CALIBSUN

In situ Veritas

Probabilistic Bidding: Revenue & Penalty Outcomes Update

18/11/2025

IS THIS POSSIBLE ?

Actual Production: 0.847 MWh

?	FORECAST 1	FORECAST 2
FORECAST VALUE(MWh)	0.686	0.098
NET REVENUE(€)	**50.30**	**87.09**

Agenda

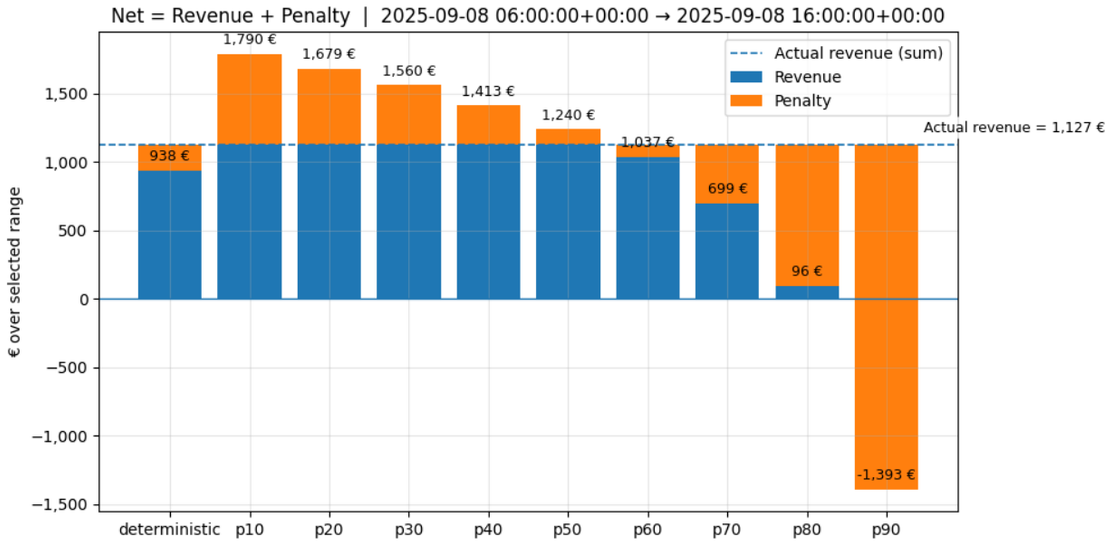
- **Understanding the penalty scheme - Case: Neoen (14MW - France)**
- **Results and Findings**

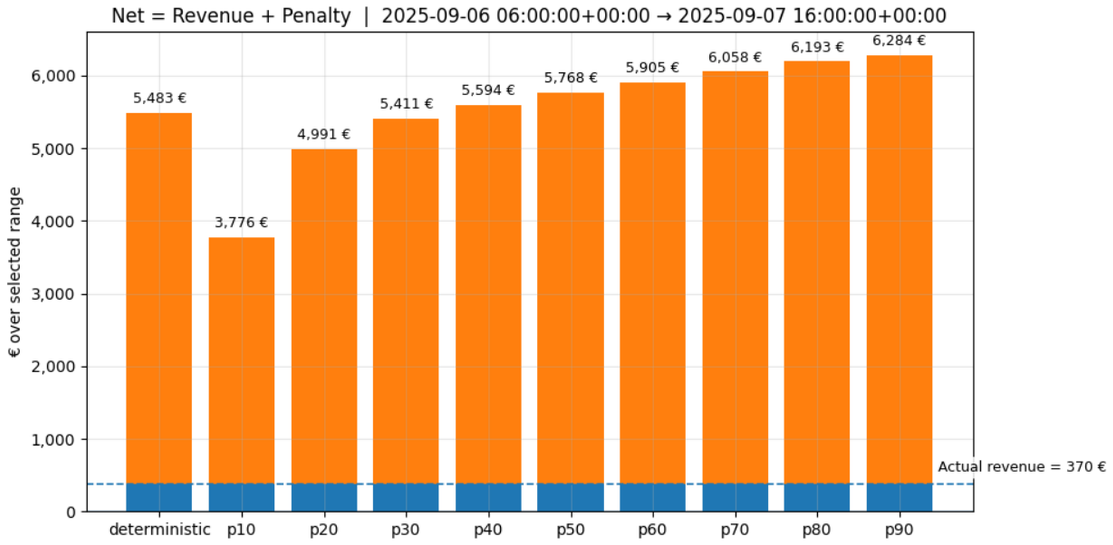
When does imbalance become revenue?

	System Long (Negative)	System Short (Positive)
Actual > Schedule	Penalty	Remuneration
Actual < Schedule	Remuneration	Penalty

“In imbalance settlement, you are rewarded when your deviation reduces the grid imbalance, and penalised when it amplifies it.”

