eFinancialModels

FINANCIAL MODEL CASE STUDY

Battery Recycling Financial Model Case Study

How we developed a sophisticated Financial Model for a Battery Recycling Plant seeking Funding



Investors in a recycling plant first ask whether contracted material fills the plant, then what return to expect, where the risks lie and what the scale-up costs. The financial model had to answer them in numbers before the first meeting.

KEY TAKEAWAYS

- An early-revenue recycler with its own process technology needed a financial model to raise capital for its scale-up.
- What mattered: contracts behind the capacity, expected returns, the risk of rising costs and the capital each ramp-up phase needs, answered in one integrated model before the investor talks.
- Turning point: the model moved from metal prices times volumes to the negotiated terms that set revenue per tonne: payable rates and metal content.
- Outcome: a presentation-ready model and draft pitch deck for talks with existing and new investors.

At a glance

INDUSTRY	Battery recycling
CLIENT	Early-revenue recycler with its own process technology
REGION	Europe
PURPOSE	Raise capital for the scale-up; talks with existing and new investors
MODEL SCOPE	10-year model, monthly and annual; project and investor cash flows; valuation considerations; scenarios
DELIVERABLES	Financial model, draft pitch deck

The situation

The client had developed its own recycling technology and was already generating its first revenues. The next step was the scale-up, which needed substantial new capital from existing and new investors. Investors would first ask whether supply contracts fill the installed capacity. Behind that came returns, rising costs, margins, working capital and valuation, and the model had to answer all of them.



What was at stake: Why an integrated model came before the investor talks

Investors asked the hard questions: is the capacity covered by contracts, what return can we expect and when, what happens if costs rise, how much capital does each ramp-up phase need, and why is the valuation justified? Each question had a place in one integrated model, so the founder answered with numbers.

How battery recycling works, and where the model comes in

Battery recycling turns used batteries into metals that can be sold again. Every step changes volumes, cost or price, so the model follows the chain from battery to metal.

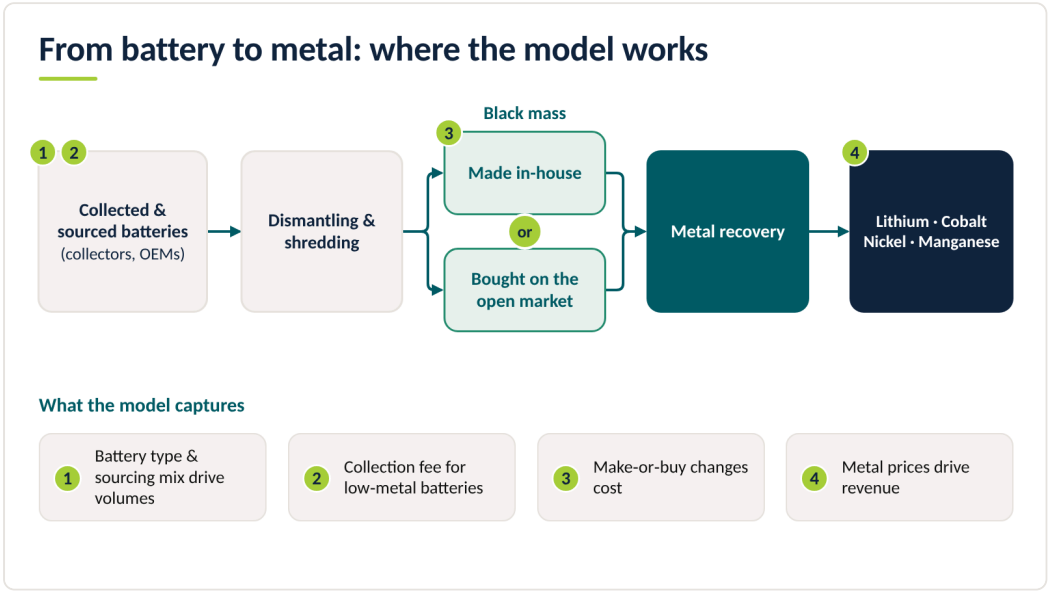
1 Collect and source
Batteries come from collectors and manufacturers under sourcing contracts. Battery type and sourcing mix set the volumes.

2 Dismantle and shred
Packs are dismantled and shredded. Low-value batteries such as LFP can come with a gate (collection) fee, which changes their profit.

