Special Report

Environmental, Social and Governance (ESG) : A Bumpy Road to Net Zero

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Transition from net-zero rhetoric to reality fraught with short-term challenges

Transition to a greener economy necessitates significant capex adjustments, workforce reallocation and raw material price fluctuations, which are fraught with risks and uncertain returns.

Capital Expenditure

- Spend on energy and land-use systems must increase by **USD3.5 trillion per year from the current USD5.7 trillion per year** for the next 30 years to **USD9.2 trillion annually.**
- This amount would be invested to deploy new physical assets and decarbonise existing ones.
- In this report, we focus on **key business risks** and perform a sector-wise analysis on the **automobiles, electric utilities, mining and oil & gas sectors.**

Raw Materials

- Investment in **raw material** procurement needs to be **prioritised over EVs and batteries.**
- While it only takes 1–2 years to build an EV or a solar plant, it could take 5-10 years, from discovery to production, to build a mine and usually much longer for a global mine.
- **Rapidly scaling up demand** for low-emission assets and other products needed for the transition, **without a** corresponding **scale-up of supply**, could lead to **supply-demand mismatch and price increase**.

Job Disruptions

- The green transition to 1.5°C could result in ~200 million direct and indirect jobs gained and **185 million jobs lost by 2050.**
- While there is sufficient time to plan for other sectors, getting the coal transition right is the first step as it is happening at a faster pace and much larger scale.

Source: McKinsey – The net-zero transition report

Higher capex alongside uncertain returns

Businesses face significant challenges in short term due to upfront investments

- The green transition entails significant upfront capital investment and reinvention of technologies to eliminate the carbon footprint. In particular, the automobile, electric utilities, mining and oil & gas sectors need higher capex to decarbonise their legacy business models.
- Since every company in the aforementioned sectors is in transition, it is challenging to divest carbon-intensive assets to generate capital. Moreover, the transition has lowered the barriers to entry, paving the way for new players to enter the market, especially in the automobile and renewable energy sectors. This has resulted in stiffer competition and tighter margins.

Key challenges from higher capital investments to manage in short term

Funding Risk

- Given the front-loaded investment in carbon technologies, companies face significant challenges in raising capital and securing finance at such a large scale.
- Lenders/investors have increased focus on green financing to reduce their carbon footprint.

Rating Pressure

- Higher investment directly translates into increased borrowing, adversely impacting leverage as well as free cash flow.
- As a result, corporates could face rating pressure. For example, on 4 April, 2022, Fitch Ratings downgraded electricity utility Enel to BBB+ on higher leverage due to the transition to renewable energy.

Risk/Return Trade-off

- Manufacturers are continuously evaluating the risk-return trade-off of their huge investments.
- The cost of producing carbon-free products is generally high relative to fossil fuel counterparts. However, whether end users can afford to pay a premium for such products, despite their willingness, is uncertain.

Technology Risk

- Green technologies are continuously evolving to increase efficiency, making it easy to manufacture on a mega scale, use fewer materials and enhance affordability.
- For example, Tesla invented the '4680' cell model that translates into fewer cell requirements compared with its earlier '18650' and '2170' cell models while facilitating considerable improvement in power and control of heat generation.

Higher capex alongside uncertain returns

Automobiles – Transition from legacy ICE production line to EVs

- The automobile industry is undergoing a transformation from its legacy internal combustion engine (ICE) production line to electronic vehicles (EVs). The transition to EVs requires substantial investments from automakers and suppliers of technologies and products.
- Since the time taken to manufacture EVs is reduced by about one-third less and they require fewer parts compared with their ICE counterparts, jobs are likely to shift from assembly and services to engineering and technology functions. The distribution model would witness reduced maintenance needs and lean more towards digital sales. As a result, auto manufacturers would have to incur additional costs in training workers with new skill sets to meet the industry's evolving needs and develop channels to address changing consumer requirements.

Automakers commit significant capex towards EV

Auto Manufacturer	Capex	Electrification Commitments
Volkswagen	USD 101bn of USD 180bn by 2026	25% of sales to be EV by 2026
Toyota	USD 70bn	33% of sales EV by 2030
Hyundai	USD 51bn by 2025	Fully electric by 2040
Mercedes	USD 45bn by 2030	100% EV by 2025
Honda	USD 43bn	40% sales by 2030; Fully electric by 2040
GM	USD 35bn by 2025	30 EV models by 2025
Stellantis	USD 34bn by 2025	70% sales in Europe and 40% in US to be EV by 2030
Ford	USD 30bn by 2025	40-50% of global sales to be EV by 2030
BMW	USD 24bn by 2024	50% EV by 2030
Audi	USD 20bn of USD 42bn by 2026	Manufacture only EV from 2026
Nissan	USD 17bn by 2026	50% EV sales by 2030

