

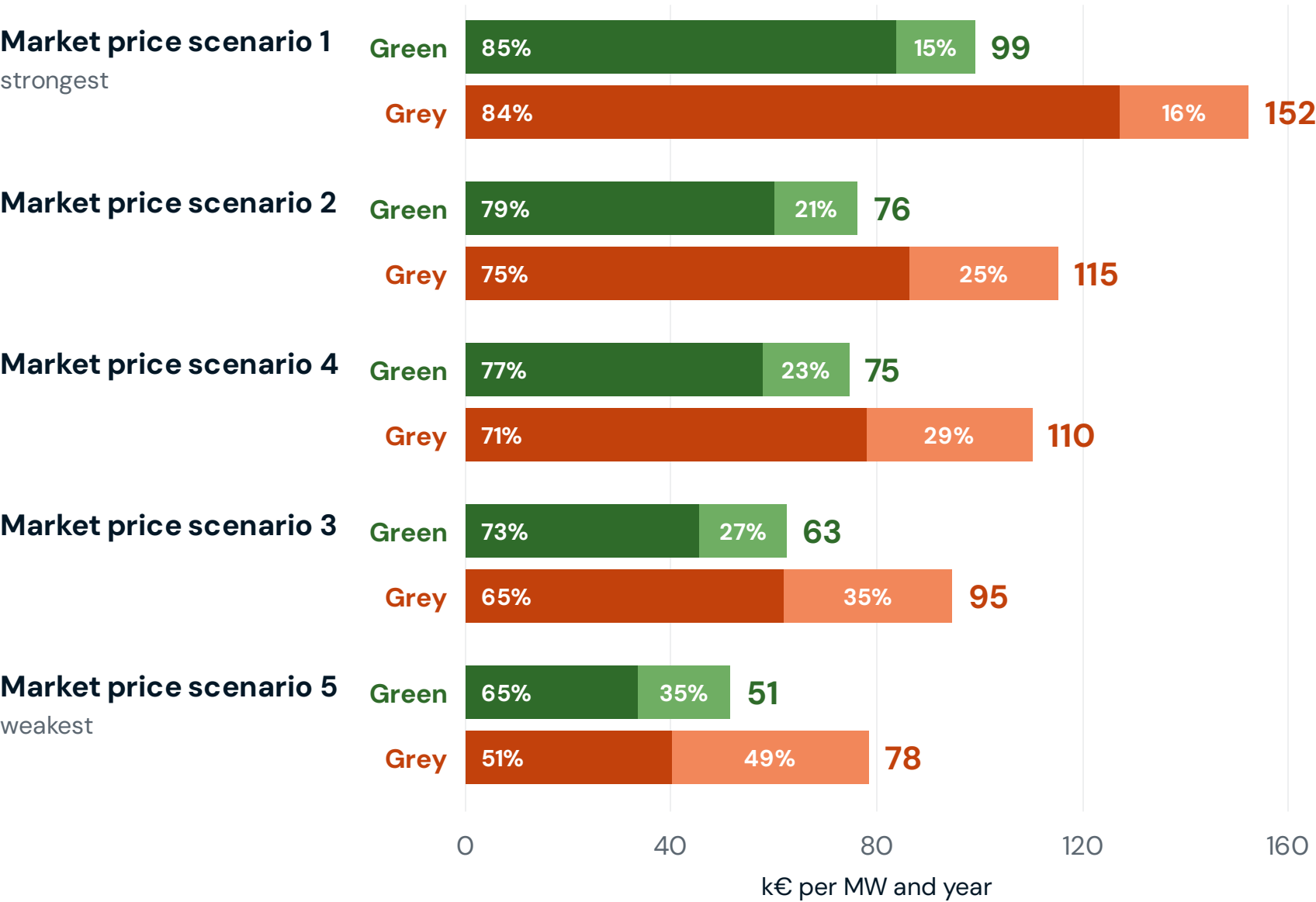
Which markets does battery storage need to pay off?

Wholesale drives the upside. aFRR protects the downside.

