ISSUE 31 / 11 NOV 2024

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POWER MATERIALS WEEKLY

ELECTION

TRUMP RETURNS: EVS, HYDROGEN AND GREEN GOALS ON EDGE

CRITICAL MINERALS

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HYDROGEN

CLEAN H2 OFFERS ASIA PACIFIC $630 BILLION MARKET OPPORTUNITY

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Trump returns: EVs, hydrogen and green goals on edge

By: Giulia Bottaro, UK

The clean tech space is gearing up for an uncertain future after former US president Donald Trump was re-elected. That's because Trump, who defeated Kamala Harris with 51% of the votes, has vowed to rescind any "unspent" funds under the Inflation Reduction Act (IRA), introduced by the Biden-Harris administration.

A change in political direction is likely to have negative consequences for the EV supply chain and the hydrogen industry. Having denounced the energy transition and general climate action as a "green new scam," Trump is expected to extend the life of fossil fuels in the country.

The Republicans now hold more power than ever with a trifecta, having won a majority in the Senate and the House of Representatives.

Many questions now surround the future of the IRA – Biden's $500 billion package to boost clean energy, reduce healthcare costs, and increase tax revenues.

The EV supply chain

As of July, IRA investments and tax credits had already spurred $177 billion of private-sector investment in EV and battery manufacturing, according to the US government.

Its complementary measure, the Bipartisan Infrastructure Law, allocated $7 billion for battery supply chains, $2.5 billion for charging and fuelling infrastructure for alternative fuels, and $1.7 billion to convert automotive factories to EV manufacturing and assembly.

Joe Biden aimed to achieve a 50% EV market penetration by 2030. This target, which was already likely to be missed, is expected to be further pushed back under a Trump government. EVs accounted for 18.7% of new sales in the second quarter of this year, according to official data, and the US market has recorded a slowdown in demand.

Yet, a Trump administration does not necessarily spell the end of the road. His policies may depend on Elon Musk's potential influence following the surprise endorsement earlier this year.

The Tesla co-founder and ceo emerged as a major supporter pledging millions not only to the Republican campaign, but also as giveaways to voters signing up a petition in favour of free speech and gun rights.

Trump, previously a fervent opponent of EVs, softened his stance during the campaign. "I'm for electric cars, I have to be because Elon endorsed me very strongly," he said in August, when he also stated he was "against everybody having an electric car."

Before Musk's support became visible, it was projected a new Trump administration would undo IRA's tax breaks on EVs, such as the $7,500 credit for buyers under Section 30D. Now, the expectation is around stricter requirements for vehicle components to be manufactured and assembled in America to qualify for the credit.

It is unlikely the whole IRA will be repealed or the money being disbursed will be clawed back. Many provisions for the EV supply chain primarily benefited Republican-led states, such as Michigan and the so-called Battery Belt – a group of Southeast states such as Georgia and Tennessee, traditionally a hub for automotive manufacturing. There may be bipartisan interest in keeping these investments alive, albeit in a new iteration.

"[The Trump administration] could put restrictions on things like the EV credits or slow down the allocation of the disbursement of the funds, or put other barriers up that would reduce the effectiveness of those programmes," David Reichmuth, senior engineer at the Union of Concerned Scientists (UCS), tells Kallanish.

Meanwhile, capital initially intended for clean tech that has not yet been allocated may be directed elsewhere – even fossil fuels. The most egregious example is the Department of Energy's (DOE) Loan Programs Office uncommitted money pool, which BloombergNEF estimates is as big as $200 billion.

According to William Tobin, assistant director at the think tank Atlantic Council, these undeployed funds may now be used to offset Trump's promised tax cuts. The Committee for a Responsible Federal Budget estimates Trump's campaign plan would increase national debt by $7.75 trillion. For example, individual income tax cuts under the Tax Cuts and Jobs Act (TCJA) are up for negotiation next year, and may be renewed or increased. The TCJA was signed into law in 2018, during the first Trump administration, to cut a range of levies, including on shareholders and taxpayers.

Trump returns: EVs, hydrogen and green goals on edge

"There are still a lot of people on the Republican side in the House of Representatives for whom fiscal responsibility is a priority, so I think they're going to try and find as many means as possible to offset the costs of extending the tax cuts in the TCJA," Tobin explains. "That's where some of these existing pools of money might be vulnerable."

Overall, Trump has promised to help the domestic automotive industry by waging war on EVs. Yet, the global move to electrification requires US carmakers to keep up.

"We need to be competitive in the EV supply chain to have a globally competitive automotive industry, and I think there are a lot of Republican advisors who are of the same mind, so I hope that cooler heads will prevail," adds Tobin.

A stronger risk factor for US automakers will be a reduction in consumer spending power. According to the Peterson Institute for International Economics, Trump's proposed import tariffs – a general 20% levy and a 60% duty on Chinese imports – would cost a typical US household in the middle of the income distribution over $2,600 a year. The tariffs announced so far have attracted mixed reactions. For example, graphite producers who stand to benefit from more expensive Chinese imports have welcomed them; meanwhile, the cross-industry Americans for Free Trade coalition has warned it will raise costs for companies and consumers alike.

Hydrogen

The situation may be similar for the hydrogen industry. Support may not cease completely, but is likely to change direction in favour of blue or grey hydrogen, rather than green.

Biden bet on hydrogen to support the decarbonisation of the economy. Under the US National Clean Hydrogen Strategy and Roadmap, the DOE is deploying $9.5 billion for clean hydrogen – although the definition of what constitutes "clean" hydrogen is yet to be determined under the Section 45V guidance, which will be released by year-end.

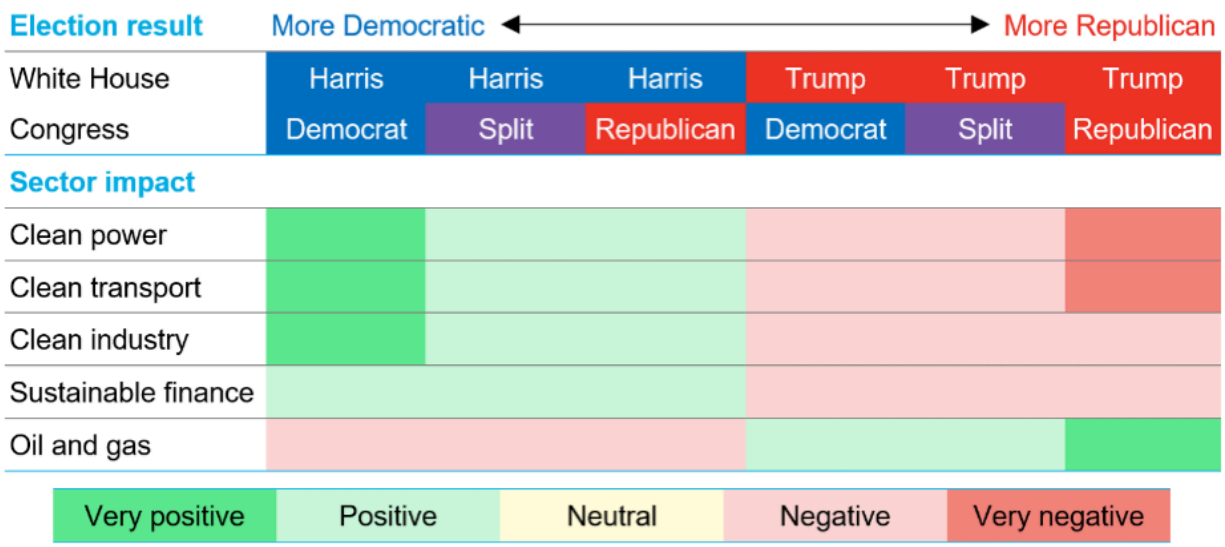
It is unclear what the Trump administration will do with the seven regional hydrogen hubs across the country that are receiving $7 billion from the DOE, an initiative estimated to spur $40 billion in private investment and support over 334,000 direct jobs. The ultimate goal has been to lower the hydrogen price to $1/kilogramme, which is estimated to boost the use of hydrogen by at least five times, eventually cutting 10% of US greenhouse gas emissions by mid-century. Again, this may be deprioritised.

Julie McNamara, deputy policy director at the UCS, says there is still a future for hydrogen, though it will probably scale up much more slowly. As industries such as steel and heavy transport strive to decarbonise, they will drive demand for hydrogen.

"We are seeing in those companies that are interested in doing international business, actually selling the commodities that are decarbonised because of use of clean hydrogen… They're not interested in dirty hydrogen," says McNamara.

"Any company that is interested in doing business internationally can't fake the math, emissions are emissions and when other countries count them, they'll still be there, even if the US attempts policies to ignore them."

IMPACT OF POSSIBLE ELECTION OUTCOMES ON CLIMATE-RELATED SECTORS' BUSINESS PROSPECTS



SOURCE: BLOOMBERGNEF

Trump returns: EVs, hydrogen and green goals on edge

In this scenario, it is in the best interest of US companies that Washington implements emissions requirements that are aligned with the rest of the world, ensuring that clean hydrogen in the US is considered clean everywhere else to avoid penalising exports.

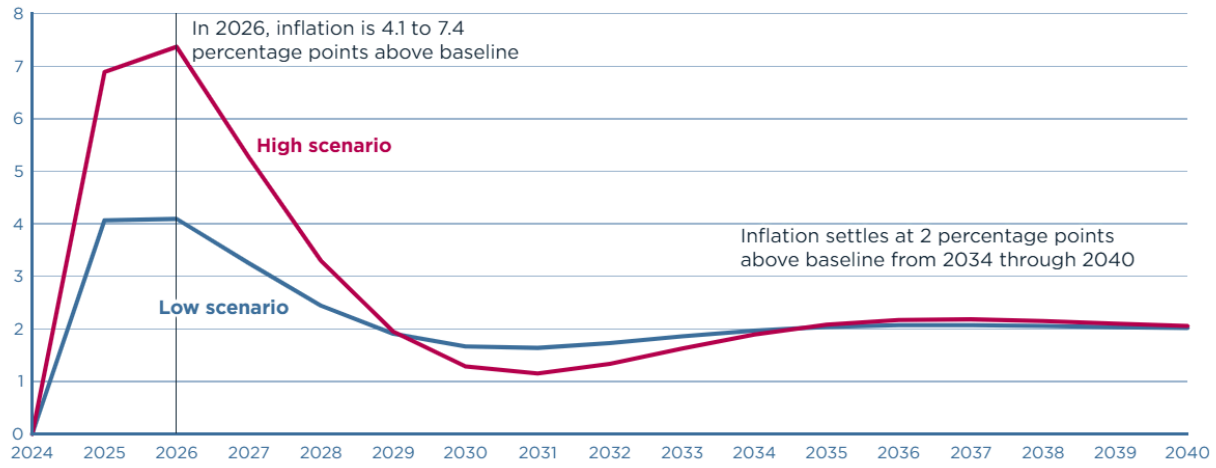
Reichmuth also points out that individual states, such as California, have their own emissions regulations and requirements for zero-emission vehicles, which are expected to continue driving demand for EVs and hydrogen. EVs accounted for 39% of the state's new sales in the first nine months of 2024, according to the California New Car Dealer Association.

"We saw, during the first Trump administration, some automakers looking to enter into voluntary agreements with California and other states to have certainty, because it's very difficult for them to deal with policies that may change every four years or even on a shorter time frame," Reichmuth notes.

Regardless of rhetoric around climate action, it is clear that there are money and jobs on the line when it comes to investing in the clean energy transition, points McNamara. "That's why I think we continue to see policymakers from both sides of the aisle stating that the IRA has proven popular and, we expect, largely durable," she says.

"Now, there are components that are at real risk, and that's really concerning, because we can't just have a few pieces. We need a whole of economy transition to meet the climate targets that are so critical," McNamara concludes. "One of the greatest concerns of this moment is that there will be this window of opportunity for those solely looking out for their profit, especially from polluting industries… but that does not have to be where we end up."

PROJECTED INFLATION CHANGE BASED ON TRUMP'S ASSUMED ECONOMIC POLICIES CHANGE FROM BASELINE UNDER TWO SCENARIOS, 2025-40



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India's minerals crunch may threaten its green ambitions

By: Reethu Ravi, UK

India has set some ambitious energy transition goals, including achieving 500 gigawatts (GW) of renewable energy capacity and 30% electric vehicle penetration by 2030. Manufacturing the clean technology equipment for these requires huge amounts of critical minerals, which the South Asian nation has a limited supply of. As a result, the country has long been relying on imports – from a small group of countries – to meet its demands.

This "excessive" import dependency is unlikely to change anytime soon, according to a recent report by the Institute for Energy Economics and Financial Analysis (IEEFA).

The country's demand for critical minerals is set to more than double by 2030, as domestic mines will take more than a decade to start producing, IEEFA says, citing the International Energy Agency. Currently, India is highly dependent on the imports of natural and synthetic graphite, lithium oxide, nickel oxide, copper cathodes, nickel sulphate, cobalt oxide, and copper ores and concentrates. For minerals like lithium, cobalt and nickel, the import dependency is 100%, leading to "significant economic and strategic risks."

A key issue arises because some of these raw materials are imported from countries with high geopolitical risks, including Russia, Madagascar, Indonesia, Peru and China.

As a result, the report warns India should "carefully craft" its import strategy to avoid supply chain risks, whilst simultaneously balancing international ties. The strategy should focus on sourcing each mineral efficiently with minimal disruptions, it adds.

"India should strive to de-risk its critical minerals sourcing by identifying new international resources and expediting domestic production," comments Charith Konda, energy specialist at IEEFA. "A concerted effort to partner with and foster bilateral relations with mineral-rich nations should be a priority for India."

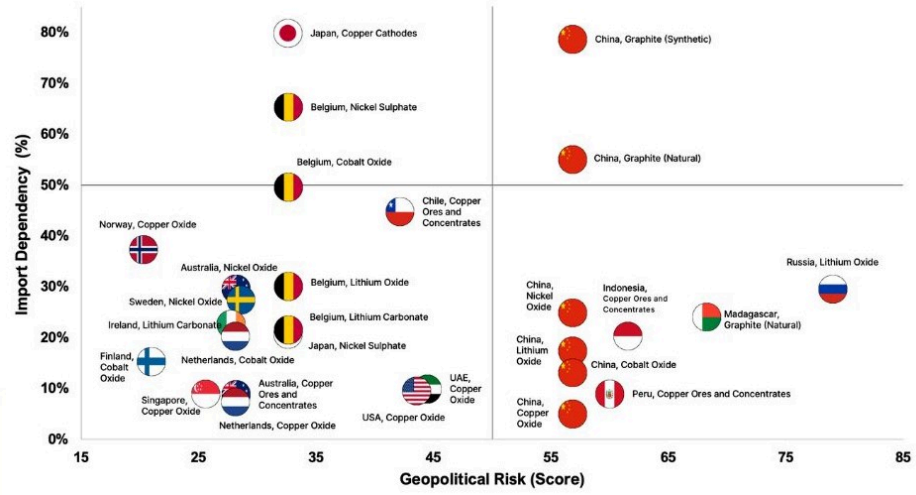
A paper released early this year by global research nonprofit, World Resources Institute (WRI), also highlighted these issues: "Domestic scarcity coupled with extreme import dependency creates a supply risk that could disrupt domestic CET [clean energy technology] value chains. Supply-side disruptions, such as trade wars, geopolitical risks, adverse weather events, and labour shortages, impact the prices of minerals, which would have a multiplier effect on CET prices."

