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Cet Partnership

Effective Dispatch Planning for Competing Storage Agents

Christoph Schimeczek[1], Felix Nitsch[2], Johannes Kochems[1], Kristina Nienhaus[1]

30th March 2026

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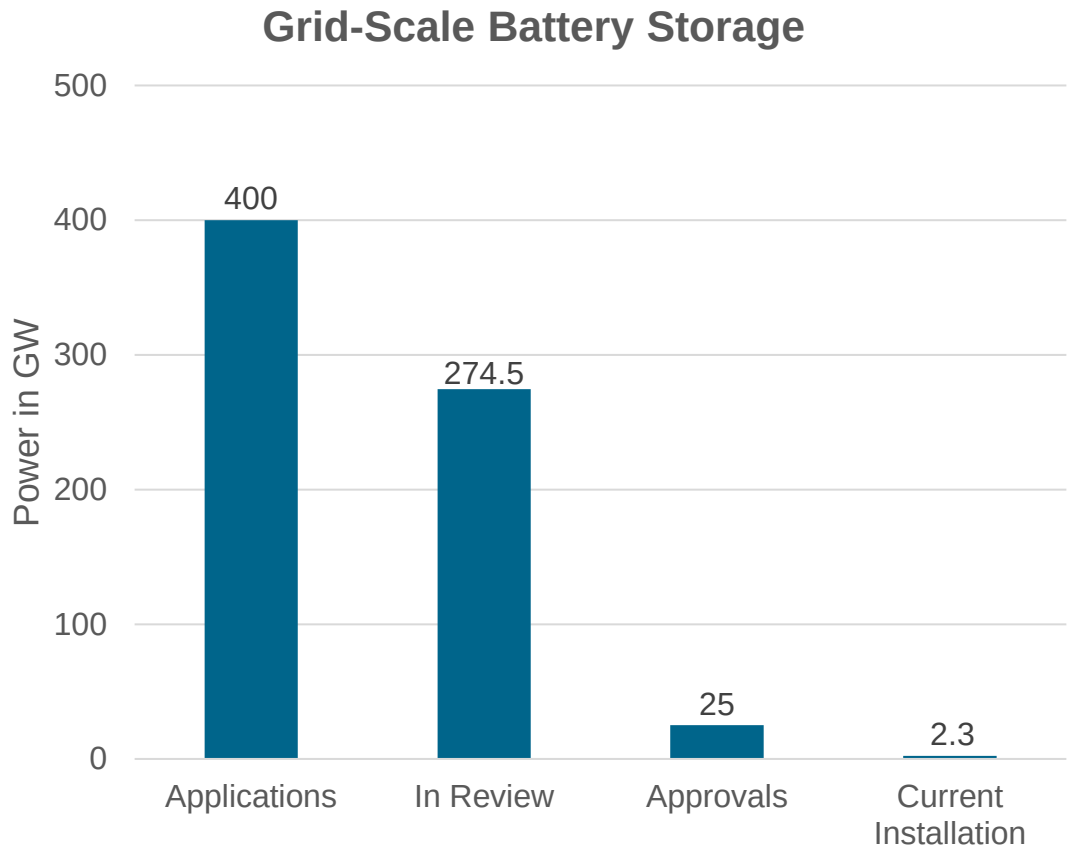
DLR

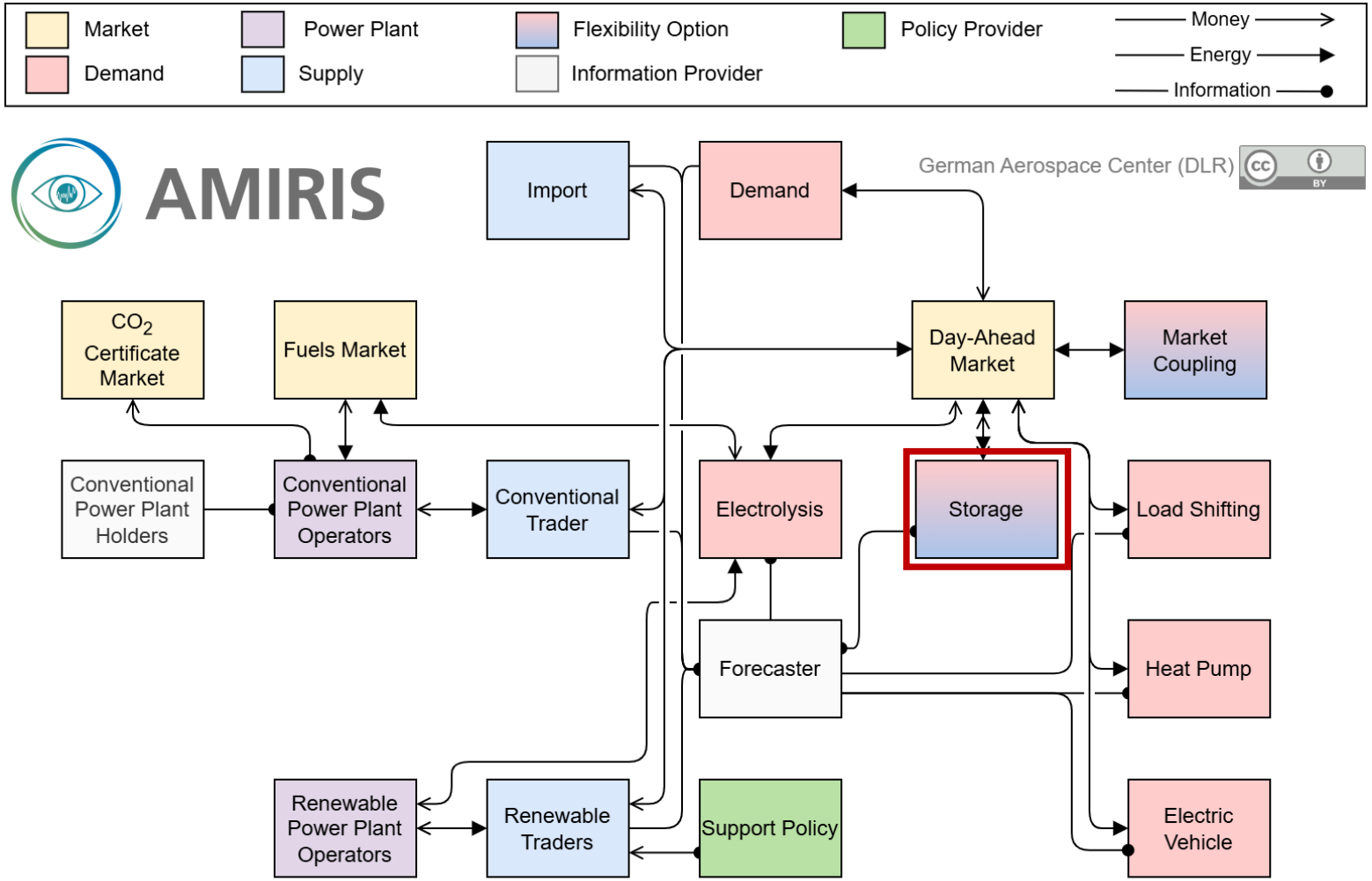
Motivation



→ What impact on electricity market dynamics might these storage units have?

Source: BNetzA (2025)

Agent-based electricity market modelling



https://wonderl.ink/@amiris

Modelling Competing Storages

Image source: DLR e.V.

Modelling Competing Storages

The Question

To charge or to discharge…

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→ Use electricity price forecast, maximise profits with *dynamic programming*

