

DECISION BRIEF

Final Investment Decision

FID

Stage-gate playbook, FID package contents, LSE appraisal (NPV / IRR / payback / ARR), debiasing protocols and governance checklists.

Item	Content
Document	Methodological brief + template for the FID package
Author / owner	Francois Philippe Amour Dorleans
Academic anchor	LSE — MBA Essentials (Feb–Apr 2023), cert. 342406
Operating anchor	Capex project management, Front-End Loading, stage-gate
Audience	Investment committee, sponsor, PMO, project team
Status	Working standard — instantiate on a named project
Language version	English counterpart of the French dossier
Date	11 September 2026

LSE golden rule before opening the file

A long-term investment decision must maximise shareholder wealth. Judge cash flows, not accounting profit. NPV is the most accurate method because it incorporates the time value of money. Study costs already spent are a sunk cost: they never justify a bad FID.

Contents

1. Purpose, audience and how to use this brief
2. What FID is — and why it changes everything
3. LSE MBA Essentials — what belongs inside a FID
4. Stage-gate architecture to FID
5. Gate 0 — Identify / Appraise / FEL-1
6. Gate 1 — Select / Pre-feasibility / FEL-2
7. Gate 2 — Define / FEED / Feasibility / FEL-3
8. Gate 3 — The FID
9. Standard FID package (committee file)
10. Investment appraisal — how the numbers must be built
11. Risk, sensitivities and scenarios
12. Cognitive biases and debiasing (LSE Module 8)
13. Governance, roles and RACI
14. Master pre-FID checklists
15. After FID — what the brief must already specify
16. CV, interview and sponsor one-pager language
17. Annexes — glossary, formulae, sources, project sheet

Seventeen sections: stage-gate playbook + committee-file template + checklists. Instantiate on a named asset before sending to committee.

1. Purpose, audience and how to use this brief

This document has two jobs. First, it explains how to build the path to FID. Second, it specifies what the investment committee must receive in order to decide. It is therefore both a methodological playbook and a template for the FID package.

It deliberately joins two bodies of knowledge that are too often kept apart: the MBA toolkit (appraisal, ratios, decision biases, value creation) and capex project management (stage-gate, FEL, FEED, estimating, contracts, permits). A FID is neither an engineering deliverable nor a spreadsheet. It is an irrevocable allocation of capital under uncertainty.

1.1 What this brief is not

- A ready-to-fill financial model for a named asset (produce that as a project annex).
- A technical FEED (FEED is an input to FID, not the FID).
- Authorisation to sign EPC contracts before independent review.

1.2 How to use it

1. Read sections 2 to 4 to align committee language (FID, gates, NPV).
2. Instantiate sections 5 to 8 on the live project (deliverables, uncertainty, risks).
3. Use section 9 as the table of contents of the committee binder.
4. Run the section 14 checklists before sending the file to the committee secretariat.
5. Keep section 16 for interviews and the CV: same vocabulary, same discipline.

2. What FID is — and why it changes everything

The Final Investment Decision is the governance gate at which the competent authority (board, investment committee, joint venture) commits the major execution capital. Before FID, the organisation buys knowledge (studies, options, FEED). After FID, it buys reality (long-lead equipment, EPC, construction, commissioning).

Managerial consequence: FID quality is judged by promised vs delivered three to five years later (capex, schedule, cash flows, HSE, ESG), not by enthusiasm in the room on decision day.

2.1 Before / at / after FID

	Before FID	At FID	After FID
Nature of spend	Studies, options, FEED	Capex commitment + launch opex	Execute, commission, operate
Typical cost uncertainty	±50%, then ±30%, then ±10–15%	Commitment-class estimate	Control vs baseline
Governance question	Should we keep studying?	Do we commit the capital?	Are we delivering the promised value?
Possible outcome	Go / Recycle / Kill	Approve / Defer / Reject	Change control, lookback
Dominant bias	Overconfidence, champion bias	Sunk-cost, confirmation	Planning fallacy realised

Table 1 — FID as a change of spending regime and governance regime.