Such supply chain disruption and price volatility, WRI cautions, challenges India's energy security in the clean energy sector.

Even if India has domestic reserves for some of these minerals, their production is often slow and in insufficient quantities due to a lack of private investment, inadequate technology development, and an insufficient regulatory environment for mineral mining and processing.

According to IEEFA, although India has around 44.91 million tonnes of cobalt ore resources, it has no production or refining capacity. The country imports cobalt oxides and hydroxides mostly from European countries, such as Belgium, Finland, Italy, France, Germany and the Netherlands, as well as China. Since China accounts for over 70% of

INDIA'S CRITICAL MINERALS IMPORT DEPENDENCY VS. GEOPOLITICAL RISK



SOURCE: IEEFA

India's minerals crunch may threaten its green ambitions

the world's cobalt processing and refining, the global cobalt market is highly susceptible to disruptions.

India meets its copper needs through a combination of imports, domestic production and scrap recycling. It is reliant on the US, Singapore, Norway, Germany and China for its copper oxides and hydroxides sourcing, while Japan delivers the majority of copper cathode imports. With the US being the fifth largest producer of copper, the country could be another source of copper cathode for India.

"Though top trade partners for copper oxides and hydroxides are relatively low risk, India's imports need further diversification," IEEFA says.

In terms of graphite, 60% of India's consumption is met through imports, with over 50% coming from China – both natural and synthetic materials.

"Mozambique, Madagascar, Brazil, and Tanzania are some countries with the highest graphite production. As part of the Global South cooperation initiatives, these countries could be favourable partners for India for graphite trading," says Kaira Rakheja, energy analyst at IEEFA.

In the case of lithium, India has no production of the mineral. Its lithium reserves are largely unknown, although a large reserve was discovered early last year in Jammu and Kashmir. To meet its lithium demand, India imported lithium carbonate mainly from Ireland, Belgium, the Netherlands, Argentina and China between April and December last year. During this period, Belgium and Russia accounted for most of the lithium oxide and hydroxide imports to the country.

"A concerted effort to partner with and foster bilateral relations with other lithium-rich nations should also be a priority for India," the report adds. "Enhancing trade with other countries of the global South could prove to be a mutually beneficial relationship."

While companies such as Hindustan Copper Limited and Nicomet Industries produce nickel in India, production is not significant and demand to date is met exclusively through imports.

China, Sweden, the US, France, Japan, Singapore, Malaysia, the Philippines and Belgium are India's key nickel import partners. However, over 85% of India's imports of nickel sulphate – which is crucial for manufacturing high-nickel cathode materials for lithium-ion batteries – comes from just two countries: Belgium and Japan.

Consequently, the Indian government is actively working on strengthening domestic production. Finance minister Nirmala Sitharaman announced earlier this year a strategy to secure critical minerals.

"We will set up a Critical Mineral Mission for domestic production, recycling of critical minerals, and overseas acquisition of critical mineral assets," she said. "Its mandate will include technology development, skilled workforce, extended producer responsibility framework, and a suitable financing mechanism."

Last year, the Indian parliament passed the Mines and Mineral (Development and Regulation) Amendment Bill, 2023, to incentivise private companies to explore and mine lithium and other minerals in the country. As such, the government auctioned 20 mineral blocks, including nickel, lithium and graphite last November. Three more tranches followed, with the fourth being in June this year.

"The critical minerals mining block auctions can serve as an opportunity for India to focus on building refining and processing capabilities to emerge as a global value-adding hub," notes IEEFA's energy analyst, Kaira Rakheja.

However, the auctions failed to garner much attention, with the government having to cancel the auctioning of the majority of the blocks. For these auctions to move forward, IEEFA notes, further government support is needed to make them more attractive, particularly to major players.

"Government support in the form of viability gap funding and technology development will help promote such auctions and ultimately the domestic production of critical minerals," explains Konda. "A stable supply of critical minerals is imperative for India to achieve its renewable energy goals."

While there have been some efforts from the government, the nation's regulatory landscape for promoting domestic exploration, extraction, and processing of critical minerals remains "inadequate and fragmented," WRI notes. India's policies related to critical minerals have not evolved at the same pace as those related to the energy transition.

"It is necessary to minimise the gap in policies between the two areas to provide an enabling and coherent environment for adequate investment in the domestic critical minerals sector," the paper explains. "Recent developments in the policy-regulatory space for critical minerals aim to fill some of these gaps, but a more nuanced approach is needed to determine the minerals that should be prioritised for energy transition technologies."

In addition, WRI highlights mitigating the socio-environmental impacts of mineral mining will also be important for increasing domestic production. Without this, "the trust of local communities will be lost, resulting in project delays and cost overruns." "Social licences to operate must be given the same importance as environmental licenses and legal approvals for the development of mineral resources," the paper concludes.

Clean H2 offers Asia Pacific $630 billion market opportunity

By: Kallanish Asia

The adoption of clean hydrogen is crucial for the timely achievement of the net zero target by 2050. In Asia Pacific, the window of opportunity to galvanise a clean H2 economy is rapidly closing.

That's the view of analysts at Deloitte in a new report analysing the hydrogen market of major Asia Pacific countries. The report warns the increasing gap in the region between clean hydrogen's policy targets and committed market activity due to limited bankable demand, and few realised positive final investment decisions (FIDs).

"Key hurdles include economically viable pricing and pricing models, mutually agreeable risk allocation frameworks, and high integrity carbon certification," it points out.

Huge potential

Despite the typical headwinds, analysts believe there is a huge potential for clean hydrogen in the region. The market could reach a value of $630 billion per year, accounting for a 50% global market share. Such achievement depends on whether the $3.2 trillion investments needed in clean hydrogen value chain development for Asia Pacific will be in place and allocated wisely over the next 25 years.

China and India are to dominate hydrogen demand in the Asia Pacific throughout 2030-2050. Deloitte's data shows that for 2030, China needs 39 million tonnes of hydrogen, accounting for about 58% of total hydrogen demand in this region for the same timeframe. India's demand is forecast to be the second largest at 14m t, accounting for a 21% market share.

Together, the two economies are projected to take almost 80% of demand in this region, with the majority of their demand (90% for China) met by domestic supply. However, since their demand volumes are high, they will still need to rely on imports.

In 2050, the value of the hydrogen market in China and India is projected to be about $225 billion and $210 billion, respectively, according to the report.

In comparison, for Japan and South Korea, the combined hydrogen demand accounts for around 10% of the region's total, with the vast majority met by imports. The Japanese and South Korean markets could account for $43 billion per year in consumption by 2030, rising to $64 billion by 2050.

Across Asia Pacific, industrial demand for hydrogen is expected to reach 67m t in 2030, and 235m t in 2050 to achieve net zero. End-users are mainly in sectors such as steelmaking, industrial chemicals, aviation, shipping, and power generation.

"Widespread adoption of clean hydrogen will cause significant downward pressure on prices," the analysts claim in the report. Delivered prices are expected to more than halve between 2030 and 2050 in Japan and South Korea, they explain.

Import needs

Due to domestic production challenges, the region will need to import 18m t of hydrogen and derivatives by 2030 to meet net-zero goals. The volume will increase to 53m t in 2050, reaching $145 billion in annual cross-border related trade, Deloitte estimates.

Then, hydrogen use as a fuel source and reactant will account for 45% or 24.1m t of the imported volumes, likely traded as ammonia. Application as e-fuel for aviation, for example, is set to take another 30% share or 14.9m t of the estimated imports. Ammonia, to serve the chemicals and shipping industries, will account for around 20% or 11.2m t of such trade. The remaining 5% or 2.7m t will come from methanol use in seaborne demand.

The analysts predict that the top three importers in the region will be India (18.9m t), Japan (11.2m t) and South Korea (10.7m t).

"Inter-regional trade – primarily supplied by Australia and Southeast Asia – is well positioned to meet around a quarter of Asia Pacific's import needs," they add. However, suppliers from other regions could offer competitively priced products. Some of the world's top hydrogen exporters are said to be North America (13.4m t), North Africa (13.4m t), and Australia (13.2m t).

"At the company level, Asia Pacific importers will need to hedge via a derisked portfolio of suppliers across continents. At the national level, importing governments will need to intensify economic, political, and social cooperation across bilateral and regional channels," they suggest.

With so-called hydrogen corridors remaining in their infancy, Deloitte highlights five key factors to ensure their success. These are geopolitical stability to provide confidence for over 30 years of project life and 15-year offtake contracts; streamlined processes for foreign direct investments; bilateral vertical integration across supply chain levels; exchange of skills and intellectual property; and cross-border trade governance providing clear facilitation in bilateral trade corridors.

Clean H2 offers Asia Pacific $630 billion market opportunity

Investment, policies needs

To achieve full adoption of clean hydrogen, accounting for nearly half of the global demand, Asia Pacific will require a total investment of $3.2 trillion over the next 25 years.

Of that, the majority will come from China and India at $1,690 billion and $725 billion, respectively. The two countries are expected to be the largest consumers of the clean fuel.

Australia also stands out with a $300 billion estimated investment, and since it's a major exporter, most of its investment is set to flow to upstream capital expenditure.

In comparison, due to reliance on imports, Japan and South Korea must invest substantially in hydrogen transport and reconversion technologies. The report shows their cumulative investments will reach $85 billion and $30 billion by 2050, respectively.

In terms of usage, most expected investment requirements are for renewable generation and transmission (52%), followed by hydrogen production via electrolysis (more than a third).

Although countries in Asia Pacific are behind in project implementation compared to the US and European countries, they have more advantages in key technology patents, according to the analysts. "Early projects using local intellectual property and manufacturers will accelerate technology scale-up and establish industry benchmarks," they add.

Government incentives will play a major role in enabling the hydrogen economy in the region. Governments in Australia, India, South Korea, Japan and Singapore have announced programs which represent around $44.5 billion of investment in clean hydrogen.

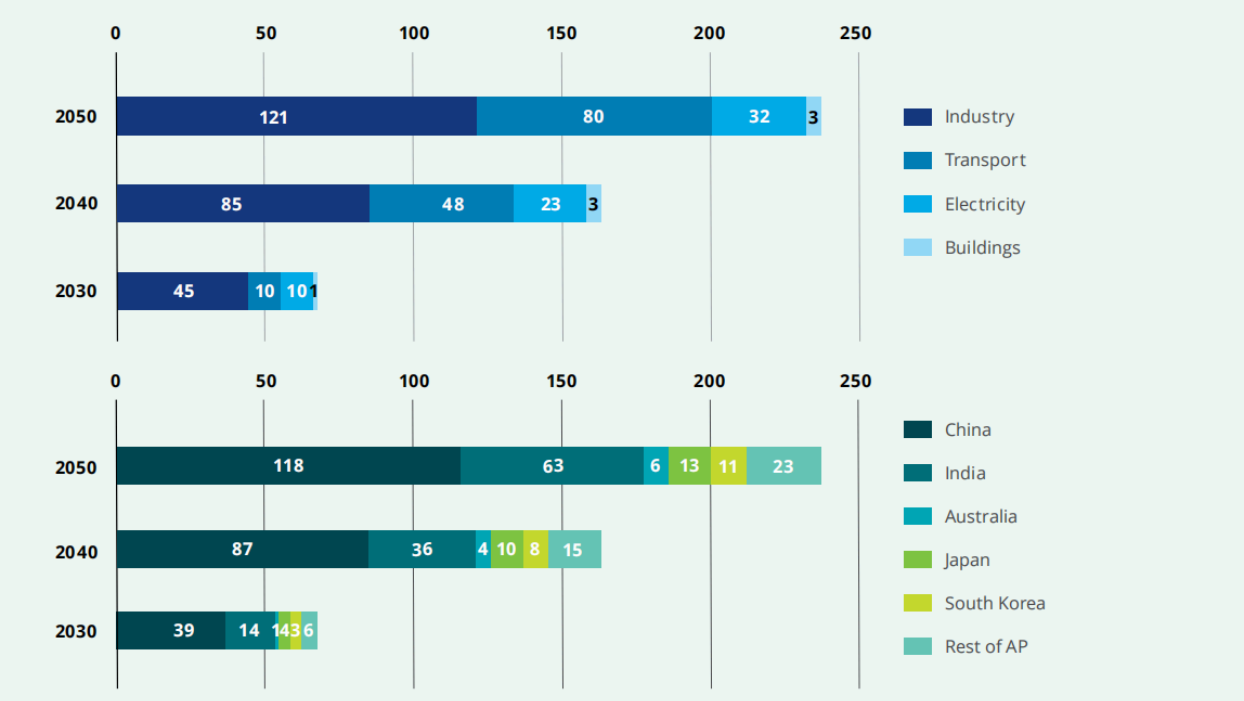
However, the analysts warn that such programs have failed to consider the wider regional policy context, with challenges in the consistency of carbon assessment and verification regimes; carbon and cost trade-offs favouring green hydrogen; contingent offtake and bid pricing; and cross-border equity based on transparent expectations.

It is not easy to achieve both decarbonisation and economic development at the same time. The realisation of both targets requires various stakeholders to jointly break down barriers to focus on the bigger picture of creating cross-border value chains.

Deloitte calls for Asia Pacific economies to learn from Europe – where a series of demand and supply-side policies are working together to create investment certainty.

"Hydrogen demand in Europe is anchored in a rising carbon price via the European Union Emissions Trading System (EU-ETS), which, combined with price reductions, is likely to ultimately see green hydrogen emerge as the dominant option," it notes. "While Australia, Japan and South Korea each have carbon pricing schemes, these remain materially lower than Europe's ETS."

ASIA PACIFIC HYDROGEN DEMAND BY SECTOR AND COUNTRY (IN MILLION TONNES OF H2)



SOURCE: DELOITTE

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INTERVIEW

WITH HYGREEN ENERGY

GLOBAL MARKETING DIRECTOR
ETHAN HUGH

Low-emission hydrogen is set to play a key role in a 2050 net-zero emission scenario, with electrolysis powered by renewable electricity touted to be the main production route, according to the International Energy Agency.

With 17 years of expertise in water electrolysis, Beijing-based Hygreen Energy is a world-leading electrolyser manufacturer with alkaline, proton exchange membrane (PEM) and anion exchange membrane (AEM) electrolysis solutions.