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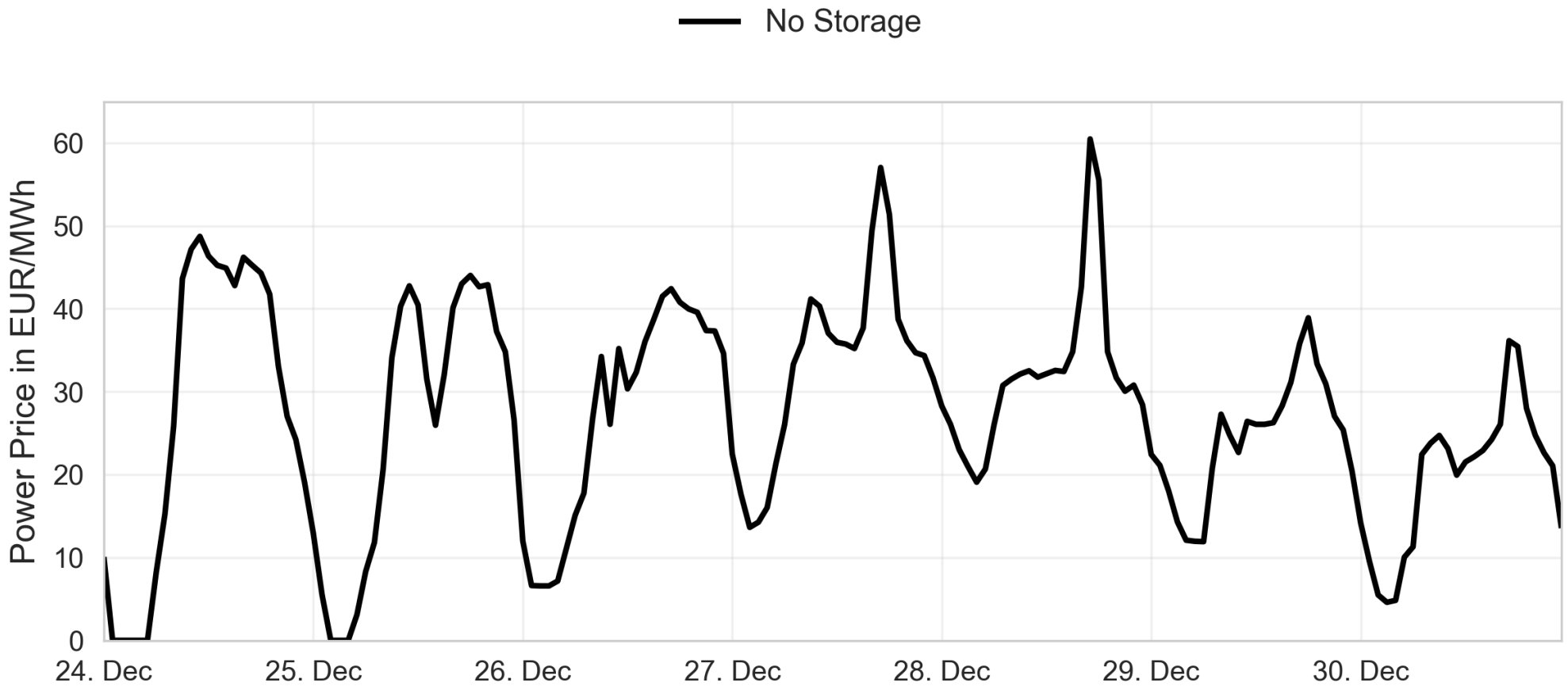

Modelling Competing Storages

The Question

To charge or to discharge…

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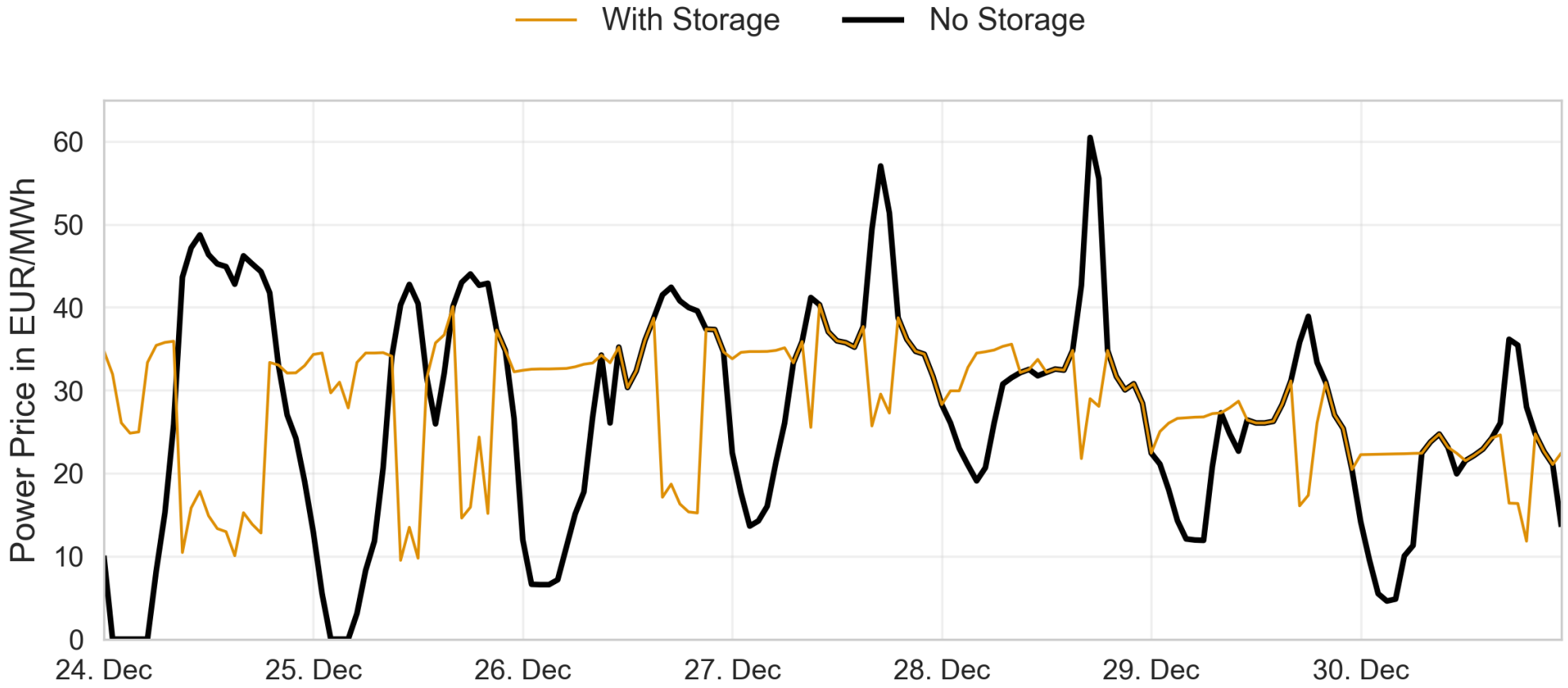

