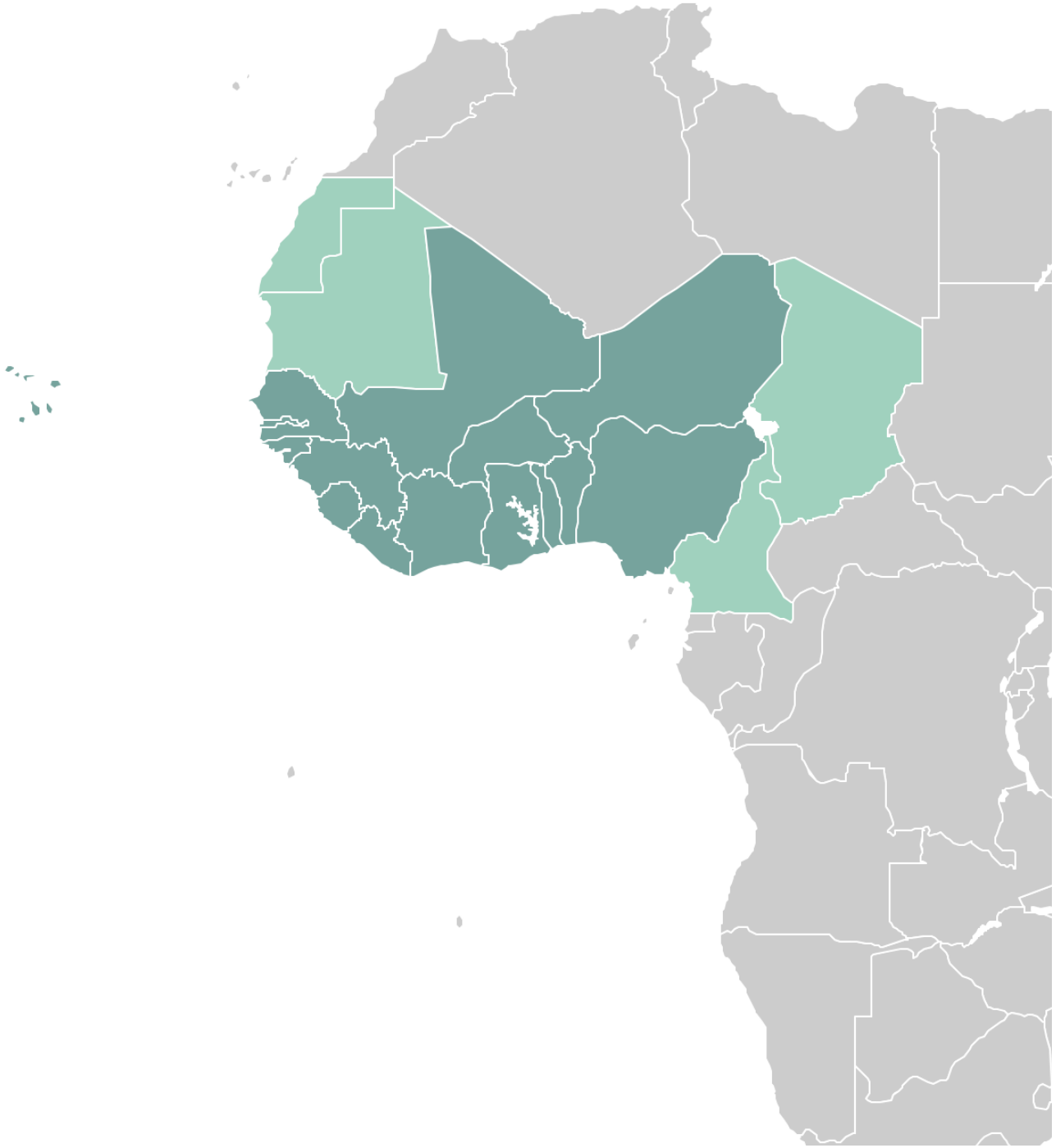


greenCrowd in West Africa

We aim to revolutionise the financing markets for small-to-mid-scale sustainable energy and waste management projects.

greenCrowd®

www.greencrowd.energy

About Us

Our approach

Our focus

We focus on sustainability, clean energy, clean water, energy storage and energy efficiency in established new and frontier markets.

