NetZero Mining®

greenCrowd in the Mining Sector

Enabling sustainable energy supply to the mining sector in Southern Africa and the path to net zero.

greenCrowd®

www.greencrowd.energy

greenCrowd

About us

greenCrowd is a growing international partnership focused exclusively on the energy sector.

We are committed to environmental, social and corporate governance goals (ESGs).

Our team comprises professionals with deep expertise in finance, structuring, capital raising, commercial and project advisory, law, engineering, stakeholder engagement and energy policy. We leverage this expertise to make projects happen in the renewable energy, power infrastructure and mining sectors.

We provide innovative financial and commercial advisory services to private and public sector organisations.

We are committed, independent and objective.

Our team works closely with clients to ensure that projects and transactions of all sizes and complexity attract the correct form of funding.

Background

We are focused on tangible results, and innovation is at the heart of our approach. Our clients like working with us because we are practical and efficient. They also like that we are not afraid to advise them, not only about what to do and how to do it but also what not to do.

We facilitate long-term, open, transparent partnerships that deliver long-term value propositions.

Our entrepreneurial focus means we understand the pressures that project developers face as they seek to grow be they financial, organisational, or related to how to implement/commercialise an idea, a new technology, or a project.

We believe a creative and collaborative approach is required to support and deliver scalable and transformative projects, engaging key decision-makers and parties committed to a common purpose.

Creativity is at the heart of everything we do.

green: /ɡriːn/. Adjective: (of a product or service) not environmentally harmful.

crowd: /kraʊd/. Noun: a group of people linked by a common interest or activity.

greenCrowd: /ɡriːn kraʊd/. Noun: a partnership of professionals who work collaboratively and openly to make projects happen that benefit our global environment.

Credentials

greenCrowd is:

- Headquartered in London, UK.
- A FCA Approved Representative firm (reference number 938737)
- A Participant of the United Nations Global Compact
- A member of the Investor Confidence Project (ICP) Investor Network

greenCrowd has been awarded approved supplier status by Innovate UK to advise companies in the Energy Systems Catapult (ESC) programme.

Members of greenCrowd are part of the UK's Foreign, Commonwealth and Development Office (FCDO) Partnering for Accelerated Climate Transitions' (PACT) roster of Experts.

United Nations Global Compact

FCA FINANCIAL CONDUCT AUTHORITY

UK PACT

INVESTOR CONFIDENCE PROJECT

We work with Innovate UK

NetZero Mining®

Mining Sector Outlook – Southern Africa

Overview

Southern Africa has abundant mineral resources, including gold, copper, uranium, cobalt, and many other metals, critical to developing the future sustainable energy system.

Mining is of critical strategic importance, being one of the region's primary sources of foreign exchange. Mining amounted to 77% of Zambia's total exports in 2019 and over 99% of those in the DRC in 2017, according to the Extractive Industries Transparency Initiative (EITI).

In parallel, aggregate energy demands from all economic sectors within the Southern African region are set to increase from 400 terawatt hours (TWhs) per annum to 565 TWhs between 2017 levels and 2030 - an increase of 41%. Mining is forecast to account for approximately 18-25% of total demand.

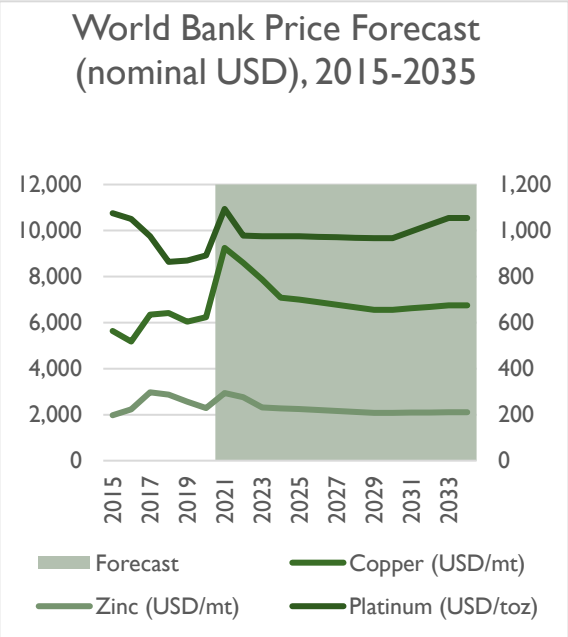
This growth comes against a background of constrained power provision, with South Africa notably forecast to have a deficit of 4GW, according to Eskom, through 2025.

