



Experts in Brazil

**Gaffney,
Cline &
Associates**

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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 monetisation, LNG/GTL, mergers and acquisitions, economics and project finance, unitisation and redetermination, and expert witness work. GCA operates worldwide from three main offices in London, Houston and Singapore, supported by regional offices in Buenos Aires, Sydney and elsewhere.

Brazil

Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP) Bidding Rounds (Rodadas) started in Brazil during the mid-90's and GCA has been assisting ANP on these Rodadas since then. Initially, GCA was assisting ANP on how to make these Rodadas attractive to the Industry. Today GCA is regularly engaged to undertake the independent evaluation of blocks awarded to Petrobras. At the present time, Brazil is the 12th largest producer of oil in the world, producing 2.6 MMBbl per day from its seven onshore basins and its numerous, less mature, offshore basins, of which the Santos, Campos and Espirito Santo are the most widely known (see map for location). The recent, staggering successes of the Brazil offshore have made these basins known even to those outside the oil and gas industry. Over 90% of all oil production is now from offshore and over 70% of the natural gas is from offshore fields.

Most (nearly 90%) of Brazil's hydrocarbon production comes from oil fields operated by state giant Petrobras, but most international E&P companies are active in the country and there are numerous smaller, Brazilian companies working in the E&P sector. GCA works with the state, Petrobras, the majors and the local independent companies in country.

GCA has successfully completed over 80 projects in Brazil, from reserve audits to due diligence, spanning the entire spectrum of the oil and gas industry, from upstream to downstream, and includes energy strategy and portfolio management advice. The list of GCA's clients is equally diverse and ranges from small independent E&P companies to major and independent oil companies, national oil companies, government ministries and lending/investment institutions.

To keep our clients ahead in the highly competitive energy business, GCA has also carried out various multi-client strategy studies and engaged in such varied activities as developing licensing rounds for petroleum exploration and development, marketing stranded gas resources and assessing the impact of changes in petroleum legislation.

To illustrate GCA's wide experience and expertise in Brazil a selection of projects is given below.

Estimation and Certification: On behalf of the Brazilian national regulator ANP, GCA reported on the potential hydrocarbon volumes in the pre-salt reservoir in ten offshore exploration blocks. This valuation was used as the basis for the Cessão Onerosa negotiation between Petrobras and the Government of Brazil, by which exploration acreage was granted to Petrobras in return for stock in the company.

Dataroom Farm-in Evaluation: GCA was requested to review data from a farm-out block. The Farminee engaged GCA to provide an independent opinion as to the likelihood for successful exploration on the block. The value to GCA's client in this farm-in opportunity depended on the chance of drilling a successful exploration well and proving sufficient gas to co-develop along with the existing two accumulations to make a commercial supply of gas.

Reserves Audit: Of a major producing oil field on behalf of the financial institution providing the funding for the transaction.

Independent Evaluation for the ANP: GCA undertook an evaluation of the six pre-salt fields awarded to Petrobras during the Cessão Onerosa. GCA's evaluation included developing the static and dynamic models, evaluating different field development plans, simulations and production forecasts. GCA also evaluated the project costs (CAPEX, OPEX) in order to perform an economic evaluation. These evaluations were used by ANP to negotiate with Petrobras the proposed development plan of the Pre-Salt fields awarded to them during the Cessão Onerosa.

Valuation of a Small Independent Brazilian Company: For the successful launching of an Initial Public Offering (IPO) in the Bovespa Stock Exchange. The client has gone on to become the most important Brazilian publically listed E&P Company.

Reserves Certification: GCA has certified the Reserves of Coral field and BS-3.

Reserves and Resources Evaluation: During a bidding process for an International NOC, GCA provided an evaluation of major pre and post-salt blocks offshore Brazil. This project included the interpretation of the seismic data, estimation of hydrocarbons initially in place (HIIP) and calculation of the related recoverable resources. Further the GCA team evaluated development plans, production forecasts, CAPEX and OPEX costs, cashflows, and NPVs.

