

# The Viscaria project

Roadshow investor presentation – Monday, Block 2

20 September 2021



# Disclaimer

## Forward-looking statements

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## Financial information

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**Our vision:**

**Provide sustainable copper,  
to enable a zero carbon  
future**




# A. Sustainability

Why we put so much effort on getting the facts straight

- **We take sustainability seriously** – we want our aspirations to be realistic not just something to put on paper
- **To verify and set a realistic plan we have done a bottom-up modeling of GHG emission** – equipment by equipment, process step by process step conducted by a world leading consulting firm
- **Based on this analysis we are convinced that already from start** we will become among the top 10% greenest mines in the world

A. Sustainability

## Three scopes of green house gas emissions

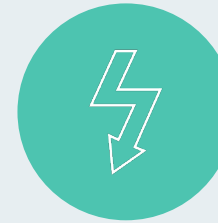
 Focus of analysis



### Scope 1

**Burning fuels (diesel, HVO)** for mobile equipment e.g.

- Haulage
- Trucks
- Bulldozers



### Scope 2

**Electricity generated** from fuel sources which produce GHG emissions e.g.

- Crushing
- Ventilation
- Mobile electric equipment



### Scope 3

**Upstream:** Emissions from raw materials incl. construction materials, consumables, raw materials for equipment

**Downstream:** Emissions from suppliers (e.g., transport) or usage of sold product



# A. Sustainability

We will move towards Net Zero in two stages

2025

~2028

>2028

## Stage 1: First step towards net zero



## Stage 2: Reaching net zero

### Addressing Scope 1

**100% Biofuels<sup>1</sup>**, made from renewable materials such as waste oils and fats, for all diesel equipment

- OP Rotary Drills, 100t OP mining truck, 50t UG mining truck, Dozers, Graders, etc.

### Battery-electric vehicles in suitable applications

- UG production drill, OP Electric loader, UG 17t loader, Dewatering pumps, Crushers, Grinding mills, etc.

### Fully electric operations, including e.g.

- Trolley systems for open pit
- Battery swapping or conveyor/skip underground
- Potentially using hydrogen fuel cell long-term

