

GO Markets today

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Agenda

- Introduction to the Guarantees of Origin markets
- Summary of market development 2023
- Key supply drivers
- Demand drivers and development in the near future





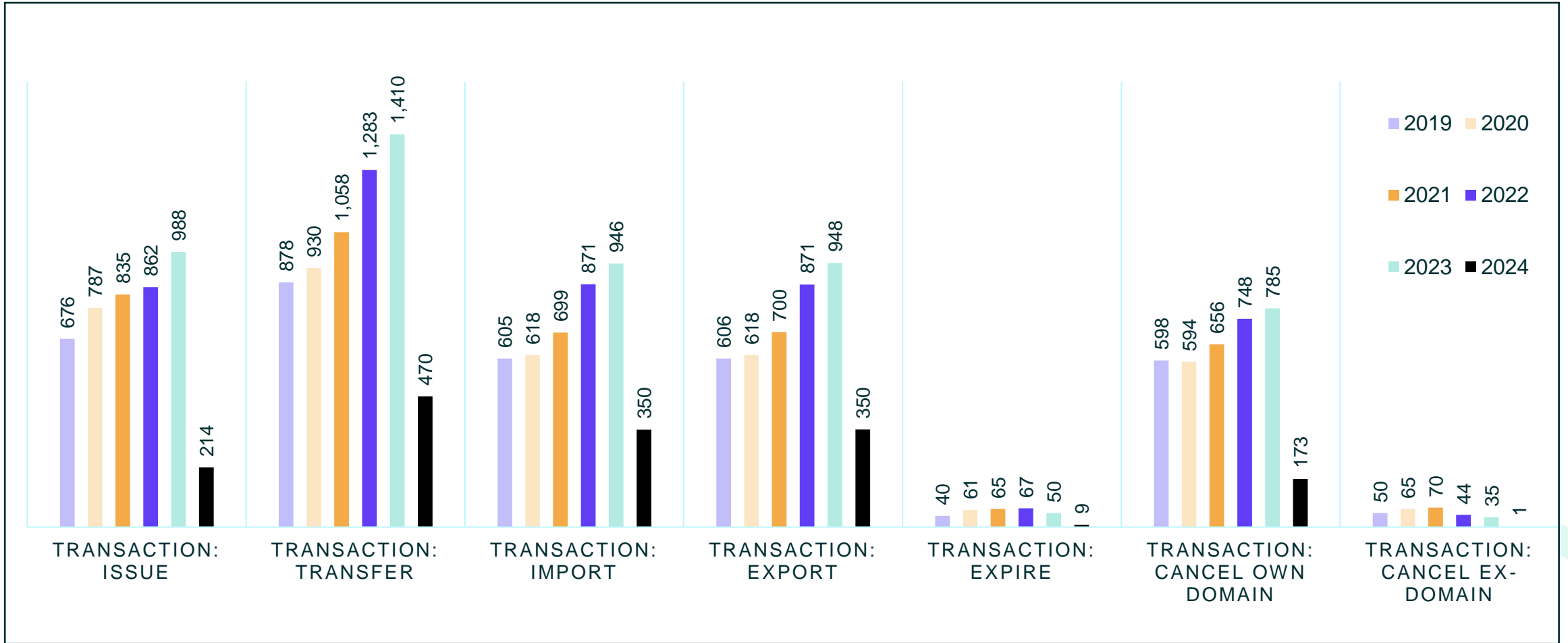
Regulation driven market

- Renewable Energy Directive III maintains the key definitions:
 - Default value of 1 MWh
 - Disclosure period 1 year or less
 - Issued for electricity, hydrogen, biogas as well as heating and cooling
 - Validity 12+6 months
- **Cancelling GO the only way to make claims on used energy source**
- Guarantees of Origin at the core of new European sustainability regulation
 - Green Claims Directive
 - Taxonomy
 - ESRS and CSRD





