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Debt: Sized & Sculpted

Everything about project debt — explained with one salary, one EMI and a very patient bank: DSCR, gearing, sizing and sculpting.



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PROJECT FINANCE · MADE FUN

Debt: Sized & Sculpted

Everything about project debt — explained with one salary, one EMI and a very patient bank.

$ *Starring Buck — your project's pay-cheque*



Developed by Mayank Jain · mjsir.org · linkedin.com/in/mayankjain17

Meet Buck — your project's pay-cheque

Think of a project as a person with a steady salary. Every term below is just a piece of Buck.

IN A PROJECT…		…IN EVERYDAY LIFE
CFADS — cash available for debt service	→	Buck's take-home salary
Debt service	→	Buck's monthly EMI (interest + principal)
DSCR — the cover ratio	→	Salary ÷ EMI — Buck's safety cushion
The lenders	→	The bank handing Buck the loan
Debt sizing	→	How big a loan Buck's salary supports
Debt sculpting	→	Letting the EMI follow Buck's income



Buck — one character, every concept.

$ **Buck says —** *Keep me in your head — debt sizing and sculpting are just two things the bank does to my pay-cheque.*

A project runs on two kinds of money

Debt and equity behave very differently — and that difference drives everything.

DEBT — the bank's money

- Cheaper — but must be repaid on a schedule.
- First in the queue to be paid.
- Lower risk for the lender → lower return.
- Comes with rules (covenants) and security.

VS

EQUITY — the owners' money

- Pricier — it carries the real risk.
- Paid LAST, after everyone else.
- Higher risk → higher return; keeps the upside.
- No fixed schedule — gets what's left over.

The capital stack — who stands where in the queue

Lower in the stack = paid first = lower risk = lower return.

Pure equity	Owners' true at-risk cash — paid last, keeps the upside.
Shareholder loan	Owners' money lent in — flexible and tax-smart.
Mezzanine / sub debt	A pricier top-up that waits behind senior.
Senior debt	The main, cheapest loan — first to be repaid.



EQUITY BRIDGE

Sits alongside the stack — a short-term loan that funds the equity during construction, repaid by equity later.

$ **Buck says —** *More cheap senior at the bottom lifts owner returns — but the lower you sit, the more you lose if things go wrong.*

Two moves on one loan

Sizing and sculpting are not two topics — they're the same story, told back to back.

1 SIZE IT

How big a loan can the cash carry?



Set the ceiling.

2 SHAPE IT

Carve the repayments to fit the cash.



Then lift it.

$ **Buck says —** *Size decides how much I can borrow. Sculpt decides how I pay it back — do both well and I borrow more, safely.*

Debt sizing — how big a loan can the cash carry?

Not based on what the asset is worth — based on the cash it will throw off.



Buck flexes: how much can he carry?