### Addressing Scope 2

**100% renewable electricity**

**100% renewable electricity**

1 HVO100 (100% fossil-free Hydrotreated Vegetable Oil)

# Viscaria

Waste Rock Dump

Lake

Water pond

Tailing pond

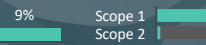
OP Mine

UG Mine

UG Mine opening

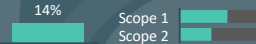
Drilling

% of mine GHGe Type of emissions



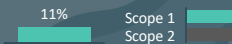
Other equipment

% of mine GHGe Type of emissions



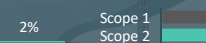
Blasting

% of mine GHGe Type of emissions



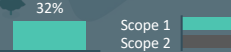
Loading

% of mine GHGe Type of emissions



Hauling

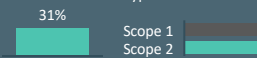
% of mine GHGe Type of emissions



Processing area

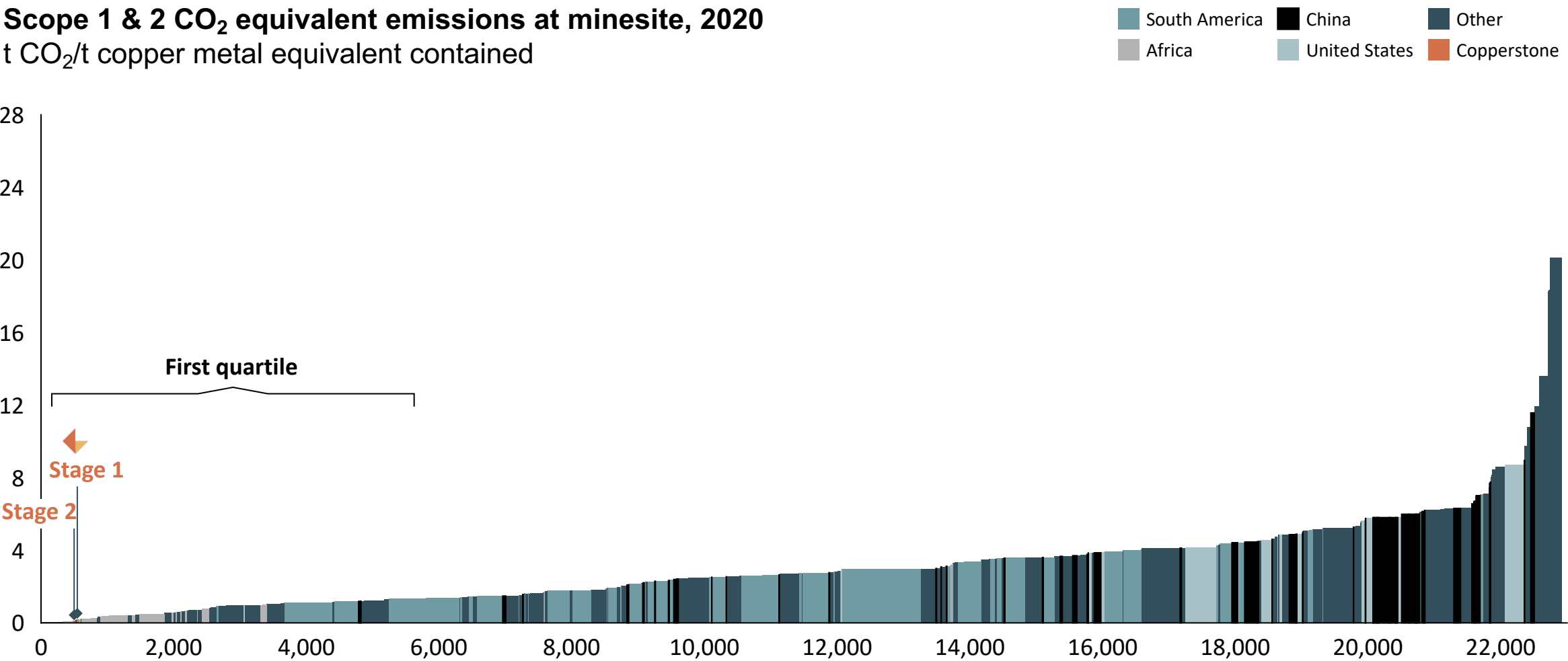
Processing

% of mine GHGe Type of emissions



# This will make us one of the world's most sustainable mines

Scope 1 & 2 CO<sub>2</sub> equivalent emissions at minesite, 2020  
t CO<sub>2</sub>/t copper metal equivalent contained