Annual EECS transactions in TWh



Production

960 TWh was produced on 2023 (+15% increase year on year)

Wind +17%

Solar +26%

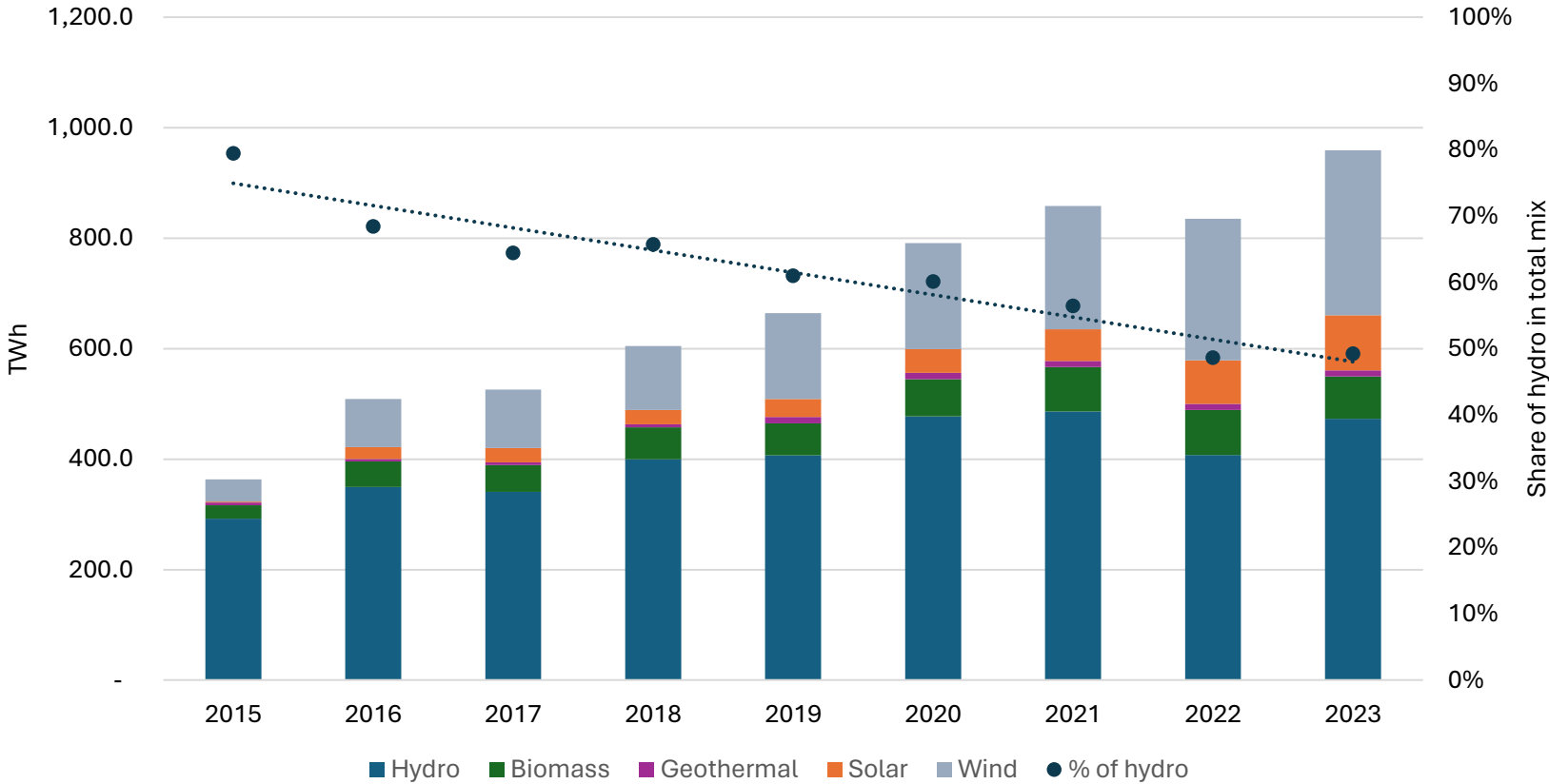
Biomass -6%

Hydro +16%

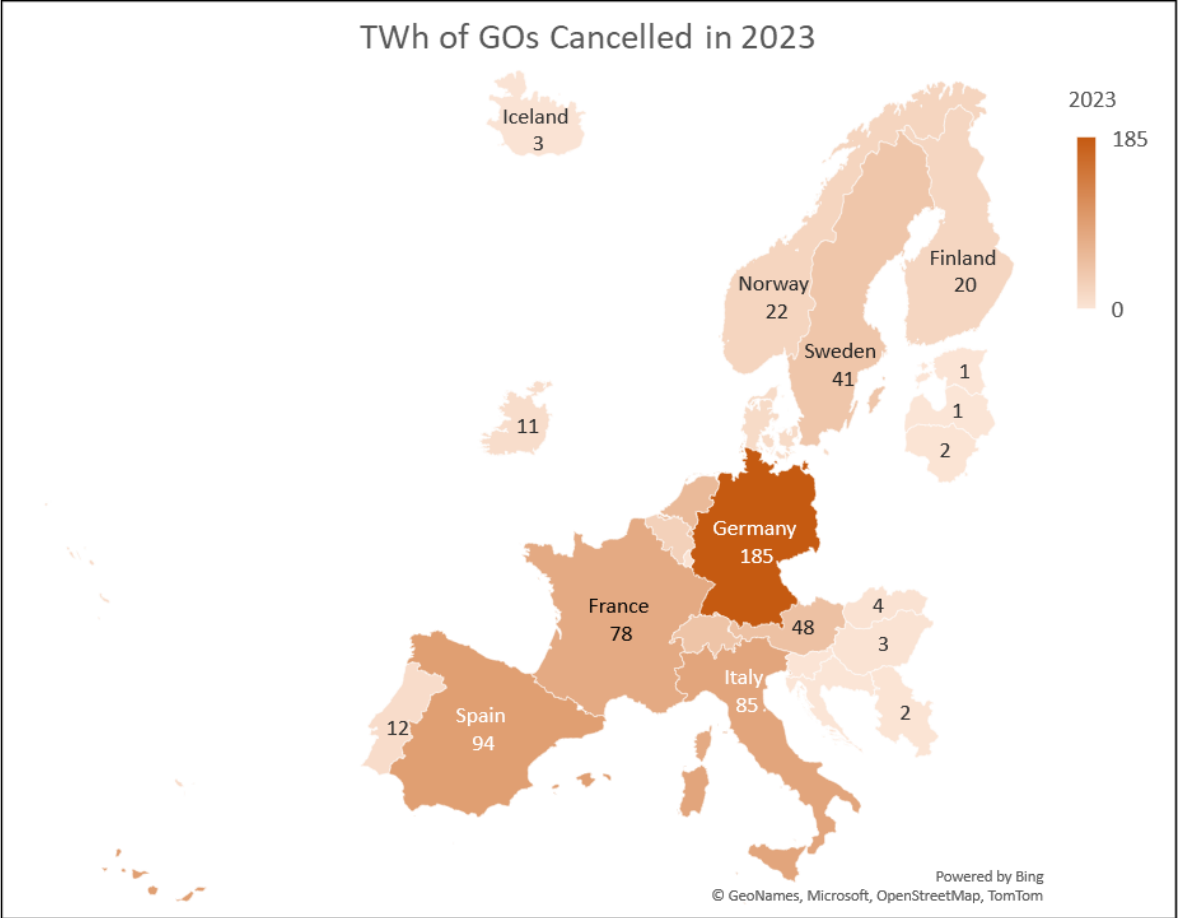
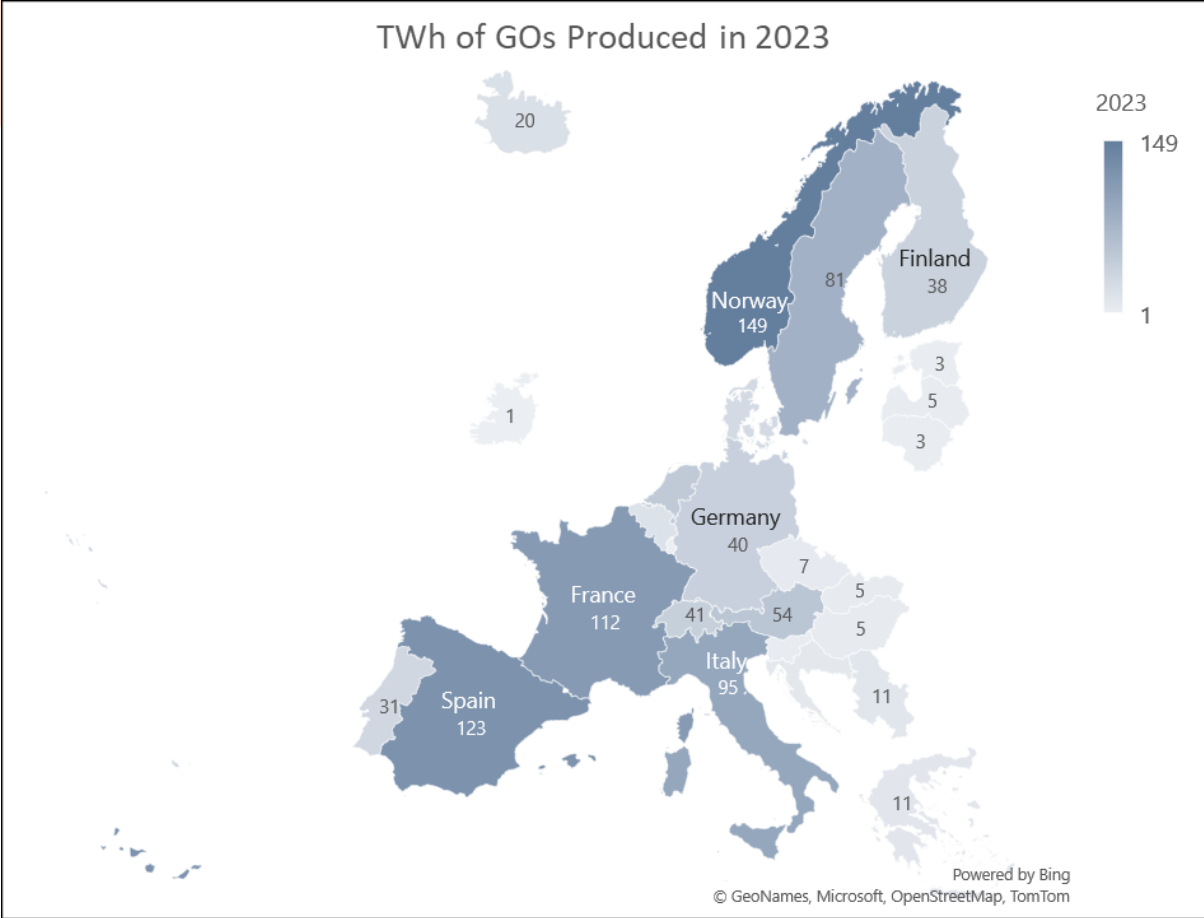
Hydro production recovered strongly in the second half of 2023 due to higher precipitation throughout Europe and Scandinavia.

Wind and Solar production continued to increase strongly due to added capacity.

GoO Production per Technology (AIB + Domestic)