Modelling Competing Storages

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To charge or to discharge…

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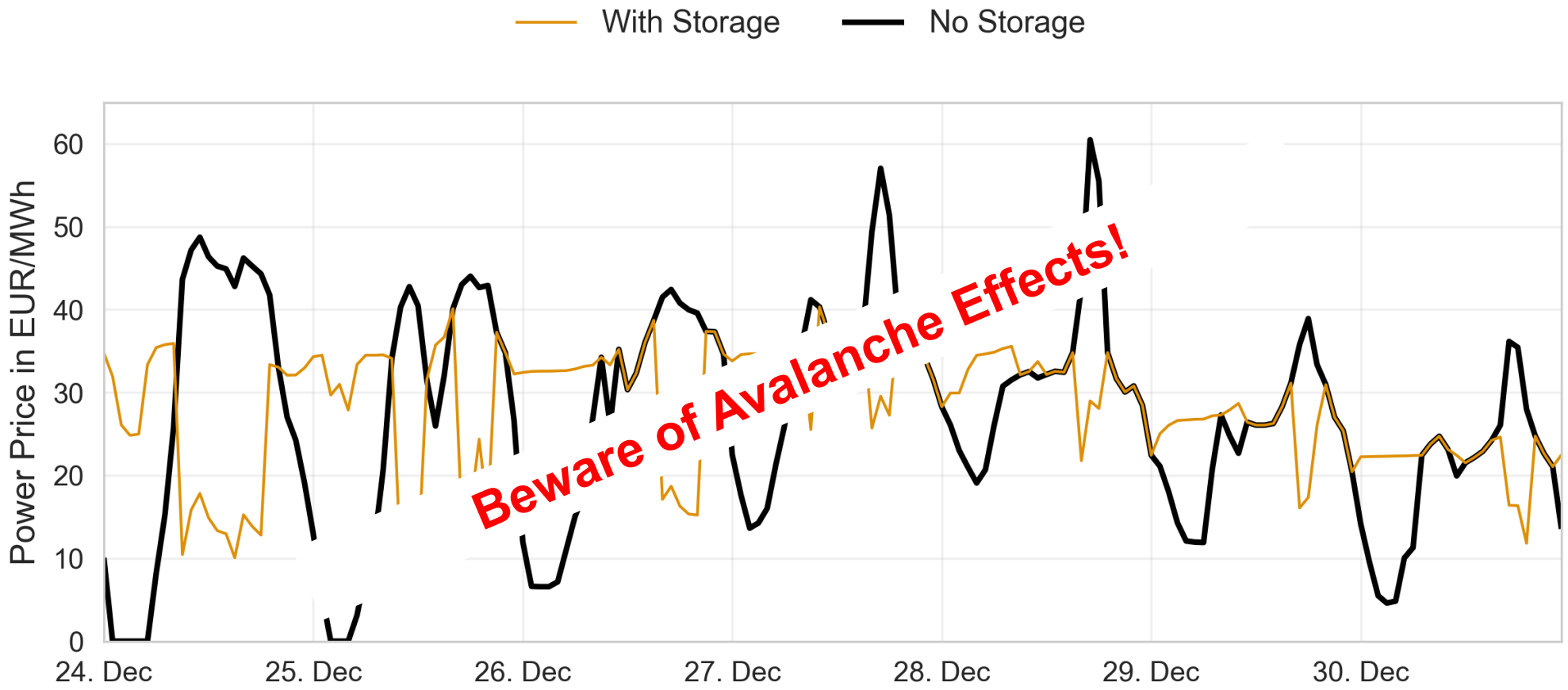
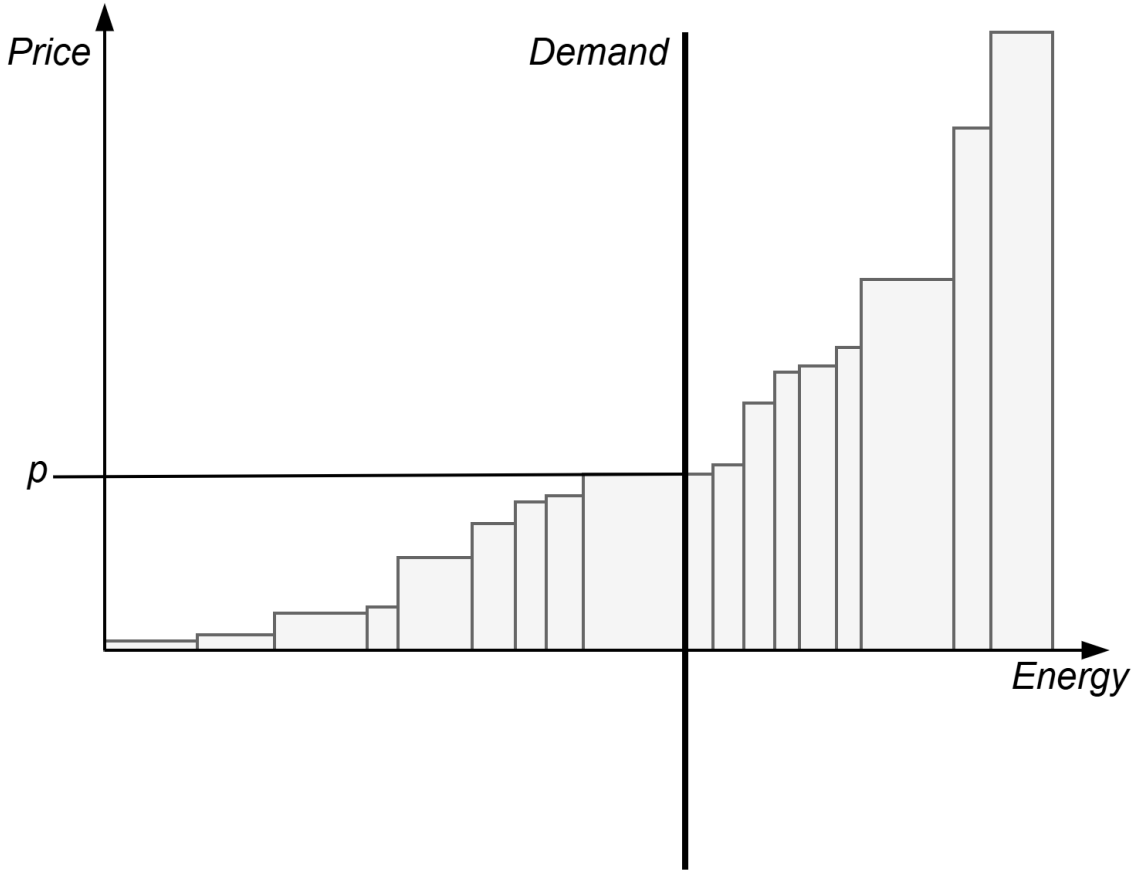