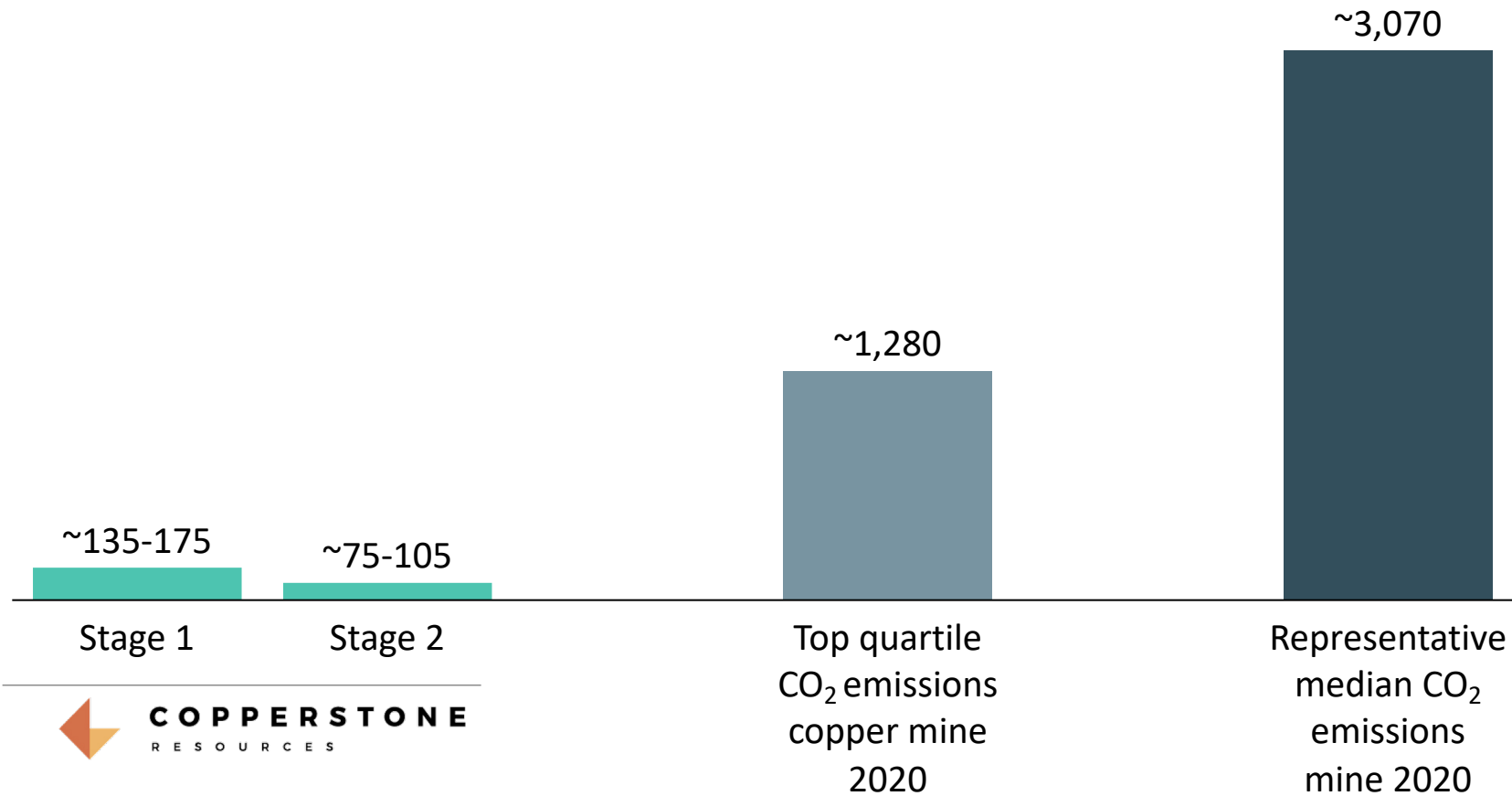
Source: MineSpans



# A. Sustainability

Already in stage 1,  
Copperstone is expected to be  
one of the most sustainable  
copper mines globally

Relative scope 1 and 2 GHG emissions  
Kg CO<sub>2</sub>/ tonnes copper/ year



Source: Company analysis; Supplier data; Annual reports; Company presentations; Press releases

**Stage 1:** Viscaria GHG emissions expected at ~135-175 kg per tonnes copper produced, mainly driven by haulage and processing

