



STRATAS ADVISORS

A HART ENERGY COMPANY

CITATIONS OF PREVIOUS ENGAGEMENTS

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UPSTREAM | MIDSTREAM | DOWNSTREAM | FUEL & TRANSPORT

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UPSTREAM

- **U.S. Unconventional Crude Oil Assessment:** A major national oil company (NOC) asked Stratas Advisors to perform an independent analytical assessment of liquids production from the Bakken, Eagle Ford Shale and Permian Basin. The assessment included estimated ultimate recovery (EUR), production forecasts by company and play to 2030, and economics in the three plays. The assessment also used GOR and GPM to estimate the type of liquids production from each play.
- **Eagle Ford Condensate Outlook:** On behalf of the multinational developer of a potential condensate splitter project, Stratas Advisors analyzed and forecast the supply fundamentals of condensate splitting from the Eagle Ford Shale to identify the most condensate-rich wells and producers in various counties in the liquids-rich window of the play. The analysis yielded GIS data displays, breakeven prices by operator to 2030 and related information to allow the client to identify the most prospective areas and producers for condensate production.
- **Multistacked Liquids-Rich Play Outlook:** A major integrated oil & gas company asked Stratas Advisors to deliver a comprehensive, independent volumetric analysis of liquids production from a multistacked play in Alberta, Canada. Using proprietary data tools, our team of analysts provided a company-by-company production forecast by hydrocarbon type to 2030. The analysis also offered insight into pipeline takeaway capacity needs for NGL and oil/condensate.
- **U.S. Unconventional Shale Play Well Count Forecasts:** Stratas Advisors supported several equipment vendors and engineering service providers who are active in the oil field services and equipment industry by developing tailored well count forecasts at the play level, county level and operator level for strategic planning purposes. These forecasts guided clients in procuring land for future operational and distribution hubs, marshaling equipment by location and projecting demand and sales volumes for key components and services.
- **Shale Play Operator Production and EUR Forecasts:** A major institutional buy-side investment management firm asked Stratas Advisors to complete a detailed well count forecast by expected location (EUR type curve) with EUR value for eight publicly traded companies in the Bakken, Eagle Ford and Permian Basin shale plays. The goal was to offer an independent assessment of hydrocarbon volume production by quarter to 2020.

MIDSTREAM

- **Rail and Rail Services Market Outlook:** Stratas Advisors characterized the unconventional market for commodities delivered to or from the Eagle Ford region by rail, forecasting the demand through 2020 for drilling inventories and well count, depth and lateral lengths, staging of fracturing laterals, sand consumption, piping needs, liquids takeaway by pipeline and rail logistics and related facets of the rail market.
- **U.S. Natural Gas Processing & Fractionation Outlook:** Stratas Advisors analyzed and forecast the integrated U.S. unconventional wet gas play market fundamentals to 2020 for a

multinational engineering and construction firm. The deliverables included annual wet gas production forecasts, processed y-mix production forecasts, current and future processing plant capacity, current and future fractionation plant capacity, NGL component output forecasts, y-mix pipeline capacity and related fundamentals.

- **Condensate Splitters Assessment:** Stratas Advisors assessed the future supply of condensate and the associated logistics and supporting infrastructure. Proposed condensate splitters in North America were also assessed in terms of structural positioning and the probability of being built and becoming operational.
- **Strategy Development for a Merchant LNG Facility:** Stratas Advisors was selected to work with a major international integrated oil & gas firm that was interested in building a position in the market for LNG as a transportation fuel. We helped the firm identify an overall position on the industry in the United States and then select a specific location and market in which to develop the project. Specific objectives included: Reviewing the national market to identify key emerging demand areas; evaluating opportunities associated with specific existing facilities compared to new facilities; identifying and assessing market competitors; developing indicative project economics and costs; projecting focused market demand and competing supply; identifying key potential customers; and assessing the local regulatory landscape.
- **LNG Fuel Market Strategy Development in North America:** A major international trading house selected Stratas Advisors to help craft its market strategy for engaging with the North American LNG fuel market. Over multiple project phases, we worked with the client to identify major areas of need in the market that the client could engage with by leveraging existing capabilities. We also kept the client up-to-speed in the market by helping it identify opportunities, assess the size of opportunities and engage the ideal stakeholders.
- **Client Identification for a Provider of Gasification Technology:** A provider of a gasification solution aimed at the steel industry selected Stratas Advisors to help it identify potential customers. Using the company's in-house data and industry knowledge, we helped it evaluate several dozen firms based on their activities and business portfolios. We also helped the client prioritize its efforts by assessing which firms would be the best candidates.
- **Storage Infrastructure Project & Economics Forecast:** A multinational engineering and design firm asked Stratas Advisors to analyze the current status and provide forecasts for above- and underground salt and mined hydrocarbon storage capacities required in key regions of North America. We also helped the client assess opportunities for new storage projects by region and by year as a result of new flow patterns and economics stemming from the ongoing shale and heavy crude revolutions. We assessed U.S. and Canadian supply and demand fundamentals for multiple hydrocarbons over a 10-year time frame across key market regions, as well as the existing and pending infrastructure that will connect supply with demand on and offshore. We included forecasts for shale, offshore and conventional supply as well as multi-modal dispatch infrastructure and capacity at or into refineries, power plants, petrochemical and industrial facilities, and more. To assist in economic ranking and evaluation of project opportunities, we also provided key price forecasts in a reference-case scenario reflecting the most likely supply, demand and infrastructure realities.