Global marketing director Ethan Hugh told Kallanish how Hygreen Energy has been expanding globally, diversifying its product matrix, and contributing to the development of the green hydrogen industry.

Q&A

Can you tell us about Hygreen, its products and its mission?

Hygreen Energy is committed to being a hydrogen and electrolyser solution provider, so while our business is primarily in alkaline and proton exchange membrane (PEM) electrolysers, we have also recently announced our anion exchange membrane (AEM) electrolysers are ready for commercial orders. This makes us uniquely positioned as an original equipment manufacturer (OEM) that can offer three technologies commercially.

In addition to this, we are not only stack developers, but we also manufacture balance of plant (BOP) and auxiliary components, as well as design solutions for hydrogen plants. In short, Hygreen Energy is expanding its breadth of product offerings, and this enables us to be more agnostic and less biased in providing the best-fit solutions for each customer's needs.

What are the major features of the recently released AEM electrolyser? Do you plan to promote it outside of China?

Our AEM technology has undergone over five years of research and development at Hygreen Energy's in-house labs, so we are very excited to bring our first commercial AEM offerings to the market. Our AEM electrolyser was announced in September 2024 with commercial orders available worldwide. We are in talks with customers around the world.

Our AEM electrolyser solution is designed with our years of experience to know what customers want. The customisation and flexibility in load range are two of the many design choices that reflect our deep understanding of customer needs. Similarly, we also believe that by offering a more plug-and-play solution, our AEM electrolyser can offer easier installation and operation, simplify deployment and reduce time to market.

Talking about geographic expansion, Hygreen has announced new investments in Spain. What has driven that decision? Do you see the company setting manufacturing capacity in other places?

Hygreen Energy's recent announcements in Spain are directly related to the company's positive outlook on the country as one of the leaders in Europe for hydrogen adoption. That said, we do believe Europe overall will experience strong growth, so our initiatives in Spain should be seen as Hygreen Energy's strategy for Europe. In fact, our manufacturing facility there will produce products that are compliant with European standards, not just Spain. Hygreen Energy will continue to look at more ways to better engage with customers across Europe.

While Hygreen Energy is particularly strong with our years of in-field experience with project developers, electrolyser expertise and manufacturing capabilities, one key advantage is our strength in management. Our European team is led by renowned industry leaders including Marcelino Oreja (chairman, EMEA), who is former ceo of Enagas, former member of European Parliament, and extensive leadership success in biogas, energy and hydrogen sectors, as well as Daniel F. Salamanca (managing director, EMEA), who brings over 20

Interview with Hygreen Energy global marketing director Ethan Hugh

years of leadership in renewable energy and environment industries. Hygreen Energy is well positioned to succeed in Europe under their leadership.

What's the relationship between SinoHy Energy and Hygreen Energy?

SinoHy Energy was amalgamated under Hygreen Energy. In essence, Hygreen Energy will leverage SinoHy's 17 years of hydrogen industry experience, product portfolio, and electrolyser manufacturing capabilities, to expand globally as Hygreen Energy. Building on SinoHy's foundational success, Hygreen Energy will combine this with an international management team, new strategic investments, partnerships, product positioning, marketing, localised regional manufacturing, technical support, and technology development.

With 17 years of expertise in water electrolysis, I'm sure there have been plenty of hurdles along the way. What have been the major challenges the company had to overcome in the past? What are the current headwinds and how can they be addressed?

Our journey to becoming a leader in manufacturing electrolysers has certainly included challenges that ultimately fuelled our growth. From pioneering the technology and scaling production, to navigating regulatory environments and shifting market conditions, each challenge gave us the opportunity to work closer with our customers, in order to learn and build our expertise. We stayed lean, made sound business decisions, built a superbly dedicated team, and grew carefully. Looking forward, regulatory and subsidy environments will continue to evolve, projects will grow larger, and the market will gain more data from in-field use of electrolysers. Costs will decrease to more attractive levels, which will create a more competitive environment. This is where our deep experience will shine in the next phase of the sector's growth, by leveraging our foundation of resilience, technology innovation, competitive product offerings, manufacturing know-how, and a dedicated team that knows how to support customers.

With the current market conditions, do you see Hygreen revising its ambitions to increase its manufacturing capacity from 2 GW today to 5 GW in 2025? Is there demand for such expansion?

The production capacity is still correct. Currently 2 GW and expected to reach 5 GW in 2025. We are also currently looking at regional manufacturing, including recently announced plans for production in Europe, specifically in Spain, to manufacture Europe-compliant electrolysers.

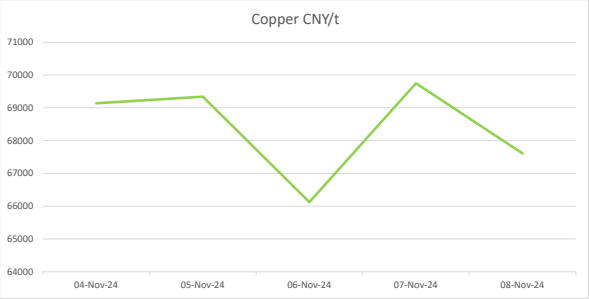
To finalise, what is Hygreen Energy's outlook for the future?

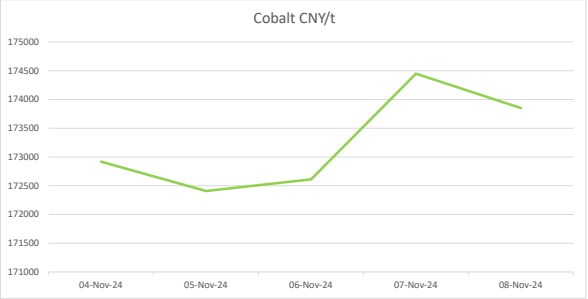
We have a very positive outlook for Hygreen Energy's competitiveness to become one of the top electrolyser suppliers in the world. This stems from our breadth of offering across alkaline, PEM and AEM technologies, our quality and scale of manufacturing, our cost competitiveness, our technology advancement, and our strategic management.

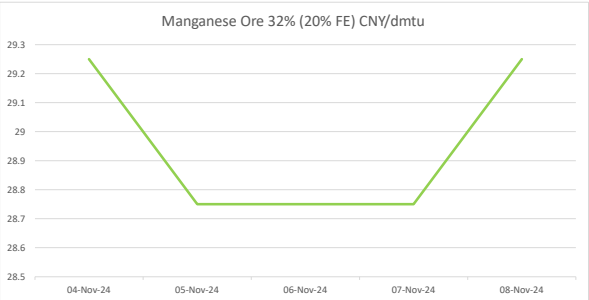
FROM THE PRICE DESK

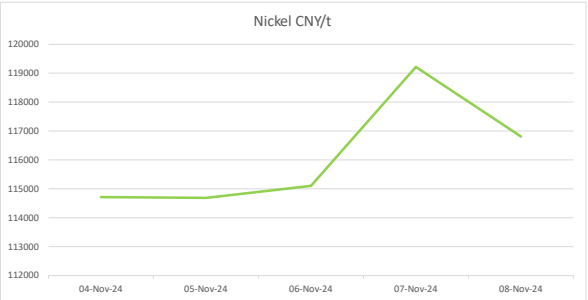
WEEKLY AVERAGE PRICE DISPLAYED | VIEW ALL PRICES ONLINE

Type	Product	w/c 04/11/2024	w/c 28/10/2024		Δ %
Base Metals	Aluminum USD/t	2647.20	2632.20	▲	0.57%
Base Metals	Copper USD/t	9592.75	9559.46	▲	0.35%
Base Metals	Lead USD/t	2037.60	2027.00	▼	0.52%
Base Metals	Nickel USD/t	16284.50	15886.20	▼	2.51%
Base Metals	Tin USD/t	31862.20	31280.00	▼	1.86%
Base Metals	Zinc USD/t	3034.80	3097.80	▲	-2.03%
Minor Metals	Cobalt USD/t	24300.00	24300.00	-	0.00%
Minor Metals	Lithium Carbonate 99.5% CNY/t	N/A	72500.00	▼	N/A
Minor Metals	Manganese Ore 32% (20% FE) CNY/dmtu	28.95	29.35	▼	-1.36%
Minor Metals	Molybdenum USD/kg	67.13	67.22	▼	-0.14%
Power	Brent USD/Bbl	75.04	72.37	▲	3.69%
Power	Coal USD/t	142.69	144.55	▼	-1.29%
Power	Crude Oil USD/Bbl	71.64	68.52	▲	4.57%
Power	France Electricity Spot Price (EUR/MWh)	73.60	71.37	▼	3.12%
Power	Germany Electricity Spot Price (EUR/MWh)	109.98	90.64	▲	21.34%
Power	Italy Electricity Spot Price (EUR/MWh)	125.06	119.58	▲	4.58%
Power	Natural Gas USD/MMBtu	2.71	2.79	▲	-2.67%
Power	Spain Electricity Spot Price (EUR/MWh)	114.41	83.14	▲	37.62%
Power	UK Electricity Spot Price (GBP/MWh)	86.65	89.29	▲	-2.96%
Precious Metals	Gold USD/t.oz	2707.41	2757.57	▲	-1.82%
Precious Metals	Palladium USD/t.oz	1037.10	1155.70	▲	-10.26%
Precious Metals	Platinum USD/t.oz	983.12	1016.10	▲	-3.25%
Precious Metals	Silver USD/t.oz	31.92	33.40	▲	-4.46%
Rare Earth	Neodymium CNY/t	527500.00	527500.00	▼	0.00%
Rare Earth	Rhodium USD/t.oz	4675.00	4680.00	▼	-0.11%





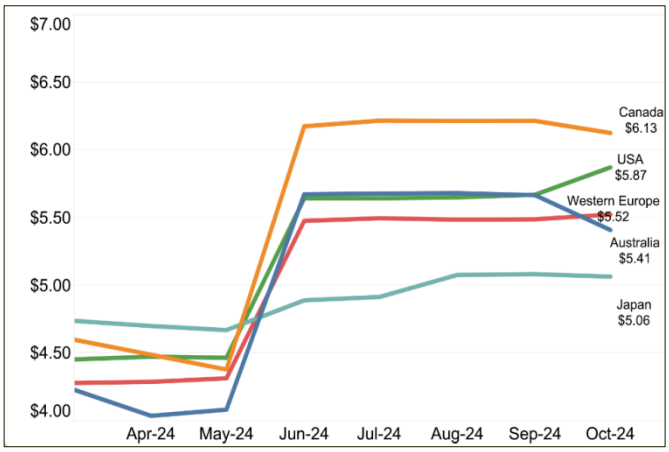




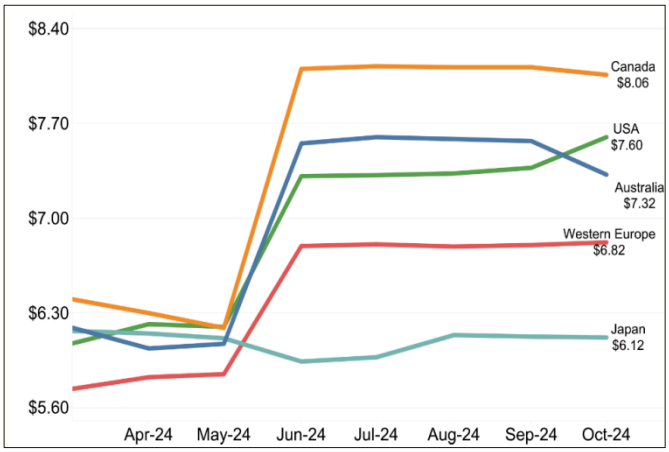
KIS HYDROGEN PRICES

KIS HYDROGEN PRODUCTION INDICES BY TECHNOLOGY AND REGION (US$/KG) | VIEW MORE KIS PRICES & DATA

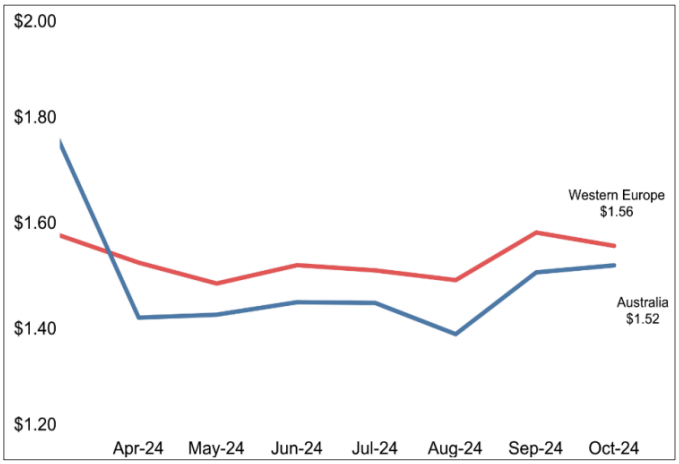
GREEN HYDROGEN: ALKALINE ELECTROLYSIS



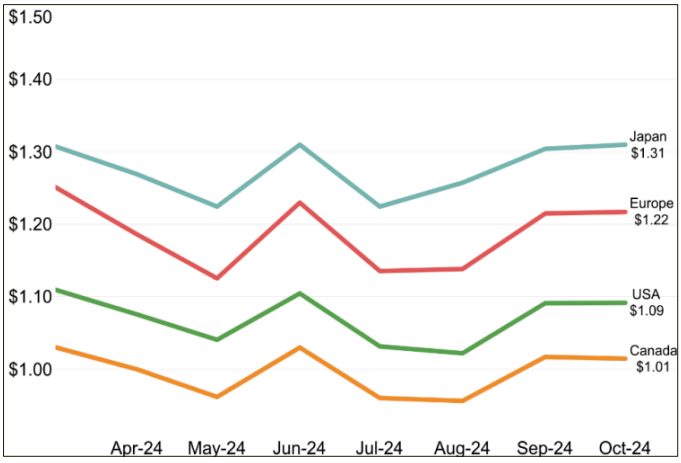
GREEN HYDROGEN: PEM ELECTROLYSIS



BLUE HYDROGEN: SMR WITH CCS



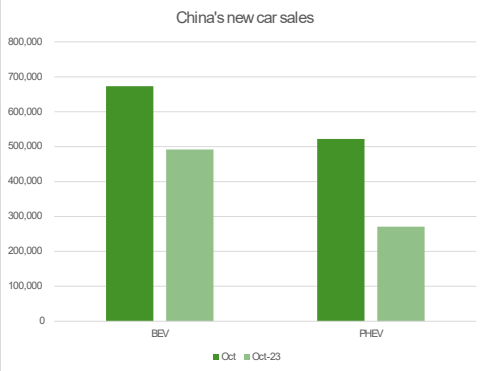
GREY HYDROGEN: SMR WITHOUT CCS



SOURCE: KALLANISH INDEX SERVICES (KIS)