Our goal

Our goal is to demystify the financing markets for small-to-mid-scale sustainable energy companies and projects, to innovate financially and continually to invest in sustainable energy as accessible, cost-effective and transparent as possible for all stakeholders.

Our corporate partnership criteria

We encourage long-term thinking and open and transparent partnerships to deliver robust, sustainable energy and waste management projects. We work with people who deliver on their promises.

Experience overview

greenCrowd is a growing international partnership of members drawn from the finance, legal, international development and engineering professions.

Across the value chain

We have collectively financed, enabled, advised and operated over half a gigawatt of clean energy projects in new, developing and established markets. Our experience spans every project development stage, from pre-feasibility through to refinancing, from advisory to ownership, operation and maintenance.

We have established several industry firsts in renewable energy finance and have built up a body of experience in how to and how not to deliver and finance ground-breaking projects, often in challenging environments.

Many of our team have invested in and built up successful SME businesses and understand the challenges such companies and entrepreneurs face in raising the correct form of finance.

greenCrowd is proud to be a participant in the UN Global Compact

Credentials & initiatives

Pioneering and precedent-setting

Europe: Structured Europe's 1st listed solar securitisation in 2012 (24-year Bond) and 1st distributed generation residential solar securitisation (20-year Green Loan) outside the US to satisfy Climate Bonds Certification Standards.

Africa: Senior Expert in Sustainable Energy Finance, EU TAF for SE4ALL Initiative; New market entry for start-up clean energy products distribution company in West Africa; Secured seed-funding for innovative energy services model for solar water pumping in Kenya.

Caribbean & Latin America: Consortium facilitation for pre-feasibility, design and operating contract of c.5MWp ground-mounted solar; Project Ackee (in development) for USD60m programme for floating solar PV.

Asia: Helped develop the emissions markets globally, including expertise in India. Enabled delivery of hundreds of sustainable projects through negotiating purchase contracts for emission reductions.

greenCrowd®

A Low-Carbon Future

The energy transition

Mitigating climate change requires a significant shift of electricity production from fossil fuels to renewable energy. Fossil fuels are non-renewable, drawing on finite resources that are environmentally damaging to extract with further socio-economic adverse effects and wasted foreign exchange.

West Africa has for decades relied heavily on oil for electricity generation, leaving consumers exposed to multiple risks and drawbacks and remote communities without energy. Oil-based electricity generation is typically expensive and subject to price volatility, which can result in risky fuel hedging strategies that lock in prices for years to come.

Financial costs

Whilst some countries, such as Nigeria, are oil & gas exporters, most West African countries are net importers. For example, Sierra Leone imports approximately 6 thousand barrels of refined petroleum products daily. These imports consume a significant percentage of gross national income and foreign exchange earnings, hampering economic growth.

Paradigm shift

Falling renewable power costs signal a fundamental paradigm shift in the competitiveness of different power generation options, including cheaper electricity from solar PV, biofuels, waste conversion and onshore wind.

Out with the old

The levelized cost of electricity (LCOE) of a power generation technology reflects the total cost of construction and operation, such as resource quality, equipment cost and performance, the balance of project costs, operation and maintenance costs, the economic lifespan of the project, and the cost of capital.

Using LCOE allows for a like-for-like comparison between different sources of power generation.

"Renewables increasingly provide electricity at costs competitive with, or lower than, fossil-based power" – IRENA

Decreases in capital costs and increases in efficiencies have led to a marked reduction in the LCOE of renewable energy.