Reserves and Resources Evaluation: GCA conducted an evaluation of a gas development project, onshore Brazil. This project included both upstream, midstream and downstream elements. The upstream involved estimation of Gas Initially In Place (GIIP), Recovery factors, auditing the reservoir dynamic simulation model, development plan, production forecasts. On the midstream and downstream sides, GCA also reviewed the electricity market evaluation, Gas Sales Agreement, gas treatment facilities and power generation facilities, and overall economic evaluation. This project today is a successful, vertically integrated, Gas Production- Power Generation project.

Reserves Audit and Feasibility Study: In connection with the farm-in to, and financing of, an ongoing oil and gas field development program.

Resources Audit and Annual Update: For a client with interests in the Manati Gas field, Brazil Offshore. GCA has undertaken this audit annually for this client for the last 8 years.

Gas Utilization and Commerciality: GCA has undertaken a significant study of the gas market in Brazil, including related field development cost estimates.

Reserves and Resources Evaluation Of numerous fields and blocks offshore Brazil. GCA has evaluated, in different bidding processes, numerous offshore fields that were offered to private companies, including the Carcara pre-salt Field, and the Atlanta Field.

Reserves and Resources Audit and Certification: Of clients assets in Brazil, including Manati and BAS-131 Fields in Camamu-Almada Basin; and Coral, Cavalo Marinho, Caravela Sul, Estrela do Mar and Sardinha Fields in the Santos Basin.

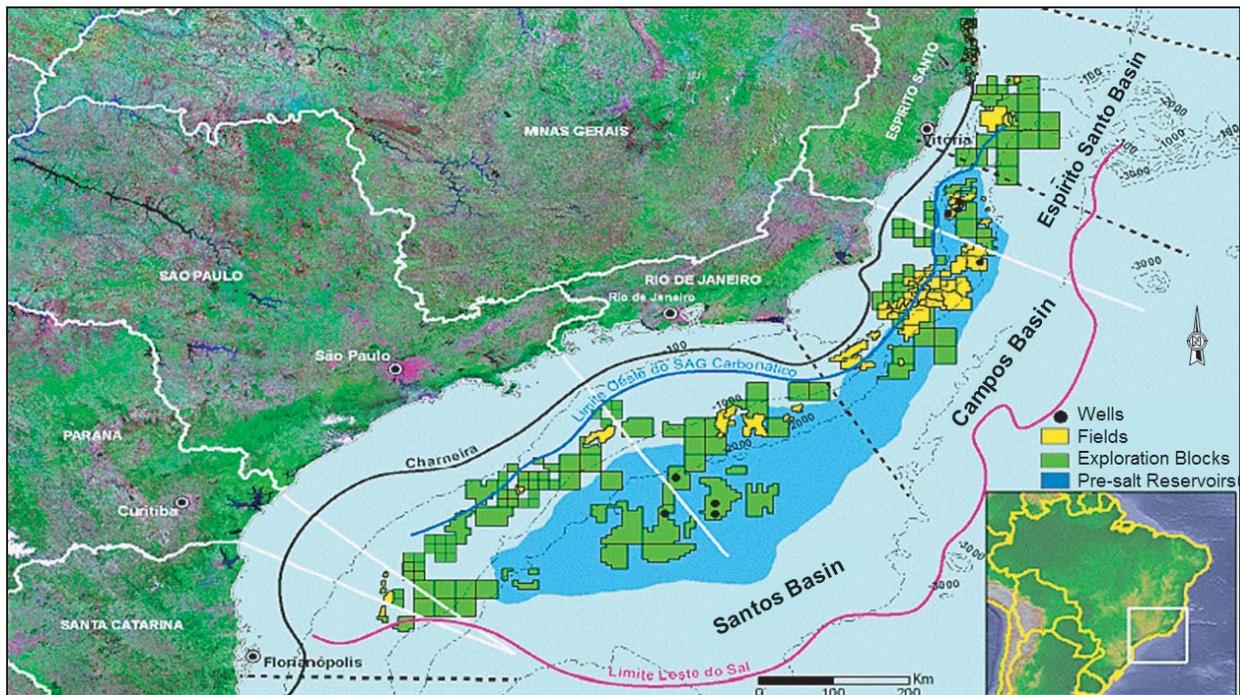
Reserves Audit and Economic Evaluations: GCA has assessed several farm-in opportunities on behalf of domestic and international E&P players both onshore and offshore, and including both pre-salt and post-salt reservoirs.

