The Digital-Infrastructure Capital Stack: Debt, Mezzanine and Equity for AI

How the layers of capital, senior debt, mezzanine, preferred and common equity, fit together to fund Gulf digital infrastructure, and how to structure the stack

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ABSTRACT

A data centre is funded not by one kind of capital but by a stack of them, senior debt, mezzanine, preferred equity and common equity, each bearing a different risk for a different return, and the way these layers are assembled determines the cost of capital, the equity return and the resilience of the whole. This paper sets out the digital-infrastructure capital stack and how an investor or sponsor should structure it for Gulf data centres and digital infrastructure. Drawing on the literature on capital structure, on leverage and the cost of capital, and on infrastructure and project finance, it advances five propositions concerning the digital-infrastructure stack. Using a stylised, clearly-labelled framework, it sets out the share and cost of each layer, the risk-return ladder, the effect of leverage on the equity return, the way the stack shifts across the project phase, the providers of each layer, and the way offtake quality lowers the whole cost of capital. The analysis finds that each layer earns a return commensurate with its risk and seniority; that leverage lifts the equity return but raises its risk, so the optimal leverage balances the two; that the stack shifts from equity-heavy in development to debt-heavy at stabilisation as risk resolves; that the quality of the offtake lowers the cost of every layer and so the whole cost of capital; and that the investor should structure the stack to its risk appetite and the project's phase, matching each layer to the providers best suited to supply it. The paper provides a capital-stack framework, a structuring checklist and a glossary, and discusses the limitations and avenues for further research.

JEL Classification: G32, G31, G24, G23, L94

Keywords: capital structure, capital stack, leverage, mezzanine, preferred equity, cost of capital, digital infrastructure, project finance, GCC

1. INTRODUCTION

A large digital-infrastructure asset, a data centre above all, is rarely funded by a single source of capital. It is funded by a stack: senior debt at the bottom, cheapest and safest, repaid first; common equity at the top, most expensive and most at risk, repaid last; and, in between, mezzanine debt and preferred equity that bridge the two. Each layer bears a different risk and earns a different return, and the way the layers are assembled, how much of each, on what terms, from which providers, determines the overall cost of capital, the return to the equity, and the resilience of the financing to adversity. Structuring the capital stack is therefore one of the central financial decisions in a digital-infrastructure investment, as consequential as the choice of asset or the securing of power, because the same asset can produce very different returns and risks depending on how it is financed.

This paper sets out the digital-infrastructure capital stack and how an investor or sponsor should structure it for Gulf data centres and digital infrastructure. It is written for the sponsor assembling the financing for a project, the equity investor judging its returns, and the lenders and mezzanine providers supplying the layers, all of whom must understand how the stack fits together and how each layer's risk and return relate to the others. Its purpose is to make the structuring of the stack explicit: to show what each layer contributes and costs, how leverage lifts and risks the equity return, how the stack shifts as the project de-risks, and how the quality of the offtake lowers the cost of the whole. The central message is that the capital stack is not a given but a design choice, that the choice trades return against resilience through the level of leverage, and that the quality of the offtake, established in the companion papers as the driver of value and financeability, also lowers the cost of every layer and so the whole cost of capital.

The companion papers in this cluster make the strategic case for the buildout, set out the underwriting of the asset, and examine the power and land bottlenecks; this paper turns to the financing, the capital stack within which the equity and debt decisions of the others sit. Where the underwriting paper assesses the debt against the asset, this paper places that debt within the full stack of senior, mezzanine, preferred and common capital, and shows how the layers interact. The four together take an investor from the strategic case, through the asset and its constraints, to the structuring of its financing, which this paper supplies.

The Gulf context bears on the stack in several ways. The region's deep pools of capital, sovereign, private and bank, can supply every layer of the stack, easing the funding of large projects; the strong, often sovereign-linked offtakes available lower the cost of capital across the stack; and the structural power-cost advantage improves the project economics that the stack finances. These features make the Gulf a market where a well-structured stack can be assembled efficiently, though the principles of structuring, the trade-offs of leverage, the matching of layers to phases and providers, are general and apply wherever the asset is financed.

The paper makes three contributions. First, it sets out the share, cost and risk-return ladder of the layers of the stack. Second, it shows how leverage lifts and risks the equity return and how the stack shifts across the project phase. Third, it identifies the providers of each layer and shows how offtake quality lowers the whole cost of capital, then compares conservative, balanced and aggressive structures. Throughout, the figures are modelled and clearly labelled; they illustrate the capital-structure mechanics rather than forecasting outcomes, and they are not forecasts.

It is worth stating why the capital stack deserves treatment as a strategic rather than a merely technical matter. It is tempting to regard the financing as a back-office exercise that follows the real decisions about the asset, the site and the tenant, but this understates its consequence. The same asset, with the same offtake, can deliver a modest or a strong equity return, and can be resilient or fragile, depending on how its stack is structured, so the structuring is itself a driver of outcomes rather than a passive consequence of them. Moreover, the structuring interacts with the asset decisions: the leverage a project can bear depends on its offtake, the financing available depends on its phase, and the providers accessible depend on the project's scale and location. Treating the capital stack as a strategic decision, integrated with the asset and offtake decisions rather than following them, is the orientation this paper urges, because the financing is where a sound asset is turned into a sound investment, or a sound asset is over-leveraged into a fragile one.

The remainder of the paper is structured as follows. Section 2 reviews the literature on capital structure, on leverage and the cost of capital, and on infrastructure and project finance, and develops five propositions. Section 3 describes the data and the stylised methodology. Section 4 presents and discusses the results, covering the stack's layers and their cost, the risk-return ladder, the effect of leverage, the shift across phases, the providers, and the role of offtake quality. Section 5 reports robustness. Section 6 sets out implementation considerations. Section 7 offers concluding comments, including limitations and directions for further research. A statement of disclosures, the references and appendices follow.

2. LITERATURE REVIEW AND PROPOSITIONS

The analysis draws on three strands: the literature on capital structure; leverage and the cost of capital; and infrastructure and project finance. This section reviews each and develops the propositions the analysis examines.

The capital-structure literature also recognises the disciplining role of debt, which is relevant to how the stack shapes a sponsor's behaviour. Debt imposes a fixed obligation to service it, which disciplines the sponsor to operate the asset efficiently and to avoid value-destroying uses of cash, because the debt must be paid before any return to equity. A moderate level of debt can therefore improve not only the cost of capital but the discipline with which the asset is run, aligning the sponsor's incentives with efficient operation. This disciplining benefit is one of the reasons a sensibly leveraged structure can be preferable to an all-equity one beyond the simple cost arithmetic, though it operates only up to the point where the debt burden becomes a source of distress rather than discipline. For a digital-infrastructure asset with a contracted cash flow, the disciplining debt is comfortably serviced and the benefit is available, which is a further consideration in favour of the moderate leverage the analysis recommends, alongside the cost and return effects.

2.1 Capital Structure

The foundational literature on capital structure examines how a firm or project divides its financing between debt and equity and the layers in between, and the consequences for value and risk (Modigliani and Miller, 1958; Myers, 1984). The relevant findings are that, in the presence of taxes, costs of distress and information differences, capital structure matters, that debt is cheaper than equity because it is safer and senior, and that adding debt lowers the average cost of capital up to the point where the rising risk of distress outweighs the benefit. The literature establishes that there is a structure that balances the cheapness of debt against the risk it adds, and that each layer of capital earns a return commensurate with its risk and seniority. This underpins the first and second propositions, on the risk-return ladder and the effect of leverage.

The capital-structure literature also offers the pecking-order perspective, which complements the trade-off view and bears on how sponsors actually assemble the stack (Myers and Majluf, 1984). The pecking order holds that issuers prefer the cheapest, least information-sensitive capital first, internal funds and then senior debt, before resorting to mezzanine and finally outside equity, because the costlier, more junior capital is also the most sensitive to the information asymmetry between the issuer and the provider. For digital infrastructure, this helps explain why sponsors maximise senior debt against a strong contracted cash flow before adding the costlier layers, and why the equity, the most expensive and information-sensitive, is the residual rather than the first resort. The pecking-order view and the trade-off view together explain the observed structures:

the trade-off sets the broad balance of debt and equity, while the pecking order shapes the order in which the layers are drawn upon, and both point to maximising the cheap, senior, cash-flow-backed debt that a strong offtake supports.

2.2 Leverage and the Cost of Capital

A second literature examines how leverage affects the return to equity and the cost of capital, and the trade-off between the two (Kraus and Litzenberger, 1973). The findings are that leverage lifts the expected return to equity, because the equity captures the residual after servicing cheaper debt, but also raises the risk and variability of that return and the chance of distress; and that the optimal leverage balances the higher expected return against the higher risk and the cost of potential distress. For an infrastructure asset with contracted cash flows, the capacity to bear leverage is greater, because the cash flow is more predictable, but the trade-off remains. This underpins the second and fifth propositions, on leverage and the structuring choice.

The project-finance literature also illuminates the role of the take-out refinancing as the hinge of the phased financing, which is central to the third proposition. Because development and construction carry risks that limit the debt available, the early stack is equity- and mezzanine-heavy and therefore expensive; the take-out refinancing at stabilisation, replacing that costly capital with cheap senior debt against the now-contracted cash flow, is what crystallises the value the development created and resets the stack to its efficient, debt-heavy stabilised form. The literature establishes that this refinancing is a key value event, and that its terms, available only once the asset is stabilised and let, depend on the offtake the project secured. The implication is that the sponsor should plan and, where possible, pre-arrange the take-out, because the transition from the expensive development stack to the cheap stabilised one is where much of the equity return is realised, and a take-out that is delayed or unavailable leaves the project stuck in its expensive phase. The take-out refinancing is thus the financial counterpart of stabilisation, and planning it is part of structuring the stack across the phases.