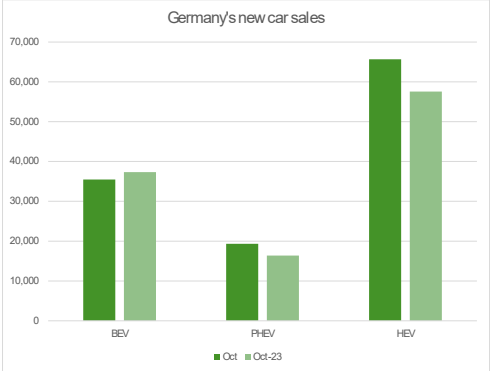
EV SALES

	Battery Electric			Plug-In Hybrid			Hybrid Electric		
	Oct 24	yoy % Δ	mom % Δ	Oct 24	yoy % Δ	mom % Δ	Oct 24	yoy % Δ	mom % Δ
China	673,000	36.8%	4.5%	522,000	92.6%	44.6%	-	-	-
Germany	35,491	-4.9%	2.9%	19,337	18.2%	29.5%	65,672	14.1%	8.6%
France	20,901	-18.0%	-26.2%	10,894	-27.0%	8.1%	31,464	20.1%	9.4%
UK	28,802	24.5%	-47.2%	23,832	-3.2%	-43.5%	19,012	-2.9%	-51.3%
Italy	5,023	-12.8%	-21.8%	4,282	-24.9%	4.4%	54,174	-0.2%	1.7%
Spain	4,874	-8.5%	-23.6%	5,140	3.0%	26.4%	-	-	-



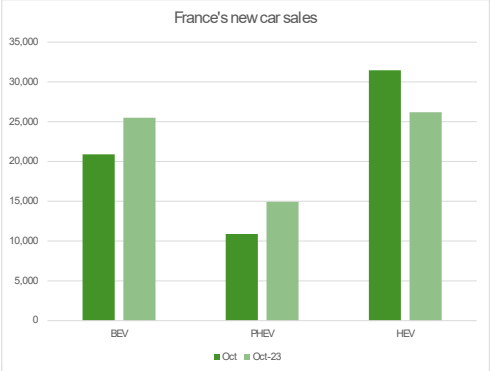
China continues to lead EV passenger uptake globally, with 1.19 million units sold in October. Penetration rate reached 52.9% in the month, following a 56.7% growth in total EV sales. PHEV registrations, which also includes extended-range electric vehicles (EREVs), increased 92.6% y-o-y as their popularity continues to expand.

SOURCE: CPCA



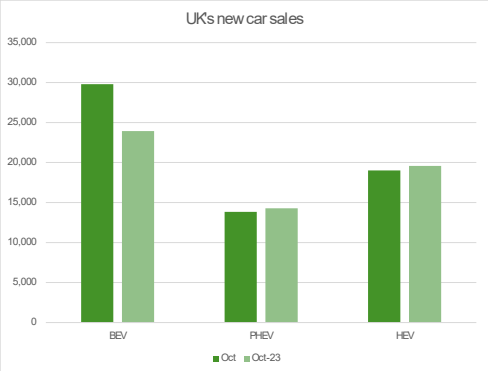
Germany's new BEV sales contracted 4.9% in October to 35,491 registrations. The Skoda Enyaq was the most sold BEV in the month. PHEV sales rose 18.2% y-o-y to 19,337 units, while HEV registrations rose 14.1% to 65,672 units. The Volvo XC60 and the Toyota Yaris were the most popular models, respectively.

SOURCE: KBA



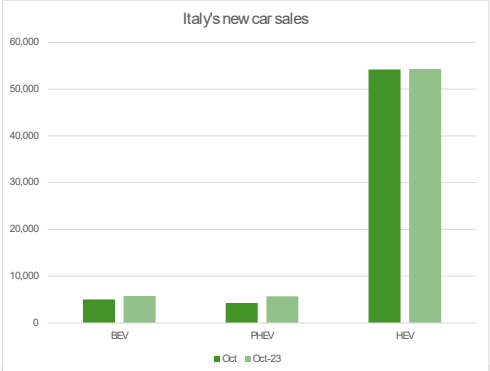
The French EV market took a hit in October, with the exception of HEV registrations. All-electric sales declined 18% to 20,901 units, while PHEV plunged 27% to 10,894 units. In contrast, demand for hybrids rose 20% to 31,464 cars. With more B-segment models available, France could see higher uptake by year-end.

SOURCE: PFA



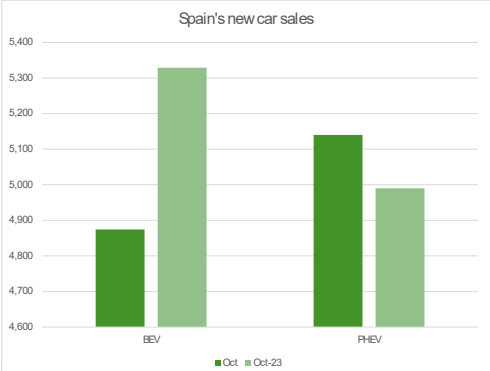
The UK BEV market rose 24.5% in October to 29,802 units - the strongest growth in Europe, though the second largest in sales volume. BEV penetration accounted for 20.7%, while PHEV and HEV stood at 9.6% and 13.2%. Meanwhile, diesel and petrol penetration declined 20.5% and 14.2%, respectively. As manufactures work to reach their mandated targets, there are 125 BEV models available on the market.

SOURCE: SMMT



The Italian automotive market continues to struggle, recording a decline for the third month in a row. BEV and PHEV sales combined accounted for 7.6% of total new registrations in October, compared to 8.4% last year. BEV sales declined 12.8%, while PHEV sales dropped 24.9%. HEV demand remained stable with 54,174 new units sold.

SOURCE: ANFIA



Spanish new BEV registrations fell 8.6% to 4,874 units. Meanwhile, PHEV sales rose 3% to 5,140 units. Private buyers accounted for around 55% of all purchases of pure electric cars so far this year, primarily due to the extension of the MOVES subsidy scheme to the end of 2024.

SOURCE: AEDIVE, GANVAM

HYDROGEN: NEWS FROM THE WEEK

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CRRC Datong's FCEV locomotive operates over 16,000 km
Chinese state-owned train manufacturer CRRC Datong announced its new hybrid hydrogen fuel cell locomotive has been operated for over 16,000 kilometres, Kallanish learns.

The company claims this locomotive has a long battery life, fast refuelling speed, and diverse operating modes. It is an intelligent green hydrogen locomotive, developed in-house.

Since it was put into operation in May last year, it has been running on the Jinbai Railway Line in Inner Mongolia, and has performed well in traction tasks.

The locomotive is powered by a hydrogen fuel cell and a battery. The total output power of the fuel cell is 400 kilowatts, the power battery has a storage capacity of 731 kilowatt-hours, and the hydrogen storage capacity is about 202 kilograms. When fully loaded with hydrogen, the locomotive can run continuously for 180 hours.

"Compared with traditional diesel locomotives, hydrogen fuel hybrid locomotives are more suitable for various application scenarios such as factories and mines, railway stations and yards shunting and small operations," CRRC Datong states. "Taking the Jinbai Railway as an example, if all of them are replaced with hydrogen locomotives, carbon dioxide can be reduced by about 100,000 tonnes each year, which has broad application prospects."

Last year, CRRC estimated that 90% of China's diesel locomotive fleet could be converted to hydrogen.

China to account for over 95% of global electrolyser exports in 2035: IEA
China is set to become the major global supplier of electrolysers by 2030-2035, thanks to the low cost of making electrolysers in the country, the International Energy Agency (IEA) says in a new report.

Under IEA's Stated Policies Scenario (STEPS), the Asian country is projected to account for over 95% of global electrolysers exports in 2035, primarily serving Central and South America, the Middle East and other Asian countries. The IEA says that over 75% of the electrolysers made in the country will be exported by 2035.

"China's exports of electrolysers are currently minimal, but the country is set to emerge as a major supplier to the global market over the next decade," the report notes.

The Chinese share of total exports is expected to increase much faster under the Announced Pledges Scenario (APS), crossing 95% in 2030. However, under this scenario, the country's share of exports in production would decline to around 40% by 2035 from around 75% in 2030, with other regions ramping up production to meet domestic demand.

That said, the IEA expects the cost of manufacturing electrolysers to remain "significantly lower" in China compared to the rest of the world under both scenarios.

"Costs remain highly competitive in both scenarios thanks to the lower capital cost, the country's large existing manufacturing capacity and economies of scale, and lower labour and energy costs," the report adds.

The average levelised cost of production in China will be 40% cheaper than those manufactured in Europe in 2030, and 25% lower than in the US. "Factoring in tariffs and NTMs [non-tariff measures], the weighted average import price of Chinese electrolysers is around 5-40% less than domestically produced ones in many countries."

China, which currently leads global electrolyser manufacturing, accounted for 60% of the worldwide electrolyser manufacturing capacity at the end of last year, with around 15 gigawatts (GW) of installed production capacity.

Based on the announced projects, the total capacity in China could reach 50 GW by decade-end, of which 55% is either already operational or has reached the final investment decision (FID). The increasing pipeline of electrolytic hydrogen projects is the primary driver behind this expansion, the IEA adds.

"Annual manufacturing output from Chinese facilities rises more than threefold to almost 6 GW in 2035 in the STEPS and to more than 40 GW in the APS, driven mainly by strong domestic demand," the report adds. "In both the STEPS and the APS, China's share of global production declines to around 60% in 2030, from over 70% in 2023, and further declines to around 50% in 2035 in the APS."

Sichuan Shudao, Toyota to form hydrogen JV
Shenzhen-listed Sichuan Shudao Equipment &Technology has recently signed a hydrogen cooperation agreement with Japanese automaker Toyota, Kallanish learns.

According to a statement from Shudao, the companies plan to jointly carry out in-depth cooperation in the fields of fuel cells; hydrogen storage and production; refuelling stations; and hydrogen-distributed power generation. The collaboration will also include financing to promote green transportation, energy conservation and emission reduction, seeking win-win results.

Shudao Equipment &Technology and its affiliation Shudao Investment, the cooperation partners Toyota and its affiliation Toyota Investment will form a joint venture mainly for fuel cell R&D and production. The JV will be owned 50-50.

They plan to launch the first phase of fuel cell power system production lines in Chengdu, Sichuan province, and then start the second phase depending on market demand and technology progress.

Shudao and its affiliates will use their experience and resources in heavy-duty vehicles to support the promotion of hydrogen-powered products to be launched by the JV. They are yet to disclose further details on a development timeline and potential launches.

HYDROGEN: NEWS FROM THE WEEK

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CPH2 licenses Hidrigin to manufacture 2 GW of electrolysers
UK hydrogen technology company Clean Power Hydrogen (CPH2) has signed an agreement with Irish developer Hidrigin to manufacture up to 2 gigawatts (GW) of its electrolysers in Ireland.

Under a licensing agreement, Lisheen Hydrogen Energy Park – which trades as Hidrigin – has secured the rights to manufacture up to 2 GW of CPH2's 1-megawatt (MW) membrane-free electrolyser units over 20 years. Hidrigin will exclusively use the electrolysers, the manufacturing of which has been outsourced to Jones Engineering.

The manufacturing is expected to start next year at Jones Engineering's plant in County Carlow, Ireland, CPH2 says.

In return, CPH2 will be paid in "staged payments," subject to meeting certain milestones, which the company aims to achieve within the next two years. The company will also get revenues from the component sales and a technology fee for each unit manufactured.

The two companies have also inked a sales agreement, under which CPH2 will sell a 1-MW electrolyser unit to Hidrigin, with delivery expected next year. Financial details have not been disclosed.

CPH2's technology uses a combination of membrane-free electrolysers and cryogenics to separate hydrogen and oxygen, Kallanish notes.

Hidrigin ceo Eric Whelan describes the technology as a "brilliant low-cost solution" to produce green hydrogen. "We are excited to be able to use this technology for our projects here in Ireland and across the world, where the opportunity for green hydrogen production together with renewable energy generation is unparalleled."

Meanwhile, Hidrigin plans to start operations at a green hydrogen pilot project in the Lisheen Bioenergy Campus in 2025. The company has already agreed to sell the green hydrogen to a "number of commercial offtakers," according to CPH2 's statement.

Toyota gets green light for H2 plant in Chile
Chilean authorities have authorised Japanese automotive giant Toyota to operate a hydrogen plant to supply hydrogen fuel cell electric vehicles (FCEV).

The facility is used to refuel Toyota's fleet of Mirai vehicles the company helds at its headquarters, located in Pudahuel, Santiago.

Already operational, the station produces 20 kg/day of hydrogen, Toyota tells Kallanish.

The group introduced its Mirai FCEV in Chile last year, the first hydrogen-powered model to be approved both in the country and in South America. With an estimated range of 650 kilometres, the Mirai takes five minutes to refuel.

"All transport authorities are very strongly committed to being able to advance in renewable energies, and transport is clearly no exception," the director of Metropolitan Public Transport, Paola Tapia, told local media.

"In 2017 we began a path that was that of electromobility, with a strategy, with a solid public policy, which has allowed us today to position ourselves among the cities with the most electric buses in the world. But to that, we add today the issue of hydrogen, as an energy that will allow us to enhance everything that is decarbonisation in our country." According to the Chilean National Automotive Association (ANAC), only three FCEV vehicles have been sold in the country across 2023 and 2024.

"This project not only promotes the use of hydrogen, but also contributes to Toyota's vision of encouraging public policies that facilitate the mass adoption of fuel cell vehicles. Through this plant, we seek to contribute to the national market, putting Chile at the forefront of these matters," Toyota Chile director Ignacio Funes is quoted as saying.

Norway's Enova awards over $70m to 5 hydrogen projects
Enova has awarded over NOK 777 million ($70.8m) in funding to five hydrogen production projects along the Norwegian coast, the state-owned company says.

Kallanish understands the funding aims to spearhead hydrogen's use in the shipping sector. The goal is to establish the "first functioning value chain" in the country, enabling the fuel to become more accessible and sustainable in the future.

"The projects that receive support will be part of a network of hydrogen producers along the Norwegian coastline, from Slagentangen in the southeast to Bodø in the north," explains Nils Kristian Nakstad, ceo of Enova. "This will make hydrogen more accessible to those who want to focus on sustainable shipping."

The winning projects include the 10-megawatt (MW) Slagen Energy Hub being developed by GreenH, ExxonMobil, Grieg Edge and North Ammonia. The project, which targets a potential production of 20,000 tonnes/year of green hydrogen, has secured NOK 144m.

HyFuel, a joint venture between Fjord Base, Hydrogen Solutions, and Sogn og Fjordane Energi, will receive NOK 180m to develop its 20-MW plant in Florø. A final investment decision for the project is planned for the first quarter of next year.

The Kaupanes Expansion Project has secured NOK 206m for the 20-MW expansion of an already operational 1-MW renewable hydrogen facility at the Eigersund Harbour. The plant, owned by Dalane Energi, is operated by Hydrogen Solution through Kaupanes Hydrogen. Eigersund Næring og Havn also holds a 3% stake in the project.