Revenue Comparison across Forecast Types





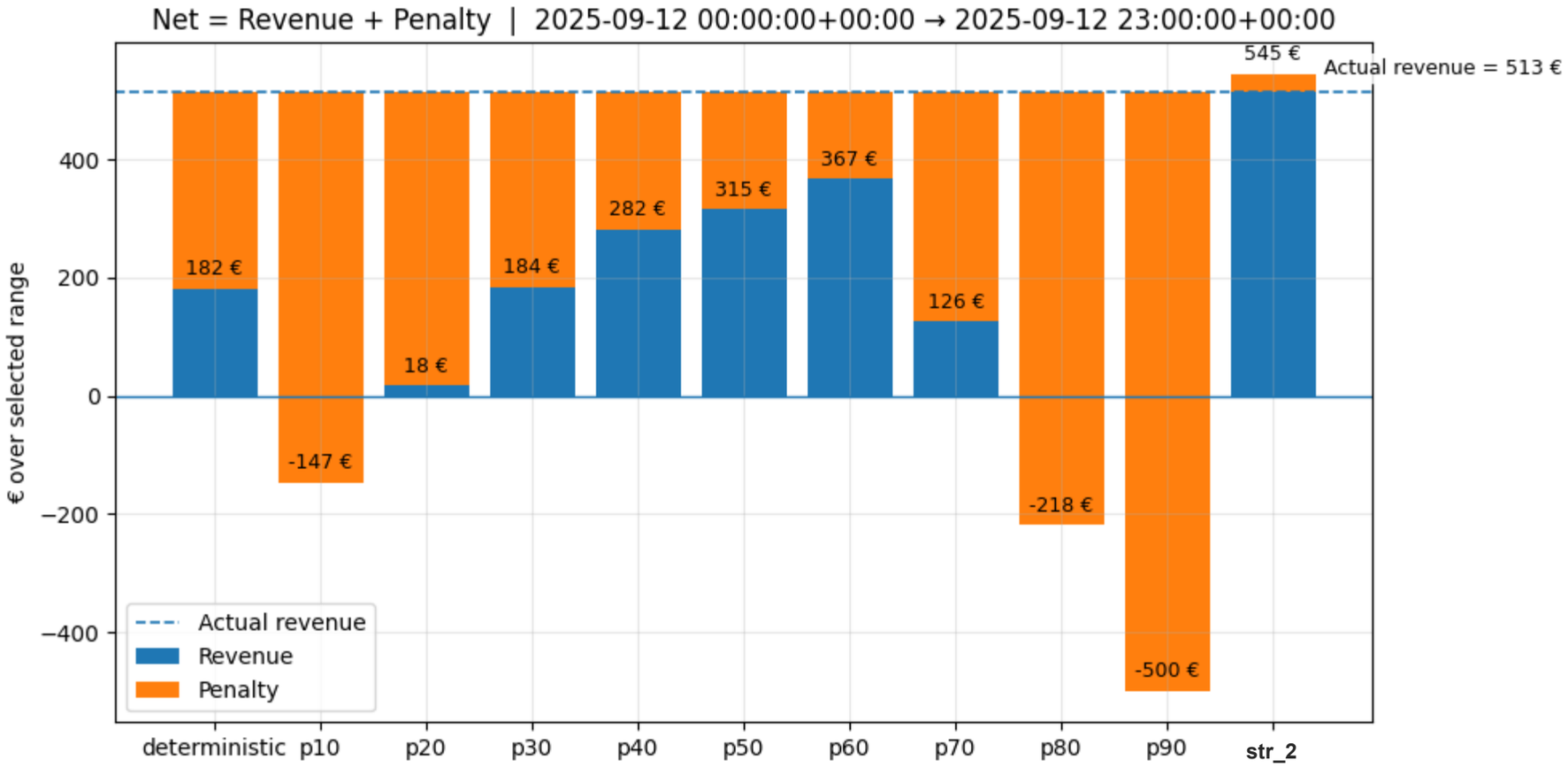
Model Considerations for Grid / System State Prediction

By anticipating grid conditions, we optimize bid quantiles to enhance revenue opportunities and reduce risk.

	Model 1	Model 2
Features Used	Cyclic features (TOD* & DOW**)	Lag + Cyclic features (1 step autoregression)
Prediction Accuracy	**57.23%**	**74.23%**

