

OIL AND GAS EXPLORATION AND PRODUCTION: PHASE 2

BLUE TEAM 10

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Overview

The Pricing Analysis Department of Compagnie Pétrolière et Gazière, INC. (hereafter the “Company”) engaged Blue 10 to simulate the cost of a single dry well and the net present value (NPV) of a single wet well. To conduct this analysis, we utilized historical drilling cost data for crude oil, natural gas, and dry wells from 1960 to 2007 and oil price projections from 2026 to 2050. We estimated year zero (2025) expenses, including drilling, seismic, lease, and professional overhead costs to generate dry well cost.

To simulate the NPV of a single wet well, in addition to year zero costs of a dry well, we incorporated completion costs, yearly professional overhead costs, and operating expenses to account for the financial obligations of a producing well. We also considered oil production and revenue risks to provide a more comprehensive financial outlook. Once we obtained the final values for cost and risk, we applied the provided formula to calculate the NPV for wet wells.

Final simulations showed that the median cost of a dry well was \$6,439,449, while the median NPV for a wet well was \$18,587,690. Based on these findings, we recommend using the simulated NPV of wet wells to optimize drilling plans. Additionally, mitigating revenue risks through hedging against oil price volatility and reducing operating costs can help maximize overall profitability.

Methodology and Analysis

This section outlines the process for determining dry well cost and wet well NPV.

Dry Well Cost

Multiple factors were considered when forecasting dry well costs. Drilling cost projections developed in phase one of the project were used again. With additional context in phase two, we added leasing, seismic, and professional overhead costs. Leasing and seismic expenses were determined by taking a random value from the provided normal distribution. The professional overhead cost was taken from a triangular distribution. All four elements were summed to reach a final cost value for 2025.

Wet Well NPV

For the wet wells, costs included the same four factors as dry wells, with three additional components: completion costs, yearly professional overhead costs, and operating expenses. Completion costs were incorporated by randomly sampling values from the provided normal distribution. Yearly professional overhead costs were extended throughout the well’s lifespan to reflect ongoing financial commitments. Finally, operating expenses were determined based on operating costs and severance taxes.

Additionally, we accounted for both oil production and revenue risks. To simulate oil production risk, we considered initial production and decline rates to ensure a realistic estimate of future output. Revenue uncertainty was addressed by incorporating price risk and net revenue interest. Oil prices were determined by randomly sampling from a triangular distribution derived from the provided price projection data. Additionally, NRI was included to account for the portion of revenue retained by the producing company after royalty payments. The final NPV calculation was performed by summing all projected revenues and expenses for each year, discounted at the weighted average cost of capital (WACC), over 15 years.

Results

The results for the expected cost of a single dry well are displayed in Figure 1.

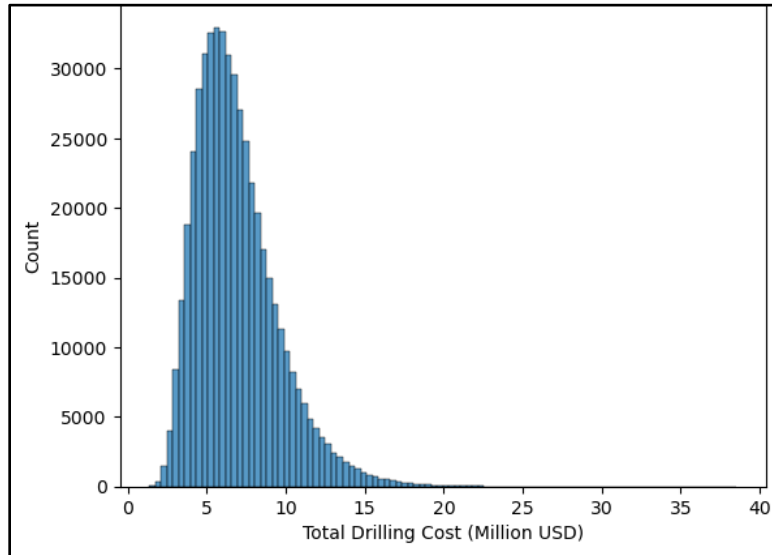


Figure 1: Simulation for the Cost of a Single Dry Well

Based on our simulation results, the median cost of a single dry well is \$6,439,449. We chose to use the median due to the distribution's notable right skew. We also plotted the distribution of the NPV for a single wet well, shown in Figure 2.

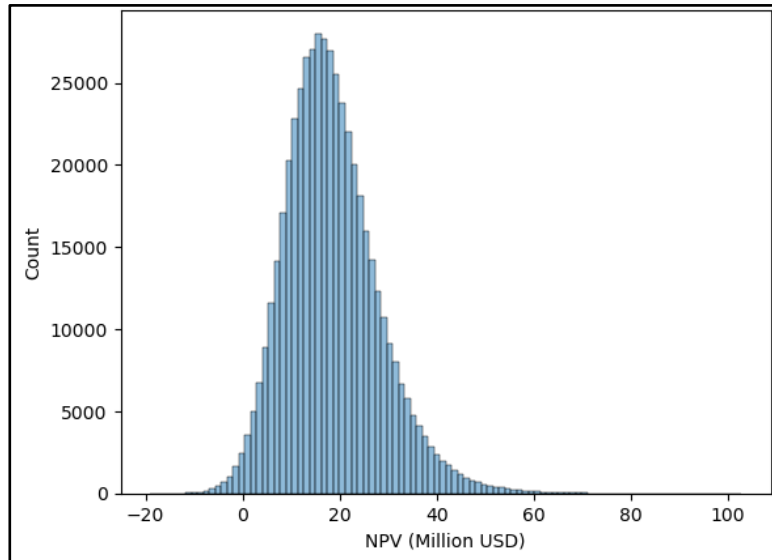


Figure 2: Simulation for the NPV of a Single Wet Well

Our simulation for the NPV yielded a median value of \$18,587,690. Almost 99% of our simulations were positive in NPV, meaning the value of a single wet well is likely to be profitable about 99% of the time. Although this simulation appeared more symmetric than that of our dry well, there was still a right skew. For this reason, we chose to report the median value in both cases.

Recommendations

Based on these findings, we recommend the following:

- **Use the simulated NPV prices of wet wells to evaluate drilling plans.** About 99% of our simulations yielded a positive NPV, indicating that wet wells will likely generate high returns over the next 15 years. Given these favorable projections, the Company may consider maximizing drilling efforts to capitalize on the potential for increased profits from wet wells.
- **Mitigate revenue risks by hedging against oil price volatility.** Given the variability of oil prices, the Company could lock in favorable prices through contracts with buyers, such as futures or fixed-price agreements. Additionally, increasing production during high-price periods and scaling back in downturns will help maximize revenue and enhance financial stability.
- **Reduce operating costs to increase revenue.** Lowering per-barrel costs below the \$2.25 average would increase profit and NPV. Investing in technology-driven automation in extraction and equipment monitoring could decrease reliance on manual labor, optimize resources, and minimize equipment downtime, ultimately reducing expenses associated with drilling.

Conclusion

Our simulations estimate a dry well's median cost to be \$6,439,449. This emphasizes the importance of strategic planning to minimize the financial impact of unsuccessful wells. The estimated median wet well NPV is \$18,587,690 over the project's 15-year lifecycle. By prioritizing wells with the greatest potential for profitability and controlling operating costs, the Company can enhance the stability and profitability of its drilling operations. Our findings reinforce the Company's long-term goals of guided investment decisions.