3 Black mass
Shredding produces black mass, a powder containing battery metals. It is also traded between companies, so a recycler can make it or buy it.

4 Metal recovery
Refining recovers lithium, cobalt, nickel and manganese, often as salts or other battery-grade materials.

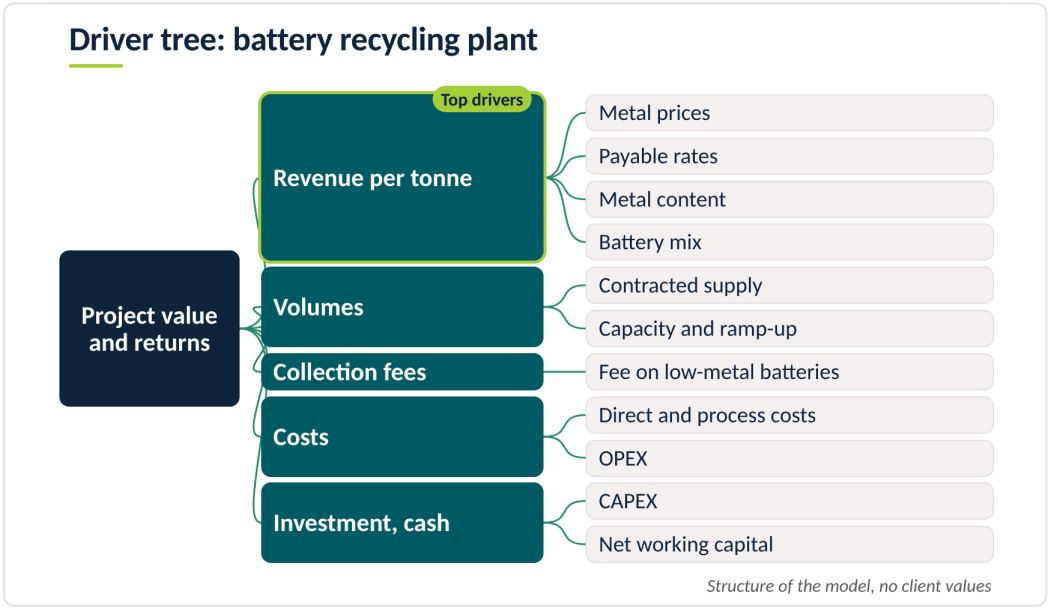
5 Sell the metals
Revenue follows metal prices and the payable rates agreed with buyers.



From battery to metal: the chain the model follows.

What drives the value?

Ranked in the engagement from most to least influence on value. Revenue per tonne comes first: metal prices, payable rates and metal content outrank every cost line.



Driver tree: from project value to the inputs (structure only, no client values).

What made it hard to model?

1 Contracts that fill the installed capacity

DIFFICULTY Investors wanted supply contracts in place to use the capacity the plant installs, phase by phase. Low-metal batteries carry a collection fee, which changes any comparison of battery types.

OUR SOLUTION We linked processing volumes to the sourcing contracts by battery type, so each phase traces back to contracted supply, and treated collection fees the same way everywhere.

2 Revenue is metal content times payable rate times price

DIFFICULTY Each battery type contains different amounts of valuable metals. Buyers pay a negotiated share of the metal price, the payable rate, and metal prices are volatile.

OUR SOLUTION We modeled recovered metal per battery type and applied the negotiated payable rates to metal price forecasts that carry the volatility, instead of one average.

3 Investor returns, exit and pre-money valuation

DIFFICULTY Investors want to know what they get back and when, and the high pre-money valuation had to be justified.

OUR SOLUTION We modeled investor cash flows and returns, an exit value from comparable EV/EBITDA multiples, and valuation considerations for purchase contracts and licenses.

4 Scenarios for rising costs and mitigation

DIFFICULTY Cost increases are a key risk to the plan, and investors want to see how management would respond.

OUR SOLUTION We ran scenarios for rising costs and for mitigation measures, showing where the likely results lie.

5 Ramp-up, capex and working capital

DIFFICULTY Each expansion step brings capital outlays and step costs, and the plant ties up material before revenue arrives.

OUR SOLUTION We modeled each ramp-up phase with its own capex and costs, checked unit costs against industry benchmarks, and forecast net working capital.