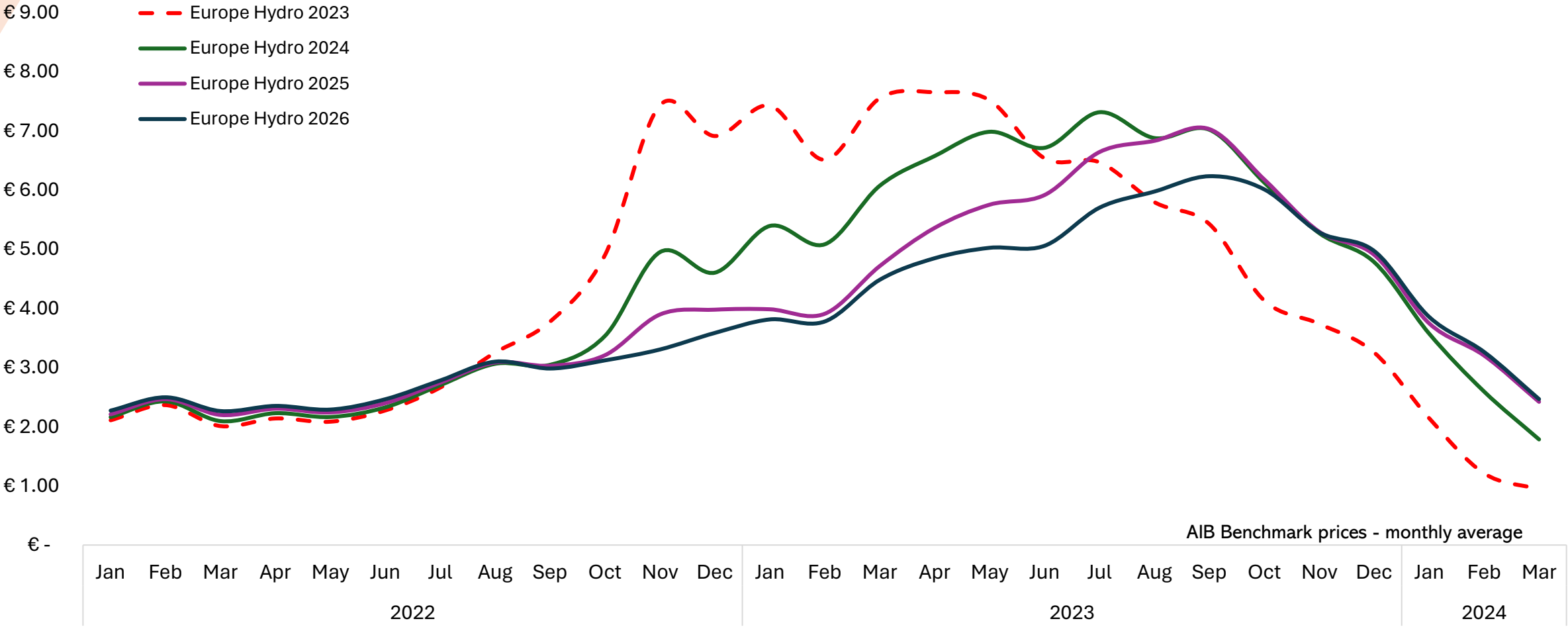
Issuance versus Cancellations



- Largest increase from France (19 TWh), Italy (15 TWh) and Spain (13 TWh)
- Smallest increase from Luxembourg (0.0 TWh), Iceland (0.1 TWh) and Estonia (0.1 TWh)

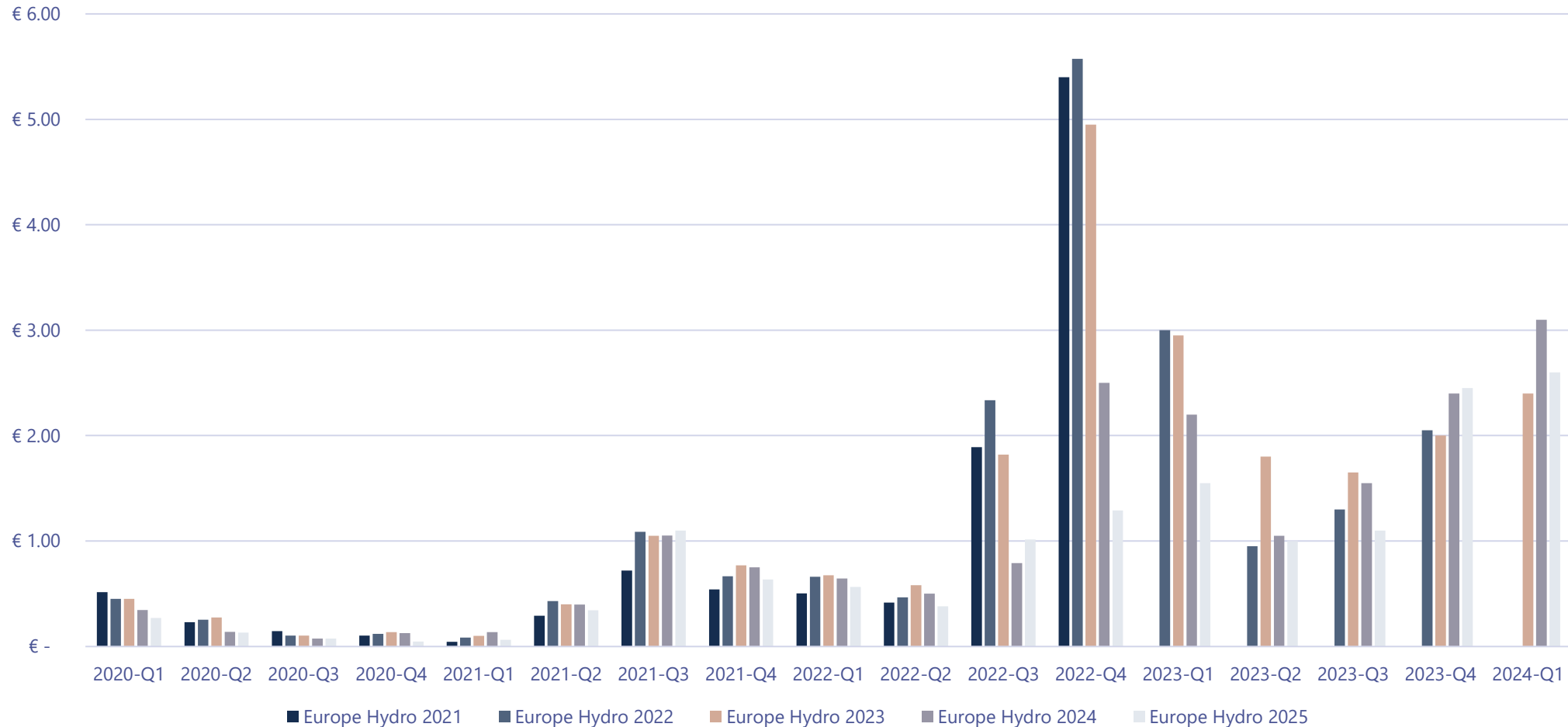
- Largest increase from Germany (43 TWh), Italy (14 TWh) and France (11 TWh)
- Largest decrease from Sweden (-24 TWh), Finland (-8 TWh) and Norway (-7 TWh)

Price Development of GoOs – Backwardated to Contango



GOOs are increasingly more volatile

Monthly Volatility of European Hydro GO price



The market is maturing

1

Hedging behaviors

- Higher volatility is resulting in ad-hoc buying/selling becoming substantially more risky
- Increased demand for longer term solutions
- New pricing structures (floating price and options)