WHAT IT IS

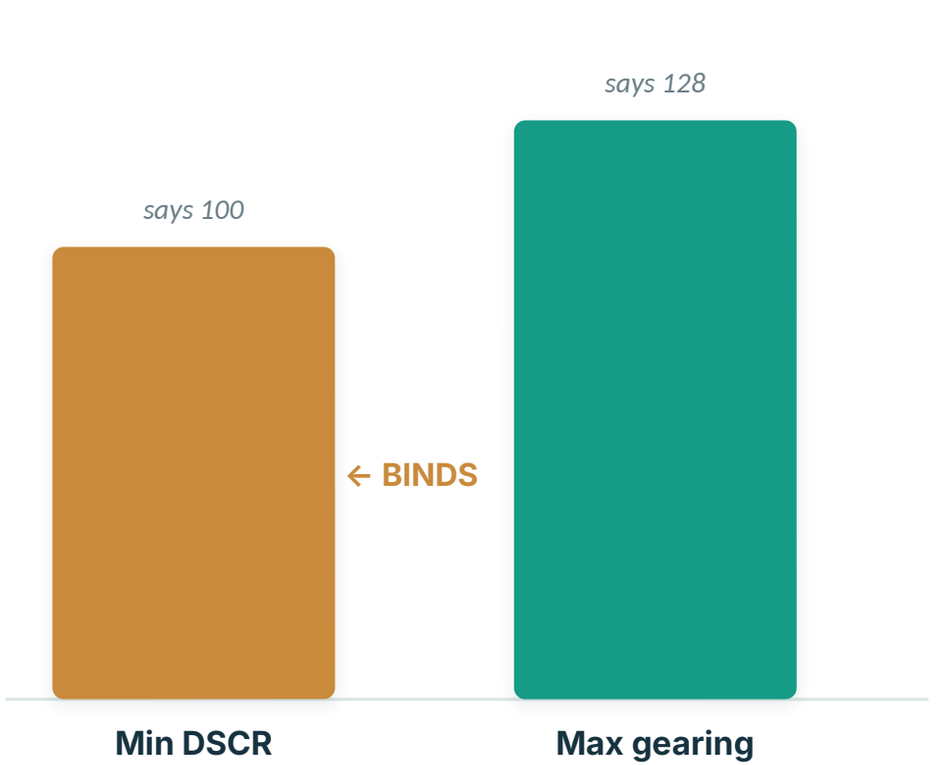
- The maximum debt the future cash flows can safely repay.
- Project finance sizes on cash flow — it's contracted and predictable (PPA / CfD).
- This becomes the debt limit the bank reserves capital for.

WHY IT MATTERS

- More cheap debt = less expensive equity = higher returns.
- Too much debt = the project can't pay and defaults.
- Getting it right is the heart of a bankable deal.

How sizing works — the tightest limit wins

Lenders set several limits. You can only borrow up to the lowest one.



Minimum DSCR

Cash must comfortably cover debt service every period.

Maximum gearing

A cap on debt as a % of total cost (e.g. 70–80%).

Tenor / LLCR

Debt must repay within the loan term, with cover.

$ **Buck says —** *Three banks, three answers. I get the smallest one.*

The sizing formula, without the headache

One idea: discount the cash the project can spare on debt.

Debt size = **Present value of (CFADS ÷ target DSCR)** over the loan tenor

BUCK'S PAYSLIP · a tiny worked example

Cash this year (CFADS)	**150**
Lenders want a DSCR of	**1.5×**
Most Buck can pay the bank = 150 ÷ 1.5	**100**
Less interest this year	**– 80**
Principal repaid = 100 – 80	**20**

Add up the present value of each year's '100' → that's the debt size.

THE INTUITION

The bank lends Buck today the value of all the spare cash he can promise it tomorrow —

no more, no less.

Debt sculpting — carve the EMI to fit the cash

Don't force a flat repayment onto a bumpy income — shape the repayment to follow it.

