

VISUALIZATIONS OF PUBLIC FUNDAMENTAL DATA

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I. PRESENTATION

The objective of this repository is to share with an [MIT license](#) the visualization tools used with public data and developed by the Wholesale Markets Surveillance Directorate ([DSMG](#)) of the Regulatory Commission of Energy ([CRE](#)). It can be used by final users such as developers and energy analysts. All suggestions are welcome at opensource@cre.fr.

II. INPUT DATA

The data used for the visualizations proposed in this repository come from different public data sources. They have to be stored in the folders indicated in `global_var/path_folders.py` which is `~/public_data/` by default.

II.1 eCO2mix

Data about the supply and demand equilibrium and provided by *Réseau de Transport d'Electricité* ([RTE](#)) through [eCO2mix](#) allows to illustrate the production and the consumption on the French electricity network. They can be downloaded automatically. No account is necessary.

II.2 ENTSO-E

The European Network of Transmission System Operators for Electricity ([ENTSO-E](#)) publishes fundamental data on its [transparency platform](#). The source files used for the visualizations in this repository currently have to be downloaded manually with the [SFTP share](#). An account is necessary.

II.3 Météo-France

As the French national meteorological service, [Météo-France](#) provides [observation data](#) extracted from the Global Telecommunication System ([GTS](#)) of the World Meteorological Organization ([WMO](#)). The data can be downloaded automatically. No account is necessary.

II.4 RTE

RTE publishes fundamental data about the French electricity transmission system. The files have to be downloaded manually on the platform [RTE services portal](#). An account is necessary.

II.5 Local organization of the input data

The default arborescence proposed to store the data is the following:

~/_energy_public_data/			
11_ENTSOE			
/			
ActualGenerationOutputPerUnit/			
		2014_12_ActualGenerationOutputPerUnit.	
		csv	
		...	
ActualTotalLoad/			
		2014_12_ActualTotalLoad.csv	
		...	
DayAheadPrices/			
		2014_12_DayAheadPrices.csv	
		...	
Outages/			
OutagesGU/			
		2014_12_OutagesGU.csv	
		...	
OutagesPU/			
		2014_12_OutagesPU.csv	
		...	
20_MeteoFrance/			
synop/			
		postesSynop.csv	

			synop.201001.csv
			...
	24_RTE/		
		Centrales_production_reference/	
			Centrales_production_reference.xls
		DonneesIndisponibilitesProduction/	
			DonneesIndisponibilitesProduction_2010.xls
			...
		eCO2mix_RTE/	
			eCO2mix_RTE_Annuel-Definitif_2012.xls
			...
		ProductionGroupe/	
			ProductionGroupe_2012/
			ProductionGroupe_2012-semester1.xls
			...

Tableau 1 – Local organization of the input data

III. DESCRIPTION OF THE CODE

III.1 Organization of the modules

Folder	Subfolder	Used for
energy_data_visualization/		All the modules used by the scripts
	global_var	Configuration variables and in particular input and output folders
	global_tools	Various tools widely used by the other modules (e.g. to format strings).
	auctions	load and plot auction results
	capacity	load capacity data
	load	load and plot load curves
	outages	load and plot outages data
	production	load and plot production curves
	weather	load and plot weather data
	multiplots	plot data from multiple sources
scripts/		All the scripts to run and obtain the visualizations

Tableau 2 – Organization of the modules

III.2 Parameters of the scripts

Variable name	Type	Possible values	Purpose
close	bool	True; False	Close the figure after saving
company_outages	None or string	any company that publishes	-
contract_delivery_begin_year	int	2018; ...	-
contract_delivery_period_index	int	depends on the selected contract_product	-
contract_product	string	"M"; "Q"; ...	-
contract_profile	string	"BASE"; "PEAK" ...	-
data_source_auctions	string	"ENTSOE"	-
data_source_load	string	"eCO2mix"; "ENTSOE"	-
data_source_outages	string	"ENTSOE"; "RTE"	-

data_source_production	string	"eCO2mix"; "ENTSOE"; "RTE".	-
data_source_weather	string	"MétéoFrance"	-
date_max	None or string	localized pd.Timestamp	Right xlim of the plot
date_min	None or string	localized pd.Timestamp	Left xlim of the plot
diff_init	bool	True; False	Plot the differences between pairs of dates
figsize	(int,int)	(8,6)	Figure size
folder_out	path	global_var.path_plots	Plots output
load_nature	string	"load forecast D-1 (GW)"; "load forecast D-0 (GW)"; "load (GW)"	-
map_code	string	"FR"; ...	-
map_code_auctions	list of strings	["FR", "GB", "BE" ...]	-
production_nature	string	"production (GW)"	-
production_source	None or string	"biomass"; "solar"; ...	-
publication_dt_extrapolate	list of localized pd.Timestamp	-	Availability plotted as seen from these dates
publication_dt_max	None or localized pd.Timestamp	-	-
publication_dt_min	None or localized pd.Timestamp	-	-
smoother	string or pd.Timedelta	"basic";	For aesthetic purposes
unit_name	None or string	any production unit	-
weather_nature	string	"observation"	-
weather_quantity	string	"nebulosity (%)"; "temperature (°C)"; "wind_speed m/s"	-