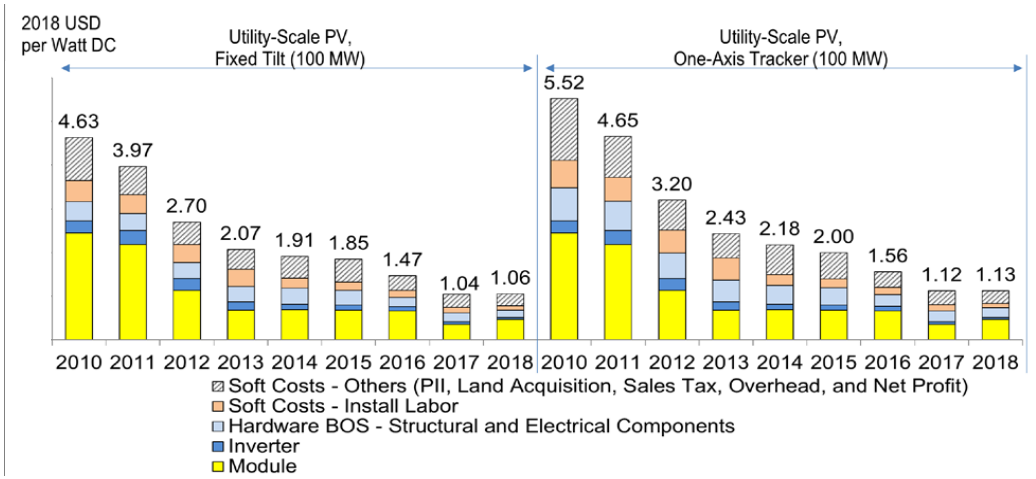
Economic imperative

Imported fuel costs account for approximately 50-80% of utilities' operating expenses. Those shifting to renewables enjoy the many benefits of the transition: operational cost savings, environmental well-being, reliable and stable power, long-term energy price stability, and reduced dependence on oil.

A new market

The good news in the chart below shows that the LCOE of solar PV has reduced dramatically in the last eight years. However, while contracted PPA rates edge down into single-digit figures across the continent for utility-scale projects, installation costs remain high in many West African countries, mainly due to topographical challenges, high import costs, and the fragmented market just beginning to establish competitive local supply chains.

Despite that, the cost savings and improved electricity network reliability make projects economically, environmentally and socially compelling.



Source: NREL utility-scale PV system cost benchmark summary (inflation adjusted), US 2010–2018

Fit-For-Purpose Energy Infrastructure

Social impacts

The region's economic disparity is vast, including high-ranking GDP per capita countries such as the Cape Verde at one end and Niger at the other. However, even the wealthier countries and all remote communities disproportionately depend on fossil fuels for their well-being.

Externalities affect everyone

Energy production typically produces direct and indirect costs to the producer and society. The drawbacks to fossil fuel-based energy production are air and water pollution and fuel cost expenditure. The air and water pollution emitted by fossil fuel plants has been linked to severe illnesses and health problems.

Pollution affects everyone. A Harvard University study estimated the life cycle costs and public health effects of coal alone to be an estimated $74.6 billion yearly in the United States. Factoring in these externalities would increase the price by 4.36 cents per kilowatt-hour of electricity produced. In contrast, renewable energy projects have no such pollutants.

Energy resilience

Power outages occur almost daily throughout West Africa. As in many parts of Africa, businesses and industries in West Africa have generators, which aren't always reliable due to the high fuel cost. They also suffer from intermittent breakdowns, compounded by requiring time to turn them on after an outage.

Critical infrastructure

Renewables can help build resilient energy services for critical services. Dedicated microgrids provide an opportunity for localised energy disbursement.

"Our vision and top priority is to provide access to electricity for all by 2030 while using environmentally friendly means ... Our ambition is to increase the electrification rate of Togo to 100 per cent by 2030." Marc Ably-Bidamon, Togo's Energy Minister

Microgrids relying 100% on solar PV generation and intelligent, battery-based energy storage can provide reliable and affordable energy.

Local economic benefits

Renewable installations can be small and medium scale, creating good local investment opportunities, local employment, increased revenue generation and helping to reduce foreign exchange outflows.

