



## TECHNICAL SESSION 3 · DAY 1

# Types and Sources of Finance and the Risks Assumed in Renewable Energy Projects

Equity · debt · grants · concessional & blended finance · guarantees & insurance · risk allocation · expected returns

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Energy Policy · Tariff · Private Investment · Climate Finance & Carbon Markets

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SAARC Training Workshop on Financial Modeling for Renewable Energy Projects

*Map for illustration only; not an authoritative depiction of boundaries.*



## SESSION 3 · LEARNING OBJECTIVES

### What you will be able to do after this session

- 1 Distinguish equity, commercial and concessional debt, grants, guarantees, insurance and carbon finance
- 2 Map the main sources of RE finance available to SAARC projects
- 3 Show how blended finance lowers the tariff while strengthening lender coverage
- 4 Identify, allocate and mitigate risks across the project life — including technology-specific risks
- 5 Explain what lenders (DSCR, gearing, tenor) and investors (ROE, IRR) require
- 6 Quantify each risk's cost in ¢/kWh using the workshop model



## SESSION ROADMAP

### Four questions every financier asks



#### MONEY

What types of finance,  
from whom?



#### STRUCTURE

How is the capital stack  
blended?



#### RISK

Who bears which risk,  
and how is it mitigated?



#### RETURN

What return do lenders  
and investors need?

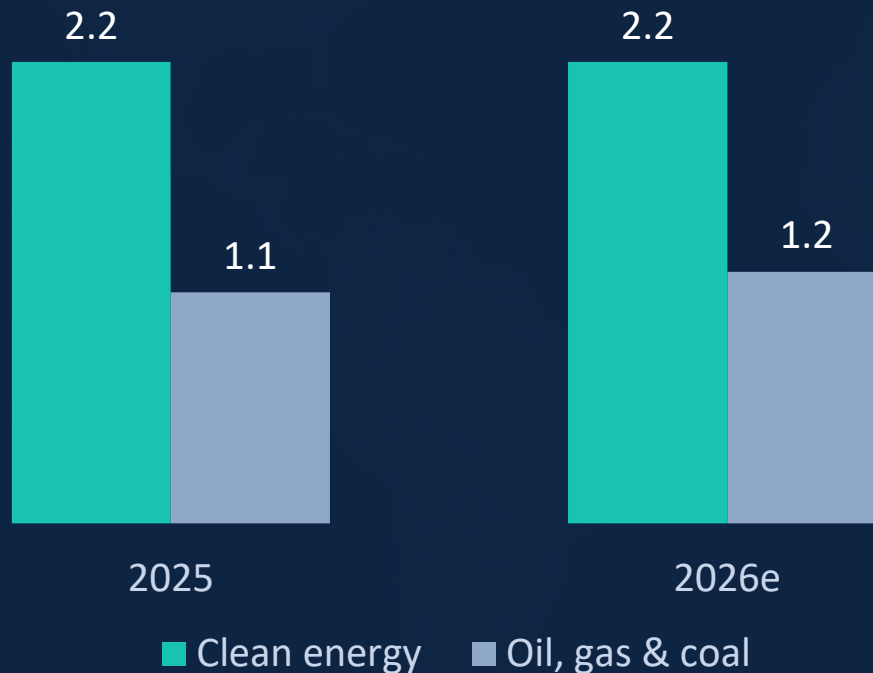
Today's challenge 🎯 Cut the tariff for a 50 MW solar IPP by  $\geq 0.5$  ¢/kWh — without breaking the lender's  $1.30\times$  P90 DSCR.



## INVESTMENT CONTEXT

Capital is flowing — but it is expensive where it is needed most

Global energy investment (USD trillion)



**USD 3.4 trillion**

Global energy investment expected in 2026 (+5%)

**> 2x**

Cost of capital for utility-scale PV in emerging & developing economies vs advanced economies

**USD 150 bn / yr**

Saved by narrowing that cost-of-capital gap by just 1 percentage point

Source: IEA, World Energy Investment 2025 & 2026; IEA, Reducing the Cost of Capital (2024).