Storage revenue, green vs. grey

Net revenue · 25 MW · 2 h battery

Wholesale (day-ahead + intraday) aFRR



aFRR share, green storage

15% → 35%

strongest → weakest market

aFRR share, grey storage

16% → 49%

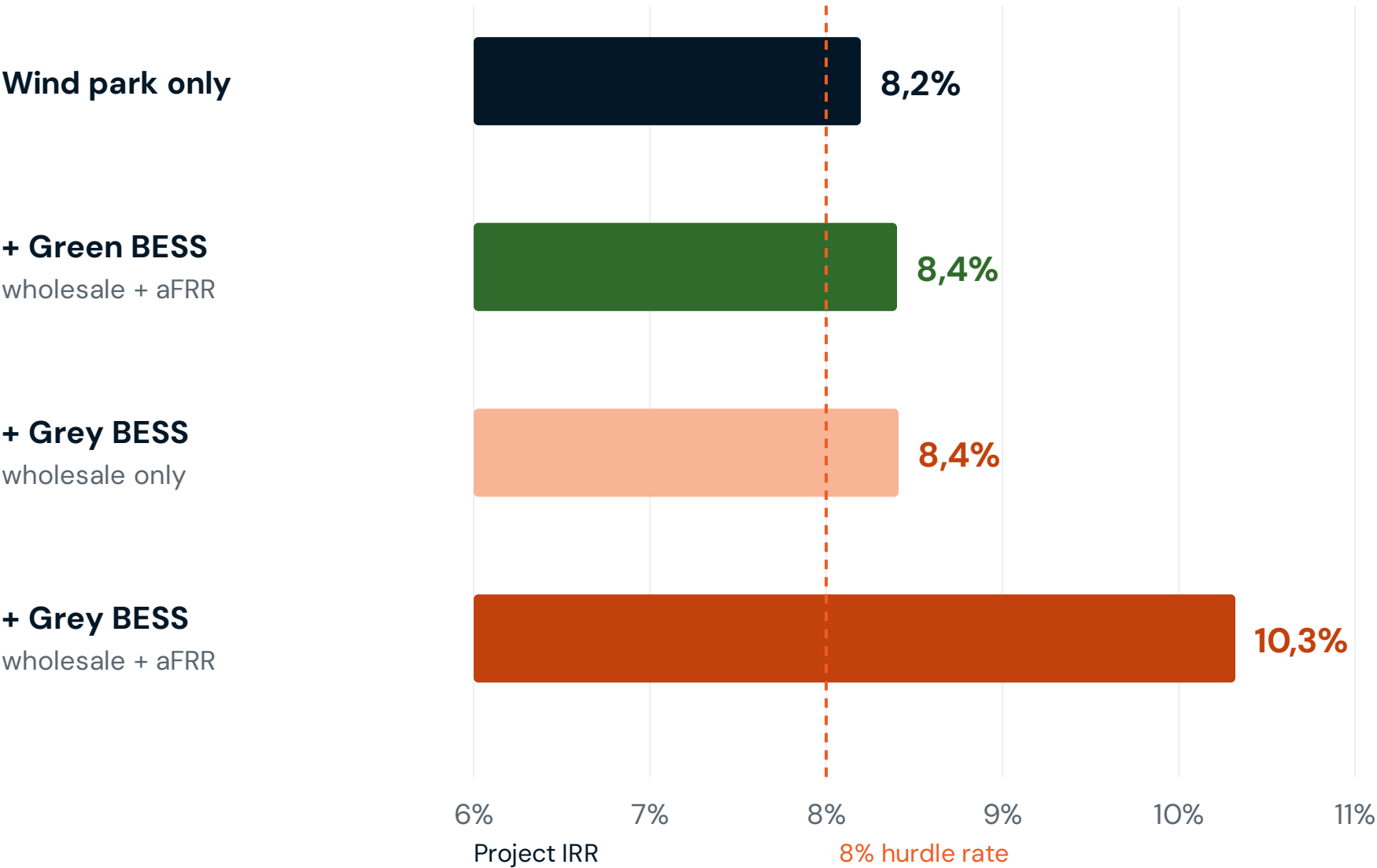
strongest → weakest market

Which markets does battery storage need to pay off?

In the worst case, the added value of grey storage comes almost entirely from aFRR.

