

Q1 2022 Automotive industry demand forecast

June 2022





ADVANCED
PROPULSION
CENTRE UK

Accelerating
Progress

This demand forecast covers

Markets Global; European; UK

Vehicles Light duty vehicles (LDVs)
Heavy goods vehicles (HGVs)  

Materials Lithium; Cathode Active Material (CAM);
Battery foils; Electrolyte and Separator Material

Our process

The data in these demand graphs is based on APC insight from our close relationship with UK OEMs on xEV production, APC Automotive Council PEMD traction specifications coupled with published data from IHS, Rho Motion & BNEF powertrain splits used to guide 2030 demand forecast. All forecasts refer to light duty vehicles unless heavy goods vehicles are specifically mentioned.

Quarterly updates

Any developments in the sector will change and influence these forecasts and therefore APC will update these on a quarterly basis in line with the impacts of those announcements.

Additional detail from APC

If you have any questions or would like more detail on any of the graphs or data email info@apcuk.co.uk




Disclaimer

These forecasts provide an estimate of electrified powertrain demand and are by no means an accurate statement of future markets and industry intentions. The data should be used in good faith and the APC UK cannot be held liable for any inaccuracies in the data, views expressed or underlying assumptions

Q1 2022 – Summary

Summary – Changes to projected demand by region



Q1 2022

 <p>Global demand update</p>	<ul style="list-style-type: none">• The outlook for global automotive battery demand in 2030 remains largely unchanged at just over 2,800 GWh	<p>page 8</p>
 <p>European demand update</p>	<ul style="list-style-type: none">• European 2025 BEV production share for passenger cars and vans revised upwards to 26% (+3%)• European 2030 BEV production share for passenger cars and vans revised upwards to 62% (+6%)	<p>page 19</p>
 <p>UK demand update</p>	<ul style="list-style-type: none">• UK 2025 BEV production share for passenger cars and vans revised downwards to 28% (-6%)• UK 2030 BEV production share for passenger cars and vans revised downwards to 73% (-5%) <p>This accounts for higher PHEV penetration than previously forecast At least 90 GWh-worth of batteries still needed by 2030</p>	<p>page 19</p>

Note: Change in methodology

Demand forecasts for market-weighted cathode material are now based on market shares for different chemistries ([page 21](#)) instead of using an 'all-NMC811' assumption as used in previous reports.

Q1 2022

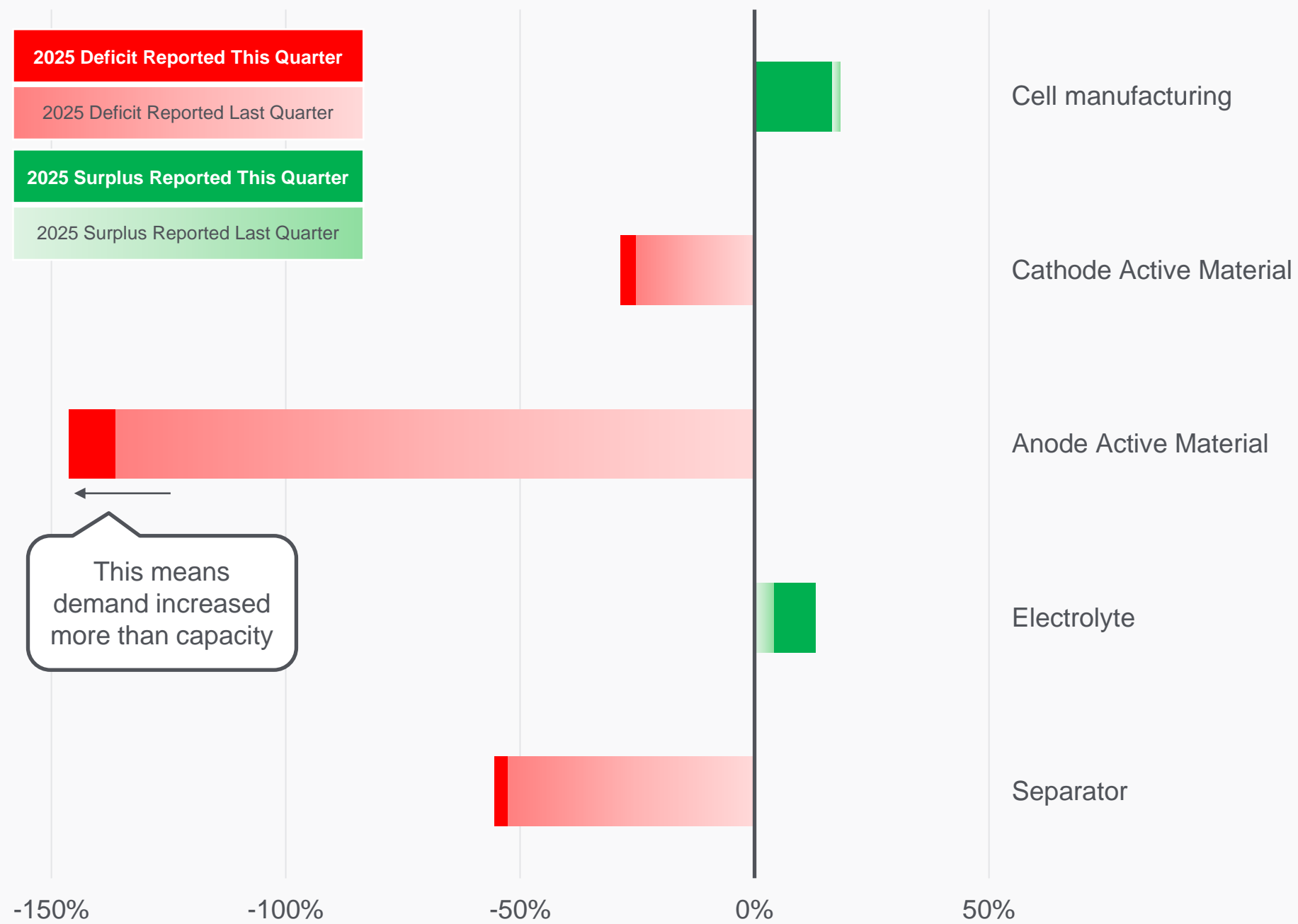
 <p>Limited global lithium supply</p>	<p>Limited lithium supply could be a potential bottleneck to global BEV penetration</p> <ul style="list-style-type: none"> Impact could be as much as 15 million fewer BEVs produced in 2030 <p>Mitigating strategies</p> <ul style="list-style-type: none"> Increase lithium supply by offering various incentives in sustainable Li mining Recycle Li from various sources Manufacturing smaller and modular batteries Substitute lithium out by adopting sodium-ion in certain vehicle segments Increased production of FCEVs 	<p>pages 13-15</p>
 <p>Increased use of LFP / LMFP cells</p>	<p>LFP / LMFP cells take over mid-Nickel NMC's share in Europe</p> <ul style="list-style-type: none"> 25% of European-produced BEVs expected to use LFP / LMFP cells by 2030. 	<p>pages 16-17</p>

Summary – Supply chain activity

Q1 2022 notes

- The graph refers to Europe’s capability to supply battery cells and sub-components that arise from local vehicle production.
- It assumes Europe is a self-sustaining bloc with no imports or exports

2025 European¹ Capacity vs Demand Balances



Status of regional capacity v demand balance in 2025	Value* (%)	UK Supply Chain Status
Still OK: announced investments likely to be sufficient for capacity	18%	Gigafactory plans to supply 90 GWh by 2030 mostly secured for UK vehicle production plants
Improvement slowing: Freyr + Aleees JV announce LFP CAM plans in Norway	46%	Required to be made in the UK from 2027 for UK cells to qualify as local and to avoid EV tariffs abroad
Sluggish: Epsilon and Grafintech JV announced in Vaasa, Finland	9%	Expected to be the next ‘big thing’ after CAM. Today’s supply is dominated by China but the UK can localise it
On track: announced investments likely to be sufficient for capacity	8%	Value in today’s liquid electrolyte is relatively low, but solid state electrolytes are a key investment consideration
On hold: no major European investments announced this quarter	7%	Significant opportunities to localise in UK even though typically manufactured in Eastern Europe

Source: APC internal analysis, BNEF forecasts (Accessed: 10.05.2022), IHS AutoTechInsight forecasts (Mar, 2021)
 1) Europe region includes non-EU countries such as Turkey.

*Value in terms of cost contribution to total cell cost based on an NMC811 cell

Q1 2022 – Demand Update

The following section includes battery demand from both light duty vehicles (LDVs) and heavy goods vehicles (HGVs)

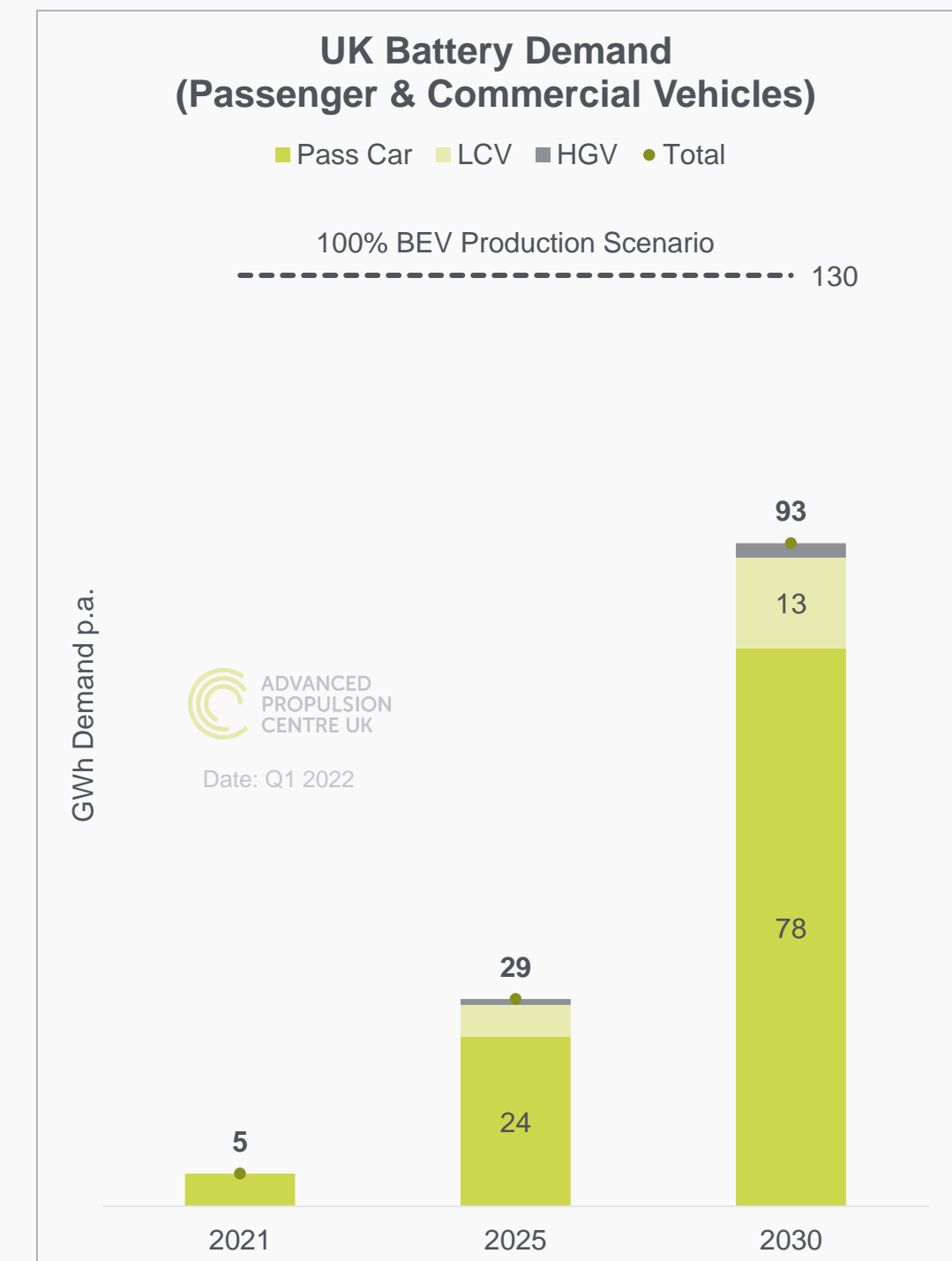
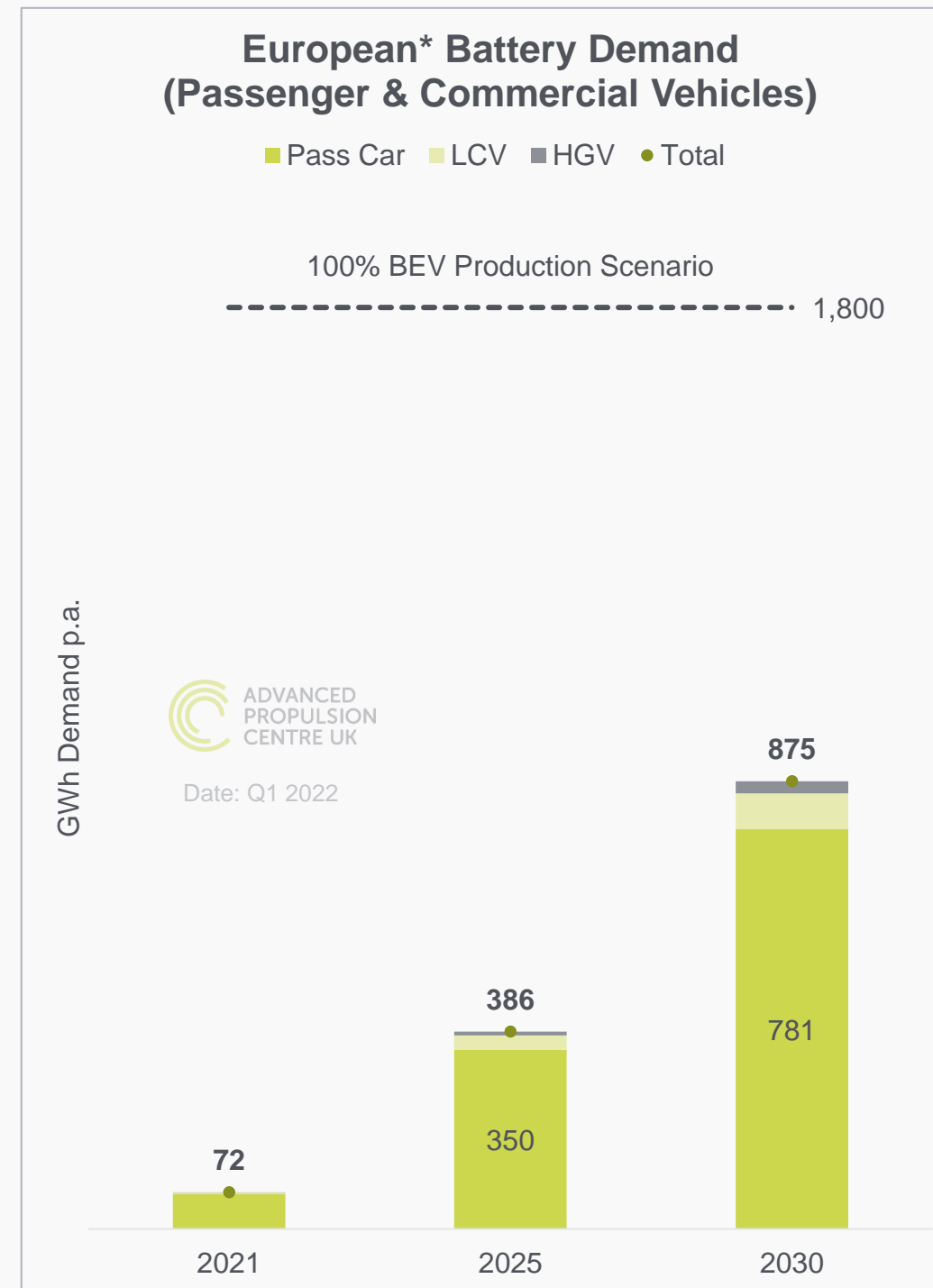
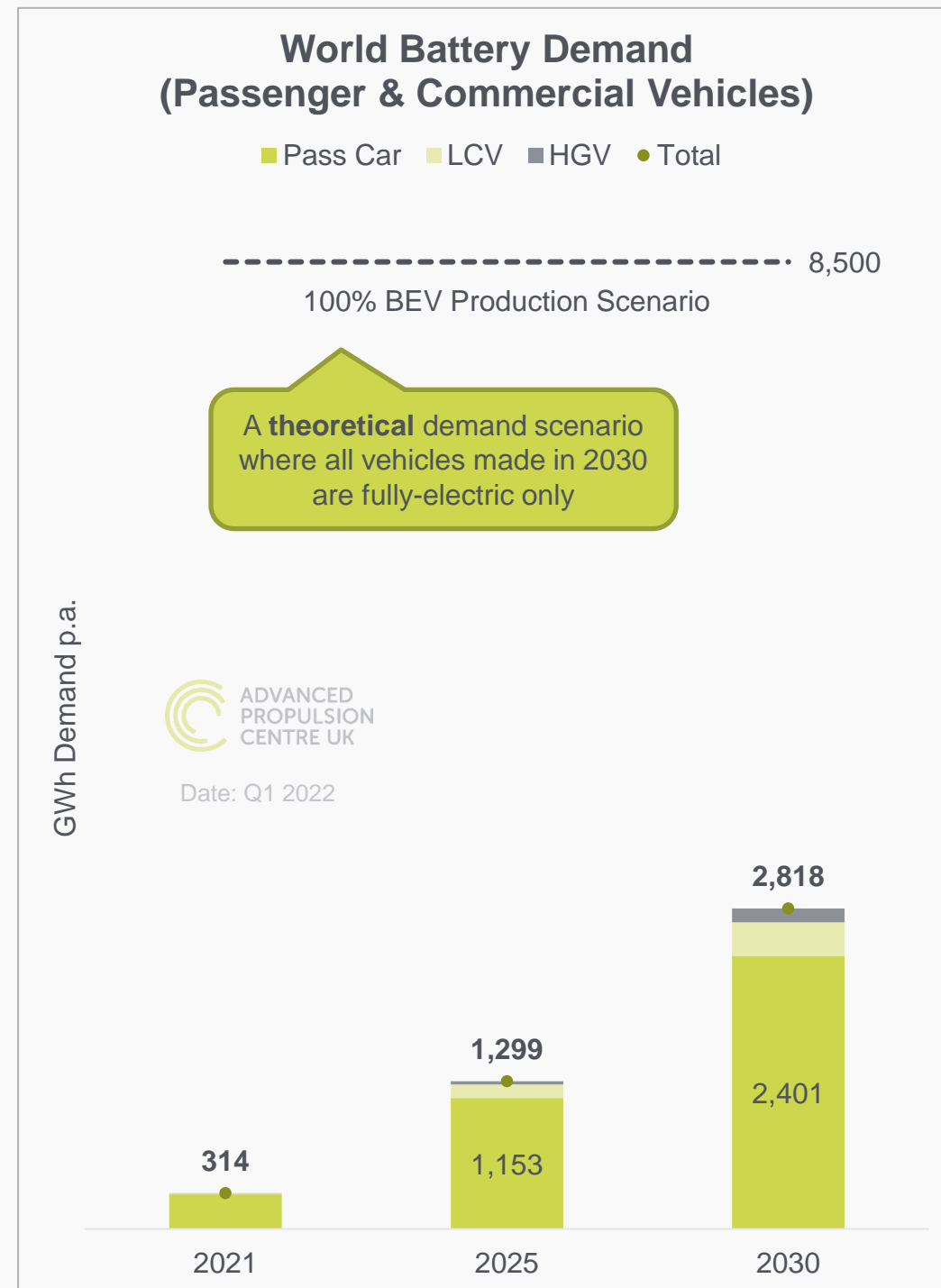


