How International Capital Finances Commercial & Industrial Solar Projects in Sub-Saharan Africa

A Qualitative Case Study of Frictions, Mechanisms, and Development Mandate in Kenya's Intermediated Financing System

Master's thesis in Management and Economics of Innovation & Quality and Operations Management

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Abstract

Across sub-Saharan Africa, the capital that finances commercial and industrial (C&I) solar PV projects stems primarily from international development finance institutions (DFIs). DFIs are publicly funded with a mandate to finance what private capital would not, called additionality. They primarily invest through an intermediated chain in which intermediary funds finance developers, who build and operate the projects for offtakers. Existing research focuses on DFI finance at the deal or portfolio level, so how capital and requirements move through the intermediary layer to the final beneficiary is poorly understood. This thesis uses a qualitative abductive method with the Kenyan C&I financing system as an instrumental case. It maps the actors in the chain, identifies the frictions arising between them, and evaluates the outcomes against the additionality mandate. The study draws on 23 interviews and on information asymmetry and principal-agent theory to explain the underlying mechanisms. The conditions DFIs impose at the top, such as environmental, social, and governance requirements and credit checks, cascade down the chain. Intermediaries pass them on while adding their own monitoring and reporting costs at each step. The cumulative burden falls heaviest on developers, and the chain functions as a filter, selecting those who can carry it and excluding those who cannot. Measured against the mandate, financial additionality (lending where private capital will not) holds deal by deal because local capital is absent. At the market level, it is weaker, held back by this filter and by capital that arrives after commercial investors have priced the early risk. Developmental additionality (the standards DFI capital brings) holds through stronger environmental and social requirements, stronger credit discipline, and technical assistance. The two are linked, however, and cannot be improved independently. The additionality framework is therefore more useful for describing trade-offs than as a separate test on each measure.

Keywords: intermediated development finance, development finance institutions, commercial and industrial solar, additionality, information asymmetry, principal-agent theory, sub-Saharan Africa, Kenya

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If you are interested in the topic, in life in Nairobi, in GMP, or have any other questions, we are always happy to share our perspectives.

Adam Westberg & Marcus Breiter, Gothenburg, June 2026

Acronyms and abbreviations

AFD	Agence Française de Développement (French Development Agency)
AML	Anti-Money Laundering
BII	British International Investment
BNEF	Bloomberg New Energy Finance
C&I	Commercial and Industrial
CAPEX	Capital Expenditure
DEG	Deutsche Investitions- und Entwicklungsgesellschaft (German Investment Corporation)
DFC	U.S. International Development Finance Corporation
DFI	Development Finance Institution
E&S	Environmental and Social
EDFI	European Development Finance Institutions
EMDE	Emerging Market and Developing Economy
EPC	Engineering, Procurement, and Construction
EPRA	Energy and Petroleum Regulatory Authority (Kenya)
ESG	Environmental, Social, and Governance
ESMS	Environmental and Social Management System
FMO	Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (Dutch Development Bank)
FX	Foreign Exchange
GHG	Greenhouse Gas
GW	Gigawatt
IDB	Inter-American Development Bank
IFC	International Finance Corporation
IFU	Investment Fund for Developing Countries (Danish impact fund)
IPP	Independent Power Producer
IRR	Internal Rate of Return
KenGen	Kenya Electricity Generation Company
KES	Kenyan Shilling
KETRACO	Kenya Electricity Transmission Company
KfW	Kreditanstalt für Wiederaufbau (German state-owned investment and development bank)

KPI	Key Performance Indicator
KPLC	Kenya Power and Lighting Company
kWh	Kilowatt-hour
KYC	Know Your Customer
LCOE	Levelised Cost of Electricity
LP	Limited Partner
MW / MWp	Megawatt / Megawatt peak
NORAD	Norwegian Agency for Development Cooperation
O&M	Operations and Maintenance
OPCO	Operating Company
PPA	Power Purchase Agreement
PV	Photovoltaic (Solar)
ROI	Return on Investment
SDG	Sustainable Development Goal
SME	Small and Medium-sized Enterprises
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
TA	Technical Assistance
USD	United States Dollar
VAT	Value Added Tax
VC	Venture Capital

Contents

1

Introduction

The following chapter introduces the topic and research context, articulates the problematization and aim, presents the research questions, outlines the methodological approach, and defines the study's delimitations.

1.1 Background

In most advanced economies, a company that wants to install solar panels can raise finance through domestic banks or other private capital providers. Across sub-Saharan Africa, that option barely exists. Local banks lend too cautiously, and equity markets are too thin, so the long-dated capital that solar projects need comes from outside the region (BloombergNEF, 2019). Most of it arrives through development finance institutions (DFIs). DFIs are publicly owned financial institutions that invest in the private sector of developing countries where commercial capital cannot or will not (Léon, 2025a). They include Sweden's Swedfund, the UK's BII, France's Proparco, and others. In Kenya, DFIs and DFI-backed funds underwrite most of this financing that, in advanced economies, would be supplied by private actors.

