

An aerial photograph of a large-scale open-pit mine. The mine is characterized by numerous terraced levels of reddish-brown earth and rock. A wide, light-colored gravel road winds through the site, curving from the left towards the center. In the lower right, a yellow mining truck is visible on the road. The background shows more of the mine's structure and some greenery at the bottom edge.

# Mining, minerals and metals consulting services

AFRY Management Consulting

MARCH 2024

# AFRY's ambition

We want to be the leading advisory to mining, minerals and metals industry players on their way to sustainability, circularity, energy transition and better performance



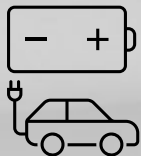
MINING/  
PROCESSING



METALLURGICAL/CHEMICAL  
PROCESSES



MANUFACTURING/  
CASTING/ ROLLING



BATTERY/APPLIANCES  
PRODUCTION



RECYCLING/  
CIRCULARITY



ENERGY TRANSITION

## AFRY'S EXPERTISE

**1,000**

Full-time mining, minerals and metals specialists worldwide

**30+**

Years in Mining, Minerals & Metals

**19,000**

Employees across Infrastructure, Energy, Process Industries, Digital Solutions & Management Consulting

**#4**

Among Top International Design firms in Steel (ENR2023)

**#7**

Among Top International Design firms in Mining (ENR2023)

Among World's Best Management Consulting firms (Forbes 2022)

Among UK's Leading Management Consultants (Financial Times 2023)

# In Mining, Minerals and Metals, AFRY brings together deep industry technical knowledge and leading management consulting capabilities

## ENGINEERING, PROCESS AND IMPLEMENTATION

**>1,000**  
Experts  
dedicated to  
mining &  
metals  
globally

- Exploration
- Mining
- Minerals processing, including:
  - Hydrometallurgy
  - Pyrometallurgy
- Recycling

**>2,000**  
Reference  
projects in  
mining &  
metals sector

- Project development and studies:
  - Scoping and concept
  - Pre-feasibility
  - Feasibility
  - Definitive feasibility
- Troubleshooting
- Process development
- Project implementation (e.g. EPCM)

## MANAGEMENT CONSULTING CAPABILITIES

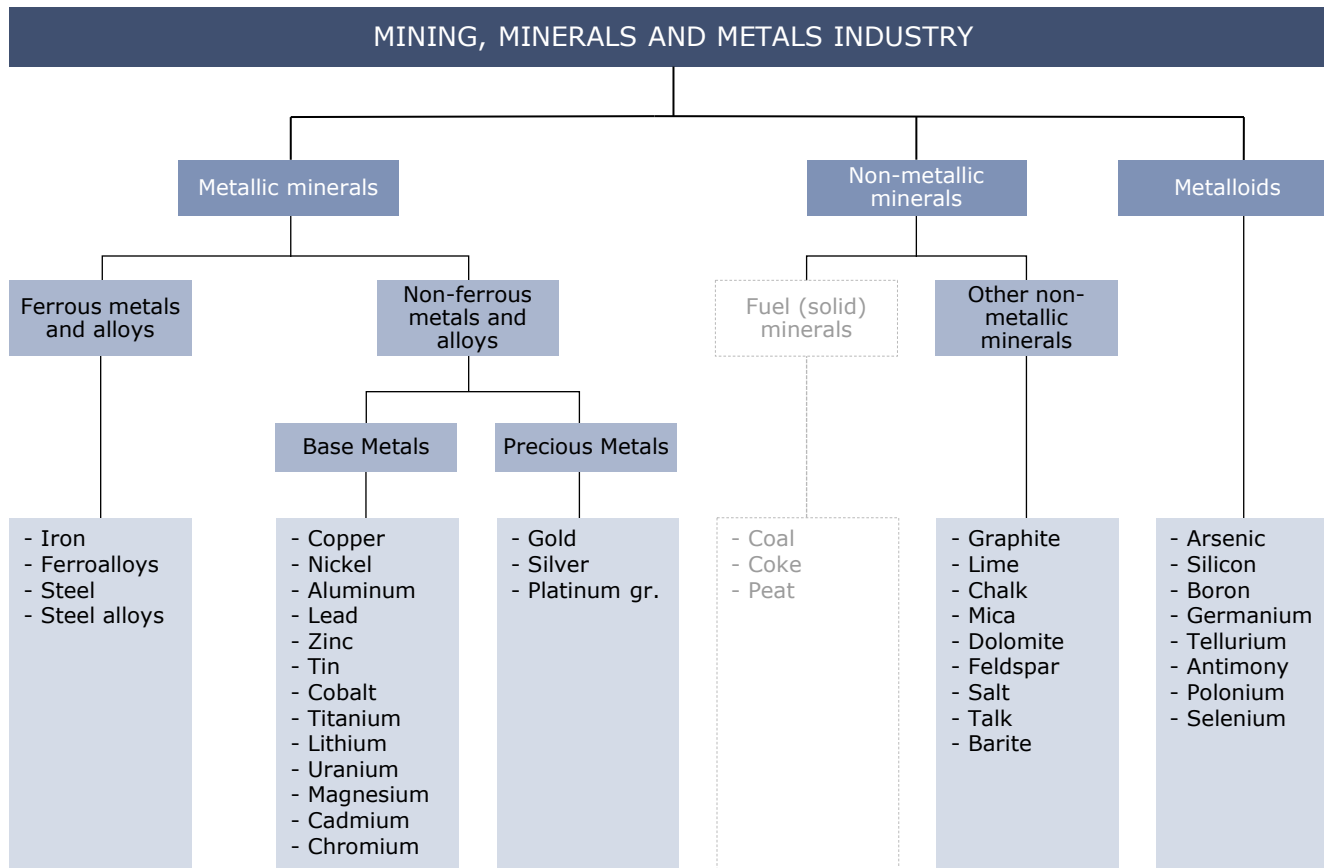
**>700**  
consultants  
across 20  
offices on 5  
continents