2

Increased transparency

- Increased amount market data available
- Additional platforms and auctions
- Full disclosure

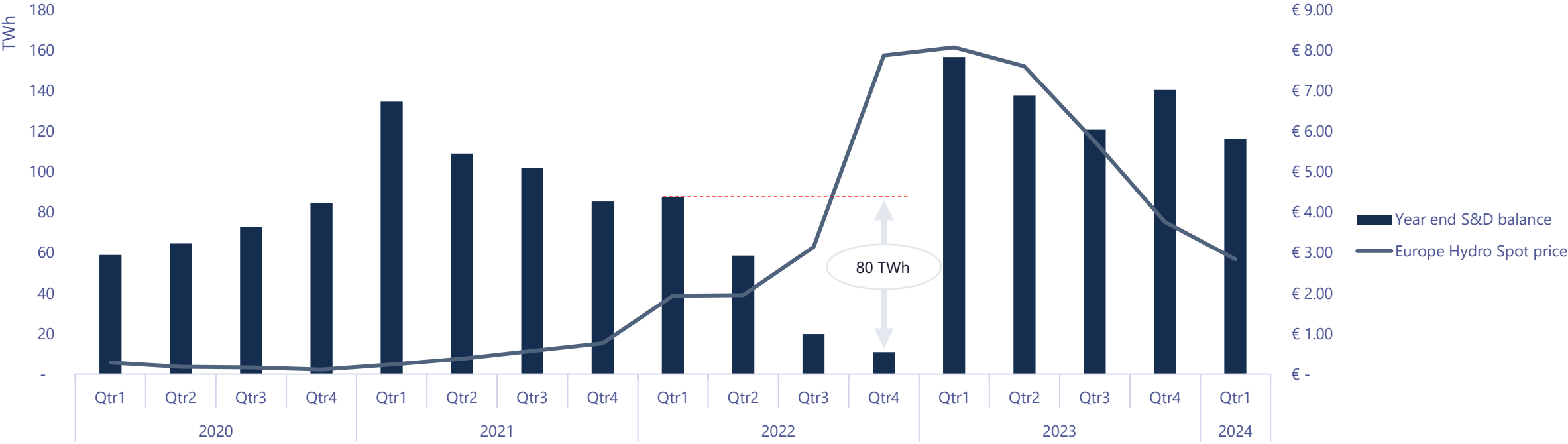
3

Higher frequency of trade

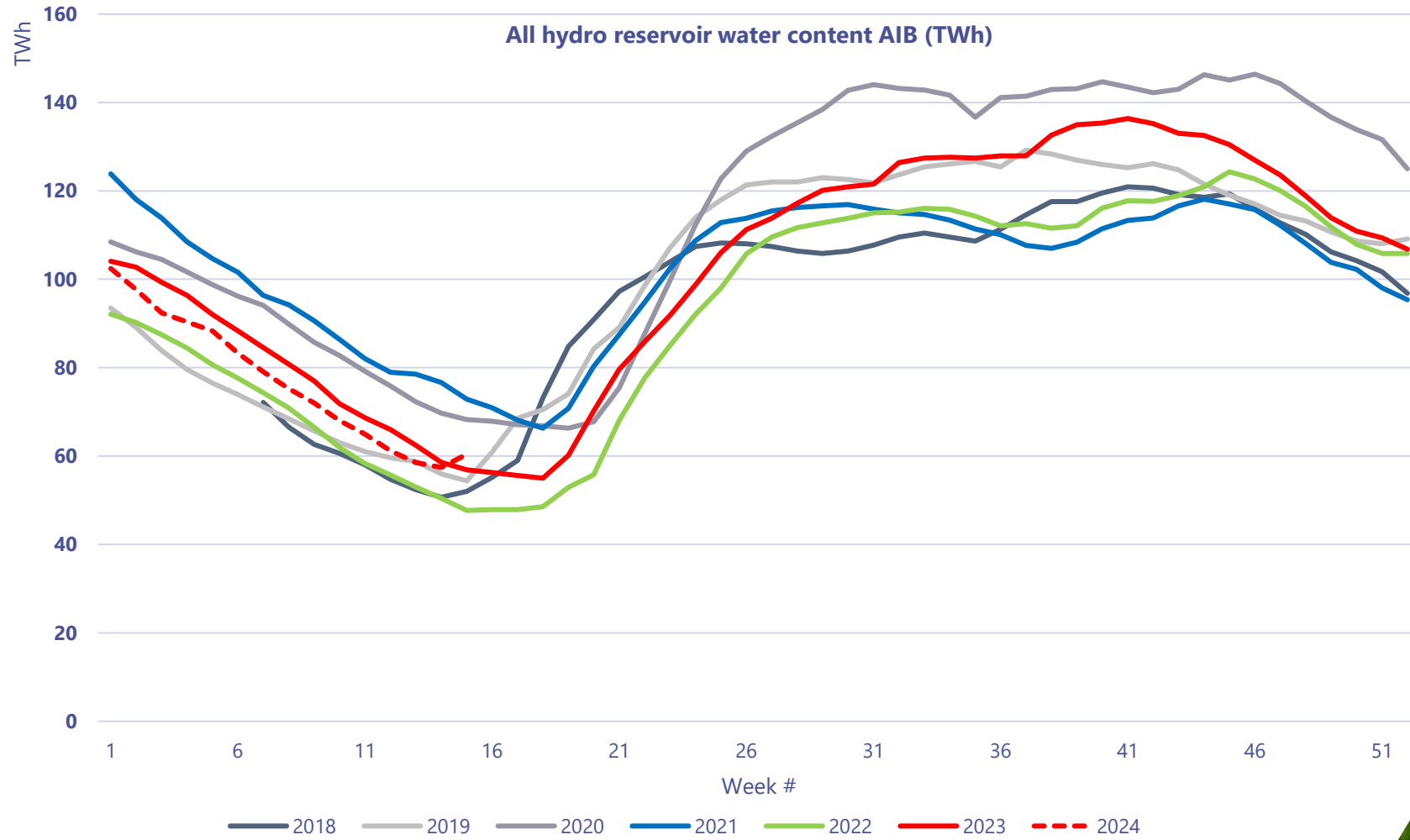
- Market is growing in all aspects
- New trading-oriented counterparties entering the market
- Market participants are becoming more educated



