

Strommarkttreffen „Batterien“

System effects of cheaper batteries: a model comparison

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- Ongoing BMWi project Open Source Energiewende
 - Lead by **neON** neue energieökonomik, together with,  **ETH zürich**
 - Specific working package: open-source model comparison
- Topic of model comparison
 - Effect of cheaper battery storage in European 2030 scenarios

- Dispatch and investment models
 - Calliope (ETH Zürich)
 - DIETER (DIW Berlin)
 - dynELMOD (TU Berlin)
 - EMMA (Neon)
 - OSeMOSYS (KTH Stockholm)
 - PLEXOS Open EU (University College Cork)
 - urbs (TU München)
- Pure dispatch models
 - Dispa-SET (JRC)
 - oemof / de21 (RLI)

Work in progress
→ we present
selected preliminary
results today

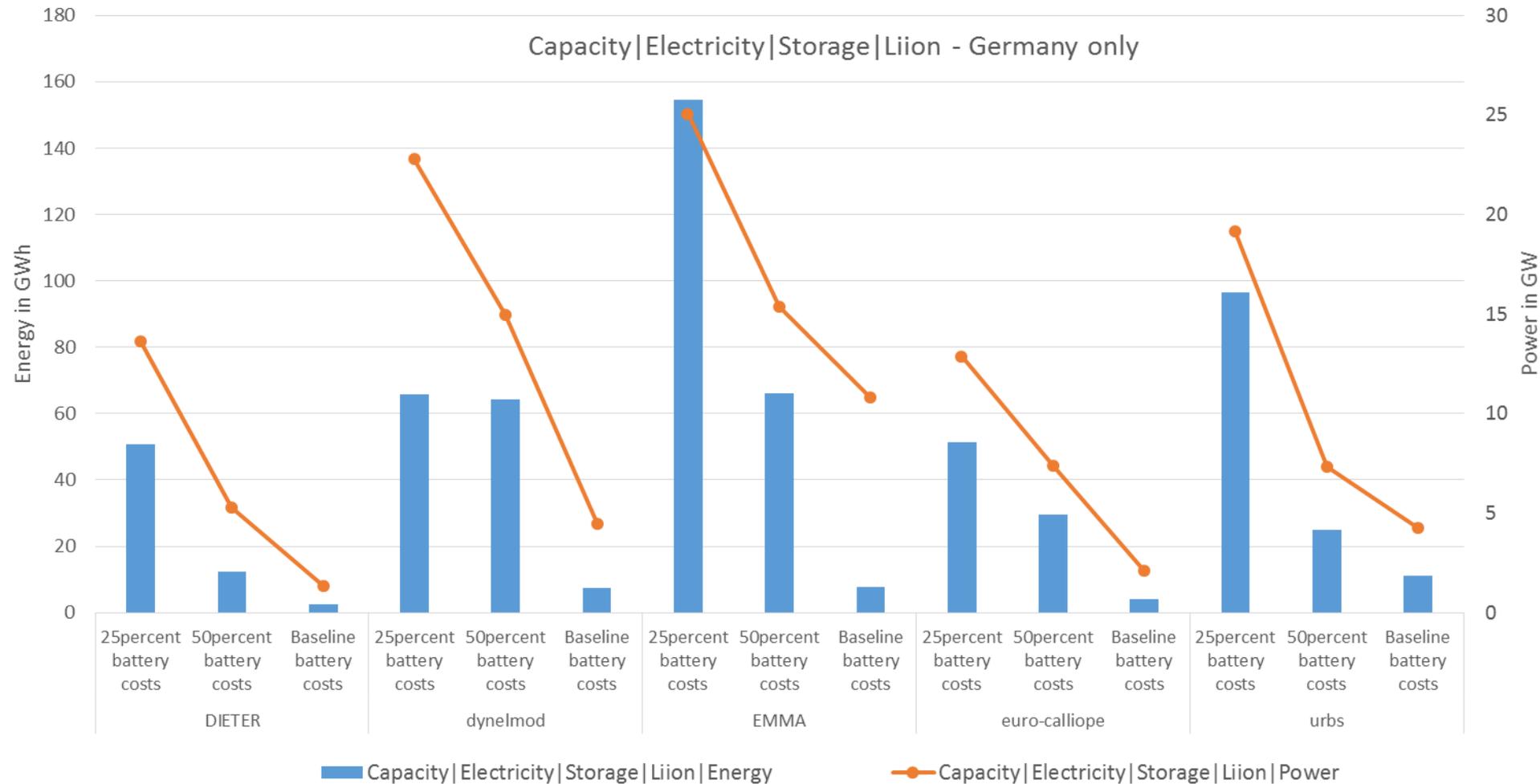
→ Different features, different geographic coverage