2.3 Infrastructure and Project Finance

A third strand concerns the financing of infrastructure and projects, where the stack is assembled around the project's contracted cash flows and shifts as the project moves from development through construction to stabilised operation (Yescombe, 2014; Gatti, 2013). The findings are that the financeable proportion of debt rises as the project de-risks, so the stack is equity-heavy in development and debt-heavy once stabilised; that the quality of the offtake determines how much debt the project can bear and at what cost; and that different providers specialise in different layers and phases. This underpins the third and fourth propositions, on the shift across phases and the role of offtake quality, and informs the analysis of providers.

2.4 Synthesis and Propositions

Taken together, these literatures imply that each layer earns a return commensurate with its risk, that leverage trades return against risk, that the stack shifts across phases, and that offtake quality lowers the cost of the whole. From this the paper develops five propositions:

Proposition 1. Each layer of the capital stack, senior debt, mezzanine, preferred and common equity, earns a return commensurate with its risk and seniority, rising from cheap senior debt to costly common equity.

Proposition 2. Leverage lifts the expected equity return but raises its risk and the chance of distress; the optimal leverage balances the two rather than maximising either.

Proposition 3. The stack shifts across the project phase, equity-heavy in development, debt-heavy at stabilisation, as the resolution of risk increases the financeable proportion of debt.

Proposition 4. The quality of the offtake lowers the cost of every layer and so the whole cost of capital; a strong, long offtake is the single most powerful lever on the stack's economics.

Proposition 5. The investor or sponsor should structure the stack to its risk appetite and the project's phase, matching each layer to the providers best suited to supply it.

3. DATA AND METHODOLOGY

This study is analytical, using a transparent, stylised framework whose assumptions are stated explicitly rather than estimated from a proprietary dataset, which suits a question about how to structure financing. The figures are modelled and clearly labelled; they illustrate the capital-structure mechanics an investor can apply, and they are not forecasts.

3.1 The Capital-Stack Framework

The framework has three components: a layer analysis setting out the share, cost and risk-return ladder of the stack; a leverage-and-phase analysis showing how leverage affects the equity return and how the stack shifts across the project phase; and a provider-and-offtake analysis identifying who supplies each layer and how offtake quality lowers the whole cost of capital. Together these address how to structure the financing of a digital-infrastructure asset.

3.1a What the Framework Does and Does Not Do

It is important to be clear about the framework's scope. It is a tool for reasoning about how to structure the financing of a digital-infrastructure asset, the layers, the leverage trade-off, the phase shift, the providers, and the offtake effect; it is not a financial model of a specific project, and it does not predict the return or cost of any particular structure. The figures should be read as illustrations of the capital-structure mechanics, the way cost rises with subordination, the way leverage lifts and risks the equity return, the way the offtake lowers the cost of capital, rather than as numerical predictions or financing terms. The detailed modelling of a specific stack requires a project model with the actual terms, which the framework frames rather than replaces; what the framework offers is the structure within which to build and interpret that model, so that the sponsor structures deliberately rather than by convention.

The framework is deliberately organised around the trade-offs rather than around a single optimal structure because there is no universally optimal stack; the right structure depends on the cash flow's certainty, the investor's risk appetite, the project's phase and the available providers, all of which vary. A framework that prescribed a single leverage or mix would mislead, because it would ignore these variations; one that makes the trade-offs explicit lets the sponsor choose the structure that fits its specific situation. The framework's contribution is thus to clarify the choices and their consequences, not to dictate an answer, which is the appropriate role for a structuring guide in a domain where the right structure is genuinely situation-dependent.

3.2 Assumptions and Their Justification

The stylised inputs, the layer shares and costs, the leverage-return relationship, and the offtake effect on the cost of capital, are calibrations informed by the capital-structure and project-finance literature (Kraus and Litzenberger, 1973; Yescombe, 2014); they are indicative rather than precise estimates and are recorded in Appendix A. The leverage and offtake assumptions are treated as the central uncertain inputs and are tested in Section 5. The base-case assumptions are set out in Table 1.

Table 1. Base-Case Assumptions for the Capital-Stack Framework

Parameter	Assumption
Senior debt share / cost	~55% / ~7%
Mezzanine share / cost	~15% / ~12%
Preferred equity share / cost	~10% / ~14%
Common equity share / cost	~20% / ~20%
Stabilised leverage	~55-65% debt
Development leverage	Low; equity-heavy
Offtake effect	Strong offtake lowers all-in cost of capital
Phase shift	Equity-heavy to debt-heavy as risk resolves

Indicative, forward-looking assumptions used to illustrate capital-structure mechanics; not forecasts. See Appendix A.

4. RESULTS AND DISCUSSION

This section presents the framework in the order of the propositions: the layers and their cost (Proposition 1); the effect of leverage and the shift across phases (Propositions 2 and 3); the providers; and the role of offtake quality and the comparison of structures (Propositions 4 and 5).

4.0a Why the Same Asset Yields Different Returns

Before setting out the layers, it is worth establishing the proposition that motivates the whole paper: that the same asset, generating the same cash flow, can deliver very different returns to its equity depending on how it is financed. This follows directly from leverage. An asset funded entirely with equity returns to that equity exactly what the asset earns; the same asset funded partly with cheaper debt returns to its smaller equity the asset's earnings less the debt service, spread over a smaller base, which magnifies the return when the asset earns more than the cost of the debt. So two investors buying identical assets can earn very different equity returns purely through their financing, and the structuring is therefore not a neutral wrapper but a determinant of the outcome. This is why the capital stack deserves deliberate design: it is one of the few levers, alongside the asset selection and the offtake, that materially changes the return, and unlike the asset and the offtake it is entirely within the financier's control. The paper's purpose is to show how to pull this lever well.

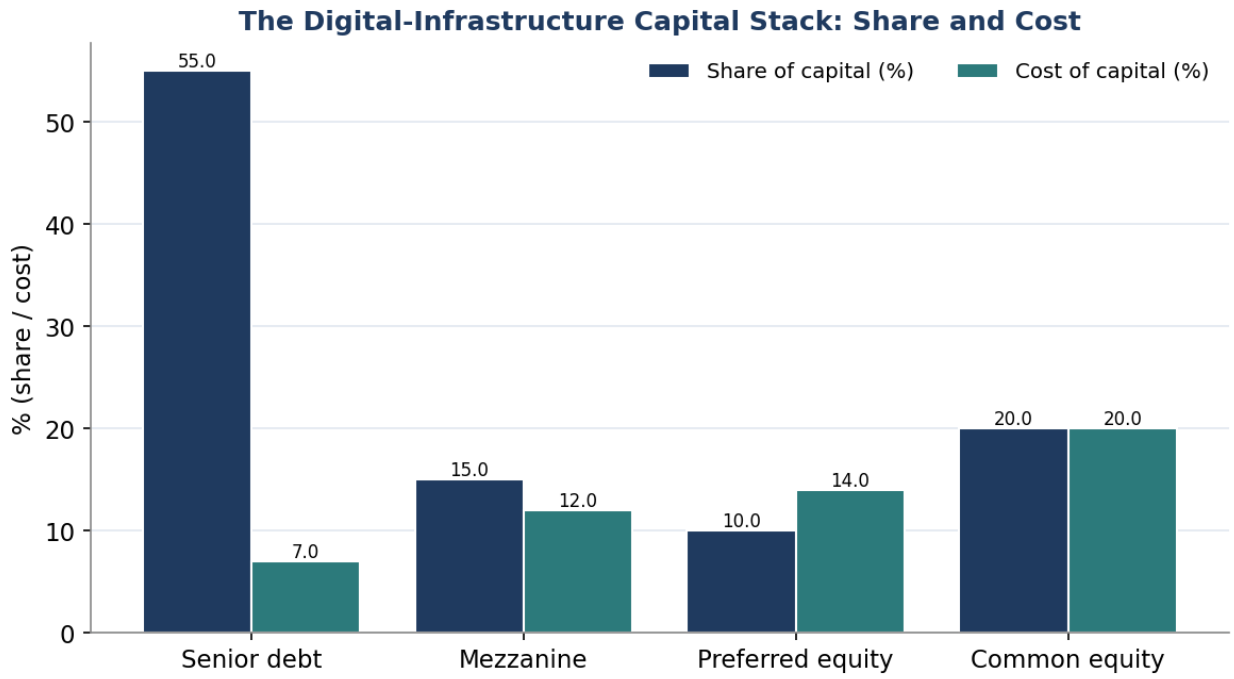
The same proposition carries a warning that runs through the analysis: that leverage magnifies losses as well as gains. The financing that lifts the equity return when the asset performs also deepens the loss when it does not, because the debt must be serviced regardless and the smaller

equity bears the shortfall. So the structuring that can turn a sound asset into a strong investment can also turn it into a fragile one, and the difference lies in whether the leverage is matched to the cash flow's certainty with a cushion, or stretched for the headline return. This dual nature of leverage, magnifying both outcomes, is why the analysis treats the structuring as a balance of return and resilience rather than a maximisation of return, and it is the single most important idea for the equity investor to hold: the financing that most flatters the base case may be the one that least survives the downside.

4.1 The Layers of the Stack

The stack is built from layers of differing risk and cost. Figure 1 sets out their share and cost.

Figure 1. The Digital-Infrastructure Capital Stack: Share and Cost



Indicative; senior debt is the largest and cheapest layer, common equity the smallest and costliest.