Source: Company filings
1 EUR = USD 1.1368, 1 KRW = USD 0.000841, and 1 JPY = USD 0.008675

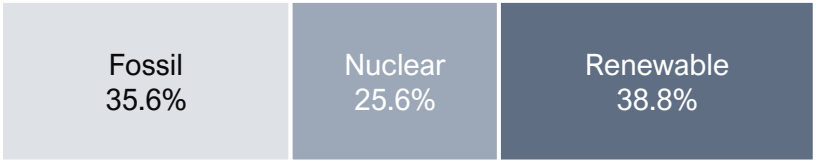
Higher capex alongside uncertain returns

Electric Utilities – Decarbonisation requires large investments in renewable energy

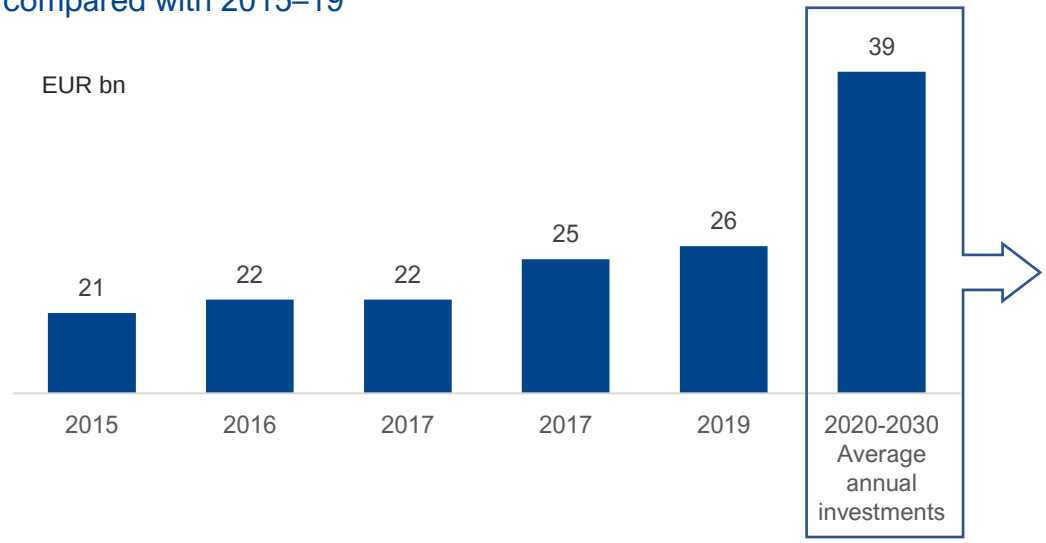
- Eurelectric estimates electricity demand would be 3,500 TWh in 2030 due to increasing electrification across sectors. To achieve this, around EUR39 billion of investment per year is required until 2030 in renewable energy generation and building of transmission networks.
- About half of the investment would be utilised for building renewable energy generation systems as well as infrastructure to fulfill the growing demand for EV charging stations, data centers, heat pumps, etc.
- The remaining would be used to build a distribution network and ramp up digital capabilities to maintain a decentralised distribution network.

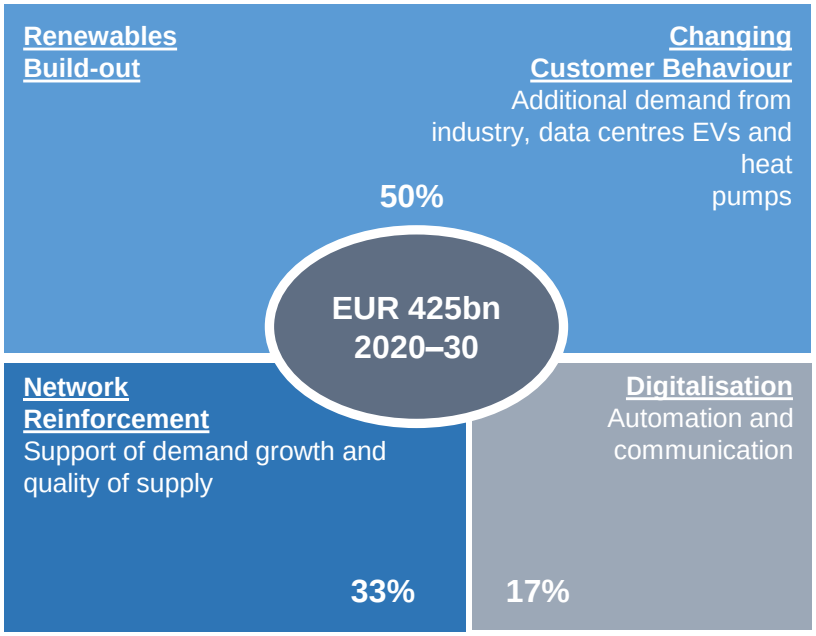
Europe generated about 60% of electricity in 2021 from non-renewable sources