- Limited funding: no full harmonization of inputs
→ Focus on comparison against model-own baseline
- Main inputs
 - Time series: OPSD
 - Capacity data: Entso-E TYNDP ST + German NEP
 - Upper bound for conventional, lower bound for RES, PHS fixed
 - Minimum RES constraints, CO₂ cap
 - Baseline battery cost assumptions based on Schmidt et al. (2017)

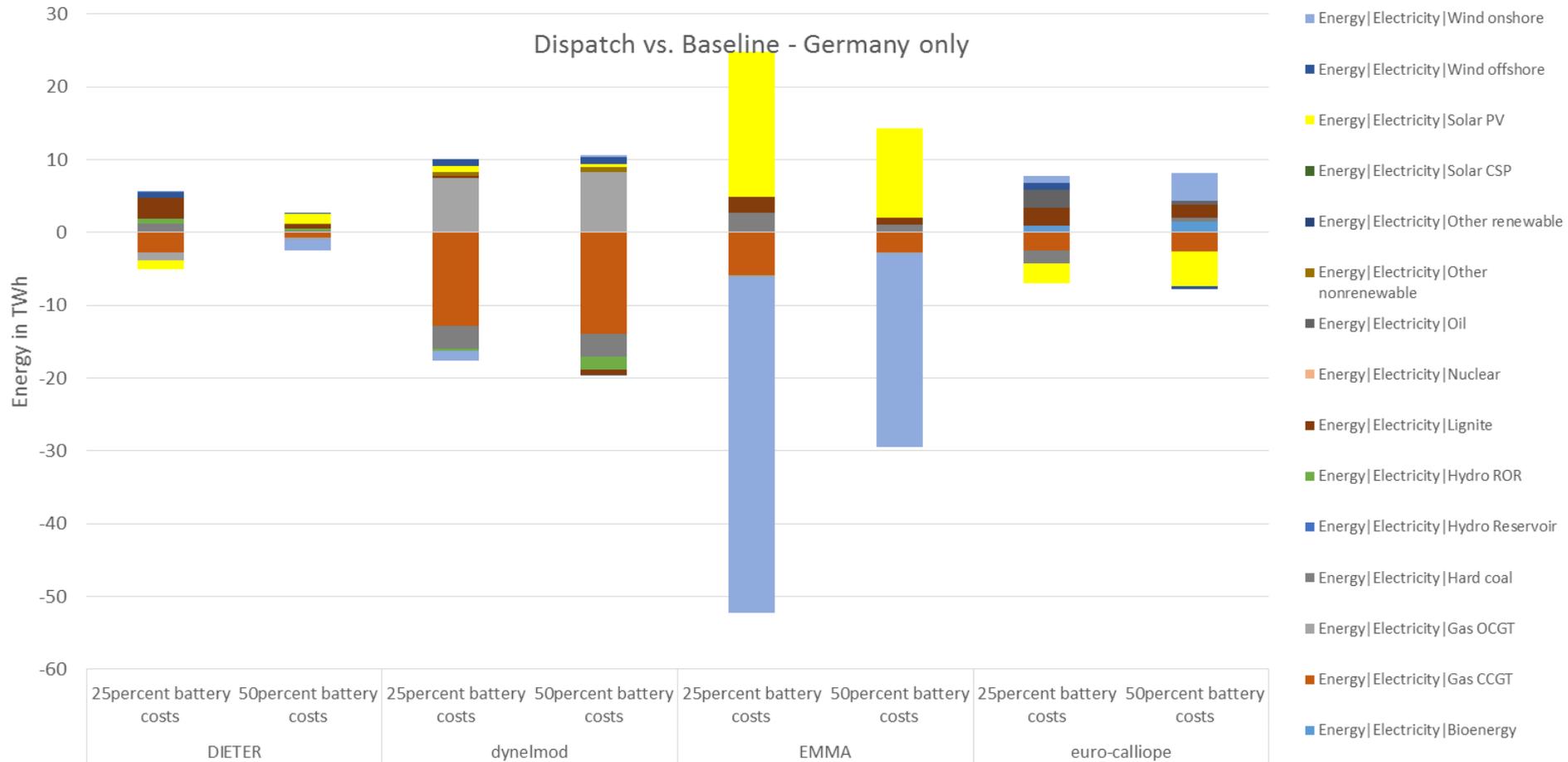
	unit	value
Investment power	€/kW	135.14
Investment energy	€/kWh	315.32
Lifetime	years	12
Roundtrip efficiency	-	0.92

