Scalable Complex Orders – Market Impact Analysis

27th July 2021

Scalable Complex Orders

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Scalable Complex Orders

Identification of Key Indicators for Product Analysis

A product analysis based on the following key indicators is performed to compare in detail Complex Orders and Scalable Complex Orders from a market impact perspective:

- Revenues of market parties: comparison of revenues and costs of CO vs. SCO
- Market prices: market price differences when SCO replace CO
- Cleared volumes: differences in cleared volumes (per order) when SCO replace CO
- Number of paradoxically rejected orders: number of (Classic or Scalable) Complex Orders that are rejected though they would be profitable given the market prices

Important remarks:

- *market impacts depend on which CO to SCO conversion rule is used.*
- *Results presented here rely on the initial conversion rule developed in the Iteration 1 of the Euphemia Lab.*

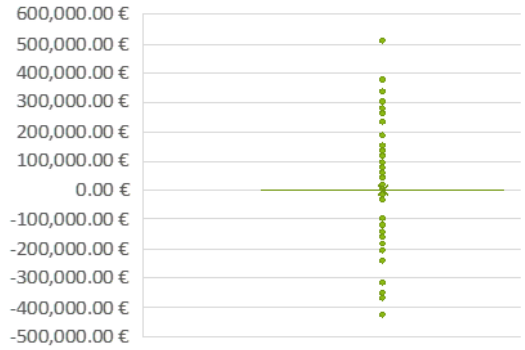
Scalable Complex Orders

Results based on the CO to SCO conversion rule from Iteration 1 of the Euphemia Lab | Impact on costs, revenues and profits of complex orders | Ireland

N-SIDE OPTIMIZING YOUR DECISIONS

Impact on costs, revenues and profits of complex orders is small
(even with a relatively simple conversion rule)

Differences of total costs per complex order (€)
Costs based on the original Fixed and Variable Terms
Production data 2020. Euphemia 10.6
8948 observations (only non-zero values appear in the chart)



Differences of total revenues per complex order (€)
Production data 2020. Euphemia 10.6
8948 observations (only non-zero values appear in the chart)

Differences of profits per complex order (€)
Production data 2020. Euphemia 10.6
8948 observations (only non-zero values appear in the chart)

Costs

- **Costs are identical to within 1€ for > 95 % of the complex orders! (8559 out of the 8948 complex orders over 2020)**
- For the few outliers, the larger differences are explained by a difference in acceptation / cleared volumes of the complex order after conversion to SCO (if acceptance changes, the incurred costs change accordingly). N.B. as the same fixed and variable terms are used on both sides of these ex-post cost calculations (classic vs scalable complex orders), this is the only possible explanation.

Revenues

- **Revenues (cleared volumes x market prices) are identical within 1 € for > 71 % of the complex orders! (6370 out of the 8948 complex orders over 2020)**
- Outliers with larger differences are explained by differences in acceptance / cleared volumes and differences in market prices.

Profits

- **Profits (revenues – costs) are identical within 1 € for > 71 % of the complex orders!**
- **Absolute differences in profits are lower than 5000 € for ~ 98 % of the complex orders ! (8763 out of the 8948 complex orders over 2020)**
- Outliers with larger differences are explained by differences in acceptance / cleared volumes and differences in market prices.

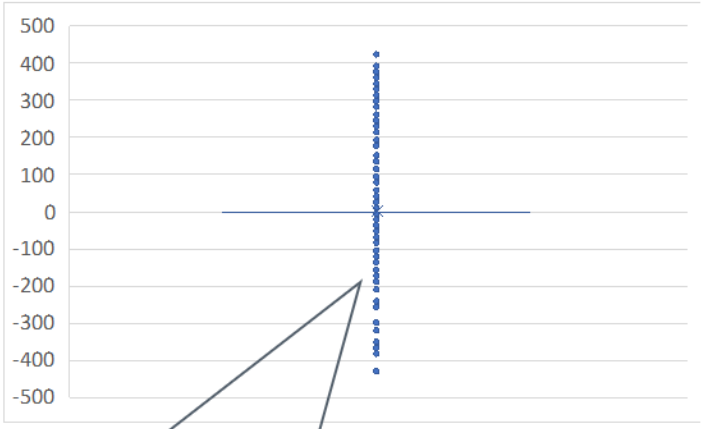
Scalable Complex Orders

Results based on the CO to SCO conversion rule from Iteration 1 of the Euphemia Lab | Impact on total cleared volumes | Ireland