*TOD: Time of the Day
**DOW: Day of the Week

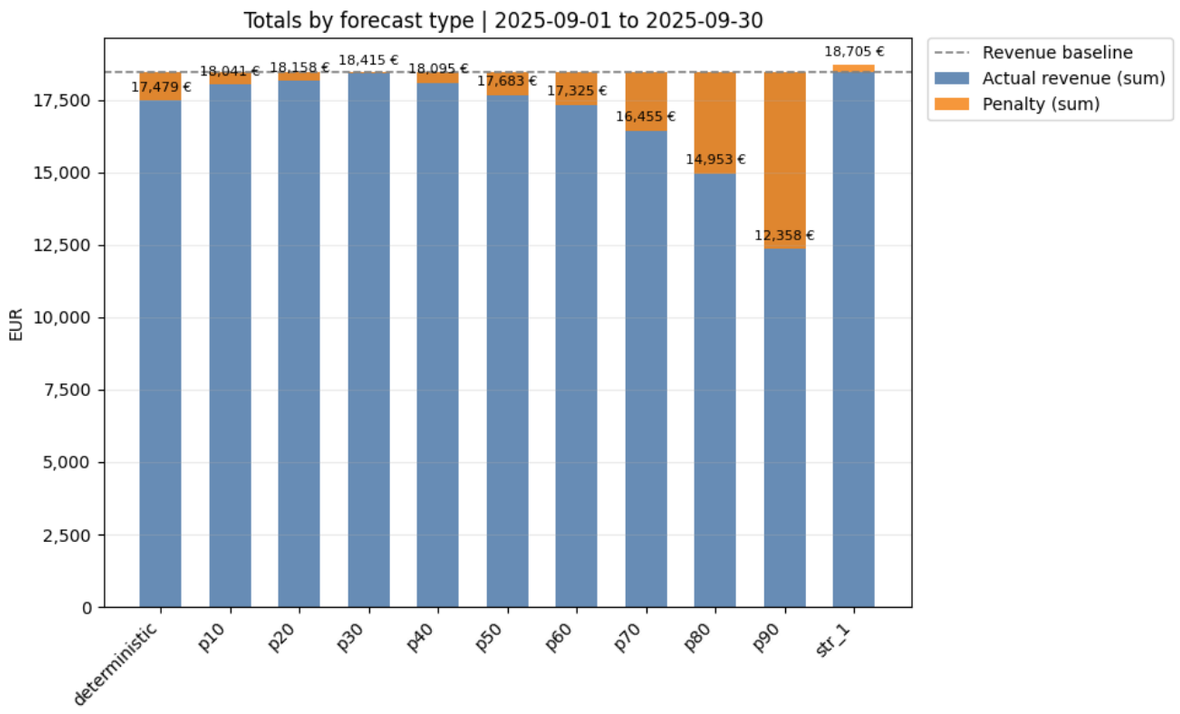
Revenue Comparison: Specific Day

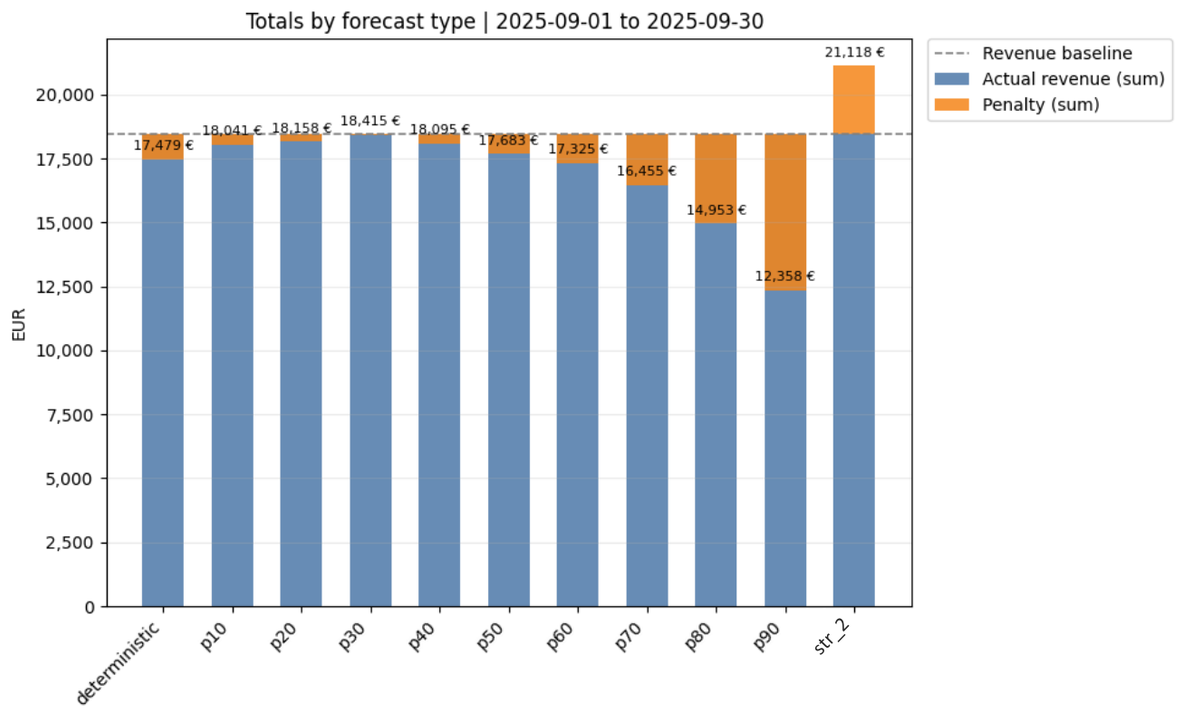


Δ% (Deterministic Vs Strategy) : **200.19%**

Performance Comparison: Analysis over a month (September 2025)

