

TRL is not business readiness.

A technology that works is a technical result, not a business. What decides whether it reaches the market — in the product, the market, and the money around it.

THE TECHNOLOGY

THE MARKET

THE MONEY

TRL 9

proven at full scale in an operational environment — and still not a product

3 axes

market, manufacturing and money — none of them measured by TRL

1 gap

the valley of death, where proven technology quietly dies before it becomes a business

Proven is *not* ready.

The engineering can be flawless and the venture can still fail on things TRL never scored — whether anyone will buy it, whether it can be built at a competitive cost, whether the money and the rules line up.

TRL does not break at the market.

Business readiness does.



These gaps come from R&D and technical due-diligence work — the ground where most commercialisation budgets are actually won or lost.

Six places a proven technology quietly stalls

Three live on the market side. Three on the business side. None of them show up on a TRL assessment.

01 Cost & competitiveness

Proven does not mean affordable — it must beat the incumbent, not merely work

02 Market & offtake

A demo is not a market; a letter of intent is not a contract

03 Regulations & standards

Permits, codes and standards the demo never needed

04 Manufacturing readiness

A demonstrator is not a repeatable production line

05 Financing & bankability

Technical risk retires; the commercial risk lenders price does not

06 Repeatable delivery

A first-of-a-kind is not an nth-of-a-kind business

Each readiness scale measures what TRL leaves out

TRL

Technology readiness · the technical axis only

Runs 1–9, from a basic principle to a system proven in the field — but says nothing about cost, market or financing.

MRL

Manufacturing readiness · can you build it

US-DoD scale 1–10. A demo often reads TRL 8–9 while its MRL sits at 4–5 — can you make it, at rate, at cost?

CRI

Commercial readiness · is there a business

ARENA's index, 1–6: market, financing, supply chain, regulation, customer. Top TRL can still sit at CRI 1–2.

IRL

Investment readiness · will anyone fund it

Steve Blank's 9 levels: is the model validated, the path to repeat revenue real? Commercial risk keeps capital away.

Proven is not the same as affordable

THE PRICE THE MARKET SETS vs THE COST A FIRST PLANT CARRIES

THE PRICE TO BEAT

1×

what the incumbent already charges
— decades of cost-down behind it

Mature supply chain • full volume • learning curve long paid down

2–5×
to close

WHAT THE FIRST PLANT COSTS

2–5×

first-of-a-kind delivered cost, above a competitive price

No volume • no learning curve • everything bespoke and one-off

Illustrative • first-of-a-kind economics. The exact multiple varies — the gap does not.

THE TEST Quote the delivered cost at the volume you will actually sell at — not the grant-funded cost of the demonstrator.



A demonstration is not a market

THE INTEREST

Everyone wants a briefing, a pilot, an MOU. On a demo that feels like traction — but it is curiosity with a logo, not demand.

THE COMMITMENT

Between interest and revenue sits a customer who signs, pays and takes delivery at a price that works. LOIs do not clear that gap; contracts do.

THE REPEAT

One paid pilot is a data point, not a business. The market exists only when the second and tenth customer buy — with no subsidy or favour.

Most commercial failures are not the technology being rejected.

They are demand that was assumed, piloted or promised — but never contracted at a price that pays.



It works once — can you build it a thousand times

MRL 4–5

the manufacturing readiness a TRL-9 demonstrator often actually sits at

Technology and manufacturing readiness are different scales — one can read 9 while the other is stuck at 4–5.