Meanwhile, GreenH secured NOK 118.66m for a 10-MW project in Kristiansund, and a separate NOK 128.65m for a project in Bodø.

"The Norwegian maritime sector is leading the way, once again," comments climate and environment minister, Tore O. Sandvik. "These projects can cut emissions in Norway, but will also contribute to the transition in the rest of Europe and the world."

HYDROGEN: NEWS FROM THE WEEK

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Uniper delays €8 billion green investments amid 'sluggish' H2 market

German energy company Uniper has delayed its plan to invest €8 billion ($8.7 billion) in green investments amid a "sluggish" development of the hydrogen market, Kallanish learns.

The firm announced the investment plans last August, including a target of 5% to 10% of its portfolio to consist of "green gases" like hydrogen. While its green investments were initially set to be realised by 2030, this has now been delayed to the early 2030s.

The market environment has "deteriorated," the company says in its latest financial report. Alongside falling energy prices, the development of regulations has also been slower, it adds.

"The ramp-up of the hydrogen economy is progressing sluggishly, and not only in Germany," Uniper says. "As of today, there are few major customers looking for green hydrogen and interested in entering into corresponding supply contracts," the company explains.

Speaking to analysts in an earnings call, the company's chief financial officer Jutta Doenges said: "We are now less optimistic about the timeline regarding the implementation of a green hydrogen economy. We observe a mood of caution among potential B2B [business to business] customers to make a commitment for significant green hydrogen or ammonia supply offtake volumes."

As part of its strategy, Uniper had said it would end its coal-fired power generation by 2029 at the latest and was eyeing 80% of its installed capacity to be zero-carbon by decade-end. In July this year, the German government said it would hold tenders for 5 gigawatts of new hydrogen-ready gas-fired power plants by year-end or the beginning of 2025.

However, Doenges notes the ramp-up of hydrogen power plants is now expected to come slower than initially assumed 18 months ago.

As such, Uniper says it will "only invest in projects based on a viable business case and that are expected to generate an appropriate return on investment" and "a favourable regulatory framework."

Uniper's announcement comes less than a month after it shelved a 200-megawatt hydrogen-based sustainable aviation fuel (SAF) project in Sweden.

Ballard defers Texas fuel cell gigafactory FID to 2026

Canadian fuel cell group Ballard Power Systems has postponed the final investment decision for its Texas gigafactory to 2026 as it waits for "clear market adoption and demand indicators."

Construction of the 3-gigawatt fuel cell facility was originally slated to start this year, with planned completion in 2027. However, the appetite for hydrogen is now stalling amid high costs, choppy market conditions and regulatory uncertainty, particularly with Trump's election.

Ballard says it will be able to maintain the $94 million in grants and tax credits secured from the US Department of Energy.

"We had a tough quarter, marked by weak revenue, strained gross margin, soft new order intake, adverse order book adjustments, a restructuring charge of $16.1m, and non-cash impairments totalling approximately $147m," comments Randy MacEwen, Ballard's president and ceo.

"We have taken difficult but important actions to better align our spending with a multi-year push-out in market adoption of hydrogen and PEM [proton exchange membrane] fuel cells."

In the third quarter of 2024, Ballard's total revenue declined by 45% to $15m compared to the same period last year, with net losses swelling six-fold to $204m. The order book shed 23% to $58m quarter-on-quarter, Kallanish reports.

During the quarter, the company started a corporate restructuring to reduce costs by 30% by 2025, including "sizeable" job cuts and the evaluation of its presence in China.

"While macro headwinds are not under Ballard's control, the company is taking steps to manage its operational expenditure," analysts at Jefferies note. "By deferring its FID for the Texas gigafactory, the company is keeping a tight leash around its capex spending as well. We see these as constructive, but the macro headwinds keep us at bay."

Cummins books losses in battery, H2 arm despite stronger sales

US manufacturer Cummins Inc. has recorded higher quarterly sales in its battery systems and hydrogen segment but has not been able to shrink losses.

It comes as the hydrogen and EV sectors struggle with higher costs, hindering wider adoption of new technologies.

The Accelera segment, which includes zero-emissions solutions such as battery systems, ePowertrain systems, electrolysers, and fuel cells, posted a 7% increase in sales to $110 million in the quarter to 30 September.

However, it recorded an underlying loss of $115m, which was roughly flat year-on-year, Kallanish notes.

The loss was attributed to higher costs associated with the development of electric powertrains, fuel cells and electrolysers, as well as products to support battery electric vehicles.

Group revenues in the period were flat at $8.5 billion, with underlying earnings (EBITDA) up by 14% to $1.4 billion.

Cummins maintains its full-year guidance, forecasting revenue to drop by 3% or to remain flat, with EBITDA accounting for 15.5% of sales.

HYDROGEN: NEWS FROM THE WEEK

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UAE firms award $2 billion in contracts for blue ammonia project
Ta'ziz, a public-private partnership in the UAE, has announced the award of over $2 billion in contracts for key infrastructure projects.

The joint venture between Abu-Dhabi oil firm Adnoc and investment company ADQ has chosen NMDC Group, formerly National Marine Dredging Company, to carry out the engineering, procurement and construction (EPC) contract for the chemicals port.

The port will facilitate the export of chemicals and transition fuels, ensuring operational connectivity to regional and global markets. It will also enhance access to imported supplies, Kallanish learns from an Adnoc statement.

Around 1 million tonnes/year of blue hydrogen-derived ammonia will be exported from the complex Ta'ziz is building in Al Ruwais Industrial City, Abu Dhabi.

Local company Rotary Engineering was awarded the EPC for the chemicals terminal in partnership with Netherlands-based Advario. The undisclosed deal will cover the chemicals terminal, including the development of storage facilities, pipelines and liquid product storage.

Two other contracts were awarded to Al Geemi Contracting. The company will develop essential infrastructure for the 17-square kilometre Ta'ziz site, including internal roads, security fencing, buildings and utilities.

While the combined awards come to AED 7.34 billion, values for individual contracts were not disclosed.

The project is set to start production in 2027, targeting 4.7m t/y of chemicals by 2028. The aim is to make Adnoc one of the five biggest global chemicals player in the world, establishing a "low-carbon" supply chain with "transition fuels."

US 45V guidelines unlikely to follow EU standards: expert
Trump may not completely "gut" Biden's Inflation Reduction Act (IRA), but he is very likely not to follow EU standards when it comes to the 45V hydrogen guidelines, an expert says.

According to Constantine Levoyannis, head of government affairs at electrolyser manufacturer Nel Hydrogen, Donald Trump's election will have a significant impact on 45V tax credit guidelines.

The tax incentive offers up to $3 per kilogram of hydrogen, depending on the carbon intensity of the hydrogen produced. It can be valid for the first 10 years after the hydrogen plant is placed into service. The guidelines for Section 45V have been a controversial point in the IRA proposal, with some saying they are too strict and others claiming the opposite.

Levoyannis believes the likelihood is that the president-elect will water down or delete parts of the IRA, Kallanish reports. "One thing's for sure in my eyes: Trump will not follow EU laws and guidelines e.g. on methane regulation or renewable hydrogen definition (Delegated act guidelines – additionality, temporal matching etc.)," he writes in a LinkedIn post. "More likely than not, proposed 45V guidelines will be watered down whereas a Democrat victory would've meant status quo and alignment with Europe on environmental laws."

Trump could trigger and pass a congressional review to repeal the IRA. Yet, some of the biggest beneficiaries of the legislation are big Republican states. Clean technologies such as hydrogen offer the US a new industrialisation avenue, creating jobs and growing the country's economy.

"The question is: will he listen to his Republican peers?" asks Levoyannis, adding: "What influence [Elon] Musk will have on US government hydrogen policy is perhaps one of the bigger questions at play given Trump's relationship with him."

Musk, the chief executive of EV maker Tesla, and expected to be head Trump's government efficiency commission, believes hydrogen is "the dumbest thing for energy storage."

Nel Hydrogen, a Norwegian manufacturer with plans to expand production capacity in the US, and many other investors continue to wait to see what happens next. The company was awarded a total of $125 million in US public funding to establish a 4-gigawatt electrolyser manufacturing facility in Plymouth, Michigan.

In 2022, the company's ceo said the US would be among the cheapest places to produce clean hydrogen in the world. A final investment decision remains tied to favourable market conditions.

ITM Power claims 'technical milestone' in electrolyser development
British electrolyser manufacturer ITM Power says it has achieved a "technical milestone" after cutting the amount of iridium used in its proton exchange membrane (PEM) electrolysis equipment by 40%.

Iridium is a rare, expensive platinum group metal. The metal is typically used as a catalyst to drive chemical reactions in the electrodes of PEM electrolysers. In addition, it is mined in a handful of regions, putting it at risk of supply chain disruptions. As such, the metal's extreme scarcity and geographical concentration have often been cited as a concern for meeting increased electrolyser demand for the hydrogen industry, Kallanish notes.

ITM has now achieved a further 40% iridium loading reduction without affecting stack performance and longevity, the company says. It claims to have already lowered loading by over 80% for precious metals in the past years, having met the EU's 2030 precious metal loading target for PEM electrolysers in 2019. "As a costly raw material, reducing iridium benefits stack costs significantly," explains ITM Power ceo Dennis Schulz. "This loading reduction and our catalyst recovery and reuse processes will substantially reduce our consumption of critical raw materials and further lower our cost."

The company plans to integrate the iridium reduction, as well as other features from its technology improvements, into its existing Trident electrolyser stack. These features will also be integrated into the company's next-generation Chronos stack platform, which is currently under development.

Early this year, ITM signed a contract with oil giant Shell for the supply of a 100-megawatt electrolyser for a green hydrogen project in Germany.

BATTERY MATERIALS: NEWS FROM THE WEEK

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Livium secures grant to develop Australian battery recycling facility
Livium, formerly Lithium Australia, has secured a grant from the Western Australian government to help it establish a battery recycling facility in the state.

The AUD 850,000 ($560,300) grant, awarded to Livium subsidiary Envirostream, will partially fund the development of a battery sorting and dismantling recycling facility. Kallanish understands the facility will collect, sort, discharge and store batteries before sending them to Envirostream's Campbellfield facility, which will process the batteries into mixed metal dust (MMD) and other metals.

According to a government statement, Envirostream's facility will have a recycling capacity of over 1,500 tonnes/year.

The funding represents "a meaningful step forward in our mission to establish a sustainable national battery recycling ecosystem," comments Livium ceo Simon Linge. "We are grateful for the support and are committed to building a facility that will contribute to a greener future by efficiently managing e-waste and recovering valuable materials."

As part of its long-term recycling strategy, Livium also plans to develop battery processing capabilities across Australia once minimum collection volumes are met, the executive adds.

The grant is part of the Western Australian government's electronic waste infrastructure grant funding program. The government recently announced AUD 5.4 million for the second round of the program, which aims to reduce the volume of electronic and electrical items being sent to landfills. A total of 15 projects received grants under the program.

Envirostream was awarded the funding after a "rigorous" evaluation process which recognised the "quality, innovation, and potential impact" of the facility, the company says. The deal is subject to the signing of a funding agreement with the state government and customary due diligence checks, which Livium says is "materially complete."

Lithium Australia changed its name to Livium in October, reflecting its strategy to shift perception and likely business focus away from lithium mining towards the provision of critical materials and services to the battery industry. The company says it will provide further details about the change shortly.

US Supreme Court rejects Apache petition over Resolution Copper mine
The US Supreme Court says it will not hear a case brought by the San Carlos Apache Tribe against a major copper project developed by Rio Tinto and BHP.

Resolution Copper, a 55-45% JV between the two mining giants, is proposing a copper mine in Arizona that could meet 25% of the US annual copper demand. Oak Flat is touted to be one of the largest untapped copper deposits globally, holding an estimated resource of 1.7 billion tonnes with an average grade of 1.5% copper.

The decision not to hear the tribe's request for a review of a lower court's decision is said to be a victory for the developers.

"The Arizona Supreme Court's unanimous decision conducted a thorough and straightforward construction and application of the relevant regulation to reach the correct result. We are pleased the US Supreme Court allowed that ruling to stand," a Resolution Copper spokesperson tells Kallanish.

Resolution Copper is building its mine near an old mine that was exhausted in 1996. In 2017, it applied to the Arizona Department of Environmental Quality (ADEQ) to renew the old mine's discharge permit including the new mine.

ADEQ issued the permit, which was challenged by the San Carlos Apache Tribe on the grounds that the new mine constitutes a new source of wastewater discharge in the Queen Creek area, which is sacred to its members.

Under the Clean Water Act, new and existing sources are treated differently, with new sources subject to more stringent standards.

The Arizona Supreme Court later ruled that Resolution Copper's mine shaft did not constitute a new source of wastewater, which led the tribe to petition the US Supreme Court.

The Resolution Copper project is the object of another US Supreme Court petition, which is still pending.

The Apache Stronghold association, a group of Native American activists, is asking for the protection of Oak Flat, also known as Chi'chil Biłdagoteel, a sacred site that risks being turned into a crater.

Even though the site is listed in the National Register of Historic Places, a 2014 defence bill authorised the Resolution Copper project. Earlier this year, the Ninth Circuit Court of Appeals refused to force a reversal of this decision following a three-year legal dispute.

The Supreme Court is expected to decide whether to hear the case over the coming weeks.

To date, the JV has invested over $2 billion in development and permits. Authorities have yet to issue final approvals.

MinRes founder to step down after probe
Australian miner Mineral Resources is to replace its managing director and founder, Chris Ellison, within 18 months following the outcome of an investigation into his private tax settlement and related-party deals.

According to a company statement, MinRes board will accelerate work to identify a suitably qualified successor to Ellison. It has been investigating certain allegations concerning Ellison that have emerged over time. This includes undeclared revenue made by companies he had an interest in.

The firm explains that the board has identified a range of issues and shortcomings that demanded a "strong and comprehensive" governance response, which included an acceleration of leadership succession.

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"The board has determined there needs to be an orderly leadership transition, significant strengthening of governance protocols, and a financial penalty imposed on Ellison. There can be no doubt that the actions, decisions and behaviours of Ellison have been profoundly disappointing and require sanction and penalty," says chairman James McClements.

The lithium and iron more miner adds that Ellison will incur board-imposed financial penalties of AUD 8.8 million ($5.8m), and loss of remuneration of up to AUD 9.6m, reflecting the significance of corporate governance and reputational issues to the company.

It notes that Ellison has told the board he fully accepts its decisions and will continue to work in the best interests of the company and its shareholders through the transition. The statement also contained an apology by Ellison regarding the events.

McClements will also step down as chair at or before next year's annual general meeting.

