

In [4]:

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1 from nilm_metadata import get_appliance_types
2 appliance_types = get_appliance_types()
3 print(appliance_types)
4
5 import os
6 os.getcwd()

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- https://en.wikipedia.org/wiki/Luminaire (https://en.wikipedia.org/wiki/Luminaire) \n
- https://en.wikipedia.org/wiki/Lamp\_%28electrical\_c
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```

```

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```


localhost:8888/notebooks/Convert meta hd5.ipynb#

```

ce', 'distance': 2}}], 'components': [{'type': 'light', 'control': ['t
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g) and the\nelectric lamp(s) within the light fitting.\n\nSee:\n - ht
tps://en.wikipedia.org/wiki/Luminaire (https://en.wikipedia.org/wiki/L
uminaire) \n - https://en.wikipedia.org/wiki/Lamp_%28electrical_compo
nent%29\n\nThe (https://en.wikipedia.org/wiki/Lamp_%28electrical_compo
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s']}, 'subtypes': ['desk', 'ceiling', 'extractor', 'single-room MVH
R']}]

```

Out[4]:

```

'/home/hb/projetos/nilmtk'

```

In [1]:

```

1  from matplotlib import rcParams
2  import matplotlib.pyplot as plt
3  import pandas as pd
4  import nilmtk
5  from nilmtk import MeterGroup
6  from nilmtk.api import API
7  import warnings
8  warnings.filterwarnings("ignore")
9
10 plt.style.use('ggplot')
11 rcParams['figure.figsize'] = (13, 10)
12
13 !pip install seaborn
14 # import pathlib
15 # pathlib.Path().resolve()

```

Requirement already satisfied: seaborn in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (0.11.2)

Requirement already satisfied: matplotlib>=2.2 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from seaborn) (3.1.3)

Requirement already satisfied: numpy>=1.15 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from seaborn) (1.19.5)

Requirement already satisfied: scipy>=1.0 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from seaborn) (1.7.1)

Requirement already satisfied: pandas>=0.23 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from seaborn) (0.25.3)

Requirement already satisfied: kiwisolver>=1.0.1 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn) (1.3.2)

Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn) (2.4.7)

Requirement already satisfied: python-dateutil>=2.1 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn) (2.8.2)

Requirement already satisfied: cycler>=0.10 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from matplotlib>=2.2->seaborn) (0.10.0)

Requirement already satisfied: six in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from cycler>=0.10->matplotlib>=2.2->seaborn) (1.16.0)

Requirement already satisfied: pytz>=2017.2 in /home/hb/mambaforge/envs/nilm_0.4.3/lib/python3.7/site-packages (from pandas>=0.23->seaborn) (2021.1)

In [1]:

```
1 from nilmtk.dataset_converters import convert_hb
2 convert_hb('./BD/CASA/convert', './data/teste17.h5')
```

Checando diretório

<nilmtk.datastore.hdfdatastore.HDFDataStore object at 0x7f32cf8df3d0>

chan_id

1 key

/building1/elec/meter1

measurements

```
[('voltage', ''), ('current', ''), ('power', 'active'), ('frequency',
''), ('power factor', '')]
```

chans_filename

meter1

<bound method NDFrame.head of

ent power frequency power factor

voltage curr

active

2021-09-02 10:14:34.515 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:35.014 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:35.513 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:36.013 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:36.527 221.500000 0.890 166.899994 60.0

0.85

...

...

2021-09-06 10:24:13.545 221.300003 2.286 458.399994 60.0

0.91

2021-09-06 10:24:14.060 221.300003 2.286 458.399994 60.0

0.91

2021-09-06 10:24:14.559 221.500000 2.282 458.299988 60.0

0.91

2021-09-06 10:24:15.042 221.500000 2.282 458.299988 60.0

0.91

2021-09-06 10:24:15.557 221.600006 2.286 459.000000 60.0

0.91

[692159 rows x 5 columns]>

LEVEL_NAMES

['physical_quantity', 'type']

<bound method NDFrame.head of physical_quantity

ent power frequency power factor

voltage curr

type active

2021-09-02 10:14:34.515 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:35.014 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:35.513 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:36.013 221.600006 0.896 167.199997 60.0

0.84

2021-09-02 10:14:36.527 221.500000 0.890 166.899994 60.0

0.85

...

...

2021-09-06 10:24:13.545 221.300003 2.286 458.399994 60.0

0.91

```

2021-09-06 10:24:14.060 221.300003 2.286 458.399994 60.0
0.91
2021-09-06 10:24:14.559 221.500000 2.282 458.299988 60.0
0.91
2021-09-06 10:24:15.042 221.500000 2.282 458.299988 60.0
0.91
2021-09-06 10:24:15.557 221.600006 2.286 459.000000 60.0
0.91

```

