

# Sustainability Roadshow Preview

Climate change

17 May 2018

- Strategic approach
- Emissions targets and performance
- Reporting update
  - TCFD
  - Aiming for A
  - Disclosure
- Energy & climate scenarios
  - Glencore perspective
- Energy demand
  - IEA update
  - SE Asia demand
- HELE technology & CTSCo
- Balanced Portfolio
- Conclusion

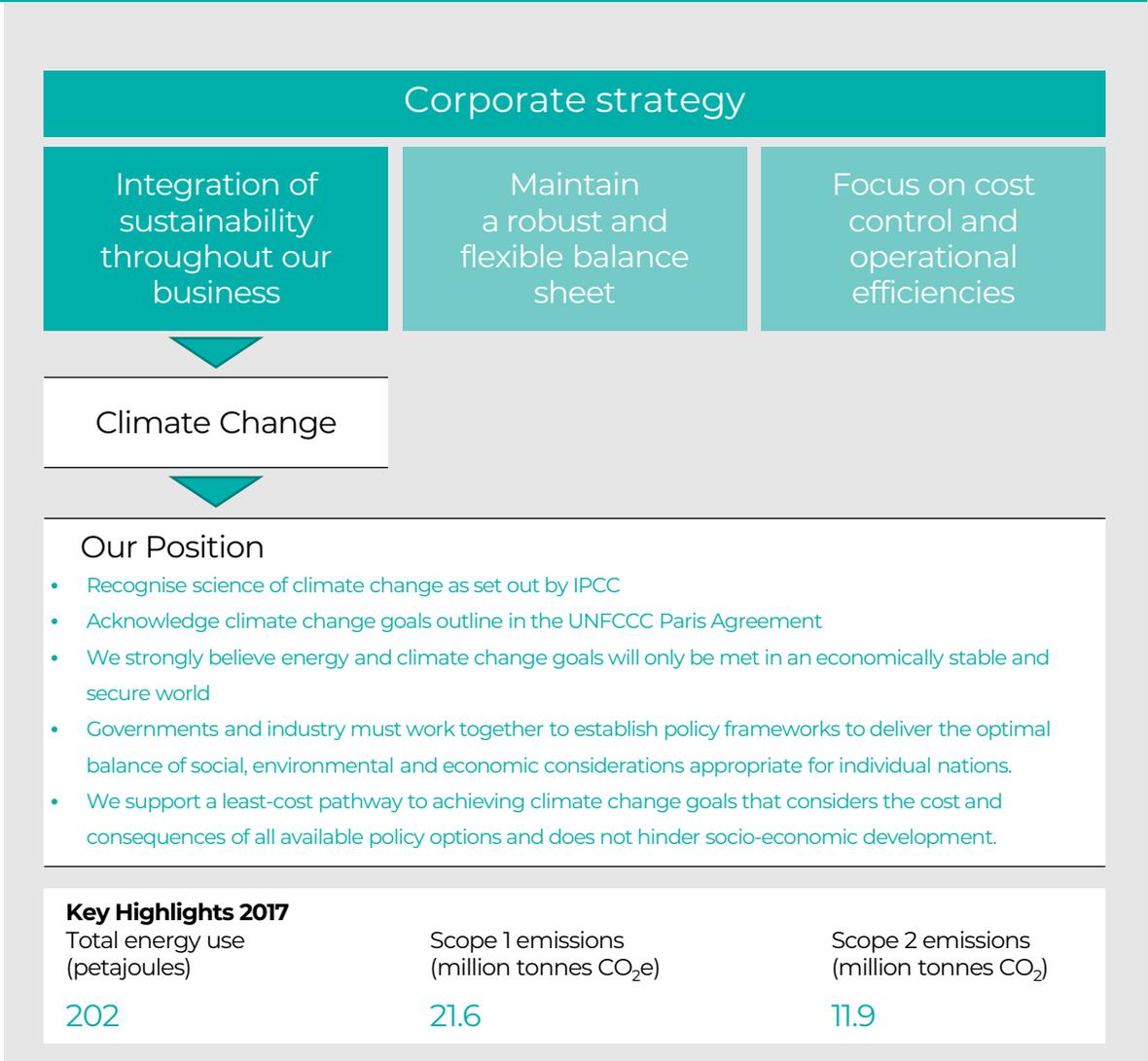
## Key takeaways

- Climate change considerations embedded in our planning
- 2020 target set at 5% below 2016, post 2020 being evaluated
  - Adopting TCFD reporting methodology
  - Delivered “Aiming for A” objectives
- Energy and climate scenarios used to evaluate business
  - Supporting least cost carbon reduction
- Global energy demand drivers persist
  - Growth and fossil fuels embedded in New Policies
  - Coal central to SE Asian energy demand
- HELE technology and CCS are essential to deliver Paris targets
- Commodity mix and resource optionality key to Glencore

## Our response

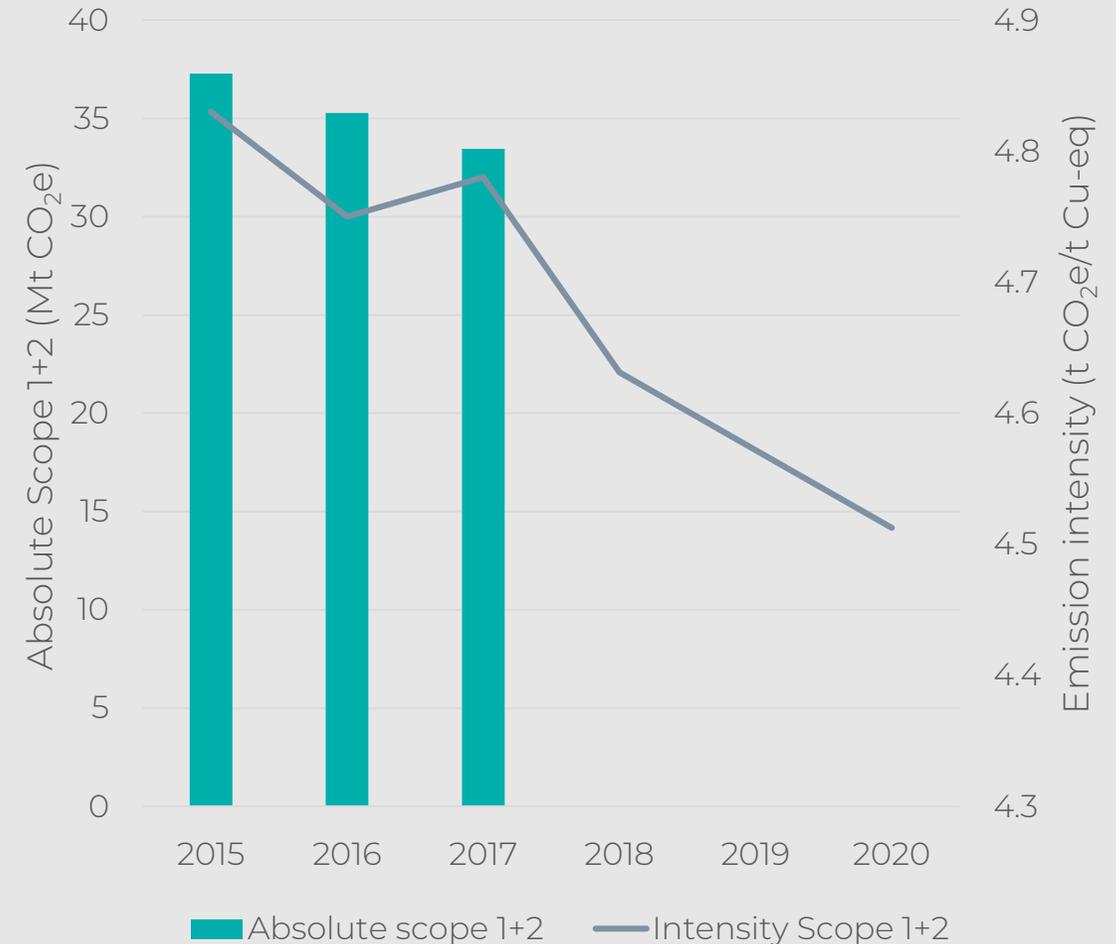
- **Assessment of risk and materiality**
  - Scenario analysis – energy and commodity demand pathways including carbon pricing
  - Risk Management – government policy, energy costs, physical, stakeholder, markets
- **Management of our energy and carbon emissions footprint**
  - Established and on target to meet 5% emissions intensity reduction by 2020
  - Evaluating post 2020 targets
- **Engagement with our stakeholders**
- **Support for low emission technologies**
  - Advocating HELE technology
  - CTSCo – CCS pilot project
  - Balanced commodity exposure

20% of Glencore's global energy consumption is sourced from renewables



- Established carbon emission intensity reduction target (Scope 1 & 2) of at least 5% on 2016 levels by 2020
- Continuing to include carbon emissions and reductions in annual planning process, updating marginal abatement cost curves to assist in establishing post 2020 targets
- Absolute Scope 1&2 emissions decreased by 5%, primarily due to lower fugitive emissions at our coal operations
- Emission intensity increased slightly, related to pre-stripping activity
- 2018 – 2021 carbon budget showed on track to meeting reduction target; combination of
  - Energy efficiency gains, specially reusing heat and waste gases
  - Carbon-efficient operational changes