**GHG Emissions,**  
kg CO<sub>2</sub>/ tonnes  
copper/ year



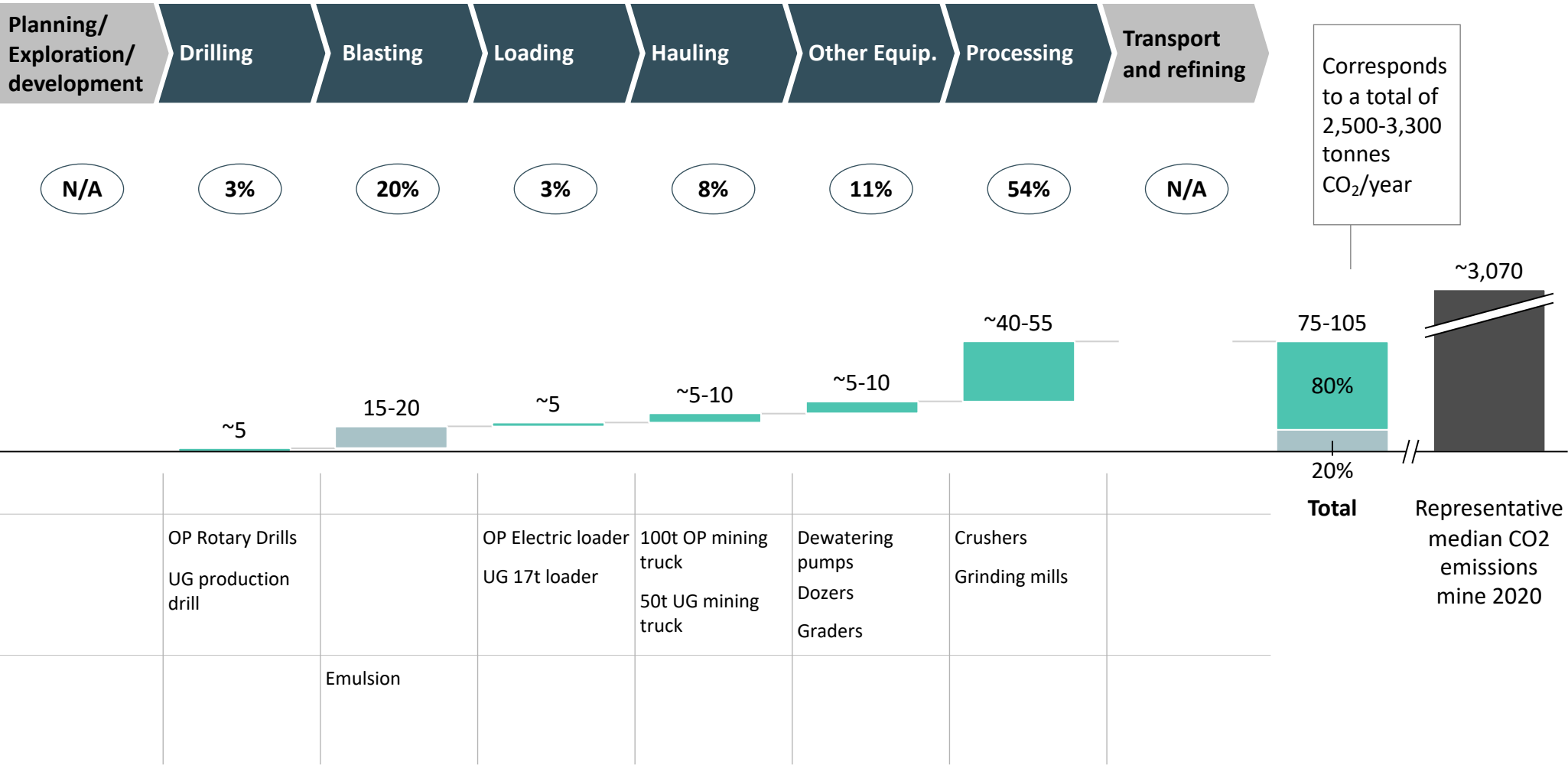
# A. Sustainability

Scope 1   Scope 2  
X% Share of total emissions

Stage 2: Viscaria GHG emissions expected at ~75-105 kg per tonnes copper produced, mainly driven by haulage and processing

## Full mine

GHG Emissions,  
kg CO<sub>2</sub>/ tonnes  
copper/ year



Source: Company analysis; Supplier data; annual reports; Company presentations; Press releases

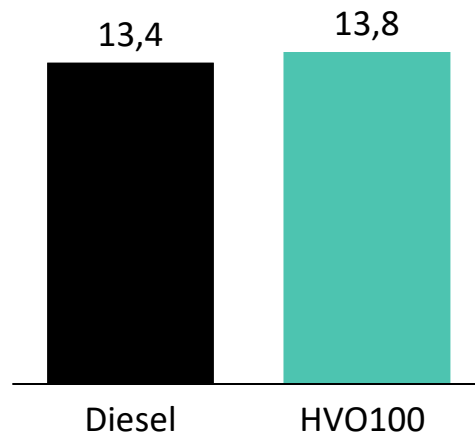
# A. Sustainability

Going green will be cost efficient

## The Swedish biofuel price is almost at par with the diesel price...

Swedish fuel price for industrial purchaser, 2021

SEK/L (incl. tax, excl. VAT)

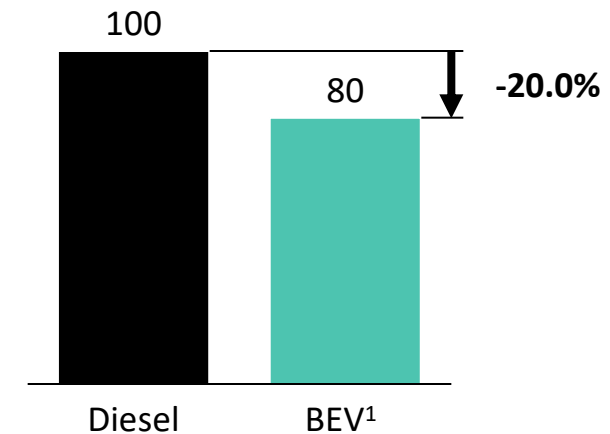


- Switching to biofuels (HVO100) has decarbonization potential up to 90% vs diesel, even using existing equipment and infrastructure
- This will come at a small cost, increasing TCO by ~5% percent today at current carbon tax and subsidy levels

## ... and the TCO for electric haulage trucks is estimated to be ~20% lower than for diesel-driven

Total cost of ownership for a 100t haulage truck, 2025

Indexed price (100 = TCO for diesel truck in 2025)