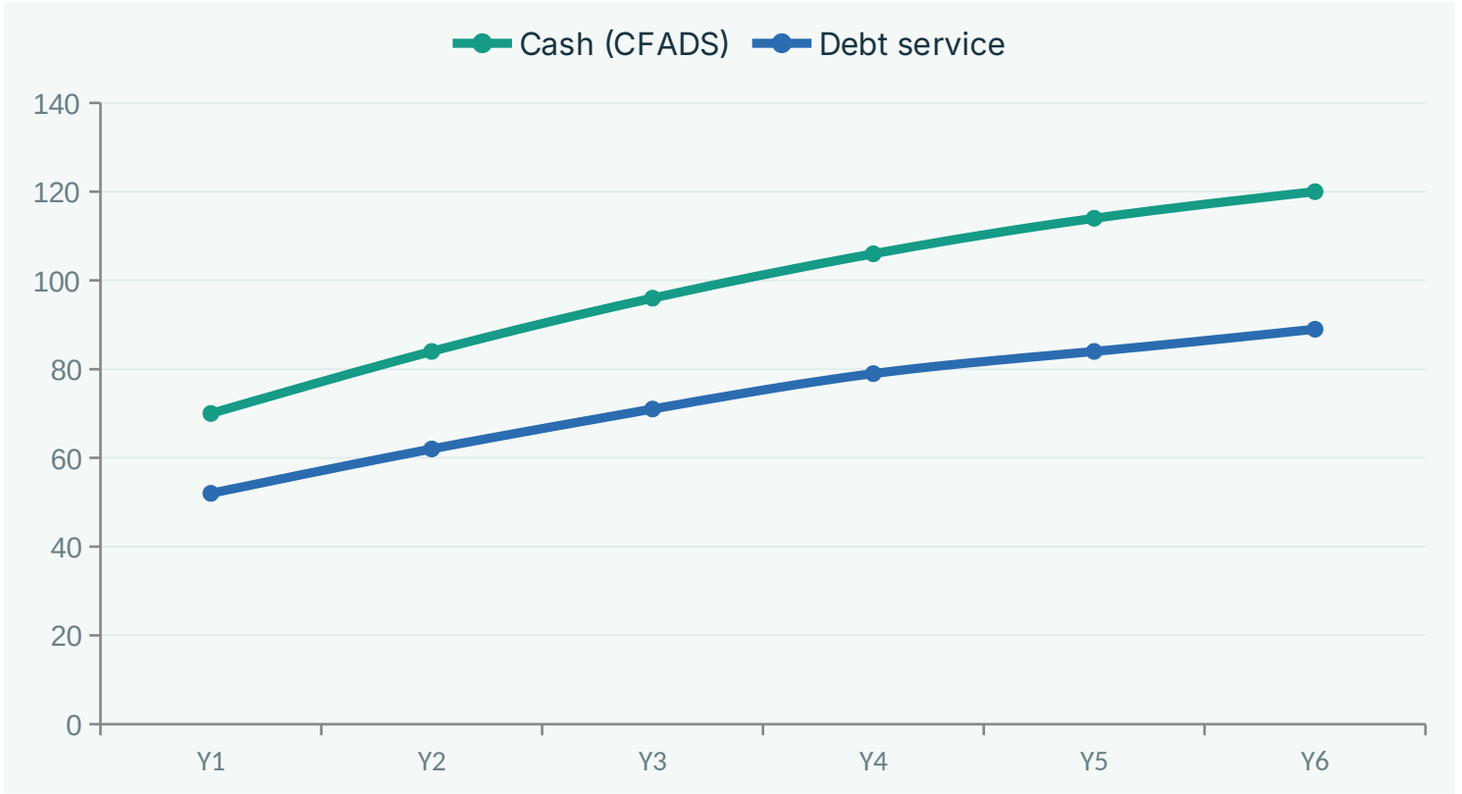


Buck the sculptor: chiselling each repayment to fit.

- Set each period's principal so debt service follows the cash flow.
- Pay more when cash is strong, less when it's weak.
- Hold the cover ratio (DSCR) steady at target — a smooth, even staircase.
- Perfect for seasonal, ramp-up or irregular cash flows (wind, solar, toll roads).

How sculpting works — debt service hugs the cash

Principal each period = CFADS ÷ target DSCR − interest. The cushion (DSCR) holds steady.



READ THE PICTURE

- Debt service (blue) tracks the cash (green) as it grows.
- The gap between them is the cushion — the DSCR, held at target.
- Early years: pay less. Later years: pay more. Always affordable.

$ **Buck says —** *My EMI grows as I do — never a year I can't afford.*

Why sculpt? Sculpted vs straight-line

Same project, two repayment styles — very different outcomes.

STRAIGHT-LINE / FLAT



same EMI every year

- Same principal every period, come rain or shine.
- In weak early years the DSCR dips dangerously low.
- To stay safe, you must borrow LESS.
- Simple — but leaves money on the table.

SCULPTED



EMI grows with the cash

- Repayment follows the cash — DSCR stays at target.
- No weak-year dip → carry MORE debt safely.
- More cheap debt → higher equity returns.
- Fits seasonal & ramp-up cash flows naturally.

Sculpting squeezes the maximum safe debt out of the same cash flows — that's why sponsors love it.

Shape it, and you can size it bigger

Why sizing and sculpting belong on the same page: sculpting is what lets the cash carry more debt.