Total electricity generated: 2,944.6 TWh



Annual investment needs in EU electricity sector 50–70% higher compared with 2015–19



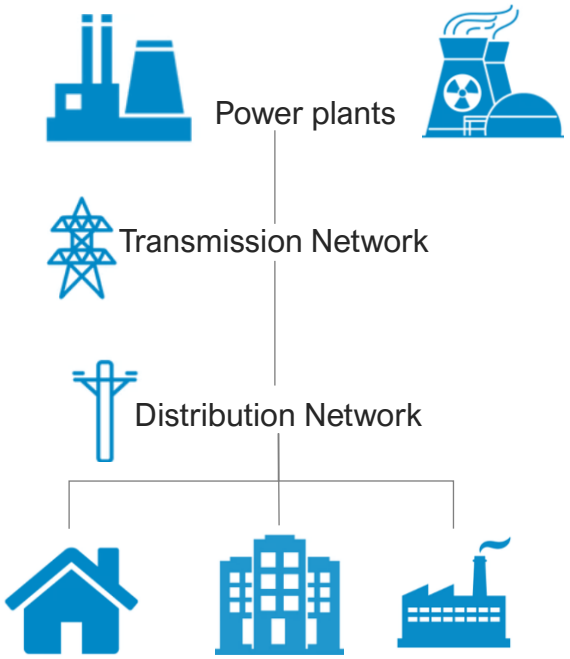


Source: Eurelectric - Federation of European electricity industry

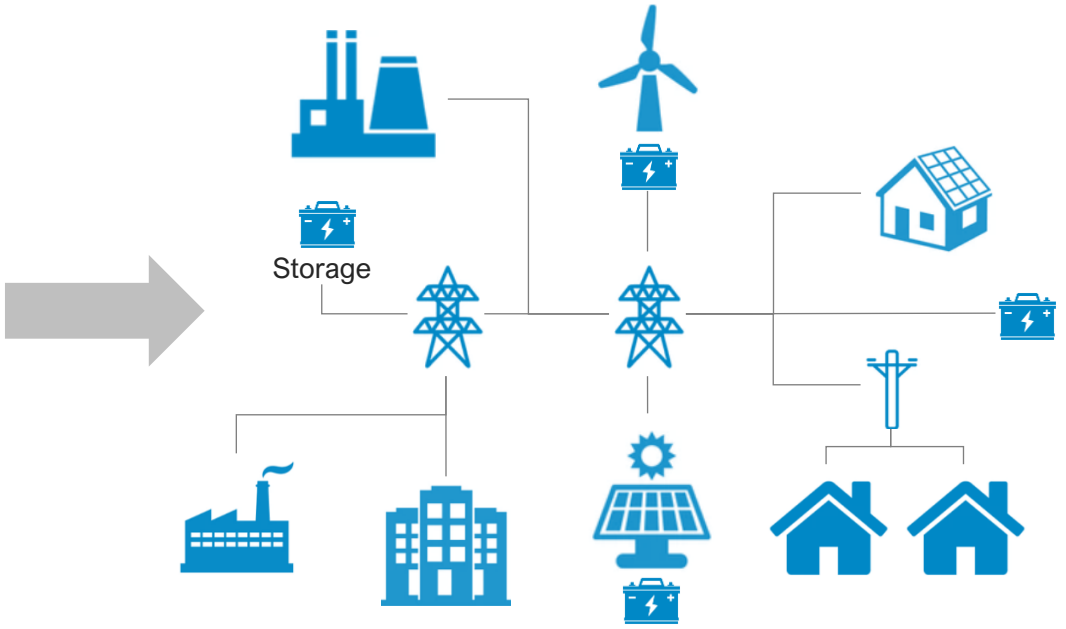
Higher capex alongside uncertain returns

Electric Utilities – Renewable energy means complex, volatile and decentralised network