DOWNSTREAM

- Market Outlook Through 2028:** A major supplier of gasoline blending components requested consulting support to develop an outlook for gasoline, octane, naphtha and butane markets through 2028. The outlook included assessments of the global supply of crude oil, natural gas, NGL, naphtha and butane; supply/demand for gasoline and oxygenates; gasoline octane markets; refinery gasoline production operations; cost curves for crude, natural gas, oxygenates and high-octane blend components; and price forecasts for crude oil, natural gas, gasoline and butane.
- Asia-Pacific Fuel Supply Security Study:** Stratas Advisors conducted a study for the Asia-Pacific Economic Cooperation Group headquartered in Singapore. This study analyzed the implications of alternative clean fuel scenarios (including various MTBE and ethanol requirements) on individual Asian markets and on the region's overall gasoline outlook. The primary deliverables were: a) estimates of refining expansions needed in the region to meet future demand (with and without MTBE) and b) quantification of the level of refining investment anticipated for the short term and longer term.
- Clean Fuel Project Evaluations:** Stratas Advisors has conducted several studies on behalf of various U.S. and international refining clients interested in establishing the economics of proposed capital projects aimed at expanding their production of clean fuels. The primary deliverable of these studies has typically been an incremental cost-to-produce figure for a particular facility (i.e., refinery) given the slate of gasoline components it is expected to produce after implementation of the capital project under review. In recent years, such projects have focused largely on the economics of MTBE replacement and low-sulfur gasoline and distillate production.
- MTBE Assessment:** Stratas Advisors reviewed available data and assessed the option of using MTBE-containing gasoline in the Kingdom of Bahrain's domestic gasoline pool. The study examined regional and global trends in MTBE use; health and environmental data summaries; practices for safe storage, handling, transfer and blending; contingency needs for environmental protection; vehicle compatibility and emissions profiles; and government regulations and specifications.
- Assessment of Potential Investment Opportunity:** A client requested consulting support to evaluate an investment opportunity in a grassroots refining/petrochemical facility. Forward-looking industry scenarios pertaining to the future supply/demand, pricing and margin environment were developed. We assessed the proposed facility's competitive position, taking into account relative scale, complexity, feedstock costs, product slate and associated inbound and outbound logistical infrastructure. We also developed the financial and operating model for the proposed assets and assessed the impact of modifications to the proposed configuration of the assets. The value of the assets within the context of the different industry scenarios was evaluated. Recommendations were presented to the investment committee.