Resources Audit and Certification: Of Proved, Probable and Possible Oil, Natural Gas and Natural Gas Liquids Reserves and Contingent Resources. This was in relation to a dispute between GCA's client and another party involved in the development of the same asset.

Reserves Evaluation of the Atlanta Field: The main characteristic of the Atlanta field is that it is a heavy oil offshore development that will be produced with electric submergible pumps. On behalf of the operating consortium of the Atlanta field, GCA evaluated the Reserves and Resources prior to the development commencing. At present, the field is under a long term test.

Resources Evaluation: For a small independent E&P company, GCA conducted an evaluation for four exploration blocks offshore Brazil, in the Campos and Santos basins. These blocks included pre-salt and post-salt reservoirs.

Location map of the three most important offshore basins in Brazil: Espirito Santo, Campos, and Santos Basins



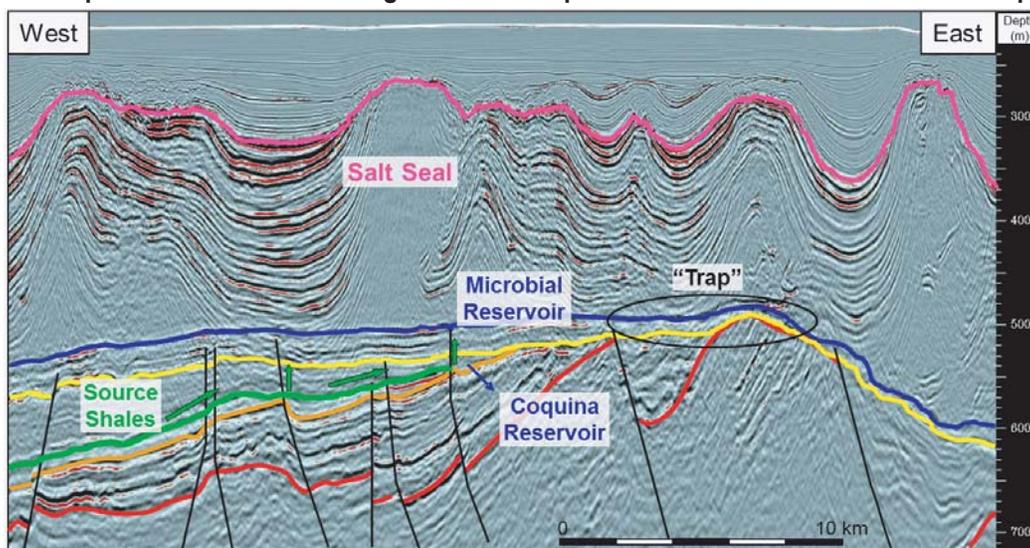
Provision of Regulatory Advice on Field Unitization & Redetermination: GCA, in conjunction with a top international legal firm with a subsidiary in Brazil, has been assisting Petrobras, IBP, PPSA, ANP and the Energy Minister on how to establish and conduct field Unitization and Redetermination processes for those fields which straddle across block boundaries. Specifically GCA has been advising on steps should be taken in order to ensure unitization is expedited and occurs efficiently. The authorities recognize that the absence of an agreed framework for unitization cases has been detrimental to the country's oil sector, delaying development of major pre-salt blocks in Brazil.

Assessed the Potential Future Growth of Natural Gas Demand: Focusing on southeast Brazil, GCA reviewed the natural gas demand and how it may evolve, and various ways to meet it, including making use of domestically produced gas but also considering competition from other possible gas imports into Brazil.

Gas Commercialization Study: For a major international E&P Company in Brazil, GCA conducted a study involving assessment of the gas market today in Brazil and future development based on the availability of new sources of gas for domestic, industry and power generation. This major E&P company is planning to develop a large oil and gas field offshore Brazil and needed to identify and evaluate the various alternative options to commercialize the gas to be produced.

LNG - Power Generation Project: GCA was engaged by a large power generating company in Brazil to assist them on the development of an integrated LNG-Power Generation project. Companies in Brazil are seeking alternatives to generate power at a reasonable cost. Today, this type of vertically integrated projects can be a valid alternative.

Representative depth seismic section through the salt and pre-salt offshore Brazil where water depth c. 2,000m



Additional Information

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

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