Centralised Transmission



Decentralised Transmission



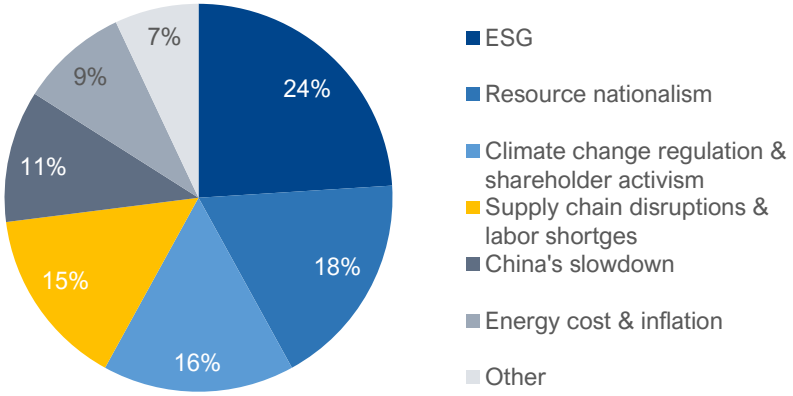
- **Investment in digitalisation is crucial to overcome the challenges of a decentralised network such as:**
  - Lack of economic scale
  - Complex network
  - Efficient management of volatile power generation
  - Limited flexibility on different network levels
  - Regular monitoring and control of network assets to ensure supply

Higher capex alongside uncertain returns

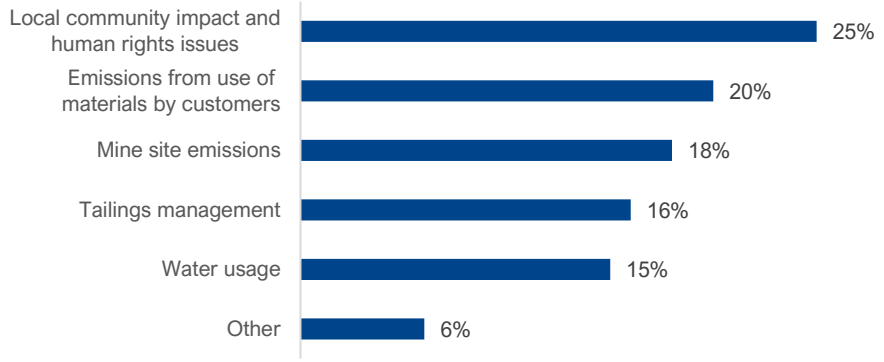
Mining – Sustainable procurement of metals a key factor driving green transition

- Despite the mining sector's critical role in the green transition, metal and mining companies face the highest ESG risk among sectors. Mining is hazardous to the environment as toxic chemicals are often used to process materials and the waste is stored behind potentially unstable dams. Social risk stems from lack of safety management, resettlement of people and cohesion with local communities.
- Governance risk arises from long-term sustainability of mining companies and high potential for corruption as they usually operate in developing countries. Failure to consider ESG would directly impact their ability to raise capital, obtain permits and work with communities and regulators.

Key risk for mining and metals in 2022



ESG areas where mining companies will face increased scrutiny in 2022



Source: White & Case - Mining & Metals market sentiment survey

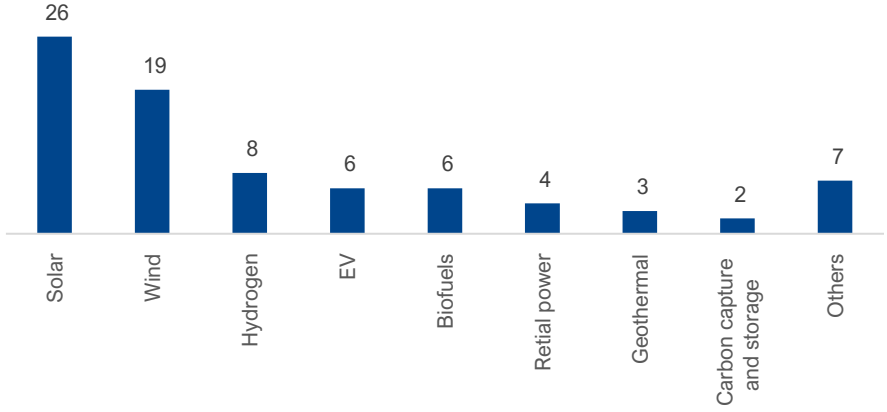
- Mining companies are attempting to minimise emission by selling stake in profitable coal businesses and promoting usage of renewable energy.
- Capital injections are required in developing alternatives to fossil fuels during smelting (e.g., making steel from hydrogen instead of coal), ensuring sustainable waste disposal and switching to EVs.
- It is vital for mining companies to become more environment-friendly due to growing concerns over sustainable procurement of raw materials. Recently, BHP signed a deal to supply nickel to Tesla by making the supply chain cleaner. Similarly, Rio Tinto is working to produce carbon-free aluminium for Apple Inc.