In October, MinRes said its lithium division is focused on transitioning to "lower-volume, higher-quality production to meet current market conditions." In the first quarter of FY25, the company reported production of 157,000 dry metric tonnes, with shipments at 178,000 dmt. The average realised price was $815/dmt for 6% spodumene concentrate equivalent. On a mixed grade basis, the price was $626/dmt. That's a decline of 32% quarter-on-quarter.

The miner says it will continue cost-out programs throughout the second quarter, with activities involving roaster changes, asset rationalisation, contract and overhead reviews, optimised regional synergies and capital referral.

Ivanhoe Mines hits record production at Kamoa-Kakula copper complex

Ivanhoe Mines has announced that the Kamoa-Kakula copper complex in the Democratic Republic of the Congo (DRC) reached record production in October.

The project is a joint venture between the Canadian miner and Zijin Mining Group, which hold a 39.6% stake each, as well as the DRC government and Crystal River Global Limited, which own shares of 20% and 0.8%, respectively.

Ivanhoe is currently working on Phase 4 expansion to boost output to 600,000 tonnes/year. At that rate, Kamoa-Kakula would be the world's third-largest copper mine. The company is also conducting exploration work near Kamoa-Kakula, in the Western Forelands project.

The ramp-up of the project was slower than expected in the first half of the year due to issues with power availability, however, Scotia Capital analyst Orest Wowkodaw does not expect this to be "a major constraint to growth moving forward."

In October, Phase 1, 2, and 3 concentrators achieved a combined monthly production of 41,800 t of copper in concentrate, plus a combined monthly milling of 1.2m t. In the year-to-date, copper production at the complex reached 345,042 t.

In the quarter to 30 September, Kamoa-Kakula sold 103,106 t of copper, an increase of 7% compared to the same period last year. It generated revenues of $828m and underlying earnings (EBITDA) of $469m, rising 16% and 10% year-on-year, respectively.

The project has estimated copper reserves of 18.6 million t, Kallanish understands.

Huawei releases sulphide solid-state battery patent

Chinese technology firm Huawei has released its latest sulphide solid-state battery patent, for which an application was filed in May 2023, Kallanish learns.

The patent has passed the initial review, according to China's National Intellectural Property Administration.

"During the charge and discharge process of sulphide solid-state batteries, the interface side reaction between the metal lithium anode and the sulphide electrolyte is serious, which affects the battery life," Huawei states in the document. "The sulphide containing material invented in Huawei's patent has better stability to metallic lithium and can be used as a sulphide solid electrolyte in lithium-ion batteries, giving lithium-ion batteries a longer service life."

Chinese investment bank and broker Orient Securities believes that all-solid-state batteries are expected to be first applied to consumer electronics, aerospace and high-end electric vehicle markets in the early stage. Accordingly, their penetration rates in EV batteries and consumer batteries sectors will reach 2% and 10%, respectively, by 2030.

Meanwhile, consultancy TrendForce predicts that solid-state battery production will reach a "gigawatt-hour level" before 2027, and the scale of all-solid-state battery applications will be greater than 10 GWh after 2030.

Amid intensifying R&D into alternative battery chemistries, two major trends in next-generation battery technologies are solid-state battery and sodium-ion battery.

According to Stanley Whittingham, 2019 Nobel Prize winner in chemistry and professor at Binghamton University, State University of New York, lithium-based batteries are going to continue dominance over sodium-based chemistries over the next five to ten years. He believes lithium-based solid-state batteries are a more attractive development.

"Whether in China or around the world, everyone is very interested in sodium-based batteries, but I personally think that the market is very limited," he tells a recent forum held in Shanghai. "The energy density of sodium-based batteries is only half that of lithium batteries, requiring higher system balance costs and safety-related concerns. It is not clear whether sodium-based batteries are safer than lithium batteries. In fact, sodium-based batteries may be less safe, and this must be studied in depth."

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CMOC posts surging profit amid copper, cobalt output boost
Chinese nonferrous mining company CMOC announced a surging net profit of CNY 8.27 billion ($1.12 billion) for the first three quarters of this year, Kallanish reports.

Amid higher production and sales of copper and cobalt products, the Shanghai-listed miner saw its net profit for the period increase 238.6% year-on-year. It claims profit has already exceeded that of the entire year of last year.

In January-September, CMOC's main product outputs exceeded expectations. The ramp-up at the Tenke Fungurume Mining (TFM) project and the CMOC Kisanfu Mining (KFM), both in the Democratic Republic of the Congo (DRC), as well as technical improvements and continuous optimisation of process flows led to a copper production of 476,049 tonnes, up 78.2% y-o-y. Compared with the upper limit of the 2024 production target, the completion rate reached 83.5% in the year-to-date.

After making three new lines operational in October 2023, TFM now has five production lines, and KFM has reached design capacity after commencing operations in the second quarter of last year.

During January-September, CMOC sold 470,631 t of copper, up 161%. Its operating income from mining and processing of copper exceeded CNY 30 billion, up 150.12%.

In terms of cobalt, the mining and processing volume in the period reached 84,722 t, an annual increase of 127.4%. Sales skyrocketed over 1,000% to 79,826 t, driving related operating income up by 637%.

In April this year, CMOC resumed mineral exports from DRC after resolving a mineral royalties dispute with state-owned mining company Gecamines.

Albemarle posts $1 billion loss amid lithium price slump
US miner Albemarle has swung to a $1 billion quarterly loss as it continues to be hit by a slump in lithium prices.

Weakness in the lithium market has persisted throughout the year due to oversupply, overcapacity of battery production, and slower demand for EVs globally.

Chinese lithium prices ticked upward slightly in October, according to Scotia Capital, while other geographies remained unmoved. Analyst Ben Isaacson forecasts lithium carbonate conversion margins to rise by 24% to $997/tonne in the first week of November, although it would still be a 72% fall year-on-year.

Albemarle is still keeping full-year guidance based on the recent average lithium price of $12,000-15,000/t. Net sales are forecast to be around $5.5 billion with underlying earnings (EBITDA) of roughly $1 billion.

In the summer, Albemarle embarked on a restructuring plan to cut costs by $300-400 million, including a 6-7% reduction of its global workforce. It also paused expansion plans at its lithium hydroxide conversion site in Australia.

The plan is to halve 2025 capital expenditures to $800-900m year-on-year, Kallanish learns. Moving forward, Albemarle expects sustaining capital will represent 4-6% of net sales. In Q3, net sales dropped by 41% to $1.3 billion, with the company swinging to a $1 billion net loss from a $302m net profit in the same period last year. This was due to a 71% drop in lithium prices that offset a 16% growth in volumes in the energy storage segment.

Albemarle did not disclose the average realised price for its lithium products in Q3, but the company plans to hold two new online auctions for lithium carbonate in November.

SQM to auction spodumene concentrate on Metalshub
Chilean lithium giant SQM has announced it will auction some spodumene concentrate online using the Metalshub platform, a move already adopted by its peer Albemarle.

SQM International Lithium (SQMi) seeks to sell around 10,000 tonnes of spodumene concentrate from Perth, Australia on 20 November. The USD deal will be based on cif terms to Qinzhou China or main Chinese port.

Mark Fones, chief executive of SQMi shared excitement in a statement, adding further bidding events are planned for 2025, thanks to "positive feedback" from market participants. "Through this initiative, SQMi expects to promote fair and more transparent pricing information enhancing the lithium market efficiency," he adds.

US Chemicals company Albemarle has been using the mechanism since March. It has two new auctions scheduled for 13 November, offering two 100-tonne cargoes of battery-grade lithium carbonate.

One lot of the lithium chemical was converted by Jincheng Lithium and the other by Zhiyuan Lithium, using spodumene from the Greenbushes mine in Australia. The product will be available in CNY, on an ex-works China basis.

Metalshub, a partner of the London Metal Exchange, says its digital bidding events help to increase transparency in lithium price discovery, which is often done through price reporting agencies (PRAs) or commodity exchanges.

Traditionally, lithium is sold through a mix of long-term contracts and spot deals. A few years ago, lithium supply struggled to keep up with surging demand for batteries and EVs, driving prices to peak at nearly $80,000/tonne in December 2022. However, that has changed since, with prices dropping around 80%.

"A sound mechanism for price discovery becomes vital to a company's success," Metalshub says. "Digital bidding events represent a modern approach to price discovery."

As an independent software provider, Metalshub enables sellers to invite bids from potential buyers and conclude legally binding transactions digitally. Different auction formats may be chosen. The process is set to be secure and efficient, allowing the seller to evaluate multiple bids and select the most competitive one. Bids are confidential. "The democratisation of information through these events reduces the risk of information asymmetry and bias," Metalshub adds.

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The company has over 200 raw materials traded on its platform, including nickel, cobalt, manganese and copper.

Australian lithium producer Pilbara Minerals was one of the pioneers in using digital auctions to gauge market appetite and increase price discovery transparency.

UK's Blencowe raises capital for graphite project in Uganda

London-listed miner Blencowe Resources says it is "well-capitalised" to complete the definitive feasibility study (DFS) of its Orom-Cross graphite project in Uganda.

The Orom-Cross project has an initial JORC-indicated and inferred mineral resource of 24.5 million tonnes at 6.0% total graphite content (TGC). It is planned to have an average production capacity of 101,000 t/y of 97% concentrate over an initial 14-year life of mine. First production is targeted for next year.

The company says it has closed a retail offer to raise £117,875 ($153,100) by issuing 2.94 million retail offer shares at 4 pence each. Separately, Blencowe also raised £1.5 million in the first week of November. Of this, £1m is through the placing of 25m new ordinary shares and a conditional £500,000 subscription for 12.5m new ordinary shares from senior management.

Kallanish understands the company plans to use the proceeds to complete a 6,000-metre drilling programme, advance the DFS on the Orom-Cross project, and for general working capital.

"We believe this support and overdue clarity on DFS financing will lead to a significant uplift in project value as we move through the final stages of the study," says Blencowe's executive chairman Cameron Pearce. "Orom-Cross is strategically positioned to meet the growing demand for graphite in the energy transition, and completing the DFS will put Blencowe in an excellent position to deliver substantial long-term value for our shareholders."

In July, the company received $500,000 in fourth-tranche funding from the US' Development Finance Corporation (DFC) for the project, bringing the total DFC funding to $3.5m. Blencowe has signed a technical assistance grant agreement with the DFC for a total of $5m.

In September this year, the miner announced its plans to establish a joint venture with two Asian graphite specialists for a battery-grade graphite production facility near Orom-Cross.

New mineral refineries in Africa could generate $6.8 billion: report

Establishing refineries of lithium, nickel, manganese and copper in Africa could generate annual revenues of $6.8 billion, a new report finds.

Countries such as the Democratic Republic of the Congo, South Africa, Zambia, and Zimbabwe have abundant reserves and ongoing extraction of the four critical minerals, Kallanish notes.

Batteries produced in the continent could be cost-competitive with Europe, according to analysts by the UK's Manufacturing Africa programme and research institute, the Faraday Institution. Morocco and Tanzania could potentially achieve production costs of $72/kilowatt-hour and $68/kWh, respectively, compared to $68/kWh in Europe, where the costs are lowered by subsidies.

Just one refinery for each mineral – lithium, nickel, manganese and copper – would result in 3,500 jobs across the battery supply chain and make Africa up to 40% more competitive than the rest of the world by decade-end, they argue.

According to the report, global battery demand is projected to reach 7.8 terawatt-hours by 2035, with China, the US and Europe representing 80% of that volume. Most of Africa's demand will come from electric two/three-wheelers and stationary battery energy storage systems, which are expected to add 3 gigawatt-hours and 4 GWh of annual demand, respectively, by 2030.

Regional markets might be "strongly unbalanced" by 2035, the analysts say, with large oversupply in China and potential undersupply in the US, Europe, and the rest of the world – providing opportunities for the supply chain in Africa.

"Investment in battery manufacturing in Africa can be a win-win, creating jobs and growth locally while driving down production costs and supporting global climate goals," comments Kemi Onabanjo, Nigeria's country lead for the Manufacturing Africa programme. "Translating Africa's abundance of critical mineral wealth into jobs and growth means African economies capturing a greater share of the manufacturing process once minerals are out of the ground."

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BAIC, Pony.ai sign technology cooperation agreement
Chinese automaker BAIC and autonomous driving technology firm Pony.ai have signed a robotaxi technology cooperation agreement on 2 November, Kallanish learns.

BAIC and Pony.ai plan to collaboratively build a robotaxi business chain, covering vehicle integration technology, autonomous driving technology, and professional travel services.

Combining with Pony.ai's seventh-generation solution, the two companies intend to deploy "thousands" of Polar Fox T5 driverless vehicles in Beijing in the next three years, as well as form a travel service fleet. Mass production verification is set to start in 2025, to be deployed on a "large scale" in multiple models.

"In Level 4 autonomous driving, BAIC is constructing layouts of robotaxi products targeted at smart cities," Zhang Jiangyong, chairman of BAIC Group, comments. "BAIC constructed a new platform based on artificial intelligence-driven big models. Currently, this platform has realised mass production of vehicle models, such as the ArcFox's economic battery electric vehicle Kaola, as well as the luxury battery electric vehicle ArxFox Alpha S5/T5.

Zhang notes that Pony.ai is currently in a "key moment" for its initial public offerings in the US, with the company recently receiving a $270 million investment from Chinese automaker GAC Group. The two have also agreed to work on robotaxis.

EU, US to see EV sales rebound next year: Macquarie
EV sales in Europe and the US are expected to rebound next year from their current "depressed" levels, according to analysts at Macquarie.

This bounce back will be led by ongoing declines in European and US CO2 emission targets and an uprating of the CO2 rating of plug-in hybrid electric vehicles (PHEVs).

The narrative surrounding EVs is more negative than the actual performance, analysts caution, except in Europe.

Indeed, global passenger EV sales rose by 23% in the first nine months of 2024 compared to the same period last year. PHEV sales rose by 49%, a much faster rate than battery electric vehicle (BEV) sales, which were up by only 12% year-on-year, Kallanish notes.

China continues to dominate the market, representing 91% of the global growth between January and September. Conversely, Europe recorded negative growth, while the US rise is estimated to be in the single digits.

PHEV sales increased by 77% in China in the period, led by demand for extended-range models (EREVs), where the internal combustion engine (ICE) is used only to recharge the electric battery, not to drive the vehicle.

EVs have reached price parity with their ICE counterparts in China, but are still 25-35% more expensive in Europe and the US.

China's dominance is bad news for nickel and cobalt, as the metals aren't used in lithium iron phosphate (LFP) batteries, which account for 60% of production in the Asian country. Everywhere else in the world, LFP batteries hold a much lower share, although demand for batteries in general is weakened by lower BEV sales.

After "extremely strong" growth in 2021 and 2022, Chinese precursor cathode active material (pCam) production declined by 5% in 2023 and is expected to be little moved this year, the analysts predict.