Sensitivities with 50% or 25%
of baseline cost assumptions

Results for Germany

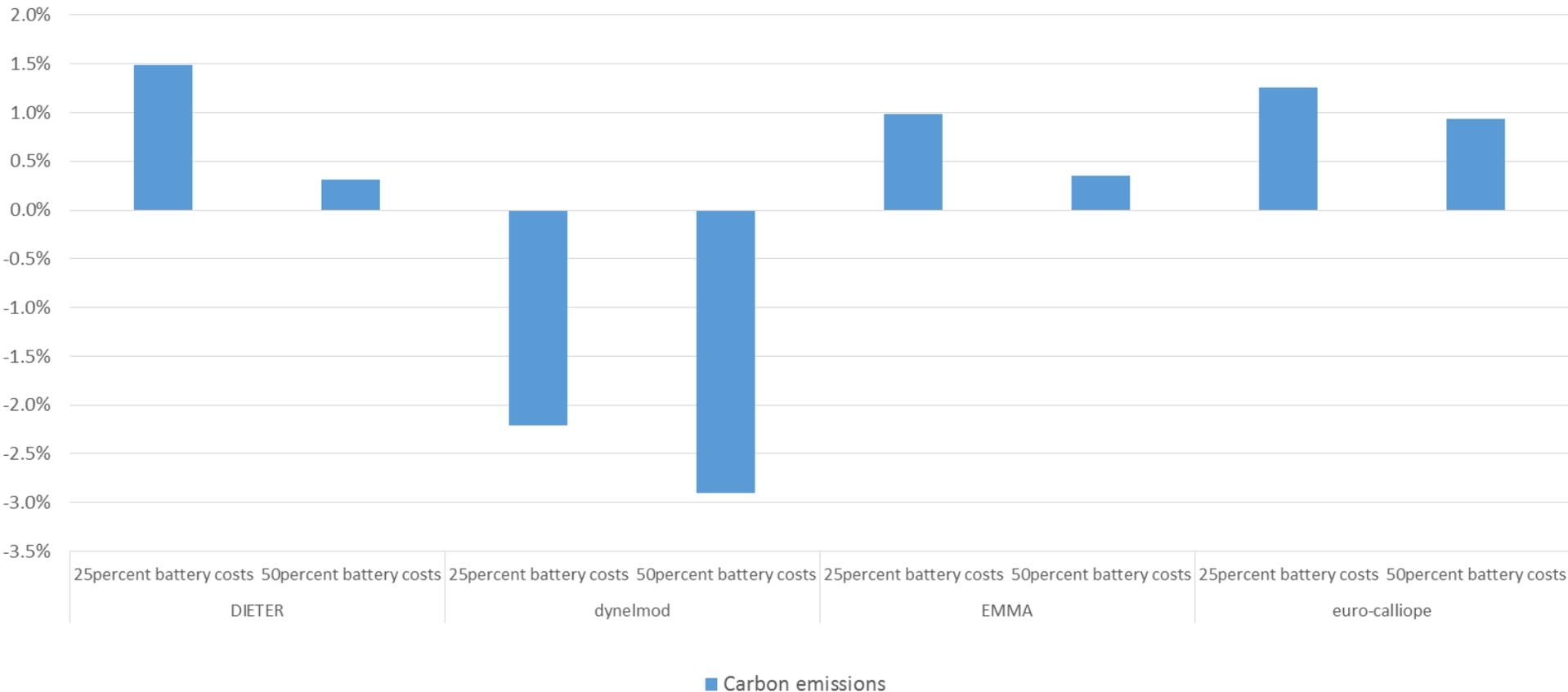


→ Relatively low for baseline costs, more substantial for 25% cost sensitivity



