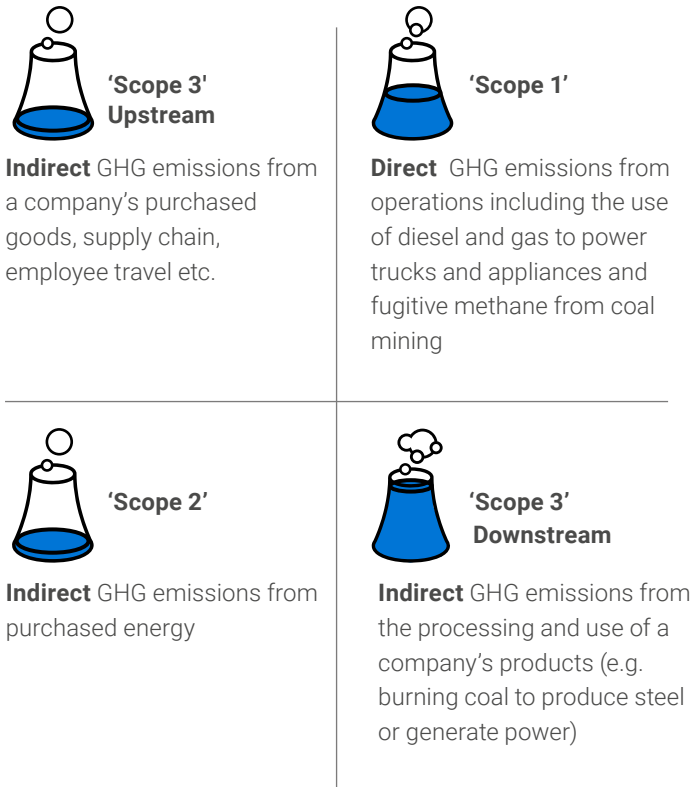



Net zero: mining

To prevent dangerous climate change, greenhouse gas emissions must reach net zero. What does the **mining sector** need to do?

4-7% of human-caused GHG emissions come from the operations of the mining sector

Sources of emissions

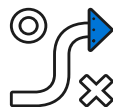


 Source: McKinsey (2020). Range in operational emissions depends on treatment of warming potential of methane



Challenges

- Loss of hydrocarbon revenues
- Water/energy use
- Costs and complexity of technologies
- Lack of infrastructure
- Limited recycling and scrap availability
- Young age for some high-carbon industrial facilities



Opportunities

- Key enabler of the low-carbon transition (raw materials for renewables, batteries, electric vehicles etc.)
- Cost reductions
- Increased safety and efficiency

Companies

Governments

Key levers	Key policies
Shifting commodity mix to accelerate the energy transition	Higher and more widely applied carbon prices
Electrification and automation to reduce emission from operations	Carbon border adjustment
Phasing out thermal coal	Fugitive methane regulation
Partnerships with vendors and customers	Policies to retrain workforce
	Policies to encourage low-carbon infrastructure



Other environmental considerations

- Pollution
- Impact on biodiversity
- Impact on land use
- Closure and rehabilitation
- Dam safety

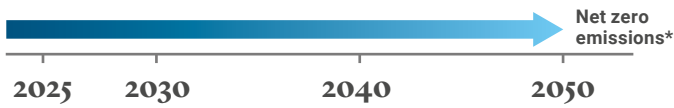
Social impacts and the just transition

- Maintaining social licence to operate/community rights
- Significant local employer
- Taxes and royalty payments

Physical risk impacts

- Water scarcity
- Heatwaves and flooding can take mines offline and disrupt supply chains

Decarbonisation effort



Easier to achieve

- Phasing of thermal coal from portfolios
- Renewable energy
- Digitalisation
- Electrification
- Increased recycling of metals

Possible with effort

- Increased efficiency and automation
- Deployment of green hydrogen and metals electrolysis
- Low-carbon processing (e.g. inert anodes for aluminium)

What is needed?



Company leadership

Taking responsibility for supporting decarbonisation across the full company value chain



Research and innovation

New smelting techniques
Hydrogen
Carbon capture and storage



Consumer behaviour

Increased demand for renewables and low-carbon materials and parts

LGIM will vote and implement investment sanctions against companies falling short of our climate expectations.

*To be followed by reducing emissions of other GHGs such as methane to net zero

How are we assessing companies' net zero pathways?

Net-zero Commitment	<ul style="list-style-type: none"> Does the company support the Paris Agreement target? Does the company have a comprehensive target for net zero by 2050 or earlier, including emissions from sold products?
Strategy	<ul style="list-style-type: none"> Are capex decisions analysed according to a well-below 2°C trajectory? Evidence of R&D in / acquisitions of low-carbon technology? Is executive remuneration aligned with the net zero pathway?
Resilience	<ul style="list-style-type: none"> Exposure to physical risk? Resilience of business model in – and alignment to – climate scenarios?
Targets	<ul style="list-style-type: none"> Does the company have a target to achieve net-zero operational emissions? Does the company have targets in relation to energy transition commodities?
Collaboration	<ul style="list-style-type: none"> Evidence of the company working collaboratively across its value chain to reduce emissions? Evidence of the company advocating for meaningful policy action?
Red lines	<ul style="list-style-type: none"> Does the company disclose downstream scope 3 emissions? Is the company planning to increase thermal coal capacity?

For more information...

Please see: <https://www.lgimblog.com/categories/esg-and-long-term-themes/climate-impact-pledge>

Important information

Source: LGIM as at September 2020. The value of an investment and any income taken from it is not guaranteed and can go down as well as up, you may not get back the amount you originally invested. The above information does not constitute a recommendation to buy or sell any security

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