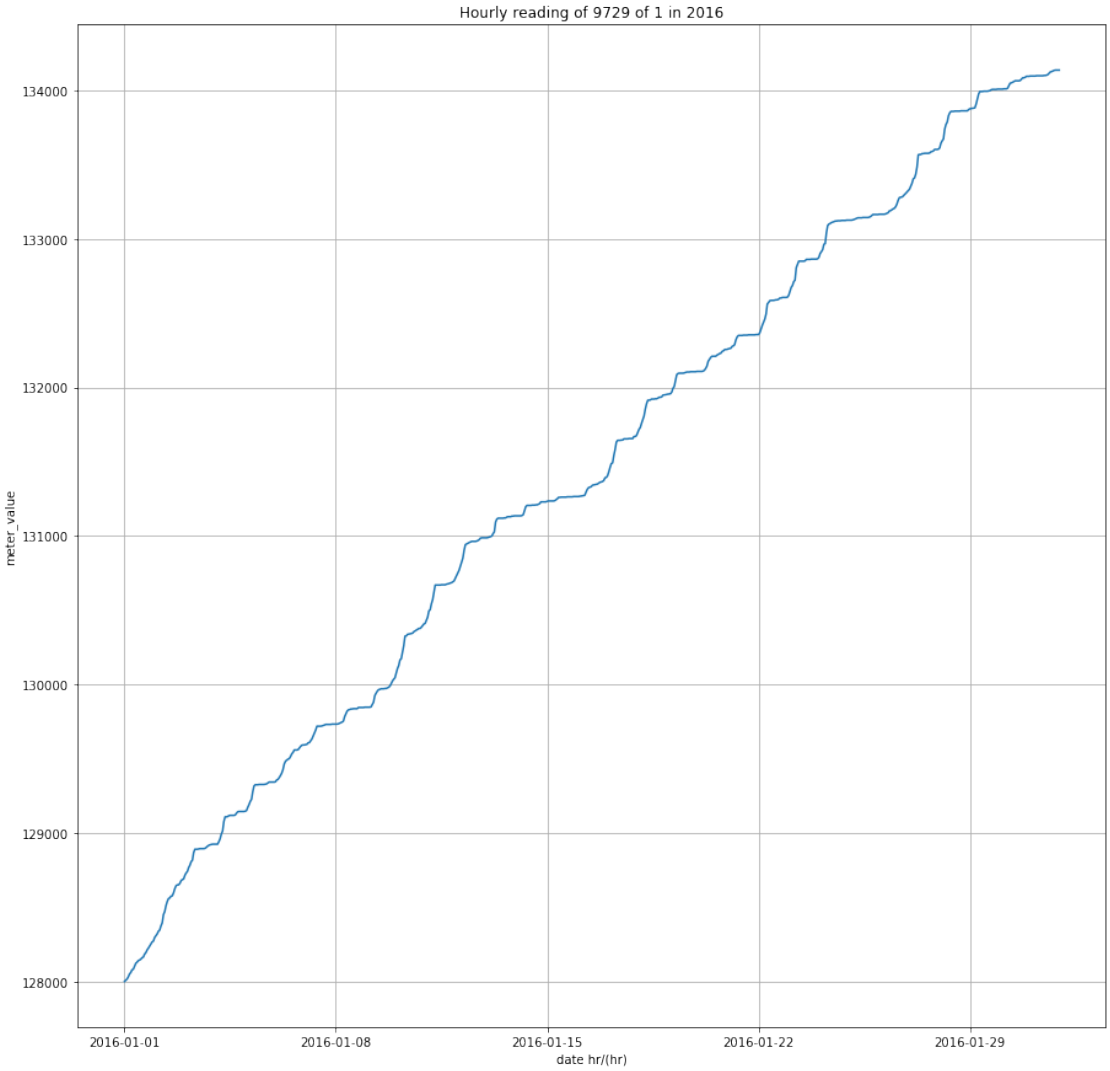

Hourly reading of 9474 of 1 in 2016
meter_value
226000
224000
222000
220000
218000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