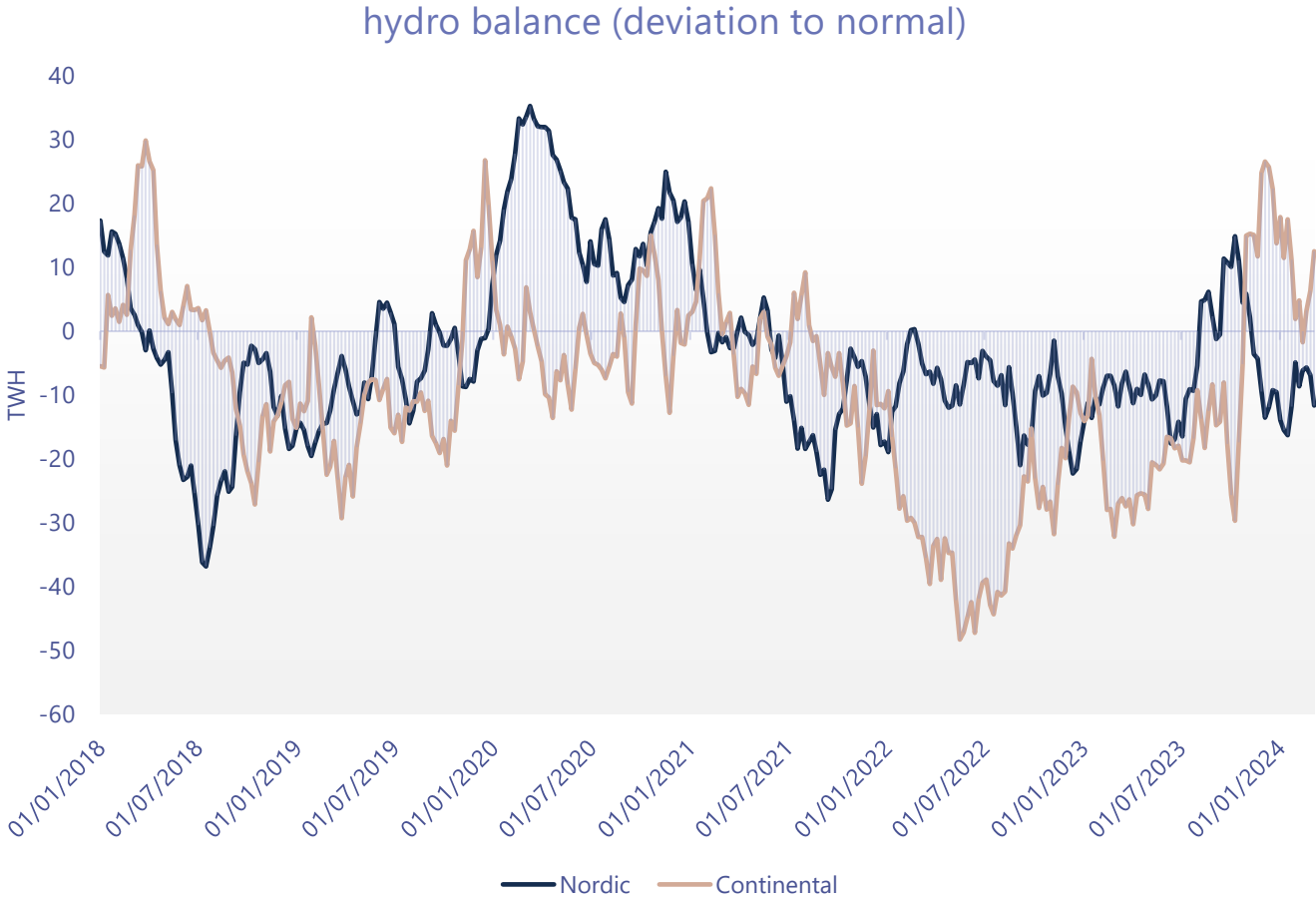
A slight imbalance due to reduced production can squeeze prices