N-SIDE OPTIMIZING YOUR DECISIONS

Impact on cleared volumes is most of the time null or marginal
(even with a relatively simple conversion rule)

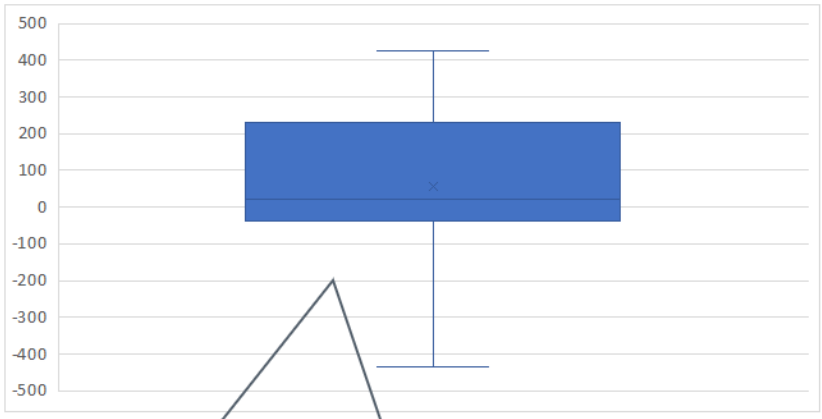
Comparison of cleared volume per period for all complex orders (MWh)
Production data 2020. Euphemia 10.6
(214 752 observations)



Over 2020, considering differences in cleared volumes per period for all complex orders

- ***Cleared volumes are identical within 0.001MWh (=1KWh) in 99% of the cases*** (212 800 cases out of 214 752)

Distribution of non-zero cleared volume differences
< 1 % of all complex orders x covered periods (1947 / 214 752)
(MWh)
Production data 2020. Euphemia 10.6



For the remaining 1 % of the cases, differences can be quite large and seem essentially due to a few differences in complex order selections.
It is important to note that adaptations in the conversion rule could further mitigate this market impact.

Scalable Complex Orders

Results based on the CO to SCO conversion rule from Iteration 1 of the Euphemia Lab

Impact on paradoxically rejected orders

N-SIDE OPTIMIZING YOUR DECISIONS

The number of paradoxically rejected complex orders is very slightly increased (global statistics taking into account all complex orders in SDAC)

Comparison of the number of paradoxically rejected complex orders per session
Production data 2020. Euphemia 10.6
(366 observations)

Important note for the comparison

- *Note that the minimum income conditions of SCO are slightly different from the minimum income conditions of Classic CO: with SCOs, the Variable Term is replaced by the marginal cost curves in the computations of the variable costs.*
- *This factor might explain the slight increase in paradoxically rejected orders once the paradoxical rejection is assessed based on the new cost calculations with SCOs: if the variable costs of SCOs are recomputed according to the original Variable Terms (before conversion), some paradoxically rejected SCO may actually not be paradoxically rejected.*

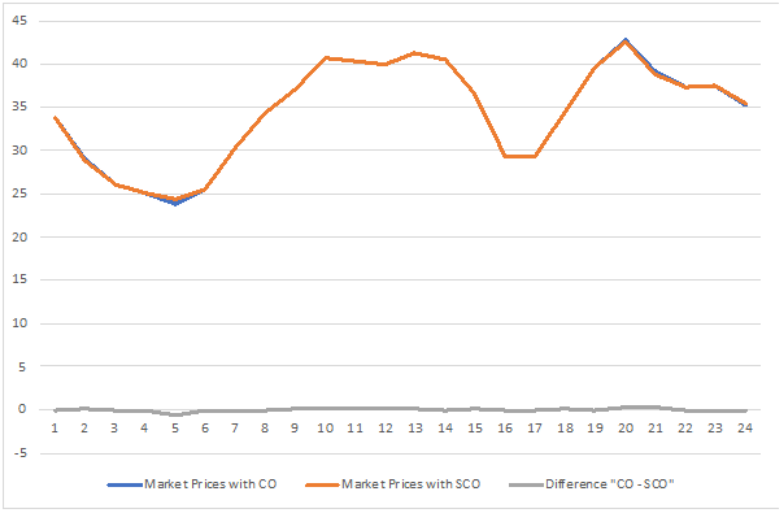
Scalable Complex Orders

Results based on the CO to SCO conversion rule from Iteration 1 of the Euphemia Lab | **Impact on market prices** | **Ireland**