Battery demand forecast

LDVs and HGVs

Q1 2022 notes

- World battery demand forecast to exceed 2,800 GWh by 2030, (more than double the forecast for 2025)
- Europe to account for ~1/3 of this demand

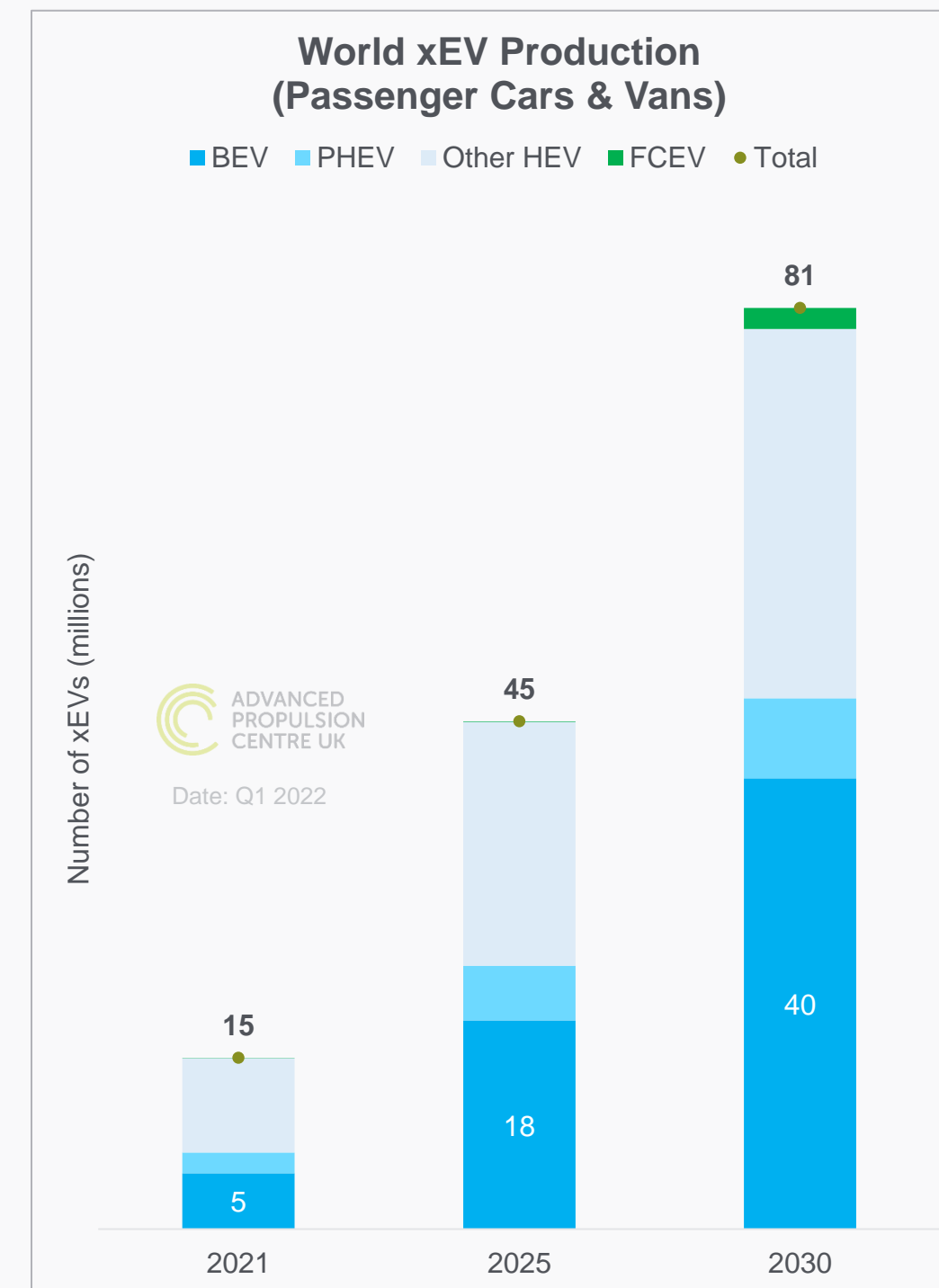
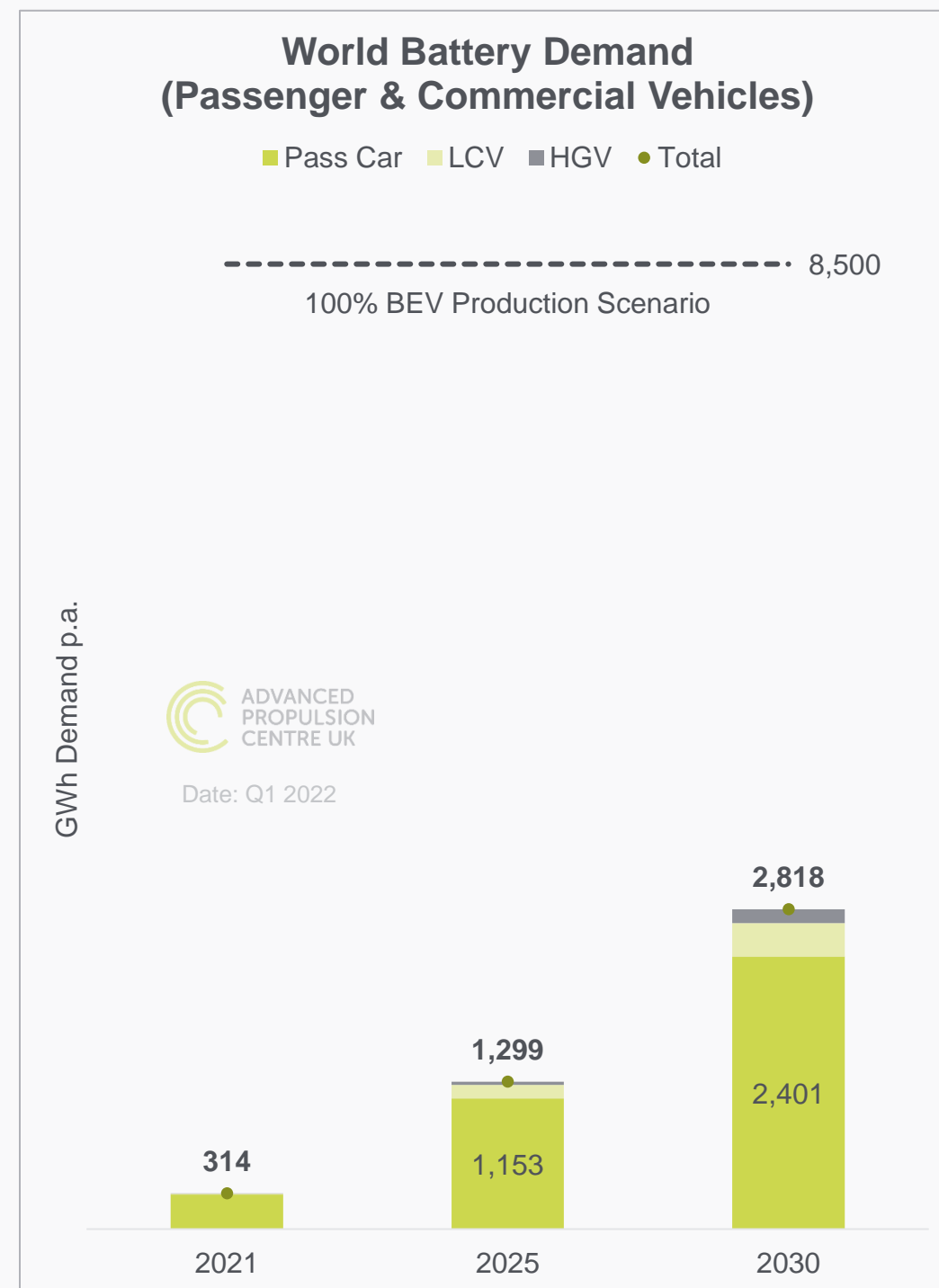


World xEV Production

Passenger Cars and Vans

Q1 2022 notes

- World vehicle production would require more than 2,800 GWh of batteries, with 40 million battery-electric cars and vans produced globally by 2030
- Our data only covers production forecasts for light duty vehicles

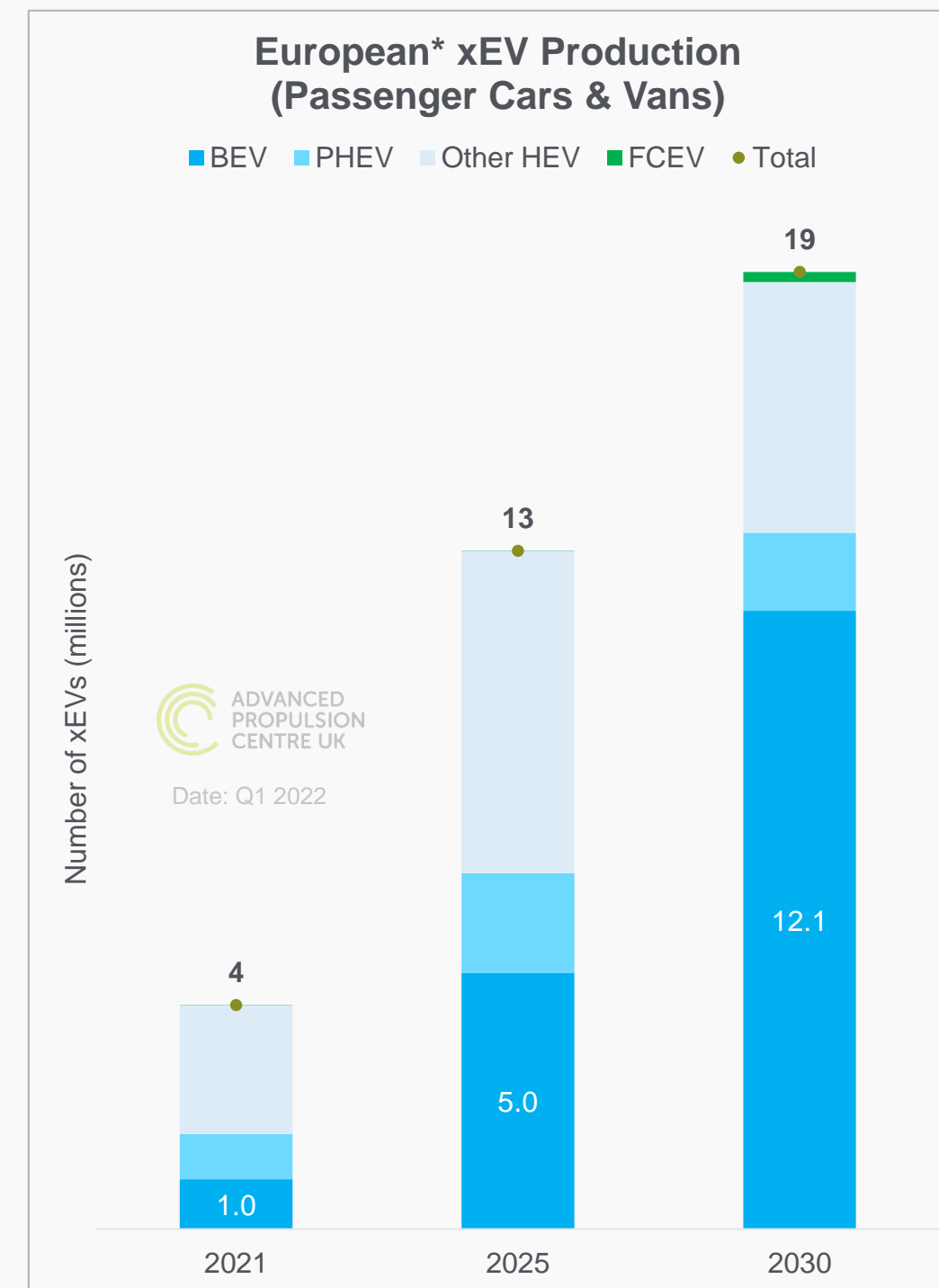
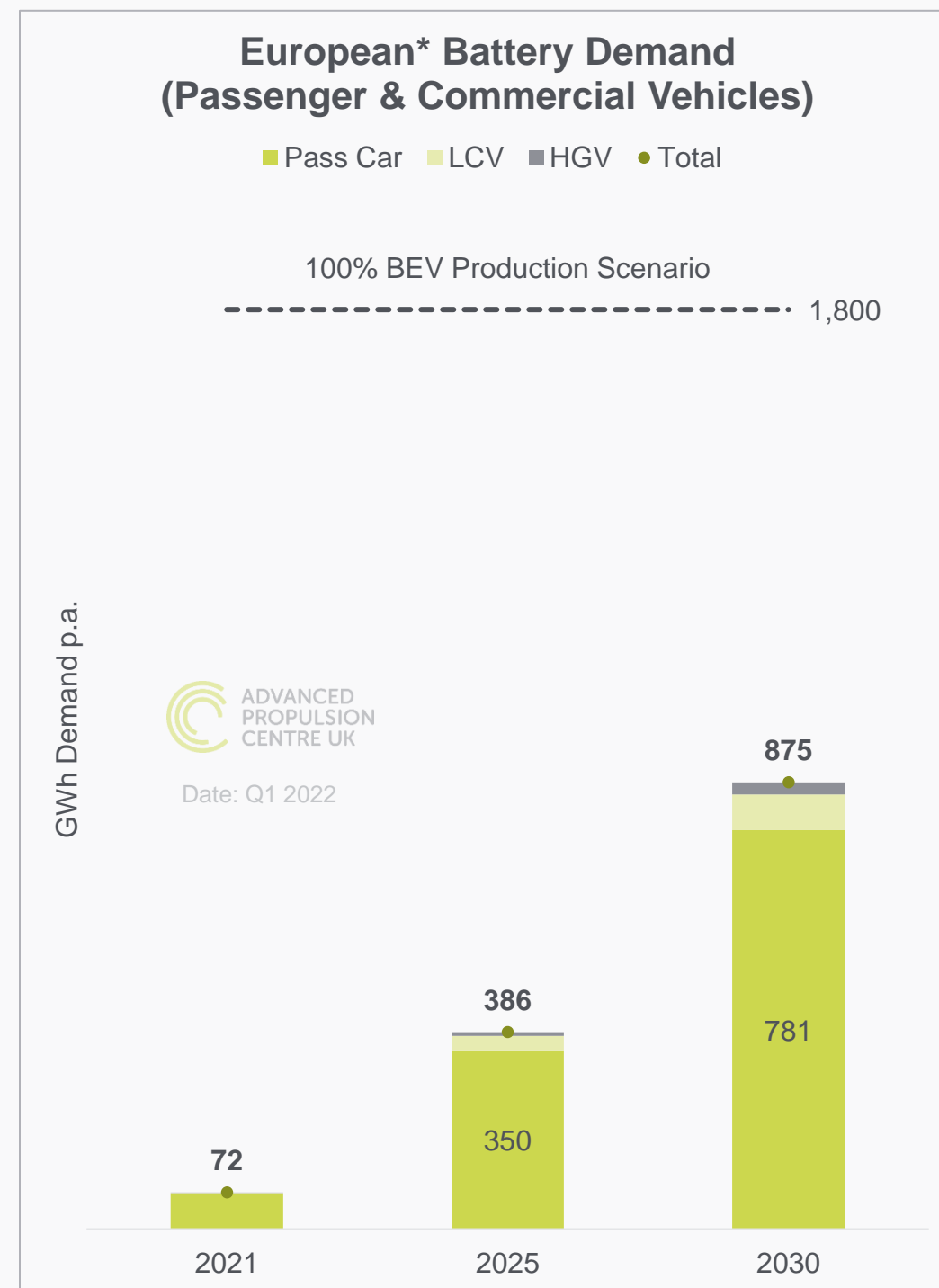


European xEV Production

Passenger Cars and Vans

Q1 2022 notes

- European vehicle production will require 875 GWh of batteries, with more than 12 million battery-electric cars and vans produced in the region by 2030