2.2 The three committee outcomes

- **Approve.** Execution budget is opened, often with conditions precedent (financial close, final permit, partner FIDs, hedges).
- **Defer / Recycle.** The project can still create value, but timing, price, scope or funding are not mature. Do not kill it: send it back to the previous gate.

- **Reject / Kill.** NPV is not robust, risk is uninsurable, capital has a better use elsewhere, or there is no strategic fit.

LSE discipline — sunk-cost fallacy (Module 8)

The millions already spent on pre-feasibility and FEED are irrecoverable. They do not enter the FID calculation. The committee judges the remaining project: future cash flows versus capex still to be committed, discounted at the required rate. Continuing 'because we have invested too much in studies' is precisely the error LSE teaches you to avoid.

3. LSE MBA Essentials — what belongs inside a FID

The LSE MBA Essentials certificate (February–April 2023) does not use the word FID. It does, however, supply the entire judgement system that a FID requires. The mapping below is what you quote in committee and in interviews.

3.1 Modules used

LSE module	Concept	Use on the path to FID
M3–M4 Strategy	Value chain, advantage, make-or-buy, M&A	Why this project, now; concept options
M5 Accounting	P&L, balance sheet, cash flows, basic ratios	Read the balance-sheet / liquidity impact of capex
M6 Management accounting	Budgets, costs, life-cycle, target costing	Capex + opex + decommissioning; design-to-cost
M6 Unit 4	ARR, Payback, NPV, IRR	Core of the investment-appraisal pack
M7 Advanced ratios	Margin, ROA, ROE, current, gearing	Post-FID balance-sheet strength, covenants
M8 Decision	Biases, planning fallacy, sunk cost	Pre-mortem, outside view, challenge
M1 / M10 Leadership	Influence, culture, accountability	Sponsors, committee, cold-eye review

Table 2 — MBA Essentials mapped onto FID practice.

3.2 The four appraisal methods (LSE Module 6 Unit 4)

LSE learning outcomes: calculate rates of return on investment opportunities; select the best opportunity. Teaching assumptions in the course (to be lifted in a live FID): cash flows estimable with relative certainty; no tax or inflation in the examples; cash flows treated as occurring on the last day of each period.

NPV — primary criterion

Unlike ARR and payback, NPV takes the timing of cash flows into account. Each flow is discounted at the required rate r (opportunity cost / WACC / hurdle), then summed.

$NPV = \sum CF_n / (1+r)^n$ (including IO at $n = 0$). Rule: $NPV > 0$ means the investment beats the alternative placement at rate r . Between two positive-NPV projects, retain in principle the higher NPV (wealth creation), subject to capital rationing and risk.

LSE verdict: “Net present value is a better method [...] as it makes use of cash flows instead of profit, and takes the timing of these cash flows into account.”

IRR — acceptance test versus hurdle

IRR is the rate that drives NPV to zero. LSE rule: accept if IRR exceeds the rate at which the money could otherwise have been invested. Operating caveat (to add to the course): IRR can mislead across projects of different scale or cash-flow shape; NPV remains the judge of value creation.

Payback — liquidity screen, not king

Cumulative cash flows are tracked until the initial outlay is recovered. LSE: if payback exceeds the maximum set by management, reject; between two acceptable projects, the shorter payback wins. Taught limits: no time value of money; a project that creates more wealth later can be wrongly discarded.

ARR — secondary accounting indicator

$ARR = (\text{average annual operating profit} / \text{average investment}) \times 100$. LSE flags two weaknesses: it uses accounting profit, not cash flows; it ignores the time value of money. Useful only if the board still asks for it; never as the sole FID criterion.

3.3 What LSE adds beyond the formulae

- Purpose of the decision: maximise shareholder wealth, not 'launch a project'.
- Long-term asset decisions have lasting financial consequences — hence stage-gate.
- Risk must be judged, not return alone (Module 6 closing note).
- Life-cycle costing: pre-production, production, post-production (decommissioning, environment, after-sales).
- Target costing / design-to-cost: start from the price the market will pay, minus required margin, to constrain capex.
- Debiasing is mandatory: the inside view is too optimistic; use outside view + pre-mortem + accountability.

