

Transportation & power sectors are key for metals outlook

Copper, aluminium, nickel, cobalt and lithium are all set to benefit from the energy transition. How much will depend on the proactiveness of government and the private sector. The trend is clear, it is just a matter of how quickly it happens. Here is how we see demand from road transportation and the power sector evolving under our scenarios



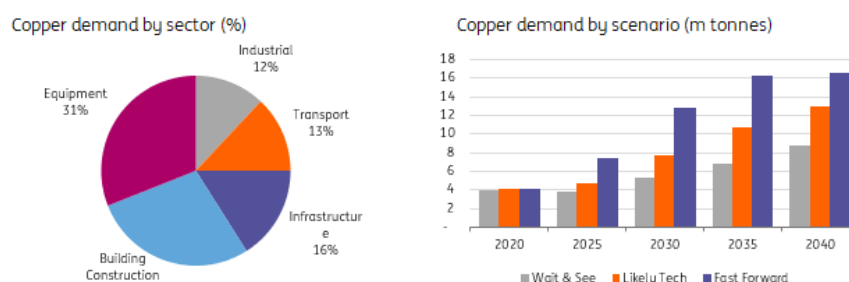
Copper

Global copper consumption is estimated at almost 29mt. It has grown at a compound annual rate of 1.97% between 2012 and 2019.

Equipment and building construction are the largest end users of copper, making up 31% and 28% of total demand, respectively. Infrastructure and transportation follow at 16% and 13%, respectively, whilst the remainder goes towards the industrial sector. Infrastructure will include transmission and distribution networks, as well as telecommunication networks. The bulk of transportation demand will go towards road transportation, but there is also a sizeable amount that goes towards railroads and shipping.

Copper demand will benefit from a growing share of electric vehicles, along with more renewable infrastructure and investment in the grid. Under our 'Wait & See' scenario, copper demand from road transportation and the power sector grows by 117% between 2020 and 2040, equivalent to a compound annual growth rate of 3.9%. Copper demand grows at annual rate of 6% under our 'Likely Tech' scenario, while under our most aggressive scenario, 'Fast Forward', demand from these two sectors grows at a CAGR of 7.2% to total almost 17mt by 2040.

Copper demand split and demand outlook by scenario for road transportation & power sector



Source: IWCC, ING Research

Aluminium

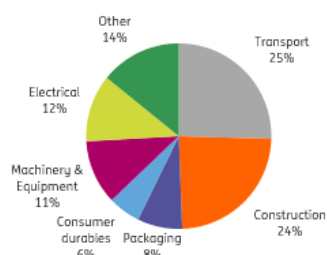
Current annual aluminium consumption totals around 90mt (including secondary aluminium). The largest end user for aluminium is transportation, making up 25% of total demand. The next two largest end users are construction and electrical, making up 24% and 12%, respectively.

Aluminium is another big winner from the energy transition. The metal has already benefited from the push towards [lightweighting](#) to improve vehicle efficiency and there is further upside ahead. Lightweighting is even more important for EVs as an even larger proportion of the chassis and body use aluminium. Meanwhile, increased wind and solar deployment in the power sector will drive higher aluminium demand. Given the cost advantage of using aluminium over copper as well as its lighter weight, almost all above ground transmission and distribution lines will use aluminium. A larger share of aluminium cables may also be used underground given the cost advantage.

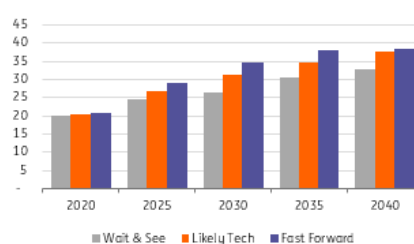
While there will be significant growth in aluminium demand from EVs, there will be displacement from reduced ICE vehicle sales. Therefore demand growth for total road transportation will be much more modest than growth seen from the EV segment. Our 'Fast Forward' scenario sees aluminium demand from road transportation and the power sector grow by a little over 3% per annum between now and 2040, or from a little more than 20mt to 38mt by 2040. Our 'Likely Tech' scenario sees similar annual growth over the period, while under our 'Wait & See' scenario, demand grows at an average of 2.5% per year.