"This suggests that the nickel and cobalt contained in electric vehicles shipped in 2023 and 2024 exceeded the actual estimated volume of nickel and cobalt consumed to make ternary precursors," Macquarie analysts comment. "This implies extensive destocking through supply chains. You can only destock once and the data is suggestive of a reasonable recovery in raw materials demand in 2025 for nickel cobalt and lithium."

Rio Tinto to trial battery swap e-haul truck tech in copper mine
Mongolia's Oyu Tolgoi, one of the largest known copper deposits in the world, is set to start trialling battery swap electric haul truck technology by year-end, Kallanish reports.

Deirdré Lingenfelder, chief executive officer of Oyu Tolgoi LLC, announces Rio Tinto is partnering with China's State Power Investment Corporation to deploy the EVs at the mine. The first truck is expected to arrive this year, with the remaining seven trucks and supporting infrastructure planned to enter operation by mid-2025.

"This innovative technology allows electric vehicles to quickly exchange a discharged battery pack for a fully charged one, bypassing the need for lengthy charging at a station," he explains in a LinkedIn post. "During the pilot, the trucks will play a key role in tailings dam rehabilitation and topsoil movement, operated and maintained by our skilled team."

The executive highlights the pilot project is another milestone in the companies' decarbonisation journey.

Oyu Tolgoi, located in the Umnugovi province of Mongolia, can produce 500,000 tonnes/year of copper at peak production. The mine, which also produces gold, is operated by Rio Tinto with a 66% ownership, in partnership with the Mongolian government.

Chinese 'new force' NEV sales remain strong in October
Electric vehicle sales by China's so-called 'new force' carmakers stayed strong in October, Kallanish reports.

Li Auto topped the new EV makers list with a sales volume of 51,443 units, up 27.26% year-on-year. During the first ten months of this year, the company, which primarily focuses on extended-range electric vehicles, delivered around 393,300 cars.

Despite its performance in October, Li Auto is conservative about its sales expectations for the fourth quarter. It estimates delivery in the period to be around 160,000-170,000 units. However, for next year, it targets twice the

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segment average in sales growth for models above CNY 200,000/unit ($28,157).

Meanwhile, Leapmotor and XPeng posted new monthly record highs. The former delivered 38,177 units in October, a surge of 109.7% y-o-y. The latter saw deliveries rise 19.6% to 23,917 units.

Nio sold 20,976 EVs, which is an increase of 30.5% compared to October 2023. It is the sixth consecutive month of deliveries exceeding 20,000 units, the carmaker notes.

China Automobile Dealers Association (CADA) estimates the sales of new energy passenger cars in China reached 2.25 million units in October, with growth seen both year-on-year and month-on-month.

"The auto market continued to heat up in October, thanks to the dual incentives of the car trade-in policy and local replacement subsidies, as well as the large-scale auto shows held across the country during the National Day holiday, as well as dealers actively carrying out promotional activities to achieve their year-end goals and intensive launch of new models," the association explains. "The overall heat of the auto market continued to rise. Consumer demand for cars was accelerated, and car sales were further boosted."

CADA also predicts that the growth in sales will continue in November reflecting ongoing sales promotions among automakers.

China Passenger Car Association (CPCA) said in a preliminary estimate that wholesale sales of passenger EVs reached 1.4m units in October, up 58% y-o-y and 14% m-o-m.

UK BEV sales up 24.5% in October despite market contraction

Battery electric (BEV) was the only powertrain to record growth in the new UK car market during October, with sales growing by 24.5% year-on-year, Kallanish reports.

According to the Society of Motor Manufacturers and Traders (SMMT), this is the strongest BEV growth this year, which led to a monthly uptake of 20.7%. Total BEV registrations reached 29,802 units.

In comparison, diesel and petrol sales declined by 20.5% and 14.2%, respectively, driving overall car registrations down 6% in October.

"While it remains the case that the average BEV has a higher upfront cost than an ICE equivalent, widening choice and huge manufacturer discounting mean that around one in five BEV models now has a lower purchase price than the average petrol or diesel car, especially for buyers able to take advantage of schemes such as salary sacrifice," the SMMT says.

In October, the UK car market also registered 13,832 plug-in hybrid electric vehicles (PHEVs) and 19,012 hybrid electric vehicles (HEVs). Sales for these powertrains dropped 3.2% and 1.6%, to market shares of 9.6% and 13.2%, respectively.

SMMT chief executive Mike Hawes explains the UK is the second largest EV market in Europe thanks to a "massive manufacturer investment in model choice and market support." There are now over 125 different BEV models available for purchase in the country.

"EVs already work for many people and businesses, but to shift the entire market at the pace demanded requires significant intervention on incentives, infrastructure and regulation," he adds.

In October, the UK government announced the extension of business and fleet incentives for BEVs. However, it maintained the upcoming changes to the Vehicle Excise Duty and Company Car Tax, which the industry warns will disincentivise the purchase of electric vehicles.

To date, nearly 300,000 new BEVs have been registered this year, accounting for 18.1% of the total new car market. Yet, the mandatory share for this year is set at 22%.

UK NEW CARS SALES - YEAR TO DATE

	2024	2023	Y-o-Y	Market share - 24	Market share - 23
Diesel	106,610	122,211	-12.8%	6.4%	7.6%
Petrol	888,925	905,582	-1.8%	53.6%	56.4%
BEV	299,733	262,487	14.2%	18.1%	16.3%
PHEV	138,775	113,278	22.5%	8.4%	7.1%
HEV	224,339	201,879	11.1%	13.5%	12.6%
Total	**1,658,382**	**1,605,437**	**3.3%**		

SOURCE: SMMT, KALLANISH

Trump's victory throws clean tech strategies into doubt

Donald Trump is returning to the White House as the US' 47th president, leaving the world questioning what will happen with the Inflation Reduction Act (IRA).

In a speech, Trump highlighted the US potential with "liquid gold" referring to the country's oil reserves, which he claims to be larger than Saudi Arabia and Russia. He also declared his love for Elon Musk, a key ally in his victory, whom Trump described as a "star" and "super genius" while talking about Musk's success with space rockets and the satellite communication system, Starlink.

Electric vehicles, deemed another Musk success story, did not make it into the speech. Having criticised both electric and hydrogen fuel cell vehicles, it remains to be seen if Trump's alliance with Musk will change his stance on road transport decarbonisation.

"With another Trump presidency from 2025, various regulations are likely to change, resulting in a further slow-down of EV sales in North America and the domestic battery market," comments Wolfgang Bernhart, senior partner and global head of automotive at Roland Berger. "Republicans are likely to target EV incentives and tax credits, potentially restricting their accessibility, particularly for commercial vehicles and leases."

Currently, the forecast is for all-electric vehicles (BEVs) to hold a sales share of 46% in 2030 and 66% in 2035. However, Bernhat now expects that to be lower at 30% in 2030 and 40-50% in 2035, in a base case scenario.

For the battery market, that means that instead of the pre-election view of around 1 terawatt-hour (TWh) in 2030

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and 1.4 TWh in 2035, he expects around 0.7-0.8 TWh in 2030 and 1.1-1.2 TWh in 2035. There will likely be further potential downsides on the BESS (stationary energy storage) side, he adds.

Benhart also believes more stringent Environmental Protection Agency (EPA) regulations for upcoming model years may be scrapped, and that California's emissions regulations could face legal challenges and potentially revocation. Tariffs on vehicles and components imported from Mexico are expected to be increased, impacting imports but enforcing the case of producing batteries in the US.

On the hydrogen front, a Republic administration could mean the US IRA's hydrogen production tax credit (45 V) is "likely out of the window," says Leon de Graaf, sustainability advocate at Brussels-based consultancy Sustainable Public Affairs. "Even if Biden rushes it through before January, the risk is it'll be short-lived. Because while it might benefit some of Trump's oil major friends, he has sworn to dismantle any Biden-era mechanisms, so why would he keep this costly one alive?"

According to Carbon Brief, a Trump administration could add 4 billion tonnes of US emissions by 2030, compared with incumbent Joe Biden's plans. "This is enough to negate – twice over – all of the emissions savings from deploying wind, solar and other clean technologies around the world over the past five years," it warns.

Clean technologies companies are likely to maintain their wait-and-see approach until after 20 January, when Trump could provide further clarity on his plans and the future of the IRA.

BMW Group's Q3 BEV sales up 10.1%, profit down 84%

BMW Group's battery electric vehicle (BEV) sales went up significantly in the third quarter, although total net profit plunged nearly 84% on-year.

The automaker delivered 103,438 units during the June-September quarter, up 10.1% compared to 93,931 units in the same period last year. Overall, the share of BEVs in the company's total sales for the quarter rose to 19.1%, versus 15.1% in 2023.

Between January and September, BMW, MINI and Rolls-Royce sold a total of 294,052 BEVs – up 19.1% on-year. Of that, 266,152 units were under the BMW brand, 26,483 units under MINI and 1,417 units under Rolls-Royce.

Kallanish understands that across the three brands, the company offers over 15 electric models, with the BMW i4 and BMW iX1 being the most popular models.

"While other manufacturers – including some that only produce electric cars – are seeing a significant decrease in sales, battery-electric vehicles remain a growth driver for us in 2024," comments BMW ceo Oliver Zipse. "Looking ahead to next year, we anticipate another significant increase in sales of fully and partially electrified vehicles."

"For that reason, we see no need to modify or delay the European Union's stricter CO2 fleet targets for 2025," Zipse adds, noting that the company is "confident" about meeting the targets.

However, the executive criticised the introduction of tariffs on EVs imported from China into the EU, saying import duties "do not make European manufacturers any more competitive."

"On the contrary: They undermine the business models of companies that operate globally," the ceo continues. "And, since these tariffs mainly affect small electric cars built by European manufacturers, they could even impede the growth of e-mobility."

BMW Group reported a net profit of €476 million in Q3, compared to €2.93 billion in Q3 2023. Revenue fell 15.7% to €32.4 billion.

The German carmaker says it faced "extraordinary challenges" in the quarter, particularly due to falling sales in China and a braking system issue that led to vehicle recalls.

Nissan announces 9,000-job cut, lowers earnings forecast

Nissan Motor has revised downward its forecast for full fiscal 2024 amid low performance in the first half, Kallanish reports.

The Japanese carmaker now expects operating profit to reach JPY 150 billion ($976 million), down JPY 350 billion from its previous estimate. Net revenue is now targeted at JPY 12,700 billion, down JPY 1,300. Net income is yet to be determined due to ongoing assessment of costs necessary for the planned turnaround efforts.

As part of its cost-reducing measures, the company will cut its global workforce by 9,000 jobs. Global production will be reduced by 20%, helping the company to shrink fixed and variable costs by JPY 400 billion by FY 2026, compared with FY24.

During H1 FY24, the automaker's consolidated operating profit dropped 90% year-on-year, with operating profit margin reaching 0.5%, down 5.1 percentage points y-o-y. Net revenue in the period decreased 1.3% JPY 5.98 trillion.

"Profitability was affected by higher selling expenses and inventory optimisation efforts, particularly in the US, along with rising manufacturing costs," the company explains.

Global sales, meanwhile, were down 1.7% to just under 1.6 million units. In China, sales declined 5.4% y-o-y. Nissan did not disclose figures by powertrain but said it plans to expand its plug-in hybrid efforts in China and e-POWER sales in the US.

It aims to sell 3.5 million units/year by FY26, which should include eight new energy vehicle models specifically for the Chinese market.

Meanwhile, Nissan also seeks to enhance investment efficiencies and product competitiveness through strategic partnerships with Renault Group, Mitsubishi Motors Corporation, and Honda Motor.

To better implement new goals, Nissan also appointed a new chief performance officer responsible for sales and profit, effective from 1 December.

ELECTRIC VEHICLES: NEWS FROM THE WEEK

READ MORE NEWS ONLINE

China's XPeng to include EREVs in its portfolio
Chinese automaker XPeng says it will start manufacturing extended-range electric vehicles (EREVs) after a 10-year exclusive focus on battery electric vehicles (BEVs), Kallanish learns.

Company's chairman and ceo He Xiaopeng announced the news during the recent XPeng AI Technology Day. Promising market differentiation, he said there would be no point producing "another normal EREV."

The new powertrain will be based on the so-called Kunpeng system. "Kun" represents the system for EREVs, and "Peng" relates to BEVs. Under this system, the new models will feature a battery-electric mileage range of 430 kilometres and a comprehensive mileage range of 1,400 km.

EREVs have a larger battery than BEVs, an electric motor and a petrol engine. Unlike in plug-in hybrids, the petrol engine doesn't power the car. It only charges the battery for electric propulsion, working as a small generator.

"We must be prepared to face different countries and regions and provide more convenient and universal energy replenishment solutions," says He. "XPeng continues optimising its system and currently has 1,307 charging stations in China domestically. For 2025, XPeng will accelerate the construction both within China and abroad. The overseas ones will be open to all brands."

EREVs are becoming a very popular EV type in China as it offers a much higher range than BEVs.

XPeng is rumoured to be targeting mass production of its first EREV in the second half of 2025. The supposed SUV will be priced above CNY 200,000 ($27,998).

Audi China, SAIC launch new brand, unveil electric concept
Automakers Audi China and SAIC have launched a new brand, AUDI, in Shanghai, ditching the traditional Audi four-ring logo, Kallanish reports.

The brand is based on the intelligent advanced digitised platform jointly developed by the two companies. It will focus on electric vehicles and rely more on domestic suppliers and technologies.

The companies, which are trying to regain market share in China, debuted the first concept car – AUDI E. The planned B-level battery electric sportback will have dual motors on the front and rear axles, reaching a total power of 570 kilowatts.

With the support of the Audi Quattro four-wheel drive system, the AUDI E concept car can accelerate from 0 to 100 kilometres/hour in just 3.6 seconds. The battery capacity of the concept vehicle is 100 kilowatt-hours.

The China light-duty vehicle test cycle (CLTC) range is said to be of over 700 km (435 miles). Its intelligent digital platform also adopts an innovative 800-volt architecture with ultra-fast charging function. A 10-minute fast charging can increase the range by 370 km, the companies claim.

According to the plan, three mass-production models will be gradually launched from mid-2025. These include one SUV within the next three years. The first model is set to be a mid-sized B-level car.

Chinese passenger NEV sales up 56.7% in October
New energy passenger car sales in China exceeded 1.19 million units in October, an on-year increase of 56.7% and an on-month increase of 6.4%, Kallanish learns from China Passenger Car Association (CPCA).

Despite the slowdown in sales around the world, China's NEV car sales continue to show strong growth. Year-to-date, sales grew 39.8% to 8.33 million units.

The passenger NEV penetration rate reached 52.9% in October. Battery electric (BEVs) accounted for 56% of total sales at 673,000 units. Plug-in hybrid electric vehicles (PHEVs) held a 34% market share with 405,000 units, while extended-range electric vehicles (EREVs) totalled 117,000 units or 10% of the total sales.

Appetite for PHEV continued, with sales surging 107.7% y-o-y, compared to a 36.7% rise in BEV sales.

