Exploring SVK Mimer "API" for actuall energy production

Initial query and CSV parsing testing

In [1]:

```
# Carl vRJ 2019-04-06
import pandas as pd
import numpy as np
# We'll also import seaborn, a Python graphing library
import warnings # current version of seaborn generates a bunch of warnings that
 we'll ignore
warnings.filterwarnings("ignore")
import seaborn as sns

import matplotlib.pyplot as plt
sns.set(style="white", color_codes=True)


csv_url_string = "https://mimer.svk.se/ProductionConsumption/DownloadText?Period
From=03%2F30%2F2019%2000%3A00%3A00&PeriodTo=04%2F06%2F2019%2010%3A10%3A55&Constr
aintAreaId=SN0&ProductionSortId=VI"

test = pd.read_csv(csv_url_string,sep=';',parse_dates=True,decimal=',') #

test.head()
```

Out[1]:

	Period	Planerad (kWh)	Avräknad (kWh)	Publiceringstidpunkt	Unnamed: 4
0	2019-03-30 00:00	NaN	4975408.173	2019-04-05 10:01	NaN
1	2019-03-30 01:00	NaN	4718669.599	2019-04-05 10:01	NaN
2	2019-03-30 02:00	NaN	4402917.724	2019-04-05 10:01	NaN
3	2019-03-30 03:00	NaN	4199060.526	2019-04-05 10:01	NaN
4	2019-03-30 04:00	NaN	4141460.816	2019-04-04 14:01	NaN

In [2]:

```
test['Avräknad (kWh)'].head()
```

Out[2]:

```
0    4975408.173
1    4718669.599
2    4402917.724
3    4199060.526
4    4141460.816
Name: Avräknad (kWh), dtype: float64
```

Digging deeper and finding different power production sources

In [3]:

```
solar = 'SE' # Solarpower
wind = 'VI'  # Onshore windpower
hydro = 'VA' # Hydropower
nucle = 'KK'  # Nuclearpower
wave = 'VK'  # Wavepower
gas = 'GA'   # Gasturbine/Disel
heat = 'OK'  # Other heat power
other = 'OP' # Other production


date_from = '01%2F01%2F2019%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '04%2F05%2F2019%2023%3A59%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', solar])
print(csv_url_string)
test = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
test.head()
```

```
https://mimer.svk.se/ProductionConsumption/DownloadText?PeriodFrom=0
1%2F01%2F2019%2000%3A00%3A00&PeriodTo=04%2F05%2F2019%2023%3A59%3A00&
ConstraintAreaId=SN0&ProductionSortId=SE
```

Out[3]:

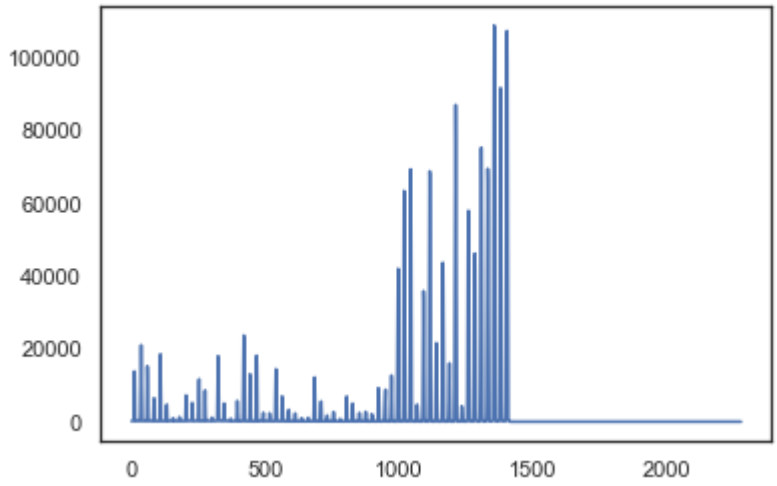
	Period	Planerad (kWh)	Avräknad (kWh)	Publiceringstidpunkt	Unnamed: 4
0	2019-01-01 00:00	NaN	176.113	2019-02-26 17:00	NaN
1	2019-01-01 01:00	NaN	180.390	2019-02-26 17:00	NaN
2	2019-01-01 02:00	NaN	180.313	2019-02-26 17:00	NaN
3	2019-01-01 03:00	NaN	177.250	2019-02-26 17:00	NaN
4	2019-01-01 04:00	NaN	167.935	2019-02-26 17:00	NaN