N-SIDE OPTIMIZING YOUR DECISIONS

Impact on market prices is most of the time null or marginal
(even with a relatively simple conversion rule)

Comparison of Market Prices (€/MWh)
Production data 2020. Euphemia 10.6
The chart represents the price dynamics for the session of July 1st 2020



Distribution of non-zero price differences – ~28 % of the periods (2475/8784 periods) (€/MWh)
Production data 2020. Euphemia 10.6

Over 2020, market prices are
- ***identical* 72% of the time** (6309 hourly periods out of 8784)
- **different by less than 1 €/MWh 92 % of the time** (8098 hourly periods out of 8784)

A few market price difference "outliers" remain, with an absolute price difference above 4 €/MWh in 2% of the hourly periods over 2020 (181 periods out of 8784).

SEM (SEMOpx Zone)

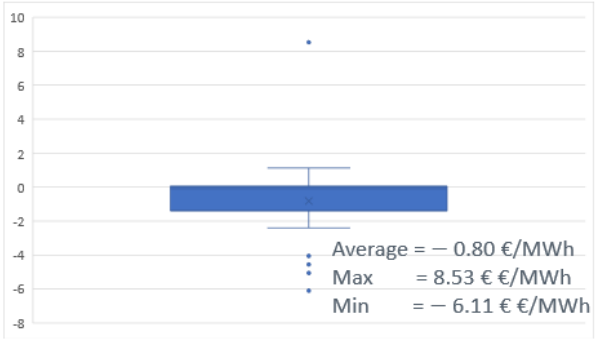
Scalable Complex Orders

Price differences "CO – SCO" (€/MWh) per delivery hour

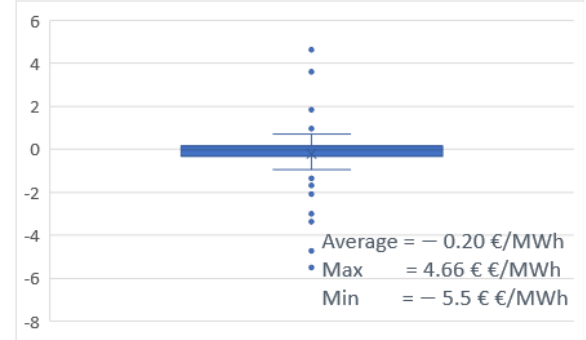
Production data 2020 - Euphemia 10.6

N-SIDE
OPTIMIZING YOUR DECISIONS

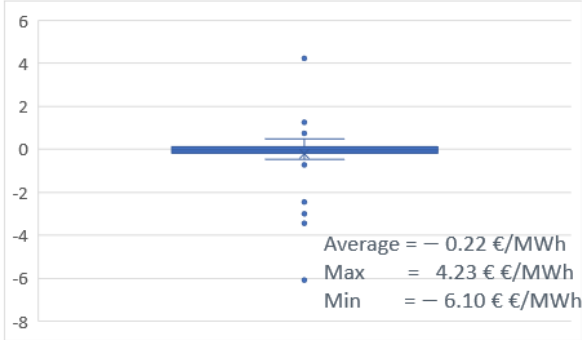
Hour 1
Price diff. in only ~17 % of the sessions (64/366 observations)



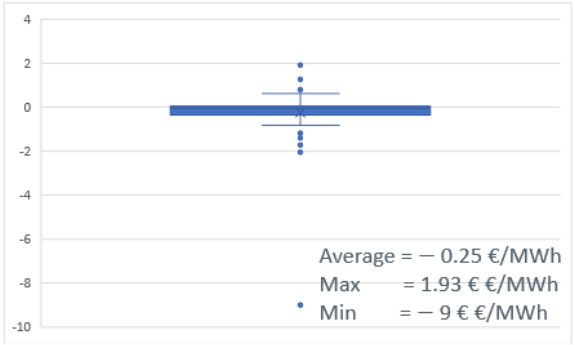
Hour 2
Price diff. in only ~22 % of the sessions (64/366 observations)