Revenue Baseline – €18,452

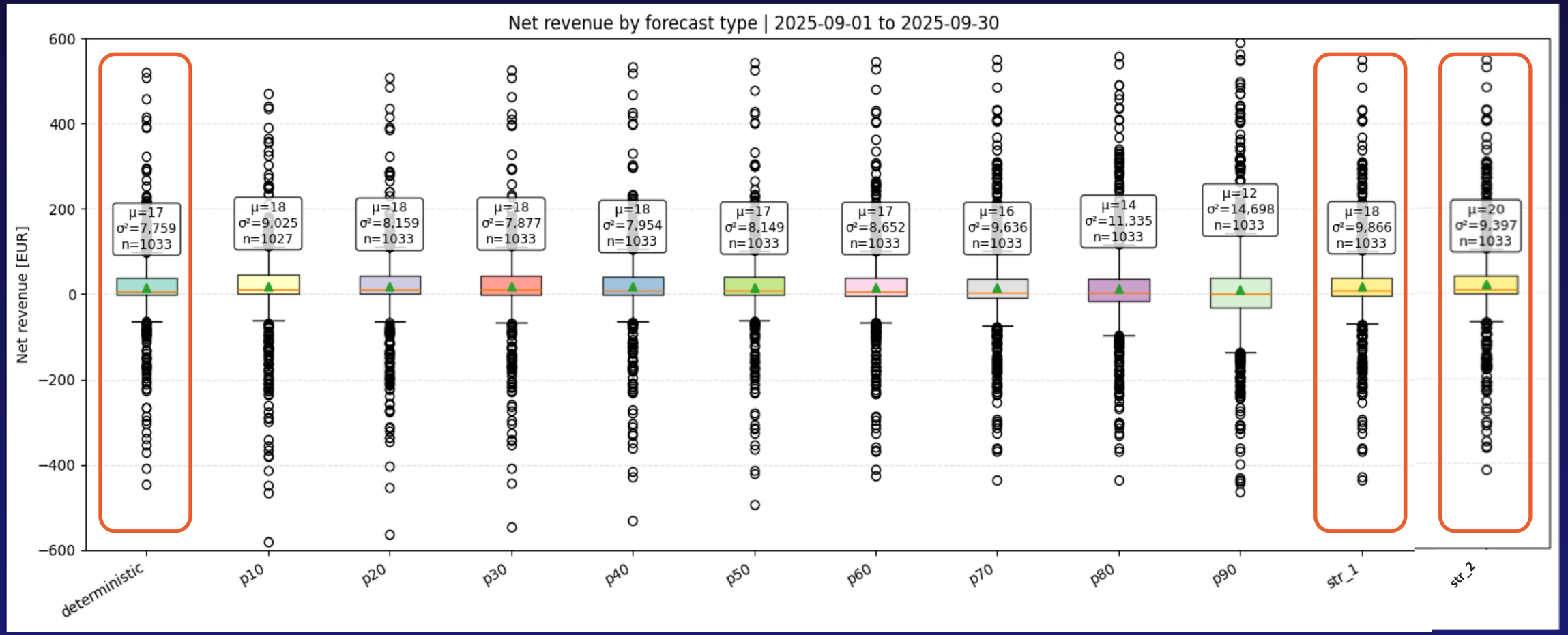




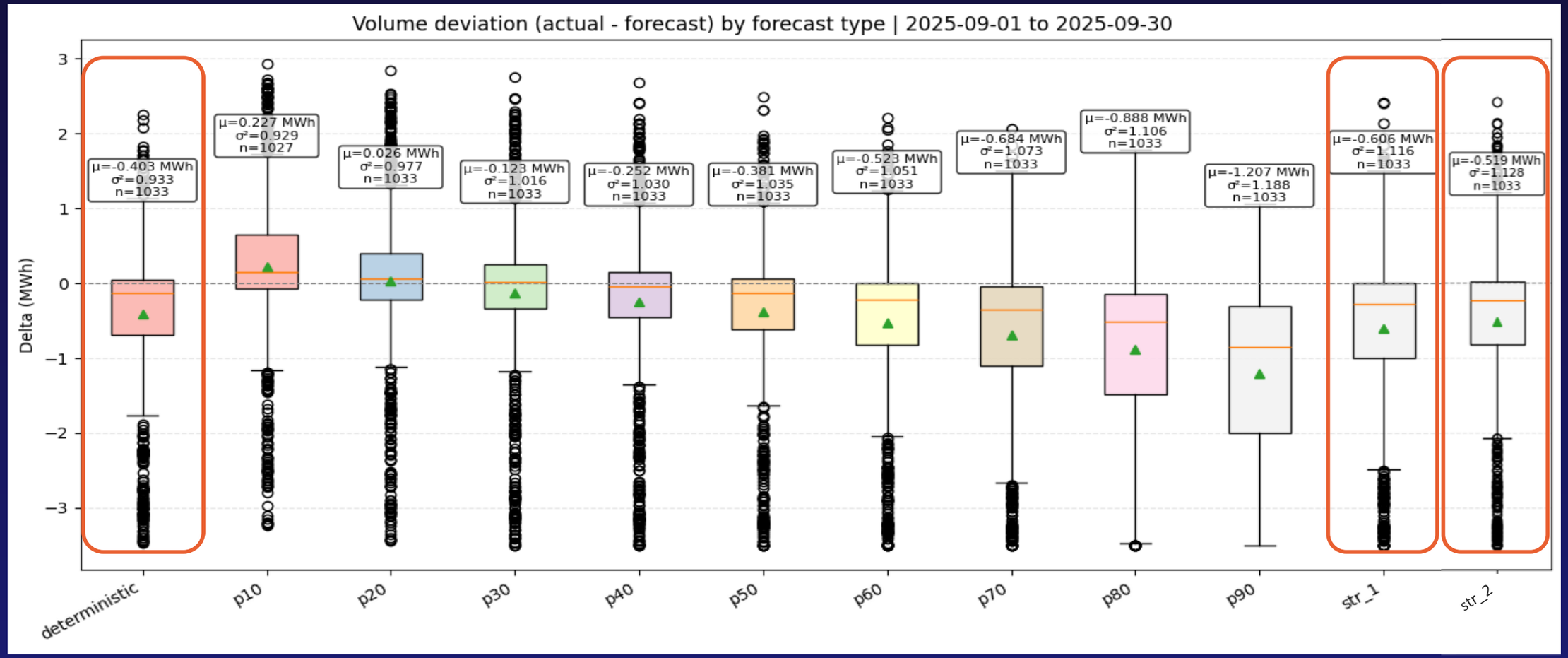
Δ% (Deterministic Vs Strategy_1) : **7.02%**

Δ% (Deterministic Vs Strategy_2) : **20.83%**

Performance Comparison 1: Revenue over a month (September 2025)



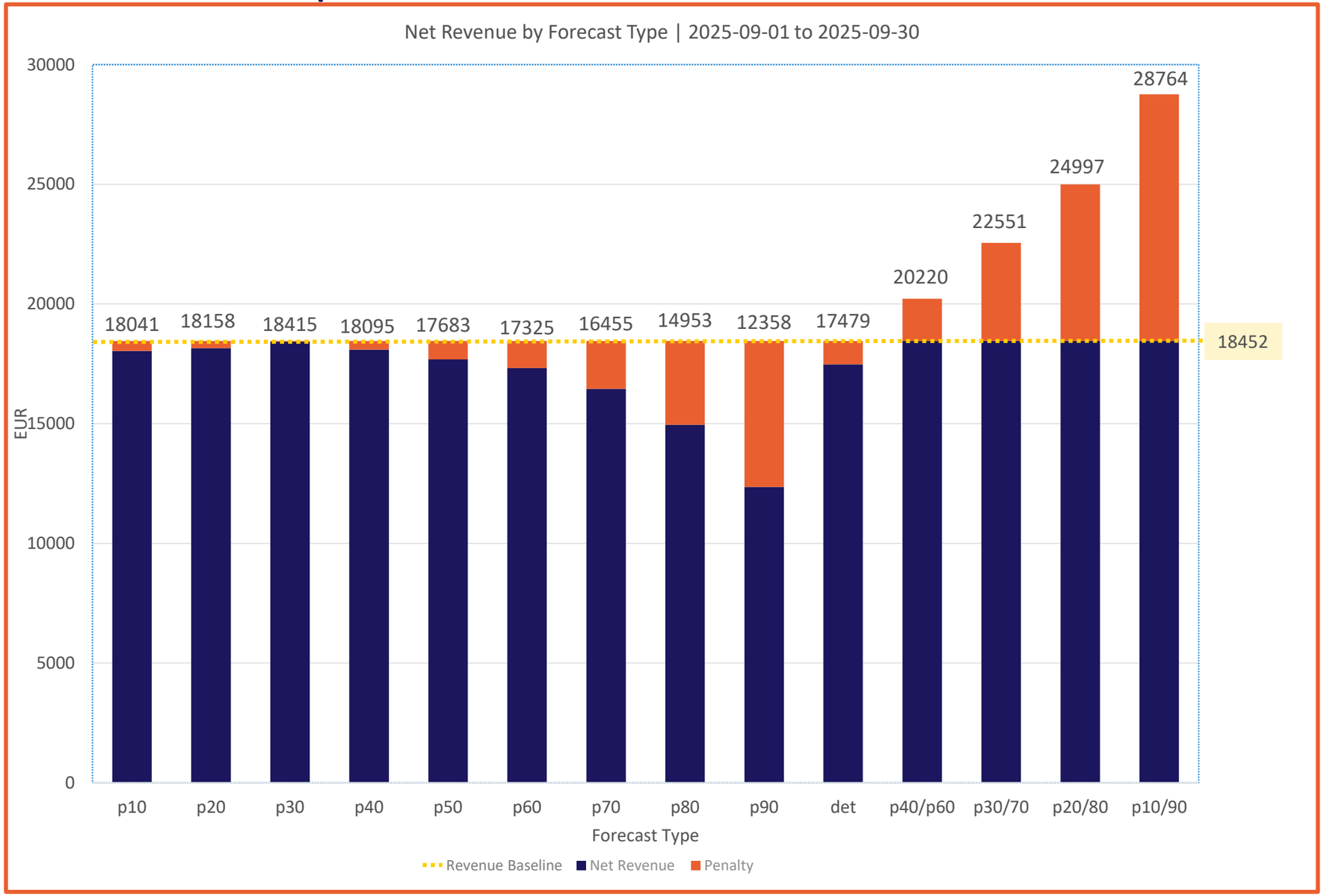
Performance Comparison 2: Volume Deviation over a month