Higher capex alongside uncertain returns

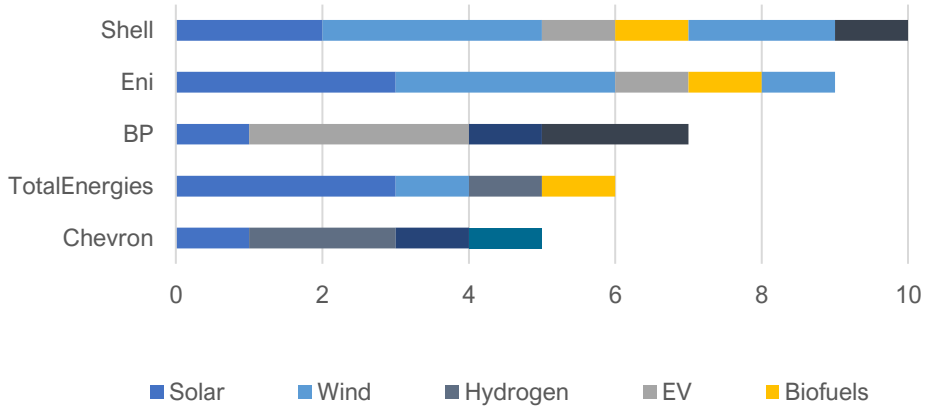
Oil & Gas– Focus shifts to renewable energy

- In a bid to move away from fossil fuel, oil & gas producers are increasingly investing in renewables, hydrogen and carbon capture technologies. In 2021, oil & gas producers signed 81 green deals, including in emerging sectors such as hydrogen production, EV charging and biofuel.

Most deals signed in solar & wind energy



Shell records highest deals among oil & gas producers



Source: Evaluate Energy

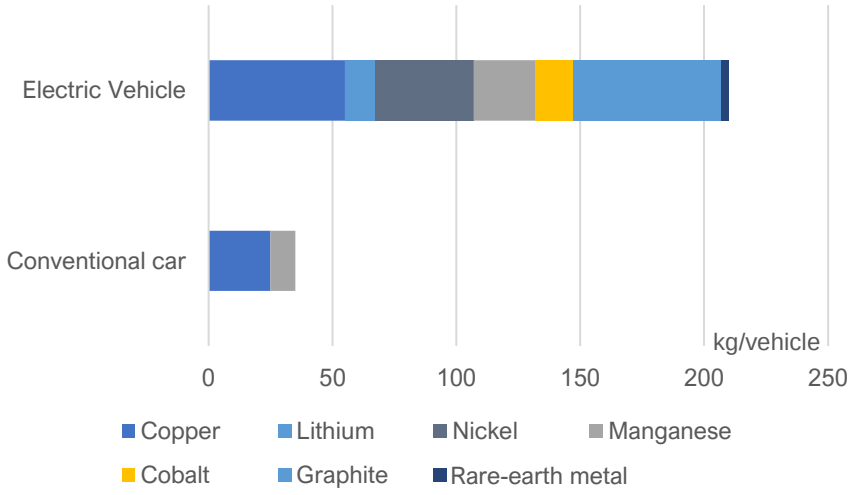
- Although investment in renewables is the quickest way for oil & gas producers to accelerate decarbonisation, it comes with its own challenges, mainly asset management. Turning from oil fields to solar and wind farms involves managing new assets, along with making fundamental changes in skill sets, manpower and material procurement. Similarly, switching to retail assets, such as EV charging stations, entails more customer focus, complex supply chains and strategies to sustain intense competition while expanding margins.
- To fund capex for renewables, major oil & gas players are divesting their oil assets. However, unloading these assets would not be easy as the entire industry is looking to transition to renewable energy.