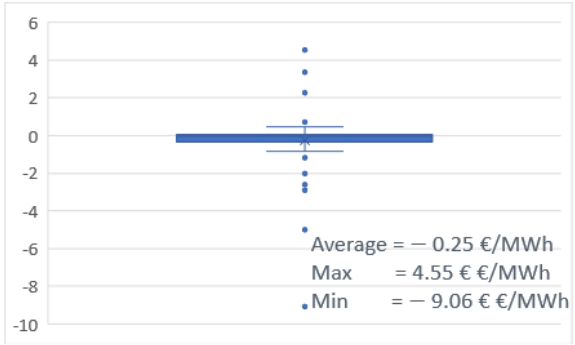
Hour 3
Price diff. in only ~21 % of the sessions (76/366 observations)



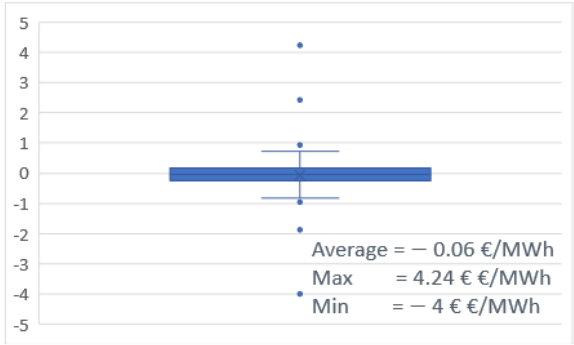
Hour 4
Price diff. in only ~21 % of the sessions (76/366 observations)



Hour 5
Price diff. in only ~22 % of the sessions (81/366 observations)



Hour 6
Price diff. in only ~22 % of the sessions (81/366 observations)



N.B. Average price differences reported above are averages over *non-zero* price differences

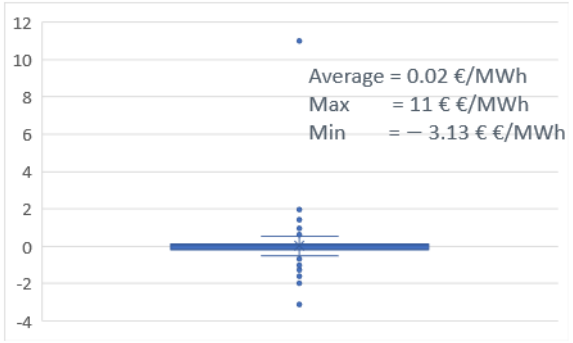
Scalable Complex Orders

Price differences "CO – SCO" (€/MWh) per delivery hour

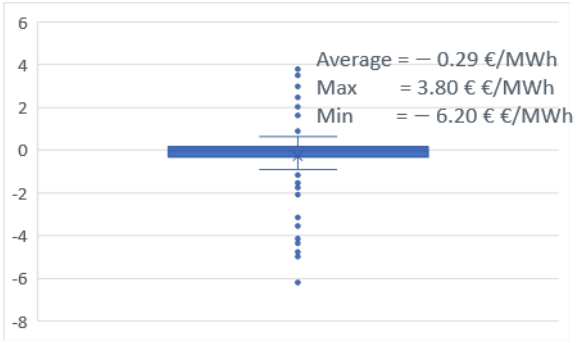
Production data 2020 - Euphemia 10.6

N-SIDE
OPTIMIZING YOUR DECISIONS

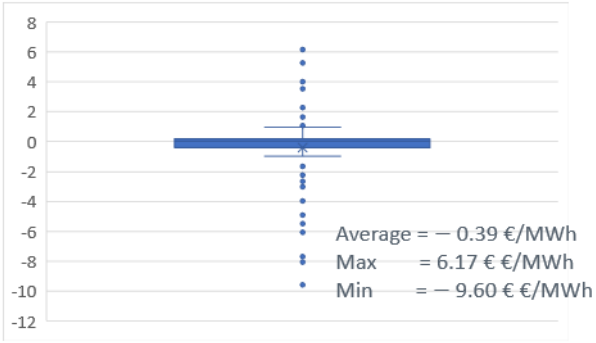
Hour 7
Price diff. in only ~26 % of the sessions (95/366 observations)



