eFinancialModels

FINANCIAL MODEL CASE STUDY

# Gas Well Project Financial Model Case Study

How we developed a Financial Model to test the feasibility of a new gas drilling programme



*A drilling programme earns from how much gas its wells deliver and from what that gas is used for. The financial model tested the programme's feasibility and showed which scenarios lead to attractive returns, so the developer could open the discussion with investors on numbers.*

**KEY TAKEAWAYS**

- Situation: a developer planned a new gas drilling programme and would look for investors. The gas could be sold into a pipeline, made into electricity, processed (liquids, CO2) or used for on-site Bitcoin mining, and the developer wanted more value from it than a raw sale.
- What mattered: investors judge expected return, risk and upside. Wells, prices and the use of the gas each move all three, so they belonged in one model.
- Turning point: the developer sought ways to capture more value from each unit of gas, so the analysis moved to what a unit of gas is worth in each outlet, set against selling it.
- Outcome: the developer can see which scenarios lead to attractive returns, and what remains if the preferred use falls short.

## At a glance

| | |
|---|---|
| INDUSTRY | Oil and gas: gas well drilling with downstream use of the gas |
| CLIENT | Project developer preparing to approach investors |
| PURPOSE | Financial feasibility of a new gas drilling programme, and which scenarios lead to attractive returns |
| MODEL SCOPE | Drilling programmes, production and decline, use options, prices and costs, financing, investor split, scenarios and sensitivities |
| DELIVERABLES | Financial model and analysis |

## The situation

A developer planned a new programme of gas wells and would look for investors. Before that, the programme had to show its financial feasibility: what return it earns, how much it can lose, and which combinations of well results, prices and uses of the gas give returns worth investing in. The developer also sought to capture more value from the gas than a raw sale: pipeline, electricity, processing (liquids, CO2 or others) and on-site Bitcoin mining of part of the output.

## Gas, oil and liquids: what a gas well produces

Gas wells produce gas, often with condensate and natural gas liquids as side products that carry their own prices. Fluids are classed by gas-oil ratio, the gas produced per unit of oil: the higher the ratio, the more gas-like the well, and the line between types is not always clear.

### What was at stake: What a developer must show investors

Investors fund a drilling programme on expected return, risk and upside. A further use of the gas asks for more capital, so they also ask what it adds and what happens if it disappoints. The model had to answer for each use of the gas in worst, base and best cases, with selling the gas as the fallback.

## How a gas project earns: a well's life and the uses of its gas

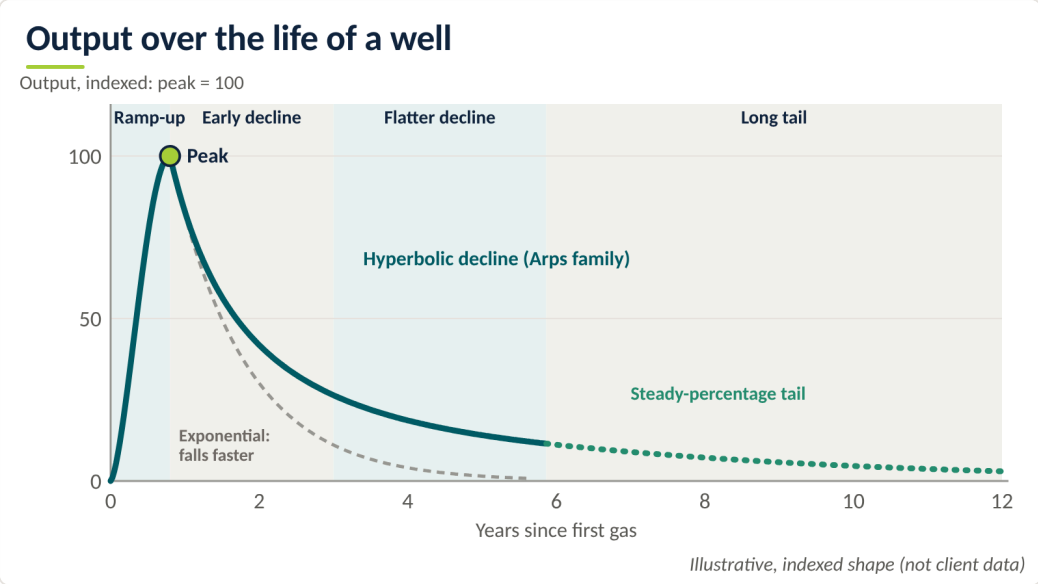
Each well ramps up to a peak and then declines, so the supply on offer to any use is highest early and falls over time. Four outlets compete for that gas, as the developer sought to capture more value from it; the model values each before it asks what the project earns. Plants and mines must be sized for the years of decline, not for the peak. A plant sized to the peak flow stands partly idle for most of a well's life.