### Glencore emissions reduction



<b>TCFD core elements</b>	<b>Governance</b>	<b>Strategy</b>	<b>Risk Management</b>	<b>Metrics and Targets</b>
<b>2017 reporting</b>	<ul style="list-style-type: none"> <li>• Board oversight</li> <li>• Management of risks and opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Describe risk &amp; opportunities</li> <li>• Impact on business, strategy, financial plan</li> </ul>	<ul style="list-style-type: none"> <li>• Risk identification process</li> <li>• Risk management process</li> <li>• Embedding into</li> </ul>	<ul style="list-style-type: none"> <li>• Risk &amp; operational metrics</li> <li>• Scope 1 – 3 metrics, risks</li> <li>• Targets</li> </ul>
<b>Future Action</b>	<ul style="list-style-type: none"> <li>• Established Climate Change working group, chaired by Chairman</li> <li>• Included carbon pricing in budget process</li> <li>• Published TCFD cross reference table in AR 2017</li> </ul>	<ul style="list-style-type: none"> <li>• Performed high-level risk assessment</li> <li>• Developed 3 scenarios on carbon and energy prices, applied to commodities, disclosed investment outlook</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosed high-level risk assessment &amp; management process</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosed assured Scope 1, 2 &amp; 3 emissions, breakdowns, intensities</li> <li>• Set 2020 intensity target</li> <li>• Applied internal cost of carbon in commodities with highest GHG emissions</li> </ul>
	<ul style="list-style-type: none"> <li>• Continue board involvement in climate change governance</li> <li>• Incorporate climate change considerations in M&amp;A, large projects</li> <li>• Induce climate change incentives for assets with high climate change impact/risk</li> <li>• Have full response to TCFD in AR 2019</li> </ul>	<ul style="list-style-type: none"> <li>• Disclose longer term climate change strategy</li> <li>• Disclose indication of financial impact of risks &amp; mitigating actions for regions, products</li> <li>• Disclose updated scenarios including assumptions</li> </ul>	<ul style="list-style-type: none"> <li>• Perform top-valued asset level risk assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare post-2020 target</li> <li>• Consider further metrics on risks and opportunities</li> <li>• Extend implementation of internal cost of carbon where relevant</li> </ul>

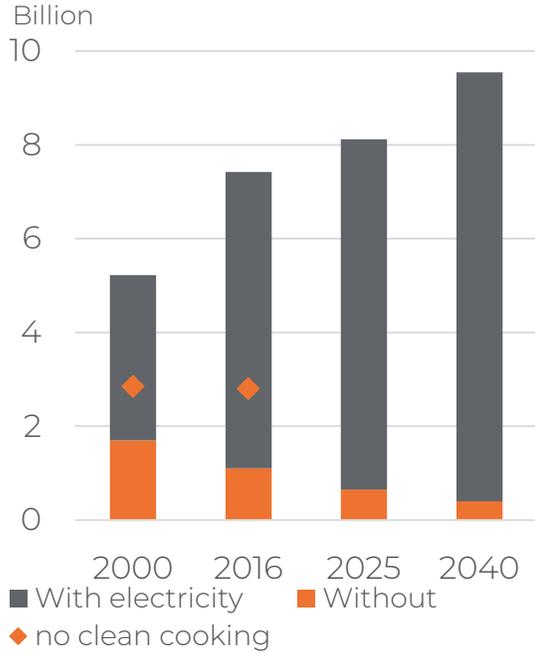
<b>Aiming for A area</b>	<b>Ongoing operational emissions management</b>	<b>Asset portfolio resilience</b>	<b>Low carbon energy R&amp;D and investment</b>	<b>Strategic KPIs and executive incentives</b>	<b>Public policy interventions</b>
<b>2017 report</b>	<ul style="list-style-type: none"> <li>• 2017 CDP score: B</li> <li>• Disclosed all Scope 1 – 3 emissions in SD17</li> </ul>	<ul style="list-style-type: none"> <li>• Published scenarios, including IEA 2DS, up to 2040, in separate report</li> <li>• Reiterated in AR17 and SD17</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosed CTSCo and Callide Oxyfuel projects</li> <li>• Amount invested in Callide Oxyfuel was disclosed</li> </ul>	<ul style="list-style-type: none"> <li>• Declared KPIs and incentives to be most relevant at asset level</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosed our own position</li> <li>• Disclosed views of industry bodies in which we participate and our involvement in their positions</li> </ul>

Report	Content
Annual report 2017, p. 30-33	<ul style="list-style-type: none"> <li>• TCFD cross reference</li> <li>• Strategy, impact</li> <li>• High level values</li> </ul>
Climate change considerations for our business 2017	<ul style="list-style-type: none"> <li>• Our approach, policy developments, strategic integration</li> <li>• Risk management, transition to low carbon economy</li> <li>• Business opportunities, portfolio resilience, case studies</li> </ul>
Sustainability report 2017, p. 28-35	<ul style="list-style-type: none"> <li>• Our approach, performance, risk management</li> <li>• TCFD cross reference, summary of portfolio resilience</li> </ul>
Data book and GRI references 2017 p. 16–19, 22-30, p. 48 - 50	<ul style="list-style-type: none"> <li>• Detailed breakdowns of energy, Scope 1 and 2 emissions by type, region and commodity; Scope 3 details</li> <li>• Emission factors, carbon reduction initiatives, carbon trading, breakdown of coal production by mine type</li> </ul>
CDP Climate Change 2017	<ul style="list-style-type: none"> <li>• Not to be responded to for 2017: highly redundant to TCFD-based and freely accessible reporting as per above</li> </ul>

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- We support reducing global carbon emissions and acknowledge the COP21 climate goal of 2° C global leaders have pledged to achieve
  - We want to see a logical and least cost approach to achieving climate goals
  - There is a significant gap between the energy reality and outcomes being predicted by key climate commentators who are basing their forecasts on policy statements
  - Industrialisation and urbanisation of developing economies, particularly in Asia, will continue to drive significant growth in global energy / electricity demand which will continue to largely be met by coal, oil and gas for the foreseeable future
    - Glencore's commodity mix is aligned to the broader electrification of economies
  - While it may no longer be predominant - under most scenarios, coal will play a major role as key input to industrial processes and as a competitive, safe, secure and reliable baseload source of energy
  - The achievement of climate goals has to consider the ongoing use of coal – policy needs to drive the use of high efficiency low emission (HELE) technology, which already exists and which now delivers up to 35% less emissions than older technology
  - The aim of climate and energy policy must be to reduce CO<sub>2</sub> emissions in the most cost effective manner whilst ensuring energy security – investing into HELE coal technologies achieves this
  - All climate scenarios recognise that the deployment of carbon capture and storage technology (CCS) is essential to achieving climate goals – global policy needs to support this otherwise climate goals will not be met

# Global energy demand being driven by population and economic growth

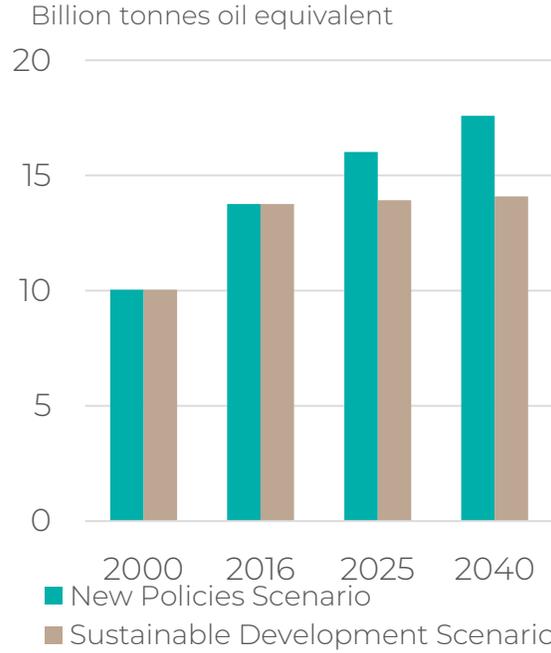
## Global Population



Energy policy is currently not expected to be able to deliver electricity nor provide clean cooking facilities to the global population

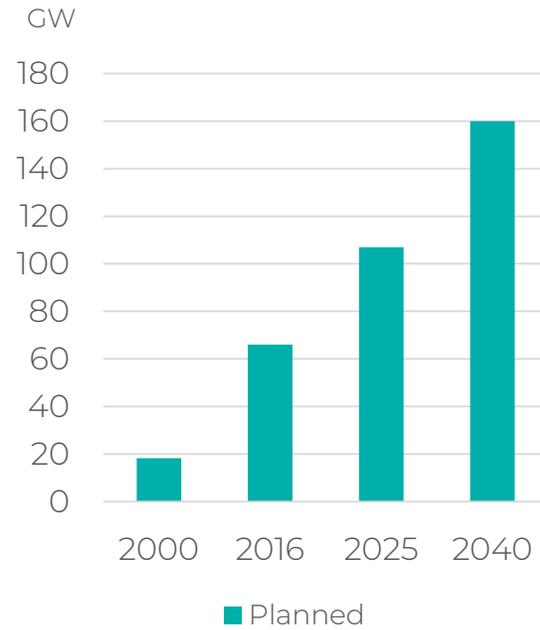
**Global economic growth 3.4%pa with extensive urbanisation still to occur**