The figure supports Proposition 1. The stack runs from senior debt, the largest layer and the cheapest because it is safest and first to be repaid, through mezzanine debt and preferred equity, intermediate in both risk and cost, to common equity, the smallest layer in a leveraged structure but the costliest because it is last to be repaid and bears the residual risk. Each layer's cost reflects its position: the safer and more senior the capital, the lower its required return, because it is more likely to be repaid and repaid first. The stack is thus an ordering of capital by risk and seniority, with the cost rising as the protection falls. The practical significance is that the blend of layers determines the overall cost of capital: a stack weighted toward cheap senior debt has a lower average cost than one weighted toward expensive equity, which is the basis for the leverage effect examined next. Understanding the cost and risk of each layer is the foundation of structuring the stack, because the structuring is precisely the choice of how much of each layer to use.

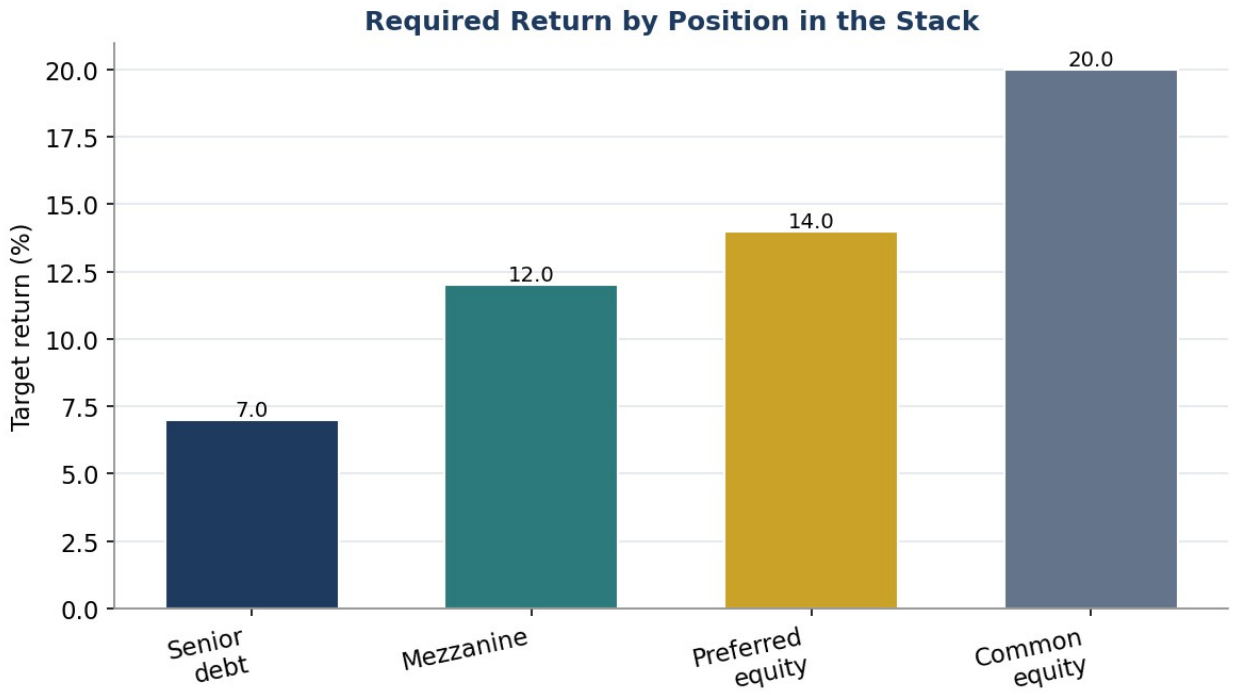
A practical implication of the risk-return ladder is that the layers must be priced and sized consistently, so that each provider earns a return appropriate to its actual risk and no layer is mispriced relative to its position. If the mezzanine is priced as if it were senior, its provider is undercompensated and will not supply it; if the senior debt is priced as if it were mezzanine, the

structure is needlessly expensive. The sponsor assembling the stack must therefore understand the fair return for each layer given its seniority and the project's risk, and price each accordingly, which is also how it accesses the right providers, since each provider expects the return appropriate to the layer it supplies. A coherent stack is one in which each layer is priced and sized consistently with its risk, and the sponsor's task is to assemble such a coherent stack rather than to minimise the cost of any single layer at the expense of the others. The ladder is thus not only a menu for investors but a discipline for the sponsor, ensuring the whole stack hangs together.

4.2 The Risk-Return Ladder

The layers form a ladder of risk and return. Figure 2 shows the required return by position.

Figure 2. Required Return by Position in the Stack



Indicative; required return rises with the riskiness and subordination of the position.

The figure reinforces Proposition 1 by setting out the risk-return ladder explicitly. Senior debt requires the lowest return, because it is repaid first and protected by everything below it; mezzanine requires more, because it ranks behind senior debt; preferred equity more again, ranking behind the debt; and common equity the most, because it is last and bears the residual. The ladder is continuous and ordered, and it reflects a single principle: return rises with the risk that the position is not repaid in full. For the investor choosing where in the stack to participate, the ladder is a menu: it can lend senior for a safe, modest return, provide mezzanine or preferred for an intermediate return and risk, or take common equity for the highest return and risk. The choice should match the investor's risk appetite and capability, just as the choice of entry point did in the strategic paper, and the ladder makes the trade-off explicit. The same project offers a spectrum of risk-return positions through its capital stack, and an investor can access the digital-infrastructure theme at the point on that spectrum that suits it.

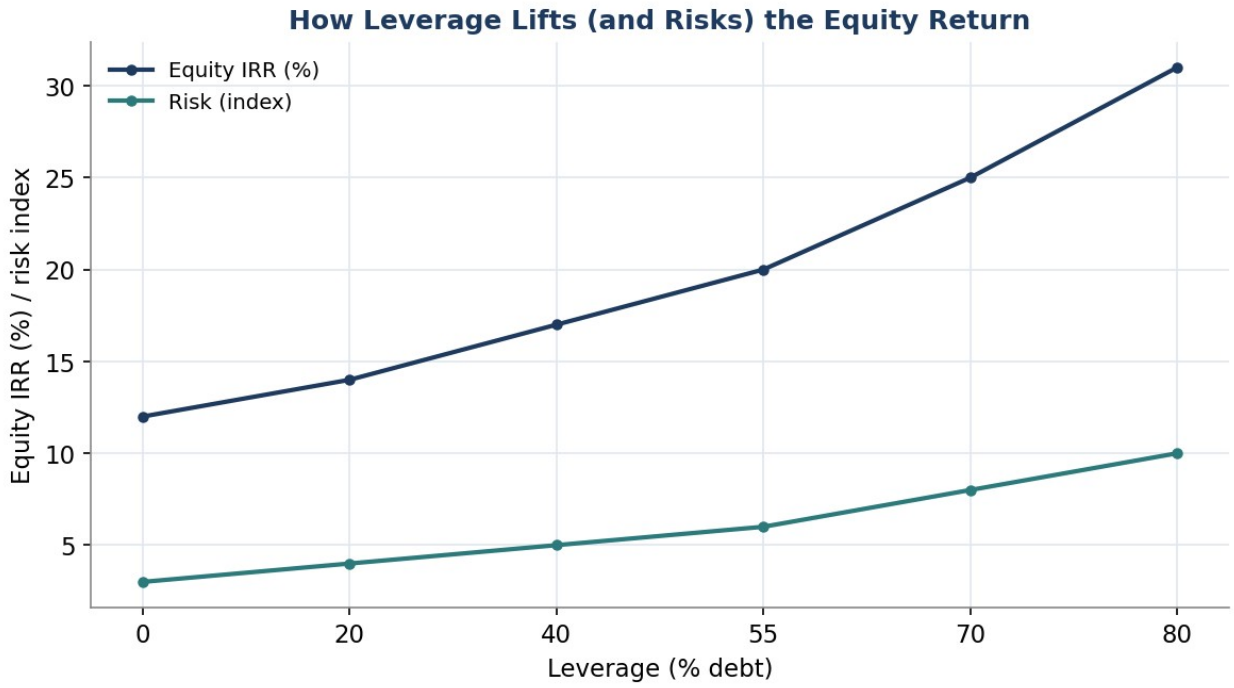
It is worth distinguishing the effect of leverage on the expected return from its effect on the range of outcomes, because the two are often conflated. Leverage raises the expected equity return when the asset earns more than the cost of debt, but it also widens the range of possible equity

outcomes, making the good outcomes better and the bad outcomes worse, and beyond a point it raises the probability that the worst outcomes, distress and loss of the equity, occur at all. An equity investor attracted by the higher expected return must therefore weigh the wider range and the rising tail risk that accompany it, recognising that the same leverage that lifts the expected return also raises the chance of a severe loss. This is why the leverage decision cannot be made on the expected return alone; it must consider the whole distribution of outcomes, and in particular the downside that the leverage deepens. An investor that focuses only on the higher expected return that leverage offers, without weighing the deeper downside it brings, has seen only half of what leverage does, and it is the unseen half that causes the losses.

4.3 How Leverage Lifts and Risks the Equity Return

The central structuring trade-off is leverage. Figure 3 shows its effect.

Figure 3. How Leverage Lifts (and Risks) the Equity Return



Indicative; higher leverage raises the equity IRR but also the risk, steeply at high levels.