```
[692159 rows x 5 columns]>
```

```
df.index
```

```

Index(['2021-09-02 10:14:34.515', '2021-09-02 10:14:35.014',
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      '2021-09-02 10:14:36.527', '2021-09-02 10:14:37.027',
      '2021-09-02 10:14:37.526', '2021-09-02 10:14:38.025',
      '2021-09-02 10:14:38.524', '2021-09-02 10:14:39.023',
      ...,
      '2021-09-06 10:24:11.049', '2021-09-06 10:24:11.548',
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      '2021-09-06 10:24:14.060', '2021-09-06 10:24:14.559',
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```

```
<bound method NDFrame.head of physical_quantity
```

```
vol
```

```

tage current      power frequency \
type                                     active
2021-09-02 07:14:34.515000-03:00 221.600006 0.896 167.199997
60.0
2021-09-02 07:14:35.014000-03:00 221.600006 0.896 167.199997
60.0
2021-09-02 07:14:35.513000-03:00 221.600006 0.896 167.199997
60.0
2021-09-02 07:14:36.013000-03:00 221.600006 0.896 167.199997
60.0
2021-09-02 07:14:36.527000-03:00 221.500000 0.890 166.899994
60.0
...
...
...
2021-09-06 07:24:13.545000-03:00 221.300003 2.286 458.399994
60.0
2021-09-06 07:24:14.060000-03:00 221.300003 2.286 458.399994
60.0
2021-09-06 07:24:14.559000-03:00 221.500000 2.282 458.299988
60.0
2021-09-06 07:24:15.042000-03:00 221.500000 2.282 458.299988
60.0
2021-09-06 07:24:15.557000-03:00 221.600006 2.286 459.000000
60.0

```

```
physical_quantity
```

```
power factor
```

```

type
2021-09-02 07:14:34.515000-03:00 0.84
2021-09-02 07:14:35.014000-03:00 0.84
2021-09-02 07:14:35.513000-03:00 0.84
2021-09-02 07:14:36.013000-03:00 0.84
2021-09-02 07:14:36.527000-03:00 0.85
...
2021-09-06 07:24:13.545000-03:00 0.91
2021-09-06 07:24:14.060000-03:00 0.91
2021-09-06 07:24:14.559000-03:00 0.91
2021-09-06 07:24:15.042000-03:00 0.91

```

2021-09-06 07:24:15.557000-03:00 0.91

[692159 rows x 5 columns]>

<bound method NDFrame.head of physical_quantity vol

tage	current	power	frequency \	active
2021-09-02 07:14:34.515000-03:00	221.600006	0.896	167.199997	60.0
2021-09-02 07:14:35.014000-03:00	221.600006	0.896	167.199997	60.0
2021-09-02 07:14:35.513000-03:00	221.600006	0.896	167.199997	60.0
2021-09-02 07:14:36.013000-03:00	221.600006	0.896	167.199997	60.0
2021-09-02 07:14:36.527000-03:00	221.500000	0.890	166.899994	60.0
...
2021-09-06 07:24:13.545000-03:00	221.300003	2.286	458.399994	60.0
2021-09-06 07:24:14.060000-03:00	221.300003	2.286	458.399994	60.0
2021-09-06 07:24:14.559000-03:00	221.500000	2.282	458.299988	60.0
2021-09-06 07:24:15.042000-03:00	221.500000	2.282	458.299988	60.0
2021-09-06 07:24:15.557000-03:00	221.600006	2.286	459.000000	60.0

physical_quantity	power factor
2021-09-02 07:14:34.515000-03:00	0.84
2021-09-02 07:14:35.014000-03:00	0.84
2021-09-02 07:14:35.513000-03:00	0.84
2021-09-02 07:14:36.013000-03:00	0.84
2021-09-02 07:14:36.527000-03:00	0.85
...	...
2021-09-06 07:24:13.545000-03:00	0.91
2021-09-06 07:24:14.060000-03:00	0.91
2021-09-06 07:24:14.559000-03:00	0.91
2021-09-06 07:24:15.042000-03:00	0.91
2021-09-06 07:24:15.557000-03:00	0.91

[692159 rows x 5 columns]>

chan_id

2 key

/building1/elec/meter2

measurements

[('power', 'active'), ('power', 'apparent'), ('power', 'reactive'), ('power factor', ''), ('voltage', ''), ('current', '')]

chans_filename

meter2

<bound method NDFrame.head of power power factor \

	active	apparent	reactive	
2021-09-02T10:47:51	0.767000	18.454000	18.400000	0.04
2021-09-02T10:47:56	1.091000	31.761999	31.700001	0.03
2021-09-02T10:48:01	1.091000	20.479000	20.400000	0.05
2021-09-02T10:48:06	0.923000	31.187000	31.200001	0.03
2021-09-02T10:48:11	0.923000	23.195999	23.200001	0.04
...

2021-09-06T10:55:40	86.717003	104.512001	58.299999	0.83
2021-09-06T10:55:45	86.690002	104.272003	57.900002	0.83
2021-09-06T10:55:50	86.841003	104.617996	58.299999	0.83
2021-09-06T10:55:55	87.019997	104.447998	57.799999	0.83
2021-09-06T10:56:00	87.049004	104.301003	57.500000	0.83

voltage current

2021-09-02T10:47:51	222.287003	0.083
2021-09-02T10:47:56	222.546997	0.143
2021-09-02T10:48:01	222.028000	0.092
2021-09-02T10:48:06	222.287003	0.140
2021-09-02T10:48:11	221.770004	0.105
...
2021-09-06T10:55:40	222.287003	0.470
2021-09-06T10:55:45	221.770004	0.470
2021-09-06T10:55:50	222.287003	0.471
2021-09-06T10:55:55	221.770004	0.471
2021-09-06T10:56:00	221.770004	0.470

[67147 rows x 6 columns]>

LEVEL_NAMES

['physical_quantity', 'type']