Tableau 3 – Parameters of the scripts

IV. PROPOSED VISUALIZATIONS

IV.1 Auctions

IV.1.1./scripts/auctions/main_price.py

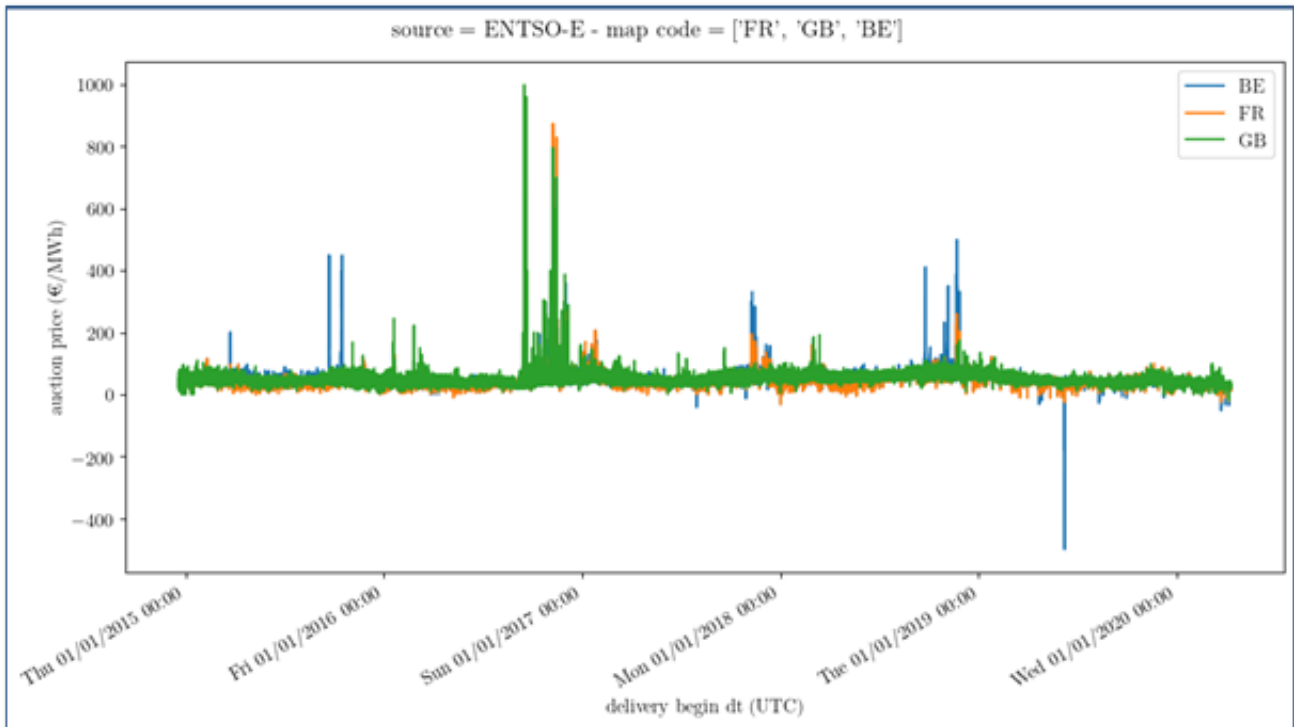


Figure 1 - Fixing prices of day-ahead auctions

IV.2 Load

IV.2.1./scripts/load/main_power.py

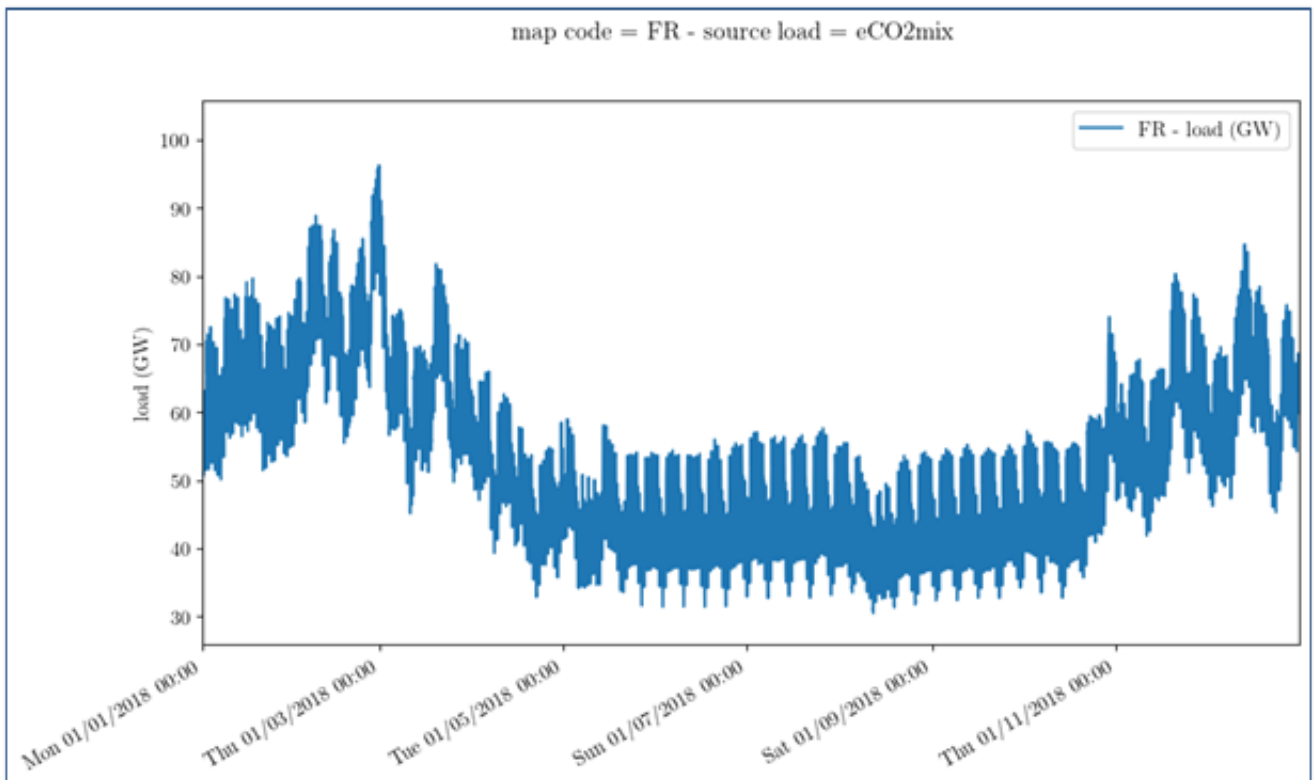


Figure 2 - National load