WHAT ACTUALLY GATES PRODUCTION — EACH ITS OWN EXPERIMENT

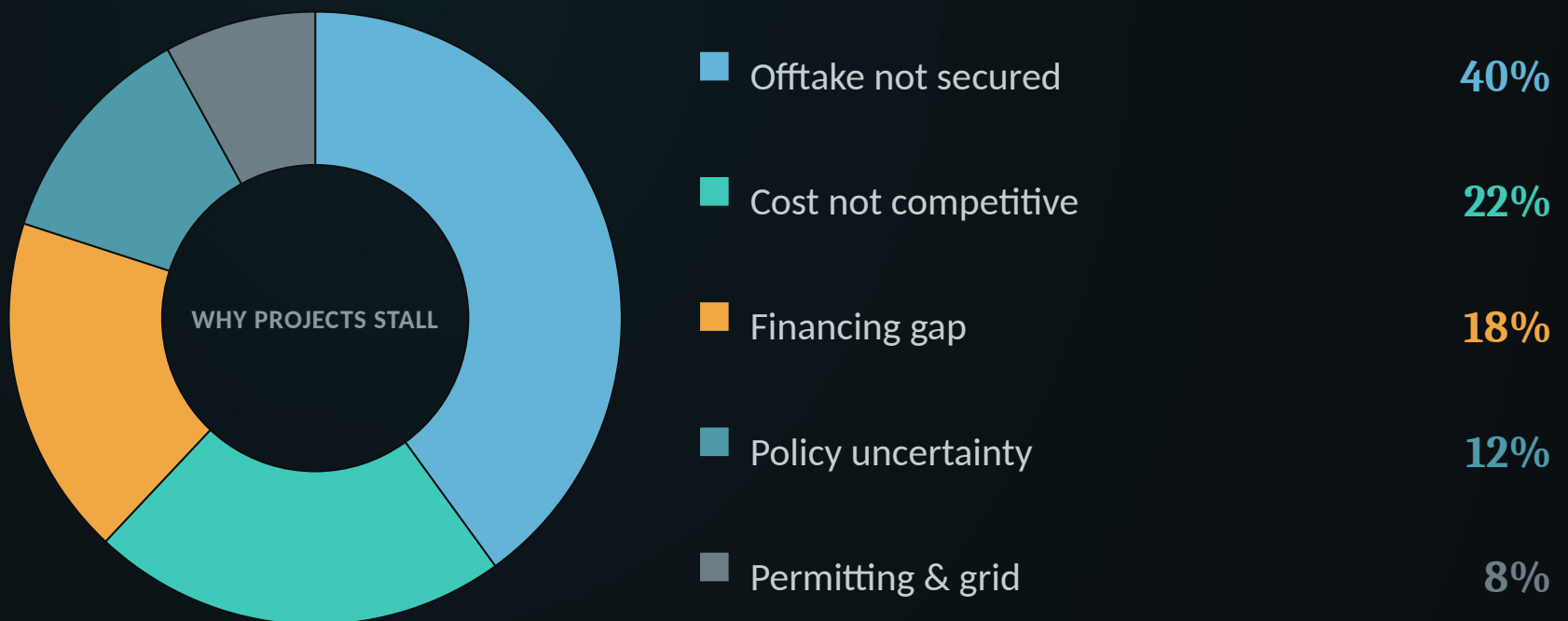
YIELD	a hand-built unit hides it; a line finds it fast
TOOLING	millions and months — and it freezes the design too early
SUPPLY	every input needs a qualified vendor at spec
COST	unit cost only falls with volume and learning

The readiness error

Validate the technology, then assume it can be built — different problems, and the slower manufacturing one gets cut first.



It is almost never the technology that kills it



Illustrative split of why announced hydrogen projects stall. The exact shares vary — the lesson does not.

Notice what is not on the list — the technology. Bankability is won or lost in the contracts and the cost stack, not the lab.



Readiness is a ladder — TRL is only the bottom rung

You cannot buy your way past a market that has not formed. The slowest necessary proof — of demand, cost and finance — sets the schedule, not the funding round.



Each rung must prove out before the next is funded. A high TRL clears the first rung — it does not clear the climb.

LISTEN NOW

The technology is the easy part.

A business is not a bigger demo — it is a different achievement, governed by cost, demand, finance, manufacturing and the rules. Respect that gap early and it is a commercial programme you can plan. Ignore it, and a proven technology becomes a cautionary tale.



The full breakdown is in Episode 6

[Link in the comments.](#)

Which of the six would you fix first — before you have to? Tell me below.

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