<bound method NDFrame.head of physical_quantity

power

power factor \

type	active	apparent	reactive	
2021-09-02T10:47:51	0.767000	18.454000	18.400000	0.04
2021-09-02T10:47:56	1.091000	31.761999	31.700001	0.03
2021-09-02T10:48:01	1.091000	20.479000	20.400000	0.05
2021-09-02T10:48:06	0.923000	31.187000	31.200001	0.03
2021-09-02T10:48:11	0.923000	23.195999	23.200001	0.04
...
2021-09-06T10:55:40	86.717003	104.512001	58.299999	0.83
2021-09-06T10:55:45	86.690002	104.272003	57.900002	0.83
2021-09-06T10:55:50	86.841003	104.617996	58.299999	0.83
2021-09-06T10:55:55	87.019997	104.447998	57.799999	0.83
2021-09-06T10:56:00	87.049004	104.301003	57.500000	0.83

physical_quantity voltage current

type		
2021-09-02T10:47:51	222.287003	0.083
2021-09-02T10:47:56	222.546997	0.143
2021-09-02T10:48:01	222.028000	0.092
2021-09-02T10:48:06	222.287003	0.140
2021-09-02T10:48:11	221.770004	0.105
...
2021-09-06T10:55:40	222.287003	0.470
2021-09-06T10:55:45	221.770004	0.470
2021-09-06T10:55:50	222.287003	0.471
2021-09-06T10:55:55	221.770004	0.471
2021-09-06T10:56:00	221.770004	0.470

[67147 rows x 6 columns]>

df.index

Index(['2021-09-02T10:47:51', '2021-09-02T10:47:56', '2021-09-02T10:48:01',
'2021-09-02T10:48:06', '2021-09-02T10:48:11', '2021-09-02T10:48:16',
'2021-09-02T10:48:21', '2021-09-02T10:48:26', '2021-09-02T10:48:31',
'2021-09-02T10:48:36',

```

...
'2021-09-06T10:55:15', '2021-09-06T10:55:20', '2021-09-06T10:5
5:25',
'2021-09-06T10:55:30', '2021-09-06T10:55:35', '2021-09-06T10:5
5:40',
'2021-09-06T10:55:45', '2021-09-06T10:55:50', '2021-09-06T10:5
5:55',
'2021-09-06T10:56:00'],
dtype='object', length=67147)

```

```

<bound method NDFrame.head of physical_quantity          power
power factor \
type          active    apparent    reactive
2021-09-02 07:47:51-03:00    0.767000    18.454000    18.400000    0.
04
2021-09-02 07:47:56-03:00    1.091000    31.761999    31.700001    0.
03
2021-09-02 07:48:01-03:00    1.091000    20.479000    20.400000    0.
05
2021-09-02 07:48:06-03:00    0.923000    31.187000    31.200001    0.
03
2021-09-02 07:48:11-03:00    0.923000    23.195999    23.200001    0.
04
...
...
...
...
2021-09-06 07:55:40-03:00    86.717003    104.512001    58.299999    0.
83
2021-09-06 07:55:45-03:00    86.690002    104.272003    57.900002    0.
83
2021-09-06 07:55:50-03:00    86.841003    104.617996    58.299999    0.
83
2021-09-06 07:55:55-03:00    87.019997    104.447998    57.799999    0.
83
2021-09-06 07:56:00-03:00    87.049004    104.301003    57.500000    0.
83

```

```

physical_quantity          voltage current
type
2021-09-02 07:47:51-03:00    222.287003    0.083
2021-09-02 07:47:56-03:00    222.546997    0.143
2021-09-02 07:48:01-03:00    222.028000    0.092
2021-09-02 07:48:06-03:00    222.287003    0.140
2021-09-02 07:48:11-03:00    221.770004    0.105
...
...
...
2021-09-06 07:55:40-03:00    222.287003    0.470
2021-09-06 07:55:45-03:00    221.770004    0.470
2021-09-06 07:55:50-03:00    222.287003    0.471
2021-09-06 07:55:55-03:00    221.770004    0.471
2021-09-06 07:56:00-03:00    221.770004    0.470

```

```

[67147 rows x 6 columns]>
<bound method NDFrame.head of physical_quantity          power
power factor \
type          active    apparent    reactive
2021-09-02 07:47:51-03:00    0.767000    18.454000    18.400000    0.
04
2021-09-02 07:47:56-03:00    1.091000    31.761999    31.700001    0.
03
2021-09-02 07:48:01-03:00    1.091000    20.479000    20.400000    0.
05
2021-09-02 07:48:06-03:00    0.923000    31.187000    31.200001    0.
03

```



```

2021-09-02 07:48:11-03:00 0.923000 23.195999 23.200001 0.
04
...
...
2021-09-06 07:55:40-03:00 86.717003 104.512001 58.299999 0.
83
2021-09-06 07:55:45-03:00 86.690002 104.272003 57.900002 0.
83
2021-09-06 07:55:50-03:00 86.841003 104.617996 58.299999 0.
83
2021-09-06 07:55:55-03:00 87.019997 104.447998 57.799999 0.
83
2021-09-06 07:56:00-03:00 87.049004 104.301003 57.500000 0.
83

```

```

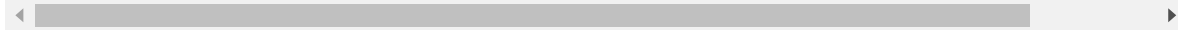
physical_quantity      voltage current
type
2021-09-02 07:47:51-03:00 222.287003 0.083
2021-09-02 07:47:56-03:00 222.546997 0.143
2021-09-02 07:48:01-03:00 222.028000 0.092
2021-09-02 07:48:06-03:00 222.287003 0.140
2021-09-02 07:48:11-03:00 221.770004 0.105
...
2021-09-06 07:55:40-03:00 222.287003 0.470
2021-09-06 07:55:45-03:00 221.770004 0.470
2021-09-06 07:55:50-03:00 222.287003 0.471
2021-09-06 07:55:55-03:00 221.770004 0.471
2021-09-06 07:56:00-03:00 221.770004 0.470