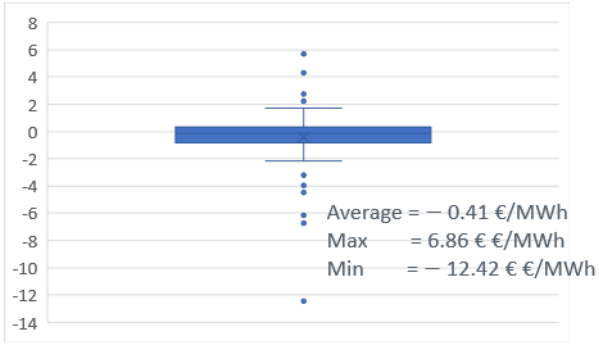
Hour 8
Price diff. in only ~23 % of the sessions (85/366 observations)



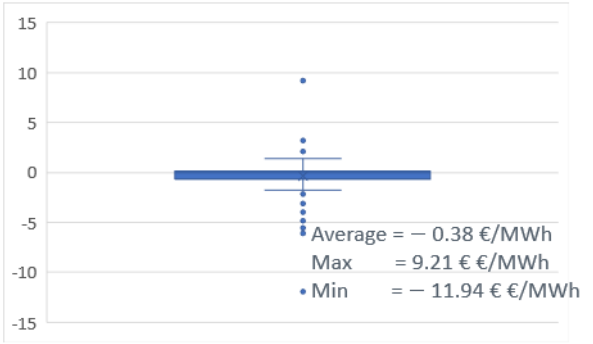
Hour 9
Price diff. in only ~31 % of the sessions (115/366 observations)



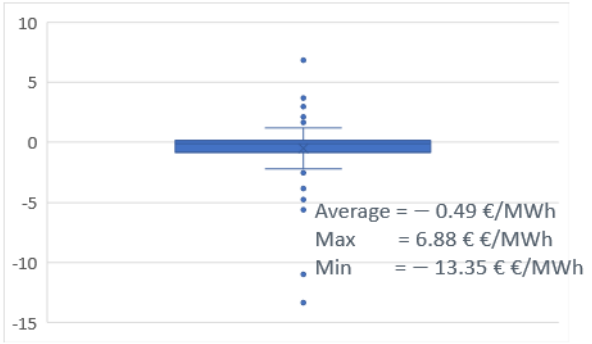
Hour 10
Price diff. in only ~32 % of the sessions (119/366 observations)



Hour 11
Price diff. in only ~32 % of the sessions (116/366 observations)



Hour 12
Price diff. in only ~31 % of the sessions (113/366 observations)



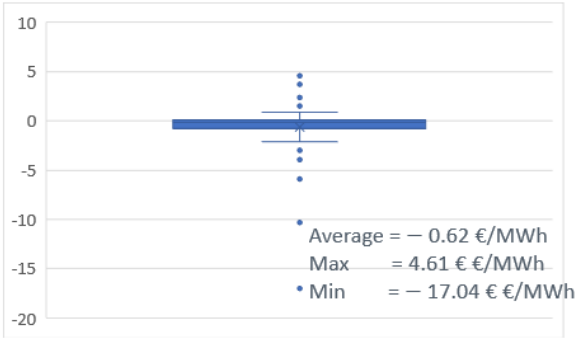
N.B. Average price differences reported above are averages over *non-zero* price differences

Scalable Complex Orders

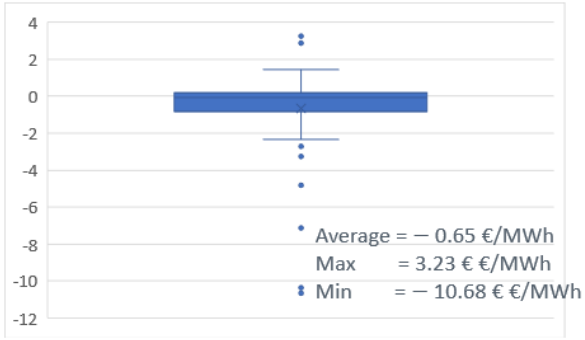
Price differences "CO – SCO" (€/MWh) per delivery hour
Production data 2020 - Euphemia 10.6