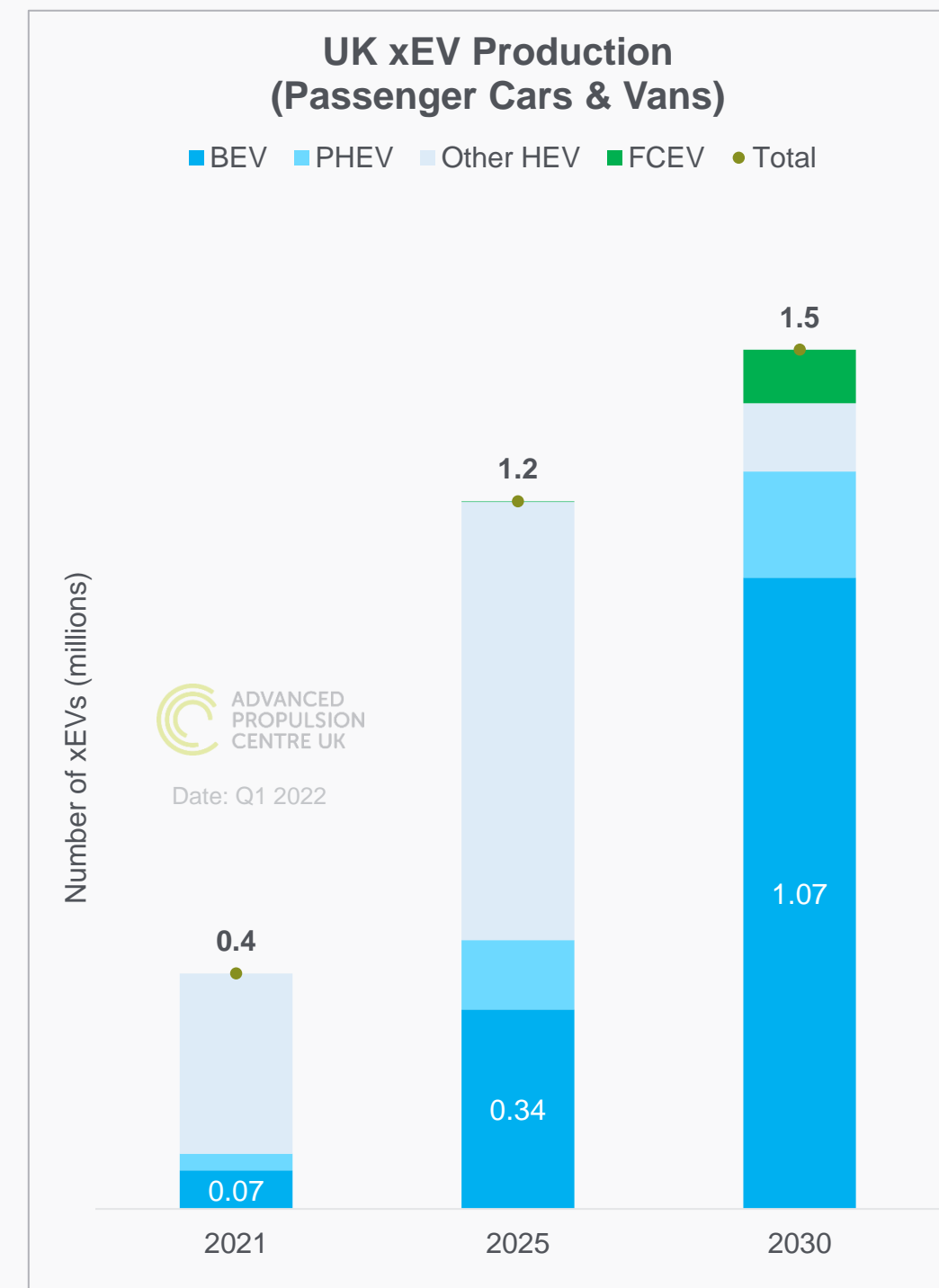
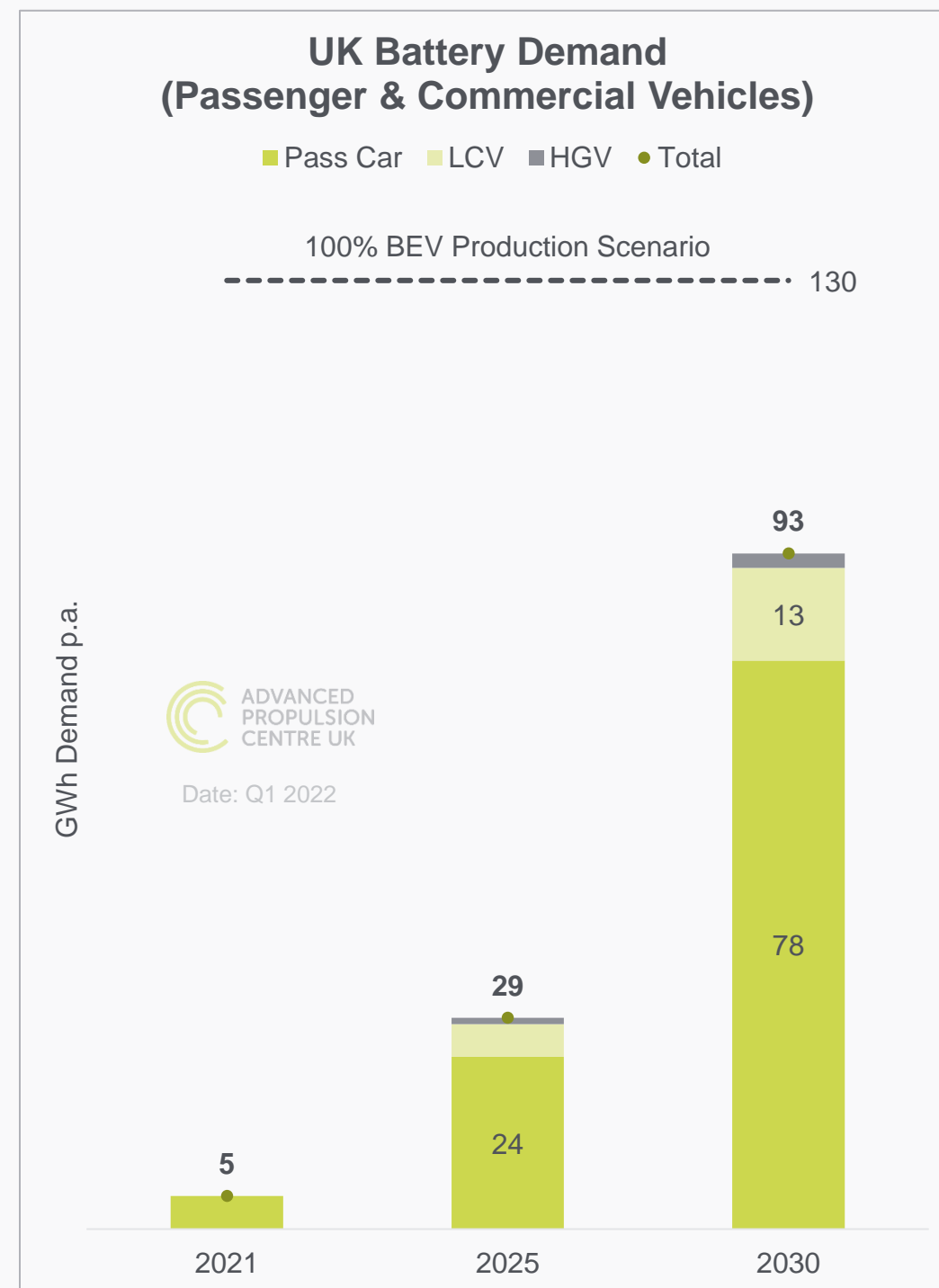


UK xEV Production

Passenger Cars and Vans

Q1 2022 notes

- UK vehicle production will require 93 GWh of batteries, with more than 1 million battery-electric cars and vans produced by 2030

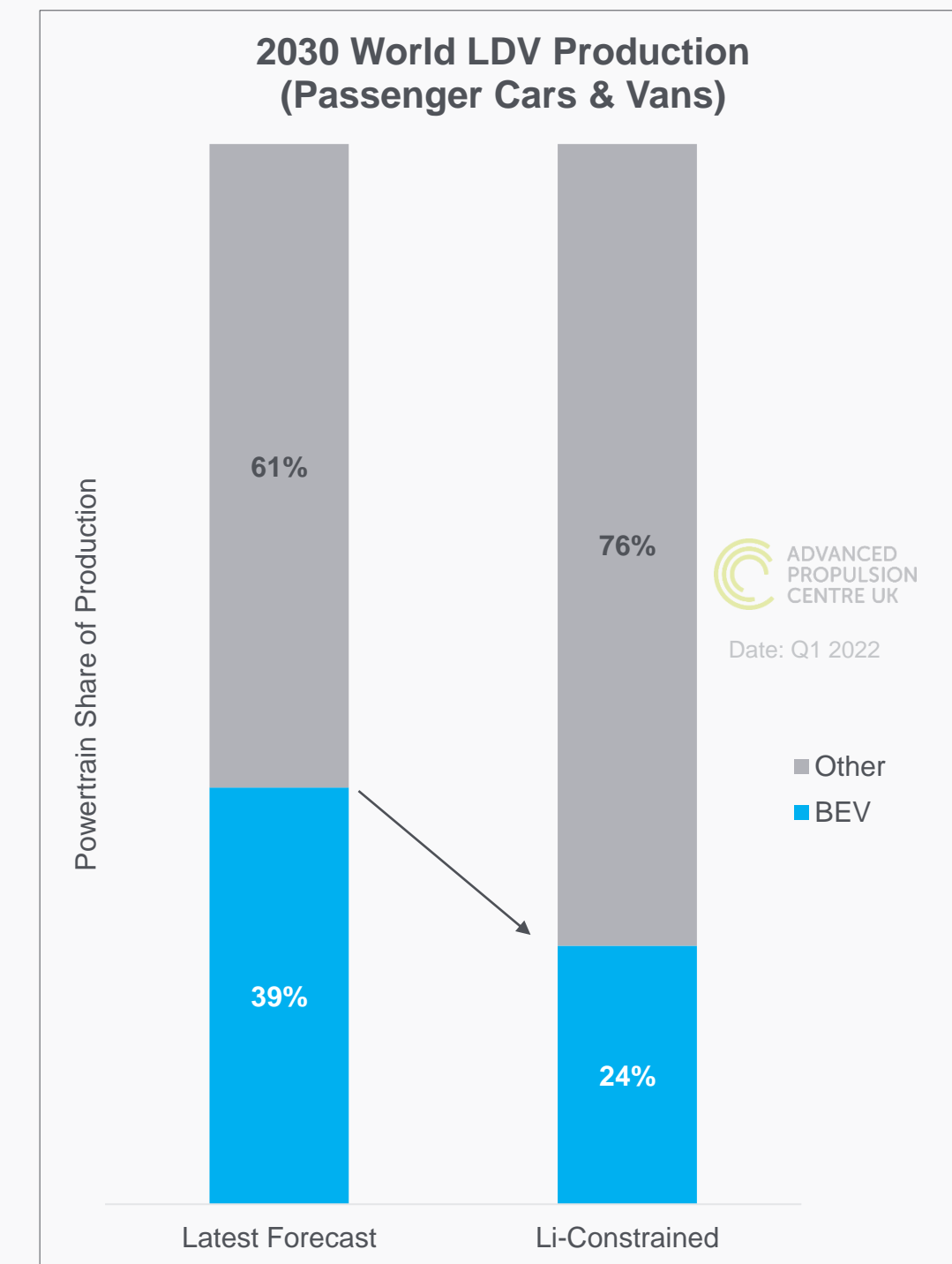
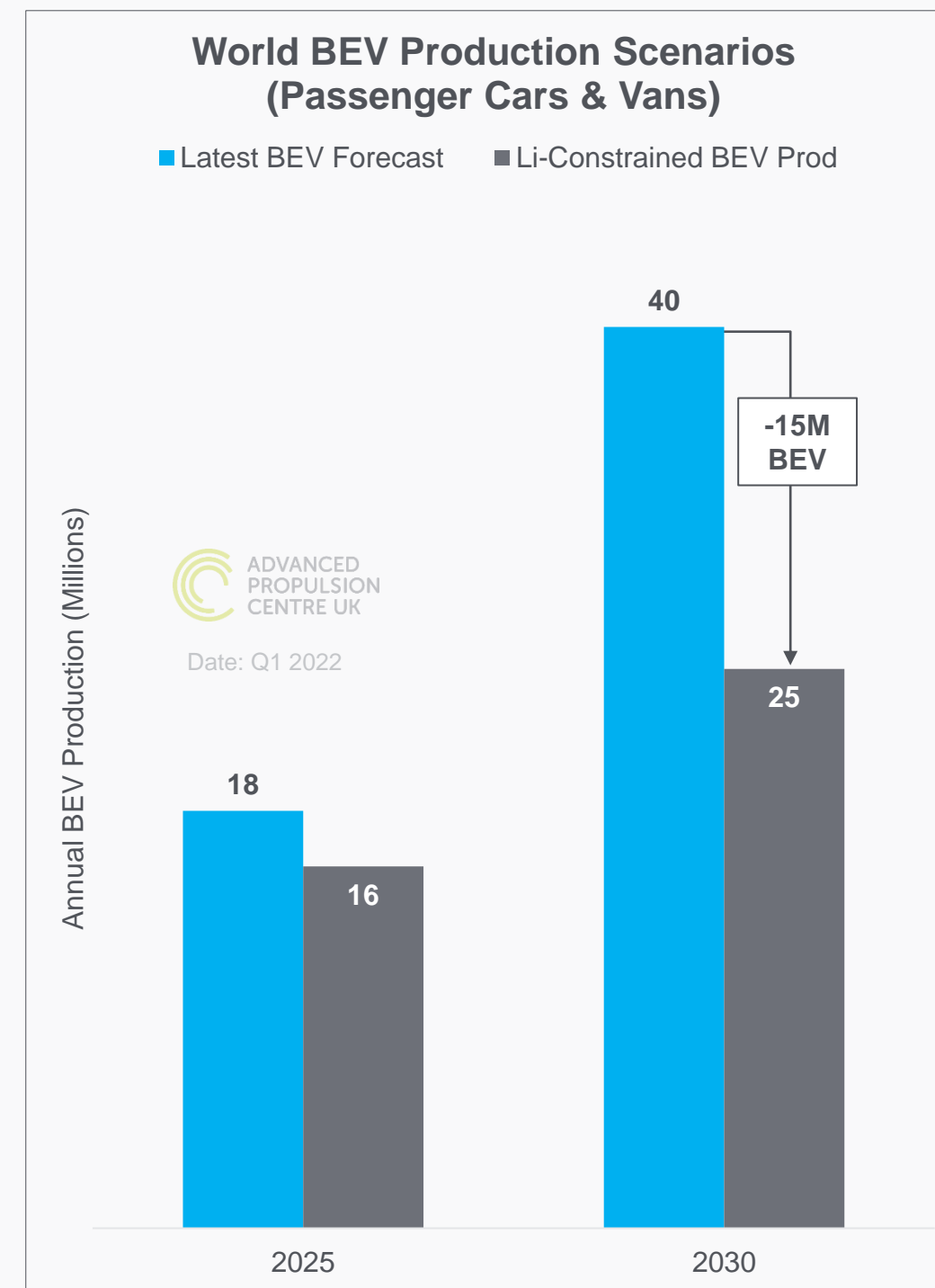
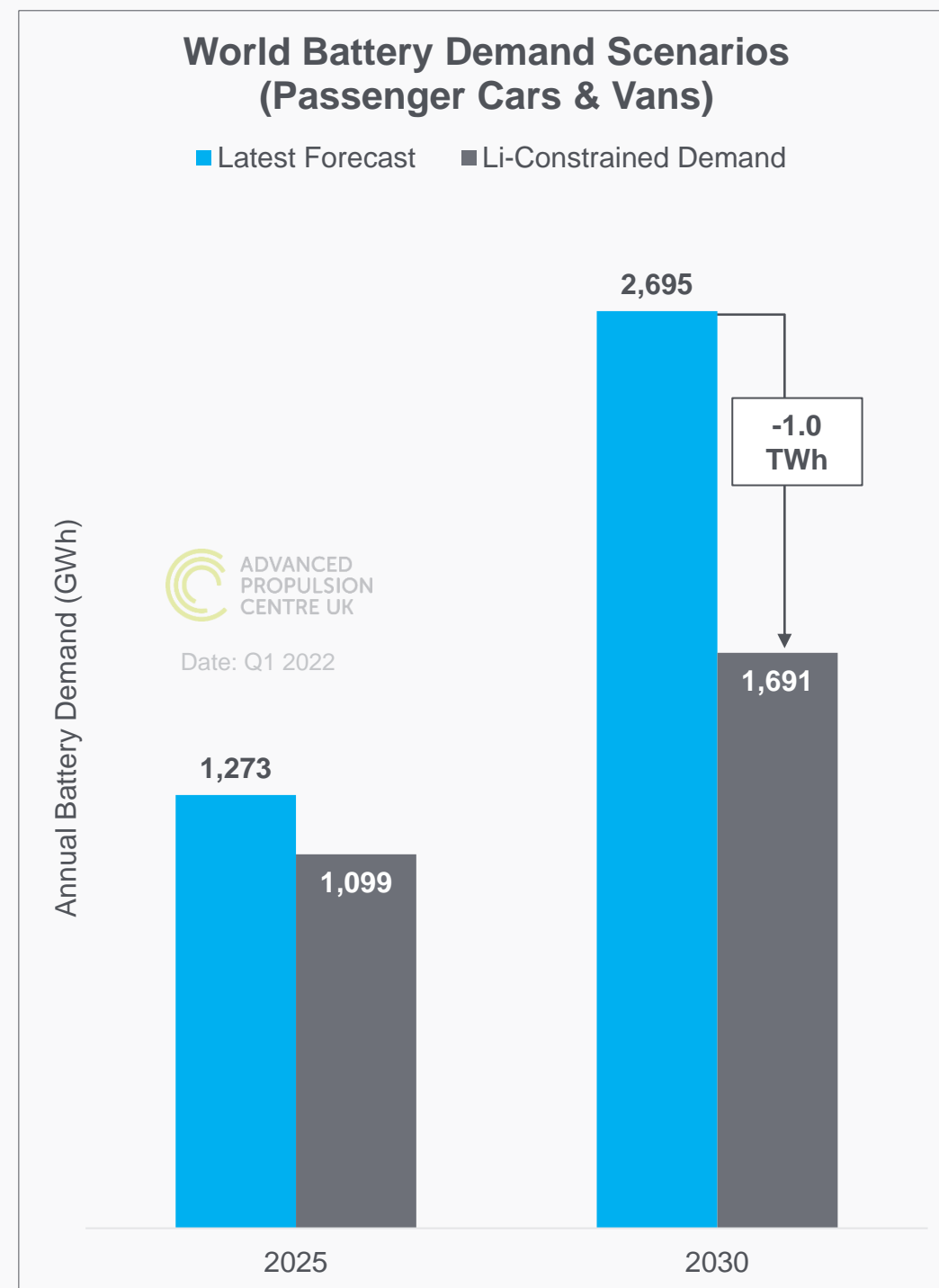