Exports of passenger NEVs accounted for about 27.1% of total Chinese car exports, reaching 160,000 units in October. That's virtually in line with last year's volume.

"With the recovery of markets such as South America, Chinese domestic brand exports reached 371,000 units in October, an on-year increase of 16% and an on-month increase of 3%. Exports of joint venture and luxury brands reached 70,000 units, down 4% y-o-y," CPCA notes.

CHINA BATTERY MATERIALS TRADE FLOW

EXPORTS FROM CHINA

Commodity	Product Name	Sep 24	Mom Δ %	Yoy Δ %	YTD Yoy Δ %
Cobalt	Unwrought cobalt	515	-28%	-4%	137%
Lithium	Lithium hydroxide	12,714	22%	15%	9%
	Lithium carbonate	166	-30%	-71%	-69%
Nickel	Nickel sulphate	3,334	64%	531%	83%
	Unwrought nickel	7,665	-16%	107%	288%
Precursor	NCM precursor	9,355	-16%	-41%	-24%
	NCA precursor	4	-80%	-	-45%
Cathode	NCM cathode	3,920	-47%	-38%	-27%
	LFP cathode	537	105%	1,210%	108%
	NCA cathode	80	-86%	-90%	-53%
Anode	Graphite flake	5,944	-13%	-8%	-23%
	Spherical graphite	3,515	28%	-6%	-26%
	Synthetic graphite	47,508	7%	7%	0%

SOURCE: GTT, KALLANISH

IMPORTS FROM CHINA

Commodity	Product Name	Sep 24	Mom Δ %	Yoy Δ %	YTD Yoy Δ %
Cobalt	Cobalt concentrate	-	-100%	-100%	-95%
	Cobalt intermediates	61,359	18%	102%	84%
	Unwrought cobalt	292	65%	-13%	-40%
Lithium	Lithium hydroxide	1,473	176%	29,360%	189%
	Lithium carbonate	16,264	-8%	19%	49%
Nickel	Nickel concentrate	4,566,207	-7%	-22%	-13%
	Nickel sulphate	21,678	-5%	50%	110%
	Nickel matte	34,206	-50%	29%	62%
	Unwrought nickel	4,339	-39%	5%	-15%
Precursor	NCM precursor	-	-100%	-100%	-50%
Cathode	NMC cathode	3,540	-28%	-66%	-32%
	LFP cathode	2	-33%	-33%	82%
	NCA cathode	1,203	157%	-18%	-23%
Anode	Graphite flake	27	-93%	-97%	-69%
	Synthetic graphite	851	-14%	-37%	-22%

SOURCE: GTT, KALLANISH

BATTERY MATERIALS TRADE FLOW ANALYSIS

SOURCE: GTT, KALLANISH

LITHIUM CARBONATE NET IMPORT

TOP 5 COUNTRIES

Imports	Sep-24	MoM	YoY	YTD	YoY
Chile	13,927	8%	28%	130,367	35%
Argentina	2,026	-55%	-24%	30,906	141%
South Korea	218	199%	738%	1,702	164%
Brazil	69	23%	n/a	125	n/a
Lao	23	n/a	n/a	142	n/a

Exports	Sep-24	MoM	YoY	YTD	YoY
Japan	104	-29%	-53%	1,361	-40%
India	19	n/a	533%	139	48%
Italy	10	n/a	n/a	70	483%
Indonesia	7	n/a	n/a	90	2,900%
South Korea	6	-89%	-98%	518	-89%

LITHIUM HYDROXIDE NET EXPORT

Imports	Sep-24	MoM	YoY	YTD	YoY
Australia	802	n/a	n/a	3,561	19,683%
South Korea	419	24%	n/a	810	2,900%
United States	252	168%	n/a	769	187%

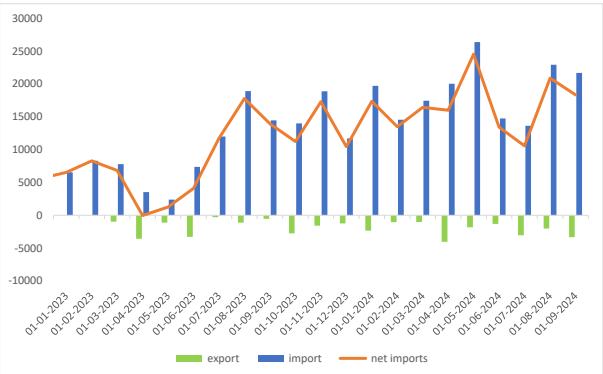
Exports	Sep-24	MoM	YoY	YTD	YoY
South Korea	10,261	43%	24%	69,080	5%
Japan	2,063	-31%	-19%	27,337	16%
Sweden	144	0%	33%	1,854	20%
Singapore	96	433%	n/a	402	108%
Netherlands	43	n/a	115%	198	144%

GRAPHITE FLAKE NET EXPORT

Imports	Sep-24	MoM	YoY	YTD	YoY
Madagascar	13	-97%	-98%	8,934	-50%
United States	13	n/a	550%	31	15%
Taiwan	1	n/a	n/a	1	n/a

Exports	Sep-24	MoM	YoY	YTD	YoY
Japan	1,015	-24%	17%	8,794	-10%
South Korea	987	-15%	1%	8,889	-14%
United States	794	231%	339%	2,920	-35%
Iran	667	80%	55%	1,897	16%
Germany	519	-34%	-39%	7,125	80%

NICKEL SULPHATE NET IMPORT



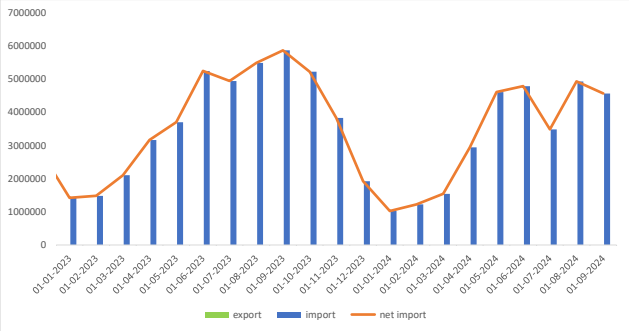
Imports	Sep-24	MoM	YoY	YTD	YoY
Indonesia	18,680	-8%	122%	135,860	301%
South Korea	2,246	5%	-36%	16,167	79%
Finland	701	n/a	-59%	14,899	-47%
Japan	23	21%	92%	178	-14%
Belgium	21	11%	n/a	116	53%

Exports	Sep-24	MoM	YoY	YTD	YoY
Japan	2,400	26%	n/a	12,974	21,523%
Indonesia	900	1,186%	n/a	1,680	16,700%
Bangladesh	10	n/a	n/a	27	35%
Hong Kong	8	-43%	n/a	80	25%
Viet-Nam	8	700%	-27%	40	-53%

BATTERY MATERIALS TRADE FLOW ANALYSIS

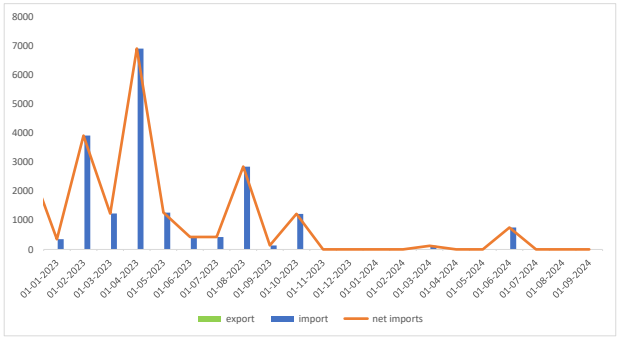
SOURCE: GTT, KALLANISH

NICKEL CONCENTRATE NET IMPORT



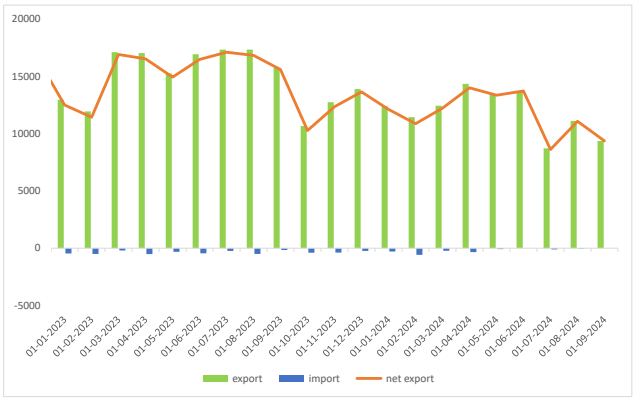
Imports	Sep-24	MoM	YoY	YTD	YoY
Philippines	4,364,677	-9%	-19%	26,372,308	-9%
Solomon Islands	54,002	n/a	n/a	422,223	n/a
New Caledonia	47,488	n/a	-78%	962,797	-59%
Côte d'Ivoire	37,777	-60%	-53%	809,173	-27%
Russia	27,614	65%	-45%	182,778	22%

COBALT CONCENTRATE NET IMPORT



Export	Sep-24	MoM	YoY	YTD	YoY
South Africa	1	0%	n/a	2	-98%

NCM PRECURSOR NET EXPORT

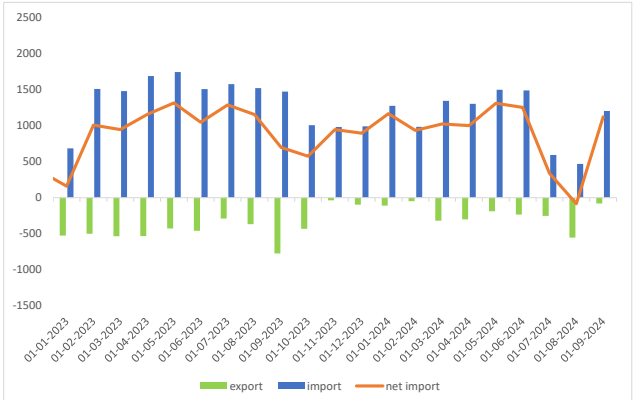


Exports	Sep-24	MoM	YoY	YTD	YoY
South Korea	9,328	-14%	-40%	105,959	-25%
Indonesia	16	n/a	n/a	16	n/a
Morocco	8	-95%	n/a	185	n/a
United States	2	-33%	-50%	77	-43%
Japan	1	-67%	n/a	9	-76%

NCA PRECURSOR NET EXPORT

Exports	Sep-24	MoM	YoY	YTD	YoY
South Korea	4	n/a	n/a	21	-42%

NCA CATHODE NET EXPORT

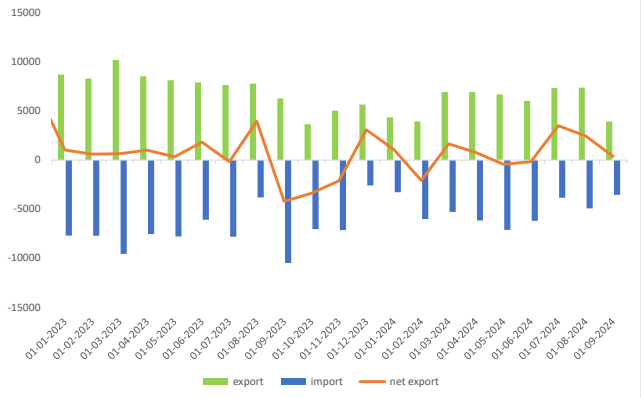


Export	Sep-24	MoM	YoY	YTD	YoY
Taiwan	76	-65%	-77%	1,586	64%
Malaysia	3	n/a	n/a	159	n/a
France	1	n/a	n/a	2	100%

BATTERY MATERIALS TRADE FLOW ANALYSIS

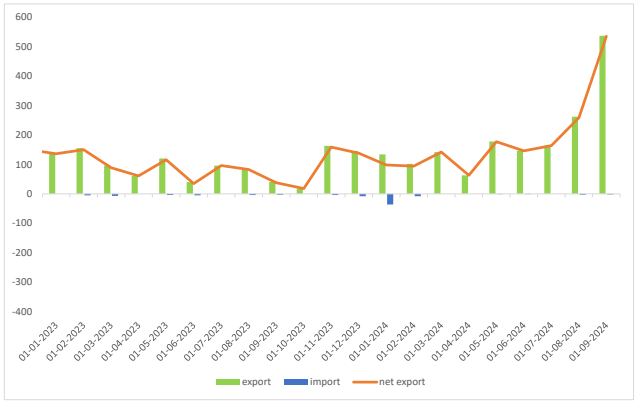
SOURCE: GTT, KALLANISH

NCM CATHODE NET EXPORT



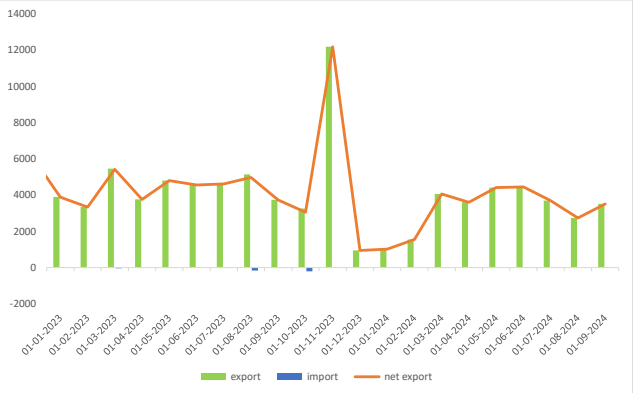
Exports	Sep-24	MoM	YoY	YTD	YoY
Japan	1,720	99%	47%	8,268	-8%
Poland	836	-42%	127%	9,843	-10%
South Korea	617	-81%	-87%	26,423	-44%
Indonesia	480	-43%	1,900%	3,749	2,366%
Belgium	100	-78%	n/a	2,047	977%

LFP CATHODE NET EXPORT



Export	Sep-24	MoM	YoY	YTD	YoY
Taiwan	180	88%	n/a	360	216%
Viet-Nam	121	1,629%	n/a	153	n/a
Poland	96	n/a	n/a	96	n/a
South Korea	62	-31%	77%	623	64%
Japan	52	767%	940%	112	-18%

SPHERICAL GRAPHITE NET EXPORT



Exports	Sep-24	MoM	YoY	YTD	YoY
South Korea	1,472	16%	-33%	14,034	-36%
United States	1,173	72%	59%	6,057	-33%
Japan	665	20%	-19%	8,139	11%
Indonesia	129	316%	n/a	351	n/a
France	74	35%	n/a	215	1333%

SYNTHETIC GRAPHITE NET EXPORT

Exports	Sep-24	MoM	YoY	YTD	YoY
Netherlands	7,520	n/a	1,349%	37,909	528%
Iran	7,200	543%	n/a	26,808	n/a
India	5,023	-37%	-37%	49,131	-1%
Japan	4,417	-30%	-18%	52,055	4%
United States	2,885	-66%	-60%	61,304	27%

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