

## Consulting Services

Republic of Colombia Partners with IHS for Knowledge, Support as it Rolls Out New Plans for Growing its Hydrocarbon Industry



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## Case Study

### Business Benefits

- Consultants created a model of Colombia's oil assets to evaluate long-term plans for the development of the country's hydrocarbons. The scenario analysis took into consideration factors such as project timing for the undeveloped discoveries, scenarios of yet-to-find size and discovery schedule, oil price, and fiscal terms.
- Analysis of several basic scenarios of production, future discovery, and oil price resulted in several key findings that influenced ANH's long-term planning and budgeting.
- With the model, an initial set of scenarios and IHS training, ANH is equipped to evaluate other scenarios and keep current with changing circumstances, in an ongoing effort to refine its long-term plans.
- The planning, analysis and participation of IHS generated industry and government praise for ANH.

### Industry Challenges

#### **Agencia Nacional de Hidrocarburos (ANH), Republic of Colombia**

Colombia is actively looking to grow its hydrocarbon industry by boosting exploration activities, increasing reserves and attracting investors. As ANH created its plans and contract terms, it needed to understand the economic viability and impact of those decisions, and put in place a sound, reliable way to evaluate its plans on an ongoing basis.

### The IHS Advantage

IHS Consulting Services assisted ANH in developing a dynamic model to evaluate the financial impact of the country's current and future plans.

### A New Era for Colombia's Hydrocarbon Industry

The Republic of Colombia, with current oil production of 537 mbopd, is facing the possibility of importing oil within the next 5-7 years. As such, the country is aggressively looking to grow its hydrocarbon industry by boosting exploration activities, increasing reserves and attracting investors. Colombia offers a broad range of opportunities, from frontier offshore basins to mature areas. Though it has enormous potential in its frontier areas, more than 80 percent of the country's territory remains unexplored.

**"IHS not only understood the ideas and goals of the project, but they actually improved the plans. IHS really added so much value to what we were thinking. It went very well."**

Tomás De La Calle, Technical Director – ANH

In June 2003, the government of Colombia formed Agencia Nacional de Hidrocarburos (ANH), an agency responsible for administering Colombian hydrocarbon resources. ANH oversees all exploration and exploitation activities in the country, including planning, evaluation and implementation of promotional strategies. Additionally, ANH is charged with implementing and monitoring all industry regulatory issues. The country's national oil company and previous regulator, Ecopetrol S.A., shifted its administrative role to ANH and now operates as a state-owned stock corporation.

Shortly after formation, ANH established an ambitious objective: develop contract terms that would allow it to compete in the top quartile among nations worldwide. ANH outlined a plan featuring a number of terms designed to attract new foreign investment.

ANH decided to extend exploration, evaluation and production periods to give contractors more time to explore areas to fully evaluate the feasibility of any discovery. It also chose to give contractors greater independence in defining their own work programs and plans, and allow them to retain 100 percent of the working interest and product.

Additionally, the Congress passed a law that structured a sliding royalty scale based on per-field production. And,

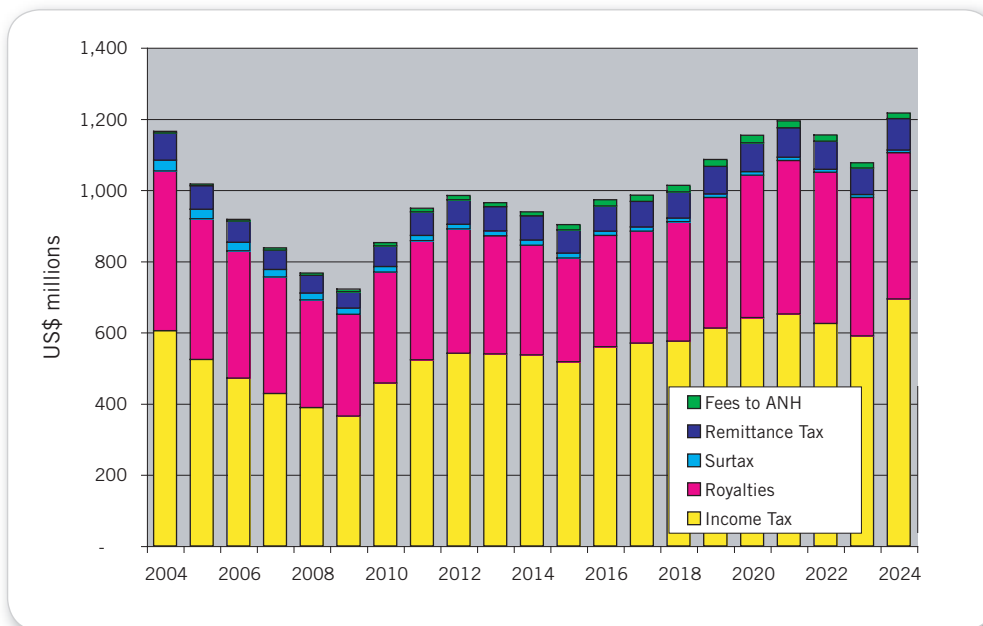
rather than providing payments for signature or discovery, ANH prefers that companies invest in exploration or evaluation of projects.