IV.2.2./scripts/load/main_forecasting_error.py

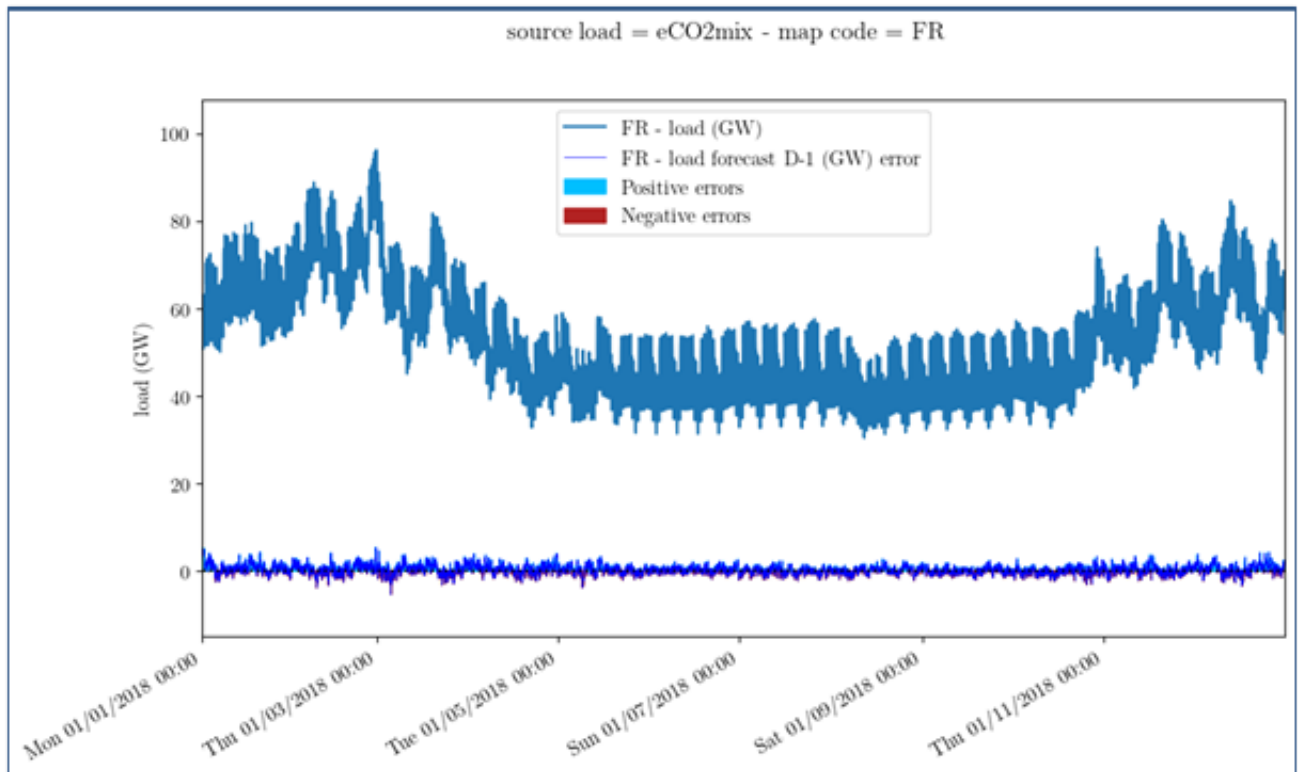


Figure 3 - National load forecasting error

IV.3 Outages

IV.3.1./scripts/outages/main_animated_availability.py

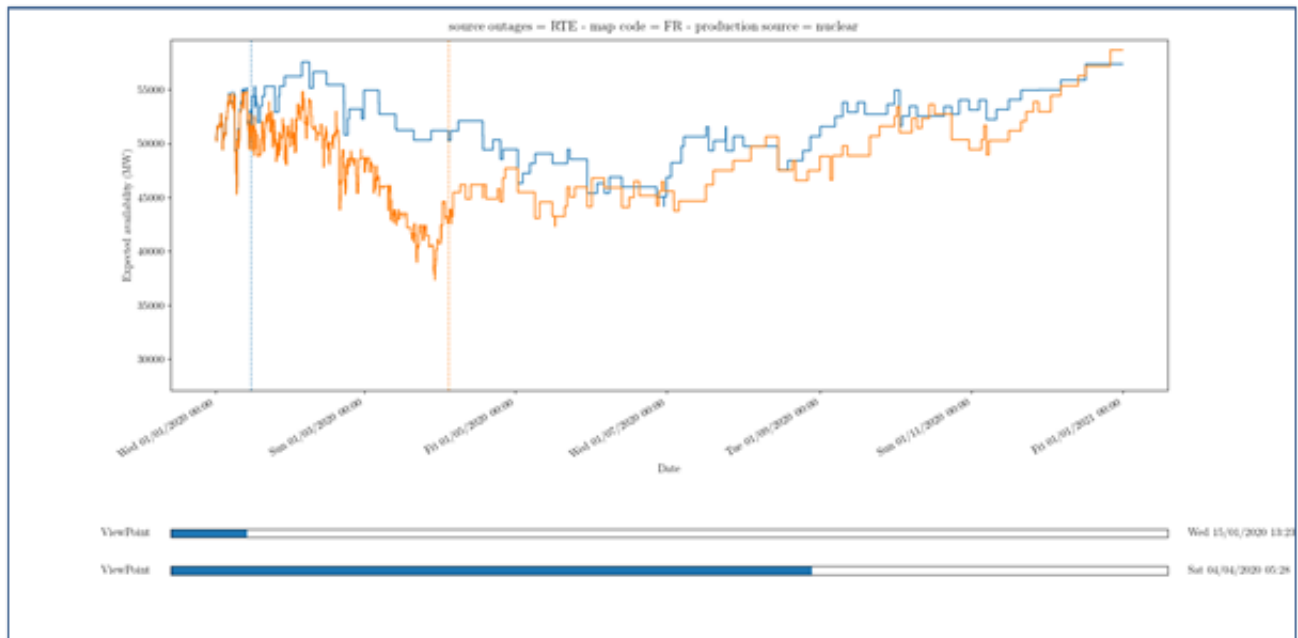


Figure 4 - Animated view of the availability

IV.3.1 ./scripts/outages/main_evolution_mean_availability.py