With money in the region, local demand for construction and engineering and income diversification improve regional economic stability and foster economic growth in more remote areas.

Reliability

With small conurbations, the economics of developing transmission and distribution lines for many communities can be cost-prohibitive.

Happily, a more distributed generation system could provide a lower-cost option that is easier to fix. Evidence from deploying systems in other sub-Saharan African countries suggests decentralised systems lead to multiple positive additional benefits, such as new jobs and skillset creation through supply chain development.

A Regional Approach

A swift transition

While much of the energy transition growth over the past ten years has been due to larger utility-scale projects, recent efficiency advancements and cost reductions in renewable energy technologies will allow small to medium-sized projects to become competitive and for utility-scale projects to outcompete their fossil fuel older cousins.

Countries like Cape Verde are leading in the transition to clean energy, aiming for 100% renewable energy by 2030. A growing number of ambitious renewable energy targets and programmes spreading across the region will complement each other, helping to accelerate clean energy deployment and lower costs.

A billion-dollar challenge

To eliminate the costly dependency on fossil fuels so that West Africa can meet its 2030 renewable energy targets will require an enormous amount of new, innovative and cost-competitive capital to be deployed. There are additional opportunities to address energy efficiency projects.

Small-medium size

High and volatile electricity tariffs and ongoing blackouts offer an opportunity for renewable energy installations and energy efficiency measures. Projects under 5MW can be more challenging to finance and deploy at scale but provide multiple benefits over more centralised facilities, such as faster, less bureaucratic and more flexible deployment, decentralised solutions, private wires and projects that address the needs of specific communities.

System benefits

A review of 11 net metering studies by Environment America Research and Policy Center found that distributed forms of renewable energy, such as solar, offer a net benefit to the entire electric grid through reduced capital investment costs, avoided energy costs, and lowered environmental compliance costs.

Rooftop and small-to-medium scale installations close to the off-taker can reduce the need for costly grid upgrades, benefiting the local distribution and transmission company and lowering system costs.

Decentralised opportunity

The past decade has seen a significant increase in decentralised renewable power generation financing and deployment.

As technology has matured and technology providers offer secure performance guarantees, the market has attracted investment attracted by the performance of new generation assets. Investor confidence is now spreading to smaller-scale projects.

Regional significance

Economic Community of West African States (ECOWAS) comprises 15 member states: Benin, Burkino Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

The region's energy demands are set to increase fourfold between 2015 and 2030.

Regional Opportunities

Naturally Resource Rich

The West Africa region spans three distinct climatic zones: the hot, dry Sahara Desert in the north, the hot semi-arid Sahel in the central zone, and the tropical southern area. There are significant opportunities available in West Africa:

- Estimated 23,000 MW of hydroelectric potential (6,000 MW is micro-hydro) concentrated in five of the 15 Member States. Only 16% have been exploited to date.
- Traditional biomass remains a crucial energy source for people experiencing poverty, accounting for 80% of total energy consumed, resulting in good potential for all forms of bioenergy.
- There are considerable wind, tidal, ocean thermal and wave energy resources available in some countries in the region.
- Depending on the scenario analysed, solar PV in the ECOWAS region ranges from 8 gigawatts (GW) to over 20 GW by 2030, implying an annual average deployment of 1.5

A regional market

The region is experiencing a smooth democratic transition. The last and most recent change to democracy was in The Gambia in 2017, completing the peaceful shift to the rule of law in the region. These developments are reinforcing several regional energy initiatives already underway.

Connected energy systems

Endorsed in 2016, the West Africa Clean Energy Corridor (WACEC)'s primary objective is to support the development of utility-scale renewable energy-based power. It is a 2,000 km line with a capacity of 1,000 MW project cost of US$1.2bn+. It will promote the integration of renewable energy sources into the West African power systems to create a market for trans-border power trade.

The World Bank estimates that integrated power trade in the region could lead to cost savings of US$5-8 billion per year by enabling countries to import cheaper sources of electricity. It will increase access to affordable, reliable and modern energy whilst reducing CO_2 emission intensity.