- Forward looking market analysis
- Strategic advice and decision support
- Operational and digital transformation:
  - Capital project and programme optimisation
  - Operational and organisational efficiency and effectiveness
  - Sustainability and decarbonisation
- M&A and transaction services



# AFRY has competence and experience with most minerals and metals within the industry

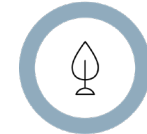
## MINING, MINERALS AND METALS INDUSTRY STRUCTURE



## FOCUS PRODUCTS



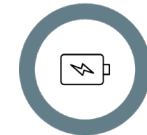
Energy Transition Minerals and Critical Minerals



Green Steel and other Green Metals










Bio-based materials as feedstock and components

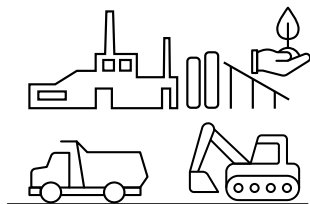


Battery value chain incl. battery minerals

# 7 global trends are reshaping the industry

 <h3>1. DECARBONISATION AND ENERGY TRANSITION</h3> <ul style="list-style-type: none"><li>- Industry goes "Green" – decarbonising power and production</li><li>- The industry is fundamental for the Global Energy Transition</li><li>- First 50–75% of the abatement curve typically NPV-positive</li><li>- Key technologies for decarbonisation of certain industries not yet mature/ cost-effective (e.g. steel, cement), but this will change rapidly</li></ul>	 <h3>2. EXPLOSION OF DEMAND (POTENTIAL)</h3> <ul style="list-style-type: none"><li>- Potentially massive demand increases in critical minerals</li><li>- Bottlenecks are mining (lead time to production) and metals refining</li><li>- Mega-projects hindered by permitting, market and technology risks – require downstream partnerships, full transparency and innovative finance</li></ul>	 <h3>3. RECYCLING AND CIRCULAR ECONOMY</h3> <ul style="list-style-type: none"><li>- Western markets setting ambitious circularity targets and incentivising resource efficiency</li><li>- However, the rate of expansion of production means recycling feeds not available for decades</li><li>- Technologies being developed rapidly (e.g. battery materials, recycling)</li></ul>	 <h3>4. NEW CUSTOMERS AND SUPPLY CHAINS</h3> <ul style="list-style-type: none"><li>- E.g., automotive customers have very different product development and specification processes to miners' traditional customer base</li><li>- Incentivises long-term, integrated supply relationships and tailored processing routes</li></ul>
 <h3>5. BIOTECHNOLOGIES</h3> <ul style="list-style-type: none"><li>- Substituting for fossil carbon</li><li>- Enhancing metal production and recovery</li><li>- Treating waste streams</li></ul>	 <h3>6. DIGITAL, ROBOTICS AND AI</h3> <ul style="list-style-type: none"><li>- Rapidly evolving technological capability brings opportunities to drive down project and operations costs and increase safety</li><li>- E.g. maintenance, construction, real-time process optimisation</li></ul>	 <h3>7. GEOPOLITICAL CHANGE</h3> <ul style="list-style-type: none"><li>- Increased geopolitical distrust and pandemic experience driving "deglocalisation" of supply chains</li><li>- Pressure and economic incentives for large-scale development of critical resource supplies in-region</li></ul>	

