



Experts in India

**Gaffney,  
Cline &  
Associates**

## Gaffney, Cline & Associates

Gaffney, Cline & Associates (GCA) is a global consultancy that has been offering technical, commercial, and strategic advice to the oil and gas sector for more than 50 years. GCA is well known as one of the leading suppliers of Reserves and Resources assessments, which are required for many purposes including statutory reporting, stock exchange listing, development planning, project finance, and asset valuation. In addition, GCA offers a full range of upstream, midstream and downstream consultancy services. These include seismic interpretation, static and dynamic reservoir modelling, field development planning, facilities and pipeline engineering, gas monetization, LNG/GTL, mergers and acquisitions, economics and project finance, unitization and redetermination, and expert witness work. GCA operates worldwide from three main offices in London, Houston and Singapore, supported by various regional offices.

## India

GCA has undertaken, and continues to undertake, a wide range of projects in India over a period of more than 30 years serving a wide range of local and international clients from oil and gas companies to national oil companies, banks, service companies and international financial organisations. The scope of these projects has been very diverse including upstream exploration portfolio management and bid round support, technical field and development studies, gas and refinery market studies, corporate strategy, legal dispute advice and a number of Reserve and Resource audits/evaluations and Competent Person Reports (CPR). In addition, GCA has supported Indian organisations growing overseas.

The following examples provide a sample of the breadth of work that GCA has been engaged on in India:

**Discovered Small Field Bid Round 2016:** For an Indian Operator, GCA provided technical and commercial evaluation of 10 Indian fields. Support was provided in-country and concluded with a shortlist of technically and commercially NPV positive fields with reduced subsurface risk for potential bid submission.

**Offshore Gas Resource Assessment:** GCA was engaged by a leading Indian oil company to provide an assessment of the gas-in-place and recoverable resources associated with the exploration results offshore in the Bay of Bengal. GCA performed detailed petrophysical interpretations generated independent 2D models of the channelised reservoir bodies and ranked in excess of 100 untested seismic anomalies.

**Resource Assessment:** GCA undertook an evaluation of the Prospective Resources in an offshore Block for the Operator. This work investigated multiple prospects and leads within proven and possible plays in the Basin. The work combined an audit of the data and analysis provided by the client, but also involved GCA undertaking independent seismic analysis and volumetric assessment and estimation of Geological Chance of Success for the prospects and leads. Much of the Block was covered by 3D seismic data, which allowed seismic attributes to be used in the evaluation of reservoir quality and fluid content where appropriate. Deeper prospects and leads were evaluated using geological principles.

**Resource Assessment Offshore Gas Discovery, India:** GCA was engaged by a large Indian oil company to develop static and dynamic reservoir models for a deep-water gas condensate discovery, offshore India. GCA conducted its own 3D seismic interpretation and analysis of log, well test and PVT data to construct static and dynamic models. Two technically attractive development options were identified and recommendations for appraisal made.

**Review of Geophysical Work:** For a major State Indian oil company, GCA undertook a complete block prospectivity and prospect evaluation for an offshore block in the Krishna-Godavari basin. This involved detailed basin analysis of the block, identification of major depositional sequences, play fairway analysis. An exploration program and strategy were developed.

GCA India Jobs by Category	Number of Jobs
Reserves/Resources	44
Field Development/Technical Studies	20
Block/Asset Review	16
CPR	10
Acquisition and Corporate Strategy	8
Gas and Refinery Studies	4
Bid Round Support	3
Unconventionals (CBM)	3
Arbitrations and Dispute Advice	2
Other	7
<b>TOTAL</b>	<b>117</b>

**Well Design in Indian Oil Field:** For a major Indian Operator, GCA advised on well design in a field with high H2S and CO2 concentrations. The work addressed well design, operational and safety procedures, and ways in which the design could be simplified to achieve cost savings.