4. Stage-gate architecture to FID

Stage-gate (Cooper) and Front-End Loading (IPA / extractives and infrastructure) say the same thing: do not buy execution with an idea. Each gate has a deliverable, an estimate class, a governance question and a right to kill the project.

4.1 Language mapping

This brief	Oil & gas / IPA	Infra / utilities	PMI (approx.)	Typical cost uncertainty
G0 Identify	FEL-1 Appraise	Opportunity / need case	Initiating	±50% (Class 5)
G1 Select	FEL-2 Select	Pre-feasibility / options	Planning early	±30% (Class 4)
G2 Define	FEL-3 Define / FEED	Feasibility / detailed design	Planning late	±10–15% (Class 3)
G3 FID	FID	Financial close / sanction	End of Planning	Commitment baseline
Execute	Execute	Construction	Executing	EAC control

Table 3 — FEL / infrastructure / PMI translation. Adapt the labels to your committee jargon, not the logic.

4.2 Economics of information

Spend 1 to 5% of final capex on studies to reduce uncertainty before committing 100. A weak FEED statistically predicts post-FID overrun. Front-end loading quality (FEL index) predicts success more reliably than sponsor enthusiasm.

5. Gate 0 — Identify / Appraise / FEL-1

Objective: a strategic problem or opportunity, not yet a project. You are seeking the right to spend study money, not the right to build.

5.1 Work to complete

- Need statement: operating constraint, market, regulation, decarbonisation, asset replacement, growth.
- Strategic fit and value chain: where does the project create advantage (cost, differentiation, real option)?
- Crude option screening, including 'do nothing' and 'defer'.
- Order-of-magnitude capex / opex / revenue ($\pm 50\%$).
- Explicit kill criteria (if even a reasonable scenario cannot create value).
- Stakeholder map, in-principle permits, HSE / ESG red flags.
- Governance: named sponsor, PMO, Gate 1 study budget.

5.2 Gate deliverable and decision

Deliverable: Opportunity brief (4 to 8 pages) + options sheet. Decision: Go to Select / Recycle / Kill.

Biases to watch: champion bias (judging the person, not the file); representativeness ('it looks like a success, so it will work'); status quo (launching so the portfolio does not have to change).

6. Gate 1 — Select / Pre-feasibility / FEL-2

Objective: a preferred option that can already be compared, with a still-fragile but discriminating business case. Do not open FEED unless the option survives an external look.

6.1 Work to complete

- Comparative concept studies: capacity, site, technology, make-or-buy, phasing, partners.
- First Class 4 capex/opex estimate ($\pm 30\%$), including offsites and owner's costs.
- Economic sketch: cash flows, indicative NPV/IRR, payback, working-capital need.
- Outside view (Lovallo & Kahneman, LSE M8): reference class of comparable projects.
- Major risks, permits, connections, HSE, ESG, social acceptability.
- First contract and financing strategy (debt / equity / JV).
- Design-to-cost: LSE target costing if the market sets the price.

6.2 Outside-view protocol — five LSE steps

1. Select a reference class broad enough to be statistical, narrow enough to be comparable.
2. Map the outcome distribution (median, clusters, cost / schedule / NPV outliers).
3. Place your project intuitively in that distribution (inside view).
4. Assess how reliable your past forecasts of this type have been.
5. Correct the estimate toward the class mean: the less reliable the forecast, the more you regress to the mean.

LSE example: the Scottish Parliament estimated at £10–40m for 2001, delivered at £414m in 2004. That is the planning fallacy as public monument. A FID that ignores the reference class repeats the same error.

6.3 Gate deliverable and decision

Deliverable: Concept select report + preliminary business case + Gate 1 risk register. Decision: authorise FEED (budget and duration capped) / Recycle options / Kill.

7. Gate 2 — Define / FEED / Feasibility / FEL-3

Objective: an executable project. This is roughly 80% of the intellectual work before FID. A FID file without a mature FEED is not a FID: it is a request for a blank cheque.

7.1 Engineering and scope

- Frozen design basis: capacity, availability, product specs, codes, site assumptions.
- FEED: PFDs/P&IDs or sector equivalent, plot plan, key MTOs, interfaces, utilities.
- Long-lead items identified; procurement lead times on the critical path.
- WBS and scope dictionary: in, out, and 'to be decided before FID'.
- Constructability, operability, maintainability, commissioning philosophy.