This reliance is visible in the commercial and industrial (C&I) solar segment. Here, private energy companies (referred to as *developers*) install solar PV systems at factories, hospitals, malls, and other customers (referred to as *offtakers*) to partly displace the expensive grid power. In Kenya, C&I solar has grown from approximately 15 MW of installed capacity in 2018 (BloombergNEF, 2019) to 283 MWp by 2026, making it the single largest solar segment in the country by capacity (Global Solar Council, 2026). The economics are favourable. C&I grid tariffs run as high as $0.148 per kWh (Global Solar Council, 2026), while C&I solar can deliver electricity at $0.07 to $0.09 (Gregersen & Bhamidipati, 2020), meaning offtakers can significantly lower their operational cost by adopting solar.

The financing of the projects is, however, not straightforward. A typical project costs more than the offtaker wants to pay upfront, so developers raise finance to build the projects and recover their capital over several years. The offtaker often earns revenue in Kenyan shillings while the finance was raised in US dollars or euros, which produces a currency mismatch that is borne somewhere in the chain (El Aynaoui & Canuto, 2022; International Energy Agency, 2021). To handle this, a layered chain of actors has emerged. DFIs sit at the top of the chain, supplying the funds. Specialist *intermediary* funds raise capital from them and lend it to, or invest in, developers. Developers, the energy service companies that build, own, and operate the systems, then sell electricity or services to offtakers under long-term contracts.

The result is a system in which capital travels through several hands before it reaches a solar panel on a Kenyan factory roof. While a private investor in this market invests to earn a financial return, DFIs, as their capital is public, aim to do something different (Léon, 2025a). Their guiding mandate is *additionality*, meaning doing something that private capital would not (DFI Working Group on Blended Concessional Finance for Private Sector Projects, 2018). *Financial additionality* means investing in projects that private capital would not, and *development additionality* means adding something else that private capital would not, such as increased requirements on environmental or safety measures (OECD, 2021). How this system actually works on the inside, what frictions and outcomes it produces, and how it delivers on the development promise that justifies the public capital flowing through it, are the questions this study takes up. The study draws on information asymmetry and principal-agent theory to explain the central findings since the chain is a sequence of delegations in which each actor finances a counterparty it cannot fully observe.

1.2 Problematization

DFIs sit at the top of a chain they cannot see all the way down, and the academic literature on DFIs shares a similar limit. It has mapped the system mainly through its portfolio outcomes, such as a tilt toward the commercial interests of the funding country (Dreher et al., 2019) and a preference for lower-risk projects (Humphrey, 2016), but the actor-level mechanisms that produce those outcomes sit outside what aggregate data can show. Léon (2025a) characterises the interaction between private investors and DFIs as almost entirely unstudied, and De Haas and González-Uribe (2025) note that evidence on intermediated public lending rarely follows the capital past the bank to the actors that ultimately use it. At the same time, DFIs face

growing scrutiny on whether their additionality claims hold up in practice, and on whether their capital actually mobilises further private investment behind it. Mapping these mechanisms surfaces what aggregate data cannot. It reveals how the conditions DFI capital arrives with are absorbed and passed on between the actors, and how the additionality the mandate promises takes shape, or does not, in practice.

1.3 Aim and Research Questions

This thesis aims to map how DFI capital flows through the chain of actors to commercial and industrial solar offtakers in sub-Saharan African (SSA) markets without local commercial capital. Further, the thesis aims to evaluate whether the resulting outcomes are consistent with the mandate that justifies the presence of DFI capital in these markets. The study is guided by three research questions:

> ***RQ1:*** *How is the commercial and industrial solar financing system in Kenya structured?*

Structured in RQ1 is defined as who the actors within it are and how they interface. The Kenyan market here is used as an instrumental case (as defined in section 4.1). By establishing the structure of the financial system in Kenya, this question aims to draw conclusions for sub-Saharan Africa, which the following questions build upon.

> ***RQ2:*** *What frictions and outcomes arise as capital flows through the system, and why?*

Building on the mapping of RQ1, this question identifies the frictions and outcomes that arise in the financing system and the underlying mechanisms that produce them. The three terms are used in the report as follows: A *mechanism* is a recurring measure that one actor in the chain imposes on another to manage information asymmetry and agency costs. A *friction* is a financial or non-financial cost that an actor bears as a result of a mechanism imposed on it. An *outcome* is the structural pattern that arises once a mechanism and its associated frictions propagate across the financing chain.

> ***RQ3:*** *How do these outcomes align with the DFI mandate?*

The *DFI mandate* rests on the principle of additionality which is further developed in section 2.1.4. RQ3 compares the outcomes identified in RQ2 against this mandate to assess whether the system operates according to the rationale that justifies the use of public capital in private markets.

1.4 Research Approach

The research questions ask how a system functions, what mechanisms produce its patterns, and how those patterns align with a normative mandate. These are questions about logic and meaning rather than about measurable quantities, and they call for a qualitative design capable of capturing how participants in different positions describe the same system. A case study approach is appropriate because the financing chain operates as an integrated system whose mechanics cannot be isolated transaction by transaction and must be studied in depth. The Kenyan C&I solar market is selected as the case as it is both mature and dependent on DFI capital and intermediary structures.