## STRUCTURE

# The capital stack: who stands where when things go wrong



*Wrap-around: guarantees & insurance (partial risk/credit guarantees, political-risk insurance, liquidity facilities) protect any layer*



## MONEY · TYPES

### Six types of finance in a renewable project



#### Equity

Sponsor / IPP capital; paid from residual cash; regulated ROE in cost-plus tariffs



#### Commercial debt

Bank loans at base rate + margin; 10–15 yr tenors typical; covenants on DSCR



#### Concessional / DFI debt

Below-market rates, longer tenors and grace periods from MDBs & DFIs



#### Grants & VGF

Non-repayable capital or viability-gap funding; lowers tariff directly



#### Guarantees & insurance

Partial risk/credit guarantees, political-risk cover, liquidity support



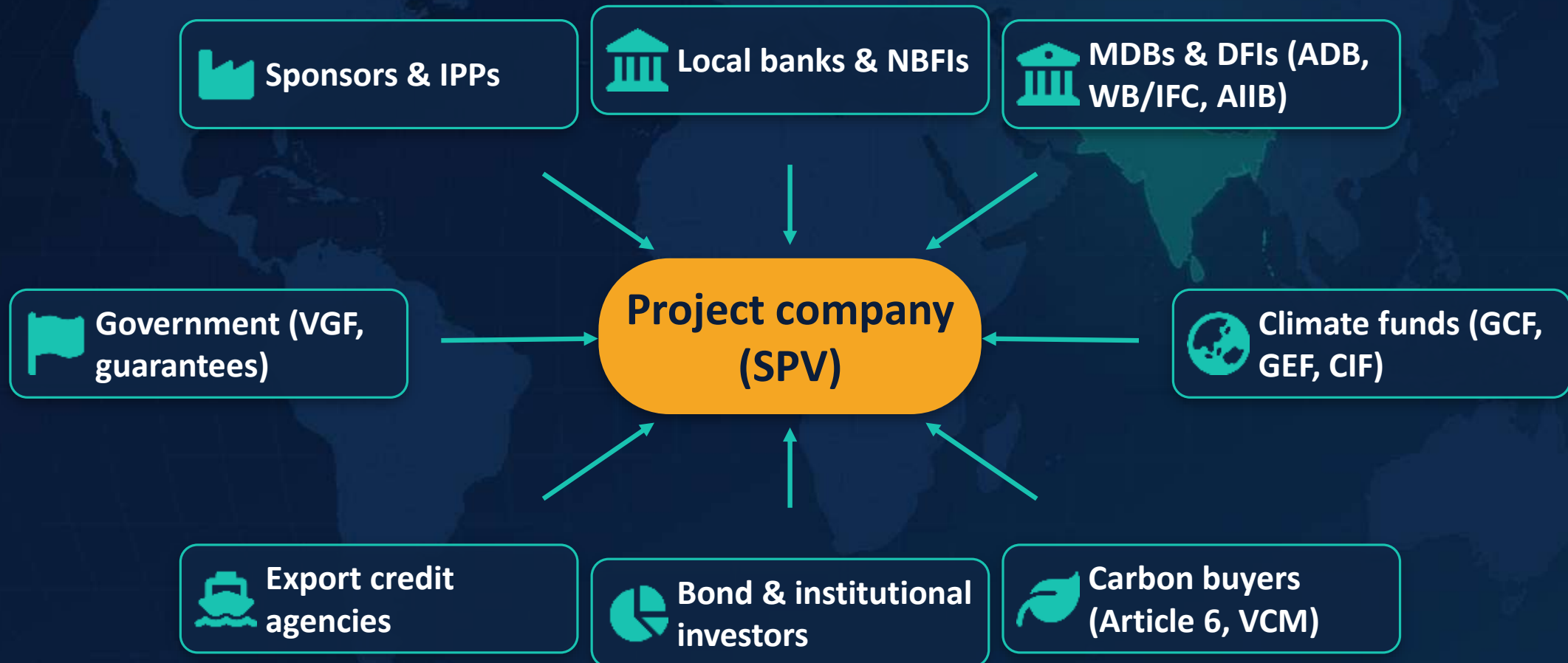
#### Green & carbon finance

Green bonds, results-based finance, Article 6 carbon credits



## MONEY · SOURCES

### Where the money comes from





## STRUCTURE · MODEL RESULT

# Blended finance in action: every layer lowers the tariff

Levelised tariff, US¢/kWh — 50 MW solar



—0.58 ¢

Moving 40% of debt to concessional terms

—0.70 ¢

USD 5 m grant (~13% of capex)