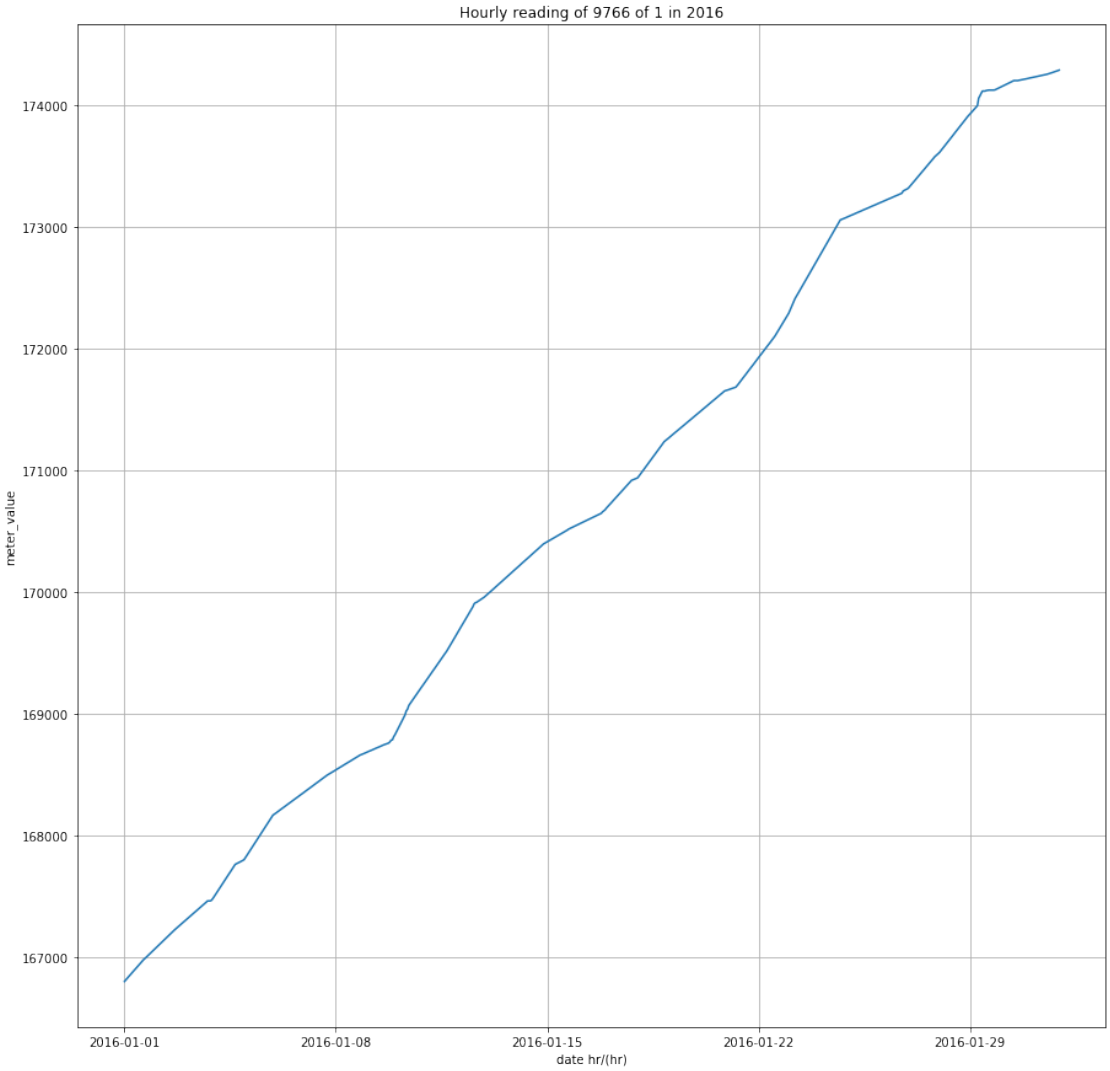

Hourly reading of 9600 of 1 in 2016
meter_value
124500
124000
123500
123000
122500
122000
121500
2016-01-11
2016-01-13
2016-01-15
2016-01-17
2016-01-19
2016-01-21
2016-01-23
2016-01-25
2016-01-27
2016-01-29
date hr/(hr)

