



Experts in East Africa

**Gaffney,  
Cline &  
Associates**

## Who is Gaffney, Cline & Associates?

Gaffney, Cline & Associates (GCA) is a global energy consultancy that has been offering technical, commercial and strategic advice to the oil and gas sector for over 50 years. GCA's reputation for quality has been built and maintained by providing advice that is insightful, impartial, technically based and commercially astute. GCA is often referred to as one of the leading Reserves consultants within the petroleum industry, but in fact offers a full range of Upstream, Midstream and Downstream, Technical and Commercial consultancy services. These services include, but are not limited to, seismic interpretation, static and dynamic reservoir modelling, field development planning, field engineering, gas monetization, LNG/GTL, mergers and acquisition, economics and project finance. GCA operates worldwide from 3 main offices in London, Houston and Singapore and from local offices in 6 further countries.

## East Africa

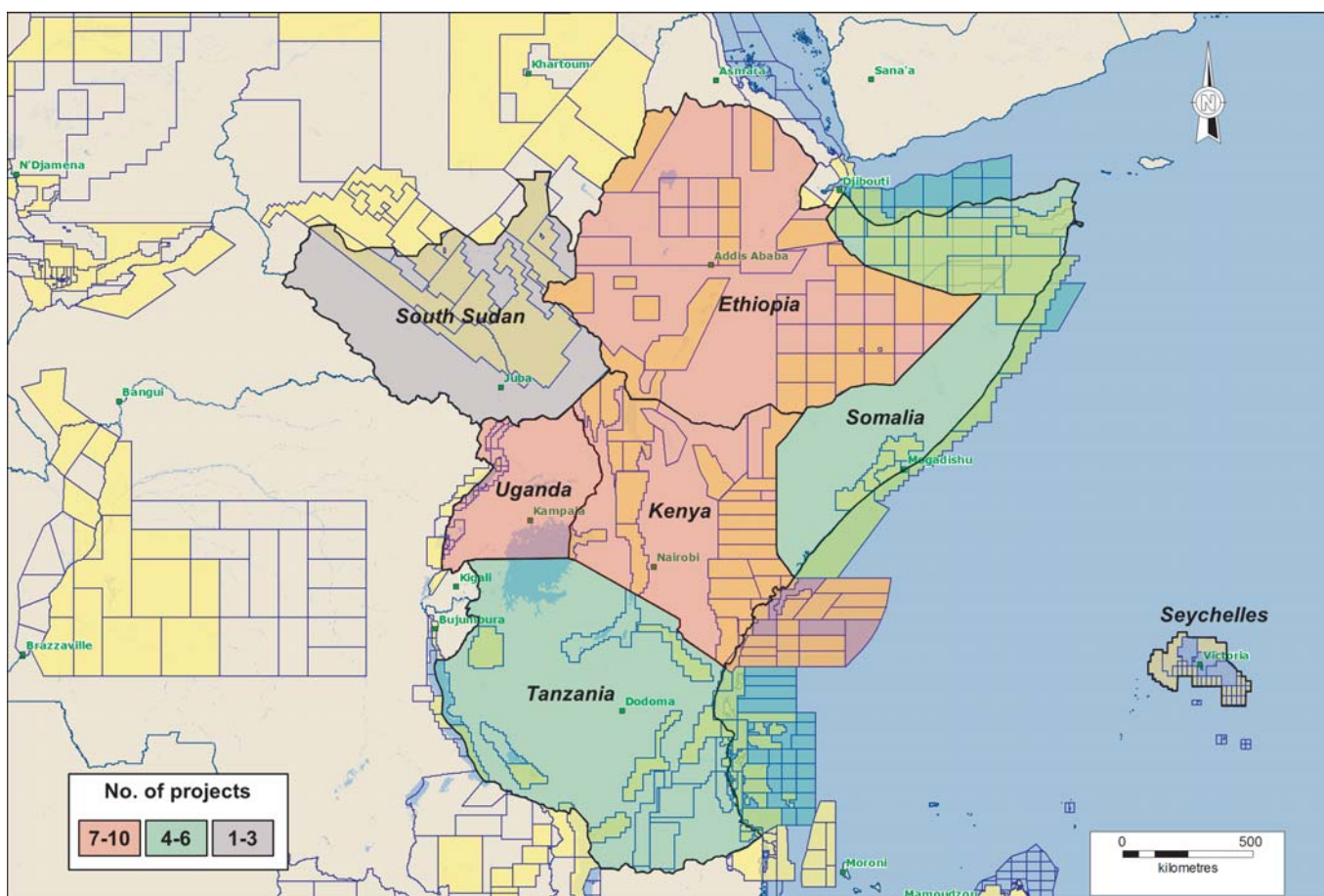
East Africa is an area where GCA has considerable experience and, in the current, vibrant business climate, has recently been very active.