Q1 2022 – Trend Update

Global BEV penetration

Q1 2022 notes

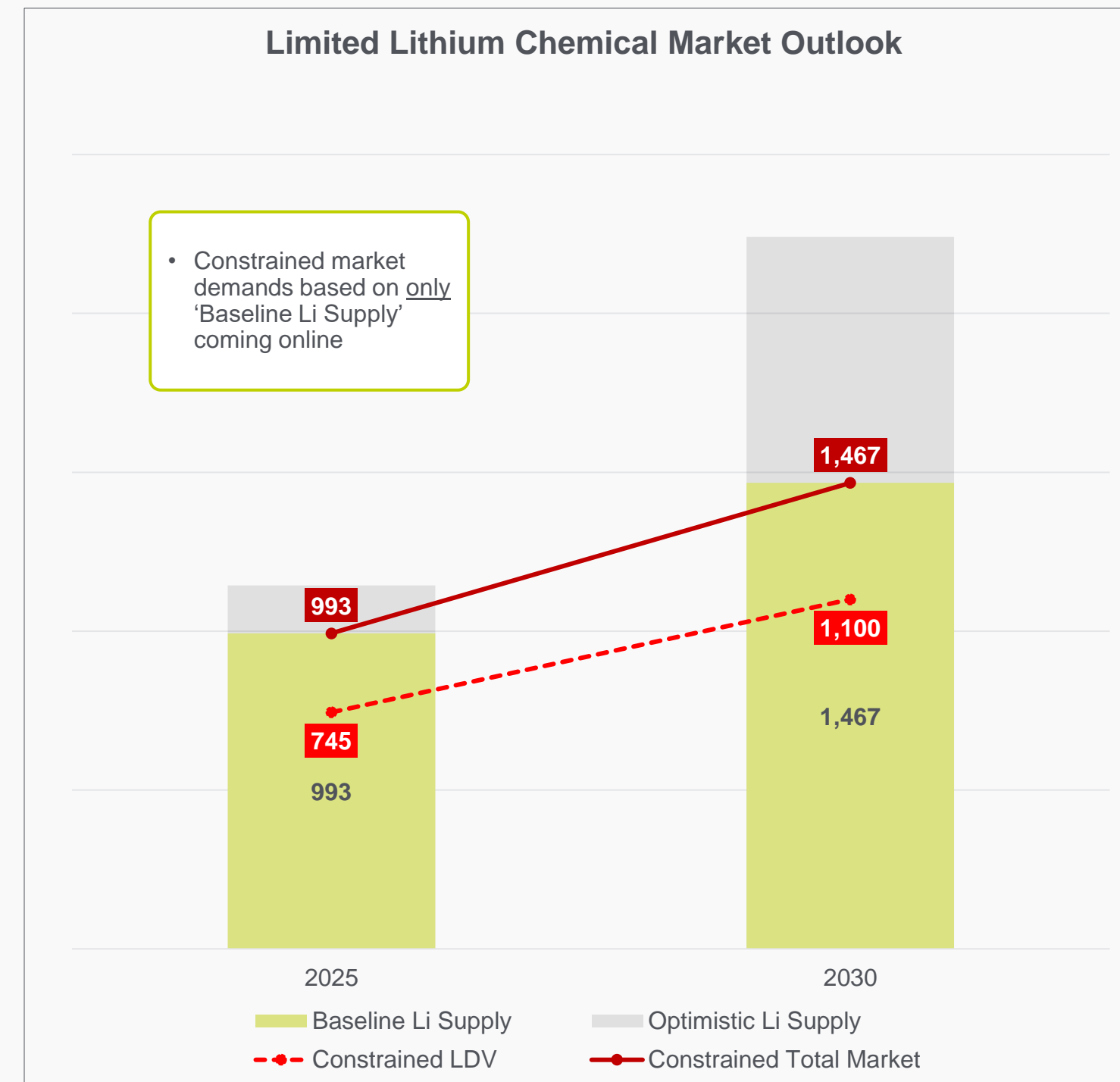
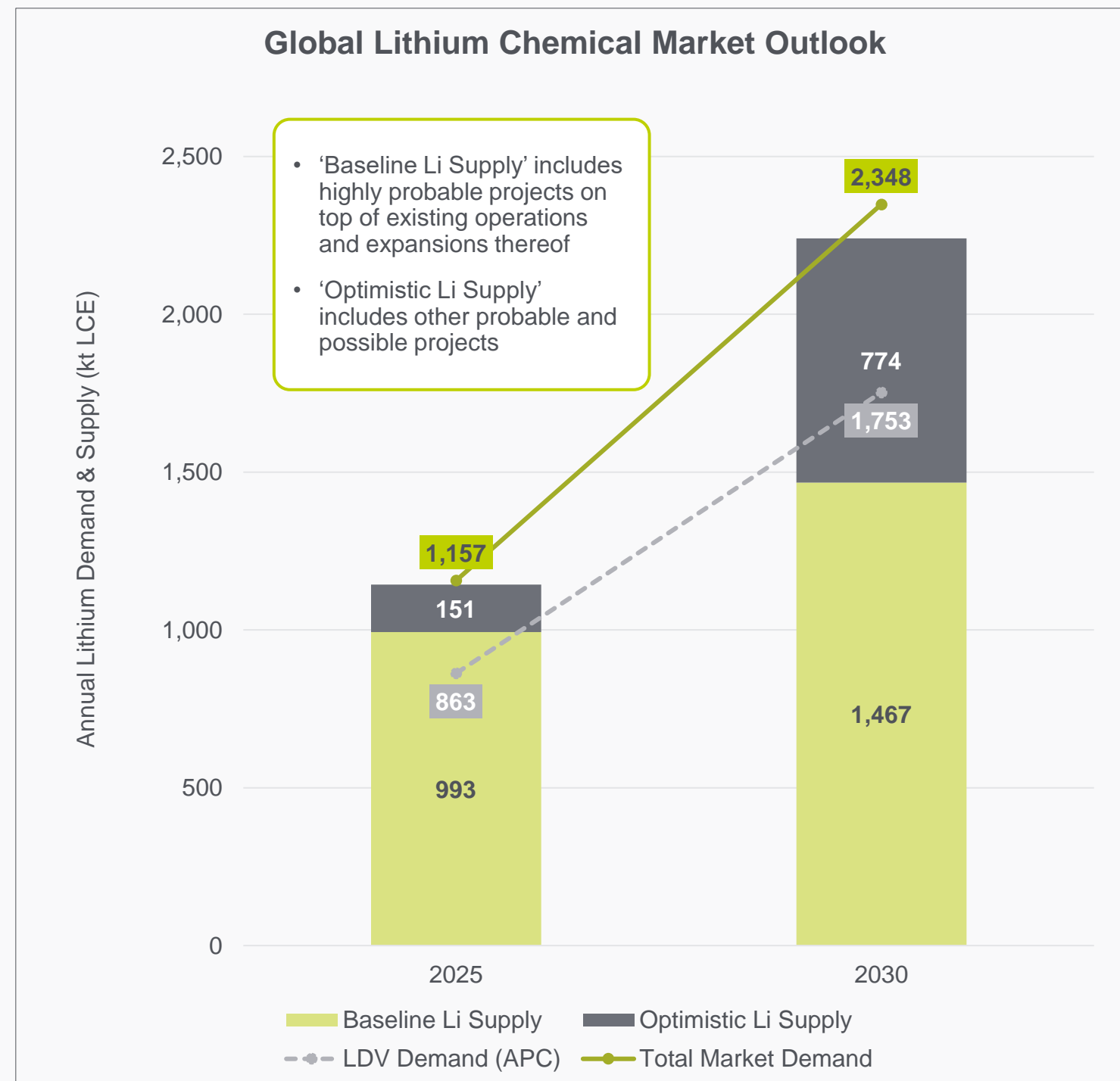
- Limited Lithium supply could be a potential bottleneck to global BEV penetration
- Impact could be as much as 15 million fewer BEVs produced in 2030



Lithium Chemical Market Outlook

Q1 2022 notes

- While rising global demand for LFP cells over NMC potentially alleviates pressures on Nickel supply, the 'elephant in the room' is still very much Lithium



Five solutions that could address a potential Lithium shortage in 2030 and help the automotive sector accelerate towards net-zero

Increase lithium supply

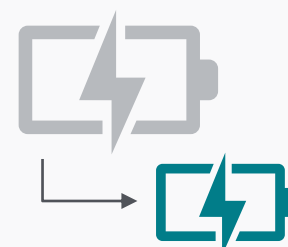


Investment incentives in sustainable Li mining



Recycle Li from various sources

Decrease lithium demand



Manufacturing smaller & modular batteries



Moving from Li-ion to Sodium-ion batteries



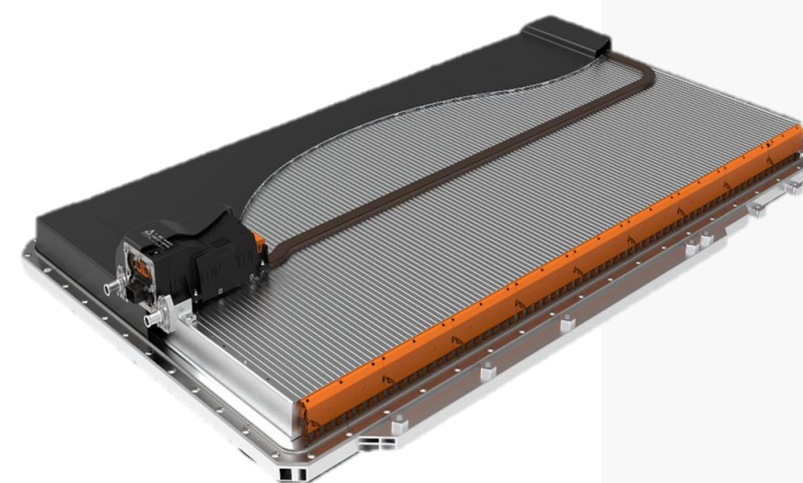
Increased production of FCEVs

Detailed analysis on potential solutions to follow in upcoming report

LFP / LMFP analysis

Market history

Historically, China has been somewhat of a lone ranger in using Lithium Iron Phosphate (LFP) cells in their battery electric vehicles. European and American based OEMs have opted for NMC or NCA due to their superior energy density over LFP at the cell level. However, pack-level energy is a crucial factor for vehicle manufacturers. The introduction of long format cells, like the 'blade' prismatic ones manufactured by BYD, have significantly increased the volumetric and gravimetric energy density of LFP at the pack level. Because of the improvements in the cell to pack efficiency of LFP, they currently compete with mid-Nickel NMC packs on energy density for a much cheaper purchase price.



BYD blade pack – source: sae.org

Benefits for European-based OEMs and cell suppliers

Initial European OEM adoption of LFP-based cells is expected in the entry-level segments A – C but also in commercial vehicles such as vans, where the superior cycle life of LFP is desirable. For European OEMs, a clear benefit of opting for LFP is that future price variability of these cells is also much lower than NMC-based chemistries. While LFP-based cell prices are mainly exposed to volatility in Lithium Carbonate markets, NMC cell prices are exposed to Li and price-volatility in Nickel Sulphate and Cobalt Sulphate, which account for a large proportion of the cell cost. It is likely that Nickel Sulphate will continue to experience price fluctuations given the predicted Nickel shortages. Therefore, European OEMs will likely converge around a diversified cell chemistry portfolio to limit their exposure to upstream raw material markets.

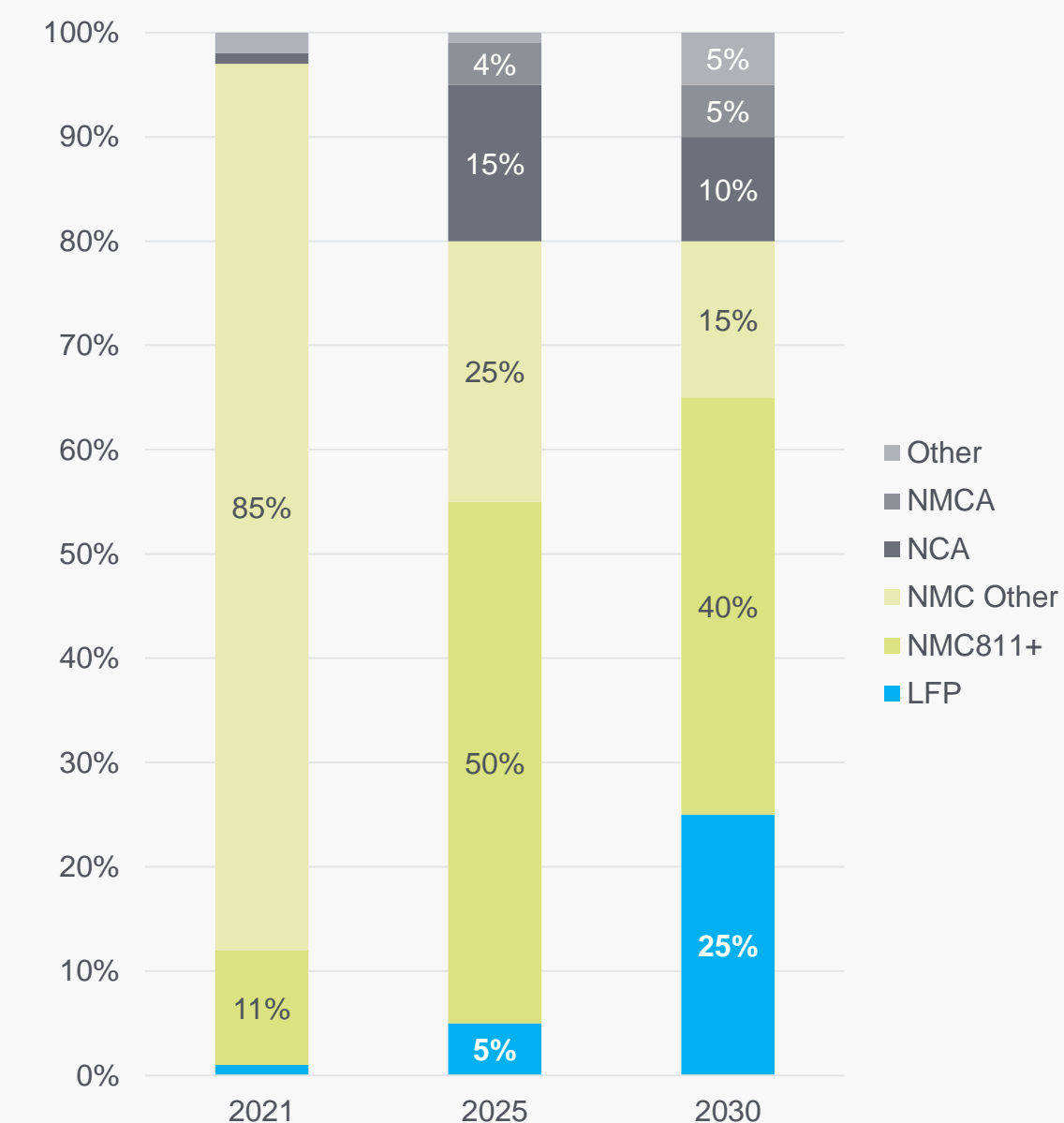


European-based OEMs and cell suppliers have announced plans for LFP

Renewed focus on improving cell-level energy density

The focus for LFP has now veered towards improving cell-level energy density with the addition of manganese in the cathode to make LMFP. This is an important step for LFP because it opens the door to silicon-blended anodes, which increase both the cell and pack energy density significantly, and could unlock further European penetration in larger vehicle segments like SUVs.

Europe Cathode Chemistry Shares



Source: APC Demand Databases using IHS AutoTechInsight (Mar, 2022), Rho Motion data (2022), BNEF forecasts (2021)
 Note: Passenger cars & Light Commercial Vehicles < 3.5t only, European forecast includes non-EU countries such as Turkey