N-SIDE
OPTIMIZING YOUR DECISIONS

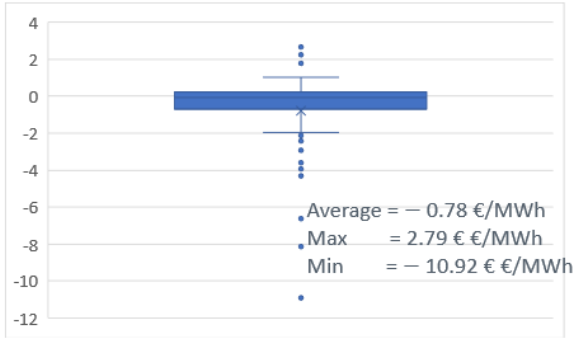
Hour 13
Price diff. in only ~31 % of the sessions (113/366 observations)



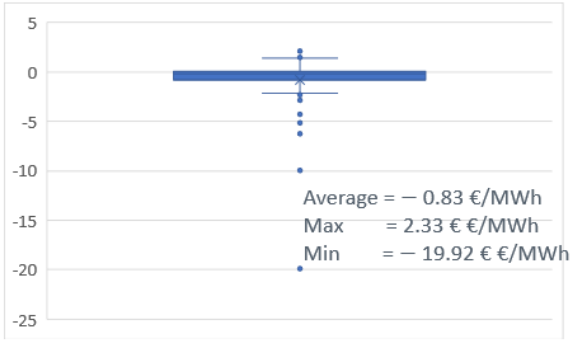
Hour 14
Price diff. in only ~29 % of the sessions (105/366 observations)



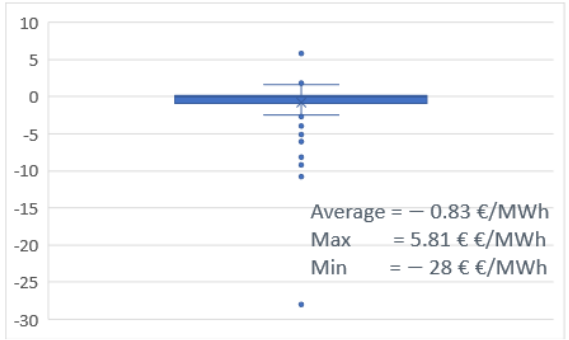
Hour 15
Price diff. in only ~31 % of the sessions (114/366 observations)



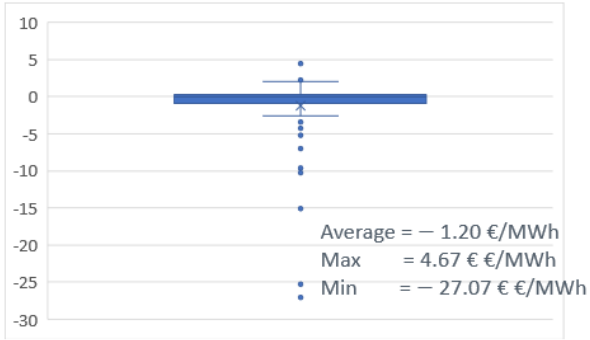
Hour 16
Price diff. in only ~29 % of the sessions (106/366 observations)



Hour 17
Price diff. in only ~x33 % of the sessions (121/366 observations)



Hour 18
Price diff. in only ~34 % of the sessions (126/366 observations)



N.B. Average price differences reported above are averages over *non-zero* price differences