→ Non-robust, driven by cost assumptions

Carbon emissions vs. Baseline - Germany only



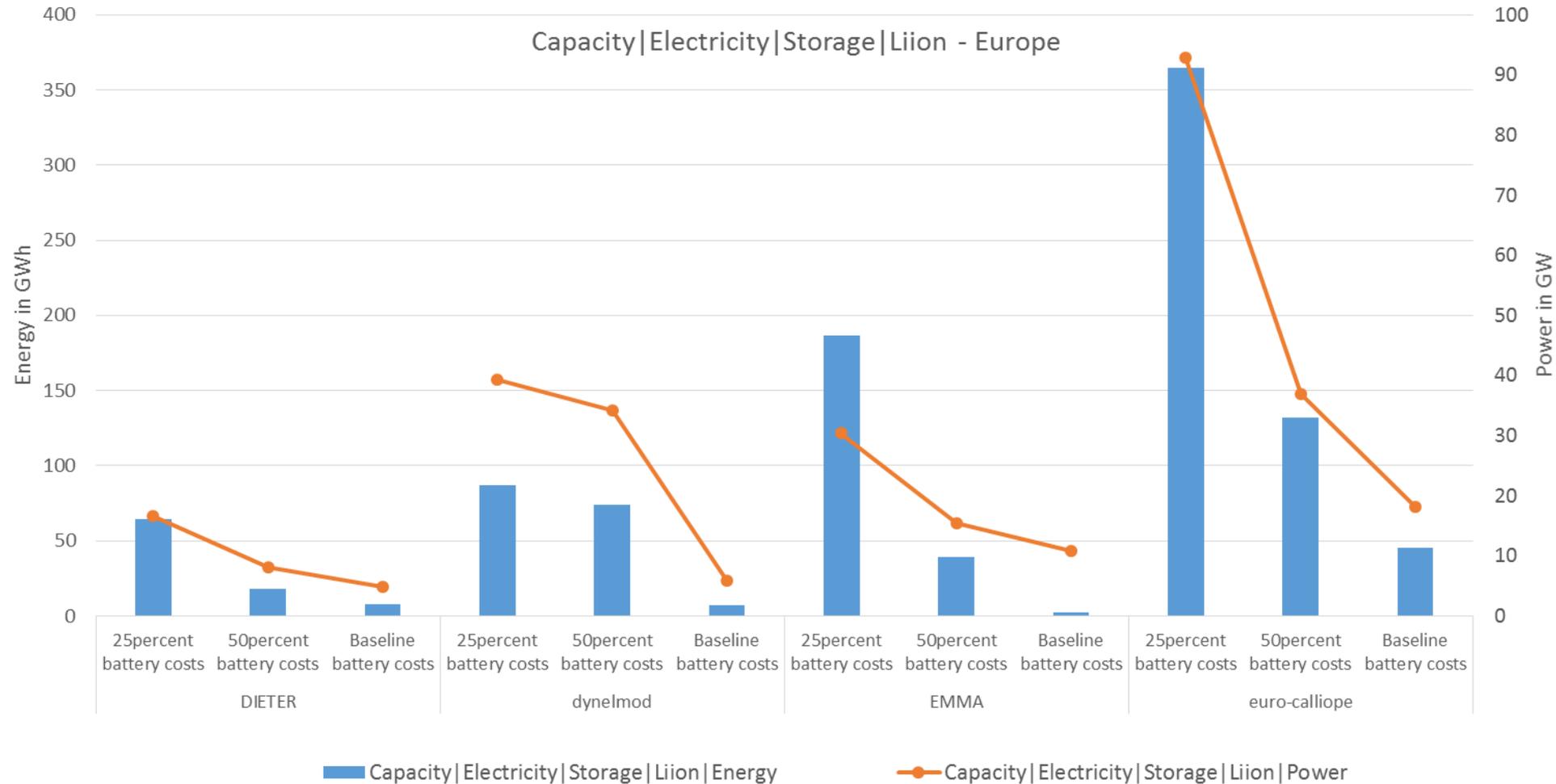
→ Cheap flexibility may increase emissions