Lingering tension over raw material prices

Green transition leads to higher demand for crucial metals

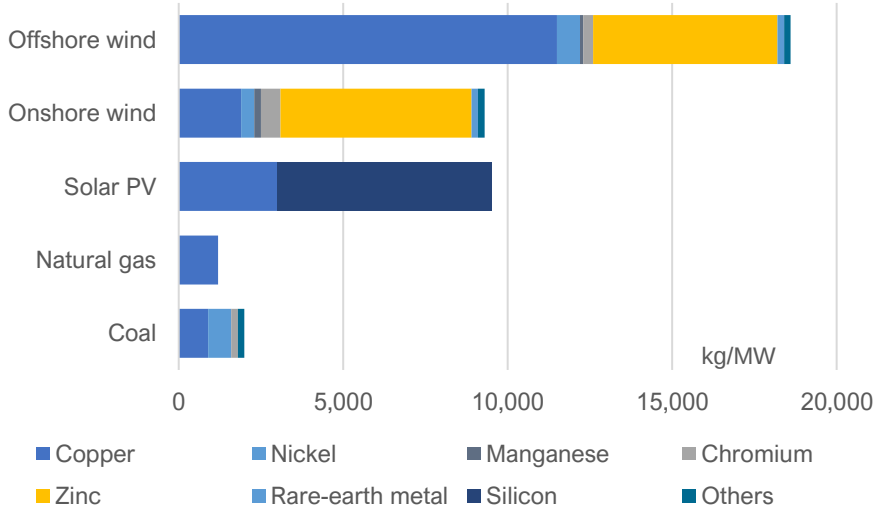
- Low-carbon technologies such as EVs and renewable energy are the key factors driving the green transition. However, EVs require more raw materials compared with their fossil fuel-powered counterparts.

