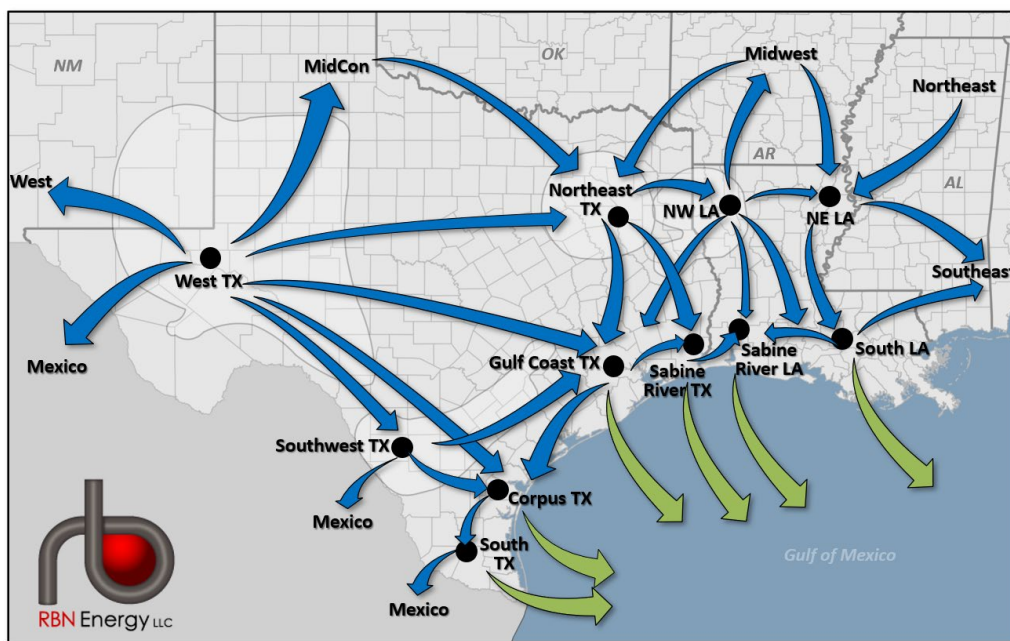


RBN Gulf Coast Natural Gas Analytics

Significant changes are coming to the new epicenter of the global LNG market: Texas and Louisiana. On top of the existing 12.5 Bcf/d of LNG export capacity in the two states, another 11+ Bcf/d of additional capacity will be coming online by 2028. The good news is that the two major supply basins that will feed this LNG demand — the Permian and the Haynesville — have the potential to increase production. But it may not be fast enough to keep up with LNG exports beyond 2024. And there’s another complication - namely that the two basins are hundreds of miles from the coastal LNG terminals, meaning that there will be a need for significant incremental pipeline capacity to move the increased production to the water.

These developments will drive highly dynamic market conditions, with flow shifts that will impact price differentials, the need for new pipeline infrastructure, and the gas sourcing strategies for LNG exporters. Understanding the market dynamics associated with all of these moving parts can only be accomplished by developing and utilizing a natural gas flow/capacity model specifically targeted to make sense out of the market dynamics in Texas and Louisiana.

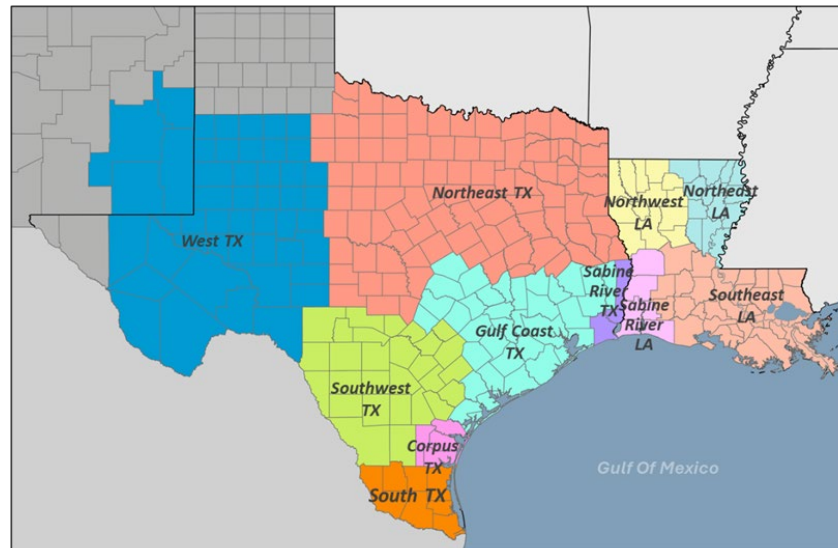
RBN has developed one, and **we call it Arrow**.



The Arrow Model, as we refer to it, is RBN’s proprietary analytical framework that organizes the Texas and Louisiana natural gas markets into pipeline “corridors” that can be used to assess changes in regional inflows, outflows and flows within each state via groups of pipes that serve similar markets from comparable supply sources. These pipeline corridors (blue arrows in map above) are aggregations of pipelines connecting 19 market hubs (black dots) that are essential to the analysis — some within Texas and Louisiana and others outside the two states. We also identify the six LNG corridors (green arrows) through which gas exits the gulf coast as LNG exports.

The attributes of each arrow include capacity, historical flows, projected flows, constraints, and other factors. The net flows for each arrow move in the direction indicated by the arrow, but they can and do flip around over time when modeled market conditions dictate.

In RBN's Arrow Model, we aggregate gas production, demand and net outflows or inflows, over time, for 11 market regions — seven in Texas and four in Louisiana (colored regions in the map, below).



This approach provides the capability to (1) aggregate gas production, demand and net outflows/inflows for each market region over time; (2) quantify the degree to which gas is pushed/pulled between and among regions; (3) predict gas flows on each corridor (and the need for incremental pipeline capacity); and (4) forecast the basis differentials that underlie and support these gas flows.

The Arrow Model has been applied in various consulting projects, including:

- Assessing the necessity and route of a new natural gas pipeline from the Permian Basin.
- Characterizing risks associated with specific midstream investments under various scenarios.
- Predicting natural gas basis among different locations in Texas and Louisiana to support trading positions.
- Identifying optimal sources for natural gas to support the increasing demands of LNG export facilities on the U.S. Gulf Coast.
- Analyzing current and projected natural gas flows required for ammonia production facilities in the region.

The Arrow Model represents an advanced analysis tool for mapping out flow dynamics and capacity optimization in key transit routes. With a focus on integrating the latest pipeline constructions, LNG export ventures, and industrial expansions, it offers holistic insights into the potential changes in flow patterns and pricing differentials across varying timeframes. One of the model's major advantages is its adaptability, allowing for adjustments to reflect rapidly evolving market variables. Leveraging this adaptability, the Arrow Model can be used to simulate a range of production, pipeline development, and LNG export scenarios to forecast market outcomes accurately.

Contact us to learn how you can leverage RBN expertise and the Arrow Model for precision forecasting and strategic decision-making. For more information, contact TJ Braziel at tjbraziel@rbnenergy.com.