Project IRR in the worst case

Market price scenario 5 · optimal storage size



Added by aFRR, grey storage

+1,9 points

8,4% → 10,3% IRR

Added by green storage

+0,2 points

8,2% → 8,4% IRR

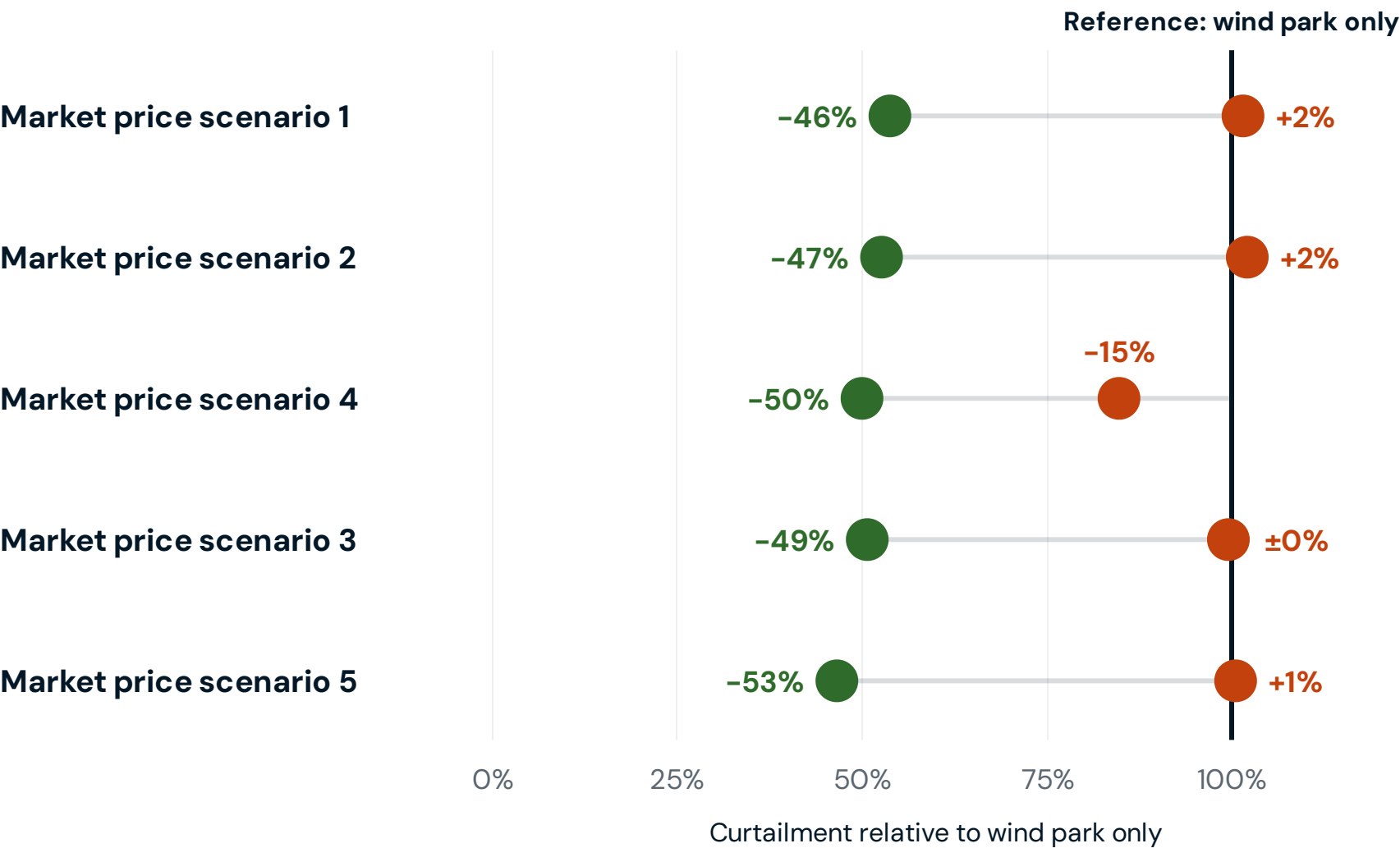
Which markets does battery storage need to pay off?

Green storage captures curtailment.
Grey storage captures negative prices.

Curtailed wind energy

25 MW · 2 h battery

● Green storage ● Grey storage



Charged from the wind park

100%

green storage

Charged from the wind park

14–32%

grey storage, rest from the grid