The petroleum systems of onshore and offshore East Africa are very different. Recent onshore exploration successes, exemplified by those in the Albert Basin of Uganda, are oil discoveries in Tertiary aged sediments and are associated with the East Africa Rift system. The offshore deepwater gas discoveries of Mozambique and Tanzania are typified by sandstone reservoirs deposited in a deepwater fold and thrust belt. A third petroleum system is much older and is exemplified by Mesozoic aged sediments seen on the island of Madagascar, as well as the petroleum system of South Sudan and its potential extension into Kenya, Ethiopia and adjacent areas.

Deepwater sands of Tertiary and Cretaceous ages, offshore Mozambique and Tanzania have proved to be the most prolific new offshore "basin" in the world in the past five years, with some 185 Tcf of natural gas resources already having been discovered since the first well completed in March 2010. Given the length of the coastline (about 4,000 miles from Somalia to South Africa) and the licenses around surrounding islands (e.g. Madagascar and Comoros), the deepwater of the region remains largely unexplored with only 85 wells drilled in the last five years; 85% of which are within a 250 mile "golden-zone" running either side of the Tanzania-Mozambique border.

GCA has worked in all of these basins and areas, each of which poses different challenges for successful discovery, development and monetization of resources. GCA activity in these relatively new petroleum provinces is still largely Upstream focussed and includes: advising on portfolio building and exploration, Reserves and Resources reporting, CPR preparation on stock market listings, mergers and acquisitions, as well as being an Expert Witness.

Downstream advice such as refining studies and gas monetization is increasingly required. GCA's clients range from Small and Independent exploration and production companies through to Supermajors, as well as financial institutions, NOCs and government ministries. GCA is uniquely placed for work in the region, having experience across the full life-cycle of East African assets. Some examples of GCA's recent East Africa projects follow:



### Albert Graben Exploration, Uganda:

For an international client considering acquiring an interest, GCA reviewed three exploration blocks and a number of oil and gas discoveries located in the Albert Graben of western Uganda. The GCA team reviewed all petrophysics, volumetric estimates and the conceptual development plans (including anticipated production profiles and Capex/Opex estimates) and provided an independent opinion on the Seller's reserve/resource estimates.

### 1st Licence Round, Uganda:

For a potential investor in the First Ugandan Bidding Round, GCA undertook a review and provided a techno-economic assessment of two Ugandan Exploration Licences (with discoveries) in the Albert Graben using data provided by the Ugandan Ministry. This review included an independent evaluation of the technical, economic and commercial potential of the discovered resources and the remaining prospectivity in the blocks evaluated.

### Refinery Feasibility Study, Uganda:

GCA worked with a major engineering contracting company on a refinery feasibility study on behalf of the Ugandan government. GCA's product market/pricing study assessed both the mix, and scale, of refined product demand that the new refinery might expect to meet in the coming decades, and realizable product prices netted back to the refinery gate. GCA analysed the economic attractiveness of various refinery development scenarios and financing options. GCA also advised the engineering contractor on the appropriateness of upstream field development concepts and profiles, and, in workshops with the Government, discussed the implications of the refinery project for the country's economic development and the development of its national hydrocarbon resource sector.