Summary of major OEMs with European production and their stance on LFP

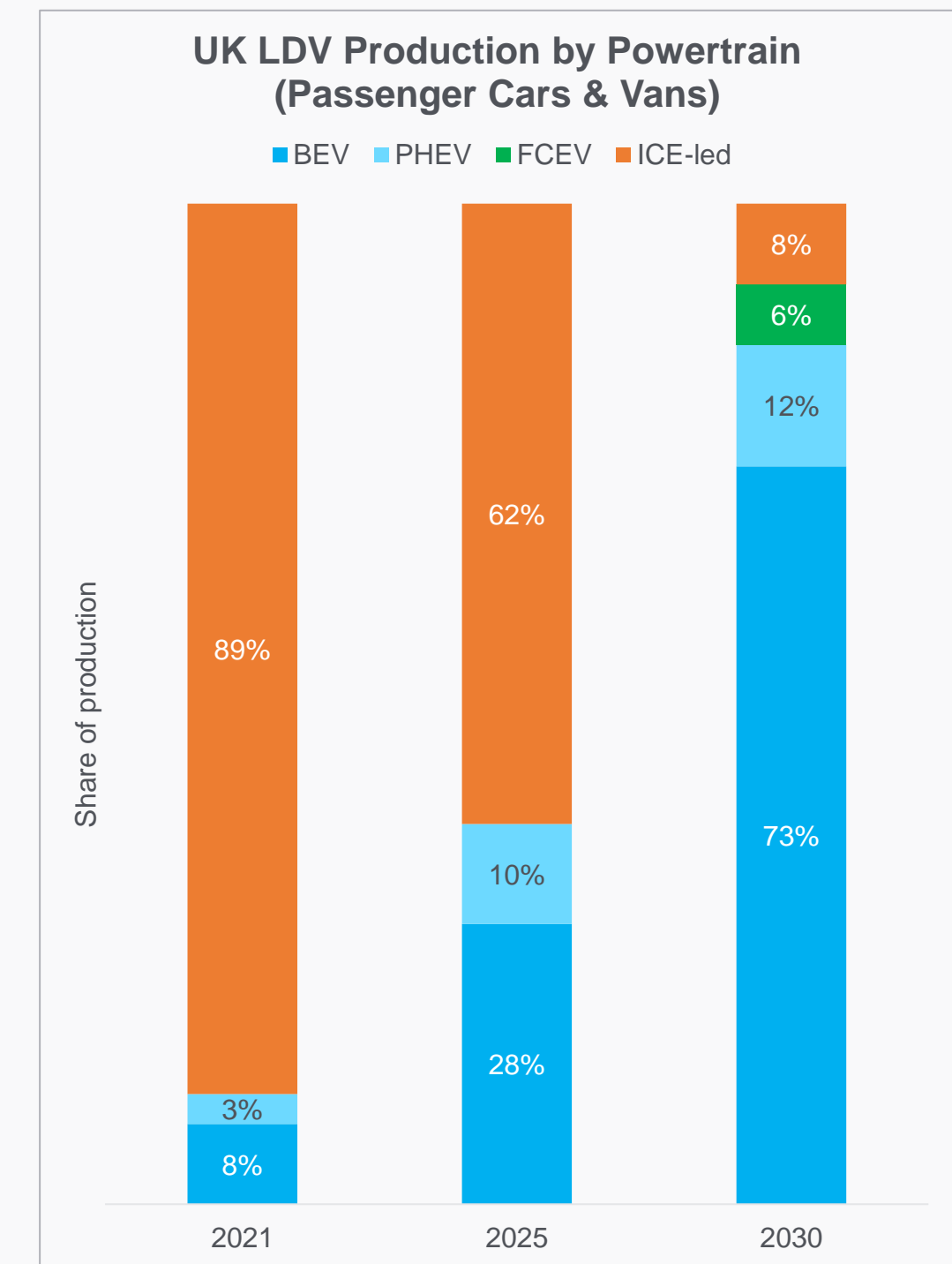
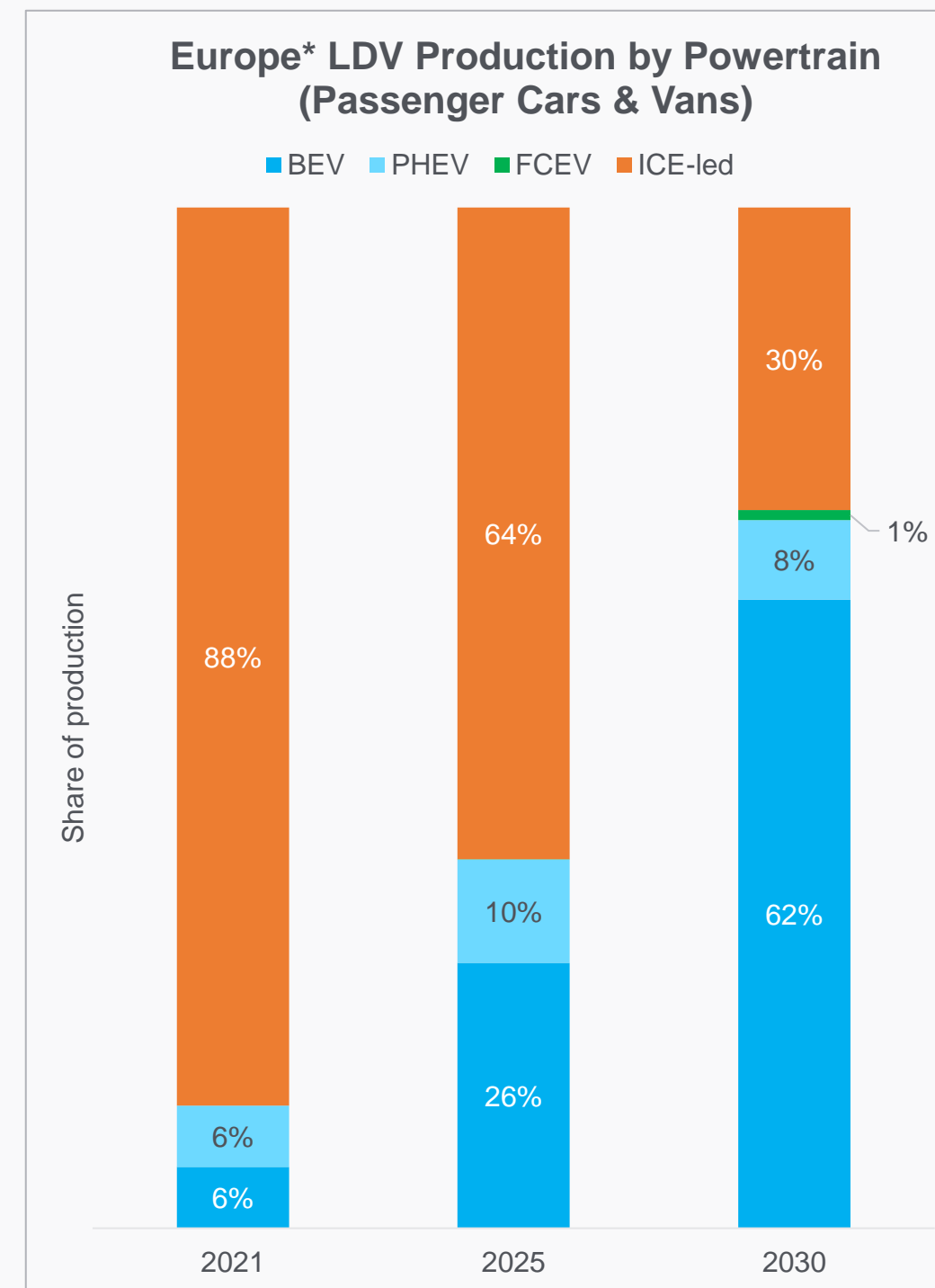
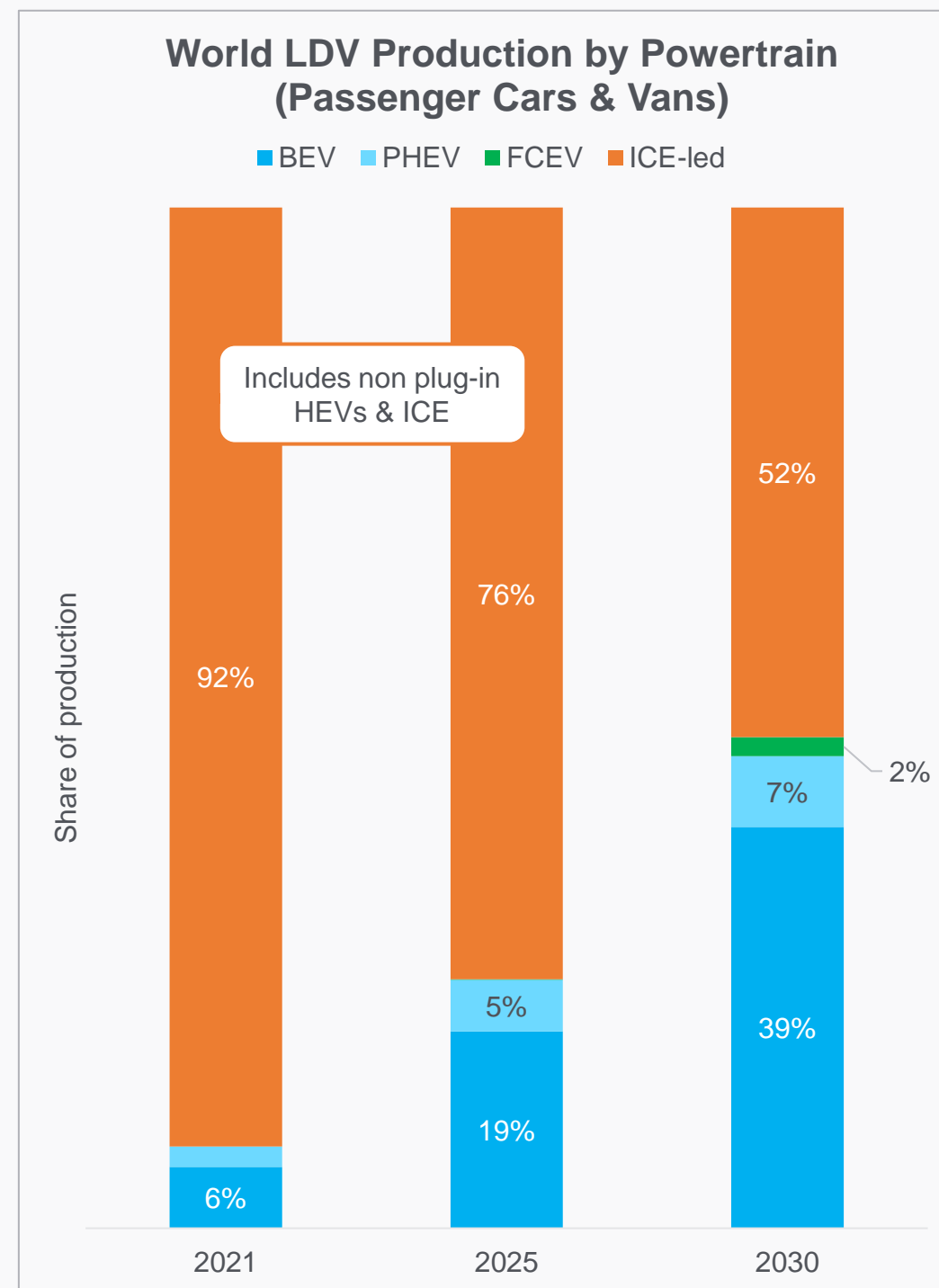
OEM	LFP Stance	Comments	Link
Volkswagen	Planned Introduction	VW committed to LFP in entry level vehicles	Click here
Toyota	Not Declared	Haven't announced any plans – rumoured to use BYD Blade in China though	Click here
Stellantis	Speculated Introduction	Committed to using NiCo-free (Fe-Mn-x) which is likely to be a variant of LFP	Click here
Renault-Nissan-Mitsubishi	Not Declared	Renault have allegedly ruled out LFP for European models in their 2021 Strategy Day	Click here
Hyundai / Kia	Speculated Introduction	LFP and cell to pack are mentioned in their Accelerated Electrification Strategy (March, 2022)	Click here
Ford	Planned Introduction	Ford committed to using LFP in their commercial vehicles as IonBoostPro product	Click here
BMW	Speculated Introduction	Peter Lamp (Head of BMW Cell R&D) said LFP could be used for 1 Series entry models in Europe	Click here
Daimler / Mercedes	Planned Introduction	Planned introduction in their entry segments	Click here
Tesla	In Production Vehicles	Model 3 already has LFP battery packs in	Click here
Volvo	Not Declared	Not declared but is Chinese-owned (Geely) so could easily acquire LFP cells	N/A
Jaguar Land Rover	Not Declared	No public announcements regarding LFP have been made	N/A

Q1 2022 – Electrified Components data

Forecasts for LDV production by powertrain

Q1 2022 notes

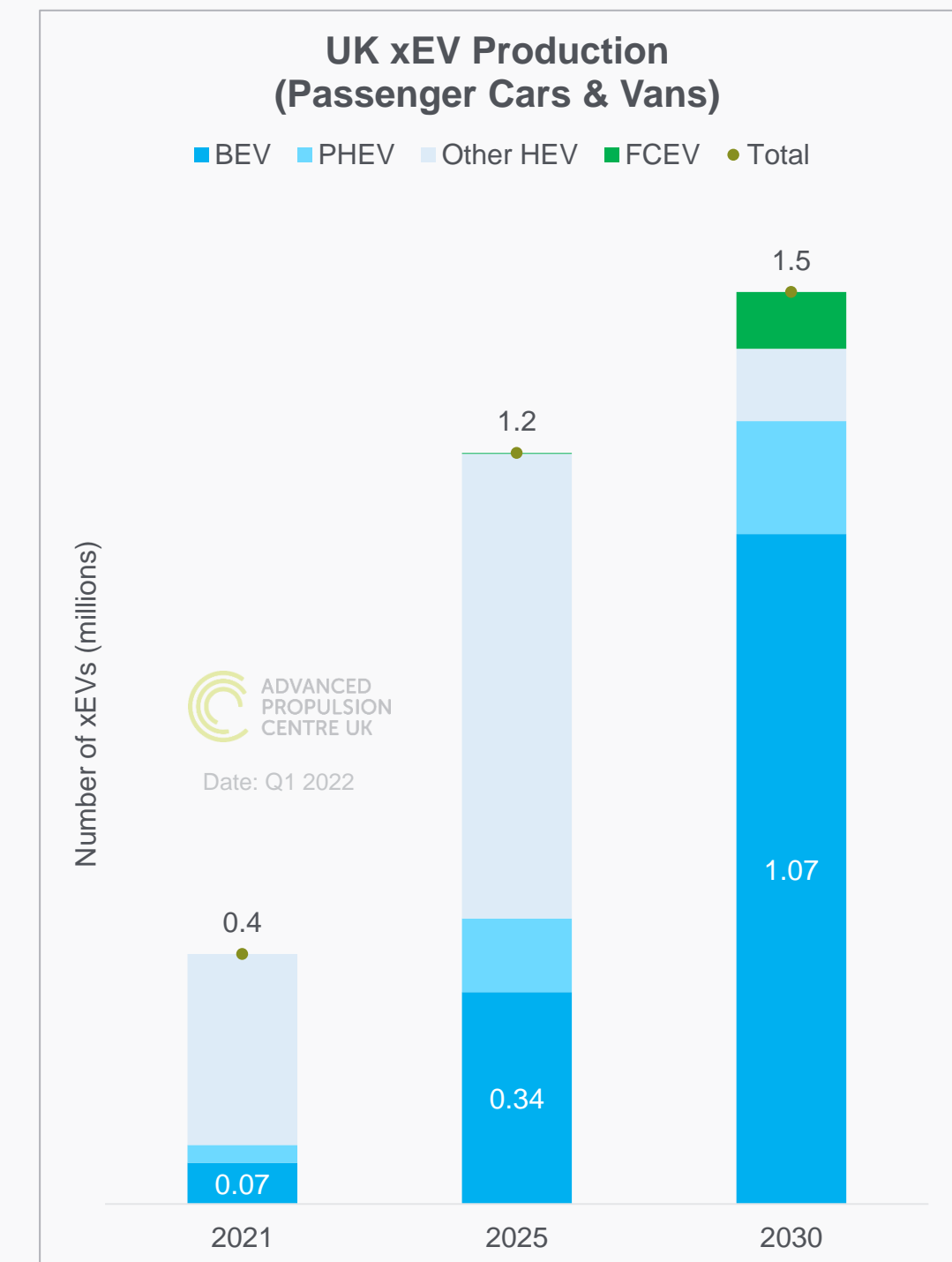
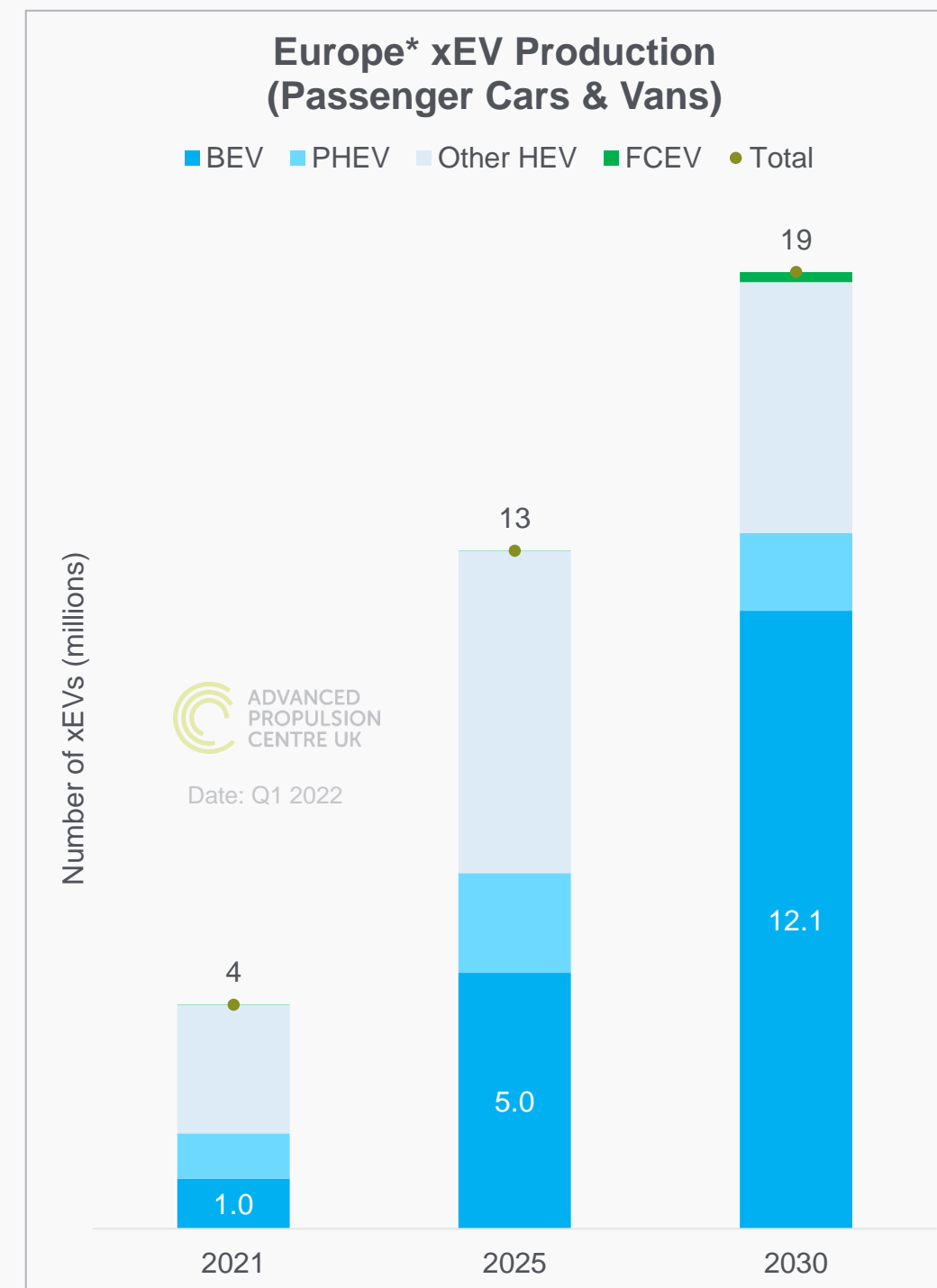
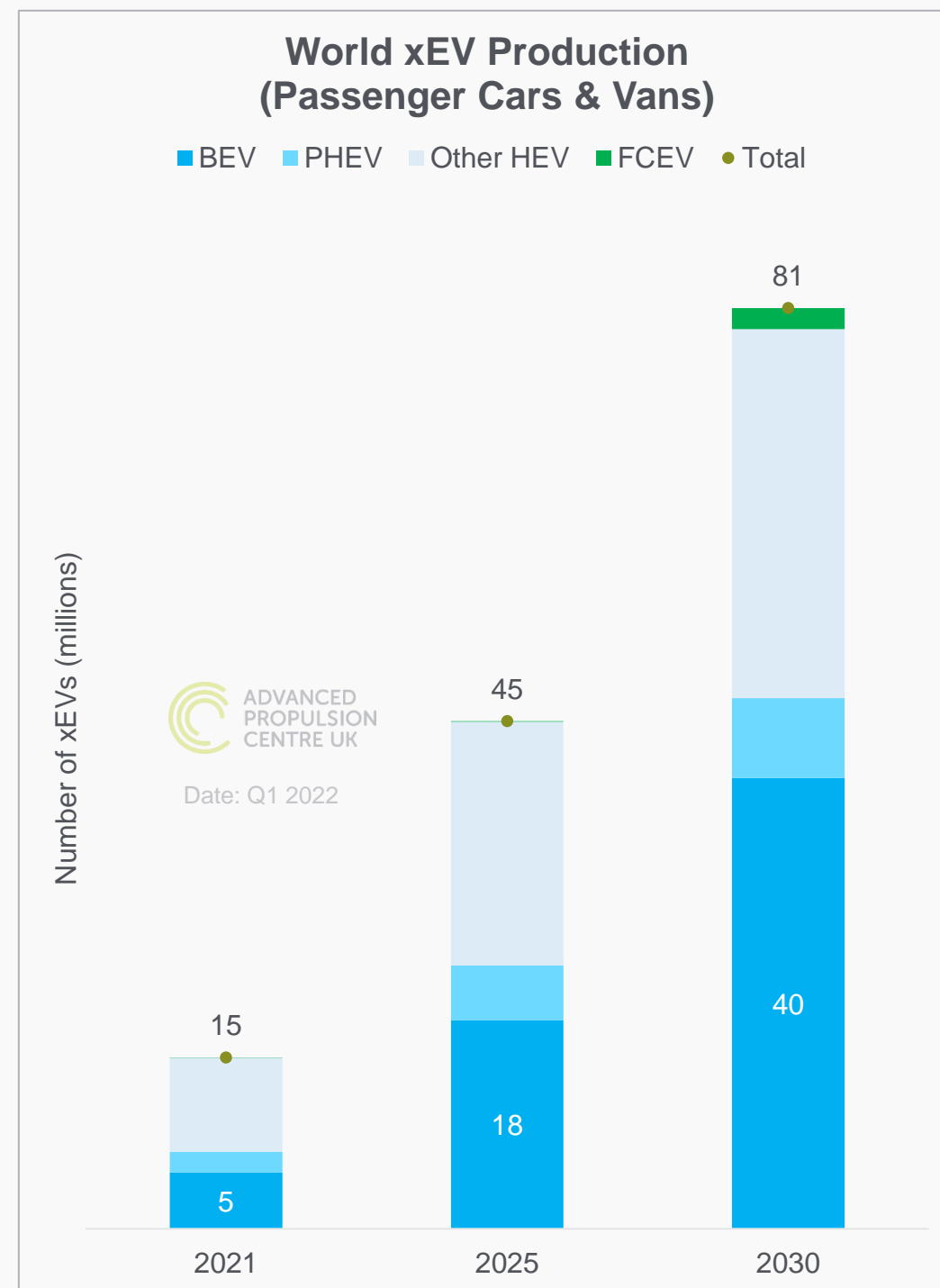
- Zero-emission vehicles (ZEVs) expected to dominate European and UK production by the end of the decade
- ICE-led powertrains still make up over 50% of global production by 2030