Modelling Competing Storages

Idea

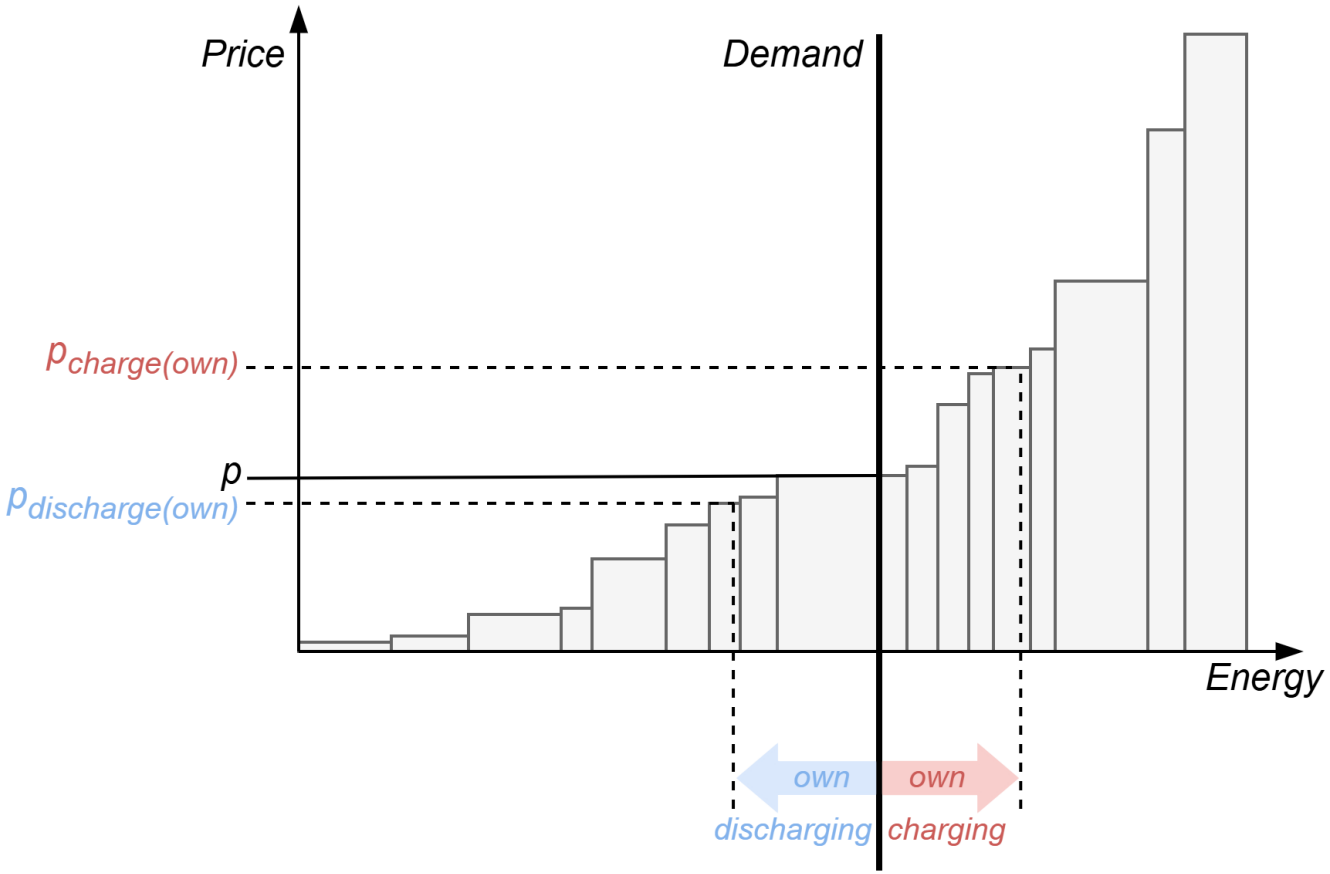
Use Merit Order in Forecast



Modelling Competing Storages

Idea

→ Account for price changes due to storage dispatch



Modelling Competing Storages

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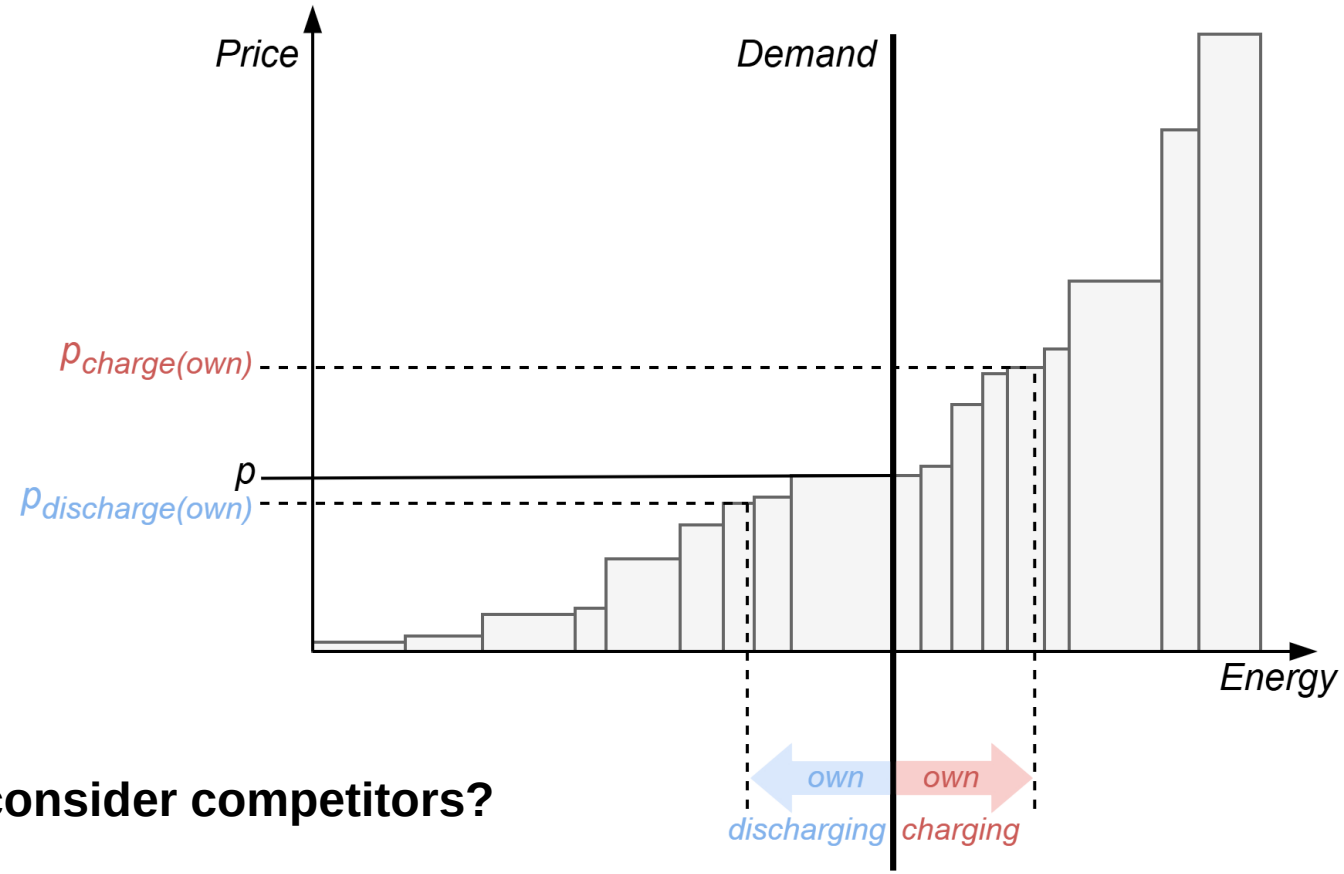
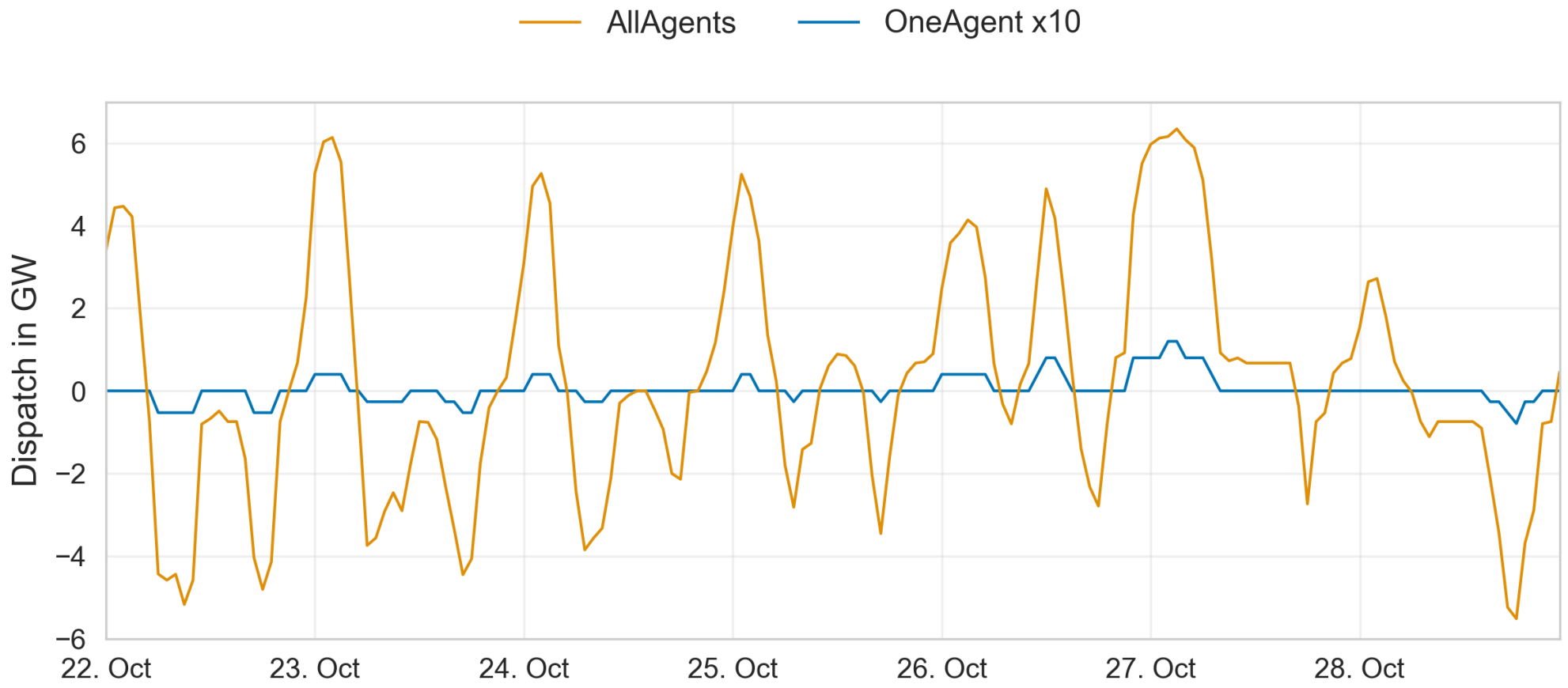


But how consider competitors?