The figure supports Proposition 2. As leverage rises, the equity internal rate of return rises, because the equity captures the residual after servicing cheaper debt, and a larger proportion of debt magnifies the return on the smaller equity. But the risk rises too, and at high leverage it rises steeply, because a more leveraged structure has less cushion to absorb adversity and a higher chance of distress if the cash flow falls short of the debt service. The relationship captures the central trade-off of structuring: leverage is the lever that lifts the equity return, but it is also the lever that raises the risk, and beyond a point the rising risk and the cost of potential distress outweigh the benefit of the higher expected return. The optimal leverage therefore balances the two, taking enough debt to lift the return materially but not so much as to court distress, and the right level depends on the predictability of the cash flow, which for a strong-offtake data centre is high, supporting more leverage than a speculative asset could bear. The leverage decision is the heart of structuring, and it is a deliberate balance, not a maximisation.

A practical consequence of the leverage trade-off is that the sponsor should think in terms of a target coverage rather than a target leverage, because coverage is what actually protects against

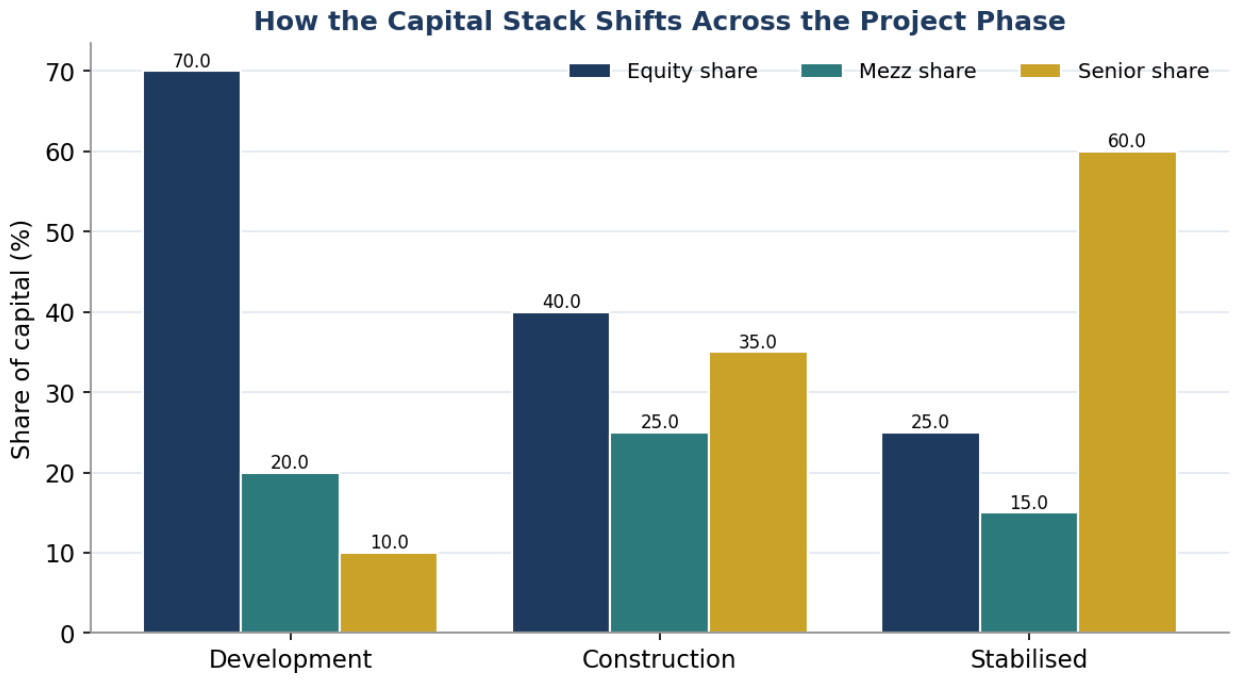
distress. Leverage expressed as a loan-to-value or debt-to-equity ratio is a useful summary, but it is the debt-service coverage, the margin by which the cash flow exceeds the debt service, that determines whether the structure survives a shortfall. A given leverage ratio implies very different coverage depending on the cost of the debt and the stability of the cash flow, so the sponsor should set the leverage to achieve a coverage that leaves a genuine cushion under stress, rather than to a leverage ratio that may imply thin coverage on expensive debt. This reframing, from a leverage target to a coverage target, aligns the structuring with the resilience that matters, and it connects to the underwriting companion paper, which sets the minimum coverage the lenders require. The sponsor and the lenders meet at the coverage: the lenders require a minimum, and the sponsor should structure to exceed it with a margin, which sets the prudent leverage for the specific cash flow.

It is worth noting that the phase shift also changes which risks the capital structure must protect against, not only its composition. In development and construction, the dominant risks are execution and completion, and the capital, chiefly equity and mezzanine, must be able to absorb cost overruns and delays without forcing distress; at stabilisation, the dominant risk shifts to the durability of the contracted cash flow, and the senior debt must be protected by coverage and covenants against a tenant default or lease expiry. The structure appropriate to each phase therefore reflects the risks of that phase, not only the leverage it can bear, and the transition through the take-out refinancing is also a transition in the kind of protection the structure provides, from absorbing construction risk to securing contracted income. A sponsor planning the phased financing should think about this shift in risks as well as in leverage, ensuring that each phase's capital is structured to absorb that phase's dominant risk, which is a richer view of the phase shift than leverage alone conveys.

4.4 How the Stack Shifts Across the Phase

The right stack changes as the project de-risks. Figure 4 shows the shift.

Figure 4. How the Capital Stack Shifts Across the Project Phase



Indicative; the stack is equity-heavy in development and debt-heavy once stabilised.

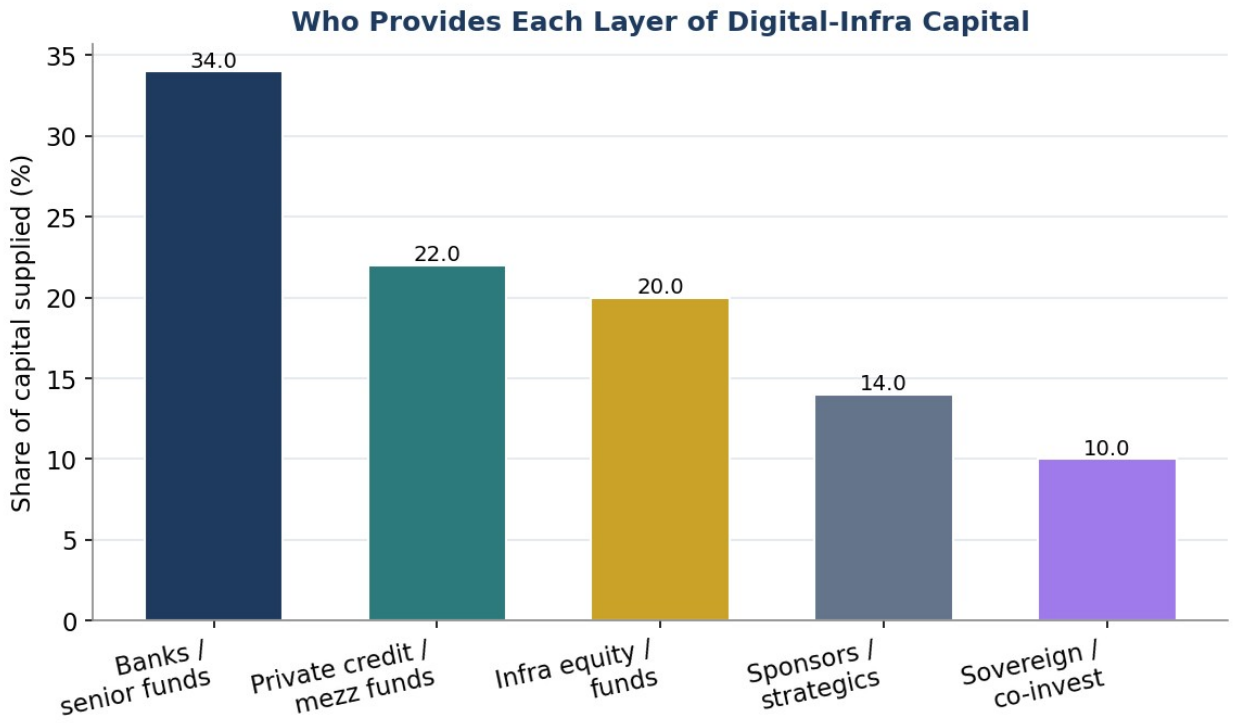
The figure supports Proposition 3. In the development phase, when the project's risks, power, construction, leasing, are unresolved, little debt can be raised, so the stack is equity-heavy, with equity and mezzanine bearing the development risk that lenders will not. As the project moves through construction and the risks resolve, more debt becomes financeable, and at stabilisation, when the asset is built, powered and let on a contracted cash flow, the stack can be debt-heavy, with senior debt the largest layer. This shift reflects the principle that debt capacity rises with the resolution of risk: lenders will advance against a contracted, stabilised cash flow what they would not against a speculative development. The practical implication is that the capital stack is not fixed but evolves, and the sponsor should plan the financing across the phases, equity and mezzanine to fund development and construction, senior debt to refinance and take out the riskier capital once the asset is stabilised. This phased financing, raising the cheaper, more abundant debt only as the risk resolves to support it, is how digital-infrastructure projects are efficiently funded, and it is why the take-out refinancing at stabilisation is a key event in the project's financial life.

A point worth adding about providers is that the right mix can change over the project's life, mirroring the phase shift in the stack. In the development and construction phases, the providers are chiefly equity sponsors, infrastructure equity funds and mezzanine providers willing to bear the early risk; at and after stabilisation, banks and senior debt funds enter to provide the take-out, and longer-term institutional investors, pension and sovereign funds, may acquire the stabilised equity or debt for its contracted income. The sponsor should therefore think of the providers not as a fixed set but as a sequence, matched to the phases, with the riskier capital provided early by those who specialise in it and the cheaper, longer capital arriving as the asset de-risks. Planning this provider sequence alongside the phased financing ensures that each phase is funded by the providers best suited to it, and that the transition between phases, particularly the take-out, is arranged with the right providers in advance. The provider landscape, like the stack itself, evolves across the project, and the sponsor that maps both can assemble and refinance the stack efficiently through the project's life.