Results for European models

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Battery capacity

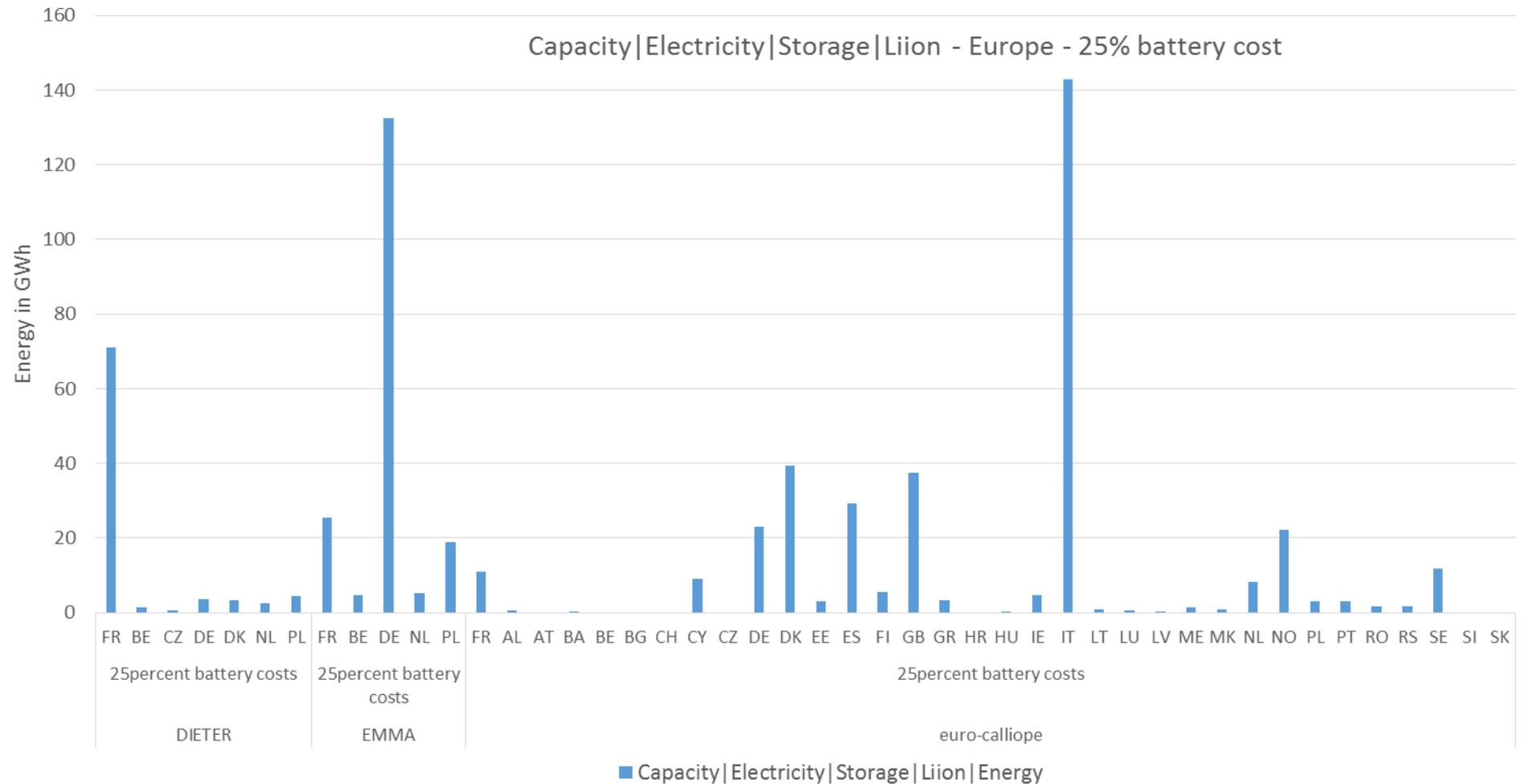
Capacity | Electricity | Storage | Liion - Europe