SAME CASH FLOW — HOW MUCH DEBT IT SAFELY CARRIES · ILLUSTRATIVE



1. Flat repayment dips the DSCR in weak early years
2. A low DSCR forces a smaller, safer loan
3. Sculpting removes the dip — DSCR stays at target
4. So the same cash now supports a bigger loan

$ **Buck says —** *Size sets my ceiling; sculpt raises it. That's why the bank does them together — and so should this deck.*

Limits & traps — where sizing & sculpting bite back

Powerful, not magic. Watch these four.



Buck, meet the banana peel.

Tenor is a hard wall

You can delay repayment, but the debt must still clear by maturity. Push too far and it won't fit.

The early-period trap

If first-year cash can't even cover interest, the maths breaks — fix the structure, not the model.

Higher DSCR = less debt

Raising the cushion slows repayment but shrinks how much you can borrow. A trade-off.

The tail problem

Loan life must sit comfortably inside project life — lenders want a buffer (the 'tail').

The circularity trap — the #1 sculpting headache

The famous loop that makes models chase their own tail.



Debt size

↓

Interest

↓

Tax

↓

CFADS

...and back to Debt size ↻

Each one needs the other first:

- Debt size depends on CFADS.
- CFADS depends on tax. Tax depends on interest.
- Interest depends on the debt size... which we're trying to find.
- Each needs the other first → Excel throws a circular-reference error.

Breaking the loop — three clean ways

You don't fight the circularity; you cut it deliberately.



Snip — Buck cuts the loop on purpose.

1 **Size on pre-interest cash**

Calculate CFADS before linking interest, size the debt, then bring interest in. Breaks the loop at the source.

2 **Controlled iteration**

Let the model iterate to a stable answer — Excel's iterative calc, or a copy-paste-values loop.

3 **A small macro (VBA)**

A button that loops the calc until debt size and repayments settle — clean and repeatable.

Golden rule: break the loop on purpose — don't let it run wild. Always check the debt fully repays and the DSCR holds.

The modeller's checklist — where to pay attention

The six checks that save you from an embarrassing re-model.

1 — Define CFADS correctly
Right items in/out — taxes, maintenance capex, working capital, reserve movements.

2 — Put ALL costs in debt service
Include fees and LC costs, not just interest — they shrink the debt you can carry.

3 — Mind the first period
Don't let the maths demand repayment when there's barely cash for interest.

4 — Keep a tail
Loan life must end before project life — lenders want the buffer.

5 — Sculpt to the right DSCR
Constant vs curved DSCR changes the answer — agree the target up front.

6 — Stress it
Re-run with lower cash, higher rates — does the DSCR still hold?

The cash-flow waterfall — who gets paid first

Every period, cash fills one bucket before it spills to the next.

1. **Operating costs** *keep the lights on*
2. **Senior debt** *interest, then principal*
3. **Reserve accounts** *top up the DSRA etc.*
4. **Sub / mezzanine debt** *the patient top-up*
5. **Equity distributions** *whatever's left over*



Equity is last in line — it only gets what survives the trip down the waterfall.

Reserve accounts, LCs & bank guarantees

The safety buffers that help the bank sleep at night.



Buck fills the rainy-day jar.

Reserve accounts

- DSRA — Debt Service Reserve: a 'rainy-day jar' holding ~6 months of debt service.
- Maintenance reserve: cash set aside for big future repairs.
- Filled from the waterfall before equity gets paid — refilled if it dips.

LCs & bank guarantees

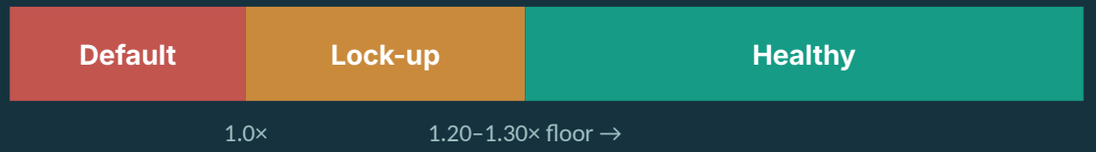
- A bank's promise to pay if you don't — used INSTEAD of cash in a reserve.
- Frees up cash; costs only a small fee… until it's called.
- Common for DSRA, performance and grid obligations.