## Energy Demand



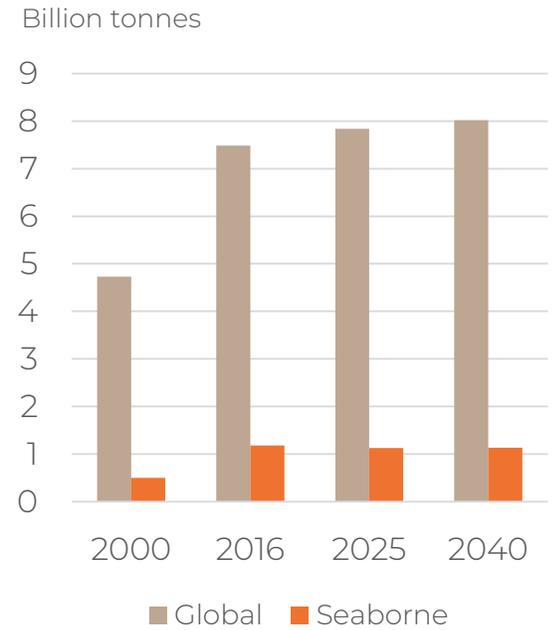
Energy demand has to stop increasing from today in order to meet Paris climate goals

## SE Asia coal plant



South East Asian economies are building new coal fired generation capacity which will be dependant on seaborne coal imports  
 “the global portfolio of CCS projects is not expanding at anything like the rate that would be needed to meet long-term climate goals”... IEA2017

## Coal Demand



Investment in new coal supply remains insufficient to meet current demand forecasts

- Reflecting range of policy, energy and climate pathways
- NDC commitment period commences from 2020
- South East Asia actively building new coal fired power generation capacity, seaborne coal demand increasing
- Funding for developing world to enable NDC’s remains uncertain

Glencore Scenario	Alignment with IEA Scenario	Description	Carbon Prices in 2030
<b>Delayed Action</b>	New Policies Scenario: <ul style="list-style-type: none"> <li>• Uncoordinated and haphazard implementation</li> <li>• 5-10 year delays to full and timely implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Domestic efforts to reduce emissions and NDC implementation are variable</li> <li>• Many countries not meeting their stated targets or objectives</li> <li>• Inconsistent implementation of carbon pricing across mainly developed economies</li> <li>• Fossil fuels continue as primary base for electricity generation, especially in Asia</li> <li>• Slower adoption of low-carbon technologies and delayed retirement of old plants</li> <li>• Stronger global emphasis on efficiency but slow and poor delivery of climate finance</li> </ul>	<ul style="list-style-type: none"> <li>• Australasia \$10 / t CO2e</li> <li>• Africa \$ 7 / t CO2e</li> <li>• Eurasia \$ 7 / t CO2e</li> <li>• Europe \$20 / t CO2e</li> <li>• N. America \$20 / t CO2e</li> <li>• S. America \$ 6 / t CO2e</li> </ul>
<b>Committed Action</b>	New Policies Scenario: <ul style="list-style-type: none"> <li>• Timely and full implementation of Nationally Determined Contributions (NDCs)</li> </ul>	<ul style="list-style-type: none"> <li>• Emission reductions with post Paris policies achieved by key countries</li> <li>• Coordinated and structured implementation of carbon pricing by developed economies</li> <li>• Moderate growth of nuclear, renewables</li> <li>• Increasing use of high-efficiency, low emission (HELE) technologies for electricity</li> <li>• Enhanced energy efficiency supported by climate finance</li> </ul>	<ul style="list-style-type: none"> <li>• Australasia \$23 / t CO2e</li> <li>• Africa \$15 / t CO2e</li> <li>• Eurasia \$15 / t CO2e</li> <li>• Europe \$37 / t CO2e</li> <li>• N. America \$37 / t CO2e</li> <li>• S. America \$12 / t CO2e</li> </ul>
<b>Ambitious action</b>	450ppm Scenario <ul style="list-style-type: none"> <li>• Consistent with achieving 2 degree climate change goal</li> </ul>	<ul style="list-style-type: none"> <li>• Global efforts to reduce emissions accelerated beyond existing NDCs</li> <li>• Universal adoption of carbon pricing through structured global carbon pricing regime</li> <li>• Rapid deployment of break-through technologies</li> <li>• Non-subsidised investment in renewable energy, battery storage, energy efficiency and carbon capture and storage (CCS)</li> </ul>	<ul style="list-style-type: none"> <li>• Australasia \$100 / t CO2e</li> <li>• Africa \$ 75 / t CO2e</li> <li>• Eurasia \$ 75 / t CO2e</li> <li>• Europe \$100 / t CO2e</li> <li>• N. America \$100 / t CO2e</li> <li>• S. America \$ 75 / t CO2e</li> </ul>

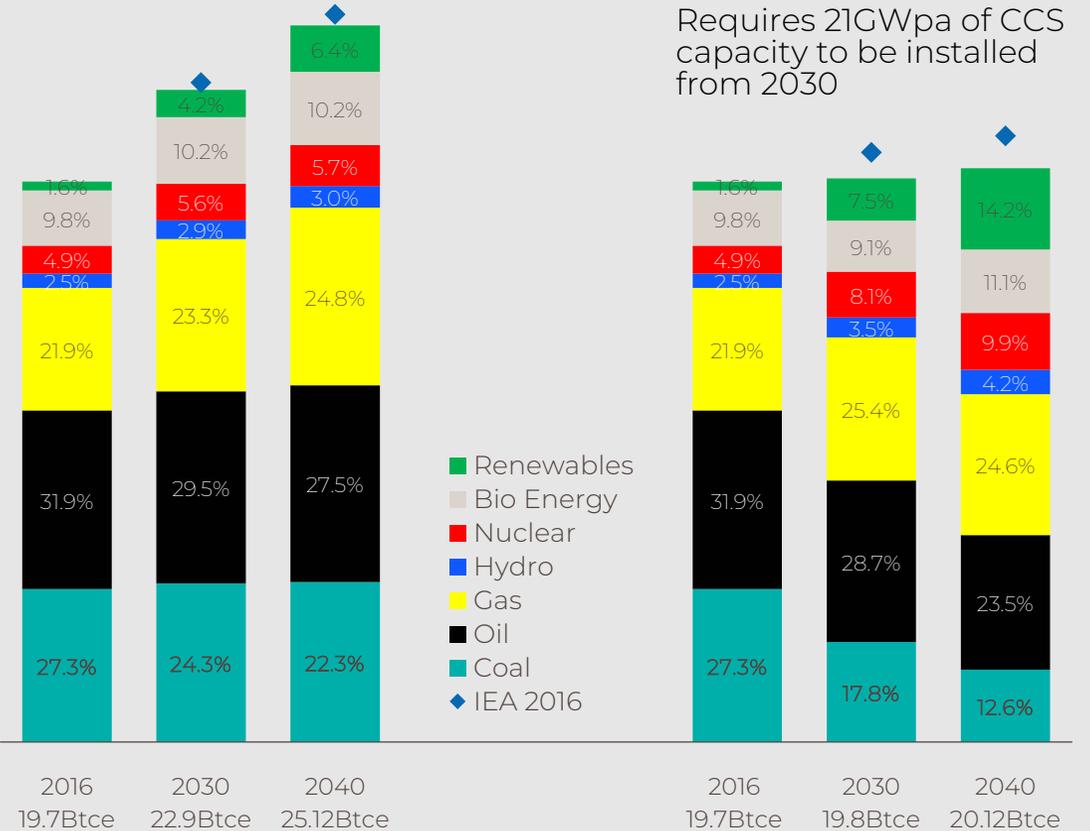
- **IEA New Policies Scenario** - goes beyond the NDC's agreed in Paris based primarily on initiatives announced in China and India.
  - Incorporates improved efficiency standards which reduce future energy demand growth
  - Global coal demand continue to grow to 2030, then stable to 2040 “...maintaining production and offsetting depletion requires cumulative capital expenditure of \$1 trillion for mines and coal supply infrastructure over the outlook period.”
  - In 2030, 77.1% of primary energy demand derived from coal, oil and gas; declining to 74.6% in 2040
  - By 2040, 6.4% of primary energy demand sourced from other renewables (404% growth from 2016)
- **IEA Sustainable Development Scenario** “ ...starts with a certain vision of where the energy sector needs to go and then works back to the present.”