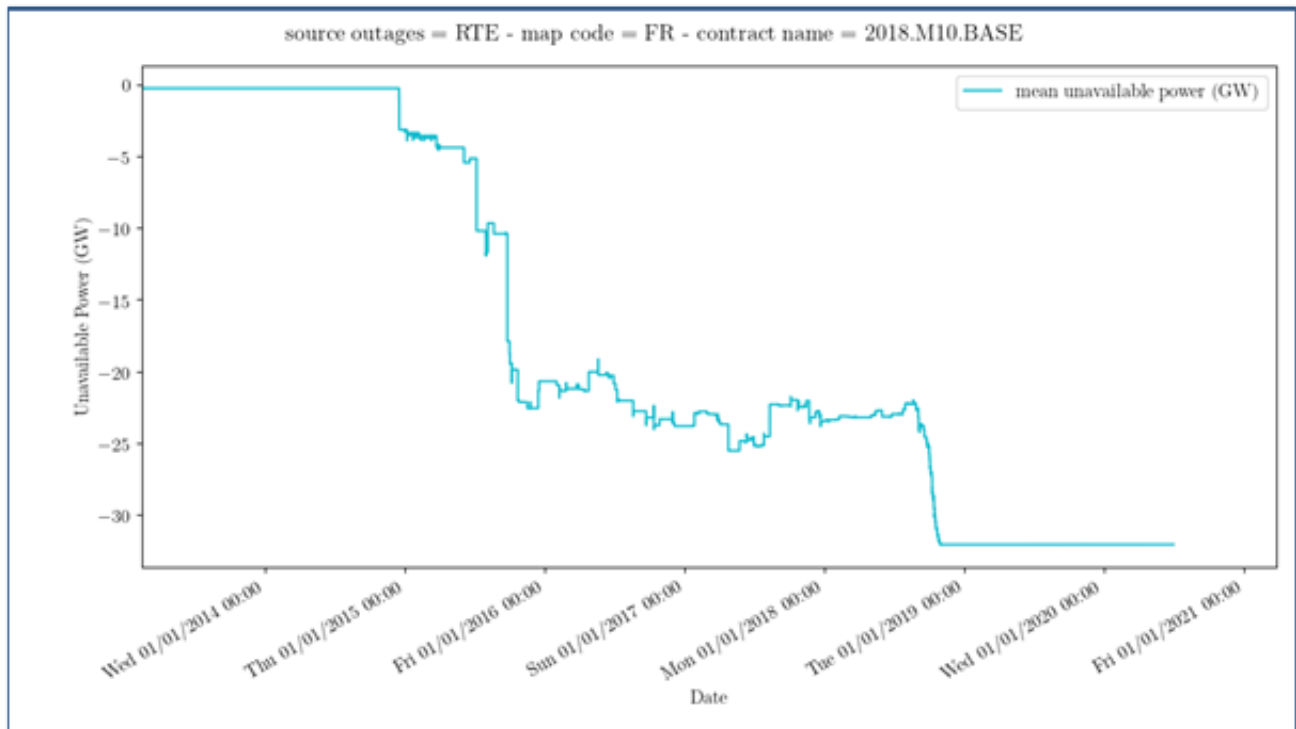


Figure 5 - Mean unavailability during the delivery of a given contract

IV.3.1 ./scripts/outages/main_expected_program.py

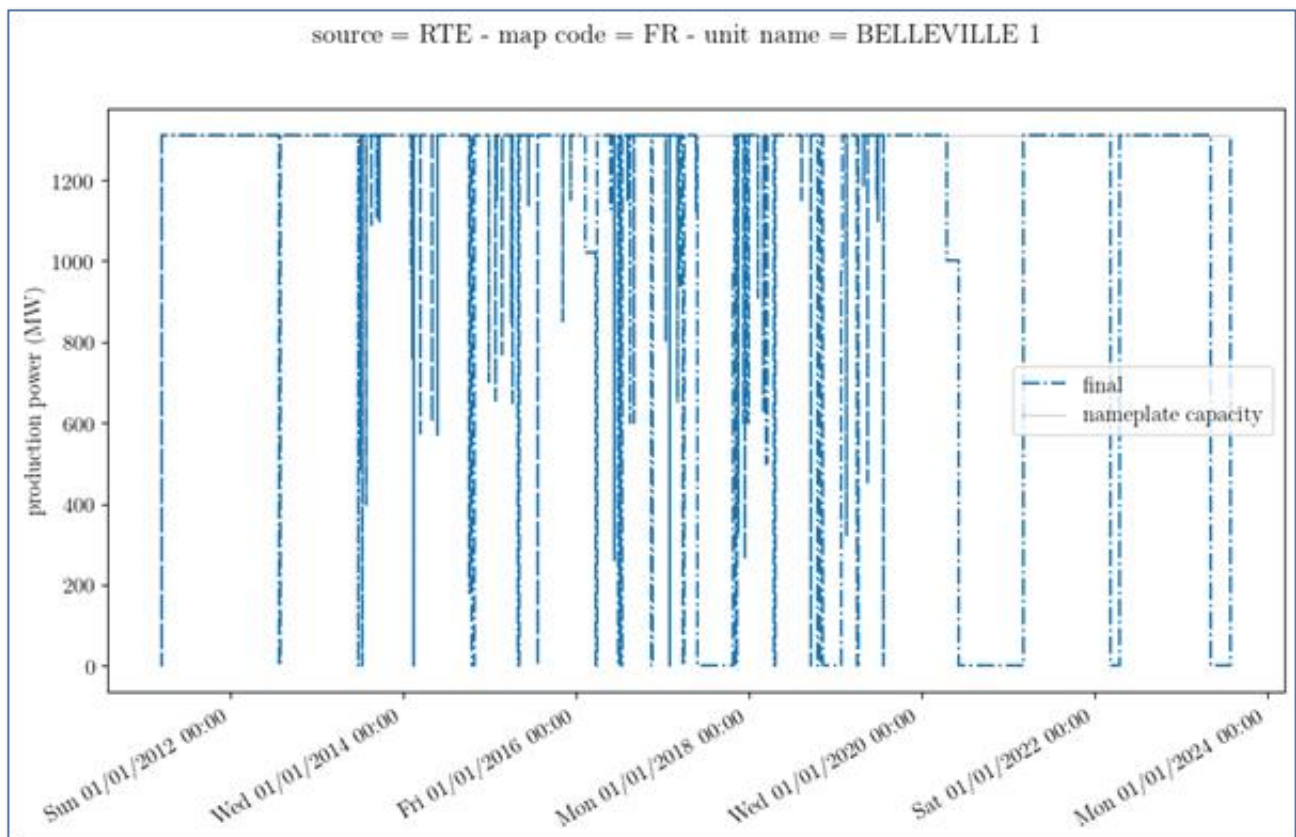


Figure 6 - Expected availability program of a given unit

IV.3.1 ./scripts/outages/main_incremental_program.py

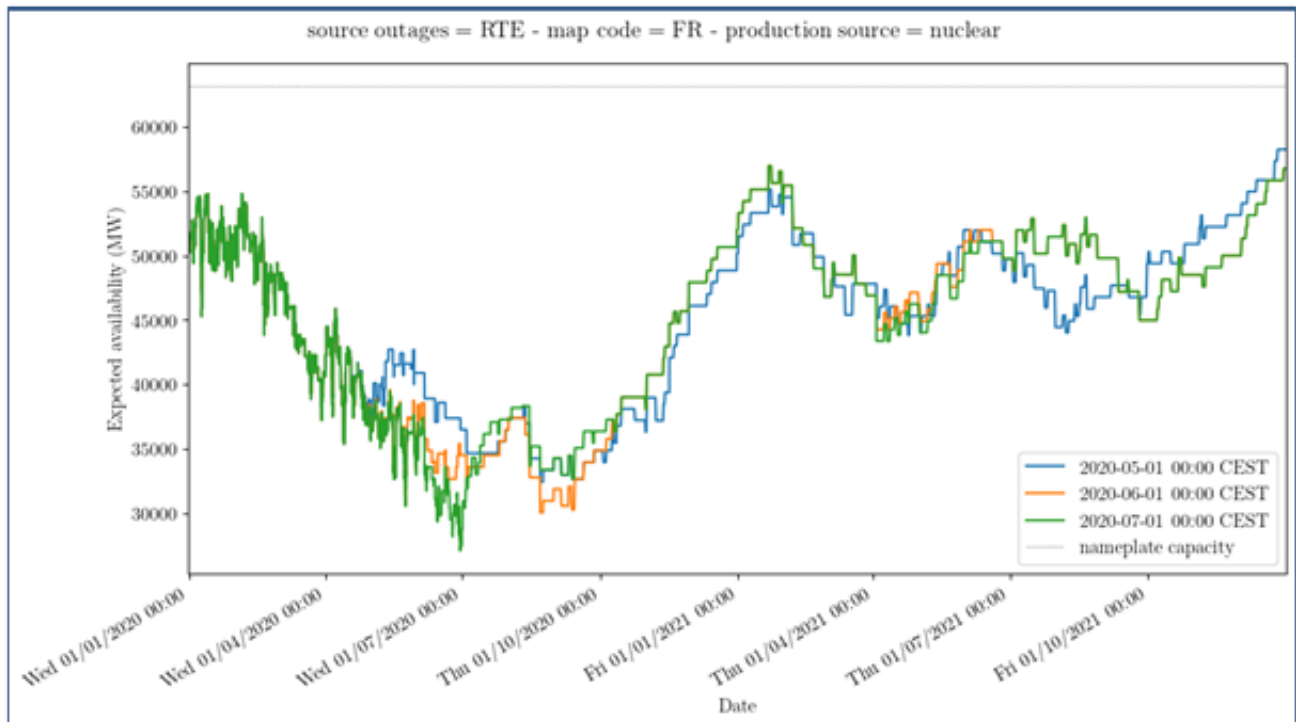