7.2 Estimating and schedule

- Class 3 estimate (± 10 to 15%): capex, owner's costs, spares, commissioning, contingency.
- Typical-year opex + ramp-up + life-cycle (LSE total life-cycle costing, including post-production).
- Integrated Level 2/3 schedule, critical path, float, construction seasonality.
- Contingency calibrated to risk (not a political cushion). Escalation and change allowance held separately.

7.3 Contracts, permits, HSE, ESG, financing

- Contract strategy: lump-sum EPC, EPCM, packages, alliance — risk allocation written down.
- Draft contracts ready to sign the day after FID (or a dated negotiation path).
- Permits / land / connections: status, critical path, conditions precedent.
- HSE case, environment, social, climate: commitments and associated opex costed.
- Financing structure: term sheet, covenants, gearing and liquidity impact (LSE M7).
- Owner team: execution organogram, critical hires, project assurance.

7.4 Mandatory pre-mortem before the file is sent

LSE / Klein / Kahneman protocol: "Imagine we are one year into the future. We implemented the plan as it now exists. The outcome was a disaster. Please take 5 to 10 minutes to write a brief history of that disaster."

This forces consider-the-opposite, bypasses group censorship once a plan feels 'too advanced', and feeds the FID risk register. Typical causes to surface: policy reversal, sponsor departure, underestimated interfaces, commodity price, contractor underperformance, permits.

8. Gate 3 — The FID

The committee is not 'validating a slide deck'. It is allocating capital. Session quality depends on package quality and challenge quality.

8.1 Questions the committee must ask

1. What is NPV at WACC / hurdle, and what happens if capex +15%, schedule +12 months, price –20%?
2. Does IRR really beat opportunity cost, or only the team's base case?
3. What is payback, and do we have the liquidity to fund the cash trough?
4. Which external reference class justifies cost and schedule? (outside view)
5. What did the pre-mortem teach us? What would actually destroy value?

6. Is scope frozen? How many hold points remain open?
7. Are permits and financing clear conditions precedent?
8. What is the balance-sheet impact: gearing, current ratio, covenants, rating?
9. Why now, and what is the option value of waiting?
10. If we have 100 of scarce capital, is this still the best use?

8.2 Typical conditions precedent

- Financial close / syndication / partner equity call.
- Determining permit obtained, or drop-dead date.
- Mirror FID of co-investors.
- Price / FX hedge if the model requires it.
- EPC contracts signed inside an authorised envelope.

9. Standard FID package (committee file)

The package is a binder, not a novel. Each tab has an owner, a freeze date and a status (final / draft / N/A). Copy the contents list below into the project workspace.

9.1 Binder architecture

Tab	Content	Typical owner
00 Decision note	3-page recommendation: Go / Recycle / Kill + conditions	Sponsor
01 Strategic fit	Problem, discarded options, advantage, timing	Strategy / Sponsor
02 Scope & FEED	Design basis, exclusions, FEL maturity	Engineering
03 Capex / opex / schedule	Class 3, contingency, critical path	Controls / Cost
04 Business case	Cash flows, NPV, IRR, payback, ARR if required	Project finance
05 Sensitivities & scenarios	Tornado, downside, rupture	Finance / Risk
06 Risks & insurance	Register, pre-mortem, policies	Risk
07 Contracts	Strategy, allocation, negotiations	Contract / Legal
08 Permits HSE ESG	Status, gaps, compliance opex	HSE / Permitting
09 Financing & balance sheet	Term sheet, gearing, covenants, liquidity	Treasury / CFO
10 Execution organisation	Owner team, RACI, post-FID KPIs	Project Director
11 Independent assurance	Cold-eye review, closed actions	PMO / IA
12 Annexes	Model, letters, prior-gate minutes	PMO

Table 4 — Recommended FID package structure.

9.2 The decision note (three pages maximum)

Page 1: context, recommendation in one sentence, capital ticket requested, base-case and downside NPV/IRR/payback. Page 2: five value-killing risks and mitigations. Page 3: conditions, commitment timetable, explicit ask of the committee. Everything else goes to annexes. A committee that has to hunt for the recommendation across 80 slides has already lost.