Regional Significance

From a low starting point, countries in the region are committing to ambitious renewable energy targets.

Supportive targets

2013, the ECOWAS Authority of Heads of State and Government adopted the ECOWAS Renewable Energy Policy (EREP).

This aims to increase the share of renewable energy in the region's overall electricity mix to 48% by 2030 (including large-scale hydropower projects, this increase to 67% by 2030).

Country	2030 target
Benin	44%
Burkina Faso	50%
Cape Verde	100%
Cote D'Ivoire*	16%
The Gambia	48%
Ghana*	20%
Guinea*	30%
Guinea-Bissau	50%
Liberia	30%
Mali*	30%
Niger	57%
Nigeria	30%
Senegal*	30%
Sierra Leone	50%
Togo	30%

** Excludes large hydro*

These are supported by renewable energy and energy policies for the majority of the countries within the region.

Ingredients For The Successful Rollout Of Renewable Energy

1. Enabling framework

The applications of renewable power systems can be split into four main categories: (1) off-grid domestic, (2) off-grid non-domestic, (3) grid-connected distributed, and (4) grid-connected centralised. An enabling framework will support all types of development to ensure sufficient mix and resilience.

Is there supportive legislation?

Due to the less well-developed regulatory energy frameworks in West Africa, the ability to introduce more nuanced commercial Power Purchase Agreements (PPAs) such as synthetic, sleeving / wheeling or virtual PPAs, for example, is limited. Projects usually require exclusive arrangements with the grid operator, which is typically also the principal or only utility in that country. This often applies at the local/residential level and commercial/utility-scale projects.

Despite these limitations, recent supportive policy announcements have shown promise, providing comfort and legal certainty for investors.

2. Development

By virtue of their size and investment requirements, grid-connected centralised projects often find it easier to gain access to capital. However, the development and execution discipline for smaller projects remains required if scale is achieved.

What are the key aspects?

- Project Development – pre-feasibility study, feasibility study, development and design
- Site Selection – the aim is to maximise output and minimise cost, not most minor cabling routes
- Energy Yield Prediction – using international best practice methodologies
- Plant Design – achieving the lowest LCOE
- Permits and Licensing – lease, environmental impact assessment, building permits, licensing, grid connections, PPA
- Procuring Contractors – this may be through an EPC depending on project requirements
- Operation and Maintenance (O&M) – preventative and unscheduled maintenance
- Economics and Financial Modelling – taking all relevant financial metrics into account, such as debt service coverage ratios
- Investment – choose the right partner on

3. The end in mind

Companies and organisations that have successfully deployed large-scale projects have simultaneously taken on project development with a 'financing-first' approach.

What's the investor process?

The project may end up being well designed but may have missed crucial aspects of due process, thereby jeopardising the project. Investors will go through various stages of due diligence (DD), getting sign-off from their credit committee, and understanding this process can help build the proper discipline for project development.

There are typically three central due diligence evaluations: (1) Legal and commercial DD with an assessment of the permits and contracts (EPC and O&M); (2) Insurance due diligence, ensuring the project has adequate coverage and the insurance policies; and (3) Technical DD covers the technical aspects of the permits and contracts, financial modelling assumptions, electrical design and layout etc. Developers that understand this process are well-placed to bring bankable projects to market.

How We Work

With whom we work

We work across the whole energy value chain. Our clients include governments, local authorities, regulators, developers, investors, generators, suppliers, commercial and industrial consumers, distribution companies, technology companies and community energy groups.

Renewables 2.0

A new era for renewable energy is emerging. The deployment of renewable energy continues to expand globally, driven by various factors, including capital allocation and investment, falling capital costs, competitive LCOE and different policy mechanisms.

Subsidy-free renewables – Renewables 2.0 – will have significant, wide-ranging consequences for all market players. There is a need to address dispatchability and availability in ways that allow utilities and network operators to provide low-carbon, affordable and reliable energy with security of supply. This requires a good understanding of the technical and economic options available.