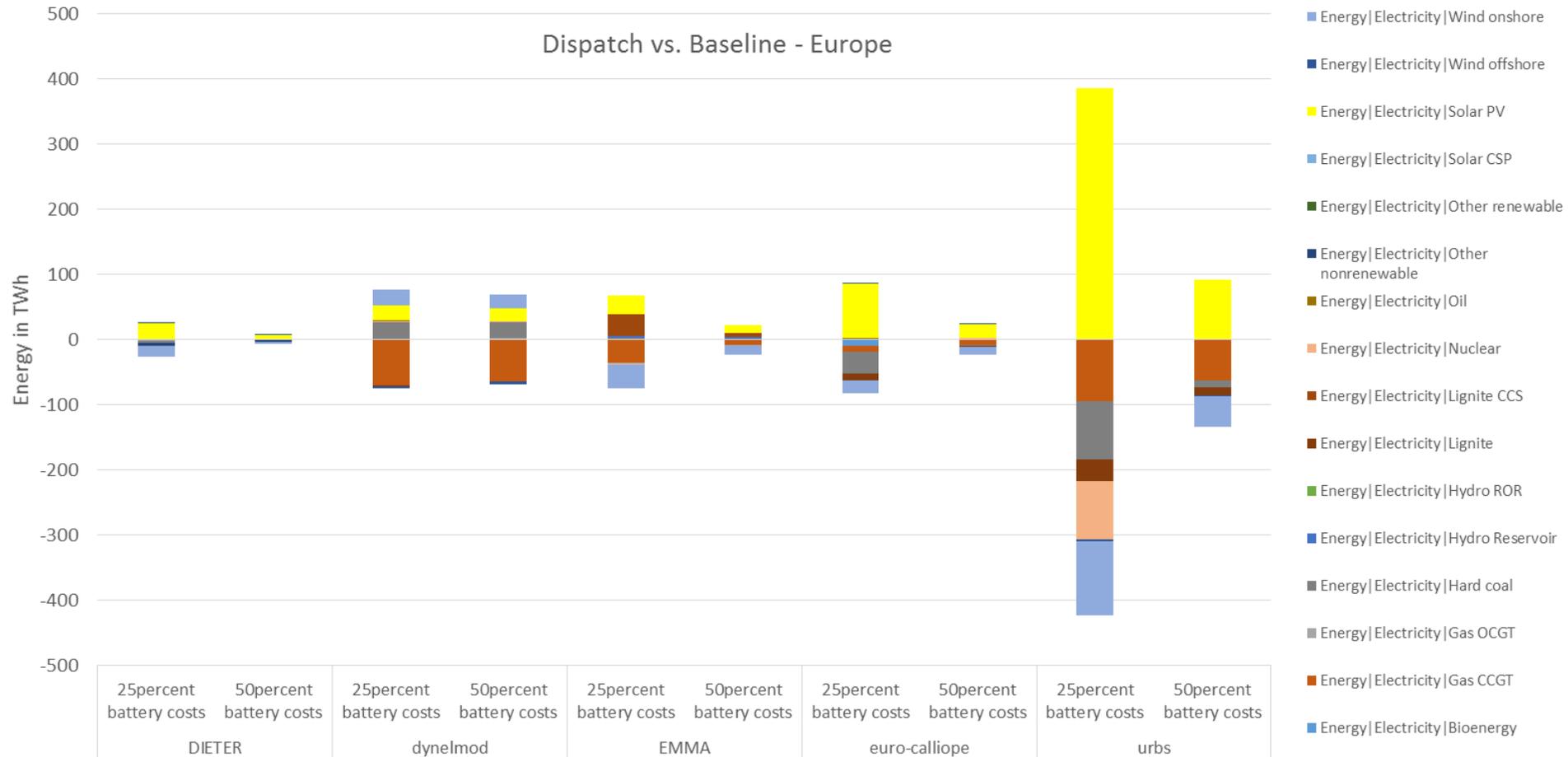
→ Qualitatively similar as for „Germany only“

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Battery capacity by country – 25% cost sensitivity



