Addendum

New content related to the individual impact of products

Performance monitoring report: analysis on the usage of each product and its impact on algorithm performance

In this section, the individual impact on performance of each product is assessed, as stated in article 8.3.a) of the Algorithm methodology approved by ACER on January 2020.

METHODOLOGY

The analysis is performed for the all the products included in the DA product methodology, apart from Stepwise Curves and Simple Blocks (which are deemed being the least impacting way to implement requirement explicitly mentioned in CACM) and merit orders (which are considered basically equivalent to stepwise curves in terms of performance impact). The analysis is performed against a historical dataset from November 2019.

CONVERSION OF PRODUCTS

In order to assess the individual impact on performance, the remaining products have been replaced by the most similar alterative product, following specific conversion rules.

- Piecewise curves: converted into stepwise curves. For each non-vertical piecewise curve segment, one stepwise curve segment is created with price at the middle of min and max price of the given source piecewise segment. In case of source segment is stepwise (e.g. having STEPWISE or HYBRID source curve) it is kept as it is. Vertical segments needed for the construction of the stepwise curve may be added or amended.

- Smart Blocks: converted into simple blocks.
  - Linked families where all members have same sign (all buy or sell) are converted into a single block that aggregates all their energy at the price of the family parent block. Linked families with mixed members (buy and sell) are discarded.
  - Exclusive groups are converted by randomly picking one of the blocks form the exclusive group, maintaining its MAR and price.

- Complex orders: converted into Simple Blocks plus Stepwise curves.
  - All suborders steps below the variable term are converted into profiled block orders with minimum acceptance ratio equal to 1 and whose price will be the variable term plus the contribution of the fixed term over the sum of all offered volume.
  - Remaining steps shall be integrated into the single curve.

- Pun orders: converted into Demand Merit Orders by changing their type.

CONVERSION OF PRODUCTS DRAWBACKS

Due to the nature of the requirements these conversion rules are not able to convert all the requirements from the original product into requirements from remaining products.

The conversions done in this study may not reflect a realistic behaviour of market participants in case one product is replaced by another one. For instance, one stepwise order may be split in several stepwise orders by a market participants in order to reflect their needs.

It should be noted that such approach is overestimating the impact on performance, as the conversion eliminates not only the individual impact of each product but also the combined effect linked to the interaction with the remaining products. For such a reason, it should also be noted that the estimated impact of the different scenarios cannot be accumulated.

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RESULTS

First, note that the gains when we replace a product measured in seconds are in the order of few tens of seconds. Furthermore, repeated runs of the same input data may return small differences values for the time to first solution (TTFS), in the order of few seconds, even when the same machine and configuration is used.

Second, the impact on individual sessions is not evenly distributed. It has been observed that despite the average behaviour may be negative, there may exists sessions that are not single outliers and its value has a different sign, sometimes even with a distinct order of magnitude.

Third, it has been observed that the impact on TTFS may depend on the internal parameters of the simulation.The selection of values for internal parameters of CPLEX and heuristics in Euphemia is done pursuing a good behavior in a wide variety of cases, covering adequate performance in average and being able to deal with problematic cases too. If one kind of product is removed, then the values of parameters should be reassessed against the full set of data scenarios used for the acceptance of new Euphemia releases.

Fourth, we have selected one challenging month of historical data for the simulations. We observed opposite behaviours (such as in piecewise conversion into stepwise). This may be indicating that the size of input data used in this study might not be big enough to extract clear statements regarding the individual impact of products.

Fifth, it should be reminded also the drawbacks due to the conversions of products applied that have been already explained in a previous slide.

In conclusion, the main findings of the study seems being:

- The outcome is heavily depending on the methodology used [replacement of products, length of the batch, selection of internal parameters of the algorithm, …]

- Given the chosen methodology, no product seems having a standalone key impact on performance.

As a final remark, all these observations suggest to reconsider the approach to be followed to assess the impact of each product on algorithm performance. It should be noted than in the scope of this study only products were taken into account, while other requirements, such as flow based has also a significant impact, as reflected in scalability report. NEMOs defend that in case corrective measures need to be applied, the decision should be accompanied with a study analysing the impact on prices.