- To go fully carbon neutral, a shift in drivetrains is required; hydrogen fuel cells and BEVs<sup>2</sup> are long-term options
- TCO improvement driven by lower fuel and maintenance costs
- Different mining players are today actively looking into this; e.g., Boliden has set up a pantograph-charged hybrid at Aitik

1 Pantograph-charge BEV; 2 Battery electric vehicles

Source: Creating the zero-carbon mine, June 29, 2021, McKinsey Article; Supplier data



# 05. Appendix

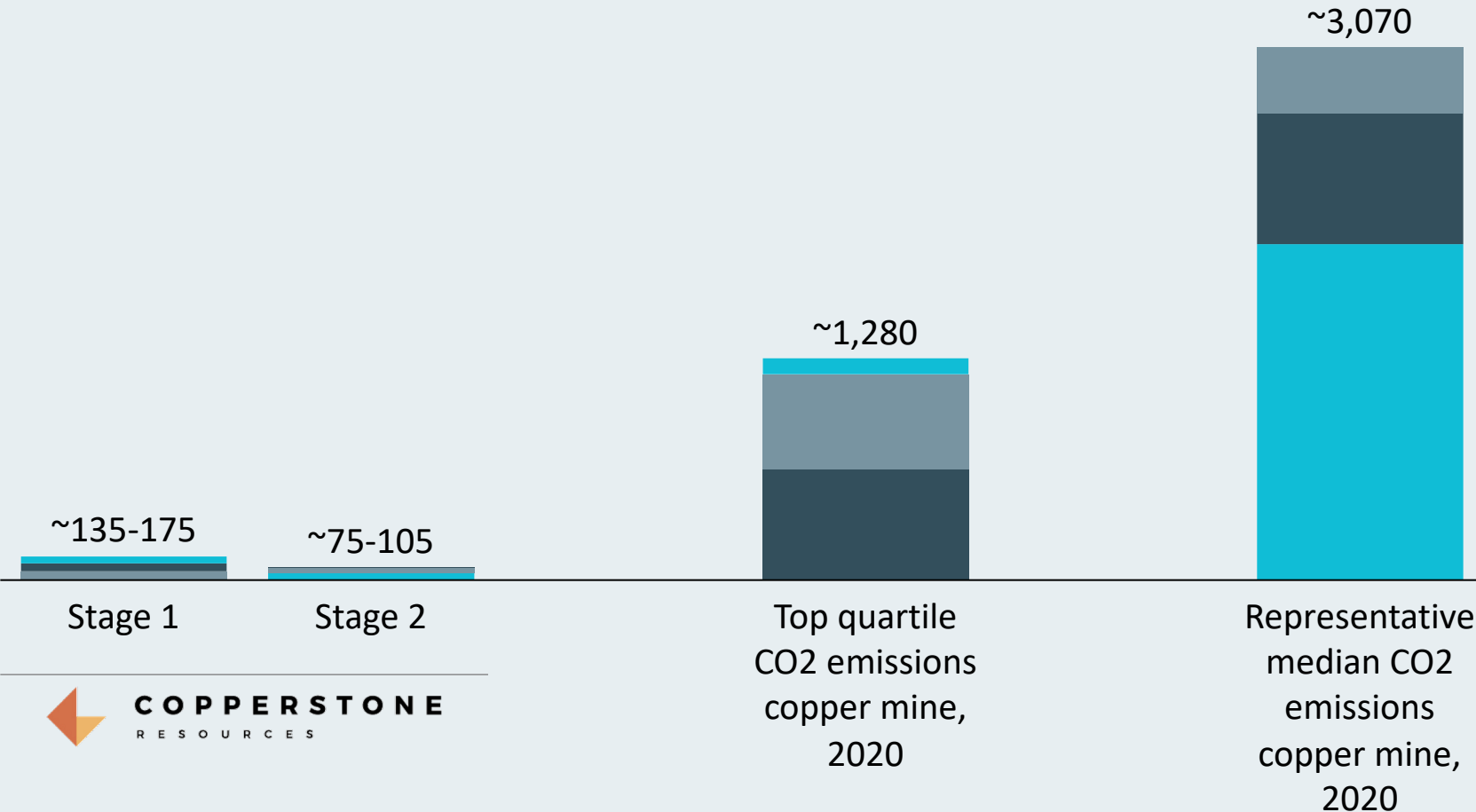


A. Sustainability

Copperstone stage 1 with lower GHG emission across all process steps

Relative scope 1 and 2 GHG emissions  
Kg CO<sub>2</sub>/ tonnes copper/ year