4.5 Who Provides Each Layer

Different providers specialise in different layers. Figure 5 shows the suppliers.

Figure 5. Who Provides Each Layer of Digital-Infra Capital



Indicative; banks and senior funds supply senior debt, private-credit funds mezzanine, infra funds equity.

The figure informs Proposition 5. The layers of the stack are supplied by different providers specialising in each: banks and senior debt funds provide the senior debt; private-credit and mezzanine funds provide the mezzanine; infrastructure equity funds and their co-investors provide the equity; sponsors and strategics provide development equity and expertise; and sovereign and co-investment capital, abundant in the Gulf, can supply several layers, often the equity and senior positions. The practical significance is that assembling the stack is partly a matter of matching each layer to the providers best suited to supply it, on the best terms, which requires the sponsor to access the right pools of capital for each layer rather than seeking the whole stack from one source. The Gulf's depth of capital across these provider types is an advantage, because it allows the stack to be assembled efficiently from specialists in each layer, and the sponsor that knows which providers supply which layers, and on what terms, can structure the stack more cheaply than one that does not. Matching layers to providers is part of the structuring craft the analysis describes.

It is worth drawing out the compounding interaction between the offtake and leverage, because together they explain much of the variation in equity returns. A strong offtake does two things at once: it lowers the cost of each layer, and it raises the leverage the cash flow can safely bear, because a more certain cash flow services more debt. These reinforce each other in the equity return: cheaper debt and more of it both lift the residual return to the equity, so a strong offtake improves the equity outcome through both channels simultaneously. This is why the offtake is the master lever, more powerful than the leverage decision alone, because it improves both the cost and the capacity of the debt that the leverage decision then deploys. A project with a strong offtake can be both more leveraged and more resilient than one with a weak offtake, because its certain cash flow supports the leverage that its low cost of debt makes attractive, while a weak-offtake project must choose between leverage and resilience. The compounding of the offtake and

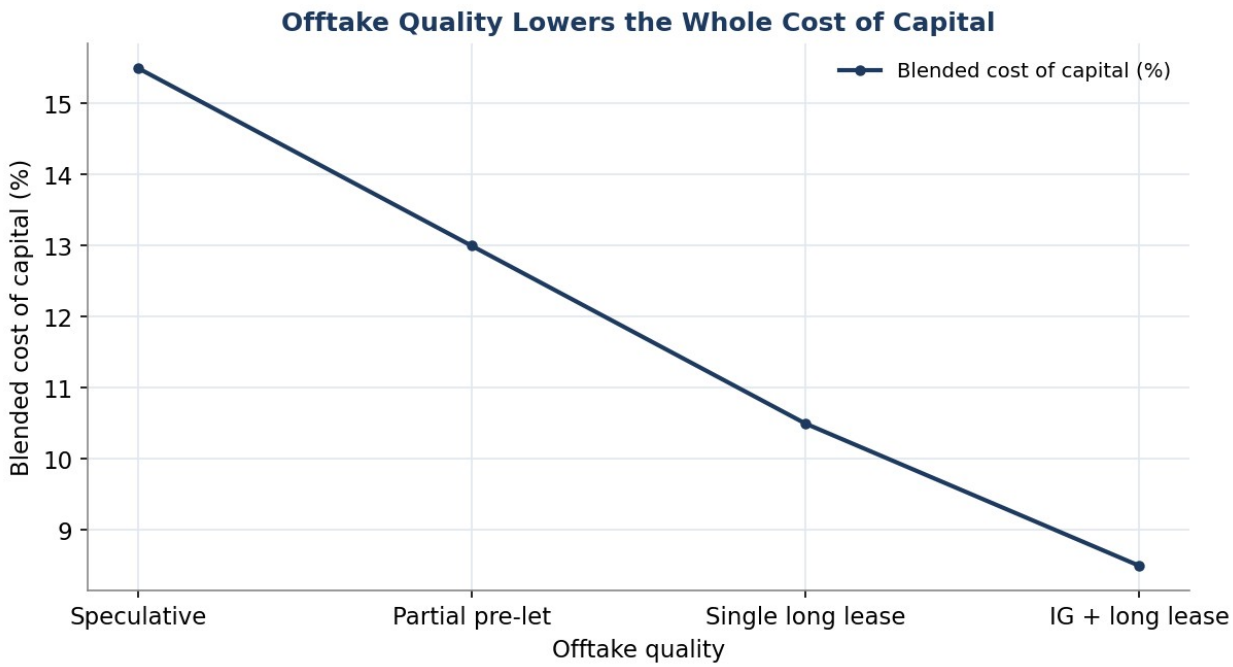
leverage effects is the deepest reason the analysis places the offtake at the centre of the structuring, and it ties this paper to the cluster's recurring theme.

A practical corollary is that improving the offtake can be worth more than optimising the financing, which reorders the sponsor's priorities. Because the offtake lowers the cost of every layer and raises the leverage the cash flow supports, an hour spent strengthening the offtake, securing a longer term, a stronger tenant, better terms, often improves the equity return more than an hour spent negotiating a finer point of the debt. This means the sponsor should treat the offtake as the first and most rewarding object of its effort, and should be willing to invest in strengthening it, even at some cost, because the return on that investment, through the lower cost of capital and higher leverage it unlocks, is large. A sponsor that lavishes effort on the financing while accepting a mediocre offtake has misallocated its attention, optimising the lever that matters less while neglecting the one that matters most. The primacy of the offtake in the cost of capital is thus not only an analytical point but a guide to where the sponsor should concentrate its effort, which is on the contract before the financing.

4.6 How Offtake Quality Lowers the Whole Cost of Capital

The quality of the offtake lowers the cost of every layer. Figure 6 shows the effect.

Figure 6. Offtake Quality Lowers the Whole Cost of Capital



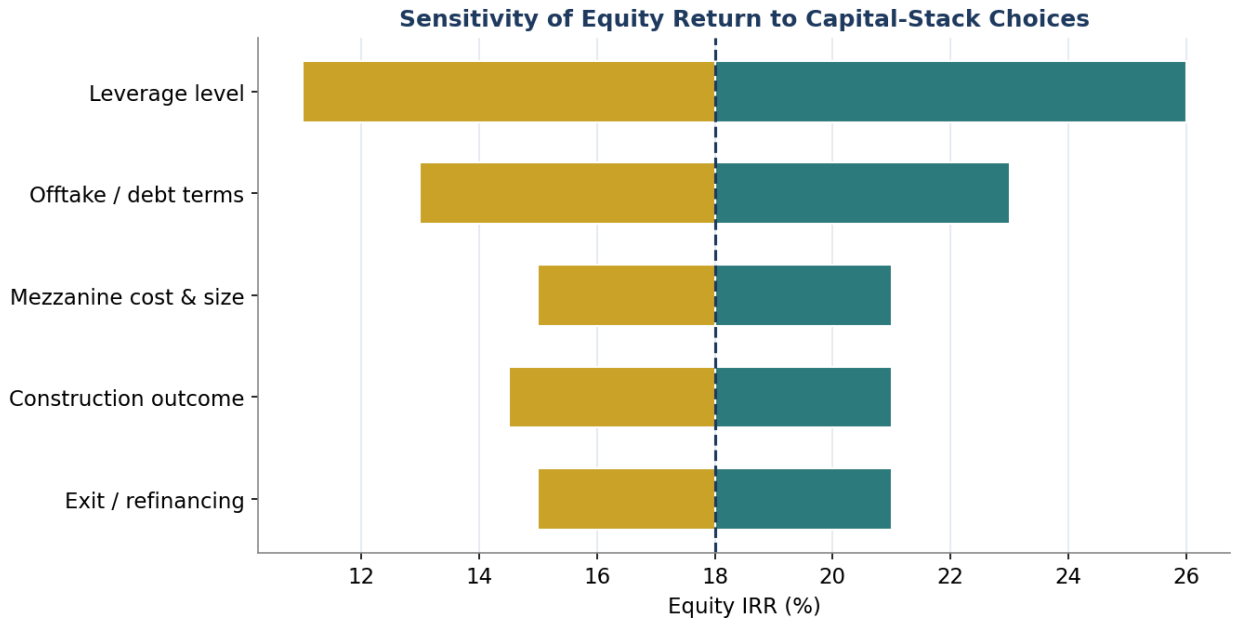
Indicative; a stronger offtake reduces the blended cost of capital across the stack.

The figure supports Proposition 4. As the offtake strengthens, from speculative, through partial pre-letting and a single long lease, to an investment-grade tenant on a long lease, the blended cost of capital falls, because every layer of the stack becomes cheaper: lenders advance more senior debt at a lower rate, mezzanine and preferred become cheaper and more available, and the equity bears less risk and so requires a lower return. The quality of the offtake thus lowers the cost of the whole stack, not just one layer, because it reduces the risk that every layer bears. This is the most powerful single lever on the stack's economics, more powerful than the leverage decision, because it lowers the cost of capital across the board rather than merely shifting the mix. It connects this paper to the others in the cluster: the strong, long offtake that the strategic paper identifies as the driver of value and the underwriting paper as the foundation of financeability is

also, this paper shows, the master lever on the cost of capital. Securing the offtake is the structuring decision that most improves the financing, and the sponsor should pursue it as the foundation of an efficient stack.

Figure 7 places the sensitivity of the equity return to the capital-stack choices in a single view.