# Supporting mining, minerals and metals clients as the industry transitions



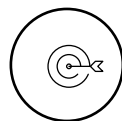
## MINING, MINERALS AND METALS

- Broad spectrum of metals and minerals, including base and precious metals, bulk commodities, energy transition minerals
- Full value-chain: from resource definition and mining to processing and mid- and down-stream manufacturing
- Full project life cycle: from concept through feasibility, fundraising, implementation and operation to decommissioning
- Industry-leading integrated sustainability



### Forward looking market analysis

- Tailor-made market research
- Forward looking modelling
- Policies and regulation analysis
- Scenario analysis
- Technology assessment
- Cost competitive analysis
- Energy markets (and other key inputs)



### Strategic advice

- Corporate and business strategies
- Investment strategies
- Market entry strategy
- Innovation management
- Value-chain security
- Sustainability and ESG strategies
- Decarbonisation roadmaps
- Bankable Feasibility Studies



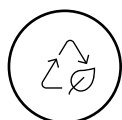
### Operational and digital transformation

- Execution gap analysis
- Operational efficiency and turnaround
- Performance improvement
- Organisation health and effectiveness
- Post-merger integration
- Capital project effectiveness
- Digital strategies and solutions



### Transaction support

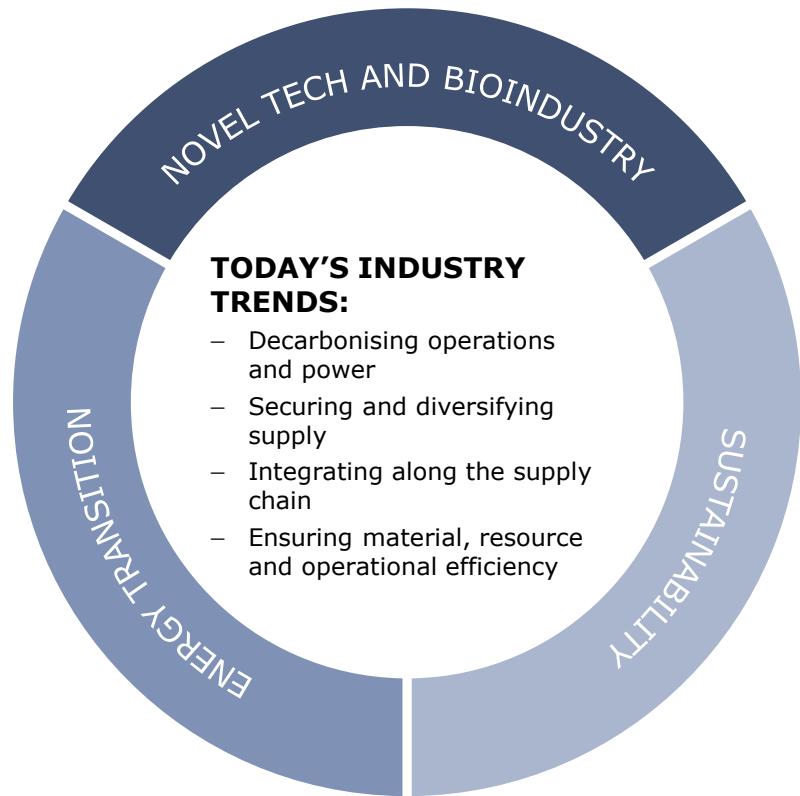
- Commercial due diligence
- Regulatory due diligence
- Technical due diligence
- EHS and ESG due diligence
- Risk management



### Sustainability services

- Greenhouse gas inventories
- Carbon calculations (scope 1-2-3)
- Social responsibility risk analysis
- Reporting of climate-related financial information
- Assessment of biodiversity risks
- LCAs and circular economy strategies, business models and ecosystems

# AFRY's focus is at the intersection of energy transition, novel tech/ biobased materials and sustainability



## FOCUS COMPETENCE AREAS:

### Energy transition

- Renewable energy sources
- CCUS and carbon offset
- DRI, electrolysis, electric furnaces
- Hydrogen and green ammonia

### Materials reuse and recycling

- Batteries, electronics and industrial metals recycling
- Material and resource use optimisation