Forecasts for light duty xEV production

Q1 2022 notes

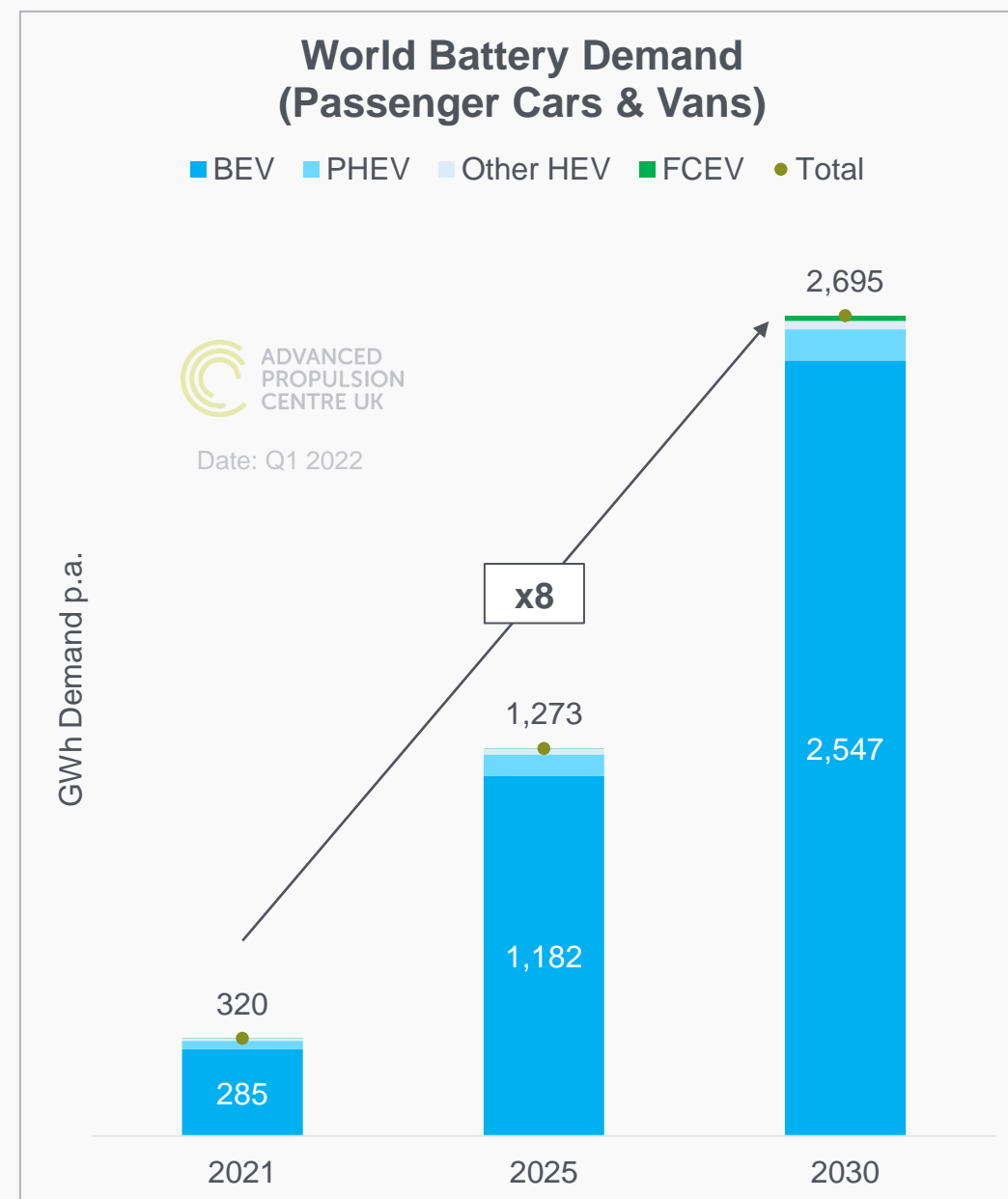
- BEV production in 2030 forecast to almost triple that of 2025 levels



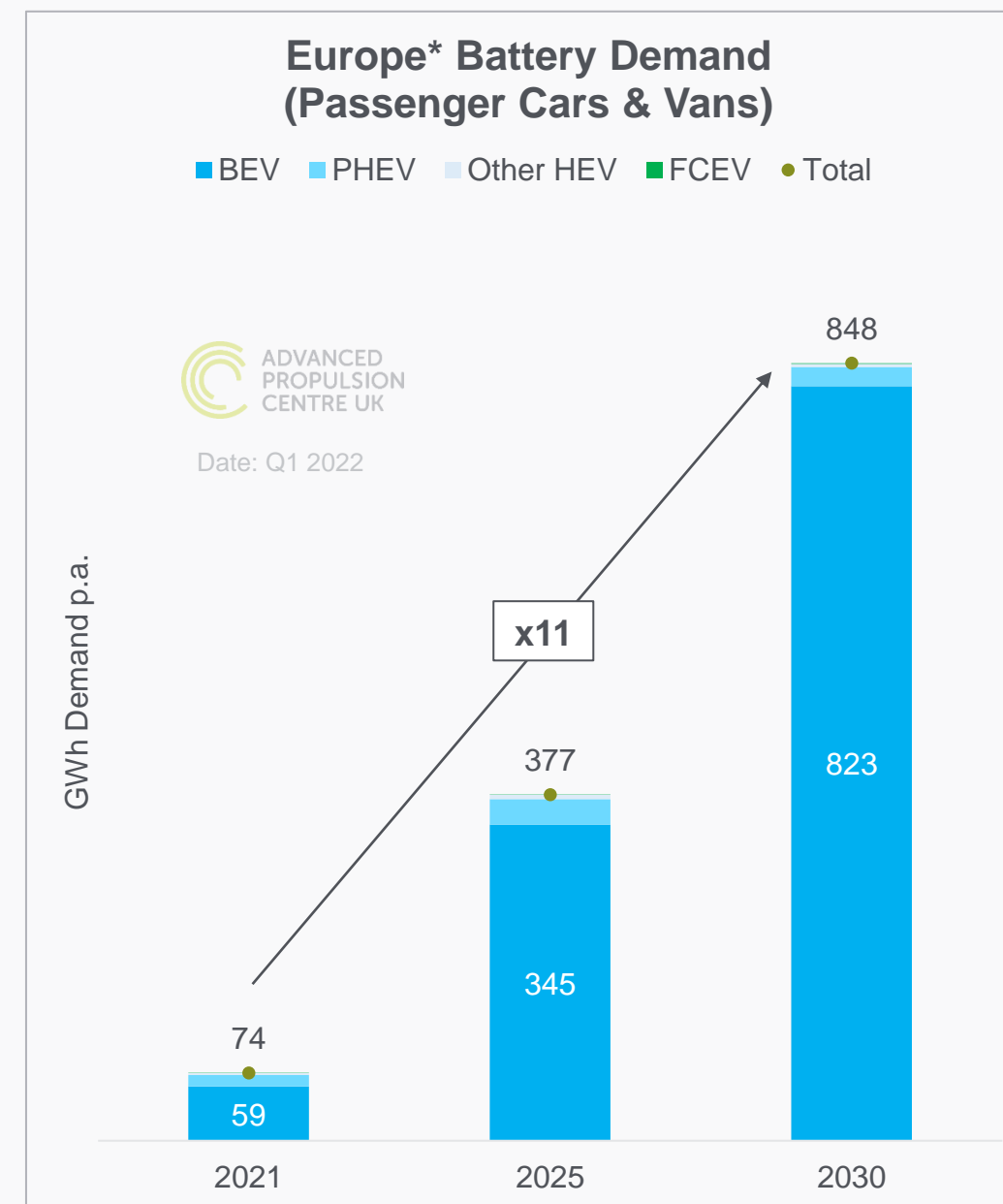
World battery demand for LDVs

Q1 2022 notes

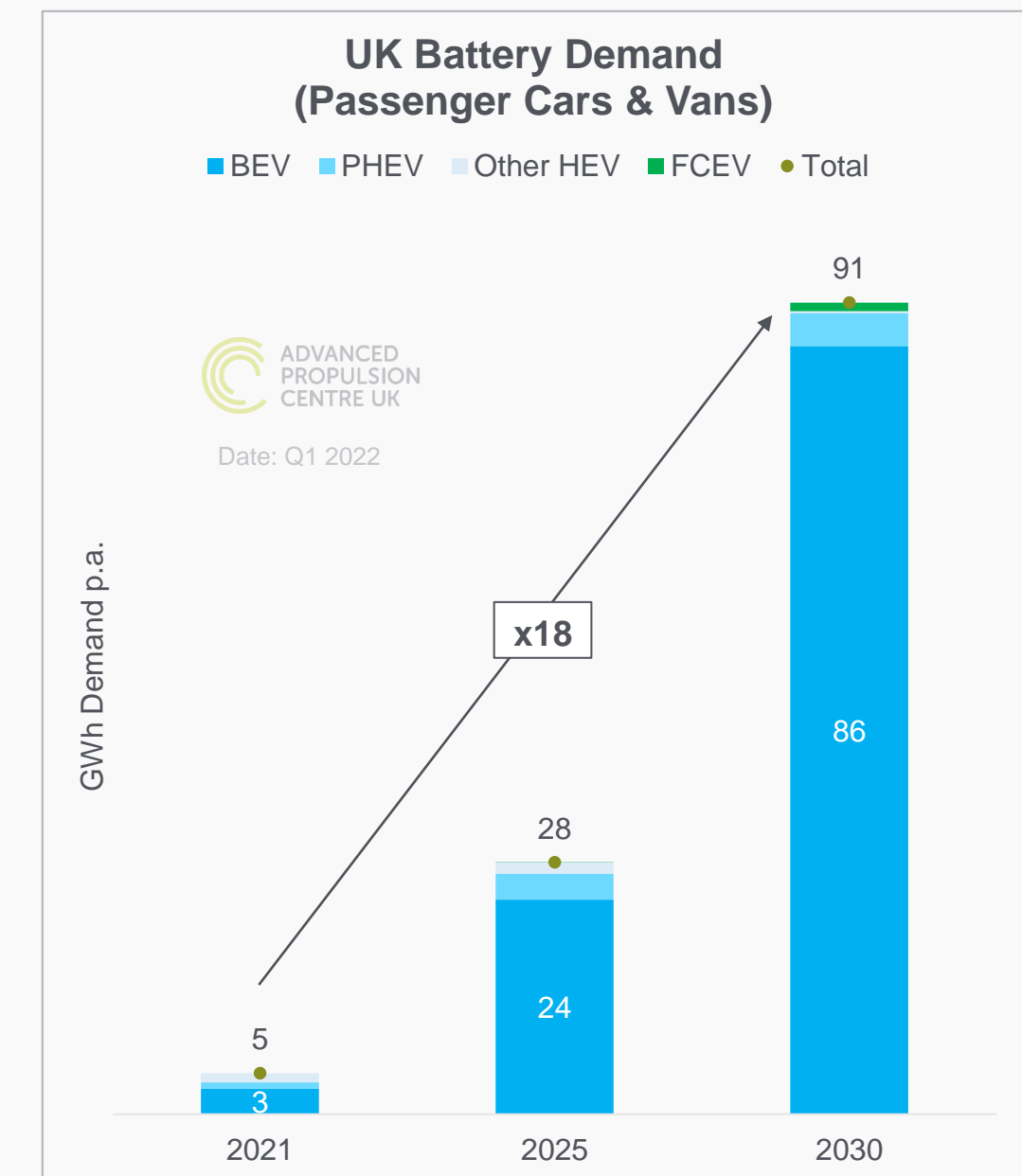
- World battery demand for LDVs to exceed 2,600 GWh by 2030
- 8x higher than demand in 2021
- Europe to account for ~30% of this demand.



- World battery demand for light duty xEVs is forecast to exceed **2,600 GWh by 2030**
- Relative to our previous forecast, we have seen a **78 GWh** uplift to our 2030 demand figure



- European demand from xEV production is forecast to account for **30%** of world battery demand in **2030**
- Relative to our previous forecast, the 2025 number has been revised upwards by **12 GWh**