Strong underlying demand

Despite COVID-19, demand for metals such as copper and cobalt has remained strong, with copper hovering around 10,000 per tonne through 2021 and early 2022, with the long-term global outlook positive, driven by substitution.

The switch to solar and wind produces higher requirements for copper/MW of power than gas or nuclear power. Electric vehicles (EVs) contain 5x more copper than their combustion equivalent, with EVs and battery storage estimated to account for about half of the growth of mineral demand by 2040 (IEA 2021).

It is widely recognised that demand for metals such as copper, lithium, nickel and cobalt – and subsequently prices – are set to remain attractive for the long term when compared to 2020 prices.



Growth in production

According to analysts CRU Group, the Democratic Republic of the Congo (DRC) could produce over 2 million metric tonnes (MT) p.a. of copper by 2026, compared with 1.6 million MT in 2020. Over the last decade, Zambian copper production has risen more than threefold from c.250 thousand MT in 2000 to c.880 thousand MT in 2020, with a government target to grow this to 3 million MT by 2032.

In passing the 2 million MT production threshold, the DRC and Zambia are vying to overtake China to become the third largest copper producer after Chile and Peru. Similar growth is expected to take place with other metals.

Powering the growth

Mining depends on a firm (non-seasonal) and reliable (non-intermittent) power supply and typically depends on grid-connected power.

While power is essential for all mining companies, the cost of energy as a proportion of total operating costs rarely constitutes less than 10% of operating costs and often exceeds 25%, according to the IBRD/World Bank.

With population growth and other factors resulting in the growing demand for power across all vital economic sectors and the region's projected long-term power deficit, competition for competitively priced high-quality control remains strong, including for MineCos.

ESG & Sustainability Led Investments

Expanding requirements

Environmental, Social and Governance (ESG) criteria have developed from a niche activity into a mainstream investment process. In recent years, regulatory developments have made adopting ESG policies and procedures mandatory as regulators seek to integrate sustainability into the financial system and steer the flow of capital toward sustainable investments.

According to Bloomberg, the result is that global assets under management that meet ESG criteria are on track to exceed USD50 trillion by 2025, representing more than a third of the projected USD141 trillion in total global assets under management.

With mounting scrutiny from regulators, markets being more sensitive to ESG-related news, and asset owners appointing managers focusing on ESG, ESG is fundamentally reshaping the finance industry. Companies demonstrating clear ESG implementation strategies are set to gain access to this growing pool of capital.

ESG & Sustainability Strategies

Increasing regulation

Compliance with ESG and sustainability requirements is beginning to put significant pressure on investors with portfolios that include mining assets.

In 2019, the European Commission was the first to formally describe the concept of "double materiality" in the context of sustainability reporting and the need to get a complete picture of a company's impact. In 2021, the EU Commission adopted the Corporate Sustainability Reporting Directive (CSRD) in alignment with the EU Taxonomy and the EU Sustainable Finance Disclosure Regulation (SFRD) for asset managers. These have set the scene for a global regulatory approach to ESG and sustainability.

As investors are increasingly required to report on the sustainability of their investment portfolios, so are businesses. To address double materiality, reports now need to cover the financial applicability of topics that influence enterprise value, i.e., information relating to "non-financial" factors and environmental and social materiality, which involves the company's impact on environmental and social aspects.