## Global Primary Energy Demand Pathways

### New Policy Scenario

### Sustainable Development Scenario

Requires 21GWpa of CCS capacity to be installed from 2030

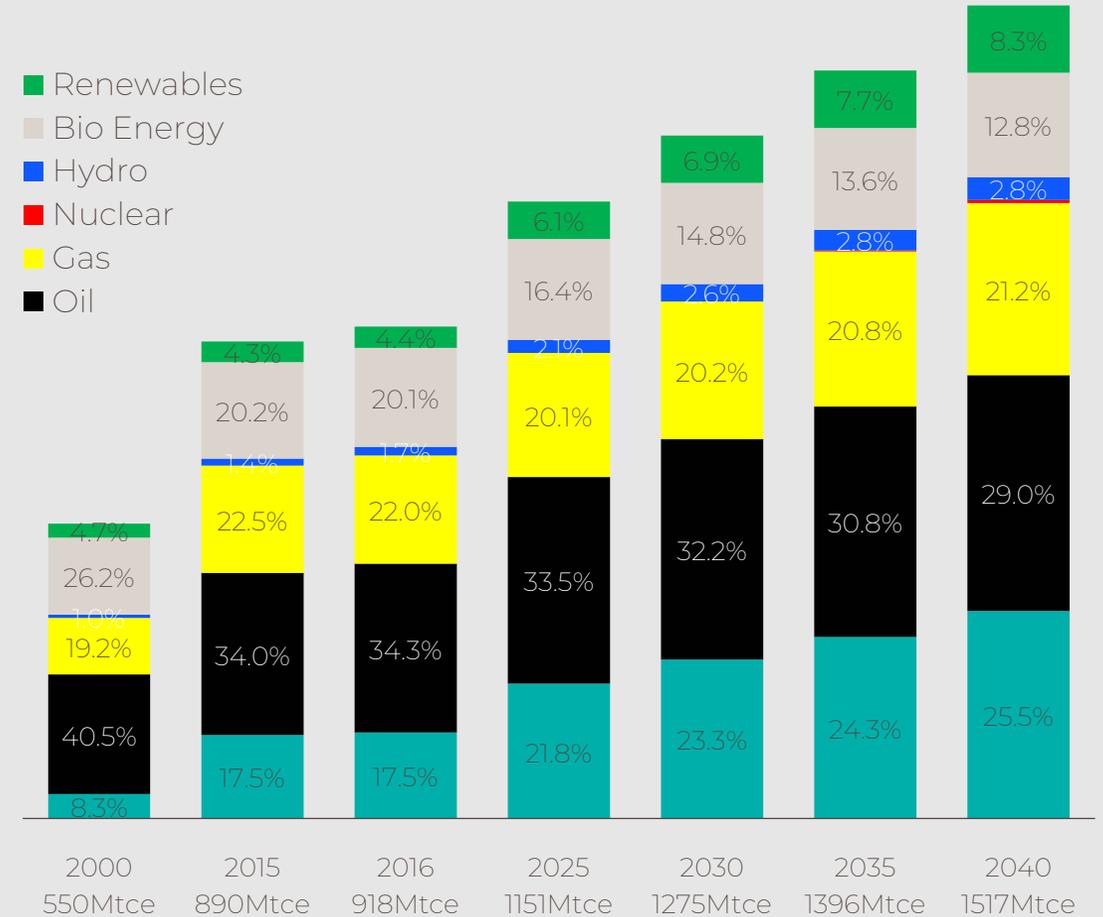


Source: IEA WEO 2017

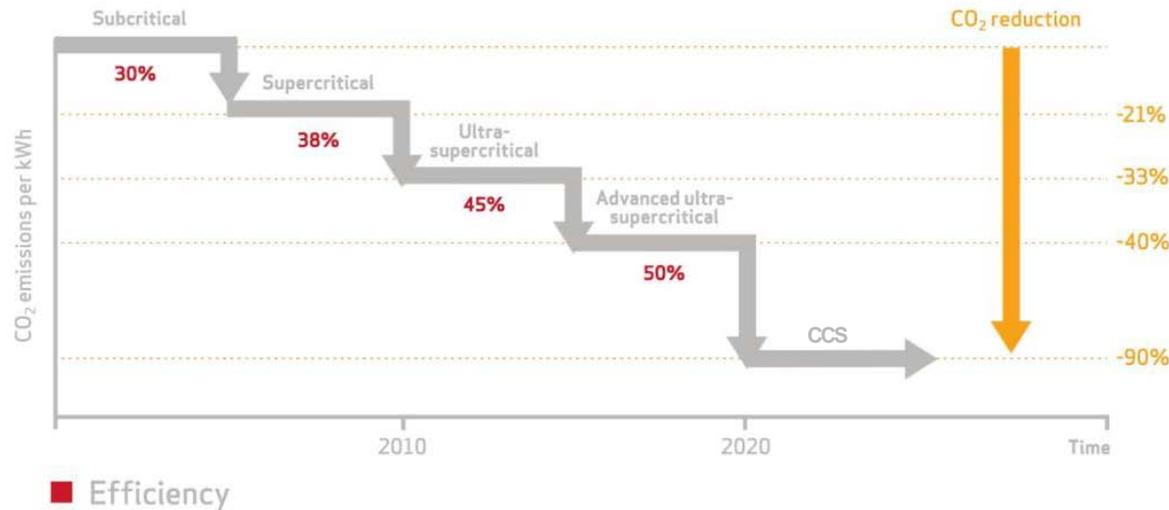
Btce : billion tonnes of coal equivalent – standardised coal quantity using coal with energy content of 7000kcal/kg or 29.31 GJ/t

- South East Asia region economy will triple in size by 2040
- Urban population set to grow by over 150 million people by 2040 to 760 million
- Energy demand will grow by almost two thirds to 2040
- Coal will account for 40% of energy growth
- Demand for high quality thermal and coking coal will rise and will be increasingly supplied from Australia, Russia and Colombia
- Other than Indonesia, countries dependent on seaborne coal imports are adding >200Mt new seaborne coal demand

Primary energy demand in SE Asia - New Policies Scenario



- New ultra Supercritical plants can deliver up to 33% CO<sub>2</sub> reduction
- Also reduce SO<sub>x</sub>, NO<sub>x</sub>, PM by up to 67%
- HELE technology available as a plant upgrades or new build
- Greater funding support required by banks
- Asian Development Bank and Japan Bank for International Co-operation already funding plants



Source: WCA HELE Special Report 2015

## Surat Basin Carbon Capture and Storage Project

**Objective:** to determine the viability of industrial-scale CCS in the Surat Basin in Queensland, Australia.

**Project Proponent:** CTSCo is a wholly owned subsidiary of Glencore.

**Funding:** funded by both industry (ACALET) and Australian government. Total cost estimated ~AUD\$260M, funded to FID

### Key Issues:

- Surat Basin one of the most prospective locations for large commercial scale CO<sub>2</sub> storage potential
- Surat Basin home to multiple coal fired power stations making it an ideal location for an industrial scale CCS project.
- Seismic, plume modelling and environmental baselining underway
- Advanced discussions with Chinese partner to construct a demonstration post combustion capture (PCC) plant, linked to an existing power station in the region.



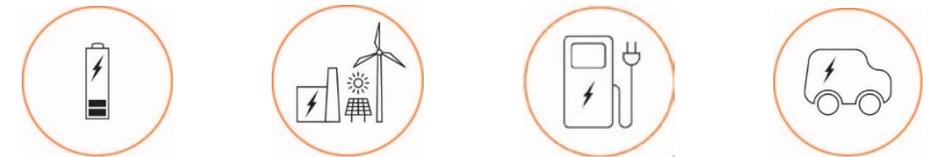
- Electric vehicles (EVs) – have the potential to be a disruptive force underpinning demand for our commodities
- The rapid emergence of EVs reflects the near simultaneous alignment of key drivers:
  - Environmental considerations
  - Political mandate
  - Technological progress
  - Consumer experience
- We commissioned CRU<sup>(1)</sup> to model the metal requirements to enable the Electric Vehicles Initiative<sup>(2)</sup> target of 30% EV market share by 2030:
  - c.4.1Mtpa of copper (18% of 2017 supply)
  - c.1.1Mtpa of nickel (55% of 2017 supply)
  - 314ktpa of Cobalt (332% of 2017 supply)
- As early as 2020, forecast demand is becoming material, requiring an additional c.390kt of copper, c.85kt of nickel and 24kt of cobalt

## Estimated average metal use per vehicle<sup>(1)</sup>



Based on estimated 53kWh global average battery pack size

## Metal demand implications across the value chain<sup>(1)</sup>

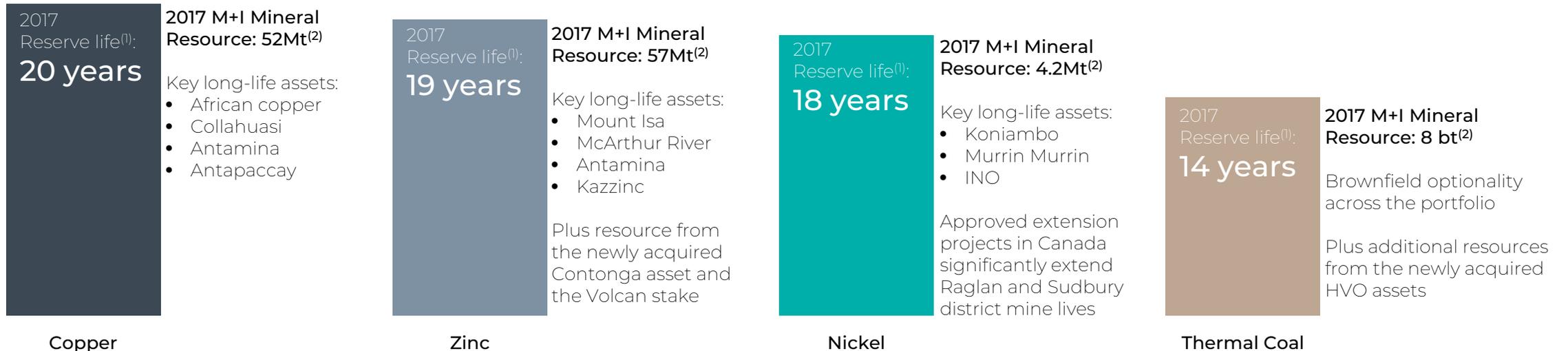


		2020	2025	2030	2020	2025	2030	2020	2025	2030	2020	2025	2030
<b>Cu</b>	Kt	40	170	536	24	86	180	23	115	392	304	1068	2972
<b>Ni</b>	Kt	-	-	-	20	71	150	-	-	-	66	299	985
<b>Co</b>	kt	-	-	-	7	26	55	-	-	-	17	80	259

Sources: (1) CRU "Mobility and Energy Futures – Perspectives towards 2035", prepared for Glencore by CRU Consulting. (2) Specifically on transportation, the EVI is a multi-government policy forum comprising 16 major global economies. The initiative seeks to facilitate the global deployment of 20 million EVs by 2020. A further campaign announced in 2017, led by China, targets at least 30% new electric vehicle sales by 2030, collectively across all EVI countries. <http://www.cleanenergyministerial.org/News/new-cem-campaign-aims-for-goal-of-30-new-electric-vehicle-sales-by-2030-85068>.