```

```

[67147 rows x 6 columns]>
chan_id

```



3 key

/building1/elec/meter3

measurements

[('power', 'active'), ('power', 'apparent'), ('power', 'reactive'),
('power factor', ''), ('voltage', ''), ('current', '')]

chans_filename

meter3

<bound method NDFrame.head of

power factor voltage current

active apparent reactive

2021-09-02T10:47:51	0.0	0.0	0.0	0.0	221.882004
0.0					
2021-09-02T10:47:56	0.0	0.0	0.0	0.0	221.882004
0.0					
2021-09-02T10:48:01	0.0	0.0	0.0	0.0	222.406006
0.0					
2021-09-02T10:48:06	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-02T10:48:11	0.0	0.0	0.0	0.0	221.621994
0.0					
...
...					
2021-09-06T10:55:39	0.0	0.0	0.0	0.0	222.667999
0.0					
2021-09-06T10:55:44	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:49	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:55	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:59	0.0	0.0	0.0	0.0	221.621994
0.0					

[67270 rows x 6 columns]>

LEVEL_NAMES

['physical_quantity', 'type']

<bound method NDFrame.head of physical_quantity

power factor voltage current

type active apparent reactive

2021-09-02T10:47:51	0.0	0.0	0.0	0.0	221.882004
0.0					
2021-09-02T10:47:56	0.0	0.0	0.0	0.0	221.882004
0.0					
2021-09-02T10:48:01	0.0	0.0	0.0	0.0	222.406006
0.0					
2021-09-02T10:48:06	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-02T10:48:11	0.0	0.0	0.0	0.0	221.621994
0.0					
...
...					
2021-09-06T10:55:39	0.0	0.0	0.0	0.0	222.667999
0.0					
2021-09-06T10:55:44	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:49	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:55	0.0	0.0	0.0	0.0	222.143997
0.0					
2021-09-06T10:55:59	0.0	0.0	0.0	0.0	221.621994
0.0					

```
[67270 rows x 6 columns]>
df.index
Index(['2021-09-02T10:47:51', '2021-09-02T10:47:56', '2021-09-02T10:48:01',
      '2021-09-02T10:48:06', '2021-09-02T10:48:11', '2021-09-02T10:48:16',
      '2021-09-02T10:48:21', '2021-09-02T10:48:26', '2021-09-02T10:48:31',
      '2021-09-02T10:48:36',
      ...,
      '2021-09-06T10:55:15', '2021-09-06T10:55:19', '2021-09-06T10:55:24',
      '2021-09-06T10:55:29', '2021-09-06T10:55:35', '2021-09-06T10:55:39',
      '2021-09-06T10:55:44', '2021-09-06T10:55:49', '2021-09-06T10:55:55',
      '2021-09-06T10:55:59'],
      dtype='object', length=67270)
<bound method NDFrame.head of physical_quantity      power
power factor      voltage \
type              active apparent reactive
2021-09-02 07:47:51-03:00      0.0      0.0      0.0      0.0 221.8
82004
2021-09-02 07:47:56-03:00      0.0      0.0      0.0      0.0 221.8
82004
2021-09-02 07:48:01-03:00      0.0      0.0      0.0      0.0 222.4
06006
2021-09-02 07:48:06-03:00      0.0      0.0      0.0      0.0 222.1
43997
2021-09-02 07:48:11-03:00      0.0      0.0      0.0      0.0 221.6
21994
...
...
...
2021-09-06 07:55:39-03:00      0.0      0.0      0.0      0.0 222.6
67999
2021-09-06 07:55:44-03:00      0.0      0.0      0.0      0.0 222.1
43997
2021-09-06 07:55:49-03:00      0.0      0.0      0.0      0.0 222.1
43997
2021-09-06 07:55:55-03:00      0.0      0.0      0.0      0.0 222.1
43997
2021-09-06 07:55:59-03:00      0.0      0.0      0.0      0.0 221.6
21994

physical_quantity      current
type
2021-09-02 07:47:51-03:00      0.0
2021-09-02 07:47:56-03:00      0.0
2021-09-02 07:48:01-03:00      0.0
2021-09-02 07:48:06-03:00      0.0
2021-09-02 07:48:11-03:00      0.0
...
...
2021-09-06 07:55:39-03:00      0.0
2021-09-06 07:55:44-03:00      0.0
2021-09-06 07:55:49-03:00      0.0
2021-09-06 07:55:55-03:00      0.0
2021-09-06 07:55:59-03:00      0.0
```

```
[67270 rows x 6 columns]>
<bound method NDFrame.head of physical_quantity      power
```

power factor	voltage	\	active	apparent	reactive		
type							
2021-09-02 07:47:51-03:00	82004		0.0	0.0	0.0	0.0	221.8
2021-09-02 07:47:56-03:00	82004		0.0	0.0	0.0	0.0	221.8
2021-09-02 07:48:01-03:00	06006		0.0	0.0	0.0	0.0	222.4
2021-09-02 07:48:06-03:00	43997		0.0	0.0	0.0	0.0	222.1
2021-09-02 07:48:11-03:00	21994		0.0	0.0	0.0	0.0	221.6
...			
2021-09-06 07:55:39-03:00	67999		0.0	0.0	0.0	0.0	222.6
2021-09-06 07:55:44-03:00	43997		0.0	0.0	0.0	0.0	222.1
2021-09-06 07:55:49-03:00	43997		0.0	0.0	0.0	0.0	222.1
2021-09-06 07:55:55-03:00	43997		0.0	0.0	0.0	0.0	222.1
2021-09-06 07:55:59-03:00	21994		0.0	0.0	0.0	0.0	221.6

physical_quantity	current
type	
2021-09-02 07:47:51-03:00	0.0
2021-09-02 07:47:56-03:00	0.0
2021-09-02 07:48:01-03:00	0.0
2021-09-02 07:48:06-03:00	0.0
2021-09-02 07:48:11-03:00	0.0
...	...
2021-09-06 07:55:39-03:00	0.0
2021-09-06 07:55:44-03:00	0.0
2021-09-06 07:55:49-03:00	0.0
2021-09-06 07:55:55-03:00	0.0
2021-09-06 07:55:59-03:00	0.0