Modelling Competing Storages

Observe Dispatch

→ Compare own dispatch to that of competitors

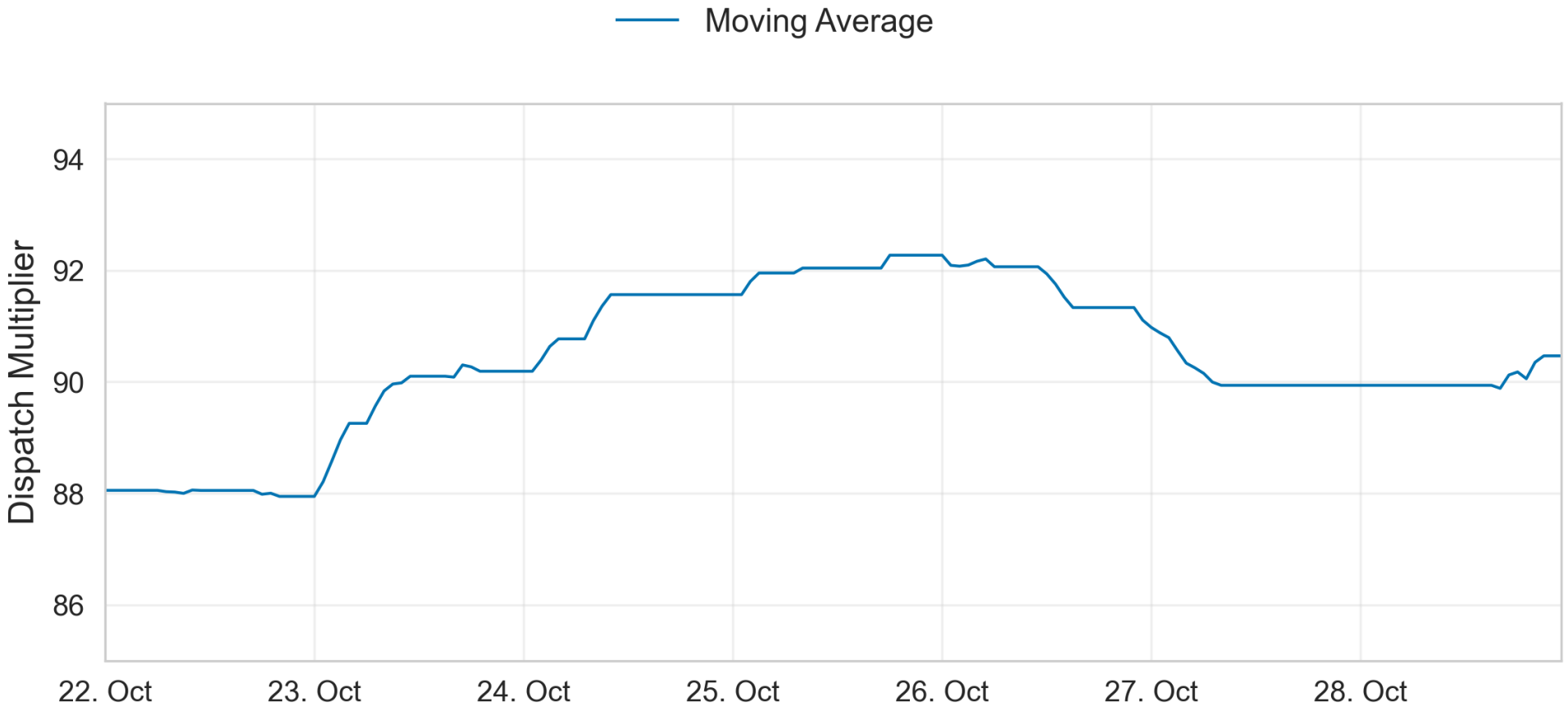


Modelling Competing Storages

Observe Dispatch

→ Compare own dispatch to that of competitors

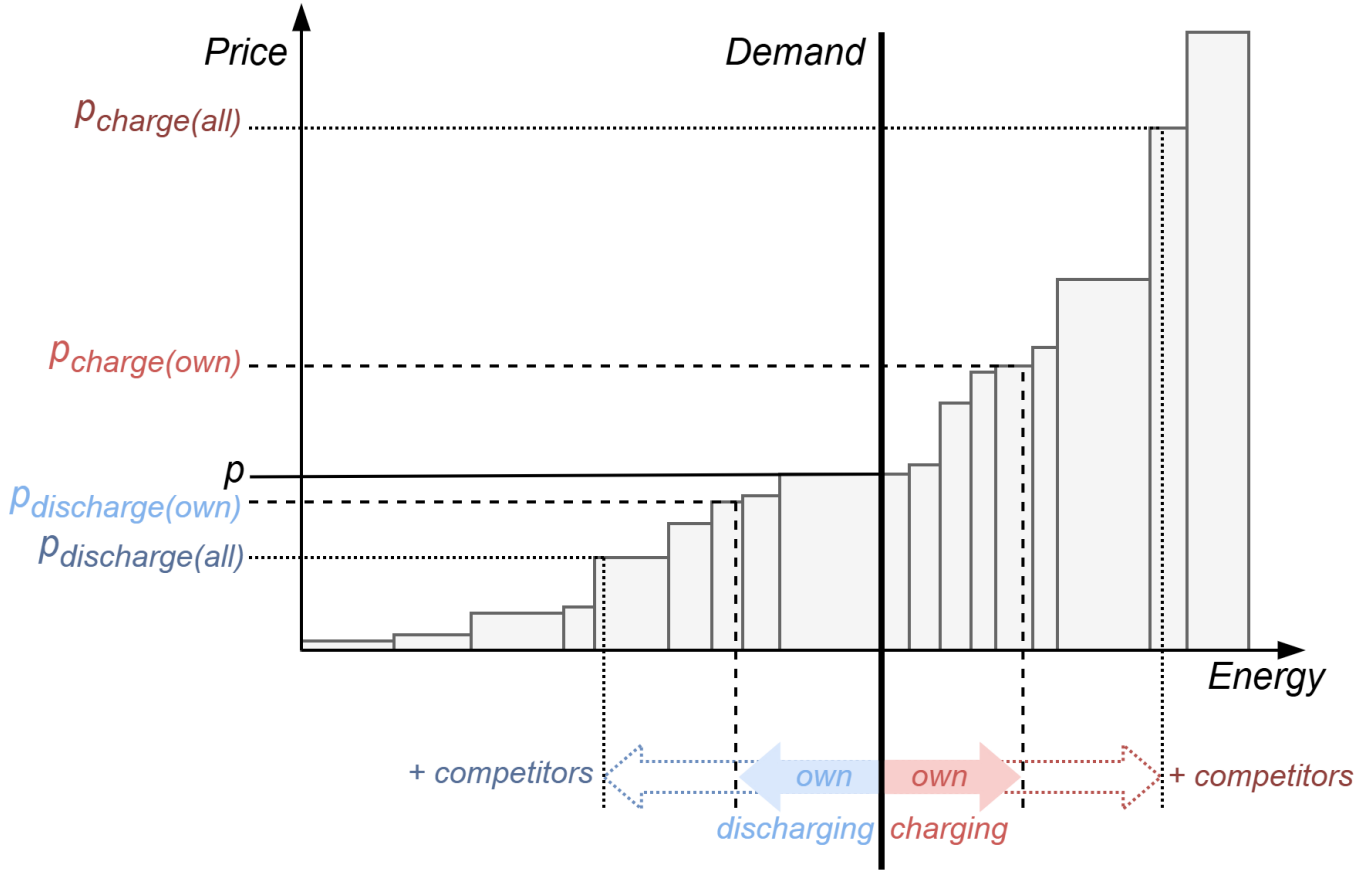
→ Represent as “**multiplier**” relative to own dispatch