Find max value of Solar 2019

In [4]:

```
m = test['Avräknad (kWh)'].idxmax()
mwh = format(test['Avräknad (kWh)'][m]/1000,'.2f') # MWh
print('Max solar power 2019 is ' + str(mwh) + ' MWh during ' + str(test['Period'
][m]))
plt.plot(test['Avräknad (kWh)'])
plt.show()
```

```
Max solar power 2019 is 108.76 MWh during 2019-02-26 12:00
```

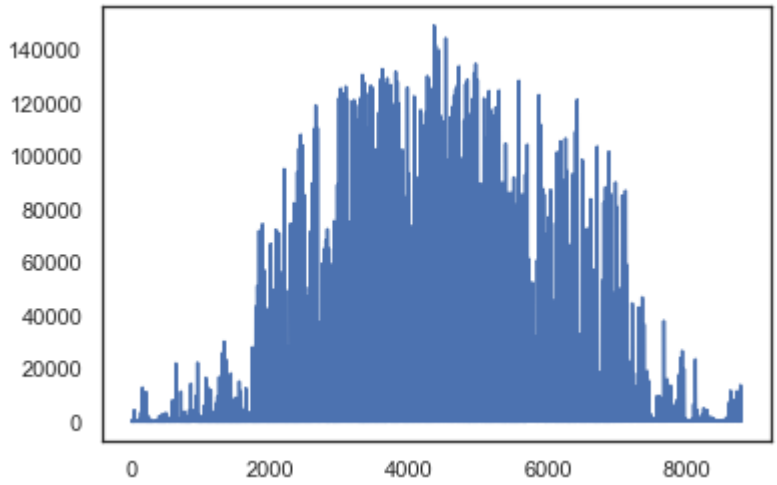


Find Max value 2018

In [5]:

```
date_from = '01%2F01%2F2018%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '01%2F01%2F2019%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', solar])
print(csv_url_string)
solar_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)

m = solar_2018['Avräknad (kWh)'].idxmax()
mwh = format(solar_2018['Avräknad (kWh)'][m]/1000,'.2f') # MWh

print('Max solar power 2018 is ' + str(mwh) + ' MWh at ' + str(solar_2018['Perio
d'][m]))
plt.plot(solar_2018['Avräknad (kWh)'])
plt.show()
```

```
https://mimer.svk.se/ProductionConsumption/DownloadText?PeriodFrom=0
1%2F01%2F2018%2000%3A00%3A00&PeriodTo=01%2F01%2F2019%2000%3A00%3A00&
ConstraintAreaId=SN0&ProductionSortId=SE
Max solar power 2018 is 149.05 MWh at 2018-07-01 12:00
```