Aluminium demand split and demand outlook by scenario for road transportation & power sector

Aluminium demand by sector (%)



Aluminium demand by scenario (m tonnes)



Source: IAI, ING Research

Nickel

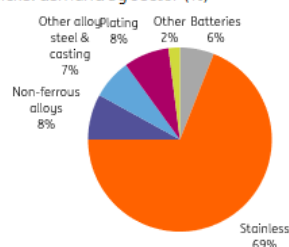
Nickel demand currently stands at around 2.4mt and is dominated by stainless steel. Almost 70% of demand comes from the stainless steel sector. The battery industry still makes up a small proportion of nickel demand at just 6%. However, with the expected growth in EVs, this is expected to grow significantly in the years ahead.

Nickel demand from the power sector will not be significant, with demand from stationary storage relatively small. However, the use of stainless steel in renewable infrastructure will indirectly be advantageous for nickel, given its use in stainless steel production.

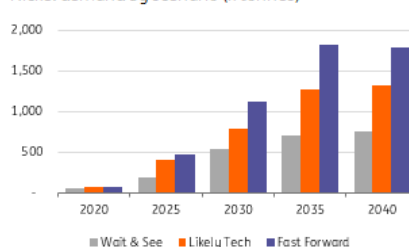
Nickel demand from road transportation and the power sector grows by 13.2% per annum between now and 2040 under our 'Wait & See' scenario, 15.3% per annum under our 'Likely Tech' scenario and 16.8% in our 'Fast Forward' scenario.

Nickel demand split and demand outlook by sector for road transportation & power sector

Nickel demand by sector (%)



Nickel demand by scenario (k tonnes)



Source: Roskill, ING Research

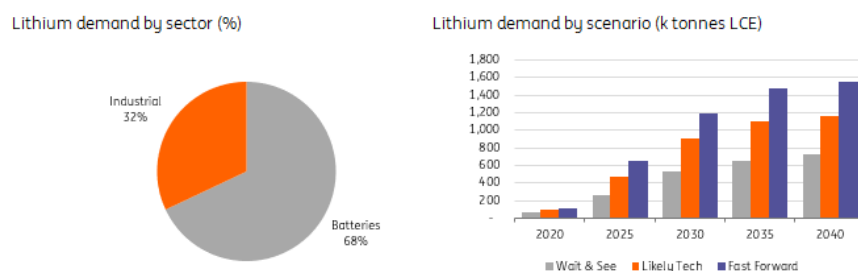
Lithium

Global annual lithium demand totals 290kt LCE. The growth in electric vehicle sales is largely behind this and is clearly a trend which is set to continue. The batteries industry makes up the bulk of lithium demand, at close to 70%. Clearly, technology advances are a risk to the bullish demand outlook for lithium. However, we assume under all our scenarios that lithium-ion batteries will be the dominant battery used by vehicle manufacturers.

Looking at road transportation and the power sector, it is the former which will dominate future demand growth. The power sector will see growth from a build-up in stationary energy storage capacity but the absolute numbers are a fraction of what will be seen in electric vehicles.

Under our 'Wait & See' scenario, we see total lithium demand from EVs and the power sector growing by 13% p.a. through until 2040. While under our 'Fast Forward' scenario, annual demand growth will be around 14% to leave demand from these two sectors at 1.6mt LCE by 2040.