### Crude Export Pipeline Advice, Uganda:

GCA analysed refining costs (in conjunction with an engineering contractor) to advise the government on the economics of constructing a crude oil export pipeline and the associated handling and transit fees.

### Portfolio Valuation, Tanzania:

GCA performed an evaluation and valuation of equity investments in a frontier exploration portfolio that included multiple offshore licences. The equity investment was successful, leading to acquisition of multiple 3D seismic surveys revealing more than 20 TCF Gas in Place in a string of discoveries and leading to LNG planning.

### Joint Venture Exploration Support, Tanzania:

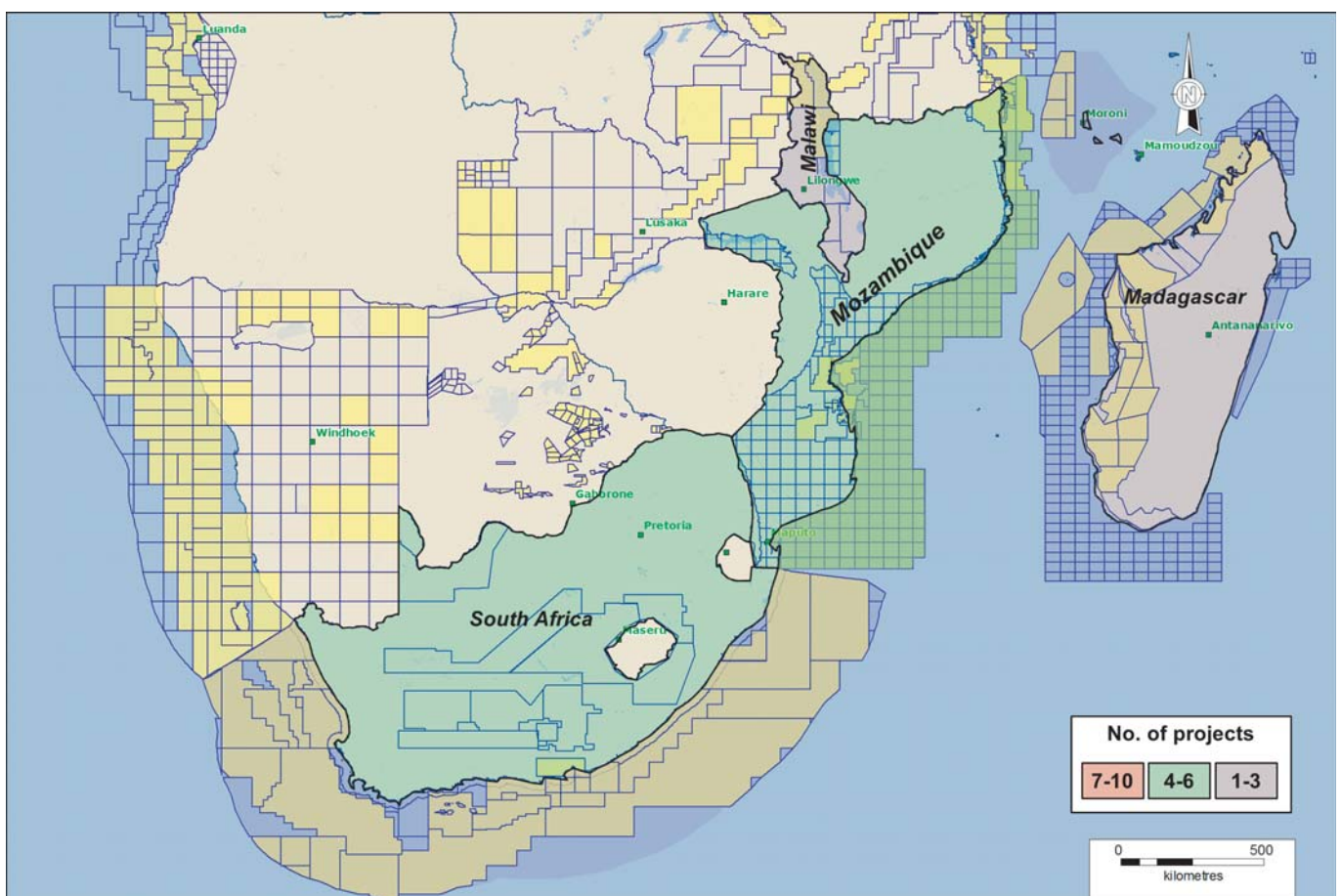
GCA provided assistance with technical decision making to a member of an E&P JV at the end of an offshore exploration phase. Decisions included the selection of relinquishment areas, prioritization of forward exploration programs, giving support at TCMs and strengthening the client's in-house technical capabilities.