Results comparison across strategies

Strategy	μ (Δvolume) [MWh]	σ^2 (Δvolume)	μ (net rev) [€]	σ^2 (net rev)
Str_1 (Acc: 57.23%)	**–0.606**	**1.116**	**18**	**9,866**
Str_2 (Acc: 74.23%)	**–0.519**	**1.128**	**20**	**9,397**

Revenue Comparison across Quantiles



Δ% (Deterministic Vs Probabilistic)

- P40/P60 - **15.68 %**
- P30/P70 - **29.03 %**
- P20/P80 - **43.02 %**
- P10/P90 - **64.58 %**

ACER & REMIT (EU cross-border)

Agency for the Cooperation of Energy Regulators – ACER

- EU rulebook and market surveillance
- Coordinates cross-border REMIT probes

EU REgulation on wholesale energy Market Integrity and Transparency – REMIT

- Article 5: Non tolerance for market manipulation or abuse

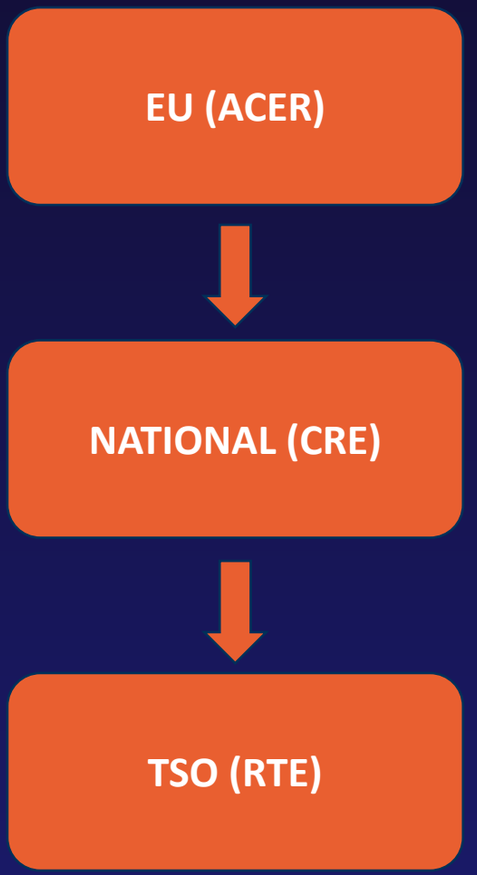
CRE & CoRDiS (France)