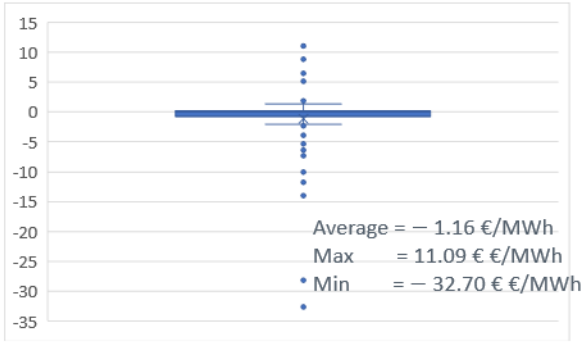
Scalable Complex Orders

Price differences "CO – SCO" (€/MWh) per delivery hour

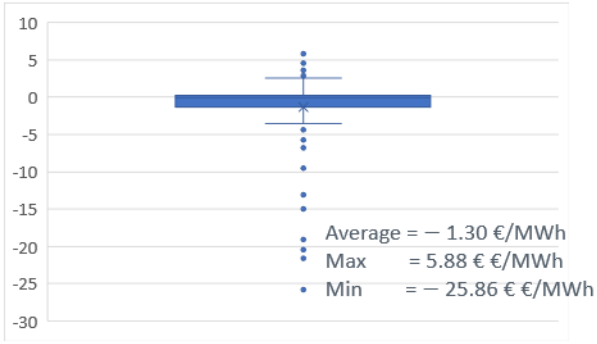
Production data 2020 - Euphemia 10.6

N-SIDE OPTIMIZING YOUR DECISIONS

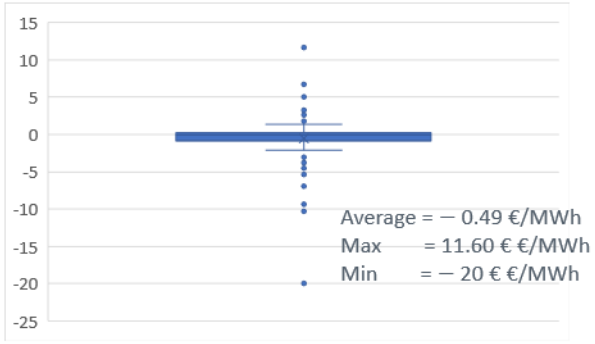
Hour 19
Price diff. in only ~33 % of the sessions (121/366 observations)



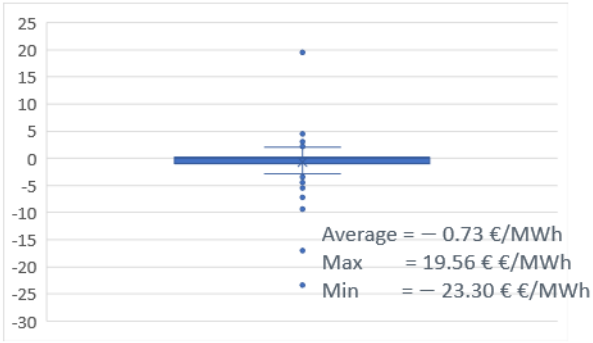
Hour 20
Price diff. in only ~31 % of the sessions (115/366 observations)



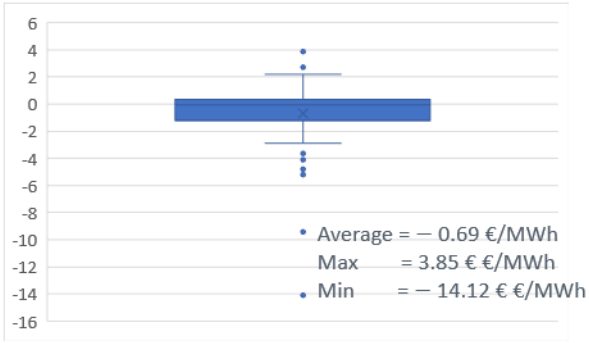
Hour 21
Price diff. in only ~33 % of the sessions (120/366 observations)



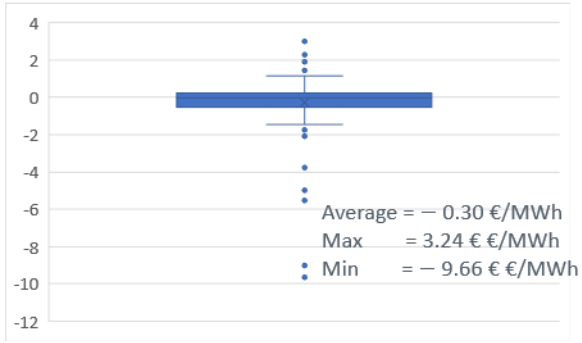
Hour 22
Price diff. in only ~33 % of the sessions (120/366 observations)



Hour 23
Price diff. in only ~30 % of the sessions (111/366 observations)



Hour 24
Price diff. in only ~28 % of the sessions (101/365 observations)



Hour 25 on October 25: there is no price difference.

N.B. Average price differences reported above are averages over *non-zero* price differences