- **Assessment of U.S. Refining Environment:** A major refiner requested an assessment of future developments in the refining sectors with consideration of the changing quality of the crude slate, the outlook for refining investments and changes in supply/demand conditions.
- **Global Middle Distillate Outlook:** A client requested an assessment of global and regional diesel/middle distillate markets and forecasts of markets distinguished by sulfur content and demand sectors. The assessment allowed the client to align its capital program with the opportunities associated with the future market requirements.
- **Feedstock Acquisition Options:** A major international petrochemical company asked Stratas Advisors to identify potential suppliers of high-purity isobutylene in key regions of the world. The assessment included potential volumes, stability of supply and price drivers.
- **Economic Evaluation of Conversion from MTBE to Isooctane:** Stratas Advisors was asked to evaluate the economic implications of converting an existing MTBE production facility to isooctane production. We provided an assessment of regional gasoline, MTBE and potential isooctane markets, gasoline component values and the impact of an isooctane conversion on the facility's economics.
- **Development of Business Acquisition Strategy:** Stratas Advisors helped a major international energy company evaluate its portfolio of technology offerings and potential synergies with other available technologies. Drawing from our experience and knowledge of emerging markets and technology needs, we made recommendations on potential acquisitions. The client successfully pursued two of these recommendations.
- **Global Octane Outlook:** Stratas Advisors developed forecasts of regional gasoline supply, demand and quality and provided an outlook for gasoline octane demand and production throughout major global regions.
- **Outlook for Coker Feed Markets in North America and Europe:** Stratas Advisors provided a forecast of regional product supply and demand, heavy fuel oil balances, refinery capacity and operations and, specifically, coker balances. We also assessed the outlook for coker feed balances in the selected regions.
- **U.S. Sulfuric Alkylation Outlook:** Stratas Advisors projected alkylation utilization and capacity in the U.S. and provided an outlook specifically for sulfuric acid-based alkylation.
- **U.S. Boutique Fuels Study:** Stratas Advisors conducted a study for the National Association of Convenience Stores, evaluating future U.S. gasoline formulations (with and without MTBE/ethanol) to assess U.S. gasoline supply security and the outlook for future finished gasoline and blendstock imports into North America. We conducted the analysis using proprietary detailed linear programming (LP) representations of each of the five U.S. PADDs. The study's primary focus was to highlight the adverse impacts that the proliferation of multiple gasoline formulations would have on the U.S. gasoline system and to examine whether the removal of MTBE would aggravate this outlook.

FUEL & TRANSPORT

- **Mileage Efficiency Outlook:** For one of the largest automotive companies in the world, Stratas Advisors assessed the outlook for mileage efficiency in major markets with consideration of current fleet regulatory policies and manufacturers' ability to meet the requirements.
- **Development of a Fuel Quality and Biofuels Policy Framework:** Stratas Advisors was selected to develop a fuel quality road map and biofuels policy for Zimbabwe. We reviewed the current fuel policy and market in Zimbabwe, the country's vehicle fleet, the agricultural landscape, the logistics and distribution network and current fuel quality. We then organized a series of workshops with ZERA and other stakeholders and presented our findings in a final report. Biofuels topics included: drivers for biofuels policies around the world and types of biofuels policies; financing mechanisms for biofuels programs around the world; interactions between biofuels and fossil fuels and logistics; key quality parameters and emissions associated with biofuels; and impact on feedstocks and commodity prices.
- **Fuel Quality Road Map for Saudi Arabia, 2006-2020:** Stratas Advisors developed the fuel quality specifications road map for Saudi Arabia. The purpose of the study was to propose fuel specifications that would improve the quality of the environment and better protect human health; maintain a competitive position in global export markets; and ensure fuel compatibility with future automotive engine technologies. We completed this study in several phases that focused on air quality characterization, vehicle emissions and fleet characterization, refining optimization, energy efficiency, fuel specification trends and alternative fuels potential.
- **Investigation of the Energy Situation in Mexico:** Stratas Advisors traveled to Mexico City with a car company client to meet with government officials responsible for vehicle emissions, air quality, setting quality specifications and ensuring fuel quality to understand the impact of energy reform on these areas and on the refining and vehicle markets. We also met with officials in PEMEX, PMI, the auto industry and various NGOs and interviewed them regarding their perspectives on the market, current issues and the impact of energy reform. After the visit, we prepared a report recommending future actions for the client.
- **Gasoline Octane in Asian Countries:** The Japan Petroleum Energy Center commissioned Stratas Advisors to produce a report on past, current and future fuel policies and specifications and on the market situation in selected Asian countries, focusing specifically on gasoline octane. This report aimed to foster an understanding of potential business opportunities for the Japanese oil industry in the Asian fuel market. It also discussed the market situation in the EU and the U.S. for comparison.
- **Asian Fuel Market Study:** Stratas Advisors prepared a market study for a refining company to support the projection of fuel quality specifications for the Asian markets for gasoline, diesel, kerosene and inland fuel, focusing on Japan, Taiwan, Thailand, Philippines, Singapore, India and Pakistan. Sulfur content was the parameter of particular emphasis for kerosene and inland fuel.

- **Differences Between U.S. and EU Fuel Regulation Policies:** Stratas Advisors prepared a report that was presented at an SAE meeting in Paris. It focused on the two regulatory frameworks of the governing bodies and demonstrated that, because of different air quality priorities and policy approaches, the resulting specifications established for automotive fuels are quite different in these two regions.