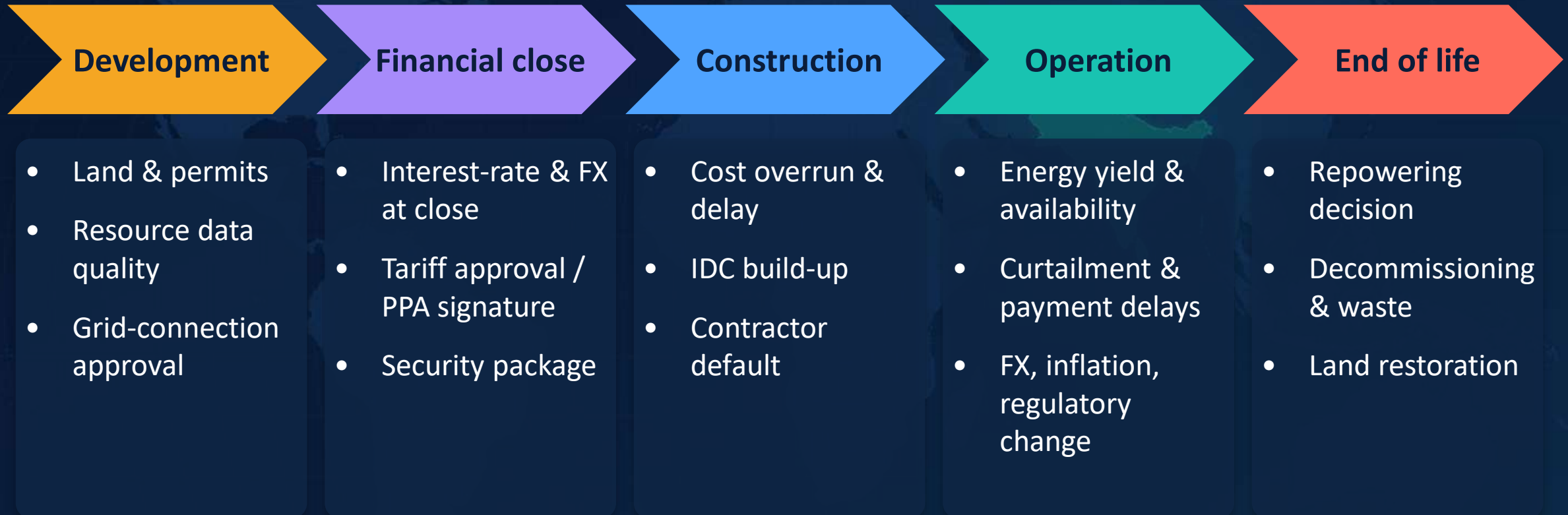
—1.60 ¢

Full blend vs commercial-only



## RISK · IDENTIFICATION

### Risks change as the project moves through its life





## RISK · ALLOCATION & MITIGATION

**Allocate each risk to the party best able to manage it**

| Risk                      | Typically borne by       | Contract / instrument                          | Model lever              |
|---------------------------|--------------------------|------------------------------------------------|--------------------------|
| Resource / energy yield   | Developer                | Independent yield study; debt sized on P90     | GenCase, $\sigma$        |
| Construction cost & delay | EPC contractor           | Fixed-price EPC, delay LDs, bonds              | Capex $\times$ , ConstrQ |
| Operating performance     | O&M contractor           | Availability guarantee, LDs                    | Losses, FOM              |
| Grid curtailment          | Off-taker                | Deemed-energy clause in PPA                    | Curtailment              |
| Off-taker payment         | Government / off-taker   | LC, escrow, sovereign or PRG cover             | RecDays                  |
| Currency (FX)             | Consumers via indexation | USD indexation or local-currency debt          | FXdep                    |
| Interest rate             | Project → lenders        | Hedges, fixed-rate DFI debt, indexation        | RateBase                 |
| Political & regulatory    | Government / insurers    | Stabilisation clause, political-risk insurance | —                        |