Figure 7 - Planned unavailability at different dates

IV.3.1 ./scripts/outages/main_regression_delays.py

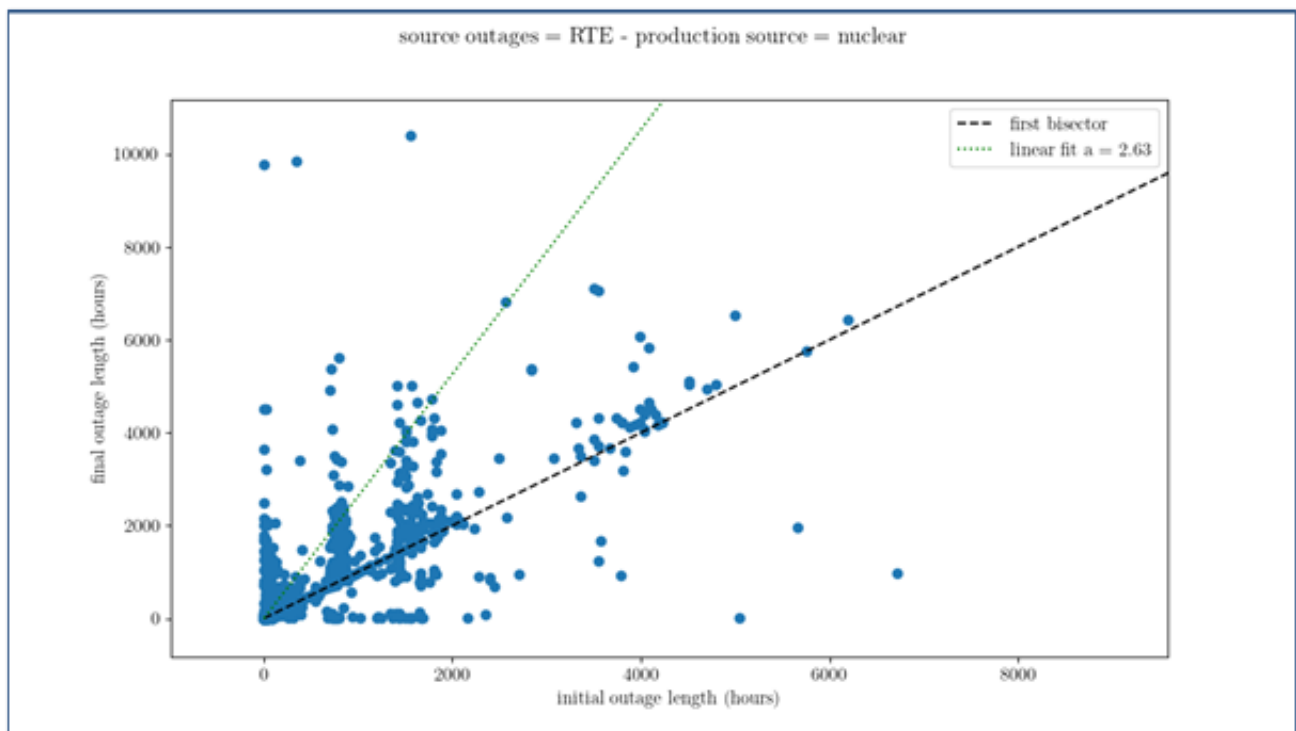


Figure 8 - Linear fit between observed and announced unavailabilities. The coefficient being obtained with the minimization of a squared error, outliers have a large effect.

