



Bachelor Thesis

Venezuelan Extra-Heavy Oil: Refinery Constraints and Downstream Impacts on Oil Product Markets

Venezuela holds the world's largest proven crude oil reserves, most of which consist of extra-heavy crude oil. Despite this exceptional resource base, oil production has declined significantly over past decades due to economic, technical and geopolitical constraints. Recent geopolitical developments have renewed interest in a potential recovery of Venezuelan oil production, raising questions about how much additional crude oil supply could realistically reach global markets and under which conditions. Existing literature highlights both the long-term potential of Venezuelan extra-heavy oil and the substantial challenges related to crude oil quality, upgrading requirements and refinery compatibility (e.g. Sena et al., 2013).

Extra-heavy crude oil differs markedly from conventional crude oils in terms of API gravity, sulphur content and residue yield, which has important implications for transport, refining and downstream product output (EIA, 2025b). Any increase in Venezuelan crude oil production would therefore not only depend on upstream production capabilities, but also on the ability of existing refinery systems to process heavier crude oils. From a global market perspective, changes in refinery utilisation and product yields could affect the supply of key oil products such as diesel, gasoline and jet fuel, with potential implications for price developments. Refinery yield data show that the composition of crude oil inputs has a significant impact on the output shares of middle distillates and lighter products, highlighting the importance of crude quality for downstream market outcomes (EIA, 2025a).

Against this background, the aim of this bachelor's thesis is to analyse different quantitative scenarios for future Venezuelan crude oil production under varying assumptions regarding investment, infrastructure rehabilitation and geopolitical constraints. Based on these scenarios, the thesis should assess how additional crude oil supply could be absorbed by existing refinery systems and how this would affect refinery utilisation and downstream oil product markets. The student is expected to develop a simplified and transparent quantitative framework (e.g. in Excel or Python) using publicly available data, with a focus on internally consistent scenario analysis rather than detailed process modelling or price forecasting.

Key tasks and objectives of the thesis

- Analyse the characteristics of Venezuelan extra-heavy crude oil and its refining requirements (Sena et al., 2013).
- Define quantitative supply scenarios and perform refinery yield calculations to estimate changes in diesel, gasoline, jet fuel and petroleum coke output (EIA, 2025).
- Assess the implications of these changes for downstream oil product markets.

Your profile

- Bachelor student in economics or a related field with an interest in energy markets.
- Strong analytical skills and interest in quantitative data analysis.
- Motivation to work with official energy statistics (e.g. EIA, IEA).

Literature

Sena, M. F. M., Rosa, L. P., and Szklo, A. (2013): *Will Venezuelan extra-heavy oil be a significant source of petroleum in the next decades?* Energy Policy, 61, pp. 51–59. <https://doi.org/10.1016/j.enpol.2013.05.101>

U.S. Energy Information Administration (EIA) (2025a): *Refinery Yield*.
https://www.eia.gov/dnav/pet/pet_pnp_pct_dc_nus_pct_m.htm

U.S. Energy Information Administration (EIA) (2025b): *Crude Oil Input Qualities*.
https://www.eia.gov/dnav/pet/pet_pnp_crq_dcu_nus_m.htm

Contact



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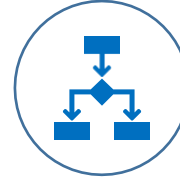
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Topics



- Venezuelan extra-heavy oil
- Crude oil quality and refinery constraints
- Downstream oil product markets

Methods



- Scenario analysis
 - Refinery yield calculations
 - Data analysis
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