Modelling Competing Storages

Apply Multiplier

→ Account for price changes of **all flexibilities**



Modelling Competing Storages

Apply Multiplier

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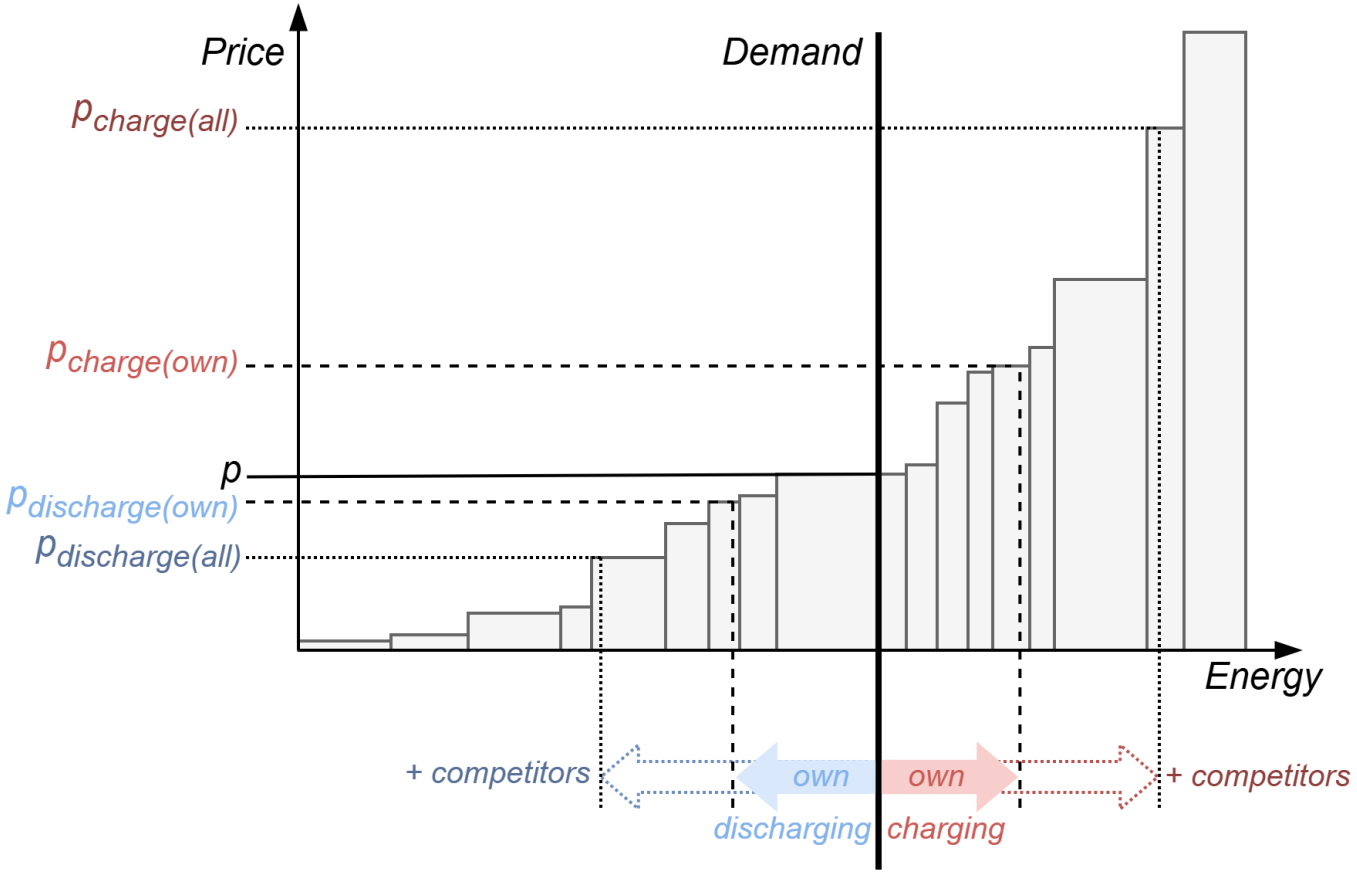
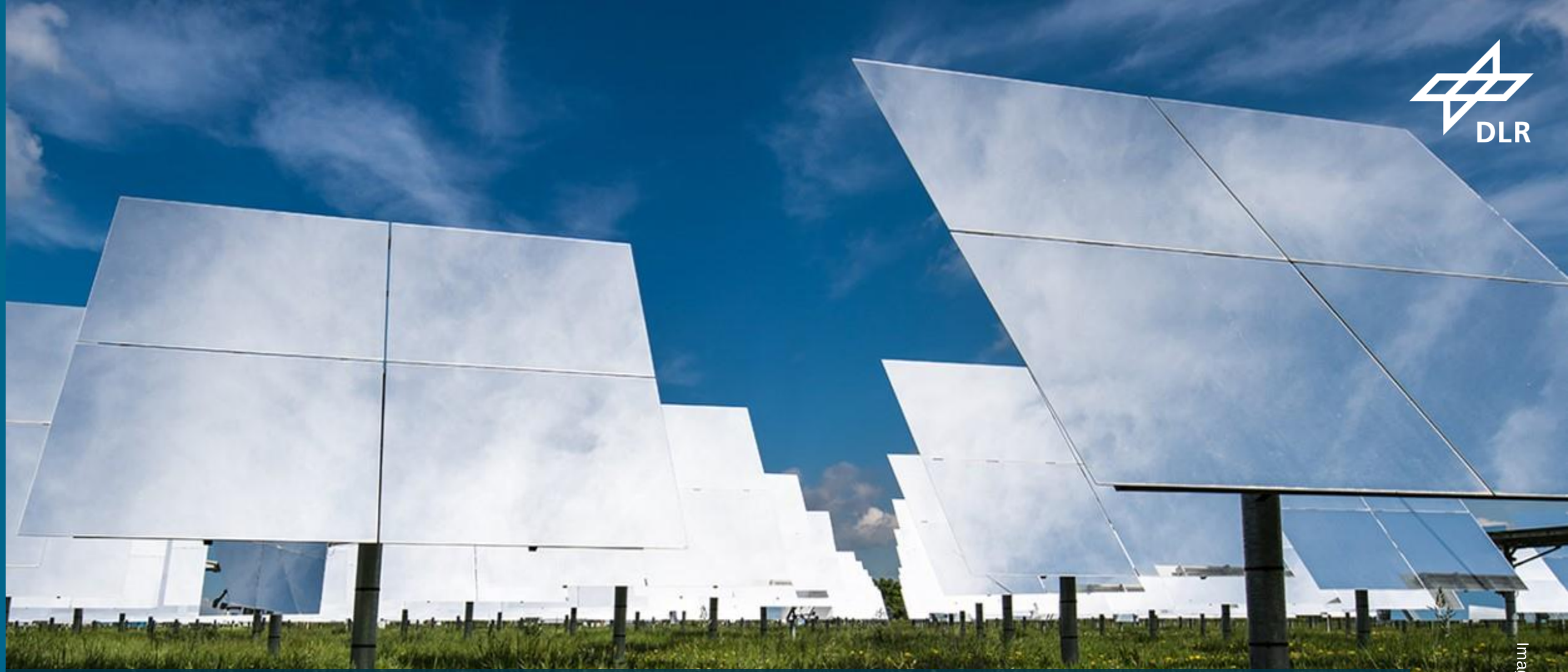


→ Avoids Avalanches

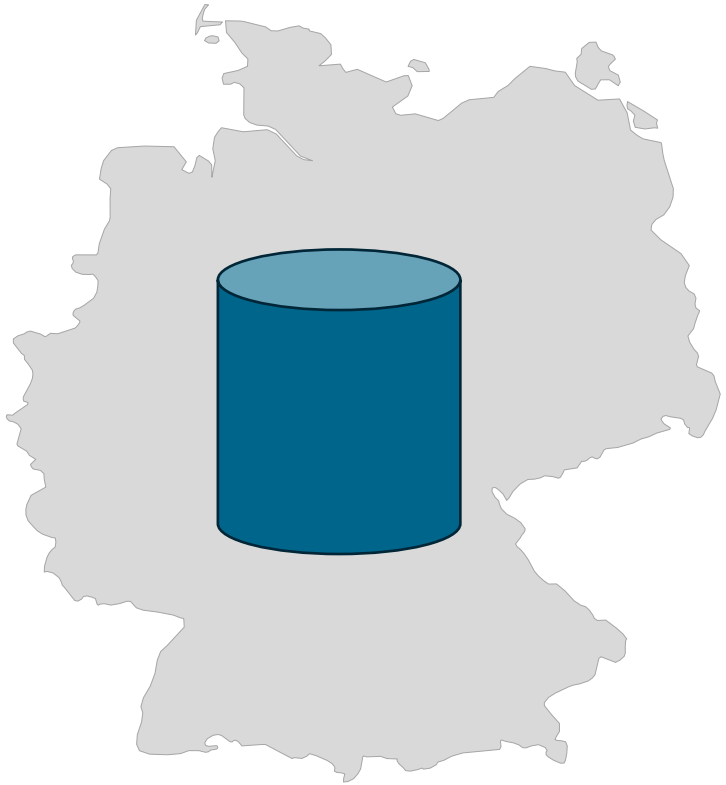


Backtesting

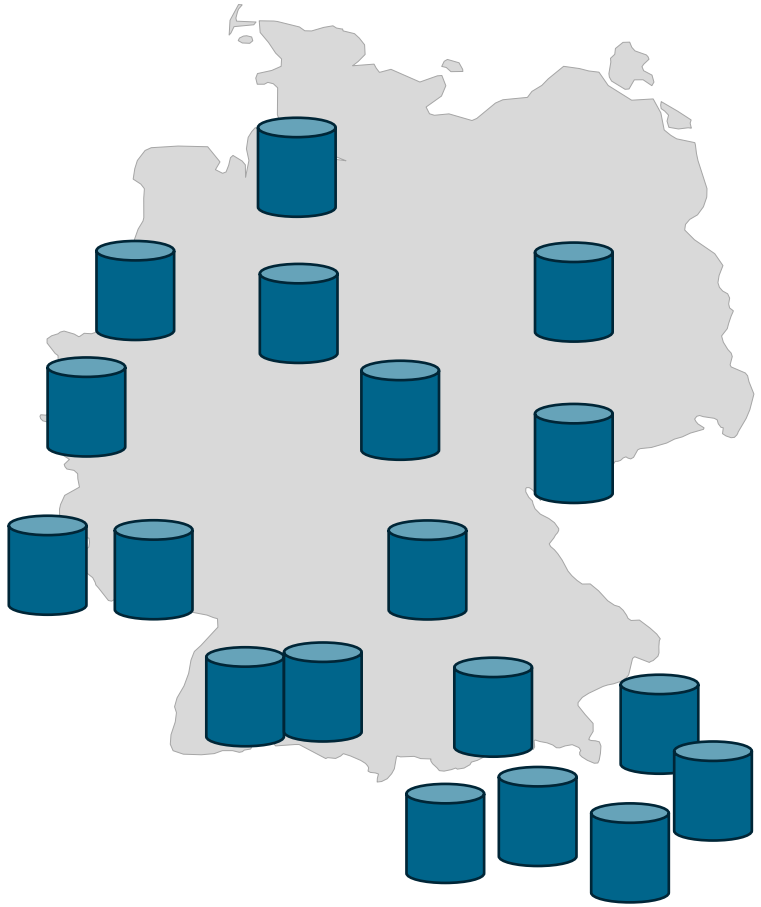
Image source: DLR e.V.