- Drilling, blasting, loading and other equipment
- Hauling
- Processing



# A. Sustainability

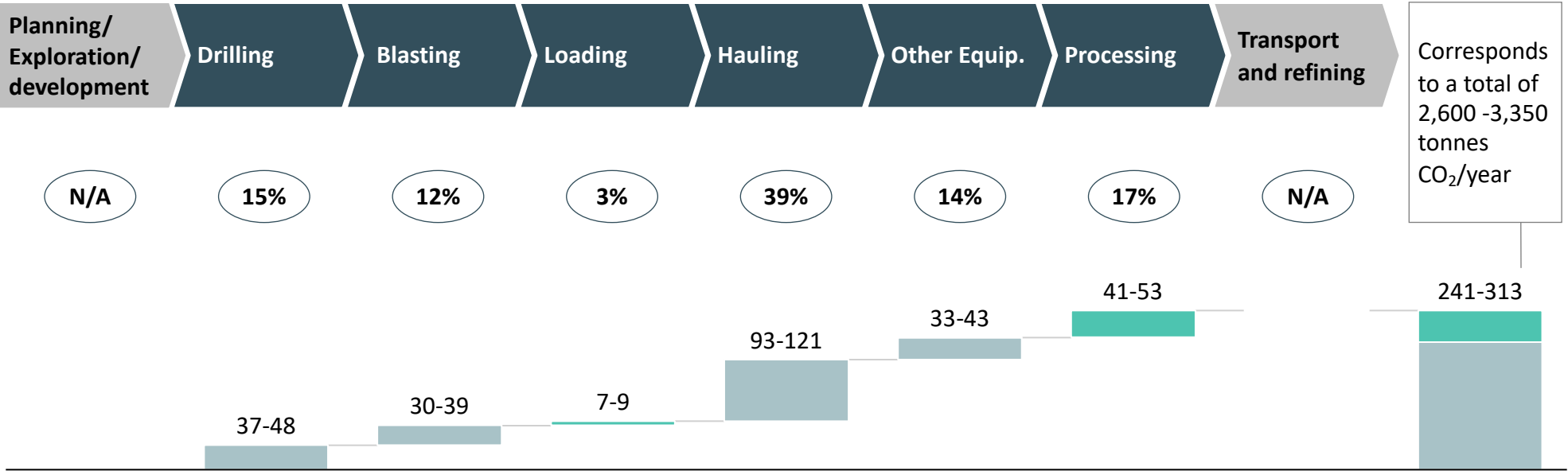
Scope 1   Scope 2

(X%) Share of total emissions

**Stage 1 back-up:** OP will have higher GHG emission intensity, ~240-315 kg CO<sub>2</sub>/ tonnes copper/year, compared to the full mine driven by a lower production volume

Open pit

**GHG Emissions, kg CO<sub>2</sub>/ tonnes copper/year**



**Example sources of emission**

HVO	OP Rotary Drills			100t OP mining truck	Dozers Graders		
Electric			OP Electric loader		Dewatering pumps	Crushers Grinding mills	
Other		Emulsion					

Source: Company analysis; Supplier data; annual reports; Company presentations; Press releases