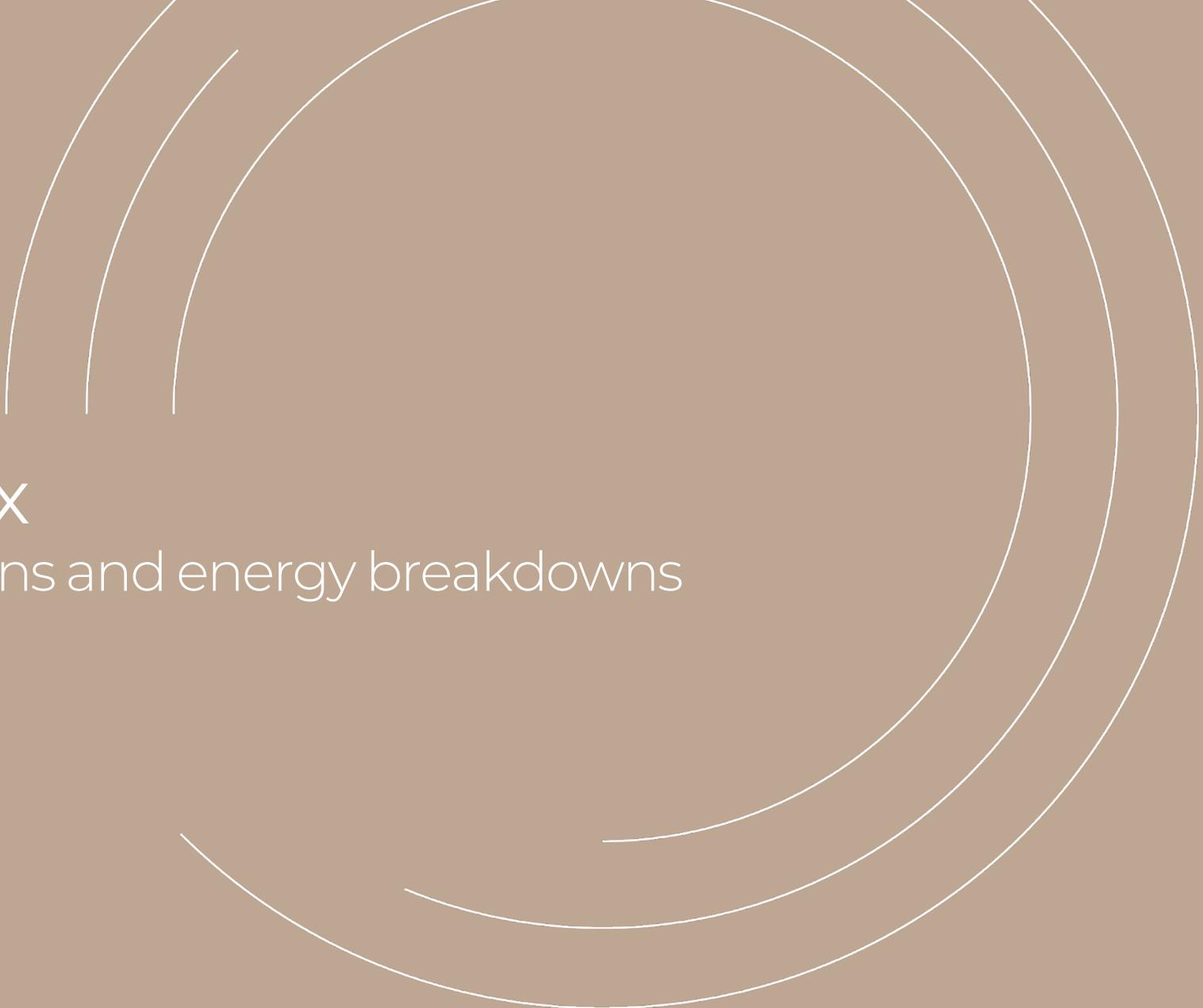
# Our portfolio is balanced and reflects underlying commodity demand dynamics

- **Long-life low-cost assets in many of the world's premier mining districts**
  - Supports sustainable long-term cash flows
- **Significant mine-life extension potential embedded in all key commodities**
  - **Copper:** Antapaccay brownfield extension (Coroccohuayco), Collahuasi/Antamina expansion potential, Mutanda sulphides, Lomas Bayas sulphides, Mount Isa extension etc.
  - **Zinc:** Kazzinc brownfield extensions, Contonga (Peru), brownfield optionality in newly acquired Volcan stake etc.
  - **Nickel:** Raglan, Sudbury, KNS and Murrin Murrin long-life mining districts
  - **Thermal coal:** extensive optionality and flexibility from existing operations; life extensions and brownfield developments



Notes: (1) Based on contained metal in 2017 proven and probable ore reserves, as reported in the 2017 Reserves and Resources Statement, and weighted by annual production that is based on 2017 actual or life of mine annual average production where more representative. Excludes operations that are closed/on care and maintenance as well as projects that are not currently approved. (2) Measured and Indicated Resource contained metal in 2017 calculated on corresponding tonnages and grades presented in the 2017 Resources and Reserves report and adjusted to reflect Glencore's attributable interest. Excludes operations that are closed/on care and maintenance as well as projects that are not currently approved.

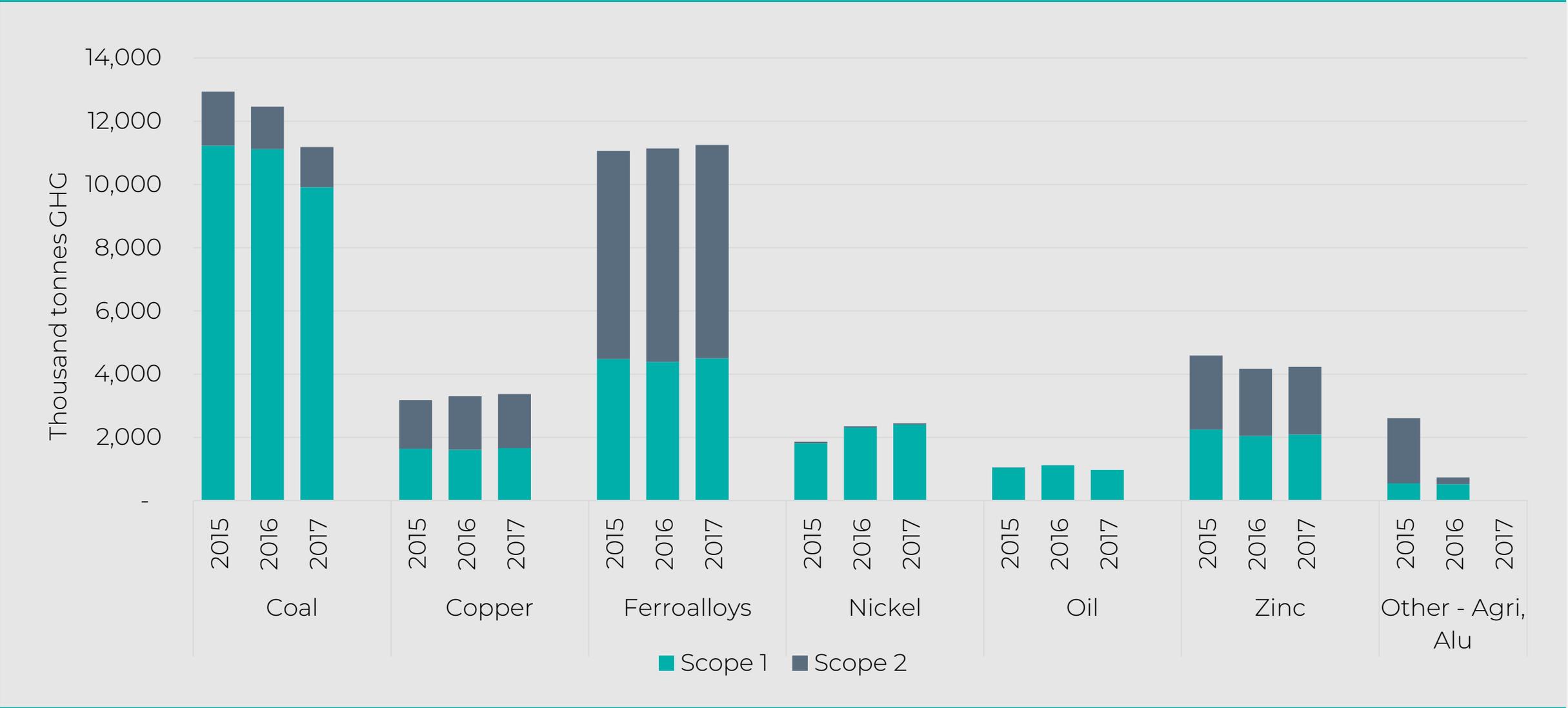
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- Climate goals will only be met in a stable world where people have a chance for a better quality of life
  - This can't happen without secure reliable and affordable energy powering essential services and industry
  - Coal is vital for this – currently powers 40% of the world's electricity and its usage is expected to grow in volume under NDC's
  - HELE and CCS exist and are proven technologies; the economics will markedly improve with the right public policy backing – policy parity is required for this
  - Good energy policy has to recognise the energy reality and will lead to quicker and lower cost emissions reductions whilst supporting economic growth in the developing world
  - Continued electrification of economies and transition to electric vehicles will support strong demand for Cu, Ni & Co.
  - Ignoring the energy reality will lead to continued investment into the least cost effective CO2 abatement solutions being pushed in the develop world, whilst low efficiency high emission plants are being built in the developing world
  - It is essential for key societal institutions such as banks to remain engaged and involved with the commodities and coal sector and policy makers; disengagement will lead to both worse climate outcomes and worse global development outcomes