Net Zero megatrend

The likes of the Taskforce on Climate-related Financial Disclosures (TCFD) and COP26 in Glasgow have increased the focus on climate change. Companies across multiple sectors have been launching net-zero strategies. In an open letter in October 2021, members of the International Council on Mining and Metals (ICMM) (some of the world's largest miners) committed to net zero direct and indirect carbon emissions by 2050 or sooner.

Yet ESG, sustainability, carbon disclosure, and related regulations that investors and businesses need to address are multifaceted. Climate change requires businesses to understand how physical and transition risks may impact enterprise value or "double materiality". For example, severe weather events may affect the company's manufacturing sites or supply chain security; climate regulation may mean that some of its products and services are not viable, or the company's carbon emissions may impact the environment and people's livelihoods.

With increasing attention on how businesses tackle climate change, there is increasing pressure on mining companies to show evidence of their performance regarding policies, systems and reporting across various metrics.

UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

What does this mean?

Investors may decide not to invest in an organisation based on the volume of its emissions, eventually affecting its ability to attract capital or the cost to access capital. The result is that investors are increasingly looking for a home for the funds gained from disposing of non-ESG-compliant investments and are seeking to confirm that assets meet double materiality requirements.

With the attention to climate change and environmental impacts, mining companies are well placed to capitalise on technology and commercial developments in the power sector. A prominent part of a mining company's strategy to address climate change can be to reduce the emissions associated with power and the on-site fleet.

While the economics of on-site renewable power generation are improving yearly, it often remains uneconomic to do so for 100% of a mine's operations. Access to renewable power sourced from state-owned utilities or via a sleeved or virtual PPA with a renewable energy independent power producer (IPP) provides a straightforward means to fulfil Scope 2 Carbon Reduction objectives.

Emerging energy regulatory frameworks in countries like Zambia and South Africa enable IPPs to produce power and wheel it through existing grid infrastructure. Countries with high penetration of renewables enjoy favourable conditions for ESG-focused investments.

Developing Power Markets

Increased interconnection

Africa's energy sector is set to become more diverse and dynamic. This provides MineCos with more significant optionality regarding energy procurement. Increased investment in infrastructure such as interconnectors is opening up markets, whilst regulatory developments and changing behind-the-meter (BTM) economics are creating new opportunities for off-takers.

Critical transmission infrastructure in development includes the Solwezi-Kolwezi Zambia-DRC interconnector and the Zambia-Tanzania-Kenya interconnection project, subject to financing availability, expected to be completed in 2025. The latter will further enhance trading opportunities between various Southern Africa Power Pool (SAPP) members by linking the SAPP and East African Power Pool, increasing system diversification of power supply and the power generation mix.

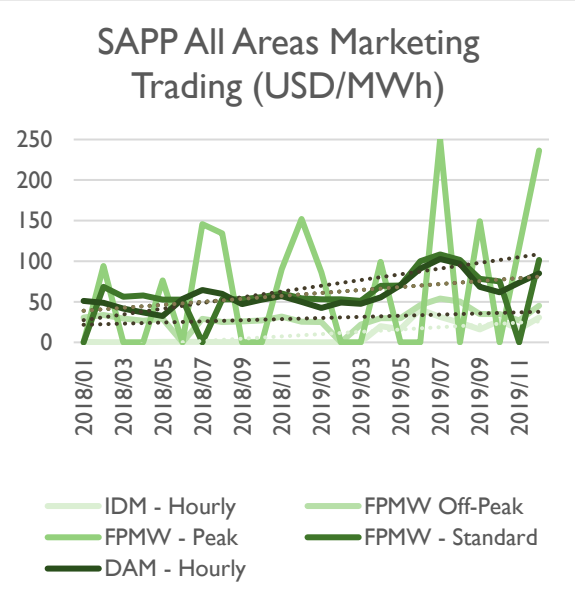
Establishing the SAPP Regional Transmission Infrastructure Financing Facility will provide the much-required financing to ensure these projects are realised.