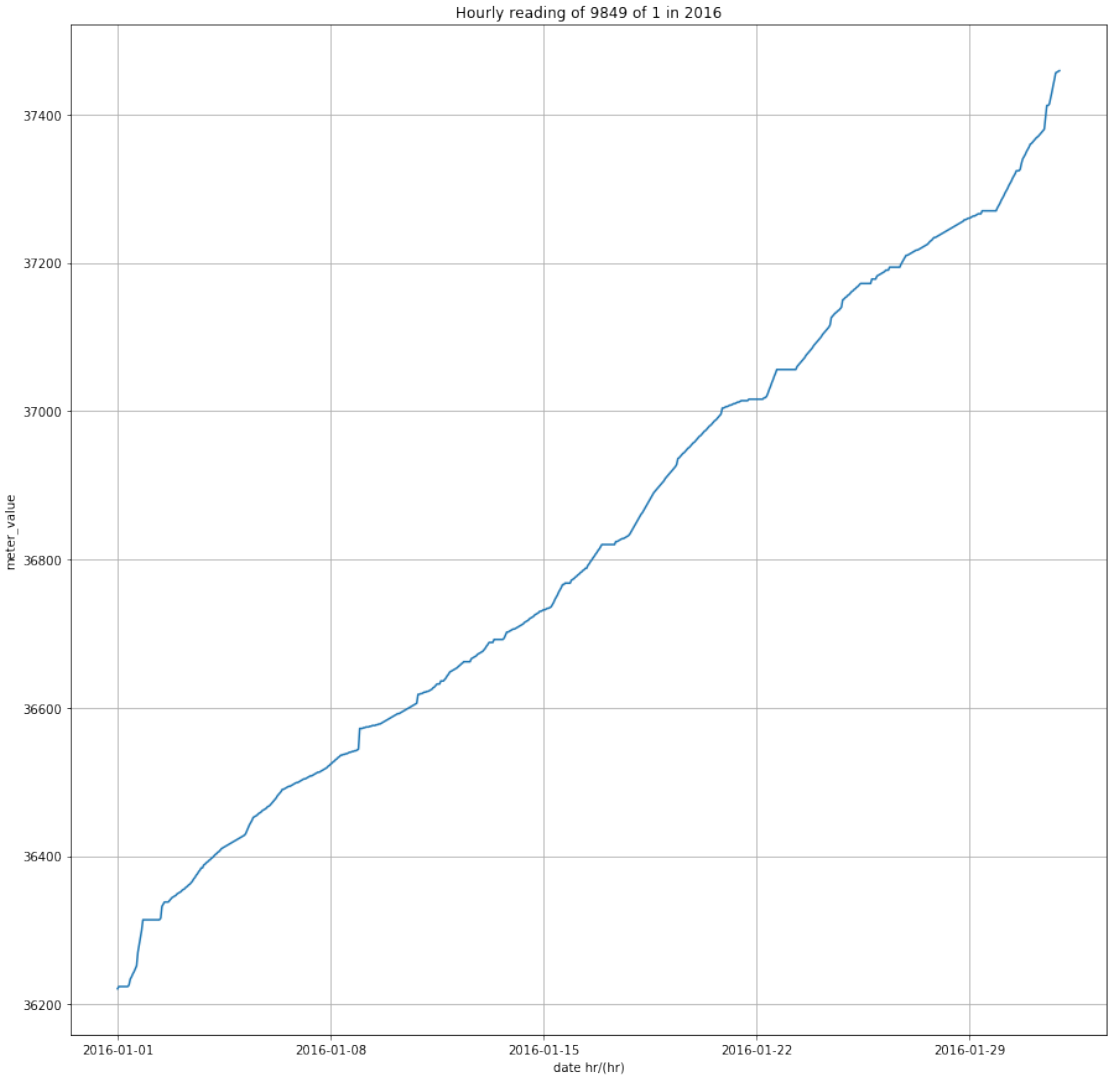

Hourly reading of 9620 of 1 in 2016
458000
456000
454000
452000
450000
448000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