**1**
**Pipeline**
Sell the gas into a gas pipeline: price and volume exposure, no extra plant.

**2**
**Electricity**
Generate power to sell or use on site; needs generation equipment and a connection.

**3**
**Processing**
Separate liquids, or make products such as CO2, to sell.

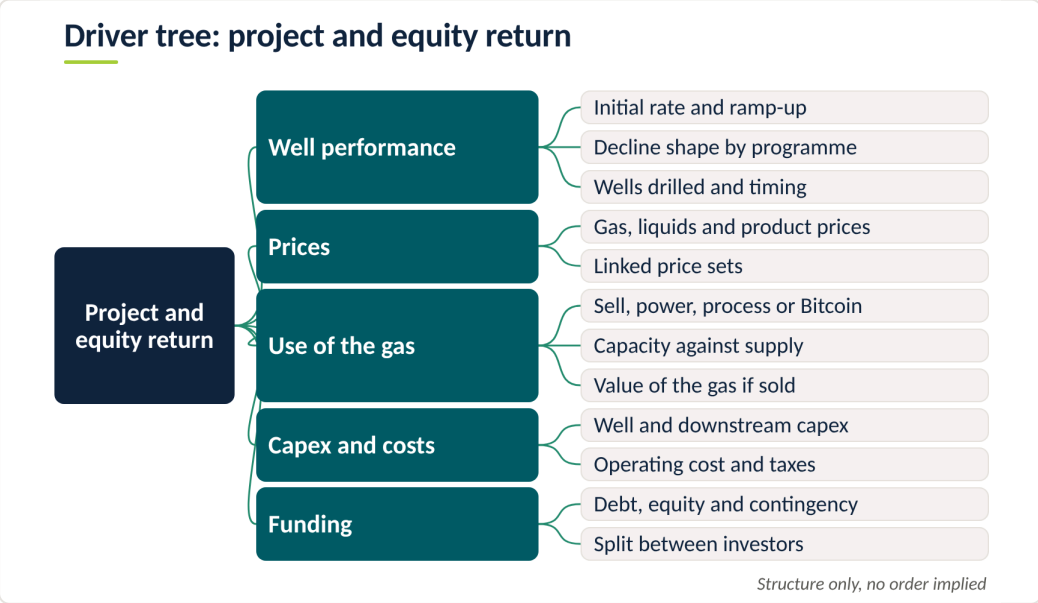
**4**
**Bitcoin mining**
Power on-site mining with part of the gas, not the peak; needs its own analysis.




*Illustrative, indexed: output of one well, ramp-up to peak, then an Arps-type hyperbolic decline and a steady-percentage tail (illustrative shape).*

## What drives the value?

Well performance, prices, the use of the gas, capex and costs, and funding together set the return; the tree lists them without ranking. The branches interact: a lower price, for example, also changes which use of the gas is worth building. Well results decide how much gas there is to sell, and prices decide what it earns in each outlet.




*Driver tree: the project and equity return broken into well, price, use, cost and funding inputs, unranked (structure only, no client values).*

## What made it hard to model?

### 1 Well results that set the return

DIFFICULTY Rate, ramp-up and decline are set per well and repeated across a programme. The wells were considered fairly certain, yet even a small shortfall in rate or decline compounds into lower returns.

OUR SOLUTION Decline curves by programme feed a monthly grid for every well, programme switches show cases with fewer wells, and a ranked sensitivity view tests early rates and decline steepness.

### 2 Prices that move together, not in step

DIFFICULTY Gas, liquids and the processed product follow related markets with different swings. Testing one price alone creates cases the other prices could never accompany.

OUR SOLUTION Switchable price sets move linked prices together, so each case stays internally consistent.

### 3 Plants sized to peak flow, fed by declining wells

DIFFICULTY A processing or power plant sized to the programme's peak flow stands partly idle once wells decline. Sized smaller, part of the gas has no outlet there.

OUR SOLUTION The model tests each plant size against declining supply over the full life; utilisation, not peak flow, drives its return.

### 4 Comparing the uses of gas on one basis

DIFFICULTY Uses of gas differ in capex, cost drivers and risk, and an option can look attractive only because its gas is counted as free.

OUR SOLUTION Each outlet is compared on the value it captures per unit of gas, as set out in the turning point, with incremental capex, payback and return on capital; a gas balance prevents double counting.

### 5 A Bitcoin mine uses a share, not the peak

DIFFICULTY A mine draws power at a set capacity, so it can use only part of the programme's gas. Its output depends on the Bitcoin price, competition between miners and a block reward that halves about every four years.