9.3 What Finance must certify in tab 04

- Operating cash flows, not net accounting profit (LSE).
- Complete IO: capex, owner's costs, working capital, tax credits, grants, residual value.

- Explicit rate r : group WACC, divisional hurdle, or risk-adjusted project rate — and why.
- Tax, inflation, FX: written assumptions (this is where LSE teaching simplifications are lifted).
- Consistency with Module 7 ratios: the project must not break liquidity or covenants.
- Model audit trail (version, cross-checks, independent review).

10. Investment appraisal — how the numbers must be built

This section installs the calculation discipline LSE teaches, then makes it usable in a live committee.

10.1 Criterion hierarchy

Criterion	Question it answers	Status at FID
NPV @ r	Does the project create wealth?	Primary decision rule
IRR vs hurdle	Does return beat opportunity cost?	Secondary decision rule
Payback	How fast is cash recovered?	Liquidity control
ARR	What average accounting return?	Secondary / reporting
Sensitivities	Does NPV survive an imperfect world?	Robustness condition
Balance-sheet ratios	Can the group hold after commitment?	Feasibility constraint

10.2 Working formulae

NPV: $NPV = \sum_n [CF_n / (1+r)^n]$. Equivalently, use discount factors from a table (LSE method): $PV = CF_n \times \text{factor}(r, n)$.

ARR: $(\text{average annual operating profit} / \text{average investment}) \times 100$, with average investment = $(I_0 + \text{disposal value}) / 2$.

Uneven payback: track the cumulative; between two years, fraction = residual / next-year flow, converted to months if needed (LSE example: 2 years and 8 months).

IRR: rate such that $NPV = 0$. In practice: Excel IRR / XIRR, or bracketing by trial (LSE example around 20% then 25%).

10.3 LSE teaching mini-case (know it by heart)

Pink Panther Productions — machine £40,000; flows 8 / 15 / 20 / 18 / 8; disposal £7,000 in year 5; 20% opportunity rate. LSE computes a positive NPV of about £3,367. At 25% the NPV turns negative (about -£1,460). IRR is therefore slightly below 25% and above 20%: the project beats the alternative placement. That is exactly the reasoning to hold at FID, with extra zeros.

10.4 What a live FID adds to the course example

- Tax, inflation, FX, working capital, decommissioning.
- Phased capex (not a single I_0 at $n = 0$).
- Real options: defer, expand, abandon — sometimes more valuable than a binary Go.
- Cost of capital: group WACC vs divisional hurdle vs project beta.
- Capital rationing: NPV per unit of scarce capital if the budget is capped.
- A distribution, not a point: P50 / P80 of capex and NPV.

10.5 Ratio link (Module 7) — the project inside the group

A positive-NPV project can still be refused if it trips a covenant. Before FID, Finance documents the effect on: net margin, ROA, ROE, current ratio, quick ratio, gearing. LSE: 30% gearing is not 'high risk' in itself — it depends on the sector and cash-flow stability. The committee must still see the leverage path through the construction peak, when cash leaves and the asset is not yet productive.

11. Risk, sensitivities and scenarios

LSE: “in addition to return on investment, there are also other factors (such as risk)”. A FID package with only a base case is an advocacy file, not a decision file.

11.1 Minimum set

- Tornado: NPV vs $\pm$ capex, $\pm$ price / volume, $\pm$ opex, $\pm$ schedule, $\pm$ rate.
- A credible downside (not a cartoon 'worst case').
- A rupture scenario (permit loss, contractor default, commodity shock).
- Switching values: at what capex or price NPV hits zero.
- Contingency vs management reserve: who holds which pot, who releases it.

11.2 Translating risk into governance

Every 'NPV-killing' risk needs an owner, a leading indicator, a post-FID hold point and, where possible, a contract or policy that carries it. A risk with no owner in the package does not exist for the committee: it will explode in execution.

12. Cognitive biases and debiasing (LSE Module 8)

Projects die more often from organised optimism than from a wrong formula. The FID file must make countermeasures visible, not only Excel outputs.