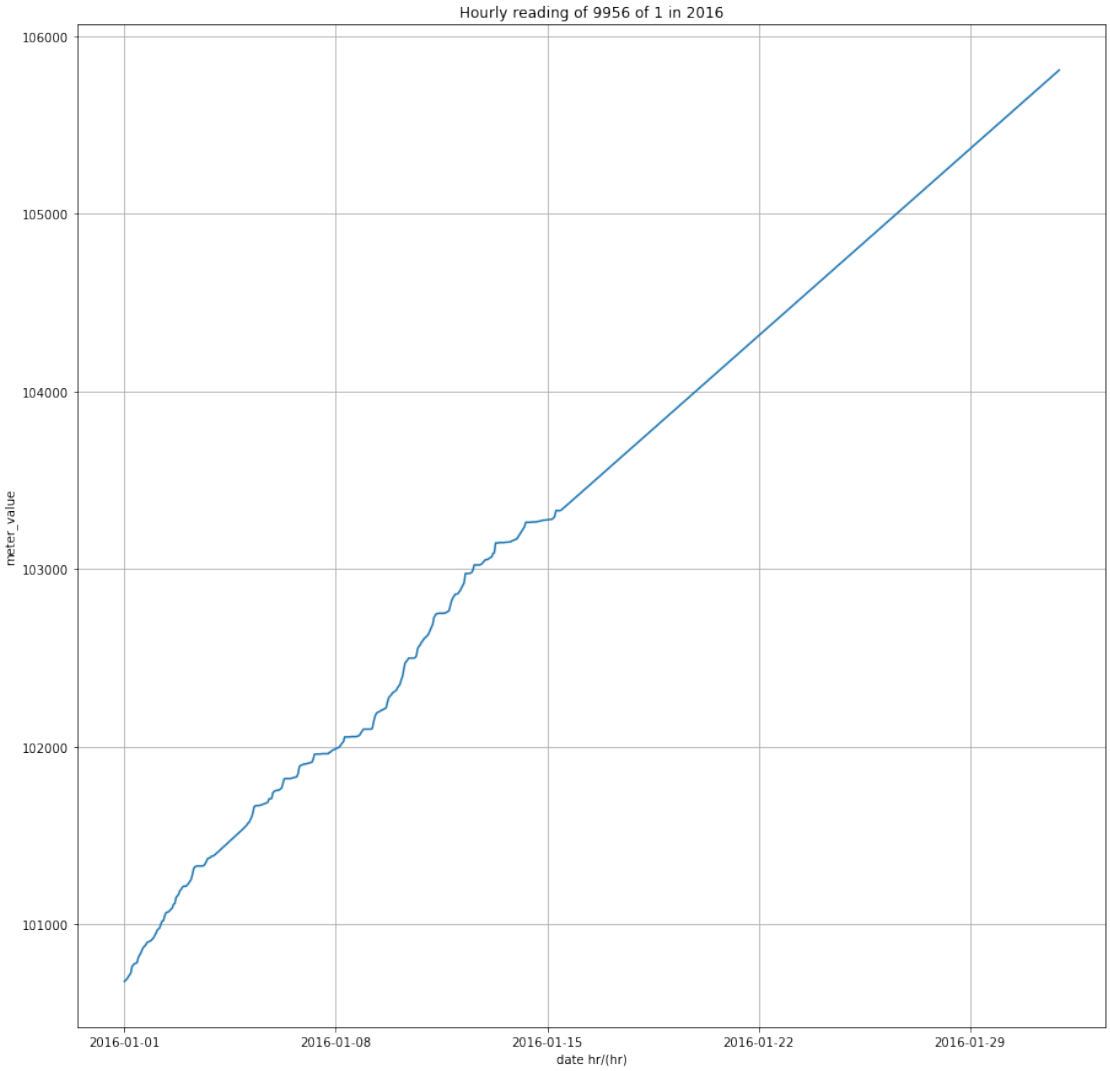

Hourly reading of 9631 of 1 in 2016
meter_value
121000
120000
119000
118000
117000
116000
115000
114000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