EXTERNAL ASSESSMENTS

- **Assessment of the Future Environment:** A major integrated oil company requested consulting assistance to develop scenarios for the future oil & gas industry environment. Our support included developing integrated scenarios that took into account potential developments in geopolitics, economics and technology. The impact of unconventional oil supply and biofuels was assessed, and the impact of the changing competitive landscape was evaluated. Narratives were developed for each scenario along with associated quantitative analyses, including forecasts for demand, supply/demand balances, prices and refining margins.
- **Market Study of the Energy Sector:** A major integrated oil company requested consulting support to provide a market study of the energy sector in Pacific Basin countries. We assessed the impact of regulatory changes, the existing infrastructure and the competitive landscape. Potential entry strategies for the client were developed, and the upside potential and downside risk associated with each option were assessed. We developed and presented recommendations for senior management.
- **Assessment of Future Supply:** A national oil company requested an assessment of current production volumes from existing fields, exploration projects and their implication on future NGL supply in all key production areas. The assessment at the field and country level took into account the pricing environment, the age of the existing fields and exploration success trends. We also evaluated producer strategies to assess their impact on investment patterns and production at the global, regional and country levels.
- **Development of Industry Scenarios:** A client required consulting assistance to develop a deeper understanding of the future petrochemical environment. We developed several long-term scenarios from a worldwide perspective and for each of the key geographic regions. Olefin-based, aromatics-based and syngas-based petrochemicals with consideration of feedstock supply/demand and end-use developments were assessed. The geopolitical, socioeconomic and regulatory factors that serve as drivers of the supply/demand environment of the petrochemical industry from a global and regional perspective were evaluated. Forecasts for future supply/demand, trade flows and prices and margins were developed. The nature and magnitude of the risks affecting the client within the context of the different industry scenarios were developed, as were potential opportunities for improving the client's future competitive position.
- **Assessment of Competitive Position:** A major integrated oil company requested an evaluation of the current competitive landscape, including the drivers that would affect the future landscape. We assessed the strategies and the financial and asset bases of key

competitors, along with the current and future expected performance associated with the existing strategies and portfolios of assets and market positions. We performed a detailed analysis of the operating assets and identified structural and operating strengths and weaknesses. The impact and suitability of strategic alternatives, including portfolio adjustments (acquisitions, divestitures and joint ventures), and operational improvements were evaluated. We developed and presented recommendations for strategic initiatives and operational improvements to strengthen the client's future competitive position.

- **Market Study to Support Expansion:** A major supplier to the oil & gas sector with multiple products and market segments requested a market study to identify opportunities and provide guidance for prioritizing expansion efforts. The potential upside and downside associated with each market segment were evaluated along with future supply and demand and associated margins and the client's ability to compete in each segment. We gave the client a structured assessment of each market segment and identified the segments with the best fit for the client in terms of value creation potential.

STRATEGY-RELATED

- **Entry Strategy for U.S. Market:** A major national oil company (NOC) requested consulting support to develop a strategy for entering the U.S. market. The project scope included assessing the future market environment and the competitive landscape; identifying and assessing opportunities across the oil & gas value chain; and developing the entry strategy, associated strategic initiatives and the migration plan for expanding on the initial position.
- **Investment Strategy for North America:** A major international bank with an investment fund focused on the oil & gas sector engaged Stratas Advisors to identify and assess investment opportunities in North America. We provided the qualitative and quantitative analysis required to support the entire transaction process: framing the negotiating strategies, assisting with financial and operational due diligence and providing ongoing support throughout the negotiations.
- **Development of Portfolio Strategy:** An independent oil & gas operator requested consulting assistance to develop a portfolio strategy that took into account not only the upside potential associated with the U.S. market, but also the downside risks — including the impact of changes in oil and gas prices, changes in the competitive landscape and changes in regulations and policies — within the context of the client's financial wherewithal. As a result, the client developed the capability to manage its portfolio proactively with a focus on achieving optimal risk-adjusted returns.
- **Development of Business Strategy:** A service provider to the North American oil & gas sector requested assistance from Stratas Advisors to develop a five-year business plan. We drew on deep knowledge of the strategic and investment plans of E&P operators in North America to develop a demand forecast for the services provided by the client. We then worked with the client to develop a strategy that enables it to achieve a greater market share by focusing its efforts on the appropriate opportunities and, in turn, minimizing capital investments.