Electric vehicles use more metals than conventional cars



Source: IEA

Renewable electric sources are heavily dependent on metals



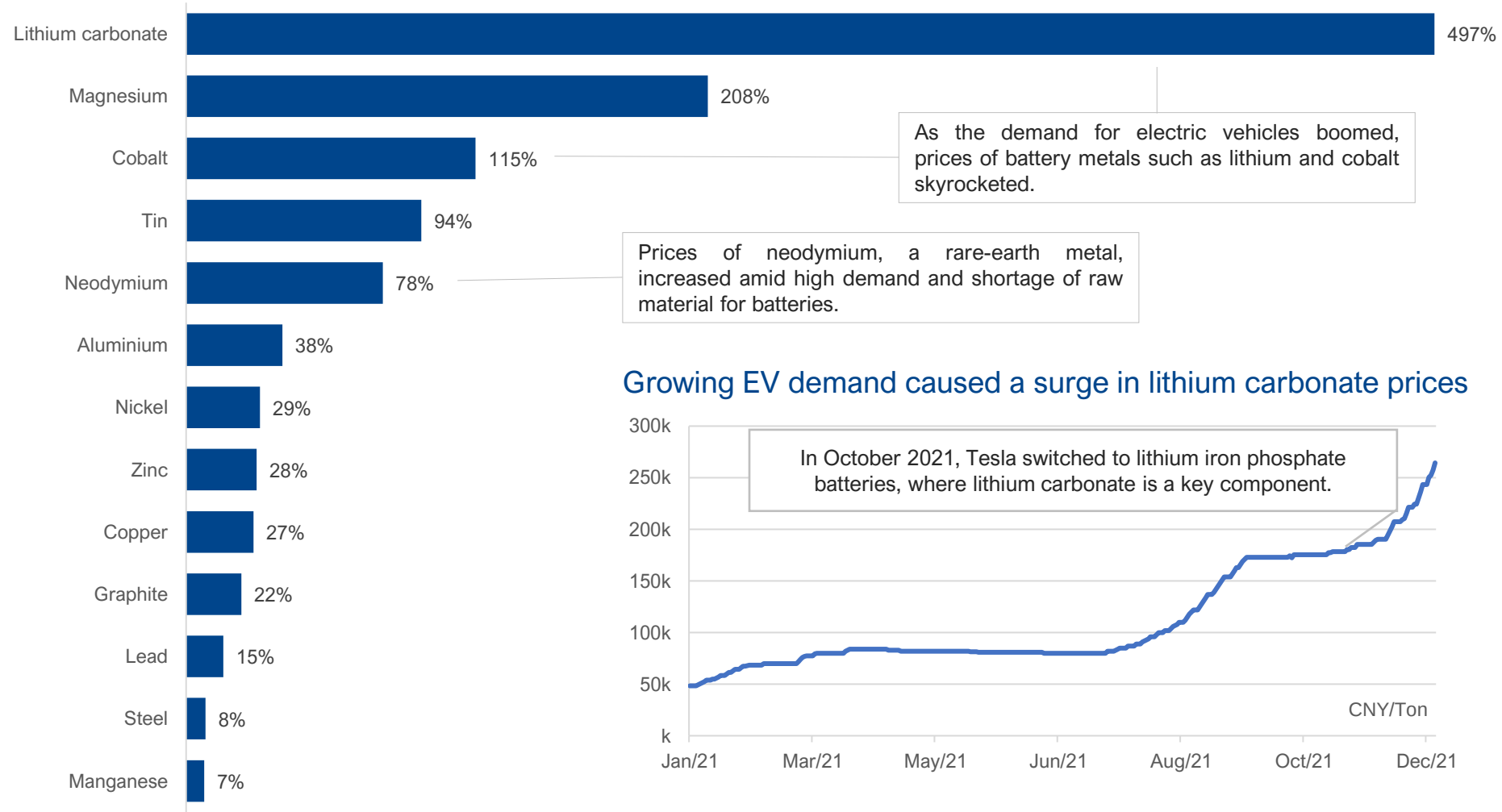
Source: IEA

- The high raw material requirement has led to a huge supply-demand mismatch. According to Russel Investments, the world produces 2.5 million tonnes of nickel/year, most of which is used for stainless steel. By 2025, another 1 million tonnes of nickel/year is needed just to satisfy the battery requirement, along with increased demand for steel from new infrastructure bill sanctions. By 2028, additional 2 million tonnes of nickel/year would be required for batteries, given the net-zero targets. It takes 3–5 years to set up a mine, considering responsible consultation and permitting times.
- Climate-neutral projects are increasingly sought-after and funded privately and publicly. All these factors have led to a surge in the demand for and price of crucial metals such as copper, lithium, cobalt, graphite and manganese. The current low recovery and recycling rate of these metals mean that their supply would come from virgin materials, leading to expansion of mining activities. However, growing socio-environmental concerns associated with metal extraction must also be addressed if a sustainable green transition is to be achieved.

Lingering tension over raw material prices

Higher demand resulting in record metal prices

Prices of crucial metals used in green technologies soared in 2021



As the demand for electric vehicles boomed, prices of battery metals such as lithium and cobalt skyrocketed.

Prices of neodymium, a rare-earth metal, increased amid high demand and shortage of raw material for batteries.

Growing EV demand caused a surge in lithium carbonate prices

In October 2021, Tesla switched to lithium iron phosphate batteries, where lithium carbonate is a key component.

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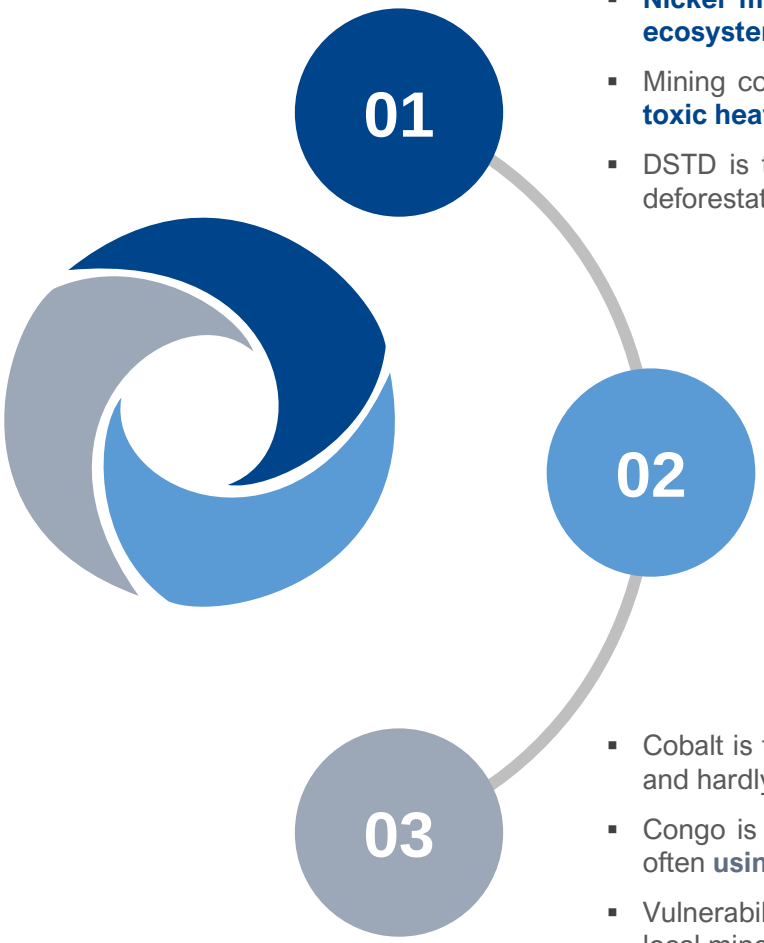
Lingering tension over raw material prices

Growing socio-economic concerns around procurement of metals

Ethical procurement of metals directly translates into higher raw material costs as sustainable mining processes are required.



- **Nickel mining in Indonesia** (the world's biggest producer) has led to **freshwater and marine ecosystem degradation.**
- Mining companies practice deep-sea tailings disposal (DSTD) by **dumping billions of tonnes of toxic heavy metal waste such as arsenic in the sea.**
- DSTD is the cheapest alternative to constructing a dam to store a tailing (which again leads to deforestation) or spending money to treat waste so it can be returned to the ground.