[67270 rows x 6 columns]>

Loaded metadata

Done converting YAML metadata to HDF5!



In [2]:

```

1 st = pd.HDFStore("./data/teste17.h5")
2 print (st.keys())
3
4 print (st['/building1/elec/meter1'].head())
5 print (st['/building1/elec/meter2'].head())
6 print (st['/building1/elec/meter3'].head())
7
8 st.close()

```

```
['/building1/elec/meter1', '/building1/elec/meter2', '/building1/elec/meter3']
```

```
physical_quantity      voltage current      power frequency \
```

```
type                                active
```

```
2021-09-02 07:14:34.515000-03:00  221.600006  0.896  167.199997
```

```
60.0
```

```
2021-09-02 07:14:35.014000-03:00  221.600006  0.896  167.199997
```

```
60.0
```

```
2021-09-02 07:14:35.513000-03:00  221.600006  0.896  167.199997
```

```
60.0
```

```
2021-09-02 07:14:36.013000-03:00  221.600006  0.896  167.199997
```

```
60.0
```

```
2021-09-02 07:14:36.527000-03:00  221.500000  0.890  166.899994
```

```
60.0
```

```
physical_quantity      power factor
```

```
type
```

```
2021-09-02 07:14:34.515000-03:00      0.84
```

```
2021-09-02 07:14:35.014000-03:00      0.84
```

```
2021-09-02 07:14:35.513000-03:00      0.84
```

```
2021-09-02 07:14:36.013000-03:00      0.84
```

```
2021-09-02 07:14:36.527000-03:00      0.85
```

```
physical_quantity      power      power factor
```

```
\
```

```
type      active      apparent      reactive
```

```
2021-09-02 07:47:51-03:00  0.767  18.454000  18.400000      0.04
```

```
2021-09-02 07:47:56-03:00  1.091  31.761999  31.700001      0.03
```

```
2021-09-02 07:48:01-03:00  1.091  20.479000  20.400000      0.05
```

```
2021-09-02 07:48:06-03:00  0.923  31.187000  31.200001      0.03
```

```
2021-09-02 07:48:11-03:00  0.923  23.195999  23.200001      0.04
```

```
physical_quantity      voltage current
```

```
type
```

```
2021-09-02 07:47:51-03:00  222.287003  0.083
```

```
2021-09-02 07:47:56-03:00  222.546997  0.143
```

```
2021-09-02 07:48:01-03:00  222.028000  0.092
```

```
2021-09-02 07:48:06-03:00  222.287003  0.140
```

```
2021-09-02 07:48:11-03:00  221.770004  0.105
```

```
physical_quantity      power      power factor
```

```
voltage \
```

```
type      active      apparent      reactive
```

```
2021-09-02 07:47:51-03:00      0.0      0.0      0.0      0.0  22
```

```
1.882004
```

```
2021-09-02 07:47:56-03:00      0.0      0.0      0.0      0.0  22
```

```
1.882004
```

```
2021-09-02 07:48:01-03:00      0.0      0.0      0.0      0.0  22
```

```
2.406006
```

```
2021-09-02 07:48:06-03:00      0.0      0.0      0.0      0.0  22
```

2.143997
2021-09-02 07:48:11-03:00 0.0 0.0 0.0 0.0 22
1.621994

physical_quantity		current
type		
2021-09-02	07:47:51-03:00	0.0
2021-09-02	07:47:56-03:00	0.0
2021-09-02	07:48:01-03:00	0.0
2021-09-02	07:48:06-03:00	0.0
2021-09-02	07:48:11-03:00	0.0

In [3]:

```

1 from nilmtk.api import API
2 import warnings
3 warnings.filterwarnings("ignore")
4
5 from nilmtk import DataSet
6 from nilmtk.utils import print_dict
7
8 hb = DataSet('./data/teste17.h5')
9 #iawe = DataSet('/data/iawe.h5')
10
11 print_dict(hb.metadata)
12 print_dict(hb.buildings)