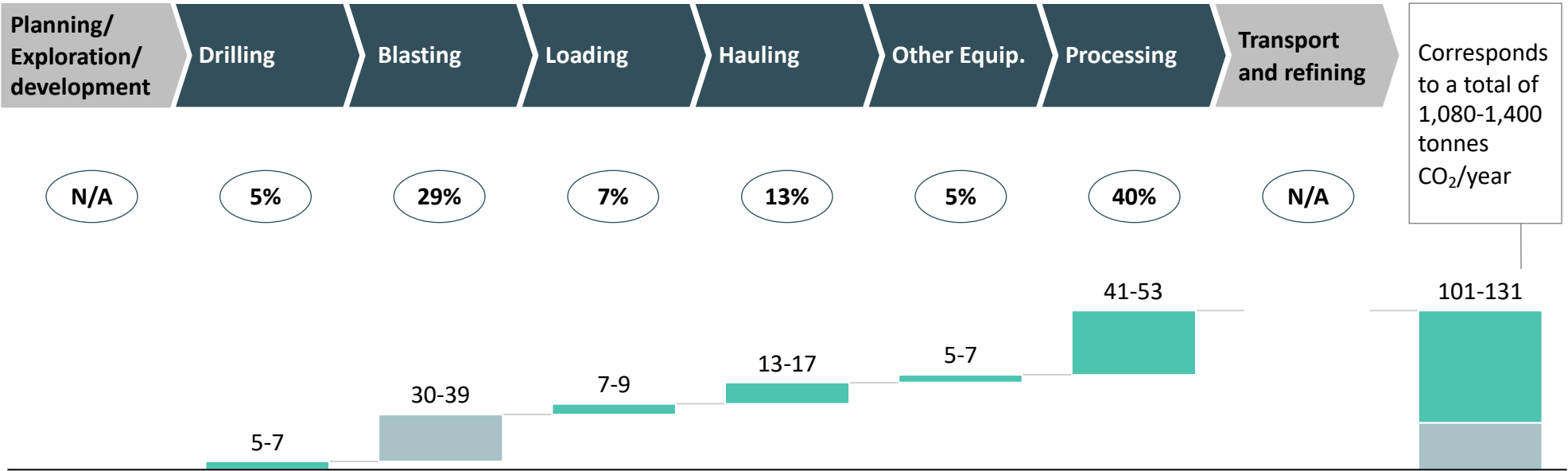
# A. Sustainability

Scope 1   Scope 2  
X% Share of total emissions

**Stage 2 back-up:** OP will have higher GHG emission intensity, ~100-130 kg CO<sub>2</sub>/ tonnes copper/year, compared to the full mine driven by a lower production volume

Open pit

GHG Emissions, kg CO<sub>2</sub>/ tonnes copper/year



Example sources of emission

HVO							
Electric	OP Rotary Drills		OP Electric loader	100t OP mining truck	Dewatering pumps Dozers Graders	Crushers Grinding mills	
Other		Emulsion					

Source: Company analysis; Supplier data; annual reports; Company presentations; Press releases



# A. Sustainability

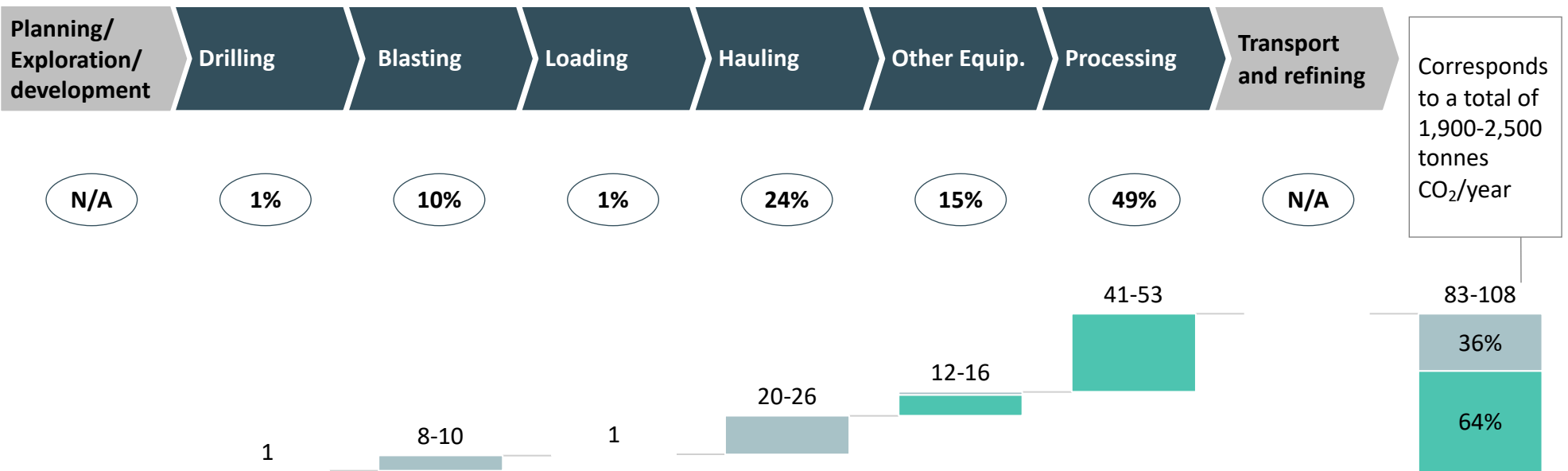
Scope 1   Scope 2

(X%) Share of total emissions

**Stage 1 back-up:** Underground GHG emissions will come mainly from hauling, and is estimated to be ~80-110 kg CO<sub>2</sub> per tonnes copper per year