### Gas Reserves Audit, Tanzania:

For a medium sized independent oil company, GCA undertook an audit of the recoverable gas volumes associated with a Tanzanian gas field. The audit was commissioned to provide comfort to potential gas buyers and to give the field operator recognition for its uncontracted gas volumes.

### Prospective Resources, Kenya/Tanzania:

For a private client, GCA prepared an independent evaluation of two properties in Kenya (in the eastern branch of the EARS) and in central Tanzania. GCA's report included an independent assessment of the Prospective Resources attributable to these two properties.



### CPR Preparation, Kenya:

GCA prepared a CPR for a company with diverse petroleum assets, including in Kenya.

### Kenya Contingent and Prospective Resources:

GCA provided regular Contingent and Prospective Resource evaluations and notional development plans for a medium size, independent oil company following their successful drilling campaign.

### Resource Assessment, Kenya:

For a private client, GCA prepared an independent evaluation of two properties in Kenya (in the eastern branch of the EARS) and in central Tanzania. GCA's report included an independent assessment of the Prospective Resources attributable to these two properties.

### Exploration Review, Kenya, Tanzania & Zambia:

This study involved evaluation of a number of exploration licences and included making comparisons to the Albertine and Lokichar Basins. The potential of the Karoo rift system was also examined.

### GIIP and Reserves Estimation, Onshore Mozambique:

GCA used an extensive well and seismic database in conjunction with dynamic data in order to estimate Gas In Place and Reserves for onshore gas fields.

### Exploration Evaluation, Mozambique Channel:

GCA evaluated two frontier deep water exploration blocks of the Mozambique channel and provided the Operator with recommendations for an ongoing work programme and possible farm-out.

### Field Development Advice, Mozambique:

GCA was requested by an integrated energy company to review options for sustaining gas production from two fields to meet a specified plateau production rate. Gas In Place was validated, and different scenarios and well counts modelled to meet the sales contracts.

### Open-Acreage Dataroom Support, Mozambique:

GCA representatives advised and supported client personnel through a 2 day, workstation-based data room in Mozambique. Following the dataroom GCA prepared a Prospectivity Report, including analogues, for the client.

### Advice on Exploration PSA Terms, Malawi:

GCA advised a company looking to enter into Exploration and Production Sharing Agreements within Malawi. The company was seeking clarification on PSA agreements in such a new hydrocarbon industry in the country.

### Play Concept Development, Offshore East Africa:

GCA undertook geological and geophysical evaluation for an Independent company with exploration licences. Play concepts were presented at client workshops.

### Gas Resources Evaluation, Ethiopia:

Gas discoveries and prospects in the Ogaden Basin were evaluated for a company looking to acquire a number of discoveries and prospects in Ethiopia.

### Unitisation:

GCA has undertaken unitization and redetermination studies on behalf of clients around the world, including in East Africa.

### Expert Witness, East Africa:

GCA personnel acted as Expert Witness in a dispute regarding exploration in a deepwater fold and thrust belt.

### Gas Monetization Study, Ethiopia:

GCA evaluated a number of options including power generation, gas-to-liquids, LNG, fertilisers, CNG or long distance pipeline for relatively remote gas discoveries where local demand was low. Analysis was done for both existing individual discoveries, and for a cluster of potential discoveries.

## Additional Information

For more information about GCA's integrated services, please contact your local GCA office.

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