```

- **name:** HB
- **long_name:** The Reference Energy Disaggregation Data set
- **creators:**
 - Henrique
- **publication_date:** 2021
- **institution:** IFCE
- **contact:** henrique@ufc.br
- **description:** Several weeks of power data for 6 different homes.
- **subject:** Disaggregated power demand from domestic buildings.
- **number_of_buildings:** 1
- **timezone:** America/Fortaleza
- **geo_location:**
 - **locality:** Fortaleza
 - **country:** BR
 - **latitude:** -3.743443904897663
 - **longitude:** -38.526093995496886
- **related_documents:**
 - <http://redd.csail.mit.edu> (<http://redd.csail.mit.edu>)
 - J. Zico Kolter and Matthew J. Johnson. REDD: A public data set for energy disaggregation research. In proceedings of the SustKDD workshop on Data Mining Applications in Sustainability, 2011. <http://redd.csail.mit.edu/kolter-kddsust11.pdf> (<http://redd.csail.mit.edu/kolter-kddsust11.pdf>)
- **schema:** https://github.com/nilmtk/nilm_metadata/tree/v0.2 (https://github.com/nilmtk/nilm_metadata/tree/v0.2)
- **meter_devices:**
 - **eMonitor:**
 - **model:** sonoff
 - **manufacturer:** Powerhouse Dynamics
 - **manufacturer_url:** <http://powerhousedynamics.com> (<http://powerhousedynamics.com>)
 - **description:** ...
 - **sample_period:** 5
 - **max_sample_period:** 30
 - **measurements:**
 - {'physical_quantity': 'power', 'type': 'active', 'upper_limit': 1142, 'lower_limit': 0}
 - {'physical_quantity': 'power', 'type': 'apparent', 'upper_limit': 1215, 'lower_limit': 0}

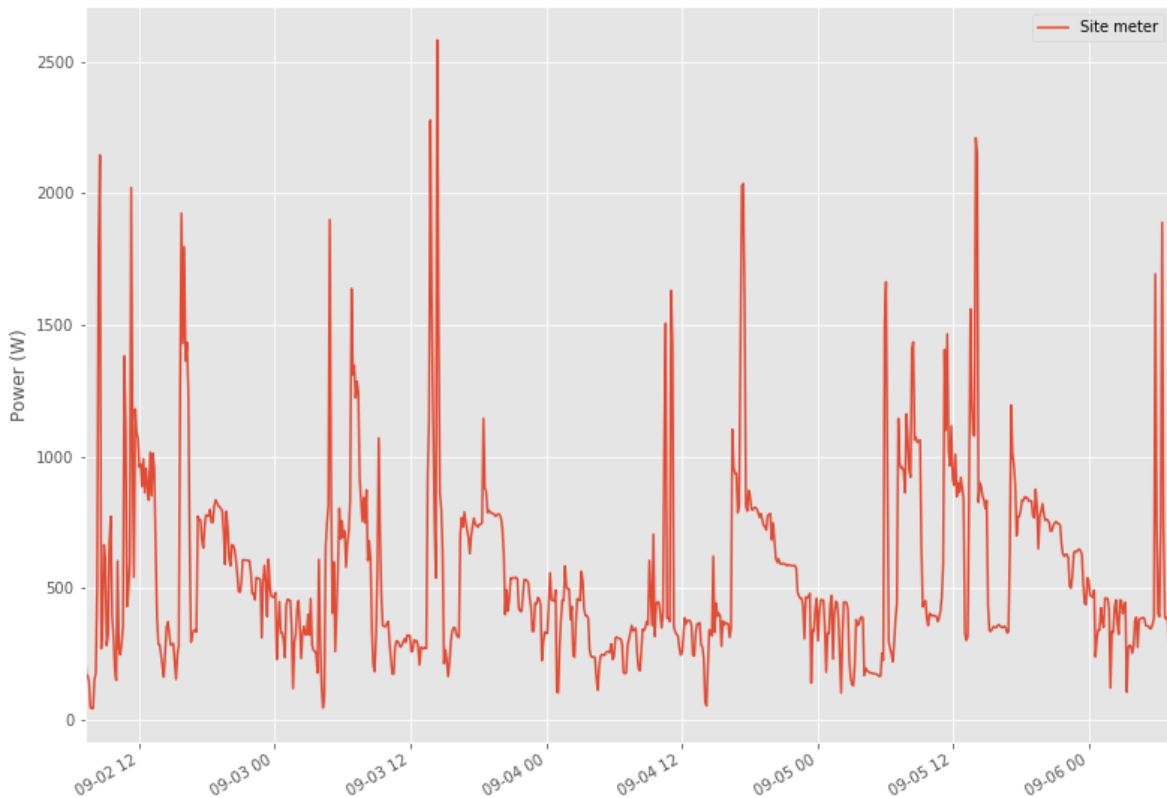
- {'physical_quantity': 'power', 'type': 'reactive', 'upper_limit': 901, 'lower_limit': 0}
- {'physical_quantity': 'power factor', 'upper_limit': 1, 'lower_limit': 0}
- {'physical_quantity': 'voltage', 'upper_limit': 232, 'lower_limit': 0}
- {'physical_quantity': 'current', 'upper_limit': 6, 'lower_limit': 0}
- **wireless**: True
- **REDD_whole_house**:
 - **model**: pzem004t
 - **description**: ...
 - **sample_period**: 0.5
 - **max_sample_period**: 30
 - **measurements**:
 - {'physical_quantity': 'voltage', 'upper_limit': 230, 'lower_limit': 0}
 - {'physical_quantity': 'current', 'upper_limit': 15, 'lower_limit': 0}
 - {'physical_quantity': 'power', 'type': 'active', 'upper_limit': 3016, 'lower_limit': 0}
 - {'physical_quantity': 'frequency', 'upper_limit': 61, 'lower_limit': 0}
 - {'physical_quantity': 'power factor', 'upper_limit': 1, 'lower_limit': 0}
 - **wireless**: False
- **1**: Building(instance=1, dataset='HB')

In [4]:

```
1 import seaborn as sns
2
3 build = 1
4 elec = hb.buildings[build].elec
5 elec.mains().power_series_all_data().head()
6 elec.mains().plot()
7 sns.set_palette("Set3", n_colors=12)
8 # Set a threshold to remove residual power noise when devices are off
9 elec.plot_when_on(on_power_threshold = 40) # Plot appliances when they are in u
```

Out[4]:

<matplotlib.axes._subplots.AxesSubplot at 0x7f8f6dd40f10>



In [5]:

```
1 from nilmtk.disaggregate import Mean,C0,Hart85
2 # from nilmtk_contrib.disaggregate import AFHMM,AFHMM_SAC,DSC,RNN,Seq2Point,Seq
3 from nilmtk_contrib.disaggregate import RNN,Seq2Point,WindowGRU
```

Using TensorFlow backend.