Hydro reservoirs tell part of the story



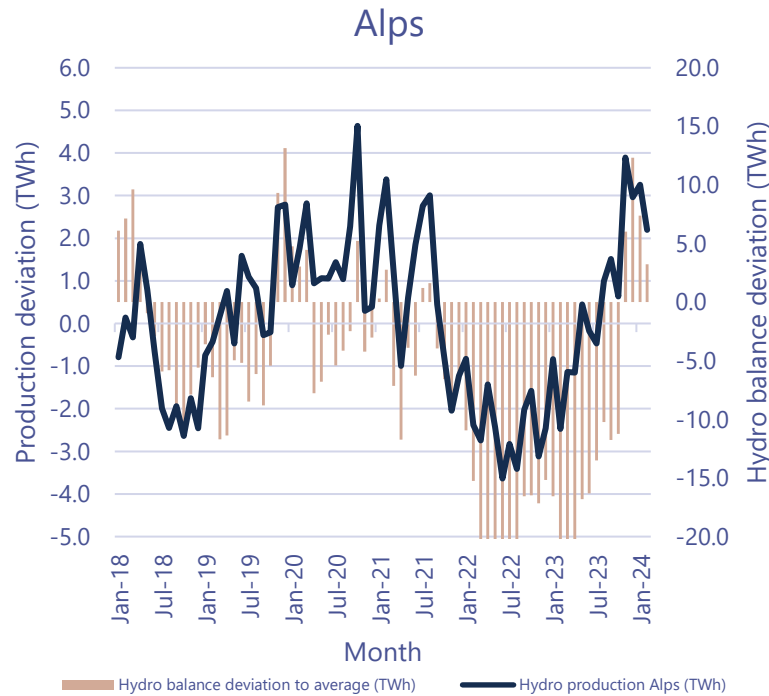
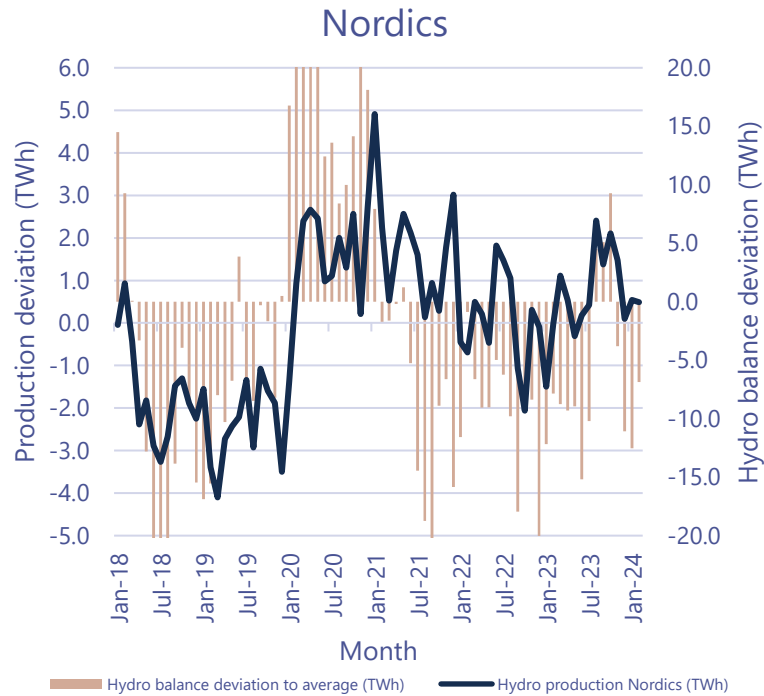
European Hydro balance Levels – Main driver of supply



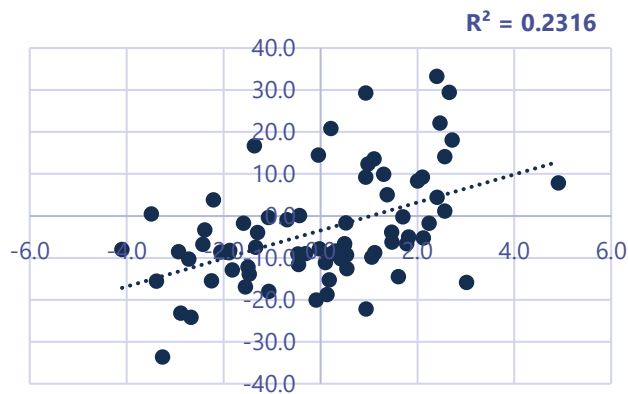
- **-80 TWh** of annual hydro GO issuance difference from **2021 to 2022**.
- **+66 TWh** increase **2022 to 2023**



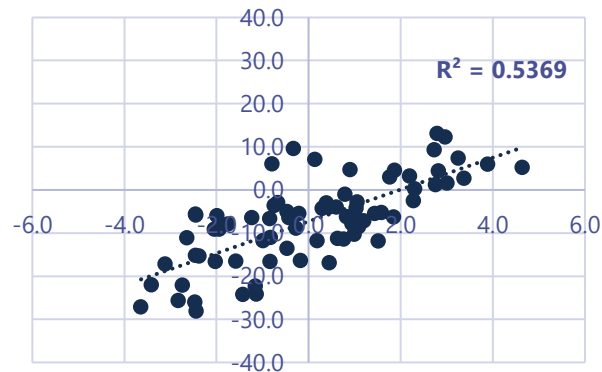
Impact of hydro balance on production – Regional dynamics



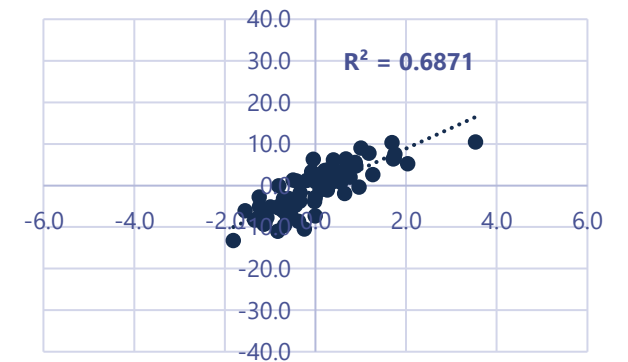
Hydro balance to production (Nordics))



Hydro balance to production (Alpine))