## RISK · TECHNOLOGY-SPECIFIC

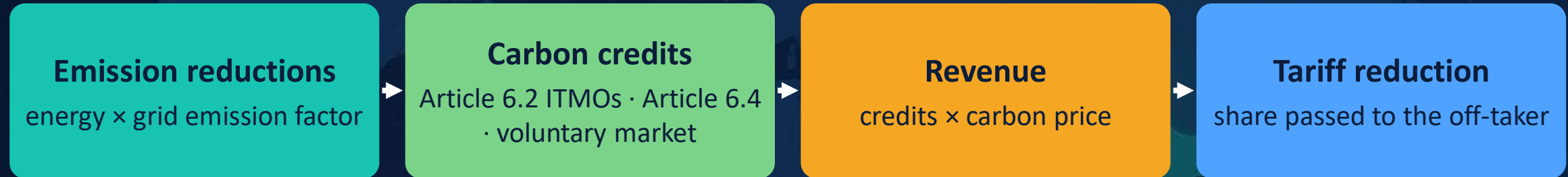
Each technology brings its own risk — and its own finance fix

| Technology             | Distinctive risk                                              | Contract / finance response                                            | Model lever      |
|------------------------|---------------------------------------------------------------|------------------------------------------------------------------------|------------------|
| <b>Biomass</b>         | Fuel availability and price over 20+ years                    | Long-term fuel supply agreement; fuel cost passed through in EPP       | FuelP, Fuel ×    |
| <b>Waste-to-energy</b> | Waste volume & calorific value; municipality pays tipping fee | Put-or-pay waste supply agreement; municipal / sovereign support       | Tip, LHV         |
| <b>Biogas</b>          | Feedstock logistics; gas yield                                | Feedstock contracts with farms / industry; carbon & fertiliser revenue | Eff, FuelP       |
| <b>Geothermal</b>      | Exploration drilling may find no resource                     | Public drilling-risk facilities, grants, insurance before private debt | Capex ×          |
| <b>Solar thermal</b>   | Complex, first-of-kind construction                           | Concessional climate finance; EPC performance guarantees               | Capex ×, ConstrQ |
| <b>Green hydrogen</b>  | No established buyer or price                                 | Long-term offtake, contracts-for-difference, auctions                  | H2_LCOH sheet    |
| <b>Wind / solar</b>    | Resource, curtailment                                         | P90 debt sizing; deemed-energy clause                                  | GenCase, Curt    |