Commission de régulation de l'énergie – CRE

- National energy regulator for France

Comité de règlement des différends et des sanctions – CoRDiS

- Investigates REMIT in France



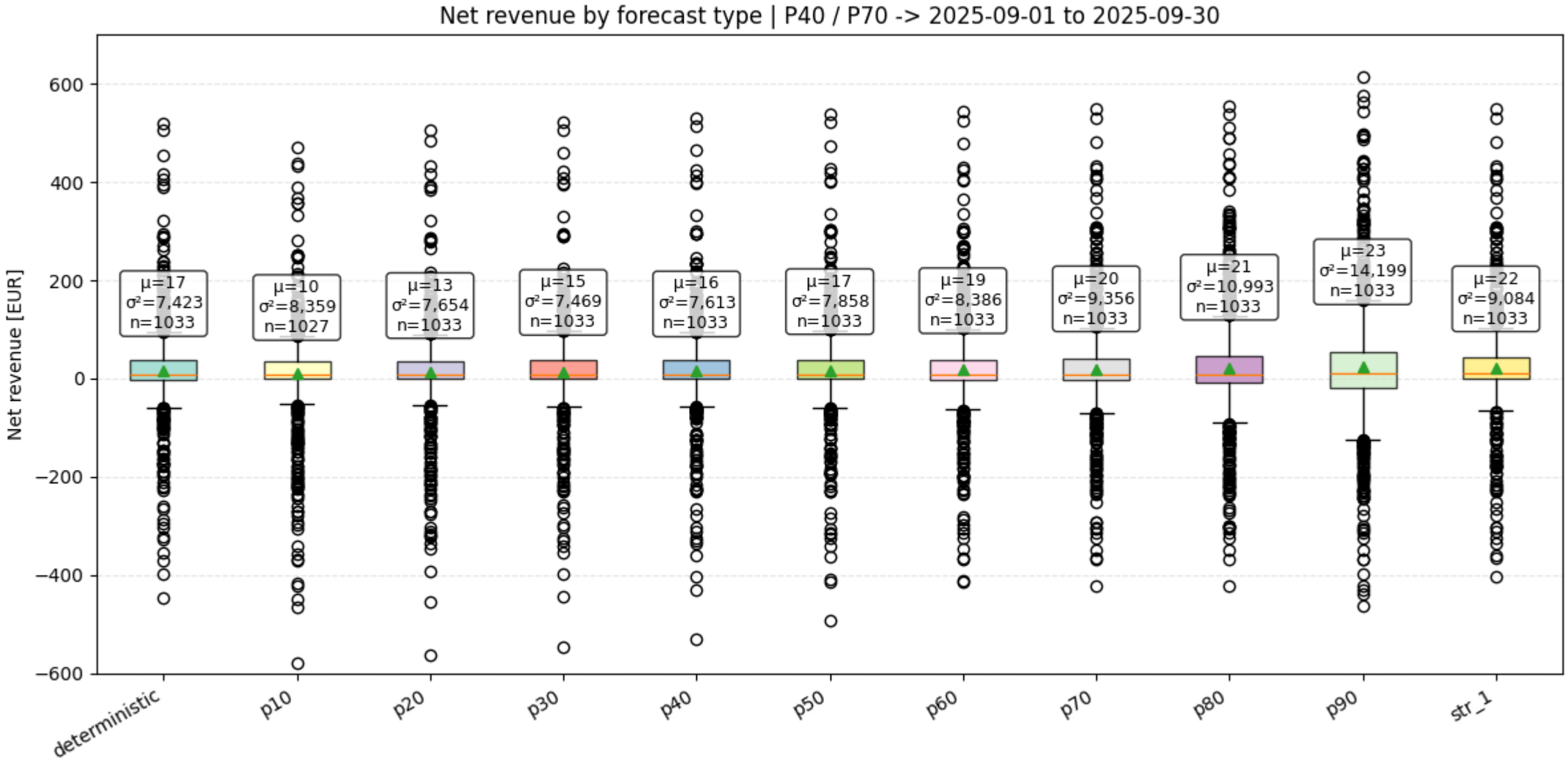
Further Study

- Penalty analysis focusing on the intra-day market – Penalty mechanisms varies across countries.
- More accurate prediction of grid state and prices of imbalances – Might be a pivot focussing more on market forecast
- Setting a base case scenario for other customer segments – Say Hybrid operators

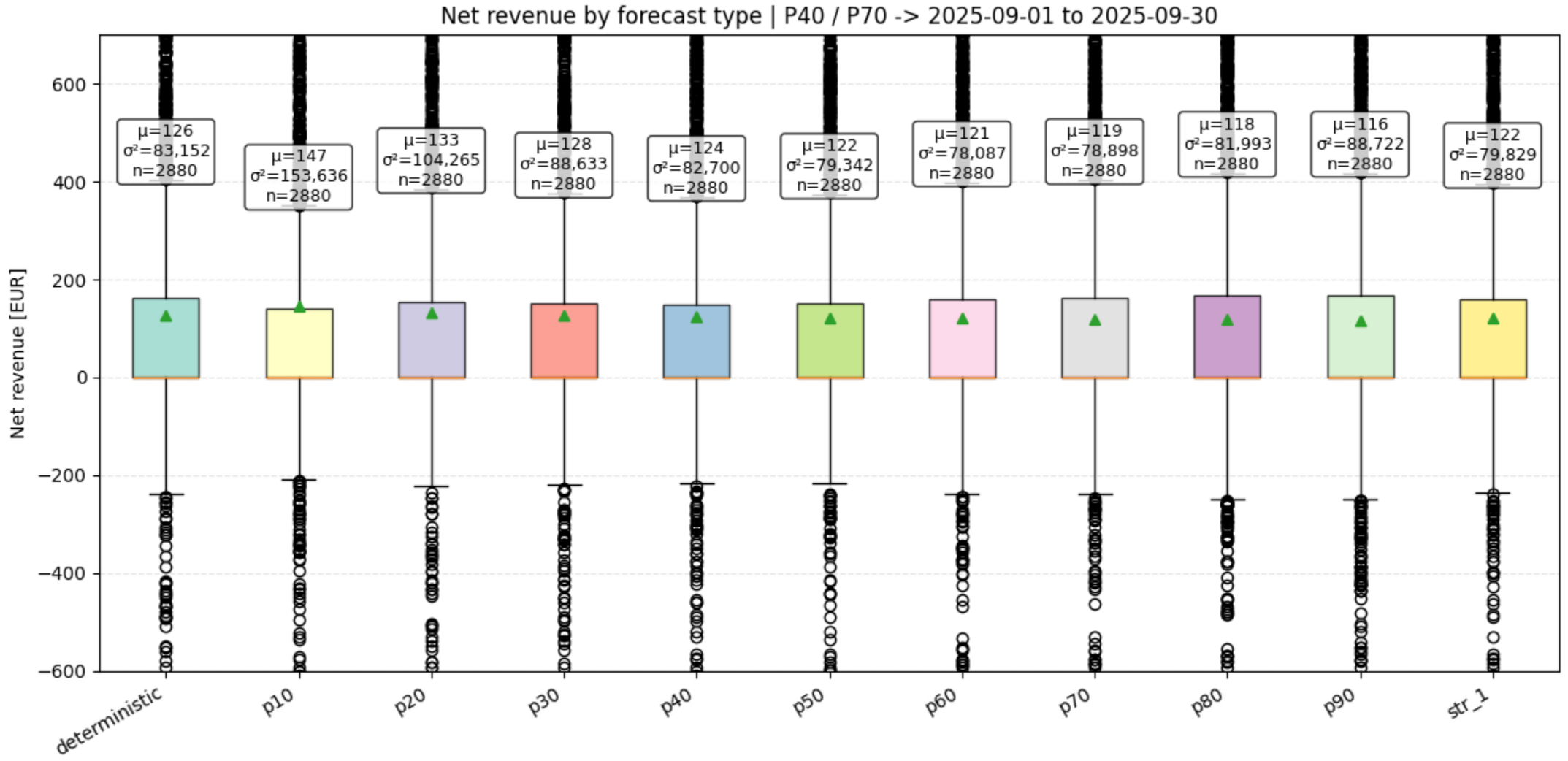
MERCI POUR VOTRE ATTENTION

SUPPLEMENTARY

NEOEN


Net revenue by forecast type | P40 / P70 -> 2025-09-01 to 2025-09-30
Net revenue [EUR]
600
400
200
0
−200
−400
−600
μ=17 σ²=7,423 n=1033
μ=10 σ²=8,359 n=1027
μ=13 σ²=7,654 n=1033
μ=15 σ²=7,469 n=1033
μ=16 σ²=7,613 n=1033
μ=17 σ²=7,858 n=1033
μ=19 σ²=8,386 n=1033
μ=20 σ²=9,356 n=1033
μ=21 σ²=10,993 n=1033
μ=23 σ²=14,199 n=1033
μ=22 σ²=9,084 n=1033
deterministic
p10
p20
p30
p40
p50
p60
p70
p80
p90
str_1