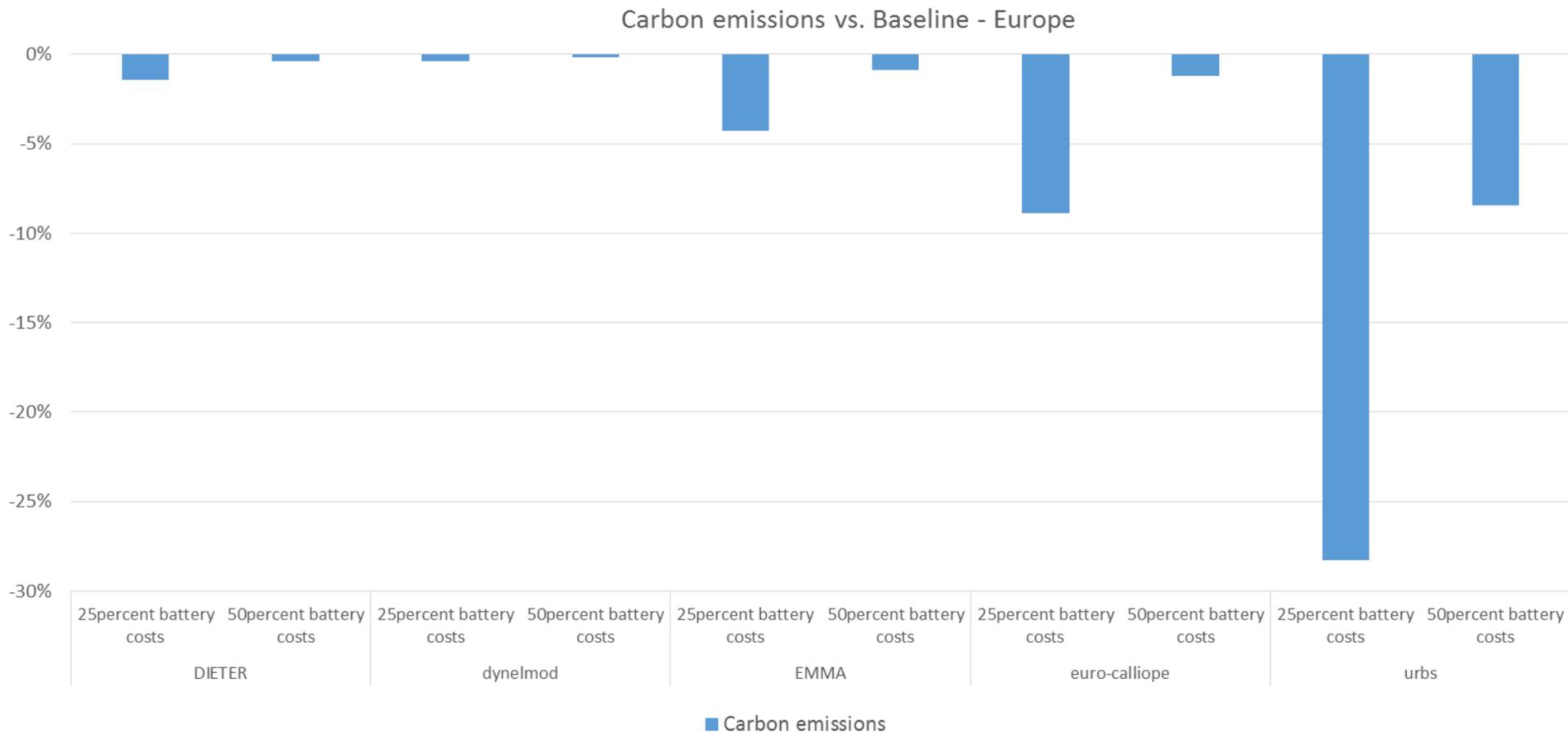
→ Strongly non-robust



→ Qualitatively more robust than for Germany only

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Effect on carbon emissions relative to respective model baseline



→ Now always decreasing

- Preliminary conclusions so far
 - „Non-robustness“ driven by
 - cost assumptions
 - geographic coverage
 - reservoir modeling
 - Cheaper batteries not a major game changer in 2030 scenario
 - Even less so if Germany is not modeled in isolation
- Next steps
 - Additional model results
 - Further exploration of drivers → being open helps!
 - Investigate effects of sector coupling

Vielen Dank für Ihre Aufmerksamkeit.



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