Technologies

A system with balanced technology will be required to provide uninterrupted supply to domestic, commercial and industrial clients. As renewables increase penetration, a key challenge will be to meet the growing need for flexibility by managing and mitigating the impact of increasingly variable and bi-directional energy flows.

What we cover

- Solar PV - rooftop, ground mount, floating
- Onshore & offshore wind
- Storage - domestic, commercial, utility
- Biomass
- Anaerobic digestions/biogas
- Hydro
- Wastewater treatment
- Energy efficiency
- Electric transportation

Collaboration is key

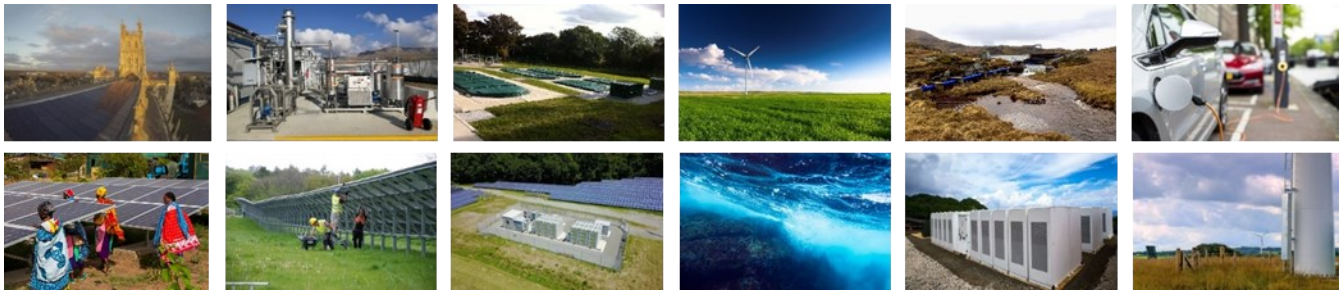
We strongly advocate for the strengthening of local markets, expertise and know-how. We therefore make it a central tenet of our engagement to work with local experts, institutions and organisations, reinforcing local capacity and capabilities.

Supporting the local economy

We recognise that many solutions are local and work at melding this know-how with international best practices.

We aim to stimulate and encourage the development of capital markets, capacity and expertise.

In working with local finance institutions, we can improve the creditworthiness of projects that generate local currency income and avoid foreign exchange risk. This can reinforce existing market indices whilst curbing unhedged currency mismatches on balance sheets. From a local economic perspective, it can help generate liquidity, stimulating local activity.



Our Services

Finance

greenCrowd's Partners are both investors and investees. We understand what it takes to develop a bankable project and what investors 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 investors.

Areas covered:

- Equity & debt fundraising
- Advisory including commercial strategy, PPAs
- Financial modelling
- Due diligence for projects and investors
- Fund management and investment
- Market entry & international strategy

In addition, greenCrowd undertakes capacity building and training for government agencies, financial institutions and the private sector.

Legal

greenCrowd's legal team complements the financial and technical aspects of any project.

Our combined expertise covers work in first mover and mature markets through to frontier and developing markets.

Areas covered:

- Documentation simplification
- Project management
- Construction and project financing
- Shareholder and stakeholder frameworks
- Environmental & regulatory frameworks
- Policy and market mechanisms development
- Leases, PPAs, licenses
- Environmental, ESG, and regulatory compliance

Technical

Our technical team provide critical support to the delivery of any project, from start to finish. Our expertise includes technical support for grid-connected, off-grid, and all sustainable energy and waste-water projects.

Areas covered:

- Feasibility, resource and yield evaluation
- System design & electrical engineering
- Grid connection
- Energy audits & environmental assessment
- Wind load, noise & air quality impact assessment
- Planning and public inquiry support
- Landscape & visual assessment
- Technical due diligence

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 at www.greencrowd.energy.com or contact the greenCrowd team.

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