Figure 7. Sensitivity of Equity Return to Capital-Stack Choices

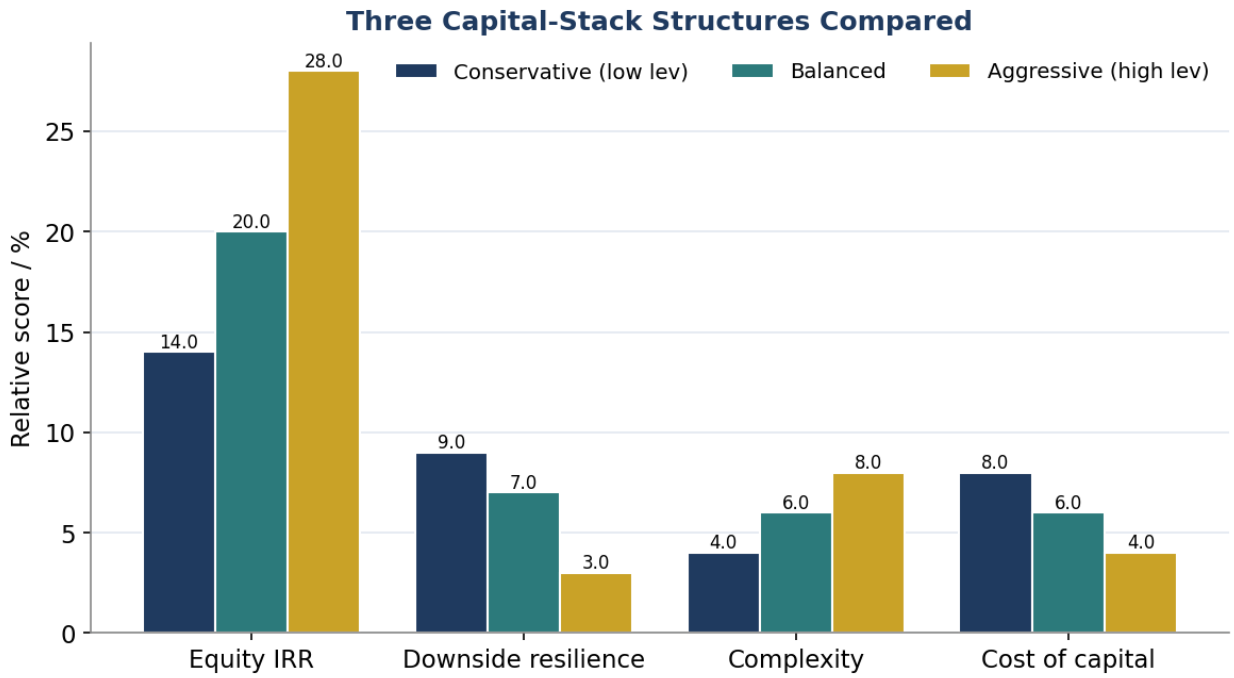


Indicative; the leverage level and the offtake and debt terms dominate the equity return.

The sensitivity analysis confirms the hierarchy. The leverage level and the offtake and debt terms have the largest effect on the equity return, ahead of the mezzanine cost and size, the construction outcome and the exit. This ordering reflects the analysis: leverage is the lever that magnifies the equity return, and the offtake determines the terms on which the leverage is available, so the two together dominate. The sponsor structuring the stack should therefore concentrate on securing a strong offtake, which lowers the cost of capital and supports more leverage, and on setting the leverage to the level that balances return and risk, because these two choices drive the equity outcome more than the finer details of the stack.

Figure 8 compares three capital-stack structures on a common set of measures.

Figure 8. Three Capital-Stack Structures Compared



Indicative; a balanced structure trades equity return against resilience better than the extremes.

The comparison supports Proposition 5. A conservative, low-leverage structure produces a modest equity return with strong downside resilience and a higher cost of capital, suiting a risk-averse investor or a project with less certain cash flow. An aggressive, high-leverage structure produces a high equity return but with little resilience and a high chance of distress if the cash flow disappoints, suiting only the most confident in the cash flow and risk-tolerant. A balanced structure, moderate leverage matched to a strong, contracted cash flow, produces a strong equity return with adequate resilience, capturing much of the leverage benefit while retaining a cushion against adversity. For most digital-infrastructure projects with a strong offtake, the balanced structure is the one the analysis recommends, because it neither forgoes the leverage benefit through excessive caution nor courts distress through excessive leverage, and it matches the structure to the predictability of the cash flow the offtake provides.

A second illustration contrasts the same asset financed two ways, to make the structuring effect vivid. Financed conservatively, with modest leverage against its strong offtake, the asset returns a sound equity return with a large coverage cushion that would survive a severe stress; financed aggressively, with high leverage stretched beyond what the cash flow comfortably services, the same asset returns a higher equity return in the base case but with a thin cushion that a moderate stress would breach, risking distress and the loss of the equity. The asset is identical; only the financing differs, and the two structures present entirely different risk-return profiles to the equity. The conservative structure suits an investor prioritising resilience and a sound return; the aggressive one suits, at most, an investor highly confident in the cash flow and tolerant of distress risk, and for most it is a worse choice because the additional base-case return does not compensate for the deepened downside. The contrast illustrates the framework's central message: the financing is a choice with large consequences, and the prudent choice matches the leverage to the cash flow with a cushion rather than stretching for the headline return.

4.7 A Worked Illustration of Structuring a Stack

To make the framework concrete, consider a sponsor structuring the financing for a Gulf data centre let to a strong, long-lease tenant. It first uses the offtake to maximise cheap senior debt, raising senior debt against the contracted cash flow at a low rate, which forms the largest layer. It adds a measured mezzanine tranche to extend the leverage without over-burdening the senior coverage, and a slice of preferred equity to bridge to the common equity. The common equity, the smallest layer in this leveraged but prudent structure, captures the residual return, lifted by the leverage but cushioned by a coverage margin the strong cash flow supports. The sponsor plans the financing across phases, funding development and construction with equity and mezzanine and arranging the senior take-out for stabilisation, and sources each layer from its specialist provider. The result is a stack with a low blended cost of capital, a strong equity return, and adequate resilience, built on the strong offtake that lowered the cost of every layer.

The illustration shows the framework guiding the structuring in priority order. The sponsor began with the offtake, the master lever, then maximised the cheap senior debt it supported, then added the junior layers in order, set the leverage to leave a coverage cushion, planned the phases, and matched the providers. Had the offtake been weaker, it would have raised less debt at a higher cost and used more equity; had it sought a higher equity return, it would have added leverage at the cost of resilience. The structure followed deliberately from the offtake, the cash flow's certainty, and the sponsor's risk appetite, which is the deliberate, situation-specific structuring the framework counsels. A sponsor that instead maximised leverage for the headline return, or sought the whole stack from one provider, would have produced a more fragile or more expensive structure from the same asset.

4.8 Bringing the Capital-Stack Choices Together

The elements of the framework, the layers and their ladder, the leverage trade-off, the phase shift, the providers, and the offtake effect, form a single connected structuring decision rather than separate choices. The offtake sets the cost and capacity of the whole stack; the layers and ladder establish the menu of capital; the leverage decision sets the balance of return and resilience; the phase shift sequences the financing over time; and the providers supply each layer. A sponsor that attends to one and neglects the others leaves a gap: maximising senior debt without planning the take-out can strand the project in its expensive phase; setting leverage without regard to the offtake can over-leverage a weak cash flow; sourcing the whole stack from one provider can overpay for several layers. The value of treating the choices as one connected decision is that it produces a coherent, efficient, resilient stack matched to the asset and the sponsor, rather than an assemblage of locally-optimised but globally-inconsistent pieces. This integrated structuring is the contribution of the framework, and it is what turns the financing from a technical afterthought into a driver of the investment's success.

5. ROBUSTNESS AND SCENARIO ANALYSIS

Because the framework is stylised, its value lies in whether its conclusions hold under different assumptions. This section varies the central inputs.

5.0a Reading the Scenarios as a Set

The scenarios that follow, higher interest rates, a weaker offtake, and a construction delay, stress different aspects of the structure, but they share a common antidote worth stating before they are taken in turn: a coverage cushion and a strong offtake. A structure with a genuine coverage

cushion absorbs a rate rise or a cash-flow shortfall without breaching its covenants; a strong offtake supports the leverage and lowers the cost that give the structure its resilience; and a development stack sized for delay survives a deferred take-out. The unifying principle is that the resilience of the structure, not the headline equity return, is what carries it through adversity, and that resilience comes from moderate leverage, a coverage cushion and a strong offtake. A structure optimised for the maximum base-case equity return, with thin coverage and high leverage against a weak offtake, is fragile across all three scenarios; one structured for resilience is robust across them. The scenarios confirm that the structuring discipline the analysis recommends, leverage matched to the cash flow with a cushion, is what protects the investor across the plausible adversities, which is why the framework favours resilience over the maximisation of the base-case return.

5.1 Higher Interest Rates

If interest rates rise, the cost of senior and mezzanine debt rises, narrowing the gap between the cost of debt and equity and reducing the benefit of leverage. The conclusion is conditioned rather than overturned: leverage still lifts the equity return where debt is cheaper than equity, but the optimal leverage falls as the gap narrows, and a project structured for a low-rate environment may be over-leveraged when rates rise. The robustness implication is that the sponsor should set leverage with a margin against rate rises, and should value the protection of fixed-rate or hedged debt, so that a rate rise does not erode the coverage and force distress. Higher rates strengthen the case for moderate rather than aggressive leverage, because they raise the cost of the debt that aggressive leverage relies on.