Covenants — the rulebook in the loan

The promises that keep the project honest — with DSCR as the star.

DSCR — THE HEADLINE COVENANT

DSCR = **cash available ÷ debt service**



- Must stay above a floor (e.g. 1.20–1.30×), tested every period and on average.
- Drop below the lock-up level → no dividends to owners until it recovers.
- Drop further → event of default; the lenders can step in.

OTHER USUAL COVENANTS

- Gearing / leverage caps
- Keep insurance in place
- No extra debt without consent
- Reserve accounts kept topped up
- Regular reporting to lenders

The debt menu — senior & subordinated

Two external loans, two very different temperaments.

Senior debt

"I lend the most, charge the least, and I get paid first."

- First in the queue — paid before everyone else.
- Lowest interest rate, because it's the safest.
- Secured on the project's assets and cash flows.
- Sets the rules — covenants, reserves, the lot.
- Usually the biggest single slice of funding.

Subordinated / mezzanine

"Pay the big bank first — I'll wait, for a bit more."

- Sits between senior debt and equity.
- Paid AFTER senior — so it's riskier…
- …and therefore charges a higher rate.
- Fills the gap when senior won't lend enough.
- Part loan, part equity in spirit — hence 'mezzanine'.

Owner's money — four ways skin goes in the game

From flexible loans-to-self to true at-risk equity.

Shareholder loan

Owners put money in as a loan, not pure equity. Flexible, tax-efficient, ranks behind the banks — counts as 'equity-like'.

Upstream loan

Cash flowing UP from the project to its parent. Moves surplus around the group — lenders watch it closely.

Equity bridge

A short-term bank loan that funds the equity during construction, repaid by real equity around COD. Lifts IRR.

Pure equity

The owners' true at-risk cash. Paid LAST, carries the most risk, keeps the most upside — lost first if it fails.

Arm's-length rule: deal with your own group as if they were strangers — fair, market terms only.

What you pay — rate, fixed vs floating & the true cost

The interest rate is really two pieces stuck together.

Interest rate = **Base rate** (the market, e.g. EURIBOR / SOFR) + **Margin** (the bank's mark-up for risk)

Floating rate

- Moves with the market base rate.
- Debt service can change each period.
- Cheaper to start, but uncertain.

Fixed rate

- Locked for the life of the loan.
- Predictable debt service — easy to plan.
- You pay for the certainty.

THE TRUE COST

Add fees — arrangement, commitment, LC — to the headline rate.

A "5%" loan can quietly cost 6%+

$ **Buck says —** *Always compare loans on the effective rate — the price I actually pay — not the headline.*

Taming the rate — and who the bank can chase

Two ways the deal manages risk.

Hedging — taming a floating rate

- A swap exchanges your floating rate for a fixed one.
- Debt service becomes predictable — no surprises.
- Lenders often REQUIRE it — they want certainty.
- Protects the DSCR from rate spikes.



Like fixing your variable mortgage so the payment can't suddenly jump.

Recourse vs non-recourse

Recourse: the bank can chase YOU — other assets, the parent. Cheaper, but riskier.

Non-recourse: the bank can only chase the PROJECT's cash flows. Loss capped at your equity — the norm.



Like a car loan secured only on the car — not your house.

Debt, in one breath

1 SIZE — Size the debt to the cash the project can spare — the tightest limit (DSCR, gearing, tenor) wins.

2 SCULPT — Sculpt the repayments to follow that cash, holding the DSCR steady — so you can safely borrow more.

3 MIND THE TRAPS — The early-period crunch, the tenor wall, and the famous circular reference.

4 WATERFALL — Cheap senior sits at the bottom; equity waits at the top for whatever survives.



That's a wrap!

Senior debt: *"I get paid first."* **Equity:** *"I get paid… eventually. But I keep the upside."*

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