Solar power production Feb 2018 vs Feb 2019

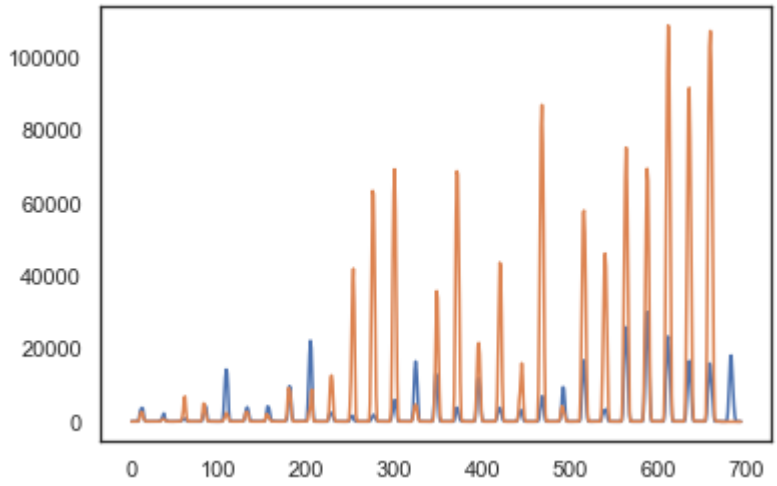
In [6]:

```
date_from = '02%2F01%2F2018%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '03%2F01%2F2018%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', solar])


solar_feb_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True
)
m_18 = solar_feb_2018['Avräknad (kWh)'].idxmax()
mwh_2018 = format(solar_feb_2018['Avräknad (kWh)'][m_18]/1000,'.3f') # MWh

date_from = '02%2F01%2F2019%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '03%2F01%2F2019%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', solar])


solar_feb_2019 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True
)
m_19 = solar_feb_2019['Avräknad (kWh)'].idxmax()
mwh_2019 = format(solar_feb_2019['Avräknad (kWh)'][m_19]/1000,'.3f') # MWh

print('Max 2018 ' + str(mwh_2018) + ' MWh, Max 2019 ' + str(mwh_2019) + ' MWh')
print(format(solar_feb_2019['Avräknad (kWh)'].sum()/solar_feb_2018['Avräknad (kW
h)'].sum(),'.3f') + ' more total solar power production in feb 2019 vs 2018')
```

```
Max 2018 30.110 MWh, Max 2019 108.763 MWh
3.647 more total solar power production in feb 2019 vs 2018
```

In [7]:

```
plt.plot(solar_feb_2018['Avräknad (kWh)'])
plt.plot(solar_feb_2019['Avräknad (kWh)'])
plt.show()
```



Wind power 2016-2019

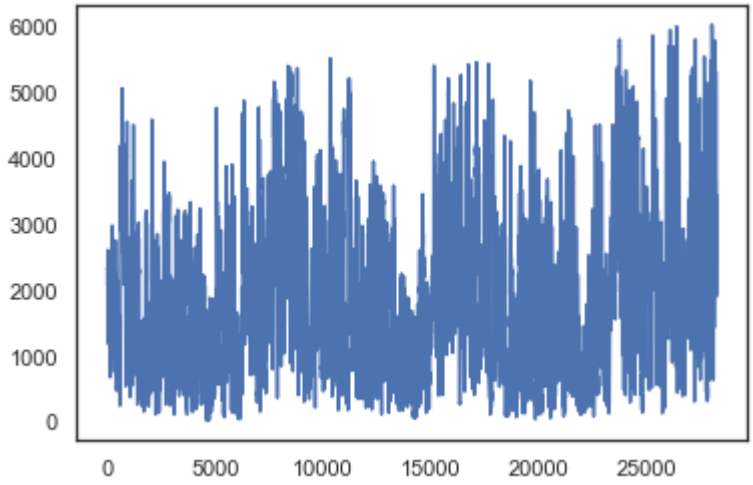
In [8]:

```
date_from = '01%2F01%2F2016%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '04%2F01%2F2019%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', wind])
wind_data = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)

wm = wind_data['Avräknad (kWh)'].idxmax()
w_mwh = format(wind_data['Avräknad (kWh)'][wm]/1000,'.3f') # MWh
print('Max Wind power is ' + str(w_mwh) + ' MWh at ' + str(wind_data['Period'][w
m]))
```

```
Max Wind power is 6037.356 MWh at 2019-03-23 15:00
```

In [9]:

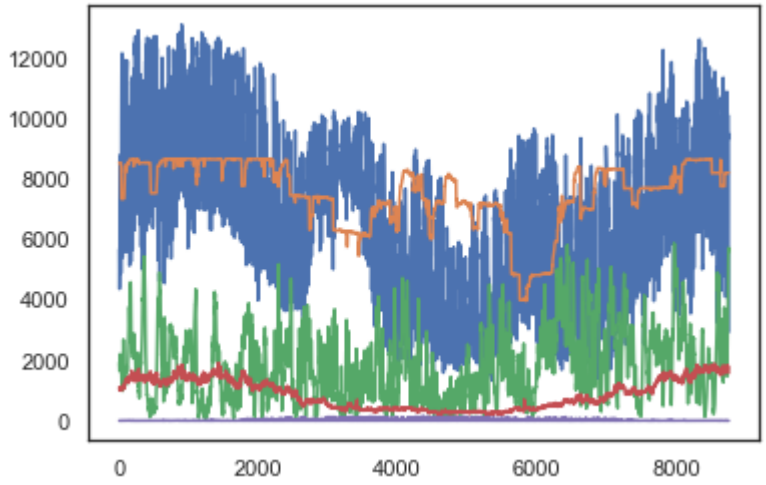
```
plt.plot(wind_data['Avräknad (kWh)']/1000)
plt.show()
```