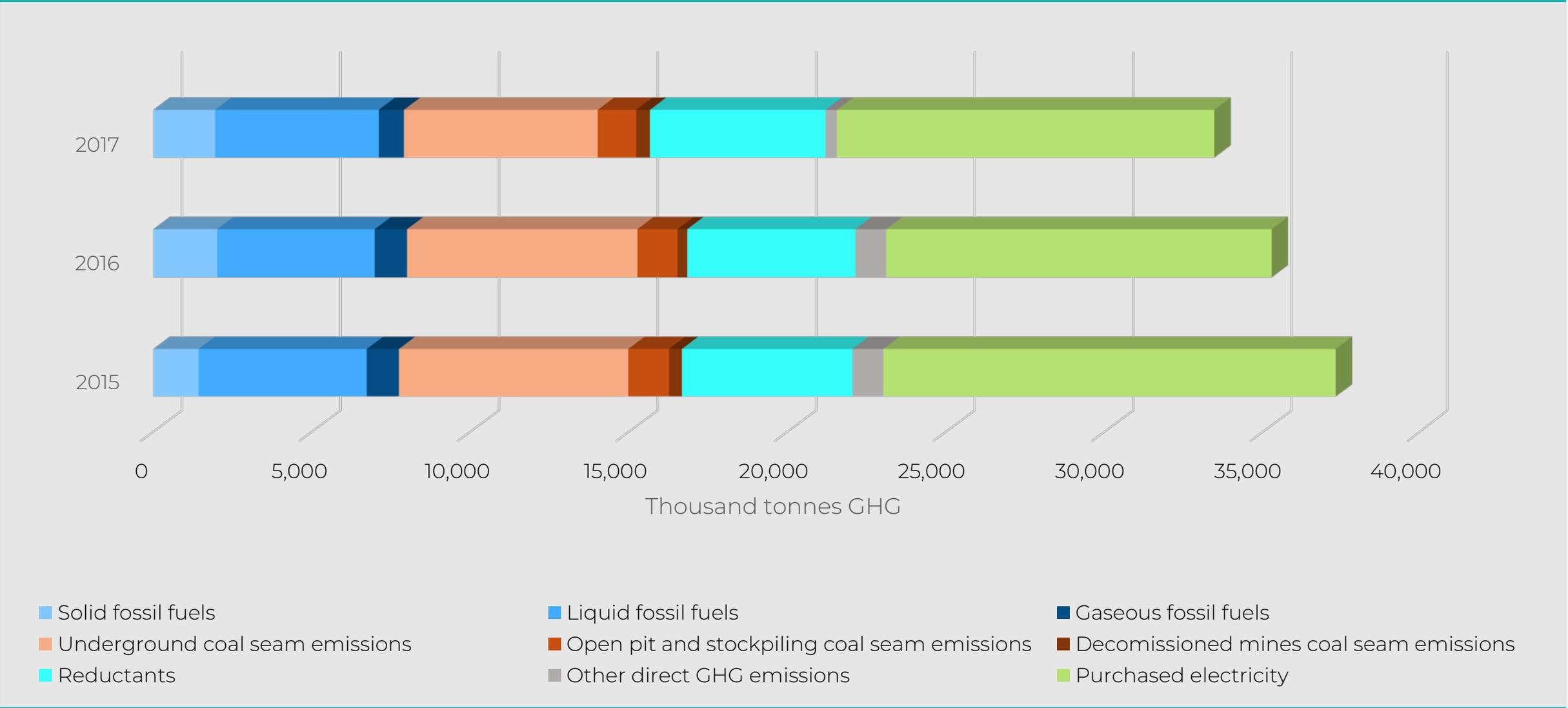
# Appendix

## GHG emissions and energy breakdowns

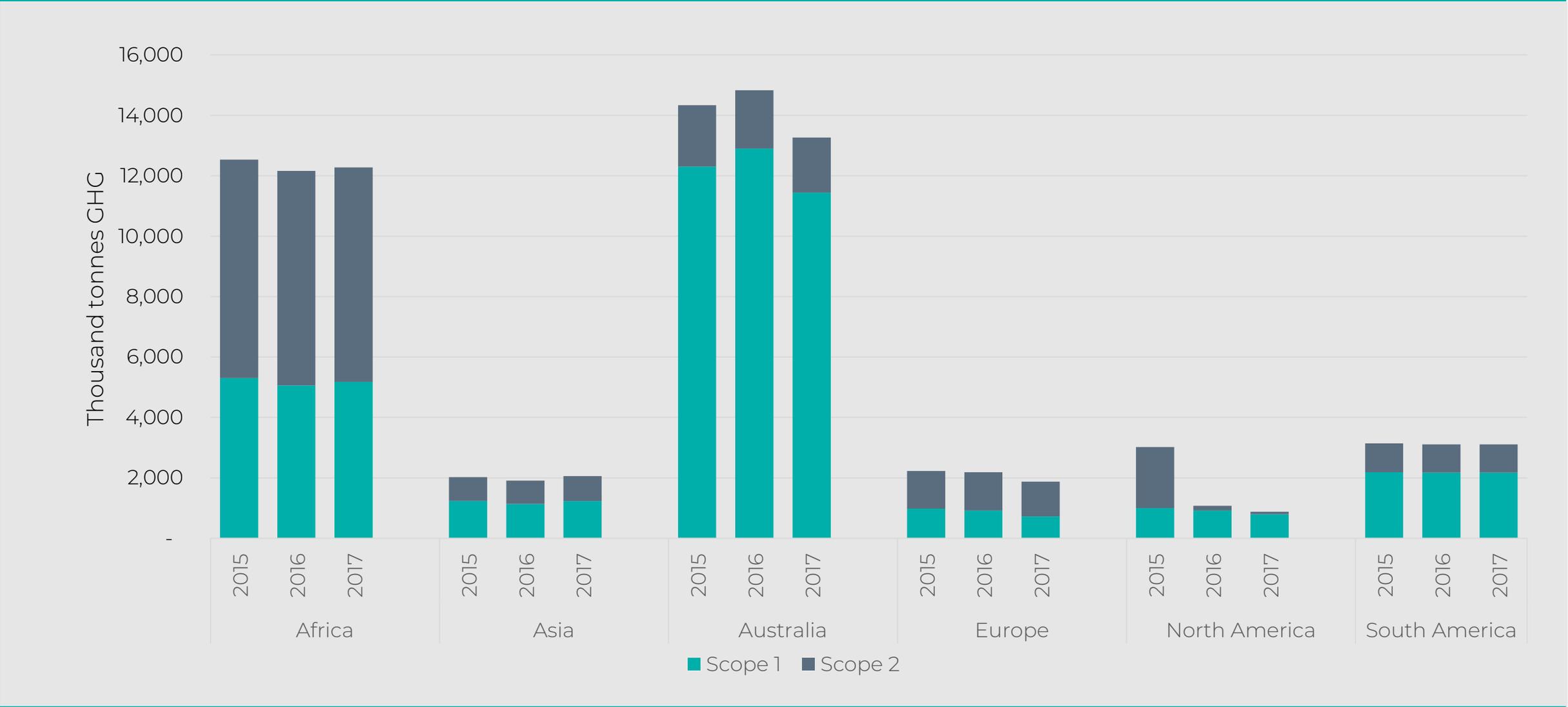
# GHG emissions 2015 to 2017 – Scope 1 and 2 breakdown per commodity