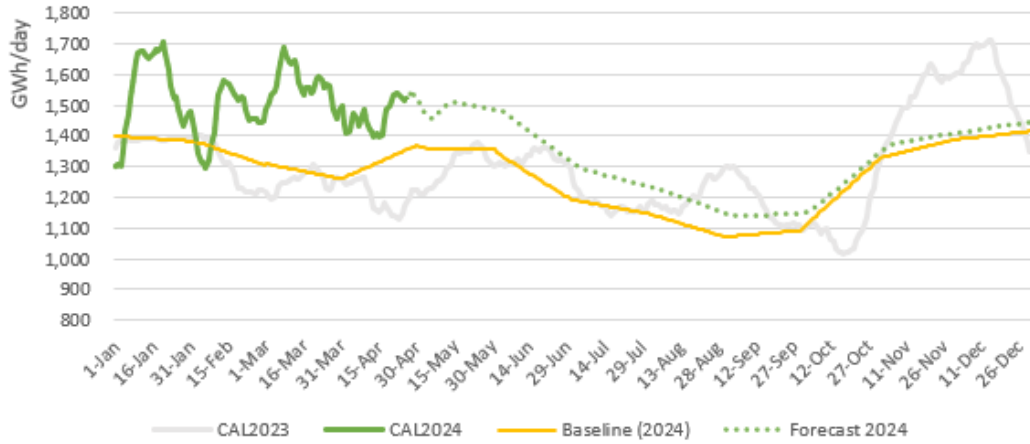


Hydro balance to production (Iberia))

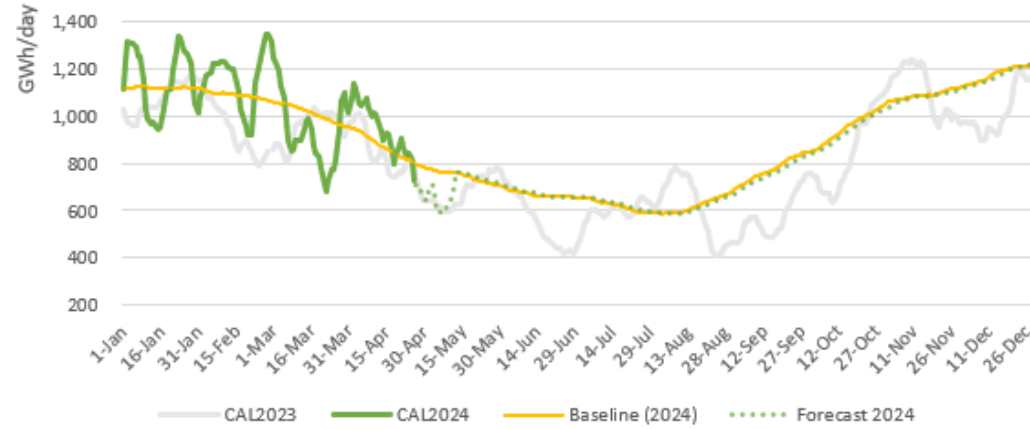


European GO production 2024

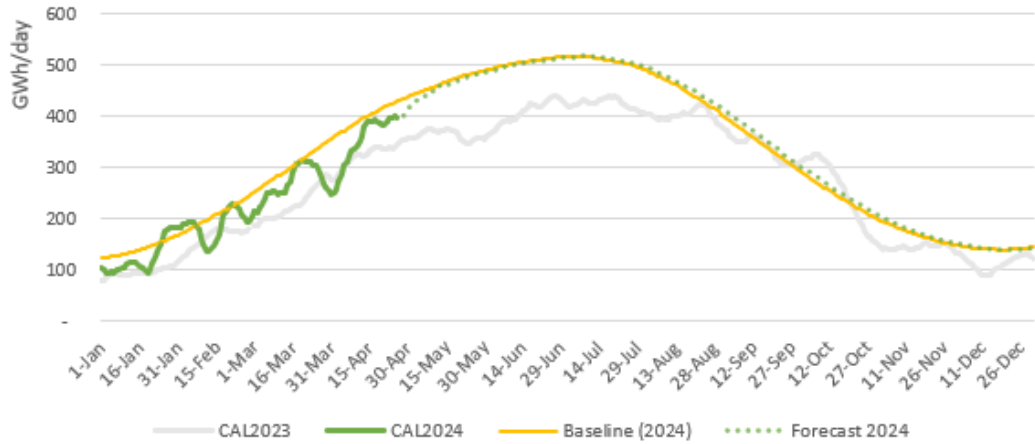
Hydro GO production AIB



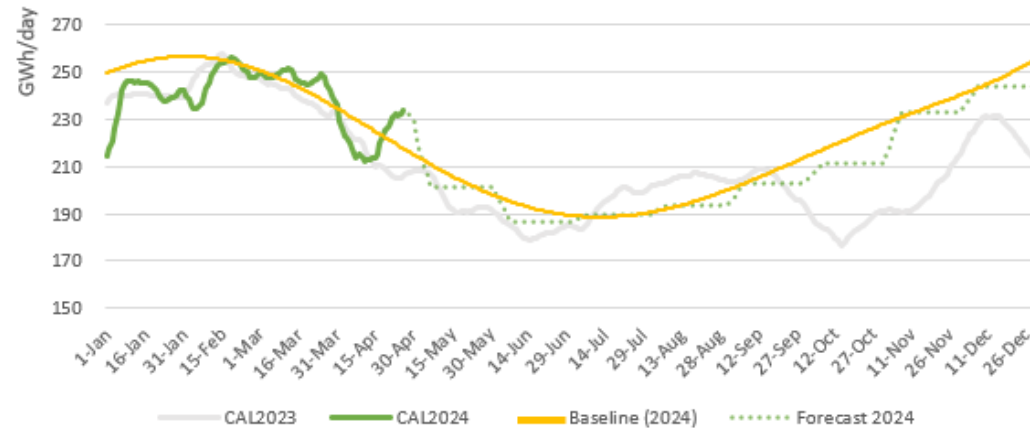
Wind GO production AIB



Solar GO production AIB



Biomass GO production AIB





Price development in 2024