IV.4 Production

IV.4.1./scripts/production/main_power.py

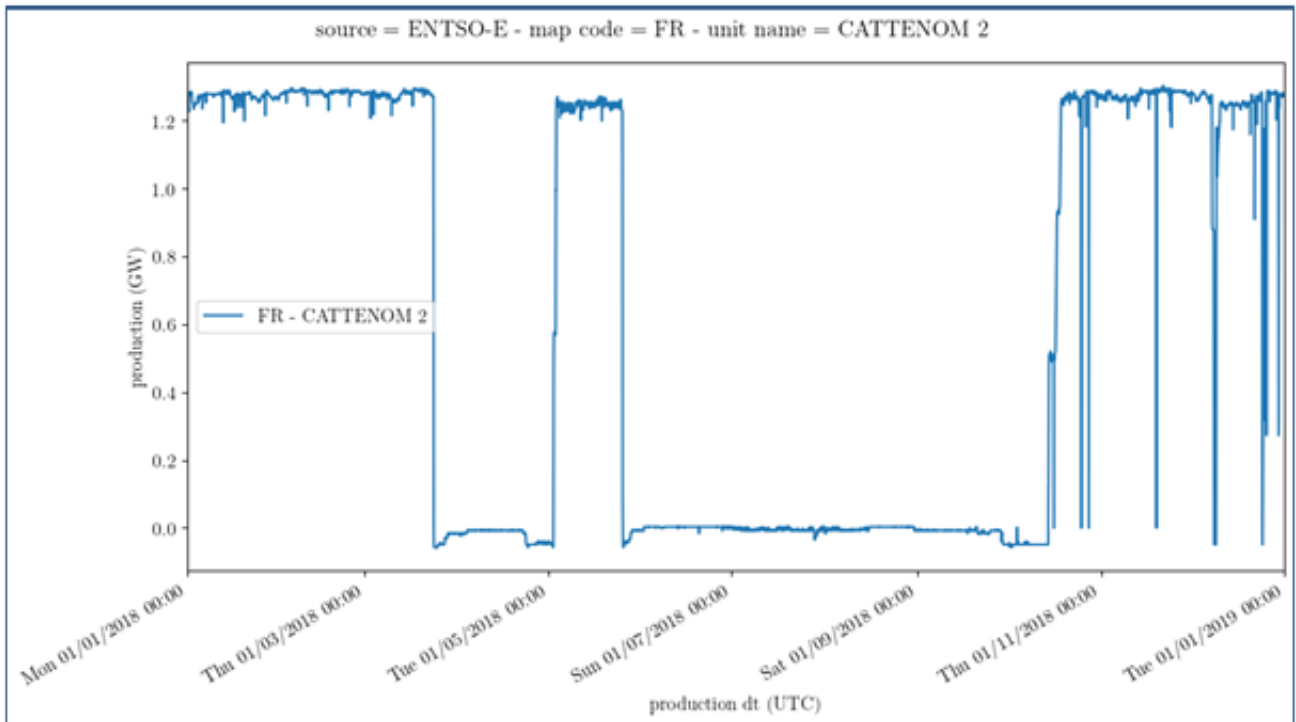


Figure 9 - Production of a given unit

IV.1 Weather

IV.1.1./scripts/weather/main_curve.py