ELECTRIC POWER

- Competitive Assessments of Independent Power Generators:** For financial clients, a peer assessment of electric utility and independent power generators was compiled and maintained to assist in valuation and portfolio planning. Operational efficiencies, capital and operating cost models and risks were forecast for 10 years forward with terminal valuations applied to rank and determine present value of operations, contrasting peer groups by debt, growth prospects and other financial metrics.
- Competitive Assessments of Alternative Power Generation Technologies:** For financial clients, a technological and commerciality assessment of emerging power generation and technological schemes was compiled and maintained to assist in competitive strategy, market penetration, valuation and portfolio planning. Manufacturing constraints, scalability, capital vs. operating costs, key market acceptance requirements and other factors were considered in this research service covering stationary fuel cells, microturbines, engine generators, uninterruptible power supplies and electric power storage technologies.
- Assessment of the Deregulation of the Power Generation Sector:** For an independent power producer, a key member of the Stratas Advisors engagement team assessed the impact of deregulation and the establishment of a power pool and the potential to enter the Singaporean power sector. The assessment considered the impact on the competitive landscape and the market environment and the feasibility of developing an IPP project.
- Development of Power Generating Strategy:** For the government of Vietnam, a key member of the Stratas Advisors engagement team evaluated future power demand and different options for meeting future power generation requirements. The options included IGCC, co-generation facilities and oil-based generating facilities.
- Development of an Integrated Manufacturing and Power Development:** For a large Asian conglomerate, a key member of the Stratas Advisors engagement team led a techno-economic assessment of an integrated manufacturing and power development. Based on the assessment, he led the effort to develop the business strategy, including the scale and scope of the facility.
- Strategy/Implementation: Nascent Merchant Generation Platform:** An investor-owned public utility holding company called upon a key member of the Stratas Advisors engagement team to facilitate discussions and guide a senior-level strategic committee formed to roll out a newly created merchant generation platform amid deregulation. A new unregulated business unit was created to exploit a low-cost generating advantage in a deregulated, restructured electric industry, redeploying a domestic generating strength and linking that low-cost advantage to a well-developed real-time trading capability through a joint venture with a large commodities trader.
- Re-Tooling and Re-Fueling Generation Mix for Island Economy:** A key member of the Stratas Advisors engagement team, reporting to both the Cabinet and to the Minister of Energy, was called upon to create a stakeholder roundtable, coordinating with regulators in a

transparent power tender while also guiding the LNG infrastructure and commodity tenders and representing the government in negotiating the terminal use agreement, the term LNG supply contract (supply and purchase agreement), the implementation agreement (concession agreement), gas offtake agreements, pipeline transportation agreements and bulk power purchase agreements. The project also involved developing the commercial structures and regulatory framework for the nascent gas industry, working with the Cabinet, regulators, the electric utility and all commercial stakeholders.

- **Acquisition of Utility and Non-Utility Assets:** For a medium-sized Midwestern utility, cross-functional asset acquisition teams were formed and leadership from Stratas Advisors was called upon for the purpose of acquiring generation and transmission assets in South America, Asia, the Caribbean and the U.S.
- **IPP Project Development and Financing:** Various developers required guidance and leadership of cross-functional teams comprising development staff, accountants, analysts, lawyers, engineers, consultants, bank financial advisors, modelers, environmental specialists, public relations consultants, lobbyists and partners. Activities that were supported included project/structured finance, banking and investor relations, development strategy, due diligence, business structure analysis and tax strategy, sizing & configuration, economic evaluation & appraisal, utility system and generation expansion modeling, siting, bid preparation and administration, environmental impacts analysis, permitting & licensing, regulatory affairs, legal affairs, lobbying, governmental compliance, legislative affairs, fuel acquisition, contracts and public relations. Total developed IPP capacity exceeded 2,000 MW.
- **GCC and CFB:** Economic studies and financial pro formas of super-critical pulverized coal and integrated gasification combined-cycle power generation were compiled for two IPP developers.
- **Regulatory Strategy Support for IPPs:** Stratas Advisors has provided guidance regarding regulatory strategy and direct testimony in connection with project development efforts before state, provincial and federal authorities.
- **Assessment of Energy Rule and Regulatory Regime:** Stratas Advisors examined the regulatory record over the past 10 years to compare total significant regulations completed annually by recent administrations. The analysis included an assessment of congressional gridlock and the ability for effective oversight.

STRATAS ADVISORS

A HART ENERGY COMPANY

Stratas Advisors, a Hart Energy company, is a global consulting and advisory firm that covers the full spectrum of the energy sector and related industries. We can help you develop a deeper understanding of the developments that are shaping the future of oil & gas. Our support includes customized consulting that is focused on a client's specific strategic objectives, competitive challenges and asset base. Additionally, we offer support through subscription services and comprehensive market studies.

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