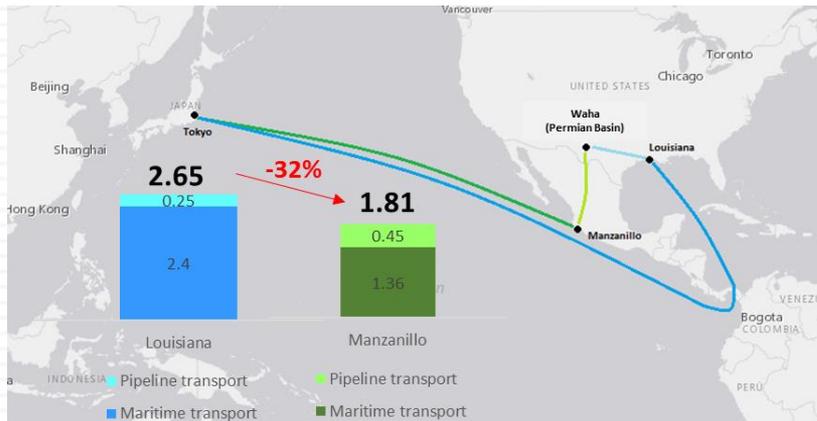


Mexico: the best route to export natural gas to Asia

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Comparison of gas transportation costs (USD/mmBTU)



- Mexico could offer export alternatives for natural gas produced in the Permian Basin. For instance, Manzanillo port has a 500 mmcfd regasification capacity¹. This facility could be transformed to liquefy and export Liquefied Natural Gas (LNG) to Asia.
- Travel time from Manzanillo to Japan could be 39% lower than from Louisiana, going from 23 to 14 days.²
- Maritime travel cost to Japan from Louisiana is estimated at \$2.40 USD/mmBTU (including a \$0.20 USD/mmBTU Panama Canal toll); traveling from Manzanillo is projected at \$1.36 USD/mmBTU.³
- Transportation cost from the Waha Hub (Permian Basin) to Manzanillo is calculated at \$0.45 USD/mmBTU⁴ (estimating a 1,978 km transport pipeline⁵). On the other hand, pipeline transportation cost from Waha to Henry Hub is estimated at \$0.25 USD/mmBTU.⁶
- Adding up maritime and pipeline transportation costs, exporting natural gas from the Permian Basin to Japan through Manzanillo port would be estimated at \$1.81 USD/mmBTU total, 32% lower than exporting from Louisiana, calculated at \$2.65 USD/mmBTU.

Sources:

¹ SENER (2013). Prospectiva de Gas Natural y Gas L.P. 2013-2017, available in: https://www.gob.mx/cms/uploads/attachment/file/62950/Prospectiva_de_Gas_natural_y_Gas_L.P._2013-2017.pdf

² SeaRates.com Digital Broker & Freight Forwarder

³ CNH's estimates based on U.S. Natural Gas (LNG) Exports: Opportunities and Challenges (Ripple, 2016). For more information, see Methodological Note.

⁴ CNH's estimates with pipeline construction costs for Waha-Guadalajara route, considering a 25 year life cycle, 30% of the construction cost for operating costs throughout the project, and a 70% capacity utilization rate. Average Waha-Guadalajara route's capacity and construction costs were assigned for Guadalajara-Manzanillo pipeline. Data sheets regarding pipeline costs and capacity are available at: <http://www.cfe.gob.mx/Licitaciones/Licitaciones/Paginas/PrincipalesProyectos.aspx>

⁵ Distance is the sum of the pipeline's length in the Waha-Manzanillo route, according to Data Sheets at: <http://www.cfe.gob.mx/Licitaciones/Licitaciones/Paginas/PrincipalesProyectos.aspx>

⁶ Pipeline transportation cost from Waha to Henry Hub is the difference between average spot price in Henry Hub minus average spot price in Waha Hub the first week of November 2017. Source: Platts

mcf: Million of cubic feet per day
 USD/mmBTU: Dollar per one million British Terminal Units
 nm: Nautical miles

Methodological note for maritime cost:

Maritime freight considers a 9,149 nm from Louisiana to Tokyo, and 5,987 nm from Manzanillo to Tokyo. Tanker rental cost is estimated at \$130,000 USD/day. Gas consumption is 35 USD/nm and travel speed is 18 knots. Two additional days for loading and unloading are aggregated. A \$0.20 USD/mmBTU Panama Canal toll is added in Louisiana route. Average waiting time to cross Panama Canal is 2 days. Tanker rental cost must be calculated for roundtrip.