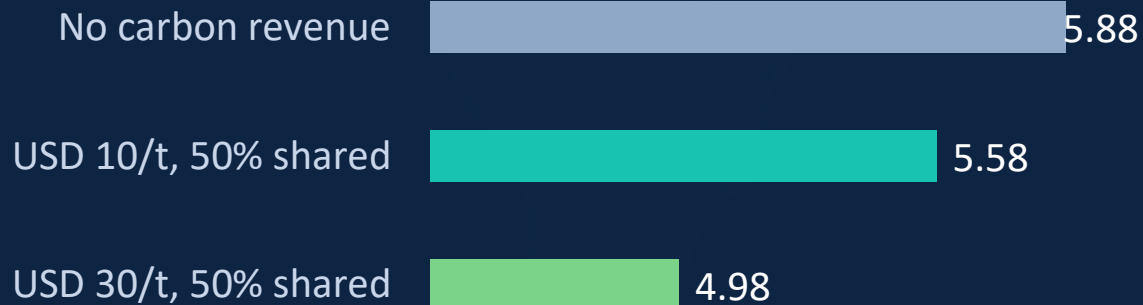


## MONEY · CLIMATE FINANCE

# Carbon finance: a revenue layer that can lower the tariff



50 MW solar, levelised tariff (US¢/kWh)



### Design questions for regulators

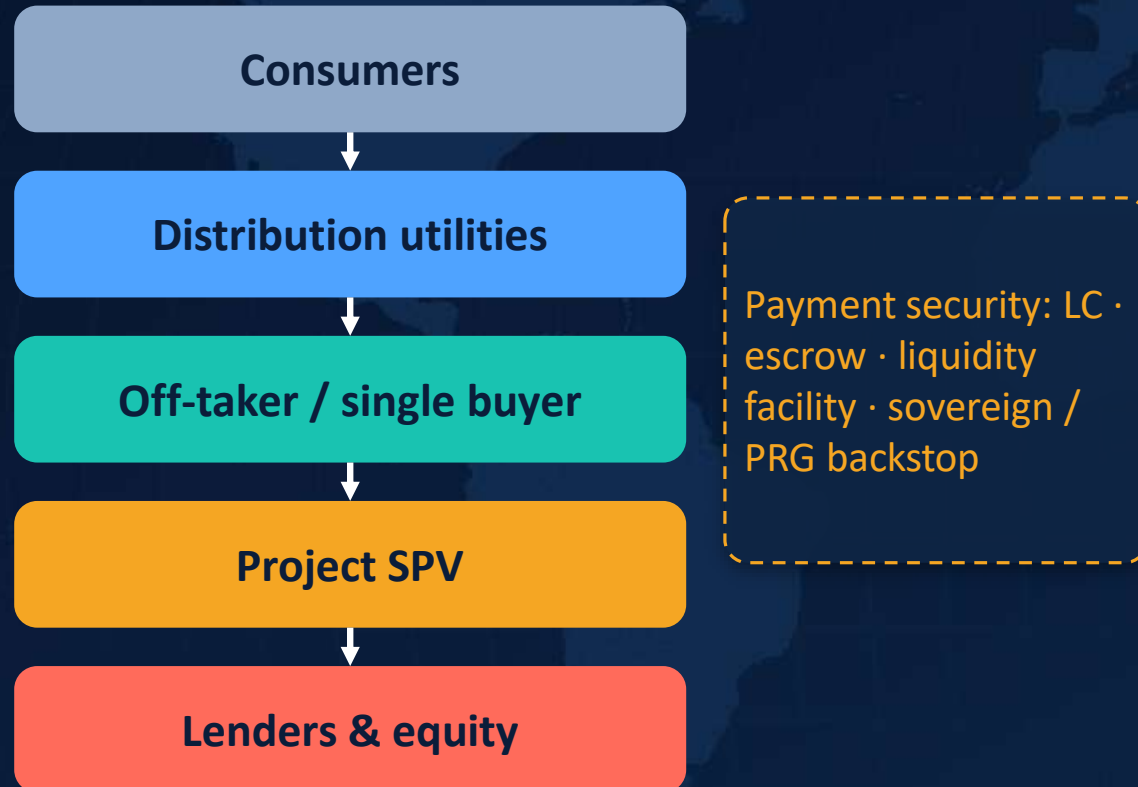
- Who owns the credits — project, off-taker or state?
- Will the host country authorise ITMOs and apply corresponding adjustments?
- Is the project additional if the tariff already covers its cost?
- Share-of-proceeds and MRV costs reduce net revenue

Source: Workshop model (Tariff sheet section D, grid emission factor 0.6 tCO<sub>2</sub>/MWh, illustrative prices).

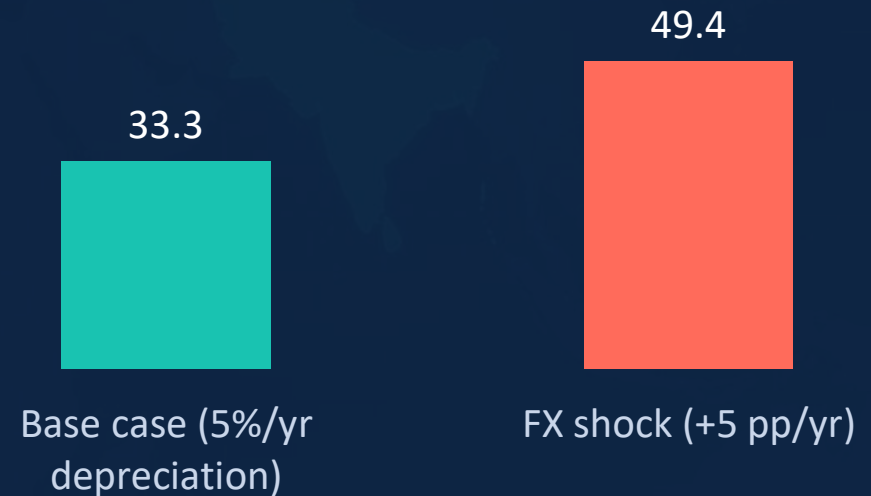


## RISK · DEEP DIVE

# Currency and payment risk: who really carries them?



Year-10 nominal tariff (LCU/kWh)



**USD tariff unchanged at 5.43 ¢ in year 1 — indexation passes FX risk to the off-taker and consumers.**



## RISK · IMPACT ON TARIFF

Every risk has a price — here is what each one costs

Levelised tariff, US¢/kWh



### Reading the chart

A 15% capex overrun adds 0.76 ¢; the combined downside adds 1.41 ¢ (+24%).

Under cost-plus, the tariff absorbs the shock — so consumers pay unless risk is contracted away.