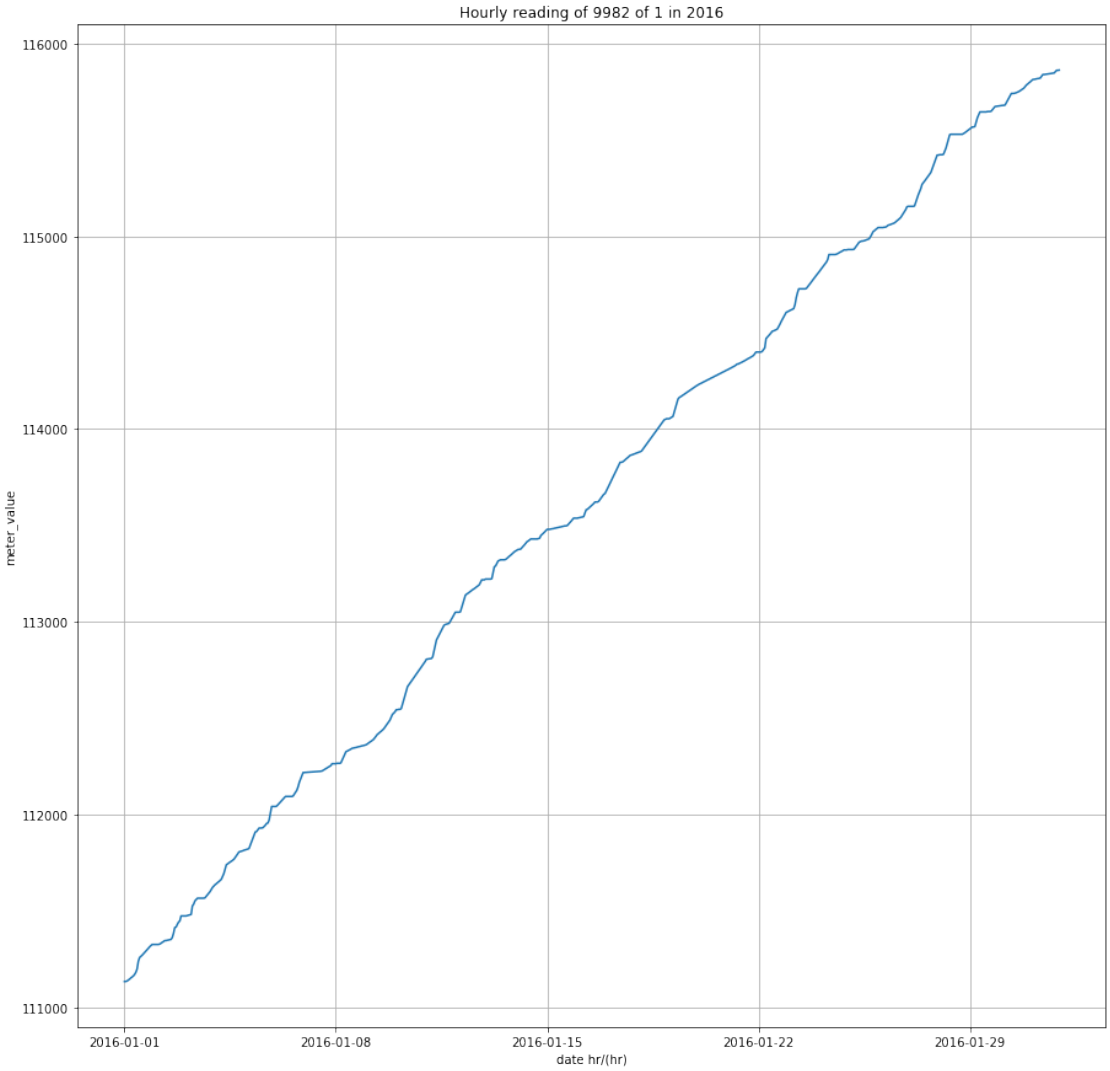

Hourly reading of 9639 of 1 in 2016
meter_value
244000
242000
240000
238000
236000
234000
232000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)


Hourly reading of 9729 of 1 in 2016
meter_value
134000
133000
132000
131000
130000
129000
128000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)


Hourly reading of 9766 of 1 in 2016
meter_value
174000
173000
172000
171000
170000
169000
168000
167000
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)


Hourly reading of 9849 of 1 in 2016
meter_value
37400
37200
37000
36800
36600
36400
36200
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)


Hourly reading of 9956 of 1 in 2016
106000
105000
104000
103000
102000
101000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)


Hourly reading of 9982 of 1 in 2016
116000
115000
114000
113000
112000
111000
meter_value
2016-01-01
2016-01-08
2016-01-15
2016-01-22
2016-01-29
date hr/(hr)

In [ ]: 8967