Regional markets

Increased interconnection across the region will facilitate the development of a competitive electricity market in the SADC region and provide the end users with a choice of electricity supplier.

2,004 GWh was traded within the SAPP on the competitive Electricity Market during SAPP's last reporting period, 2019-20, down 2.5% compared to the previous period. However, these trades were worth USD 147 million, compared to USD 107 million in the previous period, in line with the increased price trajectory over the last five years. These trades constituted 21% of transactions through the four portfolios/markets: (i) Intra-Day, (ii) Day Ahead, (iii) Week Ahead, and (iv) Month Ahead. 79% were undertaken bilaterally.

In the long term, opening up power markets across the SAPP will provide end users greater flexibility in meeting power requirements.



Developing regulation

Power prices are forecast to remain on an upward trend. This is partly due to a continued forecast power deficit in the region (any new generation added being offset by increased demand).

At the same time, there is increased optionality for off-takers. Regulatory developments have been taking place regionally, making it easier for end users of power to enter into power supply arrangements with IPPs using the grid infrastructure. In Zambia, for example, the Electricity Act No. 11 of 2019 and the Energy Regulation Act No. 12 of 2019 came into effect in February 2020. These provide access to transmission and distribution networks owned by ZESCO and CEC.

The regulatory landscape is not homogenous across the region, however. While some countries still operate with a single-buyer model, those with regulation permitting wheeling between an IPP and an off-taker include Namibia, South Africa, and Zambia.

Competitive PSAs

Entering into competitive Power Supply Agreements (PSA) with utilities remains key, ensuring MineCos can hedge against these price increases whilst maintaining the option to capitalise on technological developments for BTM generation options in the future. With the growth in utility-scale projects and the broadening of BTM offers, solutions for mining companies can lie in developing flexible power purchase and supply agreements with suppliers.

Growing Number of Power Supply Options

Technology development

The Southern African region boasts some of the world's largest hydrological sources. It is further blessed with wind, geothermal and solar potential. These renewable power sources can be located on-site or accessed through power purchase agreements (regulation permitting).

Most renewable energy systems are at gold mines, followed by copper and iron ore, as the South African Institute of International Affairs noted. As renewable energy becomes more efficient and effective at meeting MineCo power requirements, it is projected to become a vital part of the overall energy supplied to the sector.

The region will see a significant increase in directly procured renewable energy power. South African MineCos alone are planning to invest USD3.8 billion into renewable energy, translating to 3.9 terawatts of solar, wind and Battery Energy Storage System (BESS) projects according to BNEF (2021). These projects are aimed at helping limit companies' carbon tax obligations, increase reliability and lower power costs.

On-site technical solutions

As part of MineCo's ESG strategy, designing a complimentary renewable energy strategy that achieves corporate sustainability goals has several options with varying degrees of effort, impact and cost.

Declining Levelised Cost of Energy (LCoE) results in solar and BESS dominating emerging embedded generation technology solutions. These solutions are often paired with a thermal plant in a hybrid system, which can complement grid power or, depending on location and circumstances, support entirely a mine to an island.

Case study: Vametco Mine, South Africa

A hybrid solar plus BESS microgrid system is installed at Bushveld's alloy mine. A 1MW/4MWh vanadium redox flow battery is paired with 3.5MW solar PV.

The solar plus BESS will shift solar PV power to alternative times of day, with stored solar energy used as an alternative energy source for the grid. This will provide close to 10% of total electrical consumption and is expected to cut more than 114,000 tonnes of CO2 emissions over 20 years.

