GUIDE · 7 PAGES

Modelling principles by industry

Thirteen sectors — energy, water, transport, social and digital infrastructure, recycling: the revenue, costs, risks and what the model must have.

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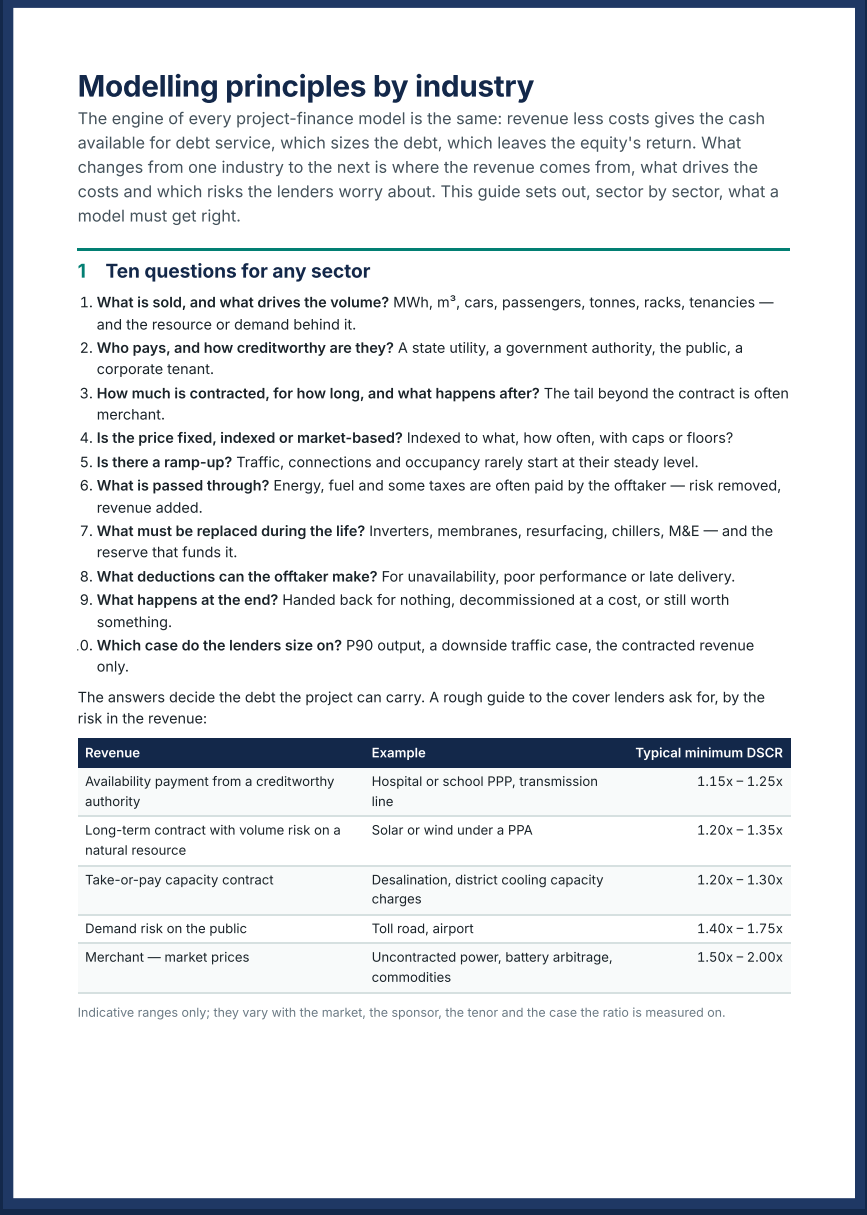

Modelling principles by industry

The engine of every project-finance model is the same: revenue less costs gives the cash available for debt service, which sizes the debt, which leaves the equity's return. What changes from one industry to the next is where the revenue comes from, what drives the costs and which risks the lenders worry about. This guide sets out, sector by sector, what a model must get right.

1 Ten questions for any sector

1. **What is sold, and what drives the volume?** MWh, m³, cars, passengers, tonnes, racks, tenancies — and the resource or demand behind it.
2. **Who pays, and how creditworthy are they?** A state utility, a government authority, the public, a corporate tenant.
3. **How much is contracted, for how long, and what happens after?** The tail beyond the contract is often merchant.
4. **Is the price fixed, indexed or market-based?** Indexed to what, how often, with caps or floors?
5. **Is there a ramp-up?** Traffic, connections and occupancy rarely start at their steady level.
6. **What is passed through?** Energy, fuel and some taxes are often paid by the offtaker — risk removed, revenue added.
7. **What must be replaced during the life?** Inverters, membranes, resurfacing, chillers, M&E — and the reserve that funds it.
8. **What deductions can the offtaker make?** For unavailability, poor performance or late delivery.
9. **What happens at the end?** Handed back for nothing, decommissioned at a cost, or still worth something.
10. **Which case do the lenders size on?** P90 output, a downside traffic case, the contracted revenue only.