Backtesting
Germany 2019

Single Storage

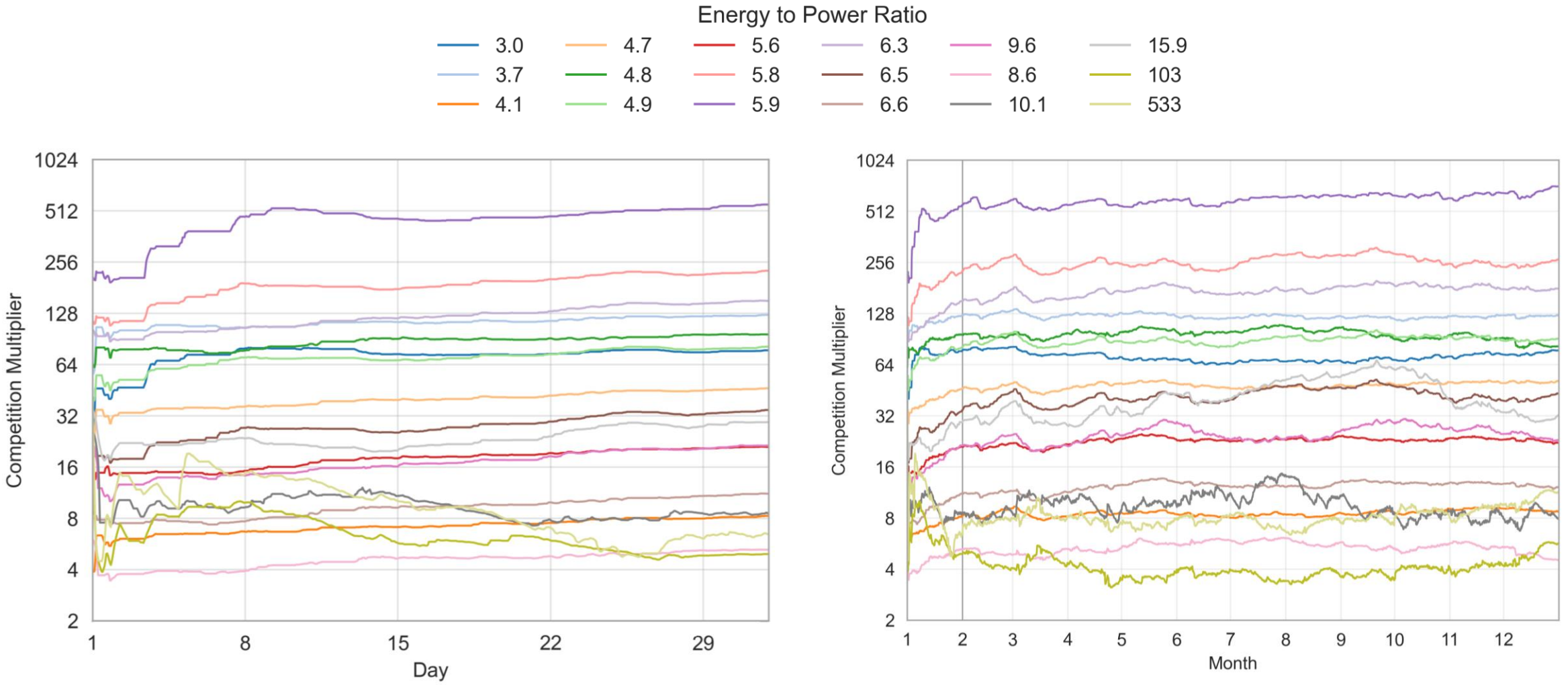


18 Competing Storage Units



Schimeczek et al. (2026). 10.1016/j.est.2025.120054

Backtesting
Multiplier development



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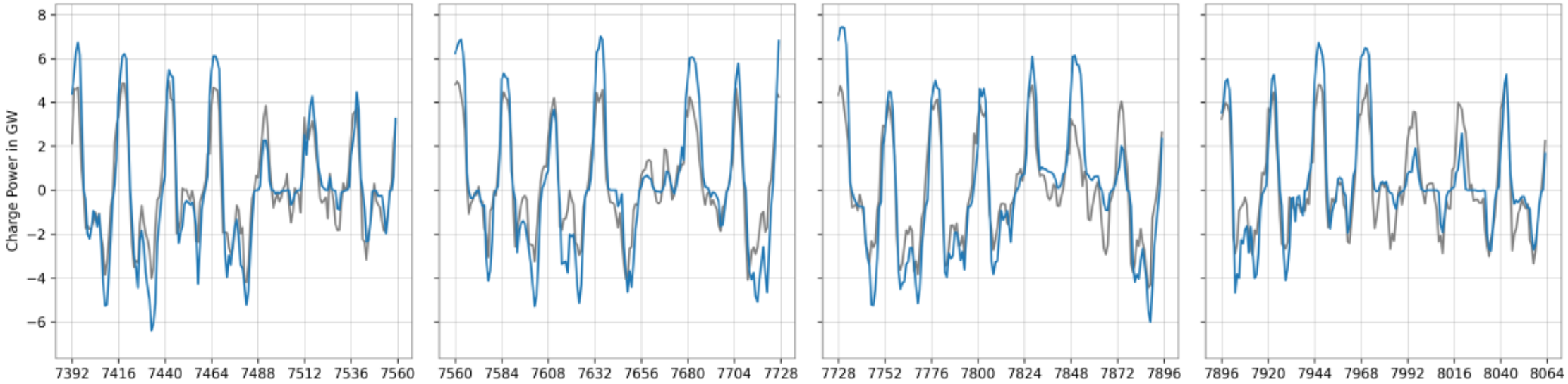
Backtesting
Storage Dispatch



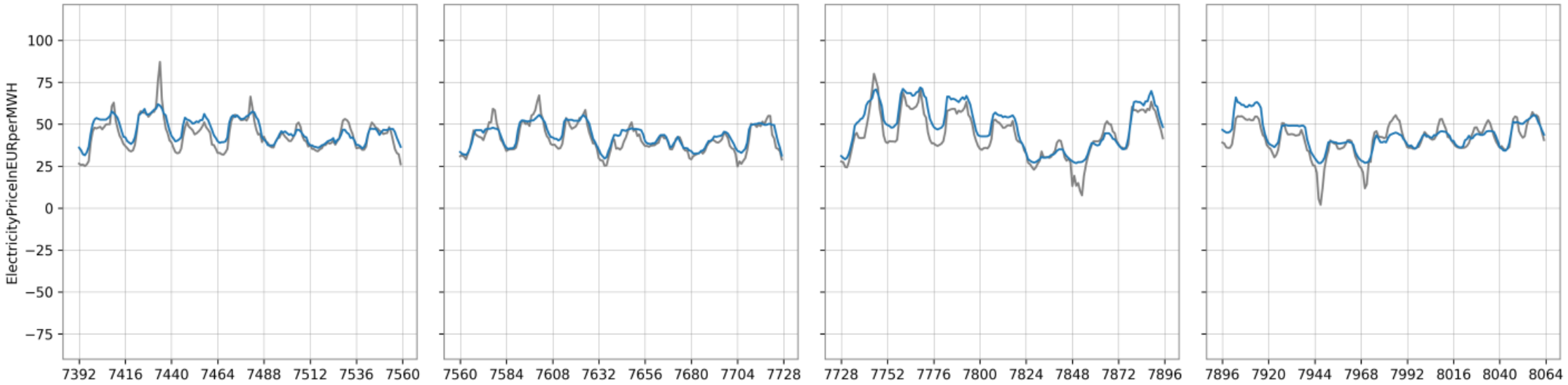
→ Accurate storage dispatch simulation

	1 Storage	18 Storages
Pearson Correlation	0.75	0.86
MAE in GW	2.06	1.02
Relative discharged energy	149%	107%

Schimeczek et al. (2026). 10.1016/j.est.2025.120054

Backtesting: 18 Competing Storages

Electricity Prices



→ Accurate electricity price simulation

	1 Storage	18 Storages
Pearson Correlation	0.80	0.85
MAE in EUR/MWh	6.21	5.37
Relative profits	70%	109%

Schimeczek et al. (2026). 10.1016/j.est.2025.120054

What if…

Image source: DLR e.V.

What if … we had more battery in the system?

