

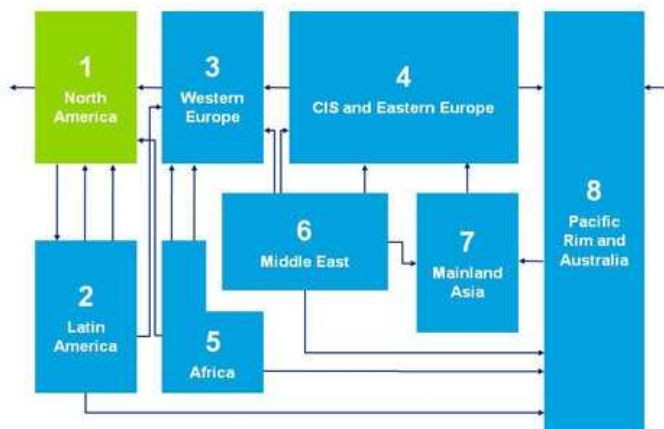
Natural Gas Models

North American Gas Model

The North American Gas Model is designed to simulate how regional interactions of supply, transportation, and demand determine market clearing prices, flowing volumes, storage, reserve additions, and new pipelines throughout the North American natural gas market.

Deloitte MarketPoint's North American Gas Model is differentiated by its ability to forecast market clearing prices and basis differentials among producing and consuming regions and thereby contributes to the valuation of a wide range of gas assets. It is based on the North American Regional Gas Model (NARG) that has been used for many of the pipeline expansion decisions and resource basin profitability evaluations in North America since 1983. It is the grandson of the NARG model used in the landmark National Petroleum Council 2003 study on natural gas, updated and improved initially by MarketPoint, Inc. and its sibling company, Altos Management Partners (together, MarketPoint/Altos), until they were acquired by Deloitte Investments, LLC in 2010, and now by Deloitte MarketPoint to meet current market conditions.

MarketBuilder World Gas Model - Integrated Regional Models



Accompanying the North American Gas Model is a proprietary database that enumerates and quantifies all gas plays (as assessed by the National Petroleum Council) in North America. This database contains field size and depth distributions for every play, with a finding and development cost model included. This database connects these gas plays with other energy products such as coal, power, and emissions. It also includes factors to model the growth of syngas, LNG imports, and oil-for-gas substitution. Finally, it contains over 300 demand nodes representing regional demands from residential, commercial, industrial, electric generation, and transportation consumers.

Deloitte MarketPoint offers both short- and long-term versions of the North American Gas Model (Gas Model). The long-term version covers 40 years based on fundamental economic factors. The short-term model expands the long-term model by embedding a dynamic behavioral model of natural gas storage. Because of this, the Deloitte MarketPoint short-term Gas Model is a better choice for predicting shorter term price variations than linear programming models. The end result is that valuing storage investments, identifying maximally effectual storage field operation, positioning, optimizing cycle times, demand following modeling, pipeline sizing and location, and analyzing the impacts of LNG has become easier and generally more accurate.

World Gas Model

The World Gas Model extends the North American Gas model to account for the globalization of the gas industry by LNG technology. The World Gas Model is an integrated model of world supply, transportation, shipping, liquefaction, regasification, infrastructure, and demand. It is based on the MarketPoint/Altos World Gas Trade Model (WGTM) extension to the NARG model, which resulted from the multi-client program begun in 1990 by the consulting company that predated MarketPoint/Altos. This model was able to help the initial subscribers meet their requirements for price forecasting and fundamental analysis as well as the subsequent adopters in later years.

The World Gas Model simulates local and regional interactions among resource supply, field processing, outbound pipelining, liquefaction, shipping, regasification, distribution, demand, and interfuel competition. The World Gas Model subdivides the world into major regions connected by actual and proposed marine shipping routes and pipelines. Competition with oil and coal is modeled in each consuming region, producing results that indicate what infrastructure is most likely to be constructed in the future. Markets for emission credits and their potential impact on energy markets are included.

The World Gas Model contains:

- 821 regions and sub-regions worldwide
- 708 demand nodes worldwide
- 7,566 full forward price schedules worldwide, including wellhead, field processing, pipeline initiation, pipeline hub, wholesale, citygate, residential, commercial, industrial, and power generation wholesale prices
- 22 liquefaction regions worldwide, each with a full schedule of new and existing liquefaction plants
- 34 regasification regions worldwide, each with a full schedule of new and existing regasification facilities
- 748 existing and prospective LNG shipping routes
- 1,910 transportation links including pipeline routes and LNG routes
- A total of 5,538 nodes worldwide

Regional Components of the World Gas Model

The following models exemplify extensive work done on the regional component models of the MarketPoint World Gas Model.

South American Model

Regional gas pipelines can also be analyzed by MarketBuilder. For example, the gas business in South America (the Southern Cone) has been partially deregulated and privatized. The profitability of this business depends highly on the ability to accurately predict forward prices at both the basins and upstream ends of the pipelines. The Southern American Model addresses that need by creating a customized model of the South American Natural Gas market.

Predicting forward prices requires considering a variety of factors, such as significant gas growth, competing fuels, and the ability of asset owners to monetize and capture profits. Each of these factors requires its own model. For example, demand growth depends on a wide variety of factors, such as the price of gas, underlying economic growth, politics, project costs, transit fees, and resource availability.

European Gas Model

MarketBuilder – Global and Regional Models for Energy Commodities



Europe, with its 350 million people, large and growing industrial base, and increasing environmental concern, has become a popular place to invest in natural gas infrastructure. As with most investment decisions -- there will be winners and losers. The European Gas Model was designed to help companies understand the investment risks and assist companies in making informed investing decisions.

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