SUNNIC


Net revenue by forecast type | P40 / P70 -> 2025-09-01 to 2025-09-30
Net revenue [EUR]
600
400
200
0
−200
−400
−600
μ=126 σ²=83,152 n=2880
μ=147 σ²=153,636 n=2880
μ=133 σ²=104,265 n=2880
μ=128 σ²=88,633 n=2880
μ=124 σ²=82,700 n=2880
μ=122 σ²=79,342 n=2880
μ=121 σ²=78,087 n=2880
μ=119 σ²=78,898 n=2880
μ=118 σ²=81,993 n=2880
μ=116 σ²=88,722 n=2880
μ=122 σ²=79,829 n=2880
deterministic
p10
p20
p30
p40
p50
p60
p70
p80
p90
str_1

For NaN (n = 1532, n = 1027)

Mean

Forecast Type	SUNNIC	NEOEN
DET	237	17
P10	276	10
P20	251	13
P30	240	15
P40	234	16
P50	230	17
P60	227	19
P70	223	20
P80	221	21
P90	218	24
STR	230	22

Variance

Forecast Type	SUNNIC	NEOEN
DET	12996	7465
P10	253598	8407
P20	166645	7698
P30	139744	7511
P40	129921	7656
P50	124443	7903
P60	122787	8433
P70	125022	9409
P80	131219	11055
P90	144504	14278
STR	125329	9134

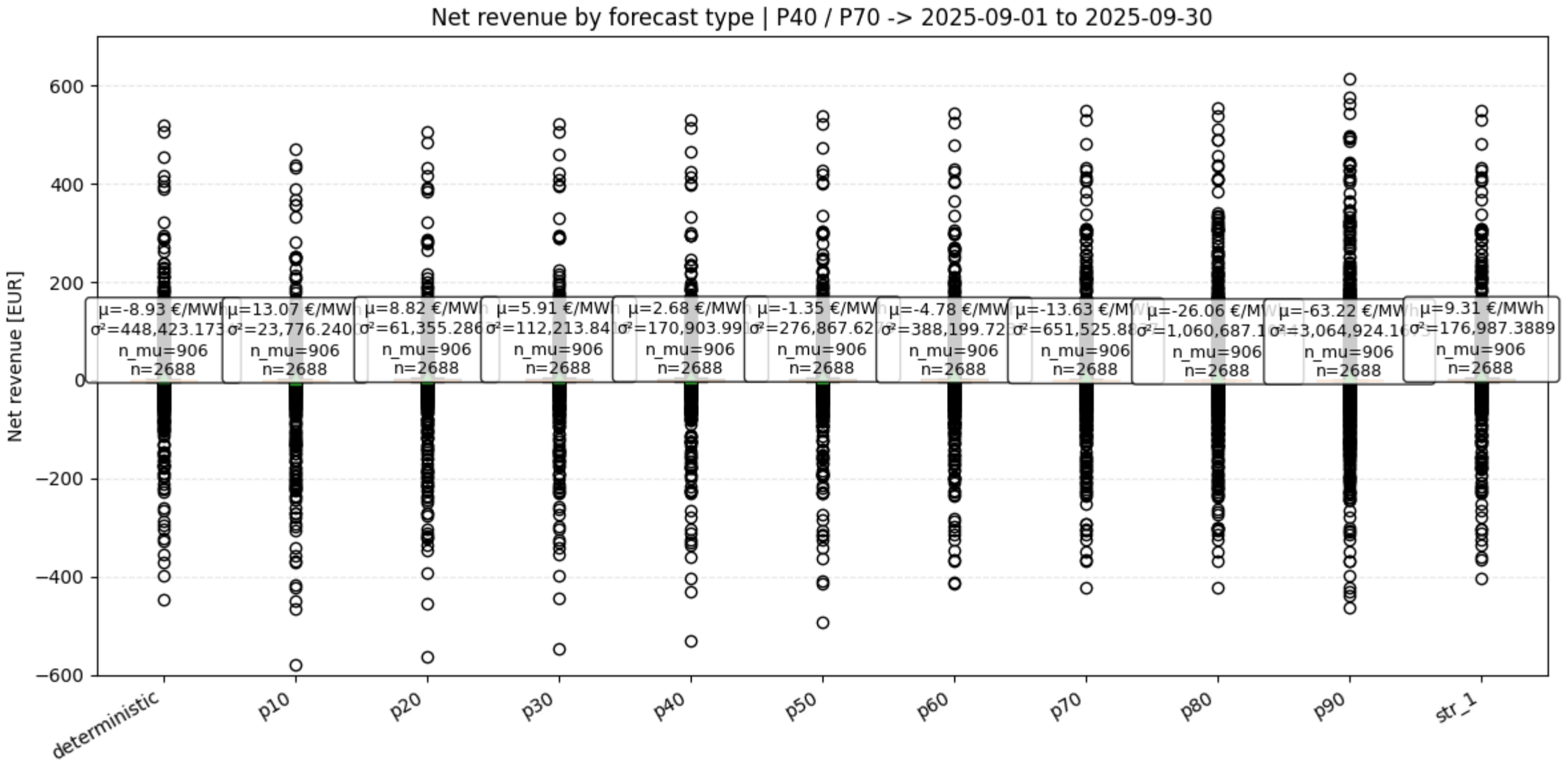
For 0 (n = 2880, n = 2688)