# GHG emissions 2015 to 2017 – Scope 1 and 2 breakdown per source of GHG emissions



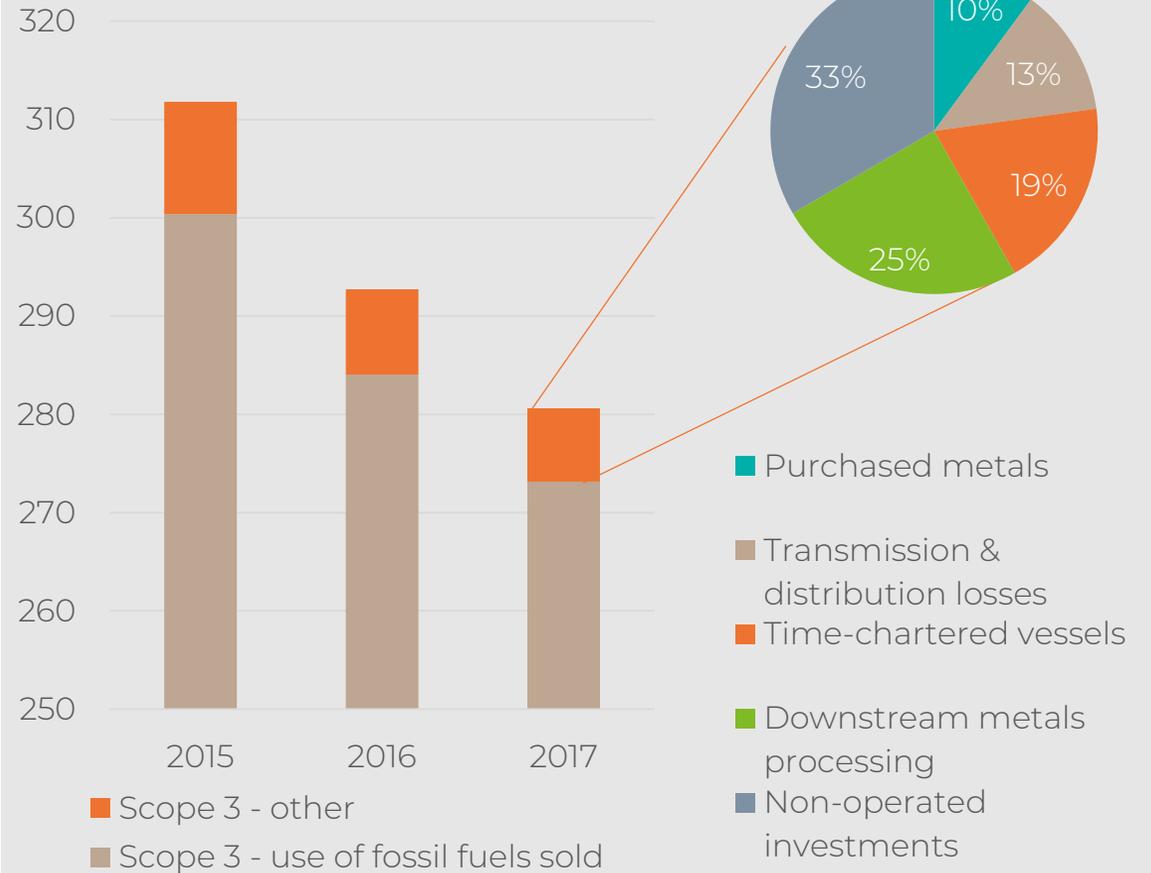
# GHG emissions 2015 to 2017 – Scope 1 and 2 breakdown per region



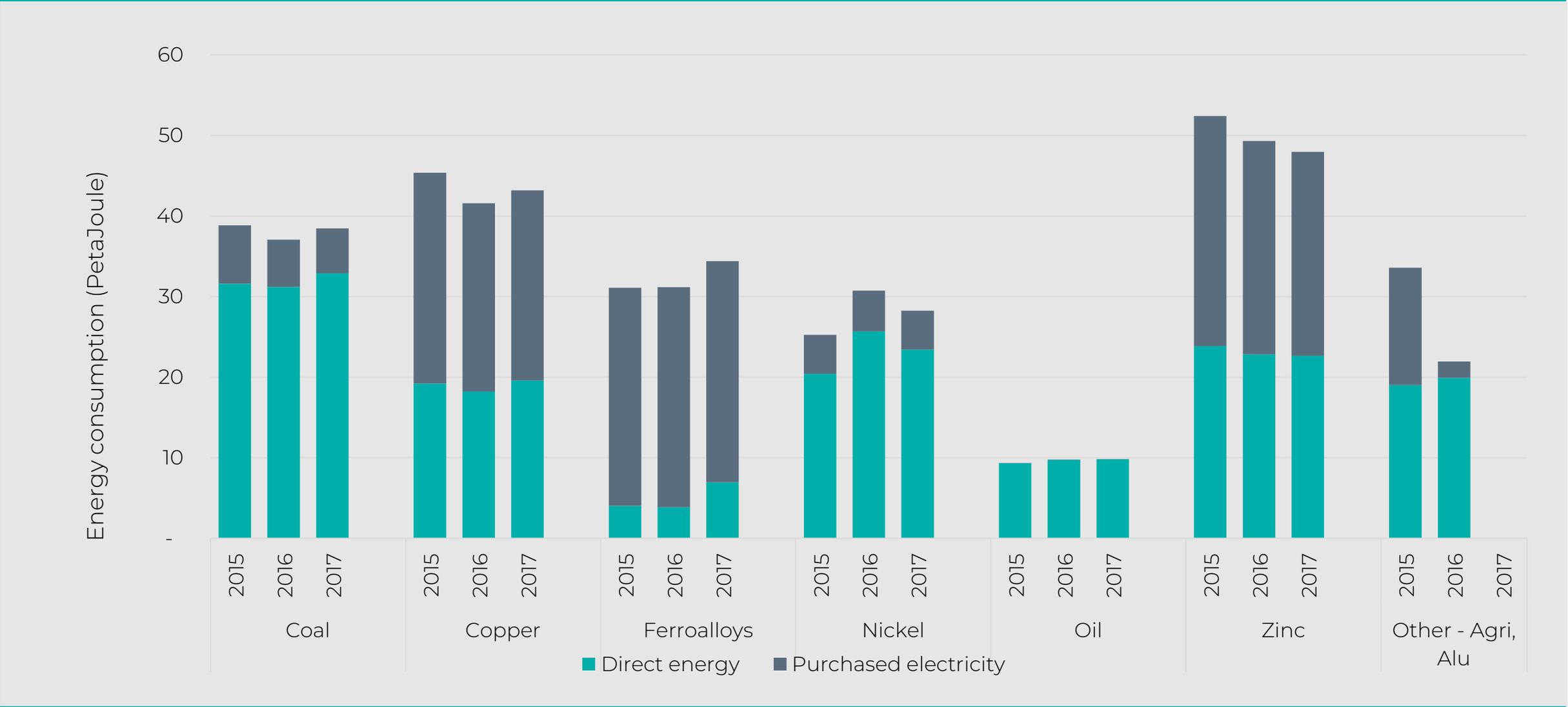
- Full disclosure is provided on supply chain GHG emissions, Scope 3
- Emissions are outside of Glencore’s direct control
- Largest contribution, directly related to production levels:  
Use of fossil fuels by customers, produced by Glencore (coal, oil)
- Other, minor scope 3 emissions include GHG emissions from
  - Purchased 3<sup>rd</sup> party metals feed into metallurgical plants
  - Transmission & distribution losses of purchased electricity
  - Bunker fuel of time-chartered vessels (upstream and downstream)
  - Customer processing of copper, lead and zinc
  - Scope 1 + 2 emissions from key non-operated investments
- Longer term opportunity: reduced emission intensity from use of fossil fuel, through application of clean coal technologies:
  - HELE (High Efficient, Low Emission) power plants
  - CCS (Carbon Capturing & Storage)