### Focused sustainability

- Forest removal compensation
- Remote sensing for mapping environmental impacts

### Bio-based materials as feedstock and components

- Biocarbon, lignin, nanocellulose etc.
- Biotreatment of waste streams

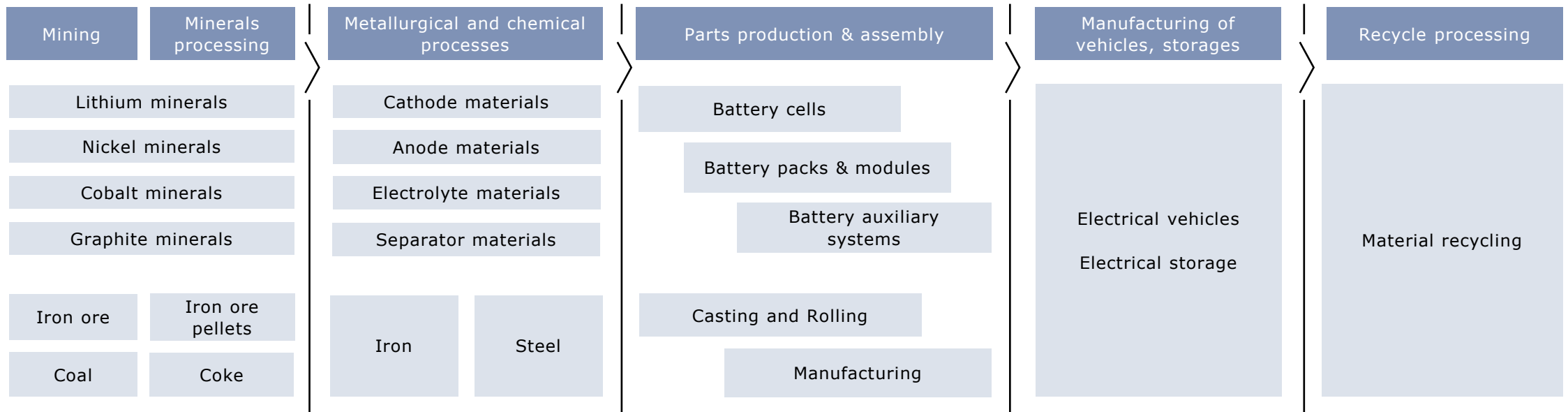
### Operational excellence and performance improvement

- Low- or no-CAPEX transformation
- Benchmarking to peers

### Securing value and supply chain

- Partner search
- Integration along the supply chain
- Securing feedstock and components

# AFRY is able of delivering advisory and engineering solutions along the industry value chain



## PROJECT EXAMPLES

- Technical feasibility studies of various levels for ferrous and non-ferrous mine projects
- Numerous biocarbon, biocoal and biochar production and application studies
- Novel technology applications (incl. lignin, nanocellulose etc.) for metallurgy and batteries production
- Hydrogen, Green Steel and Green Metals advisory and engineering projects
- Project management and engineering services for battery cell technology for energy storage
- Delivery of production line for the cell modules for a lithium-ion battery factory
- Commercial DD for the acquisition of a stake in a UK battery and EV charging developer
- Market entry study for the EV charging sector in China
- Conceptual study for battery recycling, black mass
- Detail Engineering for a complete battery recycling plant




WHAT DIFFERENTIATES US?


# AFRY is uniquely positioned to help

 **DEEP MINING AND MANUFACTURING EXPERTISE**

- Global engineering and design credentials extending across many commodities
- Consulting and industry experts' experience in industry majors
- Downstream perspective from working with clients across the value chain (e.g. battery materials, automotive, recycling)

 **UNIQUE END-TO-END CAPABILITY**

- Offering spans entire investment: strategy – concept – feasibility – fundraising – design – execution
- Offering spans entire asset life cycle:
  - Implementation: site search, permitting, design, construction, commissioning
  - Operations: optimisation, excellence, improvement
  - Closure: rehabilitation and reuse

 **ADVISOR TO BOTH PRINCIPALS AND INVESTORS**

- Successful DD means more than a red flag review – it must identify opportunities to add value that others do not see
- AFRY uniquely leverages strong industry and technical capability to advise on transactions

 **INDUSTRY-LEADING INTEGRATED SUSTAINABILITY**

- Origins in the Nordic/European centre of sustainability excellence

 **GLOBAL LEADER IN BIO-MATERIALS**

- Specialist skills and capabilities in biomaterials and the natural environment



CONTACT INFORMATION

# AFRY's mining, minerals and metals consulting services

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