The answers decide the debt the project can carry. A rough guide to the cover lenders ask for, by the risk in the revenue:

Revenue	Example	Typical minimum DSCR
Availability payment from a creditworthy authority	Hospital or school PPP, transmission line	1.15x – 1.25x
Long-term contract with volume risk on a natural resource	Solar or wind under a PPA	1.20x – 1.35x
Take-or-pay capacity contract	Desalination, district cooling capacity charges	1.20x – 1.30x
Demand risk on the public	Toll road, airport	1.40x – 1.75x
Merchant — market prices	Uncontracted power, battery arbitrage, commodities	1.50x – 2.00x

Indicative ranges only; they vary with the market, the sponsor, the tenor and the case the ratio is measured on.

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2 Energy

Solar PV

REVENUE

- A PPA price per MWh, fixed or indexed; or a CfD, or the market.
- Energy = capacity × specific yield (P50 / P90) × availability, less degradation and curtailment.

COSTS AND CAPITAL

- Modules, inverters, mounting, grid connection; a short build (6–12 months).
- Fixed O&M per MW, land lease, insurance; inverters replaced around year 10–15.

KEY RISKS

- Irradiation and performance; degradation; curtailment by the grid.
- Merchant tail: midday prices fall as solar grows (low capture prices).

THE MODEL MUST HAVE

- P50 and P90 cases (debt sized on P90), annual degradation, a monthly profile for sub-annual periods.
- Inverter replacement and its reserve; the tail after the PPA at a capture price.

Wind — onshore and offshore

REVENUE

- PPA, CfD or market; energy from a wind study at P50, with P90 over one year and over ten.
- Losses: wake, electrical, availability, icing, curtailment.

COSTS AND CAPITAL

- Turbines under a supply agreement, balance of plant, grid; offshore adds foundations, vessels and export cables.
- Full-service O&M with an availability guarantee; costs rise after the warranty; decommissioning.

KEY RISKS

- Wind varies more year to year than sunshine: the one-year P90 is well below the P50.
- Serial defects in turbines; offshore weather windows and installation delays.

THE MODEL MUST HAVE

- The one-year P90 for the cover ratio, the ten-year P90 for sizing, as the lenders ask.
- Availability guarantee and its damages, post-warranty O&M, major components, decommissioning reserve.

Battery storage — alone or with solar or wind

REVENUE

- A capacity or tolling contract; grid services (frequency response); arbitrage between low and high prices.
- With a plant: moving its output to better-priced hours.

COSTS AND CAPITAL

- Cells, power conversion, energy management; augmentation to keep the usable energy.
- Charging energy (and round-trip losses of 10–15%); O&M; warranties tied to cycles.

KEY RISKS

- Degradation with cycles, depth of discharge and heat; shrinking price spreads; saturated service markets.
- Fire safety; fast technology change.

THE MODEL MUST HAVE

- Usable energy, not nameplate; degradation by cycles; the augmentation schedule and its reserve.
- Each revenue job on its own terms; where the charging energy comes from and what it costs; the levelised cost of storage.

Run-of-river hydro

REVENUE

- PPA or feed-in tariff; energy from decades of river-flow records.
- Strong seasons: wet months carry the year.

COSTS AND CAPITAL

- Civil works dominate — weir, tunnels, powerhouse; a long build (3–5 years) and large interest during construction.
- Low running costs; a very long life, often longer than the licence.

KEY RISKS

- Dry years; geology during construction; sediment; environmental flow rules.
- The licence's end and its renewal.

THE MODEL MUST HAVE

- Monthly hydrology and a dry-year case for the debt; a generous contingency.
- The licence end — handed back or renewed — and the construction-period funding.

Waste-to-energy

REVENUE

- A gate fee per tonne under a waste supply agreement (often put-or-pay); power (and heat) sales.
- Metals recovered from ash; sometimes carbon credits.

COSTS AND CAPITAL

- Combustion line, boiler, flue-gas treatment; reagents, ash disposal.
- High O&M and regular major overhauls.

KEY RISKS

- Waste volume and its calorific value; emission limits; ash disposal cost.
- Availability of a complex plant; the municipality's credit.

THE MODEL MUST HAVE

- Tonnes × calorific value → MWh; the put-or-pay shortfall payment and its deduction.
- Gate-fee indexation and phases; the major-maintenance reserve; deemed output when the grid fails.

3 Utilities and water

District cooling

REVENUE

- A capacity charge per refrigeration ton (RT) a year, a consumption charge per RT-hour.
- Connection fees up front; a ramp-up as buildings connect.

COSTS AND CAPITAL

- Chiller plants, thermal storage, the pipe network — often built in phases.
- Electricity (the largest cost, largely passed through), water, chemicals.

KEY RISKS

- Demand and the pace of connections (developers' delays); customers' credit.
- Utility prices not fully passed through.

THE MODEL MUST HAVE

- Phased capacity with each phase's ramp-up; contracted against actual load.
- Connection fees released over the life (IFRS 15), customer deposits, a terminal value for a long-lived network.