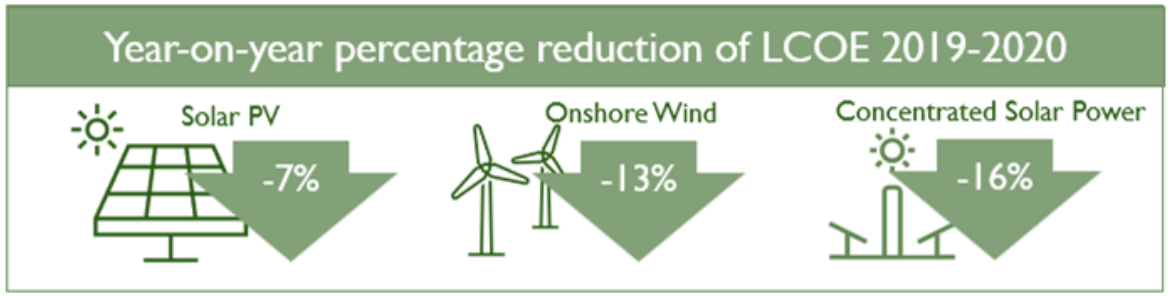
Commercial approach

There are alternative arrangements to direct ownership of assets. A hire purchase sees the MineCo purchasing the renewable energy asset in regular instalments. The service company bears the risk, and the help belongs to the lender as they are the owners until they are fully repaid. Leasing options are well suited to containerised solutions where the life of a mine does not match the time typically required for project financing.

The use of power purchase agreements has also increased in recent years. These can be physical PPAs reducing capital requirements from the MineCo. The PPA can also be virtual, wheeling through the grid.

Case Study: QMM, Madagascar

Rio Tinto has entered into a PPA with CrossBoundary Energy for its QMM off-grid mine. 8MW of solar and 12MW of onshore wind will be connected to a lithium-ion BESS with a capacity of 8.25 MWh. The storage system will allow for the stabilisation of QMM's power grid. The agreement is expected to meet 60% of QMM's annual electricity needs.



Source: IRENA (2021), Renewable Power Generation Costs in 2020, International Renewable Energy Agency, Abu Dhabi.

Firm Renewable Power

Overview

In meeting ESG and sustainability-led investment requirements, MineCos in the Southern Africa region are positioned to capitalise on some of the world's most abundant renewable energy resources and procure these through national utilities.

While the economics can favour displacing power procured from the utility with BTM or PPA contracted power, MineCos require firm control, so they typically prefer base-load supplies provided by the utility. In certain jurisdictions, regulation (yet to be introduced) precludes MineCos from entering into commercial agreements with IPPs or generating power beyond backup or emergency supplies.

As such, utilities remain vital partners for the mining sector. With Eskom's planned transition from coal to renewables in South Africa, power from the grid across the region can increasingly support MineCos in meeting carbon reduction targets.

Green(ing) utilities

On average, companies with high ESG scores experience lower capital costs than those with poor ESG scores in developed and emerging markets. A four-year study by ESG rating agency MSCI demonstrated a 1.3% difference in the average cost of capital between high and low-ESG-scoring industrial companies in emerging markets.

South Africa secured commitments valued at USD8.5 billion in financing over the next five years at COP26 in 2021 that are aimed at helping it install more clean energy. This will accelerate the country's transition away from coal power and support MineCos in addressing their Scope 2 emissions in the region.