Colombia felt it could also offer investors a solid business environment and an open legal system, including equality for national and foreign investors and the free entrance of foreign capital without the need for prior authorization.

### A Model for Evaluating Strategic Plans

As ANH created its plans, it needed to understand the economic viability and impact of any decisions and put in place a sound, reliable way to evaluate its plans on an ongoing basis. ANH turned to IHS Consulting Services for assistance in creating a dynamic and updateable model to evaluate and develop strategies for investment planning and implementation for the upstream hydrocarbon industry in Colombia. With an international reputation for its knowledge and expertise, IHS would develop a model for evaluating ANH's initial plans and provide the training necessary for ANH to apply the model in the evaluation of future plans.

Over the course of four months, IHS consultants worked closely with ANH to develop, test and execute the model. Consultants combined IHS methodology, toolsets and data, along with Colombia's own country data. IHS



One modeled scenario of oil production with an assumed \$25 oil price yields government cash flow that declines for the next few years then begins to rise again after 2009.

examined several basic scenarios for the project, taking into consideration development project timing for the undeveloped discoveries, scenarios of yet-to-find size and discovery schedule, oil price, and fiscal terms.

Using IHS AS\$ET™ economics software as the platform, consultants built a model representing Colombia's producing fields, undeveloped discoveries and undiscovered fields (yet-to-finds) – effectively the entire portfolio of existing and future discoveries in Colombia. IHS then populated the model with production forecasts derived from its historical data, validated against Colombia's own information.

Using IHS QUE\$TOR™ economic modeling software, consultants estimated development and operating costs, and then consolidated and graphed the output results from multiple AS\$ET portfolios.

To support ANH in continuing to apply the model in its ongoing planning efforts, IHS offered basic training on using the model onsite. For a more in-depth understanding, ANH staff also attended training in Houston.

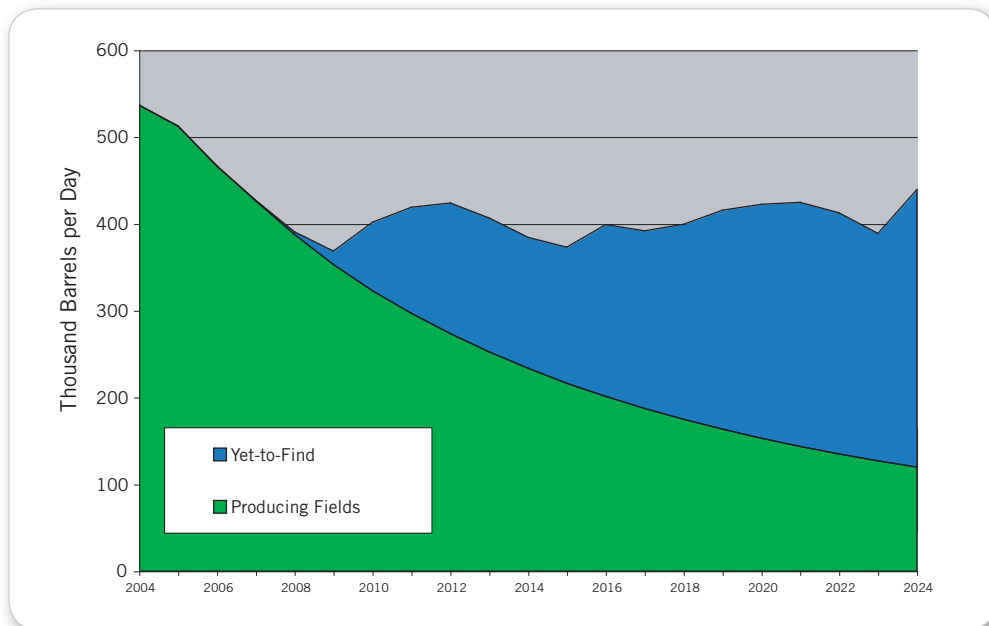
### Key Findings

IHS analysis using the model resulted in several significant findings. Consultants independently confirmed the