In [6]:

```

1  d = {
2      'power': {
3          'mains': ['active'],
4          'appliance': ['active']
5      },
6      'sample_rate': 5,
7      'display_predictions': True,
8      'appliances': ['microwave', 'fan'],
9      'methods': {
10         'Mean': Mean({}),
11         "C0": C0({}),
12         'Hart85': Hart85({}),
13         'RNN': RNN({'n_epochs': 50, 'batch_size': 1024}),
14         'Seq2Point': Seq2Point({'n_epochs': 50, 'batch_size': 1024})
15         #'Seq2Seq': Seq2Seq({'n_epochs': 50, 'batch_size': 1024}),
16         #'WindowGRU': WindowGRU({'n_epochs': 30, 'batch_size': 1024})
17     },
18     'train': {
19         'datasets': {
20             'hb': {
21                 'path': './data/teste17.h5',
22                 'buildings': {
23                     1: {
24                         'start_time': '2021-09-02',
25                         'end_time': '2021-09-04'
26                     },
27                 },
28             },
29         },
30     },
31 },
32 },
33
34 'test': {
35     'datasets': {
36         'REDD': {
37             'path': './data/teste17.h5',
38             'buildings': {
39                 1: {
40                     'start_time': '2021-09-05',
41                     'end_time': '2021-09-06'
42                 },
43             },
44         },
45     },
46     'metrics': ['rmse', 'mae', 'relative_error', 'r2score', 'nde', 'nep', 'flsco
47 },
48 }

```

In [7]:

```
1 api_res = API(d)
```

Joint Testing for all algorithms

Loading data for REDD dataset

Dropping missing values

Generating predictions for : Mean

Generating predictions for : C0

.....C0 disaggregate_chunk running.....

Generating predictions for : Hart85ave'

Finding Edges, please wait ...

Edge detection complete.

Creating transition frame ...

Transition frame created.

Creating states frame ...

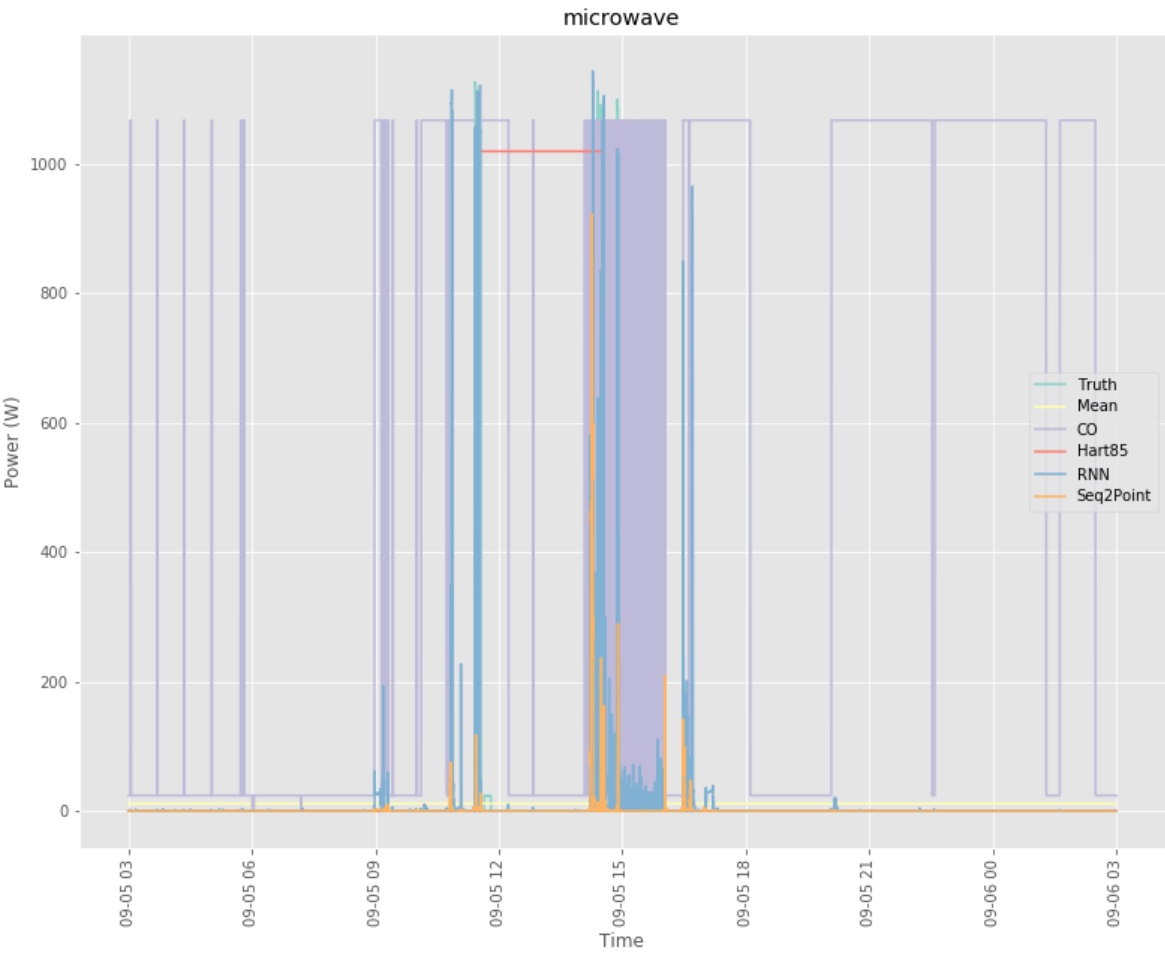
States frame created.