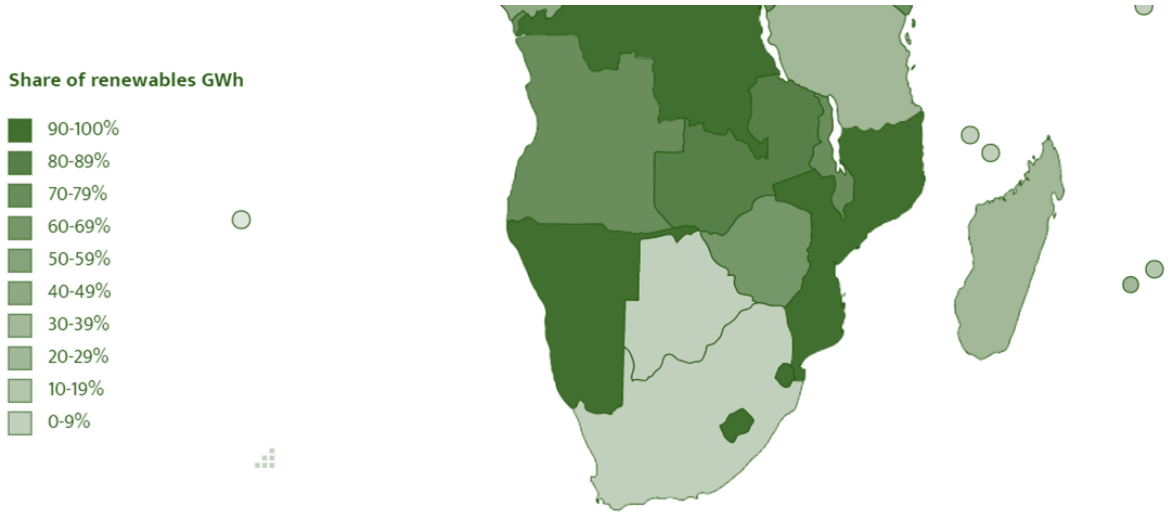
Eskom's transition complements the region's predominantly high penetration of renewables, led by large hydroelectric projects.

Diversification

Hydroelectric projects provide dispatchable power; even a large station can go from offline to maximum capacity and vice versa within a few minutes.

The region's drought has demonstrated that reliance on hydrological resources can create operational impacts. To that end, utilities such as ZESCO are implementing a diversification strategy to mitigate climate change with the planned development and procurement of solar and wind power.

According to SAPP, 16.51GW of planned new generation capacity will be commissioned in the region up to 2023. With Eskom's investments in renewables, the region's power supply is expected to become increasingly greener each year.



A Finance First Approach

Successful financing steps

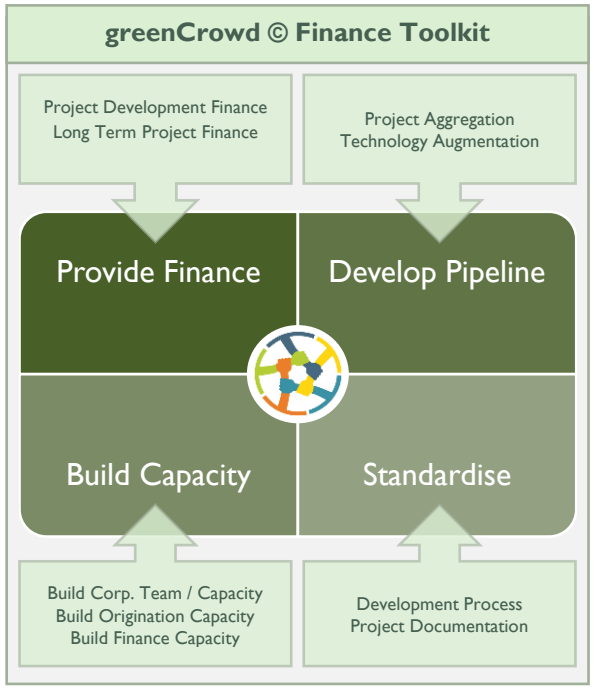
We apply the following disciplines to ensure successful projects:

- The greenCrowd Finance-First Toolkit: *rigorous project evaluation, due diligence and preparation so that there are no surprises.*
- Creativity and a finance-first approach *so that issues/obstacles can be tackled beforehand.*
- Open and transparent project management *so that all stakeholders are engaged.*
- Marketing materials target a broad audience *so that the investment rationale for debt and equity speaks for itself.*
- A targeted fundraise so that competitive tension is created among debt and equity funders to achieve *optimal capital.*
- A well-managed process *with agreed milestones to efficiently reach financial close.*

Our Finance-First Toolkit

Power projects succeed when they are planned well, commercially viable, the detail is understood, they are carefully assembled by experienced professionals who understand the risks and how to mitigate them and, as significantly, where the source of capital, both external and internal, matches the project's business plan.