12.1 Biases that specifically hit the path to FID

LSE bias	Project symptom	Countermeasure in the file
Planning fallacy	Base case = best case	Outside view + P80 schedule/cost
Overconfidence	Ranges too tight	Calibration, estimate classes
Sunk-cost	'We have spent too much to stop'	NPV on remaining cash only
Confirmation	Hunting slides that say yes	Consider the opposite + devil's advocate
Champion bias	Voting for the sponsor	Multi-criteria grid / cold-eye
Loss aversion	Rejecting a good risk	Frame as value creation, not option loss
Status quo	Re-launching the usual	Costed 'do nothing' option
Partition dependence	Sprinkling capex evenly	Capital rationed on NPV / risk

Table 5 — LSE Module 8 biases applied to FID.

12.2 Debiasing toolkit to write into the process

Motivation: sponsor accountability in front of the committee (watch the risk of producing 'defensible' files rather than true ones); incentives on forecast quality, not on 'Go'.

Cognition: consider the opposite; five-step outside view; pre-mortem; calibration training (LSE example: Shell geologists trained on past cases).

Design: written independent opinions before the session; individual estimates before group discussion (avoid anchoring); decision analysis if multi-criteria.

13. Governance, roles and RACI

A FID without a power architecture produces either zombie projects or political Goes.

13.1 Roles

Role	Responsibility through FID
Sponsor	Owns the recommendation, protects the kill, owns the lookback
Project Director / PM	Integrates scope, cost, schedule, risk, package
Project finance	Model, rate, sensitivities, balance-sheet impact
Engineering / FEED lead	Technical maturity and exclusions
Risk / HSE / ESG	Register, pre-mortem, permits
Legal / Contract	Contractual allocation and conditions
Treasury / CFO	Funding, covenants, liquidity
PMO / Assurance	Gate quality, cold-eye, checklist
Investment committee	Decide Approve / Defer / Reject

13.2 Session rules

- File frozen and circulated N days ahead (typically 5 to 10 working days).
- Three-page note read first; annexes only on question.
- A named challenger who is not the project champion.
- Decision minuted, conditions dated, owner for each condition.
- Mandatory lookback 12–24 months after start-up (LSE feedback / calibration).

14. Master pre-FID checklists

Do not send the file to the committee secretariat while a critical line is red. 'Desirable' items may stay amber with a dated plan.

14.1 Technical maturity and estimate

Item	Expected status at FID
Signed design basis	Frozen
FEED complete on the commitment scope	Yes
Exclusions and interfaces documented	Yes
Class 3 estimate (± 10 –15%)	Yes
Contingency derived from risk	Yes
Integrated schedule + critical path	Yes
Long leads identified and strategised	Yes

14.2 Economics and finance

Item	Expected status at FID
Versioned model + audit trail	Yes

Item	Expected status at FID
NPV at published rate, base and downside	Yes
IRR vs explicit hurdle	Yes
Payback and cash profile (construction trough)	Yes
Tax / inflation / FX documented	Yes
Gearing, liquidity, covenant impact	Yes
Financing aligned or condition precedent	Yes

14.3 Risk, legal, execution

Item	Expected status at FID
Pre-mortem held and folded into the register	Yes
Outside view / reference class	Yes
Cold-eye review closed or actions dated	Yes
Contract strategy and draft instruments	Yes
Permit critical path + drop-dead	Yes
HSE / ESG costed in opex	Yes
Owner team named for execution	Yes
Conditions precedent drafted	Yes

15. After FID — what the brief must already specify

FID is not the end of management; it is the start of control. The package must therefore contain the execution baseline:

- Budget, schedule and cash-flow reference (against which EAC / ETC will be measured).
- Change control: who can move scope, at what threshold the committee is recalled.
- Hold points (permits, tests, mechanical completion, handover).
- KPIs: safety, cost, schedule, quality, stakeholders, cash forecasts.
- Lookback / benefits realisation: compare actual cash flows with FID promises (organisational calibration).

This is where kaizen costing and TQM (LSE Module 6) take over: once the asset is live, value is defended in operations, not in another NPV slide.

16. CV, interview and sponsor one-pager language

Pedagogical purpose of this brief: bed LSE vocabulary into a capex practice you can tell without empty jargon.