current state of production decline in Colombia. In 2004, production rates were approximately 537 mbopd and are expected to be half that by 2012 if no new discoveries are made.

With undeveloped discoveries in Colombia being unable to provide relief, Colombia must look to new discoveries. Some estimates of the undiscovered resource volume in Colombia are upwards of 35 billion barrels of oil equivalent, however the actual volume could be much less. Most of the undiscovered resource is expected to be found in the under-explored frontier basins where little information exists from which to make a sound estimate. IHS modeled two different scenarios of discovery for the yet-to-finds (YTF), one conservative and one optimistic, creating high and low ranges to determine what production levels might be reasonably possible.

The conservative YTF modeling scenario, combined with producing fields and discoveries, yields a sustainable production rate of approximately 400 mbopd after 2010. At that level, imports could reasonably be postponed for a number of years. Based on historical data, IHS also determined how many contracts Colombia needs to sign and how many exploration wells need to be drilled each year to reach the number of discoveries used in the conservative scenario.



One modeled scenario of oil production in Colombia shows production declining over the next few years until production from new, as yet undiscovered, fields begins to kick in.

Beyond the model, IHS evaluated ANH's budgets and found many of IHS recommended expenditures already listed. Consultants also suggested that ANH allocate funds to increase the knowledge of the petroleum systems of frontier basins, and to activities or studies that support strategic planning to have the greatest impact on exploration and production.

Moving forward, the model will serve as an important tool for ANH to assess the potential and the consequences of various plans and adjust them accordingly. The agency can evaluate needs and balance that against expected potential to achieve optimum priority. For example, it can determine the effect on field profitability if it decides to change royalty rates, or address questions such as the role of natural gas or the economics of individual field development plans.

According to Tomás De La Calle, Technical Director for ANH, the most important objective was equipping his staff with the knowledge and technologies to perform analyses on their own moving forward. "My goal was to make sure the staff had what they needed to be successful in the future," he said.

## A Foundation for Success

During the four-month project, IHS assembled and quality-controlled the necessary information, built and tested the model, ran various scenarios, trained ANH personnel, and delivered the results.

The model and consulting were essential for determining the viability and economics of ANH's plans, as well as enhancing them. "IHS not only understood the ideas and goals of the project, but they actually improved the plans," De La Calle said. "We didn't know at the beginning where we were going to end up with the project. IHS really added so much value to what we were thinking. It went very well."

Leta Smith, Senior Consultant and Manager for this project, IHS, credits ANH for its willingness to seek out the resources and knowledge it needed. "They were the ideal client," she said. "They are a model for other countries on how to pull data, technology and knowledge together."

Upon completion of the evaluation project, IHS presented to an industry group, including the heads of most of the larger E&P companies with operations in Colombia. The group responded enthusiastically, commending ANH for its efforts and for bringing in industry experts to advise the agency on planning and budgeting. De La Calle believes IHS assistance was an important step in fostering credibility with the industry.

"It's important to the industry and government that we know where we're going," De La Calle said. "That's been the importance of the model, to give us an orientation. The industry is very pleased knowing there is sort of a commander in the country, some agency that really knows where we are heading. The industry and public sector have congratulated us."

Over the past year, ANH has seen a significant response to its plans. The country successfully attracted foreign investment from leading multinational energy companies. At the end of 2004, ANH had approved 36 oil contracts – 25 E&P contracts and 11 technical evaluation agreements. Plus, ANH is currently processing a number of new applications from various interested companies. During the first half of 2004, ANH allocated around \$675 million of royalty payments to the producing regions and other recipients.



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US

+1 888 OIL DATA

UK

+44 (0) 1666 501226

Canada

+1 877 495 4473

Web

[www.ihs.com/energy](http://www.ihs.com/energy)