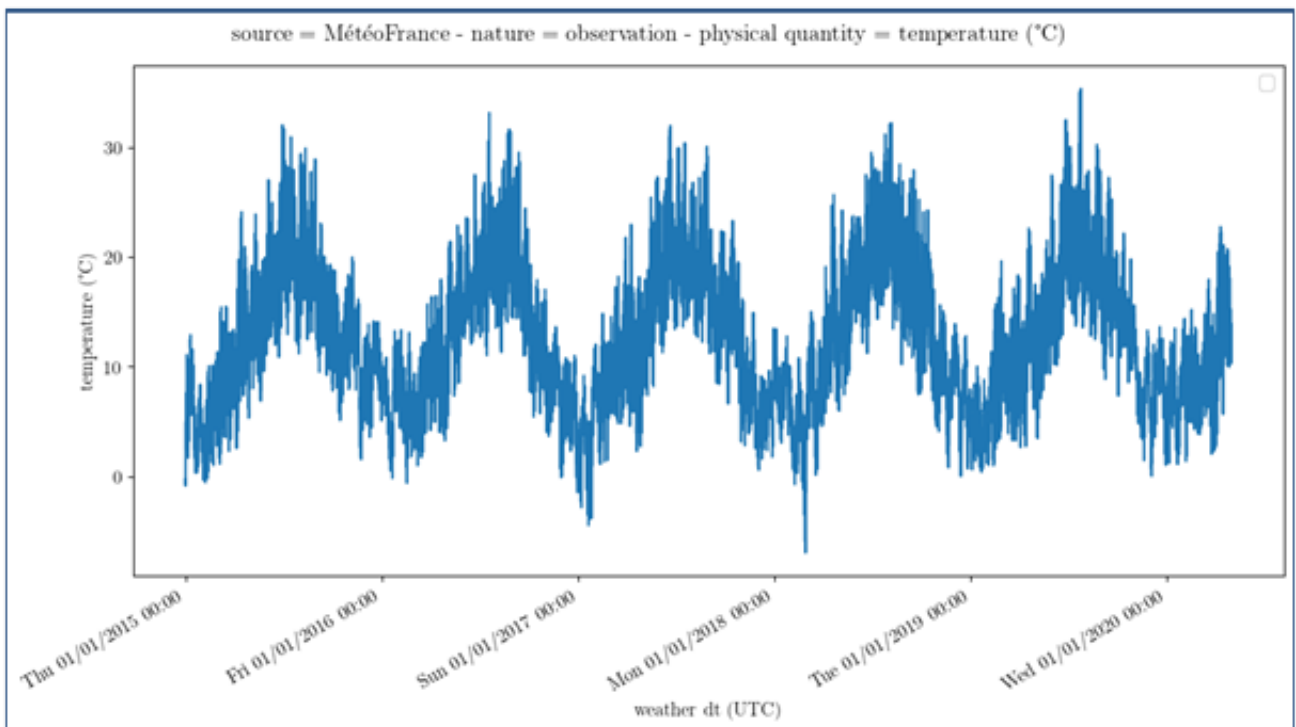


Figure 10 - National mean temperature

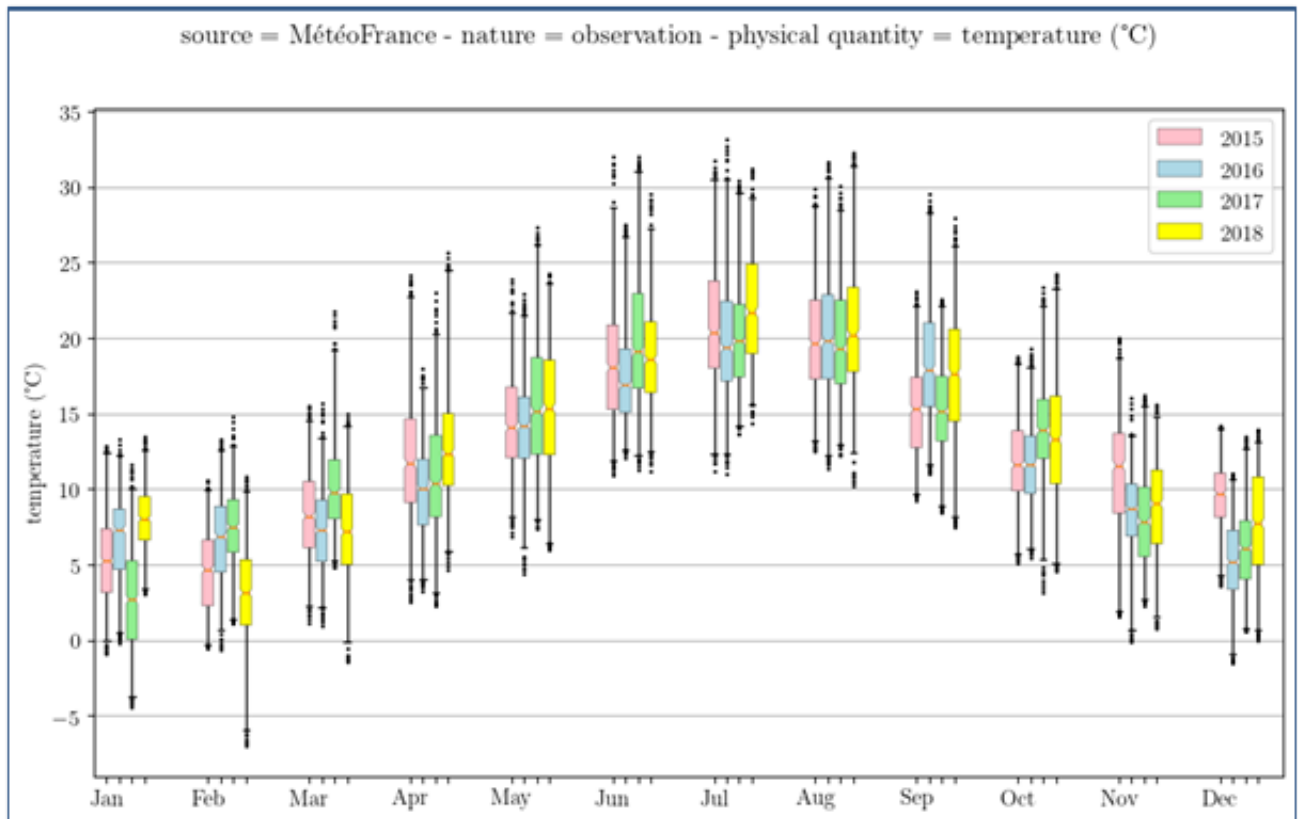


Figure 11 - Monthly distributions of mean temperatures

IV.1 Multiplots