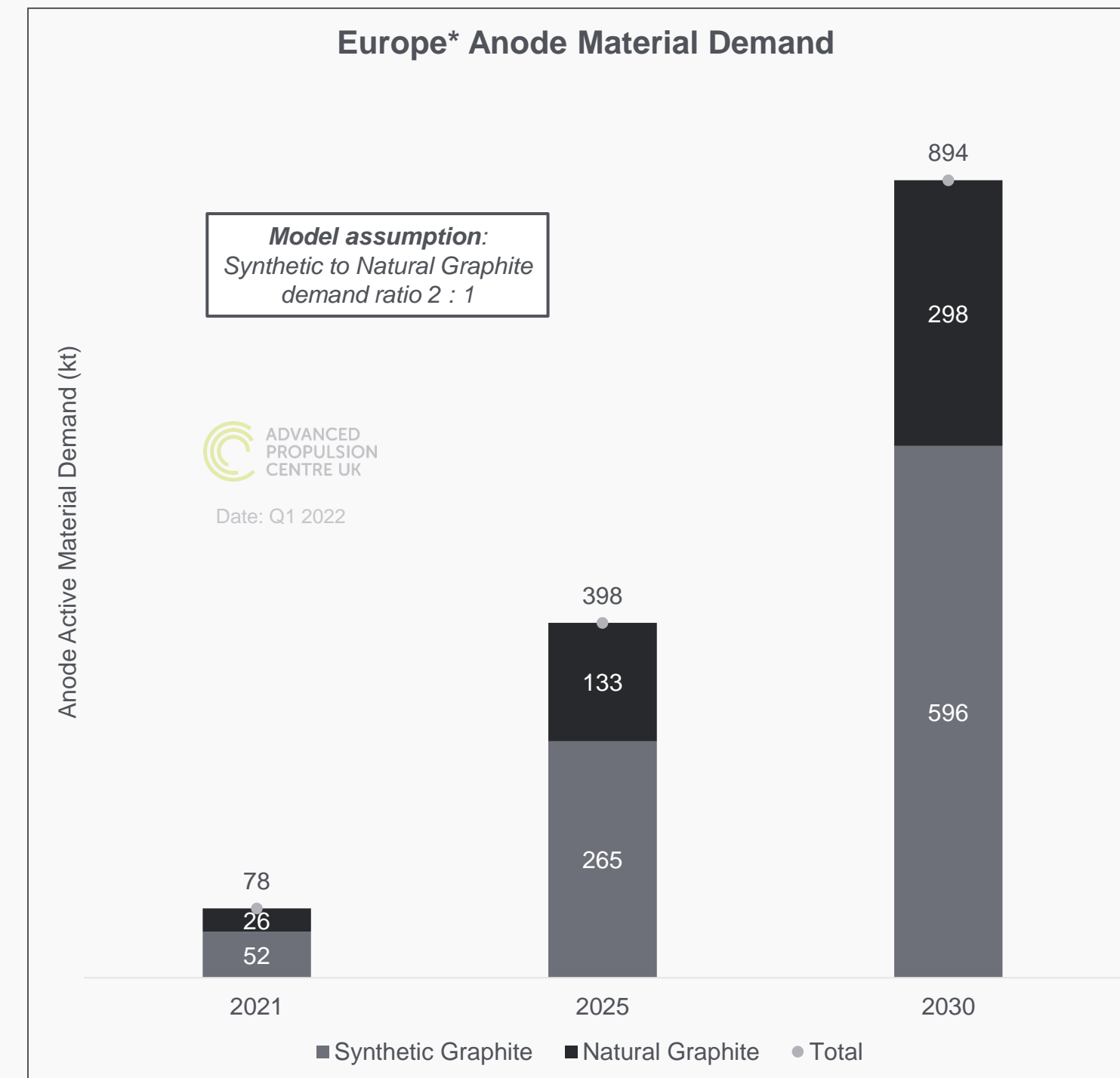
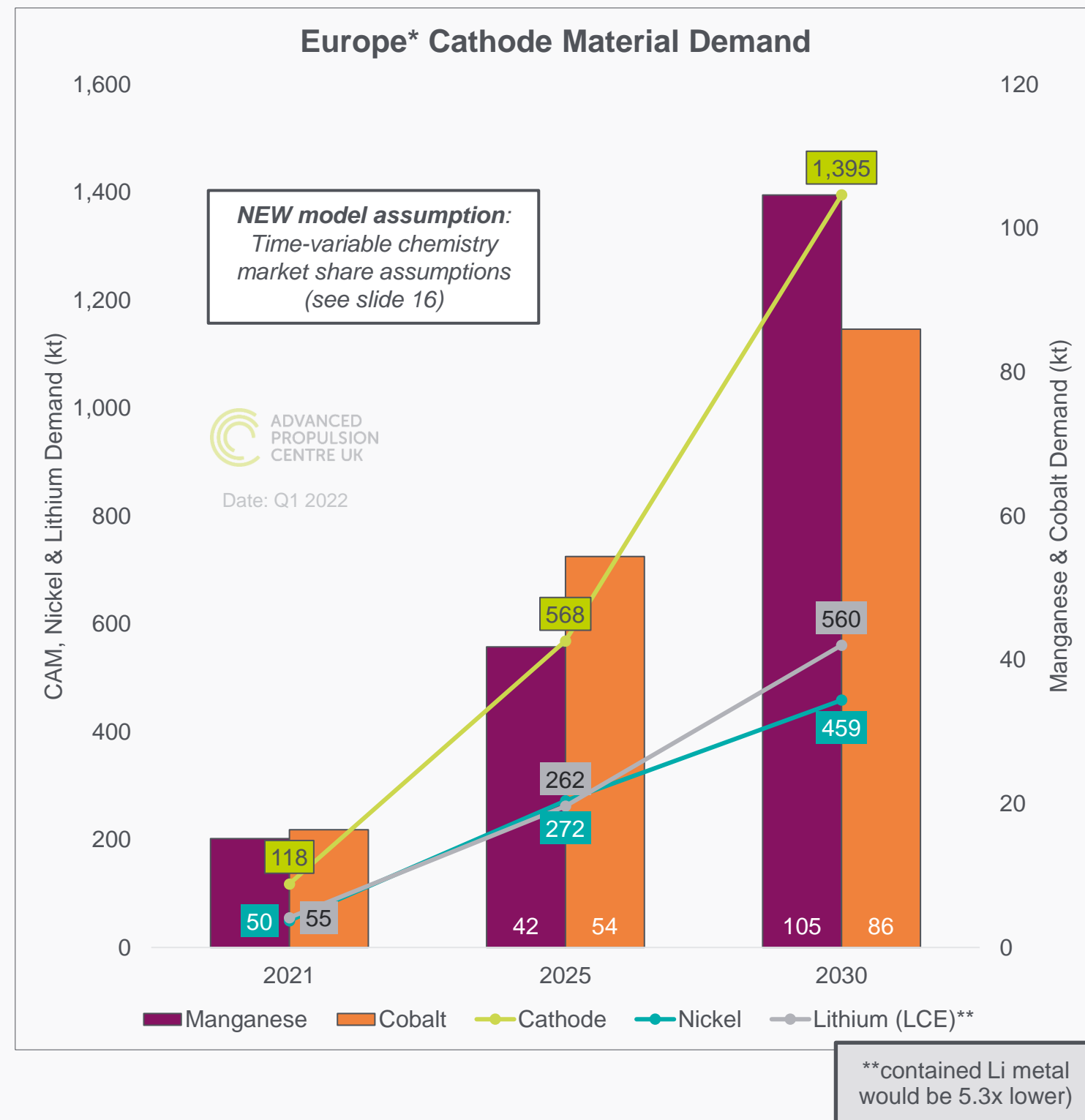


- UK battery demand forecast to account for **11%** of European battery demand in **2030**
- Forecast powertrain share for BEVs will more than double from 2025 to 2030, reaching **73% of LDV production by the end of the decade**

European Cathode Active Material (CAM) demand

Q1 2022 notes

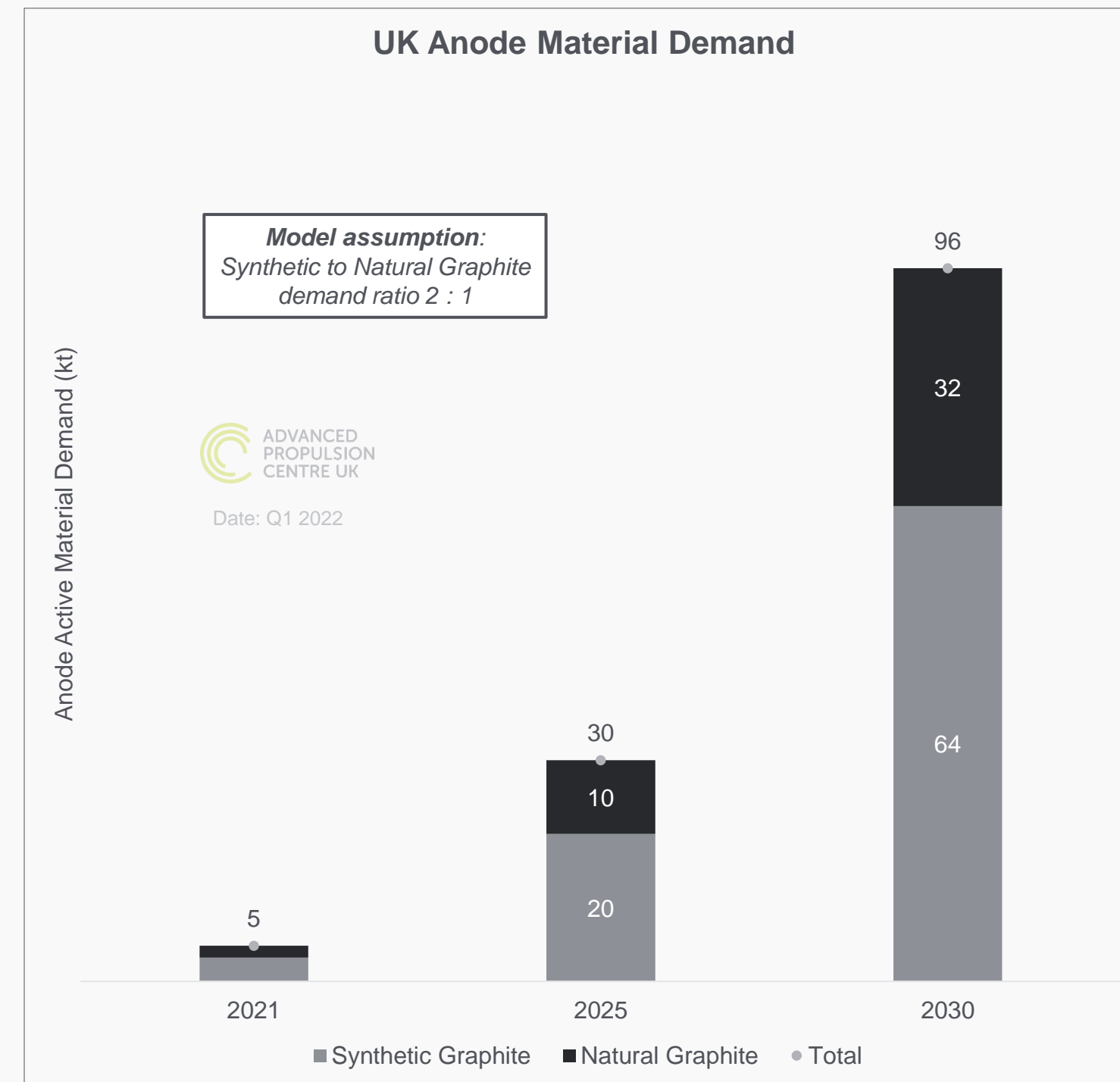
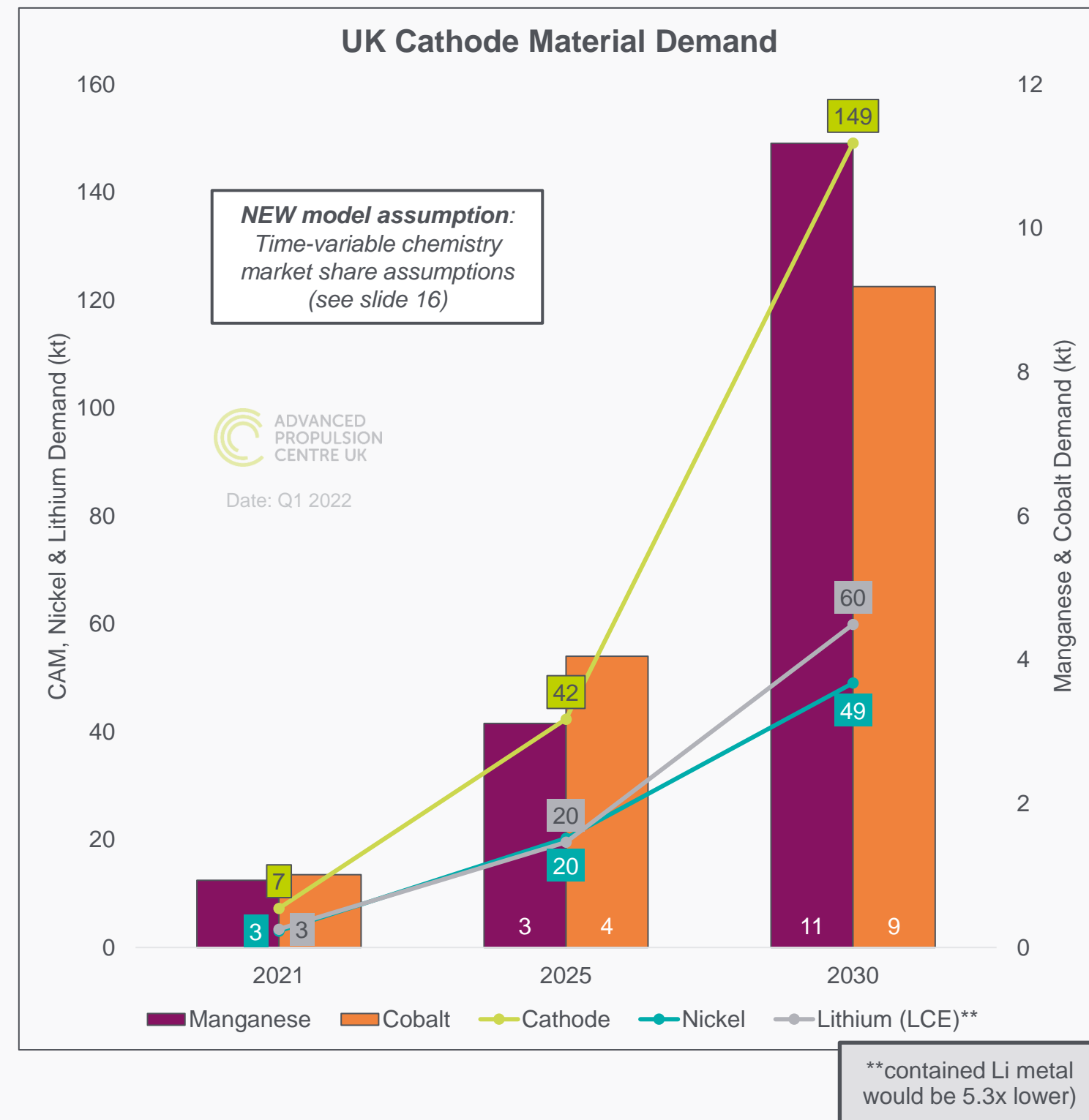
- European Cathode Active Material (CAM) demand for LDVs expected to surpass 500kt by 2025
- Demand increases fivefold from 2021 to 2030.



UK Cathode Active Material (CAM) demand

Q1 2022 notes

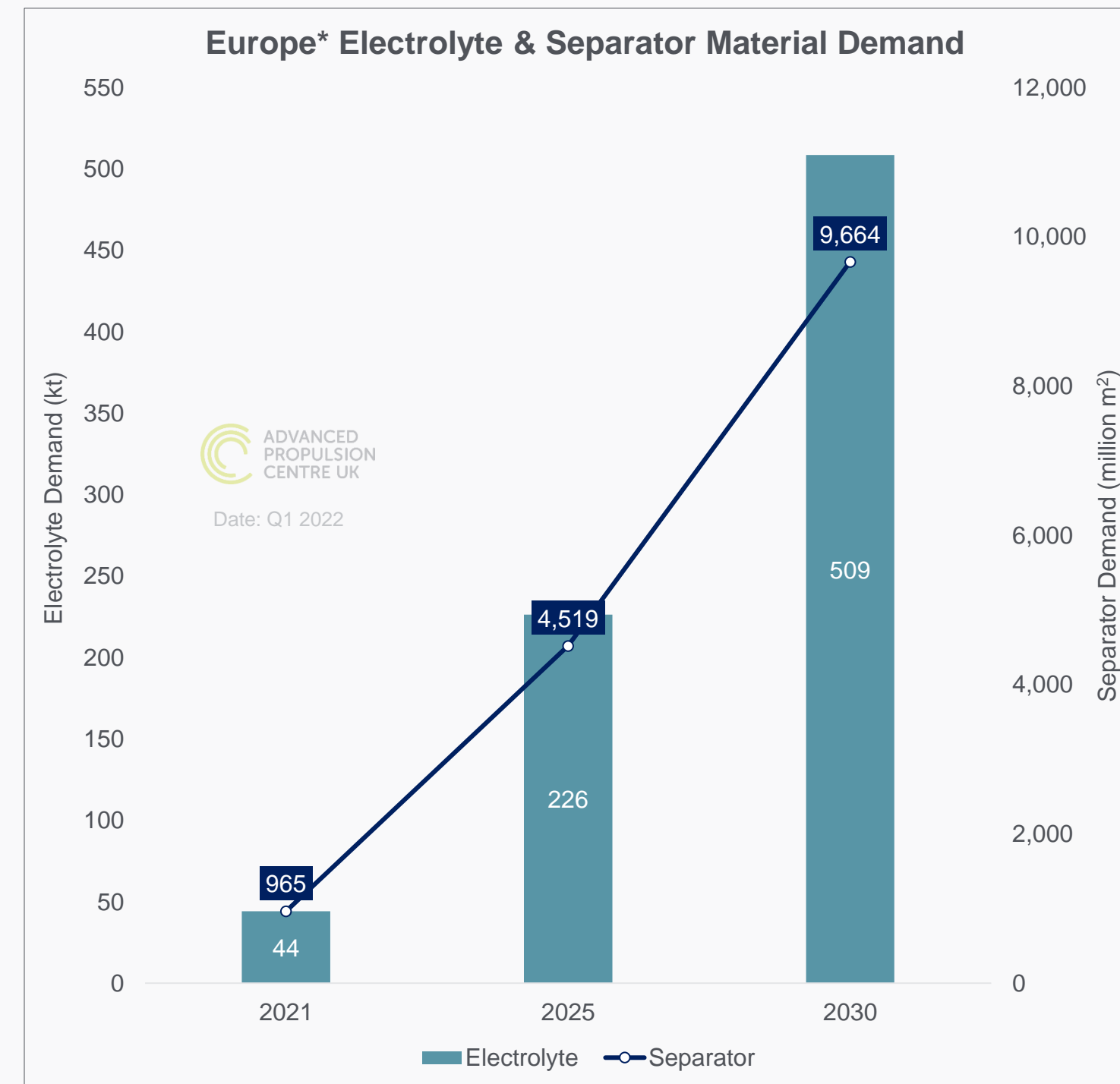
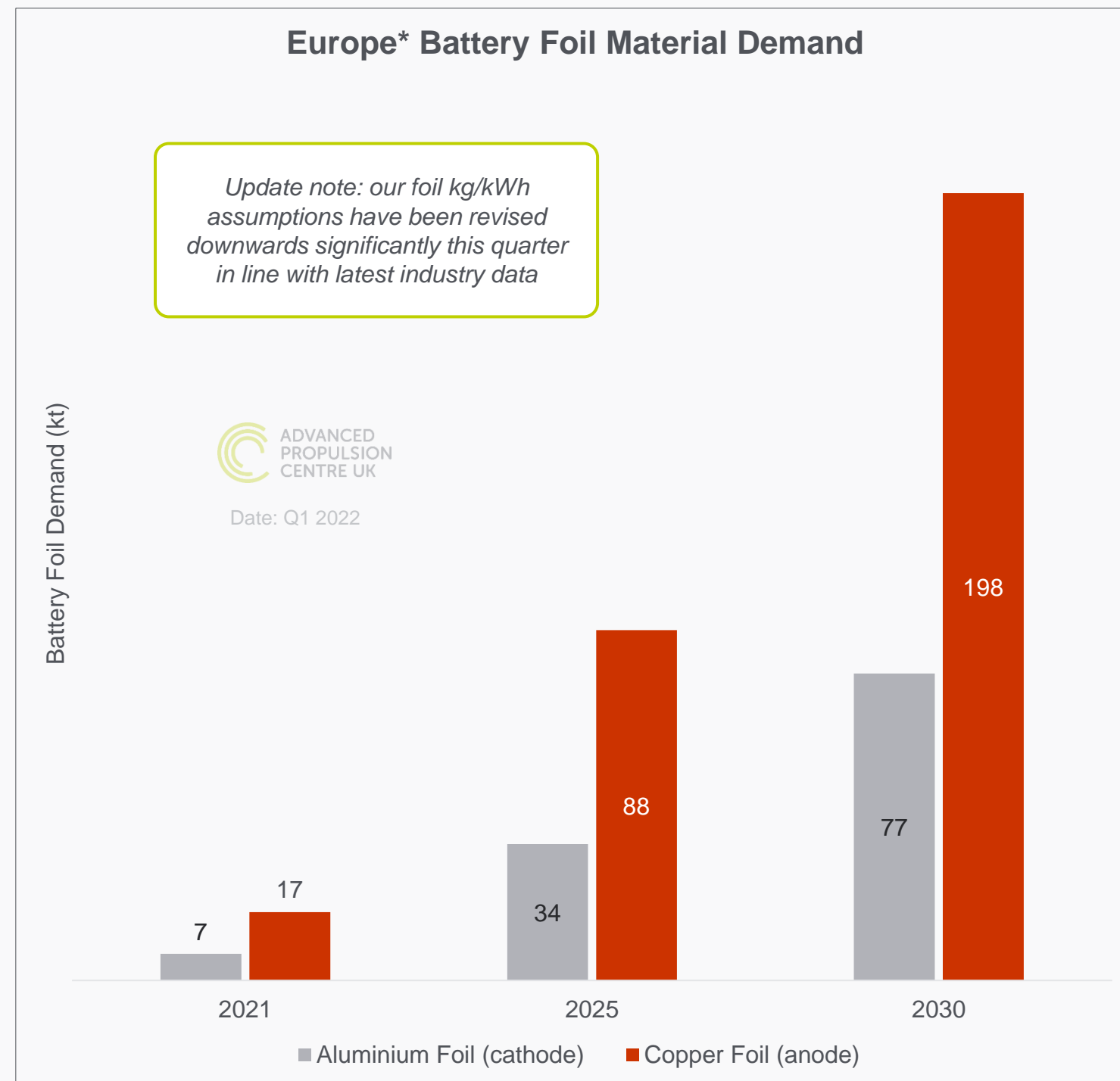
- UK Cathode Active Material (CAM) demand for LDVs expected to approach 150kt by 2030
- Big opportunity to localise at least 3 CAM plants in the UK.