## Glencore scope 3 emissions

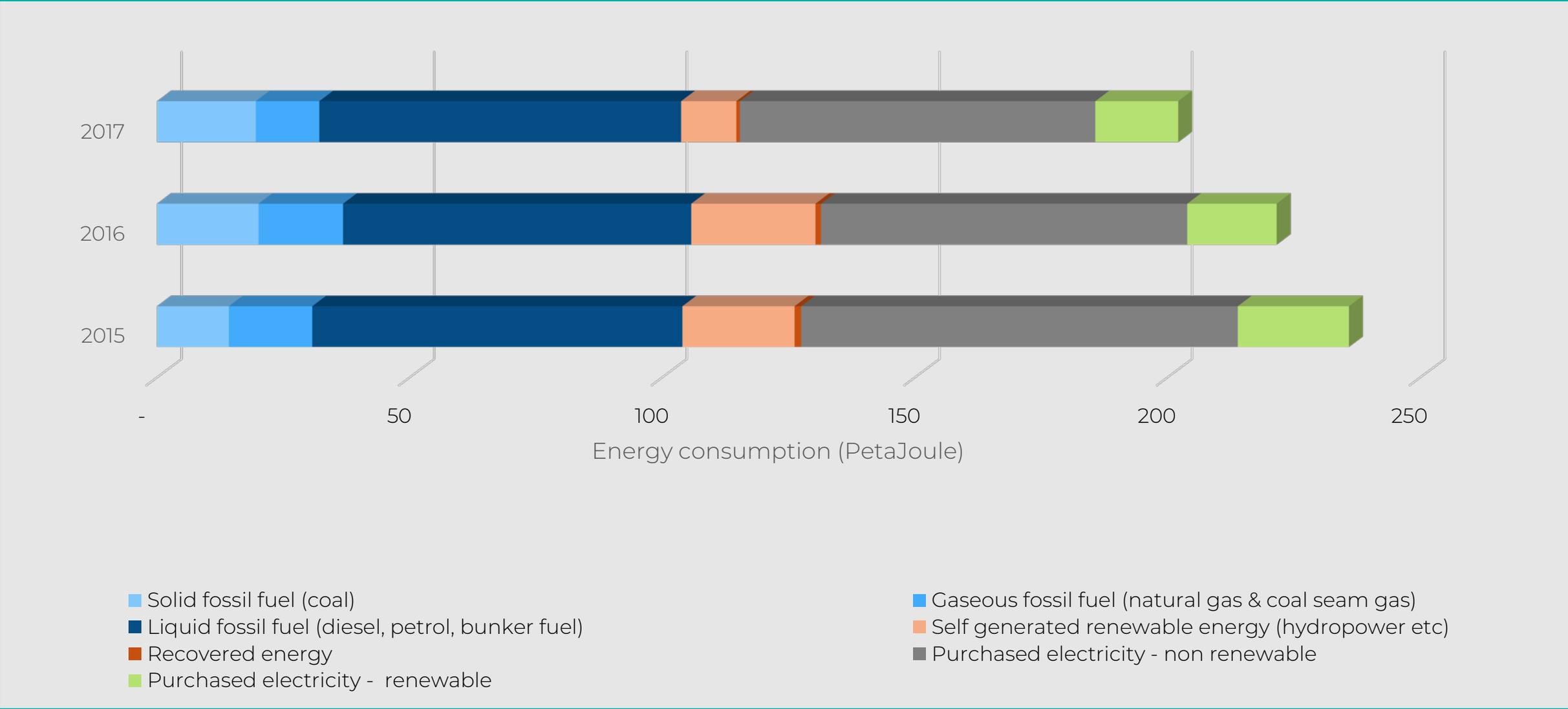
Million tonnes GHG



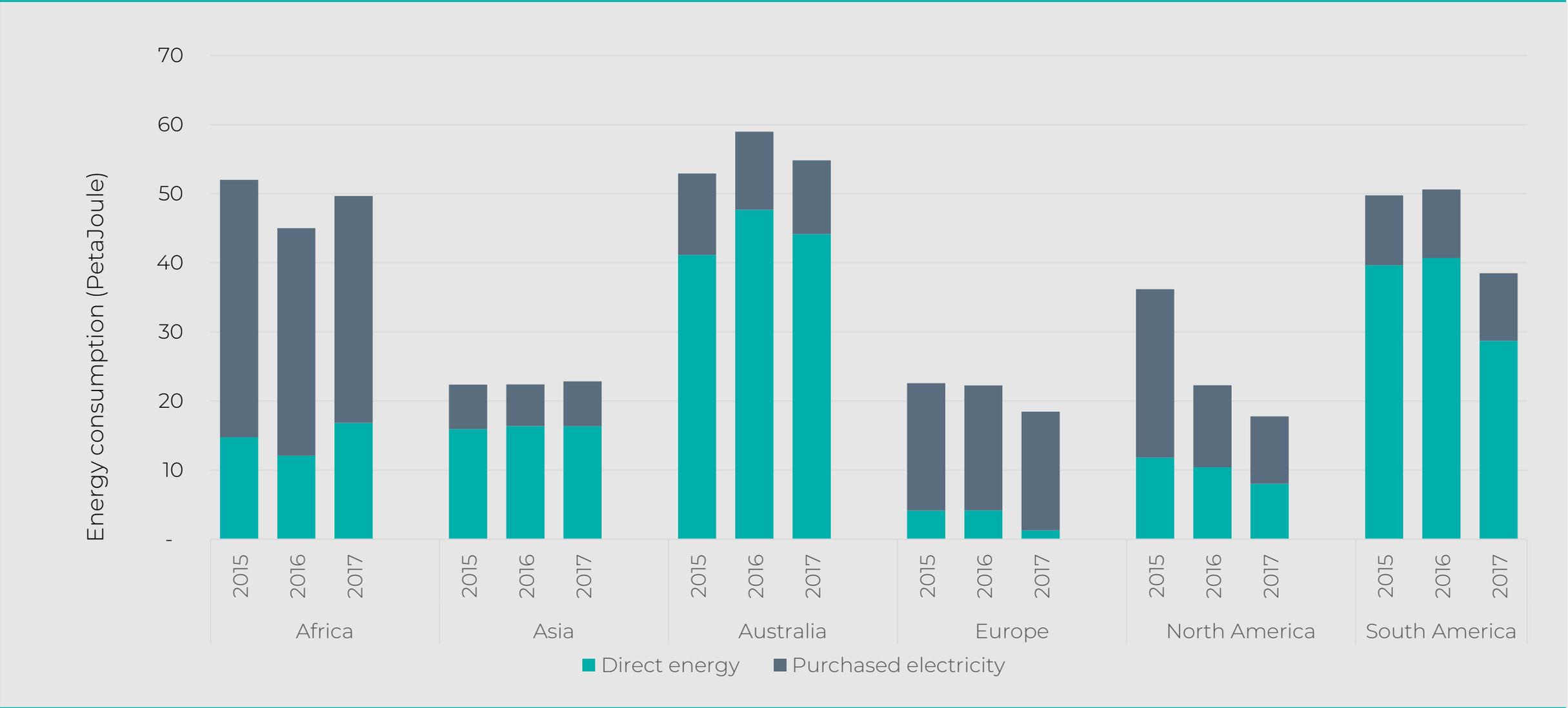
# Energy consumption 2015 to 2017 – Direct energy and purchased electricity per commodity



# Energy consumption 2015 to 2017 – Direct energy and purchased electricity per energy source



# Energy consumption 2015 to 2017 – Direct energy and purchased electricity per region





# Appendix

## Climate change risk assessment approach

# Climate change risk assessment: framework

<b>Climate change risks</b>	<b>Government policy</b>	<b>Energy costs</b>	<b>Physical impacts</b>	<b>Stakeholder perceptions</b>	<b>Market impacts</b>
<b>Sample risk identification</b>	<ul style="list-style-type: none"> <li>• Potential policy changes both positive and negative</li> <li>• Government energy policies, which directly or indirectly impact on costs</li> </ul>	<ul style="list-style-type: none"> <li>• Projected price changes by industrial asset</li> <li>• Operating cost sensitivity by asset in affected regions</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in rainfall patterns: floods; droughts; and storm frequency</li> <li>• Storm surge impact on ports and critical infrastructure</li> <li>• Temperature changes: heat stress; permafrost melt; and ice sheets</li> <li>• Impacts on local communities</li> </ul>	<ul style="list-style-type: none"> <li>• Negative perception resulting in impacts to permit approval, divestiture or cost of finance</li> <li>• Impacts on operating policy environment</li> </ul>	<ul style="list-style-type: none"> <li>• Potential impacts on existing commodity impacts</li> <li>• New or increased opportunities for our products from emerging technologies and policy changes</li> </ul>
<b>Evaluating business impact</b>	<ul style="list-style-type: none"> <li>• Determine materiality for industrial and marketing regions</li> </ul>	<ul style="list-style-type: none"> <li>• Review potential energy cost impact on operating costs</li> </ul>	<ul style="list-style-type: none"> <li>• Review regional long term climate projections for impact on infrastructure and business continuity</li> </ul>	<ul style="list-style-type: none"> <li>• Determine policy and financial consequences for the business and operations</li> </ul>	<ul style="list-style-type: none"> <li>• Determine how significant the potential impacts are (both positive and negative)</li> </ul>
<b>Identifying potential responses</b>	<ul style="list-style-type: none"> <li>• Identify and implement appropriate responses at Group and operational levels</li> <li>• Incorporate into Group risk register and monitor implementation of mitigating actions</li> </ul>				

# Climate change risk assessment: process

<b>Climate change risks</b>	Government policy	Energy costs	Physical impacts	Stakeholder perceptions	Market impacts
<b>Risk identification</b>	External consultant conducted high-level external risk review, prior to risk mitigating factors <ul style="list-style-type: none"> <li>• Focus regions: Australia; Copperbelt; South Africa; Latin America; Canada; Kazakhstan; EU</li> <li>• Applied scenarios: “Delayed action” and “Ambitious action”, both by 2020 and 2030</li> </ul>				2017: Conducted portfolio resilience analysis for three scenarios
	Conduct asset-level risk and opportunity assessment at top valued assets <ul style="list-style-type: none"> <li>• Cover ~80% of total infrastructure and business continuity value of industrial assets</li> <li>• Apply 2030 “Delayed action” for Physical impacts; “Ambitious action” for others</li> </ul>			Ongoing monitoring of developments	
<b>Evaluating business impact</b>	Evaluate integrated corporate and asset-level risk assessment outcomes <ul style="list-style-type: none"> <li>• Evaluate identified material risks against existing and planned mitigating factors</li> <li>• Align risk and opportunity assessment outcomes with post 2020 climate change strategy development</li> </ul>				
<b>Identifying potential responses</b>	Incorporate responses and monitoring into key Group governance processes <ul style="list-style-type: none"> <li>• Incorporate identified appropriate responses into post 2020 climate change strategy and business planning</li> <li>• Incorporate into Group risk register and monitor implementation of mitigating actions</li> </ul>				

Legend: Done Work in progress Next steps