Seawater desalination

REVENUE

- A water purchase agreement: a capacity charge for being available (it pays the debt and fixed costs).
- An output charge per m^3 for the variable costs, energy usually passed through.

COSTS AND CAPITAL

- Intake, pre-treatment, membranes, outfall; membranes replaced every 5–7 years.
- Energy is the largest running cost; chemicals; brine discharge.

KEY RISKS

- Availability and output quality; algal blooms and fouling.
- The offtaker's credit; changes in law.

THE MODEL MUST HAVE

- Capacity charge with availability deductions; energy pass-through.
- The membrane replacement schedule and reserve; termination payments.

4 Transport

Toll roads

REVENUE

- Traffic × toll by vehicle class, tolls indexed; or shadow tolls or availability payments.
- Traffic ramps up over several years and follows the economy.

COSTS AND CAPITAL

- Construction, with land acquisition; toll collection and routine maintenance.
- Heavy maintenance — resurfacing every 8–12 years.

KEY RISKS

- Traffic: forecasts have often proved optimistic; competing routes; tolls capped by politics.
- Construction and land.

THE MODEL MUST HAVE

- A base and a lenders' downside traffic case; the ramp-up; elasticity to tolls.
- The heavy-maintenance reserve; handback requirements; nothing at the concession's end.

Airports

REVENUE

- Aeronautical charges per passenger and per landing, often regulated (a price cap; single or dual till).
- Non-aeronautical — retail, parking, food, property — frequently 40% or more, linked to passengers.

COSTS AND CAPITAL

- Staff, utilities, maintenance; a concession fee to the grantor.
- Expansions triggered when traffic reaches set levels.

KEY RISKS

- Passenger shocks — pandemics, an airline's failure, a rival hub.
- Regulation of the charges.

THE MODEL MUST HAVE

- Passengers with shock cases; revenue per passenger by stream.
- Capacity-triggered capex; the regulatory formula; the concession fee.

5 Social infrastructure

Availability PPPs — hospitals, schools, government buildings

REVENUE

- A unitary (availability) payment from the authority, indexed — no demand risk.
- Deductions for unavailable areas and service failures.

COSTS AND CAPITAL

- Construction under a fixed-price contract; facilities management (hard and soft FM) under a subcontract.
- Lifecycle replacement over the term.

KEY RISKS

- Construction; deductions (passed down to the FM contractor); lifecycle costs higher than planned.
- The authority's credit; changes in law.

THE MODEL MUST HAVE

- The unitary charge with its indexation and deductions passed through.
- A lifecycle profile and reserve; tight cover ratios; termination compensation; the financial-asset accounting (IFRIC 12).

6 Digital infrastructure

Data centres

REVENUE

- Colocation per kW or rack, or long leases to large cloud users; power re-charged to customers.
- Occupancy builds up data hall by data hall.

COSTS AND CAPITAL

- The building and the mechanical and electrical plant (UPS, cooling, generators), whose lives are shorter.
- Power, the largest cost, re-charged at the power usage effectiveness (PUE); staff.

KEY RISKS

- Lease-up and renewals; a few large customers; higher rack densities and new cooling.
- Power supply and its price.

THE MODEL MUST HAVE

- Phased halls with lease-up; contracted against speculative capacity.
- Power pass-through at the PUE; refresh capex for the M&E; a terminal value.

Telecom towers

REVENUE

- A fee per tenant per site — the anchor operator and further co-locations — with annual escalators.
- Long master lease agreements.

COSTS AND CAPITAL

- Ground leases for the sites; power (often re-charged); maintenance.
- New sites built to suit; upgrades for new equipment.

KEY RISKS

- Operators merging and cancelling duplicate sites; tenancy growth slower than planned.
- Ground lease renewals; power costs.

THE MODEL MUST HAVE

- Sites × tenancy ratio; the anchor contract's terms and escalators.
- Ground lease costs; build-to-suit capex; a terminal value on an EBITDA multiple.

7 Circular economy

E-waste recycling

REVENUE

- Recovered materials — copper, aluminium, precious metals, plastics — at market prices × recovery rates.
- Gate fees; certificates under extended producer responsibility (EPR) rules.

COSTS AND CAPITAL

- Feedstock bought from collectors; processing, logistics, compliance.
- Stock held in the plant — working capital.

KEY RISKS

- Commodity prices; the spread between what is paid for feedstock and what is recovered.
- Feedstock supply and quality; the EPR certificate price and the rules behind it.

THE MODEL MUST HAVE

- Tonnes in × recovery rate × price for each material; feedstock cost per tonne.
- Stock and working capital; price cases; the certificate price as its own line.

In Project Finance Studio: each sector above is a preset — choose it on Project info or in My Console's New project — with the revenue lines, cost lines, reserves and wording of that industry, and every value open to change. Output › Checks tests the balance sheet, the debt repaid and the cover; Output › Sensitivity and Output › Risks run each sector's own risks with the debt held; the Excel workbook calculates the same with live formulas.

Typical figures in this guide are indicative and vary by market and transaction. Nothing in it is financial, investment, tax or legal advice.