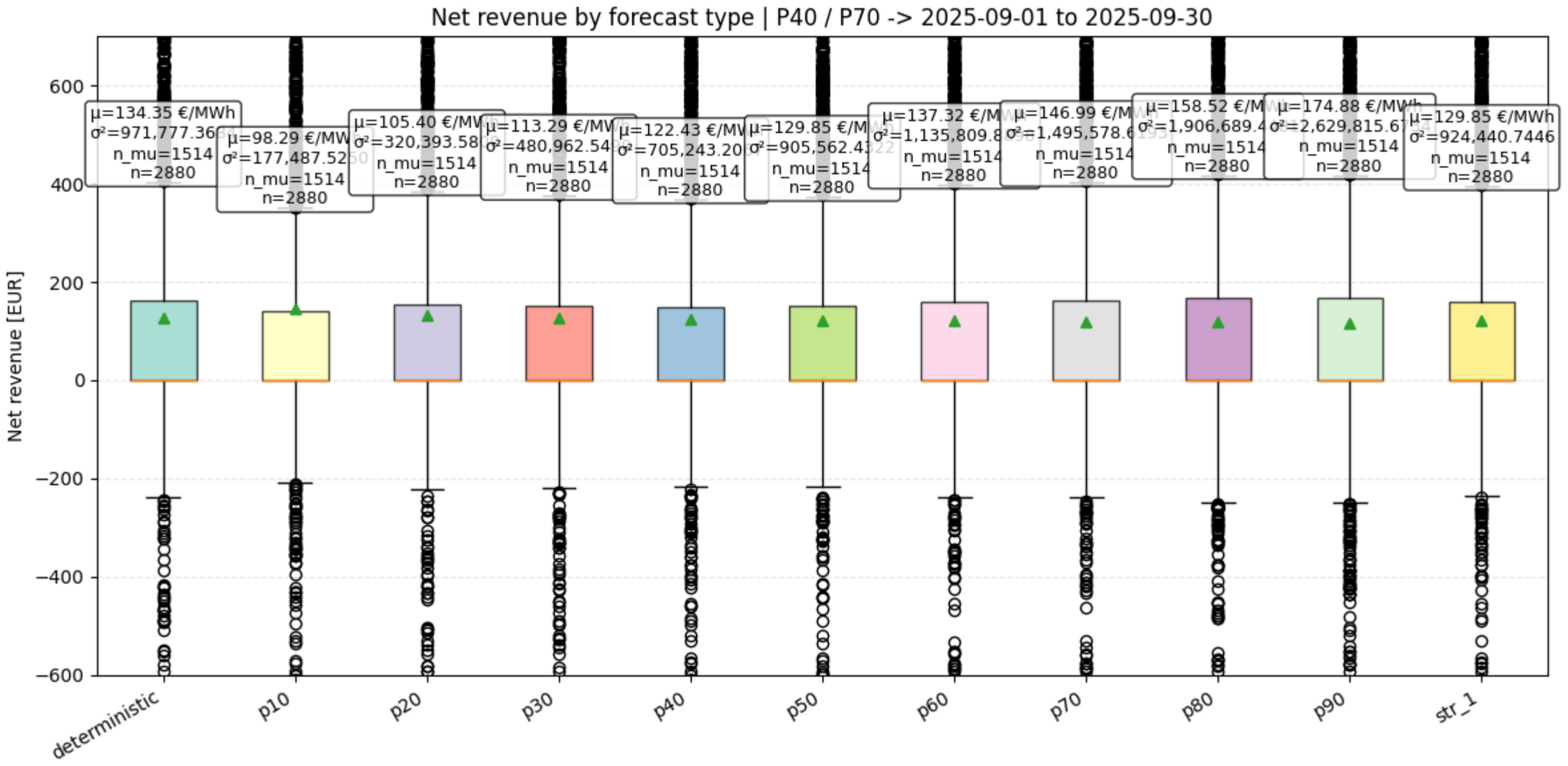
Mean

Forecast Type	SUNNIC	NEOEN
DET	126	7
P10	147	4
P20	133	5
P30	128	6
P40	124	6
P50	122	7
P60	121	7
P70	119	8
P80	118	8
P90	116	9
STR	122	9

Variance

Forecast Type	SUNNIC	NEOEN
DET	83152	2921
P10	153636	3217
P20	104265	2979
P30	88633	2920
P40	82700	2985
P50	79342	3088
P60	78087	3302
P70	78898	3684
P80	81993	4326
P90	88722	5583
STR	79829	3606


Net revenue by forecast type | P40 / P70 -> 2025-09-01 to 2025-09-30
Net revenue [EUR]
600
400
200
0
−200
−400
−600
μ=-8.93 €/MWh σ²=448,423.173 n_mu=906 n=2688
μ=13.07 €/MWh σ²=23,776.240 n_mu=906 n=2688
μ=8.82 €/MWh σ²=61,355.286 n_mu=906 n=2688
μ=5.91 €/MWh σ²=112,213.84 n_mu=906 n=2688
μ=2.68 €/MWh σ²=170,903.99 n_mu=906 n=2688
μ=-1.35 €/MWh σ²=276,867.62 n_mu=906 n=2688
μ=-4.78 €/MWh σ²=388,199.72 n_mu=906 n=2688
μ=-13.63 €/MWh σ²=651,525.88 n_mu=906 n=2688
μ=-26.06 €/MWh σ²=1,060,687.1 n_mu=906 n=2688
μ=-63.22 €/MWh σ²=3,064,924.1 n_mu=906 n=2688
μ=9.31 €/MWh σ²=176,987.3889 n_mu=906 n=2688
deterministic
p10
p20
p30
p40
p50
p60
p70
p80
p90
str_1


Net revenue by forecast type | P40 / P70 -> 2025-09-01 to 2025-09-30
Net revenue [EUR]
600
400
200
0
−200
−400
−600
μ=134.35 €/MWh
σ²=971,777.36
n_mu=1514
n=2880
μ=98.29 €/MW
σ²=177,487.52
n_mu=1514
n=2880
μ=105.40 €/MW
σ²=320,393.58
n_mu=1514
n=2880
μ=113.29 €/MW
σ²=480,962.54
n_mu=1514
n=2880
μ=122.43 €/MW
σ²=705,243.20
n_mu=1514
n=2880
μ=129.85 €/MW
σ²=905,562.4
n_mu=1514
n=2880
μ=137.32 €/M
σ²=1,135,809.8
n_mu=1514
n=2880
μ=146.99 €/M
σ²=1,495,578.6
n_mu=1514
n=2880
μ=158.52 €/M
σ²=1,906,689.4
n_mu=1514
n=2880
μ=174.88 €/MWh
σ²=2,629,815.67
n_mu=1514
n=2880
μ=129.85 €/MWh
σ²=924,440.7446
n_mu=1514
n=2880
deterministic
p10
p20
p30
p40
p50
p60
p70
p80
p90
str_1