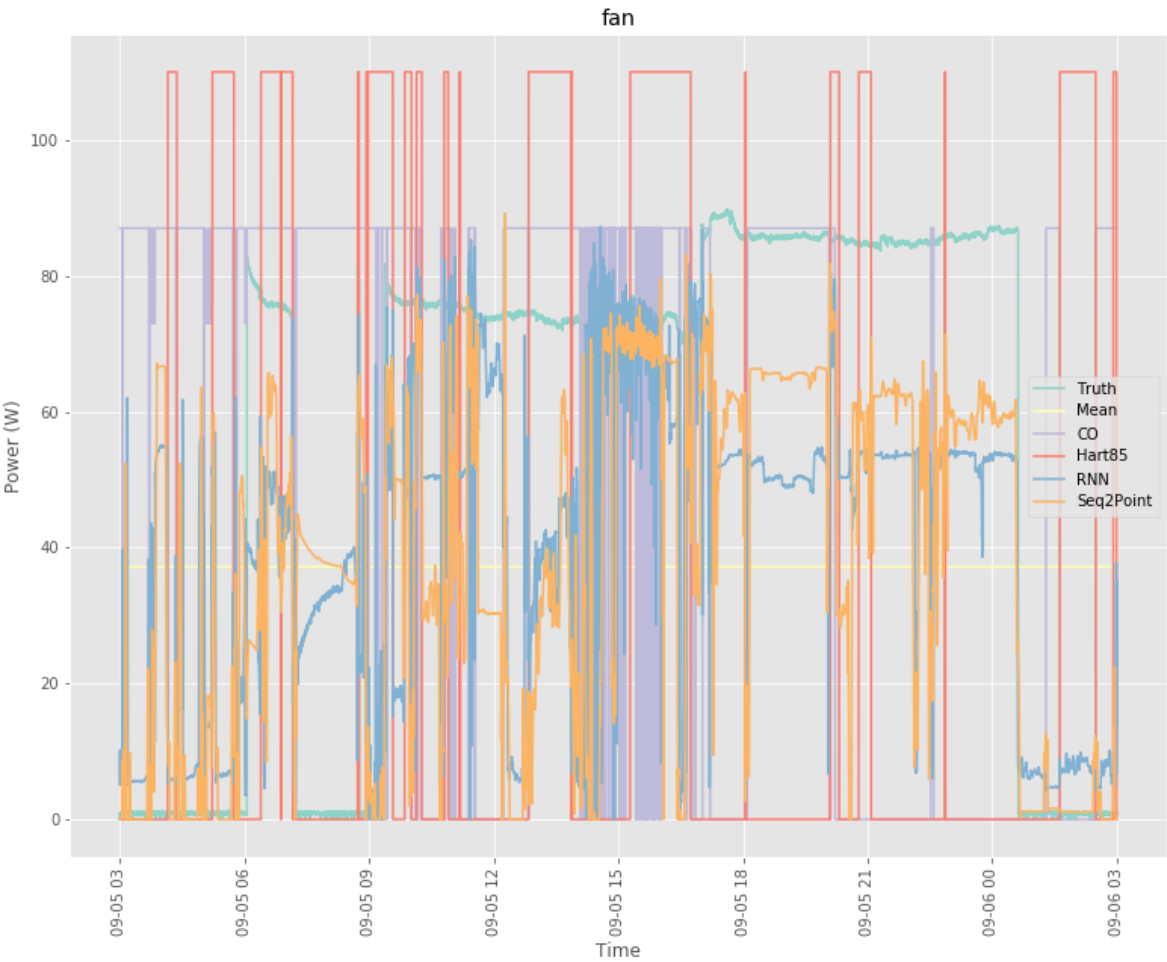
Finished.

Generating predictions for : RNN

Generating predictions for : Seq2Point

```
..... rmse .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  81.222685  711.256063  366.749531  87.472320  84.794415
fan         41.060365   63.035689   67.378482  30.579173  33.977706
..... mae .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  17.449696  487.394867  132.517517  10.589267   8.464031
fan         40.664875   50.318092   56.390381  25.340700  26.693874
..... relative_error .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  1.412063   0.963642   3.417224   1.099339   2.304760
fan         1.065485  25.819187  41.095127   1.252358   3.594753
..... r2score .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave -0.003238 -75.930989 -19.454481 -0.163565 -0.093412
fan        -0.237951 -1.917635 -2.333500  0.313391  0.152292
..... nde .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  0.998173  8.740864  4.507108  1.074977  1.042067
fan         0.618634  0.949724  1.015154  0.460720  0.511923
..... nep .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  2.587788  72.280602  19.652330  1.570387  1.255215
fan         0.737119   0.912099   1.022169  0.459342  0.483871
..... flscore .....
              Mean          C0          Hart85          RNN  Seq2Point
microwave  0.053929  0.054029  0.196907  0.262816  0.137313
fan         0.815107  0.576826  0.389441  0.878688  0.873391
```





In []:

1