IV.1.1./scripts/multiplots/main_spot_report.py

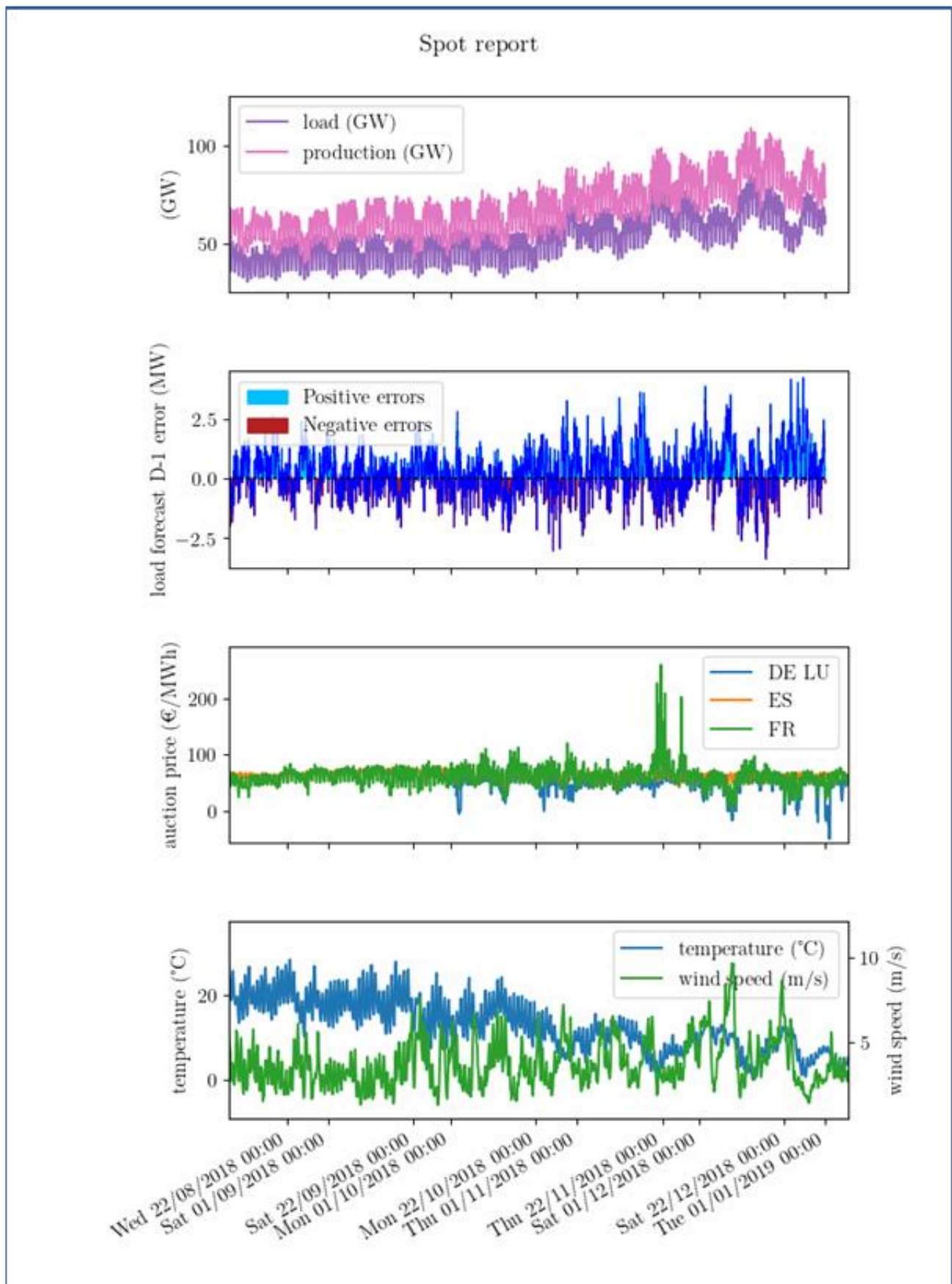


Figure 12 - Spot report

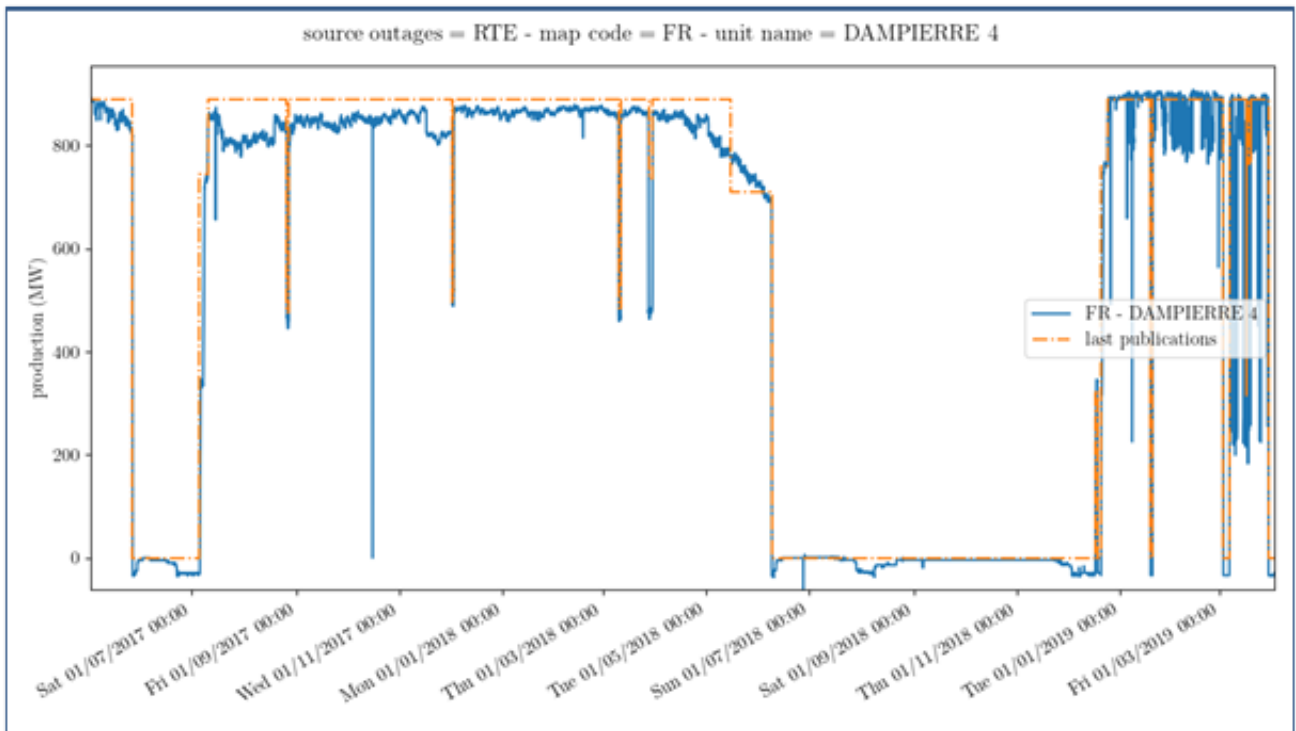


Figure 13 - Announced and observed production powers of a given unit