16.1 CV line (adapt to sector)

“Structured the path to FID through an Identify–Select–Define stage-gate: commitment-grade FEED ($\pm 10\text{--}15\%$), NPV/IRR business case vs WACC, sensitivities and pre-mortem to correct planning fallacy, Go / Recycle / Kill recommendation without sunk-cost bias. LSE MBA Essentials (investment appraisal, ratios, decision biases).”

16.2 Interview answers — four frequent questions

“What is FID?” — The decision to commit execution capital, not a Gantt phase. Before: you buy information. After: you buy steel and concrete.

“NPV or IRR?” — NPV for wealth creation, IRR for the test versus opportunity cost. In conflict (different scale), NPV wins. Payback for liquidity only.

“Why so many studies?” — Because 2% of capex spent well on FEL avoids 20% overrun. The outside view confirms this more reliably than team optimism.

“What do you do with studies already paid?” — Sunk cost. The committee judges the future. If remaining NPV is negative, you kill, even after a beautiful FEED.

16.3 Sponsor one-liner in session

“We request X of commitment. At hurdle $r\%$, base NPV is Y, downside NPV is Z. The three risks that can zero it are A, B and C; they are carried by this contract, this permit, this reserve. Recommendation: Approve subject to conditions 1-2-3.”

17. Annexes

A. Working glossary

Term	Committee-useful meaning
FID	Irrevocable commitment of execution capital
FEED	Engineering mature enough to estimate and contract
FEL	Quality of front-end work (predicts overrun)
WACC / hurdle	Discount rate r / minimum required return
NPV	Wealth created beyond the cost of capital
IRR	Rate that sets NPV to zero
Class 3 / 4 / 5	Estimate uncertainty band
Owner's costs	Owner costs outside the EPC contract
Contingency	Provision tied to estimated project risks
Management reserve	Leadership pot, outside the team baseline
Cold-eye	Independent review before the gate
Lookback	FID promises versus actuals

B. Formula reminders

$ARR = (\text{average annual operating profit} / \text{average investment}) \times 100.$

$\text{Average investment} = (\text{initial cost} + \text{disposal value}) / 2.$

$\text{Fractional payback} = \text{year before crossing} + (\text{amount still to recover} / \text{flow in the crossing year}).$

$\text{Discount factor} = 1 / (1+r)^n.$

$PV(\text{flow}) = \text{flow} \times \text{factor}.$ NPV = sum of PVs, including IO.

LSE acceptance rule: NPV > 0; IRR > alternative rate; payback < management maximum.

C. Teaching sources used

LSE MBA Essentials — Module 6 Unit 4 Investment appraisal techniques (Atrill & McLaney, 2015; Weetman, 2015).

LSE MBA Essentials — Module 6 costing (life-cycle, target costing, kaizen, TQM, benchmarking).

LSE MBA Essentials — Modules 5 and 7, financial statements and ratios (liquidity, efficiency, profitability, gearing).

LSE MBA Essentials — Module 8, biases and debiasing (Kahneman; Lovallo & Kahneman 2003; Klein 2007 pre-mortem; Larrick 2004).

Capex practice: stage-gate, FEL / IPA, AACE estimate classes, investment-committee governance.

D. Project instantiation (to complete)

Field	Project value
Project / asset name	
Sponsor / Project Director	
Current gate	

Field	Project value
Capex P50 / P80	
Rate r / hurdle	
NPV base / downside	
IRR base	
Payback	
Target FID date	
Conditions precedent	
Recommendation	Approve / Defer / Reject

Table 6 — Page to duplicate at the front of each live project package.

Close — what to remember

FID is an allocation of capital under uncertainty. Stage-gate buys information until uncertainty is affordable. LSE supplies the judge (NPV on cash flows, IRR versus opportunity cost, balance-sheet ratios) and the mental discipline (no sunk-cost, outside view, pre-mortem). The rest is execution: frozen scope, honest estimate, contract that carries risk, a committee willing to kill.

Prepared to bed capex practice in the LSE MBA Essentials frame of Francois Philippe Amour Dorleans. Instantiate project by project; do not present this as a signed FID.