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	Products	Reference Scenario – Actual values – Orders submitted (#)	Traded volumes (GWh)	Impact on performance* – AVG TTFS (s) E10.5	ΔTTFS (s) E10.5	ΔTTFS (%) E10.5	Assumptions for the simulation – # of steps at BZ level	# of block orders	# of Smart block orders	# of complex orders	# of merit orders	# of Pun orders
Reference	Reference scenario			182.61	-	-	168 513	4 839	2 627	101	45 658	5 612
Scenarios in which products are replaced	Stepwise Curves	168 513	6 055	Not estimated			-	-	-	-	-	-
	Piecewise Curves			193.20	+10.6	+5.8%	158 383	4 839	2 627	101	45 658	5 612
	Merit orders	45 658	758	Not estimated			-	-	-	-	-	-
	Block Orders	4 839		Not estimated			-	-	-	-	-	-
	Smart Block Orders (exclusive groups + linked blocks)	2 627	379	171.70	-10.9	-6.0%	168 513	2 357	0	101	45 658	5 612
	Complex Orders	101	163	148.76	-33.9	-18.5%	171 700	4 929	2 627	0	45 658	5 612
	PUN Orders	5 612	784	144.83	-37.8	-20.7%	168 513	4 839	2 627	101	45 442	0

* Calculated with respect the reference scenario.
The values of the impact (ΔTTFS) report AVG(TTFS from scenario replacing the product X) compared against AVG(TTFS from REF scenario).
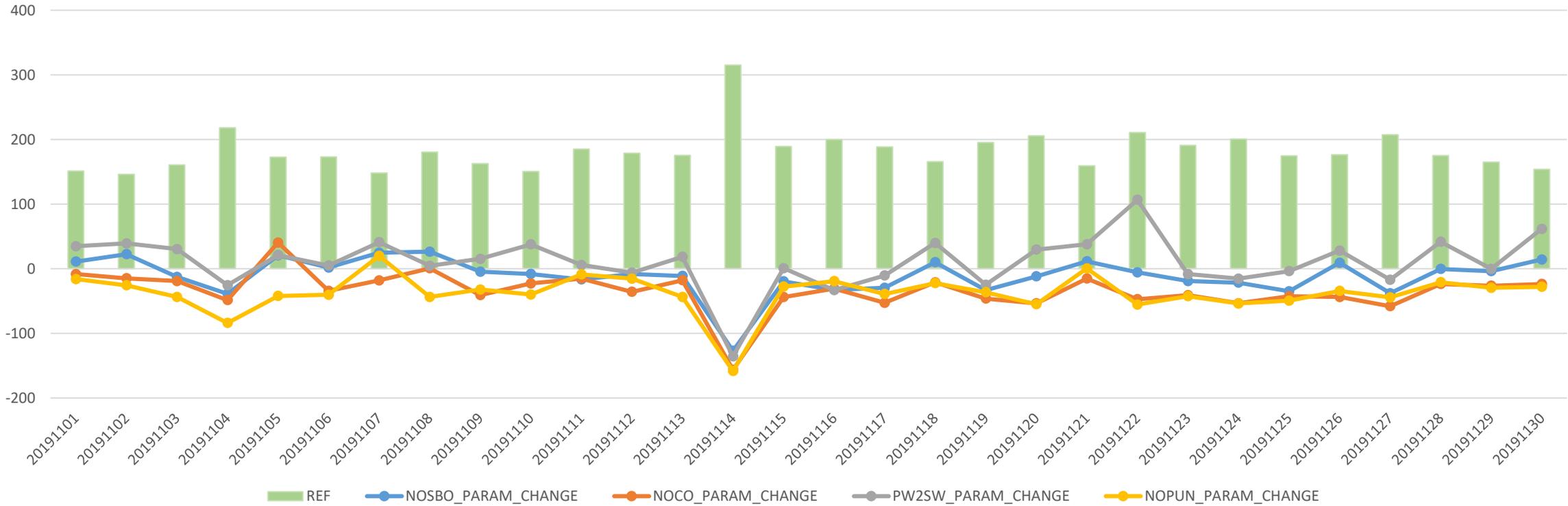A negative value means that when the product is replaced, the TTFS is shorter than in the reference scenario.
The reference scenario is calculated using default configuration (the one used in production).
For the other scenarios in which one product is replaced by other product(s), different internal parameters have been used, as suggested by the algorithm provider (these are different than the default configuration)

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Single Day-Ahead Coupling

Euphemia 10.5 (*)
TTFS Absolute differences (s) and TTFS REF values (s)

* Calculated with respect the reference scenario.
The values of the impact (ΔTTFS) report AVG(TTFS from scenario replacing the product X) compared against AVG(TTFS from REF scenario).
A negative value means that when the product is replaced, the TTFS is shorter than in the reference scenario.
The reference scenario is calculated using default configuration (the one used in production).
For the other scenarios in which one product is replaced by other product(s), different internal parameters have been used, as suggested by the algorithm provider (these are different than the default configuration)