greenCrowd has developed a Finance-First Toolkit for its clients that enables the preparation of bankable projects and transaction opportunities:



What we cover

The Finance-First Toolkit draws from the greenCrowd team's experience in the following areas:

- Renewables Financing
- Power Infrastructure Financing
- Strategic Advisory
- PPA and Power Brokerage
- Market Research
- Technical Analysis and Advisory
- Corporate and Project Finance
- Transaction Services
- Investment Management
- Commercial and PPA Advisory
- Environmental, ESG, and regulatory compliance
- Energy transition frameworks

We understand what it takes to develop a bankable project and what investors and lenders require to satisfy their credit/investment committees. Having advised both sides of investment transactions, we are well placed to support and sponsor developers, help authorities and meet investor requirements across the various stages of a transaction and project's development cycle.

Our Services

Who do we work with

We work across the whole energy value chain. Our clients include:

- Public Sector: parastatals, governments, local authorities
- Power companies: utilities, transmission and distribution companies
- Private Sector: developers, mining companies, generators, suppliers, commercial and industrial consumers, technology companies
- Capital: equity investors, debt funders, strategic and industrial investors
- Third Sector: NGOs, community energy groups.

We encourage long-term thinking and open and transparent partnerships to deliver robust projects and transactions. Above all, we work with people who deliver on their promises.

How we work

Our clients like working with us because we are open, problem-solving, practical and efficient. Moreover, we have the confidence to use our knowledge and experience to act as a sounding board for guidance when asked

Areas covered:

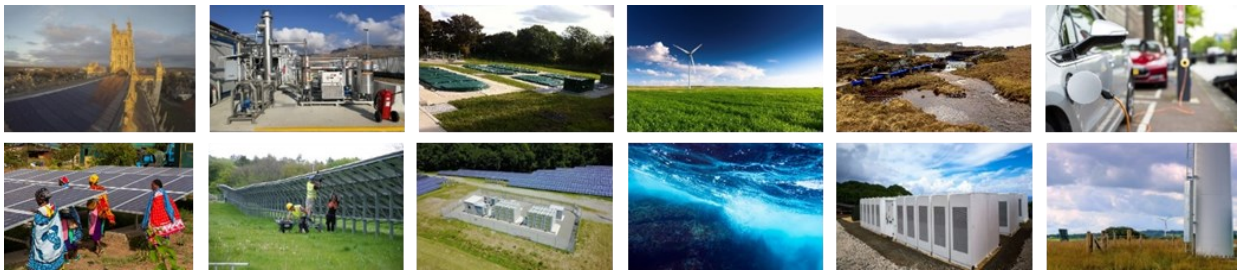
- Power generation, transmission and distribution networks
- Hydroelectric
- Solar PV - rooftop, ground mount, floating
- Onshore & offshore wind
- Storage - domestic, commercial, utility
- Biomass / Anaerobic digestions / Biogas
- Energy efficiency
- Blue Economy
- Electric transportation
- Hydrogen

Mining Sector Services

Our work supports mining companies to secure power on flexible and attractive terms. We leverage deep expertise in the power sector and Southern Africa to support the transition to clean energy and the flow of capital to projects with strategic value.

Activities

- Strategic corporate and project advisory, meeting investor ESG requirements
- Onsite and off-grid power supply analysis
- Detailed financial modelling, analysis and appraisal
- Commercial negotiations with technology providers, IPPs and utilities
- Power Supply and Power Purchase Agreement advisory
- Capital raising and investor and funder negotiations



Creativity is at the heart of everything we do at greenCrowd. To find out more about our Africa strategy and our market-leading services, please register your project at www.greencrowd.energy.com or contact the greenCrowd team.

Contact Us

Greencrowd Partnership LLP
8 Tavistock Street,
London WC2E 7PP, United Kingdom

T: +44 20 3709 9880

E: team@greencrowd.energy

greenCrowd®
www.greencrowd.energy