Total energy production in Sweden 2018

In [10]:

```
solar = 'SE' # Solarpower
wind = 'VI'  # Onshore windpower
hydro = 'VA' # Hydropower
nucle = 'KK'  # Nuclearpower
wave = 'VK'  # Wavepower, 0.0 2018
gas = 'GA'   # Gasturbine/Disel, 0.0 2018
heat = 'OK'  # Other heat power
other = 'OP' # Other production

date_from = '01%2F01%2F2018%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' m
m ':' ss] # / = %2F , : = %3A
date_to = '12%2F31%2F2018%2000%3A00%3A00'#[month '/' day '/' year ' ' hh ':' mm
 ':' ss]
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', wind])
wind_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', solar])
solar_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', hydro])
hydro_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', nucle])
nucle_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)


csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', heat])
heat_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
csv_url_string = ''.join(['https://mimer.svk.se/ProductionConsumption/DownloadTe
xt?PeriodFrom=',
                  date_from, '&PeriodTo=', date_to,
                  '&ConstraintAreaId=SN0&ProductionSortId=', other])
other_2018 = pd.read_csv(csv_url_string,sep=';',decimal=',',parse_dates=True)
plt.plot(hydro_2018['Avräknad (kWh)']/1000)
plt.plot(nucle_2018['Avräknad (kWh)']/1000)
plt.plot(wind_2018['Avräknad (kWh)']/1000)
plt.plot(heat_2018['Avräknad (kWh)']/1000)
plt.plot(solar_2018['Avräknad (kWh)']/1000)
plt.show()
```



In [11]:

```
tot = solar_2018['Avräknad (kWh)'].sum() + wind_2018['Avräknad (kWh)'].sum() + h
ydro_2018['Avräknad (kWh)'].sum() + nucle_2018['Avräknad (kWh)'].sum() + heat_20
18['Avräknad (kWh)'].sum() + other_2018['Avräknad (kWh)'].sum()
tot/1000000 # GWh
```

Out[11]:

```
152439.28069521498
```

In [12]:

```
solar_2018['Avräknad (kWh)'].sum()/tot*100
```

Out[12]:

```
0.09681693884470861
```

In [13]:

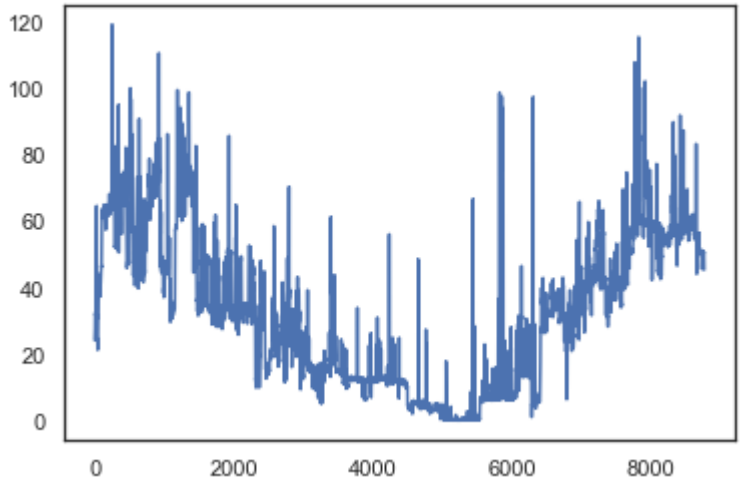
```
wind_2018['Avräknad (kWh)'].sum()/tot*100
```

Out[13]:

```
10.932027540570191
```

In [14]:

```
plt.plot(other_2018['Avräknad (kWh)']/1000)
plt.show()
```



In [15]:

```
wind_2018['Avräknad (kWh)'].sum()/1000000000 # TWh
```

Out[15]:

```
16.664704148248003
```