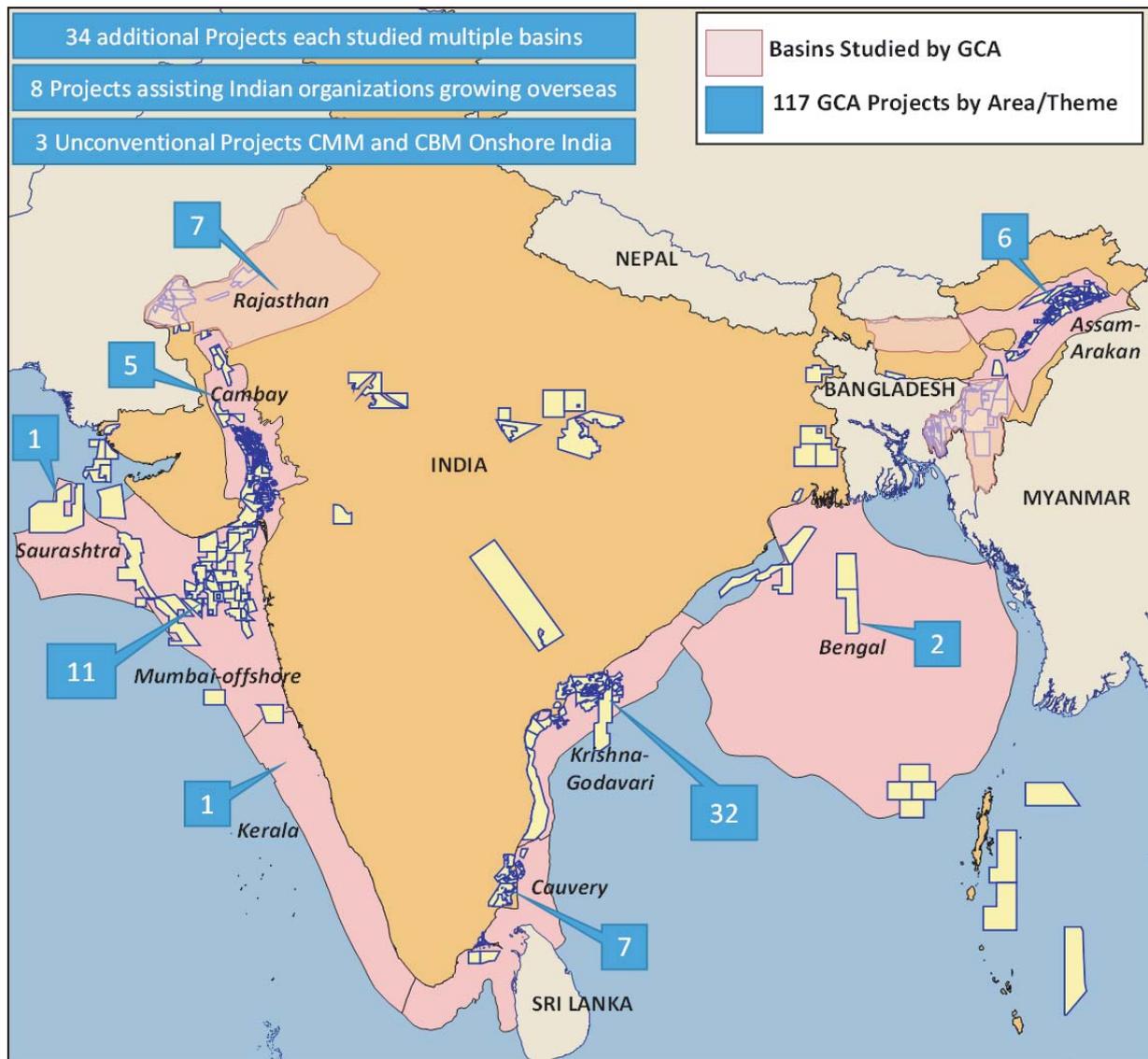
**Mumbai High Field Redevelopment:** GCA was retained by the board of the Indian Oil and Natural Gas Commission (ONGC) for over 15 years to provide assistance with the operation and management of the giant Mumbai High field offshore western India. GCA specialists spent most of the time on the ground in ONGC's offices working with their staff on a broad range of technical, operational and management issues. GCA's approach was to use multi-disciplined teams covering all aspects of field management from seismic, geology, petrophysics, reservoir engineering and simulation to drilling, well bore technology, pipeline networks, facilities, cost reduction and economics. GCA was additionally mandated to report regularly and directly to the ONGC board on matters of long term Mumbai High reservoir management, the implementation of new technologies, the introduction of an ongoing development plan and benchmarking management, organisational and technical procedures against international norms.

**Technical Due Diligence for Corporate Acquisition:** For a major Asian national oil company, GCA performed the technical due diligence and valuation of a portfolio of significant oil and gas fields in support of a large corporate acquisition. In addition, GCA provided advice on negotiating positions to adopt in discussions with the seller.

**Assessment of Indian Energy Market:** For a major Middle Eastern National Oil Company, GCA carried out a detailed evaluation of the Indian energy and gas markets. Gas supply, demand, imports and prices were determined for a 20-year period. Pipeline import economics were derived and competing fuel economics assessed.

**Refinery Financial Feasibility Study:** GCA was requested by an Asian financial institution to conduct an economic feasibility assessment of a planned crude oil refinery in the Indian sub-continent. GCA's evaluation comprised the development of capital cost estimations, a review of the likely demand for refined products within the target region for supply, financial feasibility assessment and a sensitivity analysis.

**Figure 1: GCA Projects in India**



**Upstream Asset Assessment, India:** For a major Indian operator, GCA undertook an independent assessment of a number of upstream assets as preparation for the submission of the client's tender for their licence round.

**Annual Reserves Audit:** For a international operator, GCA undertook an independent reserve evaluation of its working interest in a gas field offshore India. Reserves were evaluated to COGEH guidelines for the client's annual filing to the TSX.

**CPR for LSE Listing of Hardy Oil and Gas:** GCA provided a Competent Person's Report to assist Hardy during its listing on the London Stock Exchange.

**Overseas New Country Entry:** For a large Indian oil company, GCA evaluated the commerciality of Prospective Resources for two blocks highgraded as a possible basis for New Country Entry as part of the Ugandan First Licensing round. This involved a techno-economic assessment of the exploration potential, a range of development scenarios and offtake solutions for hydrocarbons in Uganda. A review of the PSC was also undertaken.

**Resource Assessment:** GCA conducted an assessment of Contingent and Prospective Resources for Blocks in offshore India. The assessment of the resource potential was made in a play context with each play comprising the Operator's identified prospects and leads, plus a number of postulated prospects based on the play potential and its field size distribution. Volumetric estimates were made at both the prospect and play level.

**Review of Possible New Field Development, Offshore India:** For an international investor, GCA undertook an independent due-diligence assessment of an undeveloped discovery offshore southeast India.

**Resource Assessment:** For a London-listed independent oil company, GCA prepared an assessment of its resources offshore India. GCA assigned both Contingent and Prospective Resources to discoveries and prospects on the block respectively.



## Additional Information

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

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