OUR SOLUTION Gas availability caps the electricity. A separate comparison sheet sets a reference configuration against the forecast, and sensitivities test the range: the mine gets its own analysis.

### 6 Overlapping spend and investor classes

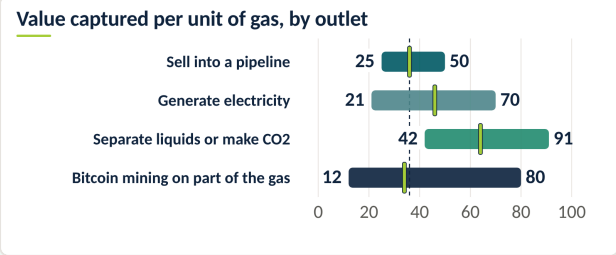
DIFFICULTY Exploration, development and downstream spending overlap, so the funding need depends on timing. Lenders and investor classes then share the same cash under different rules and repayment priorities.

OUR SOLUTION Capex phased by stage feeds uses and sources, debt tranches and a contingency. A waterfall splits levered cash across investor classes, with the developer's share before and after repayment.

THE TURNING POINT

### How much value can each unit of gas capture?

A drilling project is usually valued as drill, produce, sell. Here the developer sought to capture more value from each unit of gas, so we compared the outlets: pipeline, electricity, processing and Bitcoin mining. Each was charged the value of selling the gas and had to earn its capex on top.




*Illustrative, fictional: value captured per unit of gas by outlet, indexed, before capex (tick = base case); Bitcoin mining has the wide range.*

### What the scenarios show

**Worst case**
Weaker wells, lower linked prices; extra uses off, gas sold. Does the return still work?

**Base case**
Planned wells and prices; each outlet compared on the return it adds after the value of the gas.

**Best case**
Stronger wells and prices; each outlet shows the return it adds, Bitcoin mining with a wide range.

*Without client values. Scenarios show how the case could work out; they do not prove the assumptions.*

### Next step we would recommend: probability of success

The wells were considered fairly certain, so the spread sits in well results, shown by the three cases. With more time we would also examine the probability of success, with risked values next to unrisked ones. We recommend this extension.

## What we built

**INPUTS**

- Drilling programmes and per-well assumptions
- Gas, liquids and product prices
- Capex and operating cost drivers
- Outlets: pipeline, power, processing, Bitcoin mining
- Debt, equity and investor terms

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**CALCULATION MODULES**

- Monthly well and production grid
- Gas balance and use-option modules
- Revenue, costs and statements
- Debt schedule, uses and sources
- Profit split by investor class

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**OUTPUTS**

- Project and equity returns by use option
- Worst, base and best cases
- Break-even gas price and debt cover
- Ranked sensitivities
- Profit split for each investor class

## How we worked together

**Step 1**

### Discussion

We analysed the programme in advance and opened with a discussion of the feasibility question, the investors and the uses of gas to compare.

**Step 2**

### Plan

We agreed the scope: drilling programmes, use options, the scenarios investors would ask for and the financing structure.

**Step 3**

### Build

We built the well engine, then prices, costs, the downstream options, financing and the investor split.

**Step 4**

### Test and review

We tested the model with worst, base and best cases and ranked sensitivities, then reviewed the results together.

## What came out of it?

**The developer can see which scenarios lead to attractive returns, compare how much value each outlet captures from the gas against selling it, and show what remains if the preferred use falls short.**

- Project and equity returns per use option, from one model.
- A break-even gas price and debt cover ratios.
- Worst, base and best cases from linked price sets, sensitivities and programme switches.
- A profit split showing what each investor class and the developer receive.

## Lessons for gas project developers

1. Look for the most value in each unit of gas. Setting each outlet against selling the gas shows which one adds return, not just revenue.
2. Size downstream assets for the decline, not the peak. A mine takes a share; a plant at peak flow idles.
3. Keep a fallback switch. Investors trust a high-upside option more when they can see what remains without it.

## Questions we worked through, and why

1. Is the programme feasible? We took the whole return first, then split project from equity so financing shows alone.
2. Do all wells succeed? They were considered fairly certain, so we tested a spread of results; with more time we would examine the probability of success.
3. How fast does output fall? Decline sets revenue, so it was tested first.
4. How much value can a unit of gas capture, and where? Each outlet was set against selling the gas.
5. How large should a plant or mine be? Each size was checked over the full life, not at peak.
6. Which scenarios give attractive returns? Price sets, well results and use switches combine into three cases.
7. What is the fallback? Switch the option off and sell the gas.

*Client details are anonymised to protect confidentiality. Charts, schematics and worked examples are illustrative and contain no client data.*

**Planning a gas well project?**

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