6 Make or buy the black mass

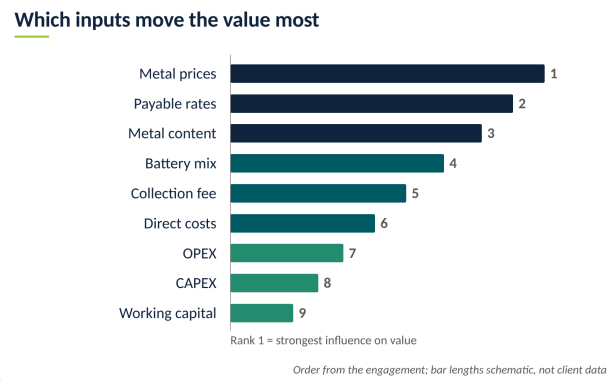
DIFFICULTY The intermediate product, black mass, can be bought on the market or made in-house from collected batteries. Buying it creates dependency on suppliers.

OUR SOLUTION We modeled both routes side by side. Buying battery cells and processing them in-house proved cheaper and captures more of the value chain.

THE TURNING POINT

From price times volume to negotiated terms

We started from the usual logic of a recycling plan: metal prices times volumes, less unit costs. As the work went deeper, it became clear that the business was negotiating something more specific: payable rates and metal content, which set revenue per tonne, and process costs. We converted the model to those drivers, so every negotiated term had its own line and a change in a payable rate shows what it is worth.



Ranking of value drivers. Bar lengths are schematic (not client data).

Scenarios: from one number to a range

Rising costs
Costs increase and no mitigation is applied: how far can the result fall?

Base plan
Costs and prices as planned: the reference case the other two are measured against.

Rising costs with mitigation
Management responds with mitigation measures: how much of the result do they protect?

Scenario logic described without client values.

Why the model uses negotiated terms, not market averages

A model on average market prices shows what a plant could earn on paper. A model on the terms of each contract shows what it earns under the deals it negotiates, so each term can be tested first.

What we built

INPUTS	CALCULATION MODULES	OUTPUTS
Battery mix and metal content	Revenue by battery type and metal	Project cash flows
Payable rates and metal price forecasts	Make-or-buy cost model	Investor cash flows & returns
Supply contracts and collection fees	Capacity expansion	Exit valuation
Capacity, capex and ramp-up phases	Net working capital	Pre-money valuation support
Costs and working capital terms	Scenarios	Summaries & pitch deck figures

How we worked together

Step 1

Analysis and discussion

An in-depth discussion of the project, prepared with our own analysis of how battery recycling works and where the money is made.

Step 2

Plan

Agreed the model structure: revenue by battery type, make or buy, ramp-up phases, funding, returns and valuation.

Step 3

Build module by module

Built the model from revenue and costs to funding, returns and valuation.

Step 4

Review and hand over

Discussed the model with the client many times, adjusted the scenarios and delivered a ready-to-present model and a draft pitch deck.

What came out of it?

The founder has a ready-to-present model built on the terms the business negotiates, for talks with existing and new investors.

- Revenue built from metal content, payable rates and metal prices per battery type.
- A supported pre-money valuation, backed by the value of purchase contracts and operating licenses.
- Project and investor cash flows, investor returns and a likely exit valuation.
- Cost and mitigation scenarios. The funding round was ongoing at the time of writing.

Lessons for Battery Recycling

1. Model the terms you negotiate. Payable rates and metal content set revenue as much as metal prices do.
2. Show the contracts behind the capacity. Investors look for contracted supply behind every phase.
3. Show a range, not one number. Rising-cost and mitigation scenarios show how far the result can move.

Questions your model must answer

1. Which share of the installed capacity is covered by signed supply contracts?
2. What happens to the return if costs rise, and which mitigation measures protect it?
3. What return can investors expect, and how does it change with the exit year and exit multiple?
4. How much capital does each ramp-up phase need, and when does the plant turn it into cash?
5. What payable rate does each contract give per metal, and how is it reset?
6. How much working capital does the plant tie up before revenue arrives?
7. Is it cheaper to buy black mass or to make it from collected batteries?
8. How does profit per tonne change with the battery mix and the collection fees?

Client details are anonymised to protect confidentiality. Charts, schematics and worked examples are illustrative and contain no client data. Full case study: https://www.efinancialmodels.com/knowledge-base/case-studies/manufacturing/battery-recycling-financial-model-case-study/

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