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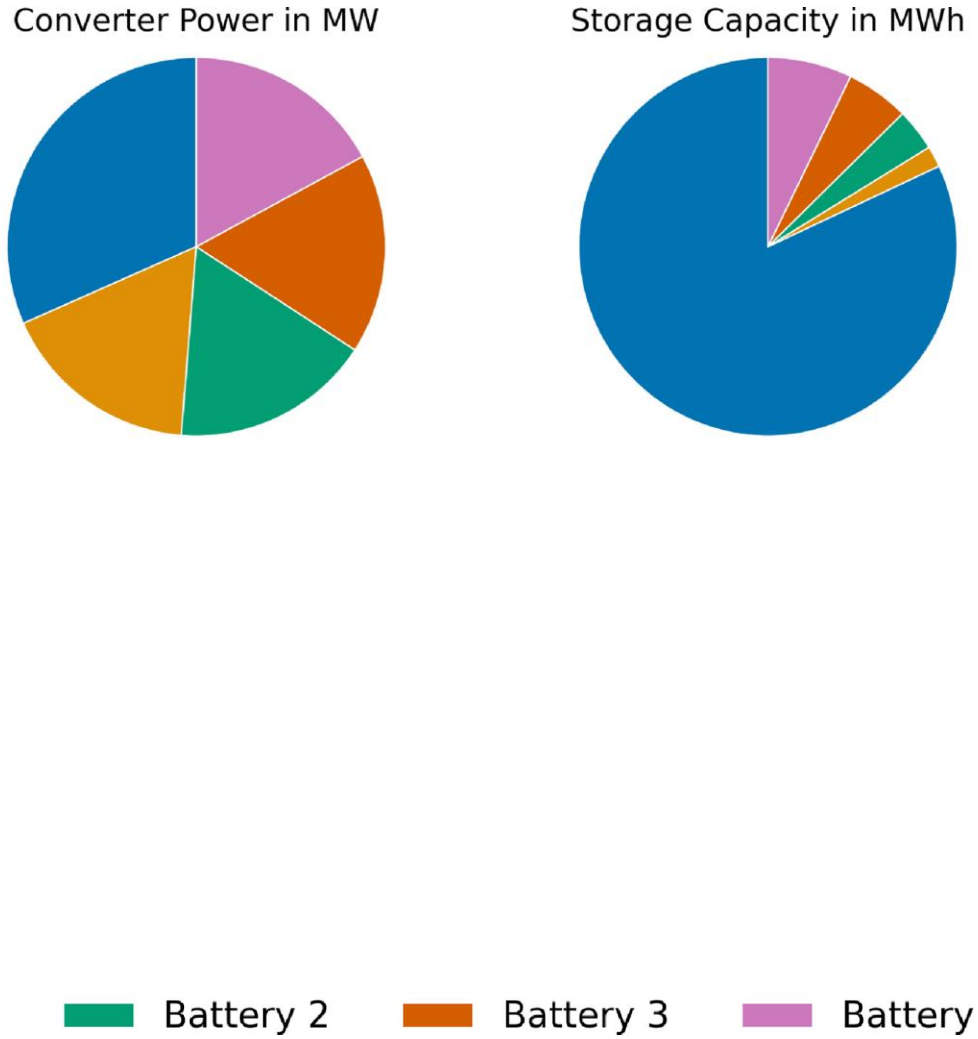
- Added 4 generic storage clusters
- Each with $P = 5\ GW$ and $\eta = 86.5\%$
- Increasing E2P ratio: 1, 2, 3, 4



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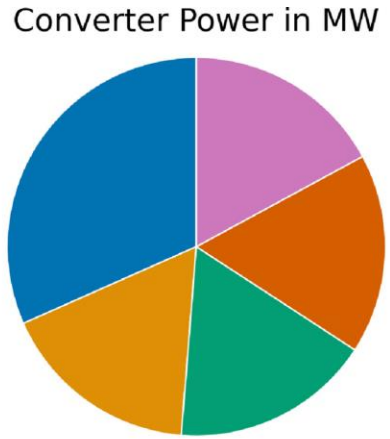

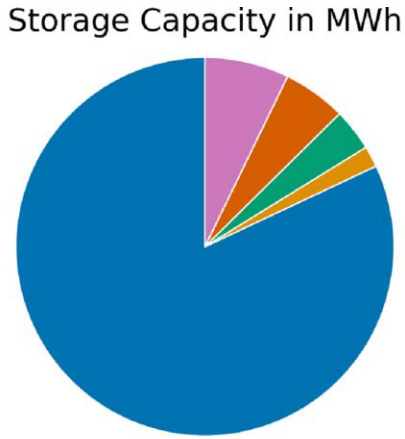

Metric	Scenario	
Discharged Energy Total	Backtesting	7.3 TWh
Total Profits	Backtesting	105 M€

Pumped Hydro Battery 1 Battery 2 Battery 3 Battery 4

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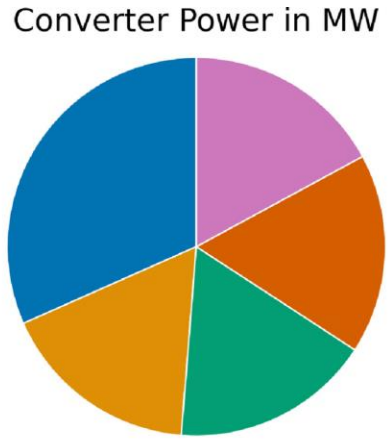

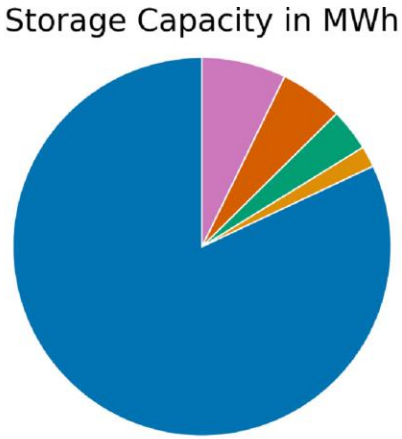

Metric	Scenario	
Discharged Energy Total	Backtesting	7.3 TWh
	Increased Capacity	10.7 TWh ↗
Total Profits	Backtesting	105 M€
	Increased Capacity	75 M€ ↓

Pumped Hydro Battery 1 Battery 2 Battery 3 Battery 4

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Metric	Scenario	
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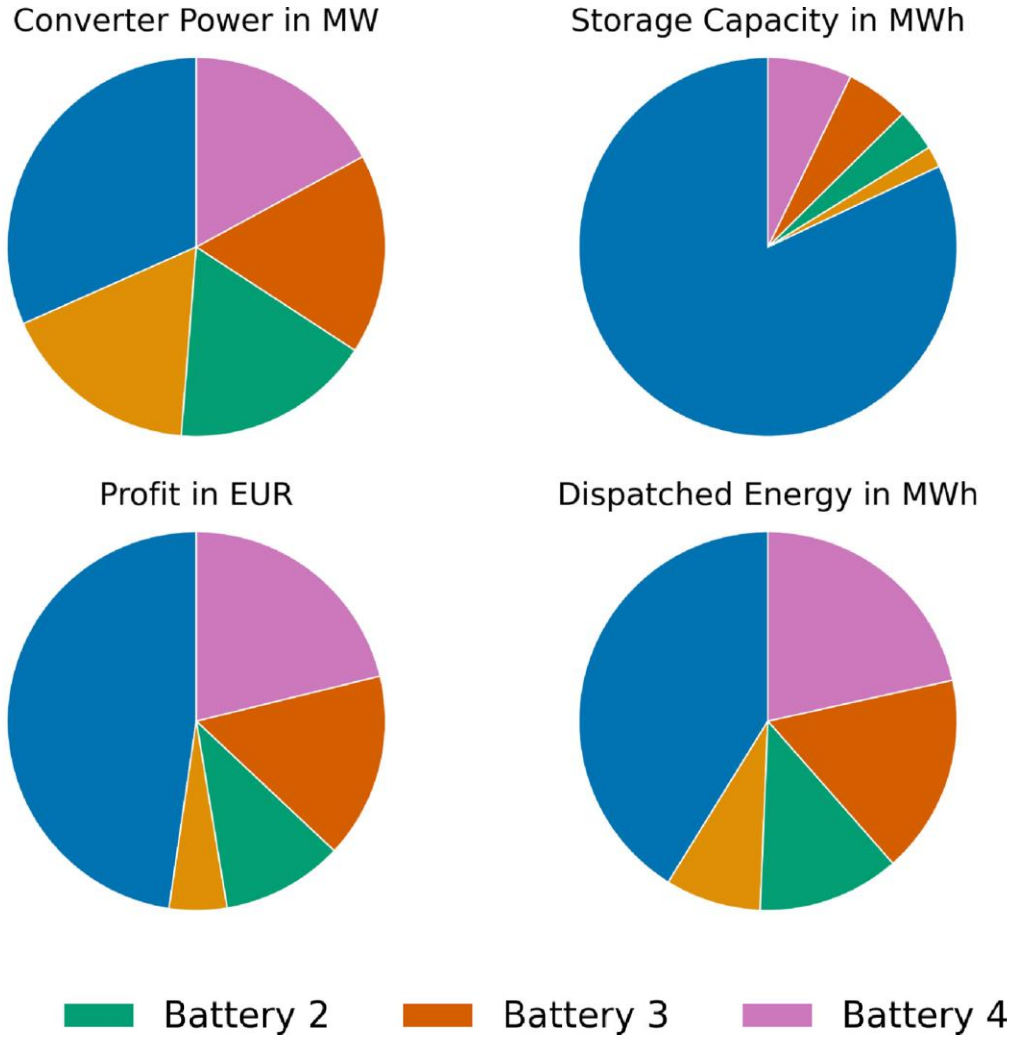

Summary

AMIRIS

Fast	1 year with 18 competing units takes ~30s
Accurate	convincing backtesting performance
More storage	significant cannibalization effect

Join our workshop: How to model competing flexibility options (fast)
Visit our poster

Model

AMIRIS Install

Paper

Imprint

Topic	**Effective Dispatch Planning for Competing Storage Agents**
Date	2026-03-30
Authors	Christoph Schimeczek, Felix Nitsch, Johannes Kochems, Kristina Nienhaus
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