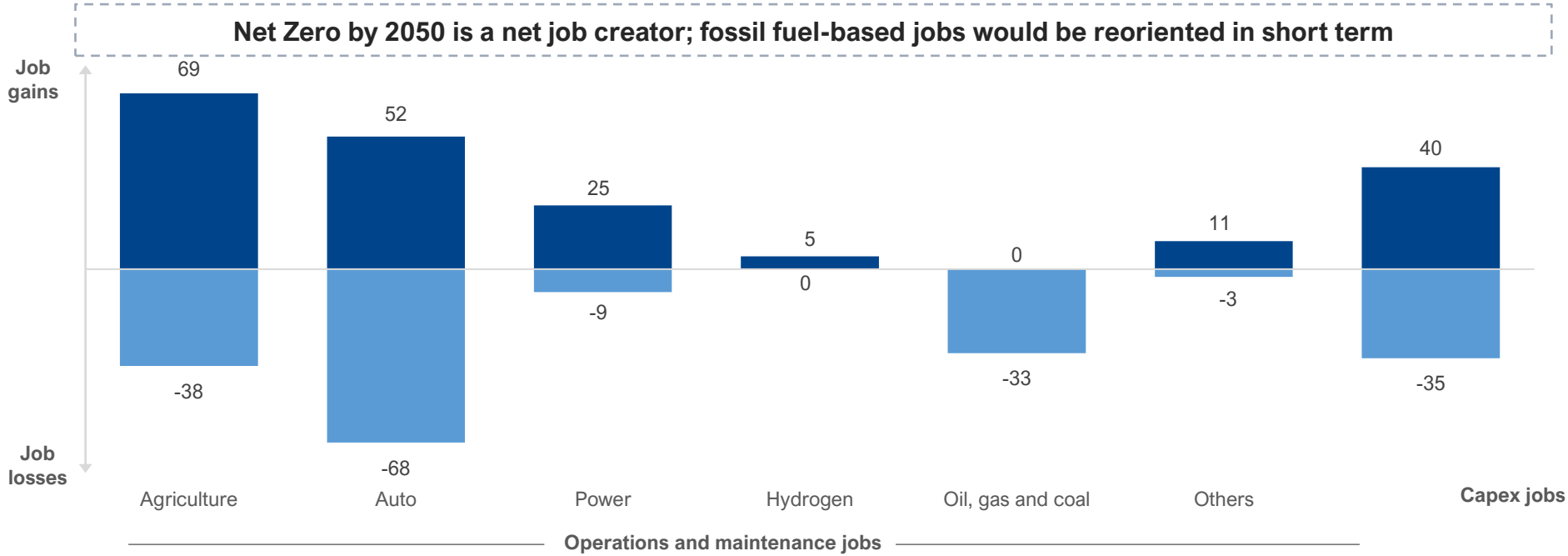
- About 50% of the world's lithium supply comes from the South American triangle – Argentina, Bolivia and Chile.
- These regions are among the world's driest places. Around **500,000 gallons of water is consumed to extract one tonne of lithium.**
- **Mining activities** in Chile's Salar de Atacama **consume 65% of the region's water, impacting local agriculture.**
- According to the International Chemical Secretariat, lithium mining **produces 17 harmful chemicals, including brominated flame retardants.**

- Cobalt is found in huge quantities across the Democratic Republic of Congo and Central Africa, and hardly anywhere else.
- Congo is home to 'artisanal mines' where cobalt is often **extracted** from the ground by hand, often **using child labour and with no protective equipment.**
- Vulnerabilities in societies have cropped up, increasing inequality between powerful MNCs and local miners.

Job disruptions in short term

Green transition is a net job creator, yet some sectors would witness significant job losses

- The impact of green transition on jobs would be unevenly spread across sectors and geographies. A few regions would observe job losses in fossil fuel-based sectors (e.g., coal mining, oil & gas) due to the need to promote alternative fuels, whereas other regions are likely to witness jobs creation in renewable energy and the circular economy. Technological skills would be in high demand while education and retraining would be essential to ensure successful job migration to green sectors.



Source: McKinsey & Company

- Agriculture, power, hydrogen and others (including mineral, forestry, steel, cement and biofuel) are net job gainers. The net gain in agriculture is mainly ascribed to higher production of poultry and energy crops to produce biofuel.
- **For net job creation to be a comfortable change for everyone, the transition to a green economy must be a smooth and orderly process instead of an abrupt one. This would ensure limited disruption and reduced cost.**

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