European demand for battery foils, electrolyte and separator material

Q1 2022 notes

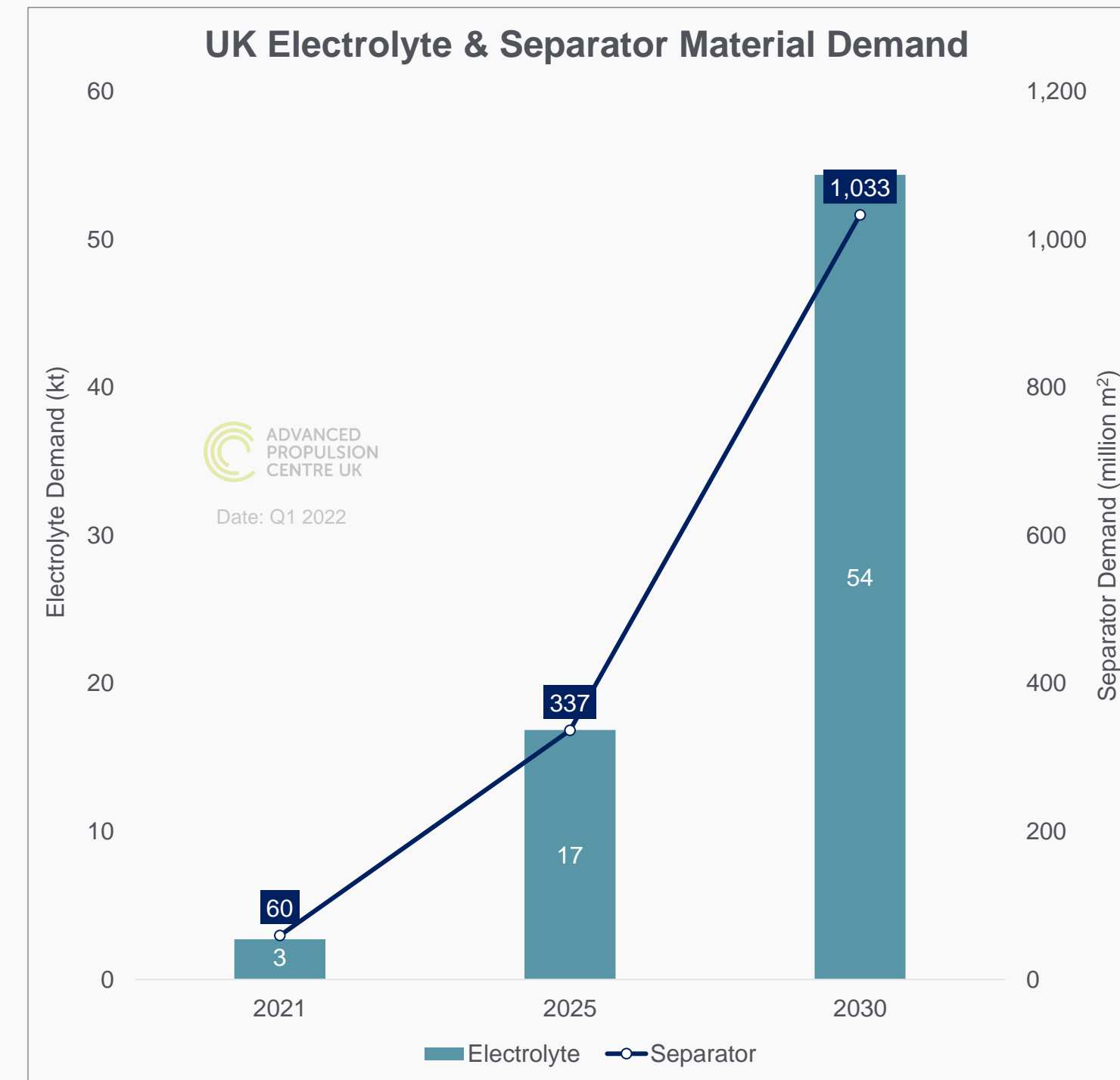
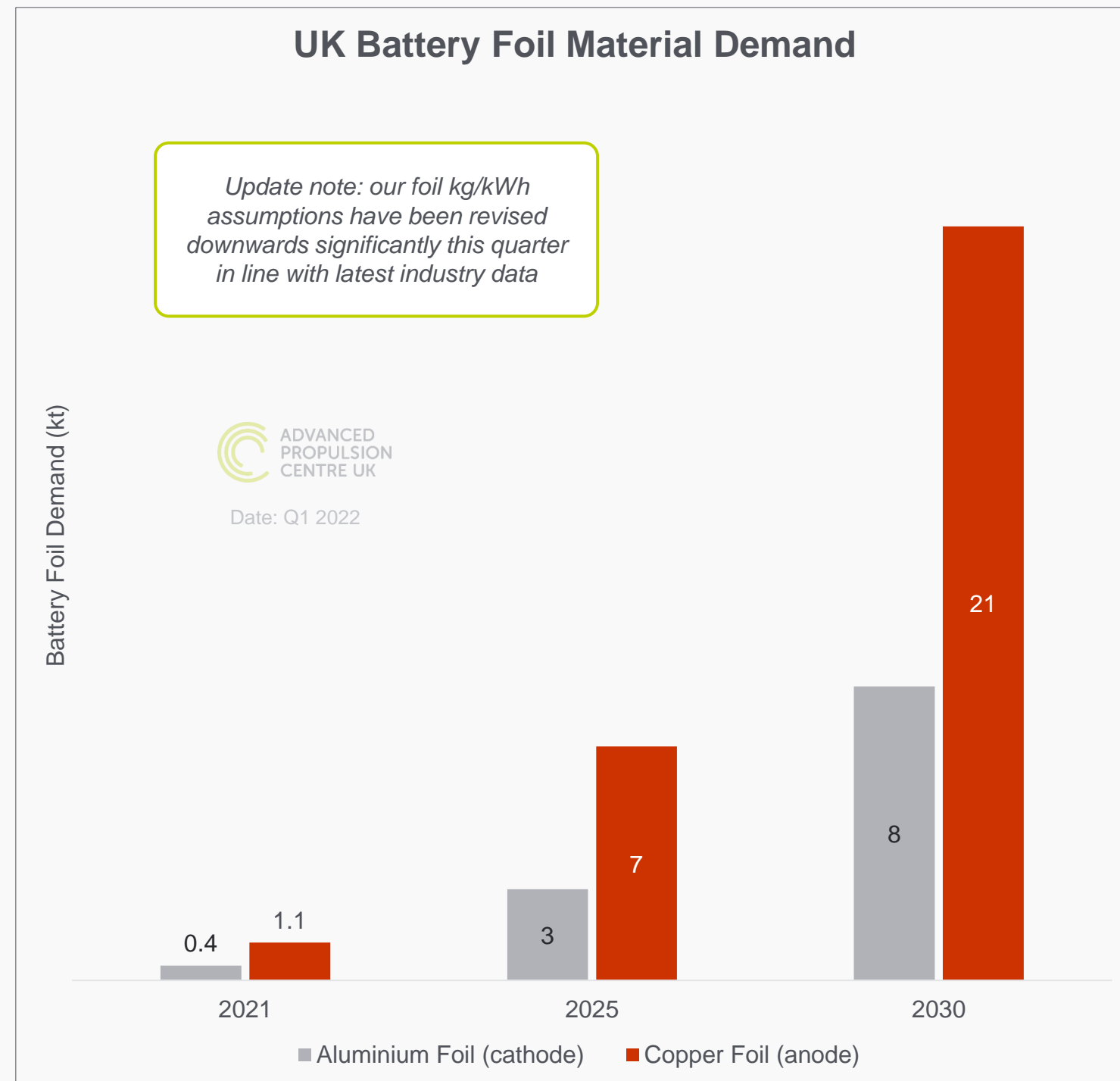
- European demand for battery foils expected to reach 120kt by 2025
- The drive to localise supply of electrolyte & separators will also intensify



UK demand for battery foils, electrolyte and separator material

Q1 2022 notes

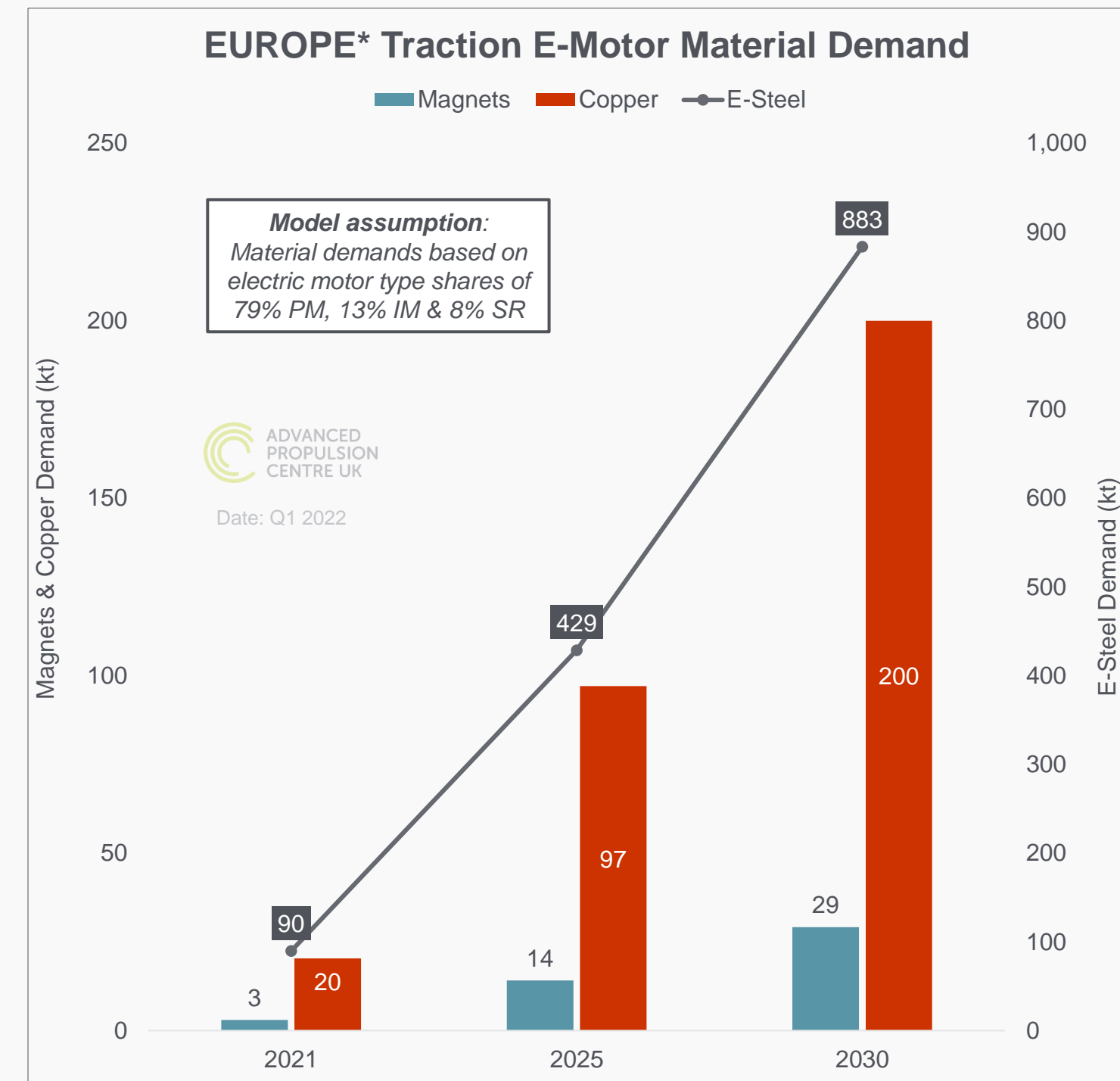
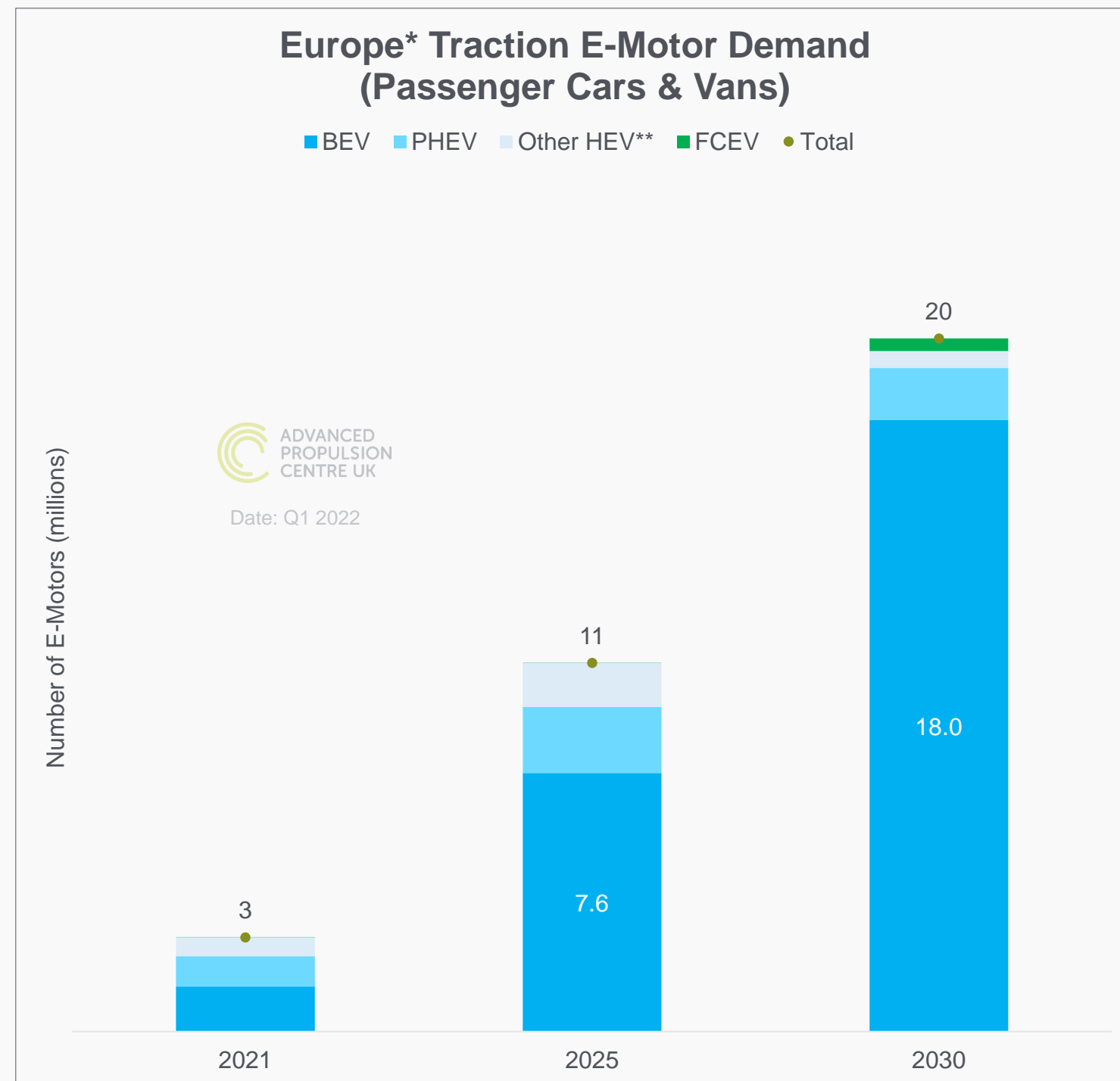
- UK demand for battery foils, electrolyte and separator material continues to grow and offers significant opportunities to localise supply



European demand for traction electric motors

Q1 2022 notes

- APC's latest forecast suggest that European demand for traction electric motors in light duty vehicles would be 7x higher in 2030 relative to 2021



UK demand for traction electric motors

Q1 2022 notes

- UK demand for traction electric motors expected to exceed 1.8 million units by 2030, providing an opportunity to transition the UK's ICE manufacturing plants