A further interest-rate consideration is the maturity and refinancing structure of the debt, because a stack that must refinance a large tranche at a single future date concentrates the refinancing risk at that point. If rates are high or markets are difficult when that maturity falls due, the project may have to refinance on poor terms or struggle to refinance at all, regardless of how sound its cash flow. The sponsor can mitigate this by staggering maturities, amortising the debt, and arranging committed long-term financing where possible, so that the structure does not depend on a favourable refinancing window at a single date. This refinancing-risk management is part of structuring for resilience to rates: it is not enough to set the leverage prudently today; the structure must also be able to survive the refinancing of its debt under conditions that may be adverse. A sponsor that has staggered and partly amortised its debt enters a high-rate period with less to refinance at once, while one with a single large bullet maturity is exposed to whatever conditions prevail when it falls due. Managing the refinancing profile is thus an extension of the leverage discipline into the time dimension.

5.2 A Weaker Offtake

If the offtake is weaker than the base case, the cost of every layer rises and the financeable leverage falls, as Figure 6 showed in reverse, so the stack becomes more equity-heavy and more expensive. The conclusion is reinforced: the offtake is the master lever, and a weaker one must be met with less leverage, more equity, and a higher cost of capital, or with additional credit support to strengthen the cash flow. A sponsor that structures an aggressive, debt-heavy stack against a weak offtake courts distress, because the leverage the structure assumes is not supported by the cash flow’s quality. The robustness analysis underscores that the leverage must be matched to the offtake: strong offtake supports more leverage, weak offtake requires less, and a mismatch is the path to distress.

A final scenario worth considering is a favourable one, in which rates fall, the offtake proves strong, and the asset stabilises early. Here the structure delivers more than its base case, and the sponsor may have the option to refinance at a lower cost or to increase leverage against the proven cash flow, enhancing the equity return. The disposition the analysis counsels even in this favourable case mirrors its counsel for the adverse ones: enjoy the upside, but do not retrospectively conclude that the prudent structure was too conservative and that future projects should be more aggressively leveraged. A favourable outcome on one project is not evidence that the resilience built into the structure was wasted; it is the outcome that happened to occur, and the next project may face the adverse scenario the resilience was built for. The discipline in good outcomes is to capture the upside, perhaps through a sensible refinancing, without abandoning the matching of leverage to cash flow that produced a sound structure, because the structure is judged over many projects and cycles, not by the one that happened to go well.

5.4 When to Favour Equity over Debt

A candid analysis should identify when the sponsor should favour a more equity-heavy, less leveraged structure even at the cost of a lower equity return, because not every project warrants the leverage its cash flow might nominally support. A project whose offtake is shorter than ideal, whose tenant is strong but unrated and harder to assess, whose technology or location carries more obsolescence or re-letting risk, or which faces a more uncertain refinancing environment, warrants more equity and less debt than its base-case cash flow alone would suggest, because the additional equity cushions the greater uncertainty. Recognising these cases is part of matching leverage to the cash flow's certainty: the certainty, not just the level, of the cash flow should set the leverage, and a project with a nominally adequate but less certain cash flow should be financed more conservatively than one with an equally large but more certain one. The discipline is to look past the headline coverage to the robustness of the cash flow that underpins it, and to favour equity where that robustness is in doubt, accepting a lower return for the resilience the uncertainty warrants.

The same logic applies at the level of the investor rather than the project. An investor whose own circumstances require resilience, that cannot tolerate a distressed or impaired position, or that is financing the equity with capital it may need, should favour a more conservative structure regardless of what the project could bear, because the cost of distress to such an investor is higher. The right leverage is therefore a function not only of the project's cash flow but of the investor's own capacity to bear the downside, and an investor should structure to the more conservative of what the project supports and what its own circumstances require. This investor-level consideration complements the project-level one, and together they determine the prudent leverage, which is why the analysis treats the structuring as situation-specific rather than prescribing a single optimal level for all projects and investors.

5.3 A Construction or Stabilisation Delay

If construction or stabilisation is delayed, the project remains in its riskier, equity-heavy phase longer, the take-out refinancing into cheaper senior debt is deferred, and the equity bears the development risk for longer at its higher cost of capital. This is a real risk for development-phase financing, and it is why the stack is equity-heavy in development: the equity must be able to bear a delay without the relief of the take-out. The robustness conclusion is that the development-phase stack must be sized to survive a realistic delay, with enough equity and committed mezzanine to carry the project through a longer-than-planned construction, and that the sponsor

should not assume an early take-out into cheap debt that a delay could defer. Structuring the development stack for resilience to delay is the counterpart, in financing, to the realistic lead-time pricing the bottleneck paper urged.

6. IMPLEMENTATION CONSIDERATIONS

Translating the framework into practice involves securing the offtake to lower the cost of capital, setting leverage to the cash flow, planning the phased financing, and matching layers to providers.

A foundational sequencing point, parallel to the other papers in this cluster, is that the financing should be planned before the project is committed, not arranged once construction is under way, because the financing feasibility is part of the project's feasibility. A project whose economics work only with a leverage its cash flow cannot safely bear, or whose phased financing assumes a take-out that may not be available, is not in fact feasible, and the sponsor should establish the financeability, that a sound stack can be assembled across the phases, before committing. This means testing, at the outset, that the offtake will support the necessary debt, that the development capital can be raised and can survive a delay, and that the take-out can be arranged at stabilisation. A sponsor that commits to a project and then discovers it cannot be financed soundly has the worst of both worlds; one that establishes the financeability first commits only to projects whose financing it can assemble. Planning the financing as part of the project's feasibility, before commitment, is the sequencing discipline the framework implies, and it mirrors the power-before-commitment discipline of the bottleneck paper.

A complementary first move, alongside securing the offtake, is to establish the project's equity base before seeking the debt, because lenders advance against a project backed by committed, credible equity and are wary of one seeking to be financed almost entirely with debt. A substantial, committed equity contribution signals the sponsor's confidence and alignment, absorbs the first losses that protect the lenders, and is in practice a condition of raising senior debt on good terms. The sponsor should therefore assemble its equity, its own and that of its co-investors, as the foundation on which the debt is then raised, rather than treating equity as the residual to be minimised. This ordering, a credible equity base first, then the debt it supports, both reflects how lenders actually assess a financing and ensures the structure has the loss-absorbing foundation that makes it sound. The equity is not merely the most expensive layer to be minimised; it is the foundation whose adequacy determines whether the cheaper layers can be raised at all.

6.1 Securing the Offtake to Lower the Cost of Capital

Because the offtake is the master lever on the cost of capital, the first structuring move is to secure the strongest, longest offtake the project can, since it lowers the cost of every layer and supports more leverage. A sponsor that secures an investment-grade tenant on a long lease before arranging the financing will find the whole stack cheaper and more available than one that approaches lenders and equity with a speculative or weak offtake. The offtake should therefore be pursued first, as the foundation of the financing, and the financing structured around the cash flow it provides. This sequencing, offtake then financing, ensures the stack is built on the strongest possible foundation.

A practical aid to setting leverage is to size the senior debt to the stabilised, stressed cash flow rather than to the base-case or development-phase figures, because the senior debt will be

serviced from the stabilised cash flow under conditions that may include stress. Sizing the senior debt to a stressed stabilised coverage ensures that the largest, most senior layer is supported even if the cash flow disappoints, which protects the whole structure, since a senior default is the most damaging outcome. The junior layers, mezzanine and equity, can then bear the variability above this protected senior base, which is appropriate because they are compensated for it. This approach, sizing the senior debt conservatively to a stressed cash flow and letting the junior layers bear the variability, produces a structure whose foundation is secure and whose risk is borne by the layers paid to bear it, which is the sound ordering of risk through the stack. It is the practical method by which the leverage is matched to the cash flow with the cushion the analysis recommends.

6.2 Setting Leverage to the Cash Flow

The leverage should be set to the predictability of the cash flow, not to a fixed rule or to the maximum the lenders will allow. A strong, contracted cash flow supports more leverage, because it reliably services the debt; a less certain cash flow supports less. The sponsor should choose the leverage that balances the equity return against the resilience the cash flow's certainty warrants, leaving a coverage cushion against adversity, and should resist the temptation to maximise leverage for the headline equity return, because the excess leverage that looks attractive in the base case is what causes distress under stress. Matching leverage to the cash flow is the central structuring discipline, and it is a balance rather than a maximisation.

A practical refinement on the phased financing is to align the maturities and step-downs of the layers so that the structure de-leverages naturally as the asset matures and amortises. A well-designed stack does not merely sit static; it can be structured so that, as the asset generates cash and amortises its senior debt, the leverage falls and the structure becomes progressively safer, returning capital to the junior layers in order. This natural de-leveraging reduces the structure's risk over time and returns capital to the equity as the asset proves itself, aligning the return of capital with the resolution of risk. The sponsor should structure the maturities, amortisation and distribution waterfall so that this orderly de-leveraging occurs, rather than leaving a static, fully-leveraged structure exposed to refinancing risk at a single maturity. Designing the stack to de-leverage over the asset's life is a refinement that improves its resilience and aligns the capital structure with the maturing of the asset, and it is part of the deliberate structuring the framework recommends.

6.3 Planning the Phased Financing

Because the stack shifts across the phases, the sponsor should plan the financing for the whole journey at the outset: the equity and mezzanine to fund development and construction, and the senior debt take-out to refinance them once the asset is stabilised. Planning the phased financing ensures that each phase is funded by the appropriate capital and that the take-out into cheaper debt is arranged before it is needed, rather than assumed. The sponsor should also size the development-phase capital to survive a realistic delay, so that a deferred take-out does not leave the project under-funded. Planning the financing across the phases, rather than arranging each phase as it arrives, is how the sponsor ensures the project is funded efficiently and resiliently through its life.