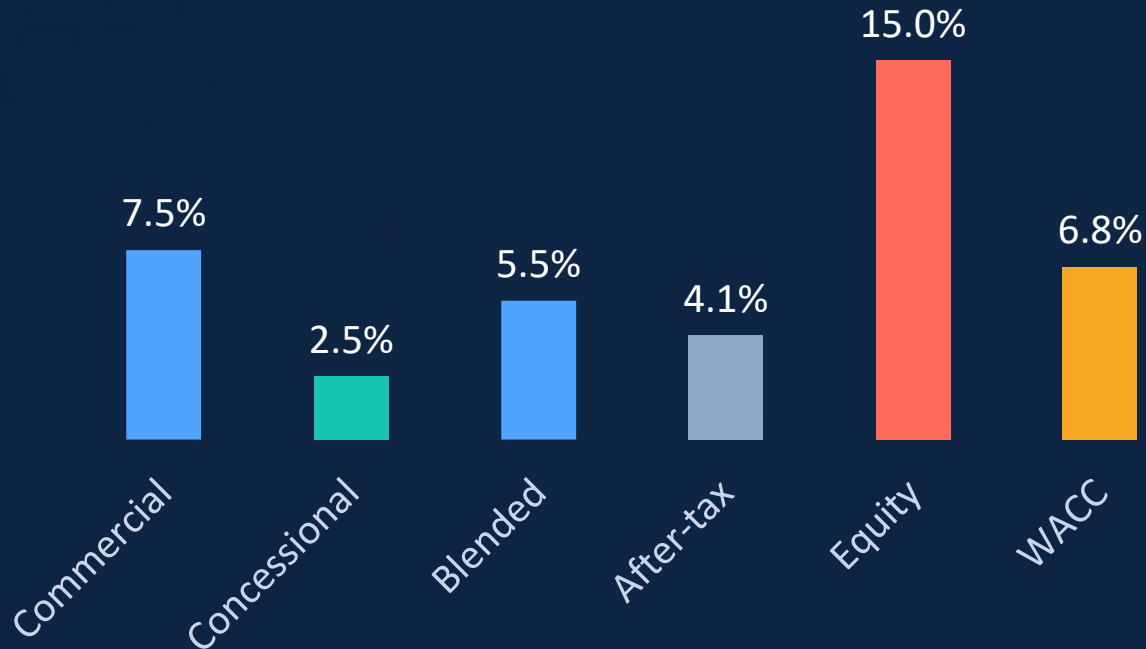
Source: Workshop tariff model — Scenarios sheet, Solar PV defaults.



## RETURN

# What lenders and equity investors expect

Cost of each source — model defaults (% p.a., USD)



## Typical lender & investor tests

**Min DSCR:** 1.20–1.35× (P90 or P99 basis)

**Gearing:** 70–80% debt

**Tenor:** 10–18 yrs; DFIs longer

**Reserves:** DSRA ~6 months' debt service

**Equity:** ROE / IRR above cost of debt + country risk

*Source: Workshop model defaults (illustrative); lender tests = typical market practice for contracted RE.*



## INTERACTIVE

### Team challenge: cut $\geq 0.5$ ¢ and stay bankable

#### Your 50 MW solar IPP

Base tariff 5.88 ¢/kWh · P90 min DSCR 1.38× ·  
lender floor 1.30×

#### Pick TWO levers (3 minutes):

- A Raise gearing to 80%
- B Shift to 70% concessional debt
- C Add a USD 5 m capital grant
- D Cut ROE by 10%

| Lever              | Tariff ¢/kWh | P90 DSCR | Verdict          |
|--------------------|--------------|----------|------------------|
| A Gearing 80%      | 5.57         | 1.26×    | ✗ breaches 1.30× |
| B 70% concessional | 5.52         | 1.46×    | ✓ bankable       |
| C USD 5 m grant    | 5.18         | 1.38×    | ✓ bankable       |
| D ROE -10%         | 5.63         | 1.33×    | ✓ bankable       |
| B + C together     | 4.86         | 1.46×    | ✓ bankable       |

Winner: B + C → 4.86 ¢ (−1.02) and DSCR up to 1.46×



## SESSION 3

# Key takeaways



In SAARC the cost of capital, not equipment, is the biggest tariff driver we can still influence.



Blend deliberately: concessional debt and grants lower the tariff and strengthen coverage at the same time.



Allocate each risk to whoever can manage it — and write it into the PPA, EPC and O&M contracts.



Under cost-plus every unmitigated risk ends up in the tariff; price it explicitly in the model.

**NEXT ► Day 2: project-finance terminology, model design, tools — then we build the model ourselves.**