Lithium demand split and demand outlook by scenario for road transportation & power sector



Source: Albemarle, ING Research

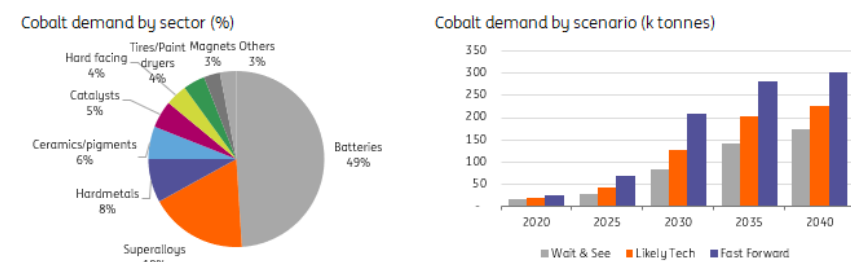
Cobalt

Cobalt demand currently stands at around 135ktpa, with the battery industry dominating demand, making up almost 50% of total cobalt consumption. Like nickel, cobalt demand will be largely driven by the transportation sector, while the power sector sees much more modest demand under all of our scenarios.

There is plenty of concentration risk around cobalt, with 66% of current supply coming from the Democratic Republic of Congo. In addition, there are worries over the sustainability of the DRC supply chain, particularly when it comes to supply from artisanal mines. As a result, there is a push to reduce the use of cobalt in lithium-ion batteries and even produce cobalt free batteries. The battery chemistry used in future is a key uncertainty when it comes to forecasting cobalt demand under our different scenarios.

Under our 'Fast Forward' scenario, we forecast that cobalt demand from road transportation and the power sector grows at an annual rate of 13.6% through until 2040. Demand under the 'Likely Tech' scenario grows at a CAGR of 13.2%, while under our most pessimistic scenario, 'Wait & See', cobalt demand grows by 12.8% per year.

Cobalt demand split and demand outlook by scenario for road transportation & power sector



Source: EU Commission, ING Research

In the next two articles we will dive deeper into the industries which we believe will drive metals demand higher in the years to come. Specifically, road transportation and the power sector.

Author

Warren Patterson

Head of Commodities Strategy

Warren.Patterson@asia.ing.com

Disclaimer

This publication has been prepared by the Economic and Financial Analysis Division of ING Bank N.V. ("ING") solely for information purposes without regard to any particular user's investment objectives, financial situation, or means. *ING forms part of ING Group (being for this purpose ING Group N.V. and its subsidiary and affiliated companies).* The information in the publication is not an investment recommendation and it is not investment, legal or tax advice or an offer or solicitation to purchase or sell any financial instrument. Reasonable care has been taken to ensure that this publication is not untrue or misleading when published, but ING does not represent that it is accurate or complete. ING does not accept any liability for any direct, indirect or consequential loss arising from any use of this publication. Unless otherwise stated, any views, forecasts, or estimates are solely those of the author(s), as of the date of the publication and are subject to change without notice.

The distribution of this publication may be restricted by law or regulation in different jurisdictions and persons into whose possession this publication comes should inform themselves about, and observe, such restrictions.

Copyright and database rights protection exists in this report and it may not be reproduced, distributed or published by any person for any purpose without the prior express consent of ING. All rights are reserved. ING Bank N.V. is authorised by the Dutch Central Bank and supervised by the European Central Bank (ECB), the Dutch Central Bank (DNB) and the Dutch Authority for the Financial Markets (AFM). ING Bank N.V. is incorporated in the Netherlands (Trade Register no. 33031431 Amsterdam). In the United Kingdom this information is approved and/or communicated by ING Bank N.V., London Branch. ING Bank N.V., London Branch is authorised by the Prudential Regulation Authority and is subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. ING Bank N.V., London branch is registered in England (Registration number BR000341) at 8-10 Moorgate, London EC2 6DA. For US Investors: Any person wishing to discuss this report or effect transactions in any security discussed herein should contact ING Financial Markets LLC, which is a member of the NYSE, FINRA and SIPC and part of ING, and which has accepted responsibility for the distribution of this report in the United States under applicable requirements.

Additional information is available on request. For more information about ING Group, please visit <http://www.ing.com>.