## Underground

**GHG Emissions, kg CO<sub>2</sub>/ tonnes copper/ year**



**Example sources of emission**

In work fuel: HVO				50t UG mining truck	Dozers Graders		
Electric	UG production drill		UG 17t loader		Dewatering pumps	Crushers Grinding mills	
Other		Emulsion					

Source: Company analysis; Supplier data; annual reports; Company presentations; Press releases

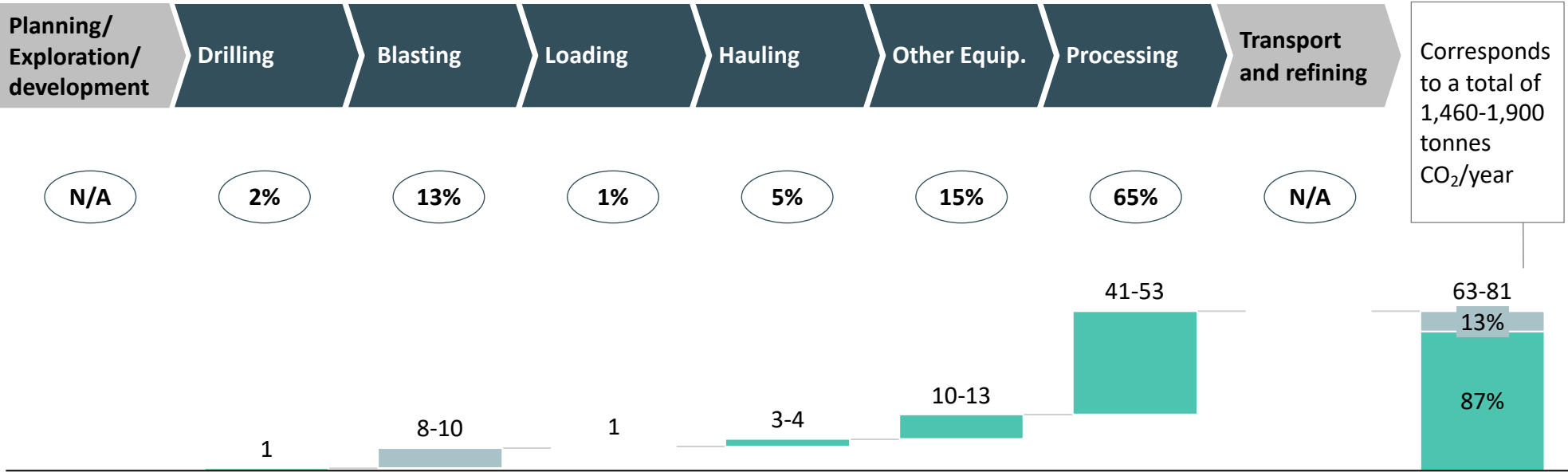
# A. Sustainability

Scope 1   Scope 2  
X% Share of total emissions

**Stage 2 back-up:** Underground GHG emissions will come mainly from hauling, and is estimated to be ~60-80 kg CO<sub>2</sub> per tonnes copper per year

## Underground

**GHG Emissions, kg CO<sub>2</sub>/ tonnes copper/ year**



**Example sources of emission**

In work fuel: HVO							
Electric	UG production drill		UG 17t loader	50t UG mining truck	Dewatering pumps Dozers Graders	Crushers Grinding mills	
Other		Emulsion					

Source: Company analysis; Supplier data; annual reports; Company presentations; Press releases

## A. Back-up: Sustainability

Key assumptions used in modelling

Parameter	Unit	Used assumption
Emission factor for HVO100	Kg CO <sub>2</sub> eq/L of HVO100 burned	0.322
Emission factor for electricity	Kg CO <sub>2</sub> eq/kWh	0.011 (General electricity mix for Sweden)
Copper recovered grade	% Cu	1.0%
Total run rate production	Million tonnes of ore per year	3 Mt on average (1/3 open pit, 2/3 underground)
Avg. mining trucks fuel consumption	L of HVO100/engine hour	70 L/h for open pit trucks 46 L/h for underground trucks
Avg. processing electricity consumption	kWh/t of processed ore	37
Energy efficiency of electric engines	% of energy turned into movement	95%
Energy efficiency of combustion engines	% of energy turned into movement	40%
Average heating value for HVO100	kWh/L of HVO100 burned	9.98
Reduction in ventilation requirements when going all electric in UG mine	% reduction	35%



**C O P P E R S T O N E**  
R E S O U R C E S