A further implementation discipline is to align the covenants and inter-creditor terms across the layers, because the layers must coexist under a single set of arrangements that govern their

relative rights. The senior lenders, the mezzanine providers and the equity have different and sometimes conflicting interests, particularly in distress, and the inter-creditor agreement that governs their relative rights, who is paid first, who controls enforcement, who can block actions, determines how the structure behaves when tested. A stack assembled without careful attention to these inter-creditor terms can prove unworkable in adversity, with the layers fighting rather than cooperating, which can destroy value for all. The sponsor should therefore structure the inter-creditor arrangements as deliberately as the layers themselves, ensuring the rights are clear and the structure can function through distress, not only in the base case. This is a technical but important part of assembling the stack, and it is where the coherence of the structure is tested, because a stack is only as sound as the arrangements that govern its layers' coexistence.

A final implementation point concerns the cost and friction of assembling a complex stack, which the sponsor should weigh against the benefit of optimising each layer. A stack with many layers from many providers, each finely optimised, can in principle minimise the blended cost of capital, but it also carries higher transaction costs, more complex inter-creditor arrangements, and more points of potential friction in execution and in distress. For some projects, a simpler stack, fewer layers, fewer providers, even at a slightly higher blended cost, is preferable because it is faster to assemble, cheaper to negotiate and more robust in adversity. The sponsor should therefore weigh the cost saving of a finely-layered stack against the simplicity and robustness of a leaner one, and should not pursue complexity for a marginal cost saving that the added friction and fragility outweigh. Matching the complexity of the stack to the project's scale and the saving on offer is part of structuring well, and for many mid-sized projects a clean, simple stack is the better choice than an elaborately optimised one.

6.4 Matching Layers to Providers

The sponsor should assemble the stack by matching each layer to the providers best suited to supply it on the best terms: banks and senior funds for the senior debt, private-credit and mezzanine funds for the mezzanine, infrastructure equity and co-investors for the equity, and, in the Gulf, sovereign and co-investment capital across the layers. Accessing the right providers for each layer, rather than seeking the whole stack from one source, secures each layer on the best available terms and lowers the overall cost of capital. This requires the sponsor to know and access the relevant pools of capital, which is part of the structuring capability, and the Gulf's depth of capital across the provider types makes efficient matching possible. Matching layers to providers is the practical assembly of the stack the framework describes.

7. CONCLUDING COMMENTS

A digital-infrastructure asset is funded by a stack of capital, and the way the stack is assembled determines the cost of capital, the equity return and the resilience of the financing. This paper has set out the layers of the stack, the risk-return ladder, the effect of leverage, the shift across phases, the providers of each layer, and the master role of offtake quality in lowering the whole cost of capital.

The evidence and analysis support five conclusions. First, each layer earns a return commensurate with its risk and seniority. Second, leverage lifts the equity return but raises its risk, so the optimal leverage balances the two. Third, the stack shifts from equity-heavy in development to debt-heavy at stabilisation as risk resolves. Fourth, the quality of the offtake

lowers the cost of every layer and so the whole cost of capital. Fifth, the investor should structure the stack to its risk appetite and the project's phase, matching layers to the best providers.

Before turning to the limitations, it is worth situating this paper within its cluster. The strategic companion establishes the opportunity and the primacy of offtake and power; the underwriting companion assesses the debt against the asset; the bottleneck companion examines the physical constraints; and this paper structures the financing within which those decisions sit. Together they take an investor from the strategic case, through the asset, its constraints and its underwriting, to the assembly of its capital stack. This paper's contribution is to show that the financing is a deliberate design that materially affects the return and resilience, that it shifts across the project's phases, and that the offtake the other papers prize is also the master lever on the cost of capital. The four papers together describe a complete approach to Gulf digital-infrastructure investment, from the decision to participate to the structuring of the financing, and the capital stack is the financial keystone that the others' decisions rest upon.

These conclusions are subject to limitations that also mark out the avenues for further work. The framework is stylised and illustrative, and actual layer shares, costs and leverage will differ; the value is in the structure, not the specific numbers. The analysis treats the stack in general terms, whereas the specific terms, tax treatment and provider landscape vary by jurisdiction and project, which further work could examine. The leverage and offtake relationships are calibrations to illustrate the mechanics rather than precise estimates, and a sponsor should populate them with project-specific data. And the analysis treats the financing; the strategic case, the asset underwriting and the physical bottlenecks are addressed in the companion papers, and a complete approach integrates the financing with them. These are extensions rather than corrections: the central message, that the capital stack is a deliberate design that trades return against resilience through leverage, that it shifts across the project's phases, and that the quality of the offtake lowers the cost of the whole, is robust. A sponsor that secures the offtake, sets leverage to the cash flow, plans the phased financing and matches layers to providers can assemble a capital stack that funds a Gulf digital-infrastructure asset efficiently and resiliently, which is the financial foundation on which the returns the cluster describes are built.

DISCLOSURES

This paper is provided for general information and educational purposes only. It does not constitute investment, financial, legal, tax or other professional advice, nor an offer or solicitation to buy or sell any security or to arrange financing. The figures and scenarios are stylised, forward-looking illustrations used to convey capital-structure mechanics; they are not forecasts, do not represent the past or expected performance of any actual project or financing, and should not be relied upon as such. Leverage magnifies both returns and losses and increases the risk of financial distress. The author is an independent researcher; the views are his own and do not represent those of any institution. Readers should obtain professional advice tailored to their circumstances before making any decision.

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APPENDIX A. BASE-CASE ASSUMPTIONS

The table below records the stylised assumptions used in the framework. They are indicative, forward-looking calibrations chosen to illustrate capital-structure mechanics, informed by the capital-structure and project-finance literature; they are not forecasts and not estimates from a proprietary dataset.

Table A1. Full Base-Case Assumptions

Parameter	Base case	Rationale
Senior debt	~55% / ~7%	Largest, cheapest, safest layer
Mezzanine	~15% / ~12%	Subordinated to senior debt
Preferred equity	~10% / ~14%	Ranks behind debt
Common equity	~20% / ~20%	Residual, highest risk and cost
Stabilised leverage	~55-65%	Supported by contracted cash flow
Development leverage	Low	Risk unresolved; equity-heavy
Offtake effect	Lowers all-in cost	Reduces risk on every layer
Optimal leverage	Balances return and risk	Not a maximisation

Indicative assumptions; see Section 3.

APPENDIX B. CAPITAL-STACK STRUCTURING CHECKLIST

The following checklist distils the framework into the questions a sponsor or investor should answer when structuring the capital stack for a Gulf digital-infrastructure asset.

1. Have we secured the strongest, longest offtake we can, to lower the cost of every layer?Have we set leverage to the predictability of the cash flow rather than to a fixed rule or the lenders' maximum?Does the structure leave a coverage cushion against adversity rather than maximising leverage for headline return?Have we matched each layer, senior, mezzanine, preferred, common, to its risk and required return?Have we planned the phased financing, equity and mezzanine for development, senior take-out at stabilisation?Is the development-phase capital sized to survive a realistic construction or stabilisation delay?Have we arranged the take-out refinancing before it is needed rather than assuming it?Have we matched each layer to the providers best suited to supply it on the best terms?Have we accessed the Gulf's deep pools of sovereign, private and bank capital across the layers?Have we set leverage with a margin against interest-rate rises, and valued hedged or fixed-rate debt?Have we stress-tested the structure against higher rates, a weaker offtake and a construction delay?Does the structure match our risk appetite and the project's phase?

APPENDIX C. GLOSSARY OF KEY TERMS

The following glossary defines the principal technical terms used in this paper for readers who may be less familiar with capital structure.

Capital stack. The layers of capital, senior debt, mezzanine, preferred and common equity, that together fund an asset, ordered by risk and seniority.

Senior debt. The safest, cheapest layer, repaid first and secured, with the lowest required return.

Mezzanine debt. Subordinated debt ranking behind senior debt, with a higher return for its greater risk.

Preferred equity. Equity ranking ahead of common equity for returns, with a fixed or preferential return below the debt.

Common equity. The residual, highest-risk layer, repaid last and bearing the upside and downside, with the highest required return.

Seniority. A layer's rank in the order of repayment; more senior capital is repaid first and bears less risk.

Leverage. The proportion of debt in the capital structure; higher leverage lifts the equity return but raises its risk.

Cost of capital. The blended required return across all layers of the stack, weighted by their shares.

Equity IRR. The internal rate of return to the common equity, magnified by leverage.

Financial distress. The condition in which a project cannot service its debt, risked by excessive leverage.

Take-out refinancing. Refinancing the riskier development-phase capital with cheaper senior debt once the asset is stabilised.

Offtake. The contract, here the tenant lease, that provides the contracted cash flow underpinning the financing.

Coverage cushion. The margin by which cash flow exceeds debt service, providing resilience against adversity.

Stabilisation. The point at which an asset is built, let and generating stable cash flow, supporting more debt.

Development phase. The early, risky phase before construction and letting, funded mainly by equity and mezzanine.

Subordination. The ranking of a layer below another for repayment; subordinated capital bears more risk.

Blended cost of capital. The weighted-average cost across the layers, lowered by cheaper debt and a stronger offtake.

Hedged debt. Debt whose interest rate is fixed or protected, reducing the risk of rising rates.

Provider. A supplier of a layer of capital, such as a bank, a mezzanine fund, or an equity investor.

Optimal leverage. The level of debt that balances the higher equity return against the higher risk of distress.

Residual. The cash flow or value remaining after senior claims are met, belonging to the common equity.