1.5 Delimitations

The study examines C&I solar projects specifically and does not extend to larger utility-scale generation, or smaller systems such as off-grid solar home systems, or mini-grids. The actor set examined is restricted to those that participate directly in the financing chain, namely, offtakers, developers, local banks, intermediaries, and DFIs. Adjacent actors such as the national utility, regulators, panel manufacturers, and EPC contractors enter the analysis only as contextual constraints on the financing chain. Blended finance, in which concessional public capital is structurally combined with commercial capital to alter a transaction's risk-return profile, is not analysed in detail because the Kenyan C&I market operates predominantly outside such structures.

1.6 Thesis Structure

Chapter 2 reviews the literature on DFIs and on the Kenyan energy market. Chapter 3 sets out the theoretical lenses used in the analysis. Chapter 4 describes the method. Chapter 5 presents the empirical findings, organised first by actors, per RQ1, and then by mechanisms, per RQ2. Chapter 6 analyses and evaluates the system. Chapter 7 discusses the findings, and Chapter 8 shows the contributions.

2

Literature Review

In the following chapters, we aim to define core concepts that will be used throughout the research, as well as establish where the current research field has reached. See Glossary for further definitions of key terms. Section 2.1 contains a general description of development finance institutions (DFIs), their purpose, and internal activities. Section 2.2 gives an overview of renewable energy investing and ends with background on the C&I PV market in Kenya.

2.1 Development Finance Institutions

2.1.1 Definition and Typology of DFIs

DFIs are publicly owned financial institutions that invest in the private sector of developing countries (Léon, 2025a). They are typically majority-owned by national governments, which ensures their creditworthiness and allows them to raise capital on international markets on competitive terms (EDFI, n.d.-a; OECD, 2023).

DFIs can be unilateral, owned by a single country such as FMO in the Netherlands or DEG within Germany's KfW group, or multilateral, owned by several countries and often operating as the private sector arm of a larger multilateral development bank, with IFC and IDB Invest as notable exceptions to this model (Léon, 2025a). This study concerns unilateral DFIs, which are the dominant capital providers in the market examined.

Beyond their ownership structure, DFIs differ considerably in size, geographic focus, sectoral emphasis, and funding model. The IFC alone accounts for more than half of total assets among legally independent DFIs, while the eleven smallest bilateral DFIs together account for roughly six percent (Léon, 2025a). Most unilateral DFIs operate with a global mandate in principle, though in practice a significant num-

ber concentrate their activity in sub-Saharan Africa. Sectorally, financial services consistently rank first across most DFI portfolios followed by infrastructure. Some DFIs raise funds directly from capital markets by issuing bonds, while others rely on retained earnings or public transfers (Attridge & Novak, 2022).

To qualify as a DFI, an institution must be legally independent and self-sustaining, pursue public policy objectives, and enjoy government support (Xu et al., 2021). How well DFIs fulfil this rationale in practice is the subject of the literature reviewed in the sections that follow.

2.1.2 Rationale for DFI Existence

Capital market failures in developing countries justify public intervention in finance. The literature identifies three interrelated failures. Information asymmetries prevent commercial lenders from accurately assessing borrower risk in frontier markets (de Aghion, 1999; Eslava & Freixas, 2021; Stiglitz, 1993). Markets fail to capture the social returns generated by externalities, leaving socially valuable projects underfunded at private hurdle rates. Excessive risk aversion among commercial lenders compounds these gaps in contexts where local track records are thin and verification is costly.

The rationale for DFI existence thus rests on three interrelated premises (Léon, 2025a). Firstly, private sector development is assumed to be central to economic growth, generating employment, innovation, and structural change. Secondly, improving the business environment alone is insufficient to stimulate this development in low- and middle-income countries, where firms face persistent constraints in accessing finance and private investors remain reluctant to engage at the required risk level and tenor. Thirdly, investing in these markets is argued to be financially viable, with DFIs positioned as first movers demonstrating that development outcomes and financial soundness are compatible.

DFIs address these failures through more than simple gap-filling. Fernandez-Arias and Xu (2020) characterize DFIs as discovery agents that identify market failures and transfer knowledge to commercial lenders and policymakers. Mazzucato and Penna (2016) extend this further, framing DFIs as market-shaping actors particularly relevant in emerging markets and nascent industries such as the green economy. Across these roles, DFIs differ from private investors in not seeking to maximise risk-adjusted returns but balancing two objectives: financial return and the developmental impact of their investments (Léon, 2025a).

2.1.3 How DFIs Operate

DFIs occupy a distinct position between development banks and private investors. Unlike development banks, they do not provide concessional finance such as subsidised debt or grants, as they aim to set an example to private investors that the markets are financially viable and to avoid market distortions (Léon, 2025a). Unlike private investors, they prioritise projects with potential for societal benefit which might otherwise be rejected on commercial grounds due to high risk, provide additional services alongside their capital such as technical assistance (TA) and policy support, and adhere to a higher standard of environmental, social and governance (ESG) (Léon, 2025a).

DFIs operate through two channels (Léon, 2025a). Direct finance is suited to large projects and involves the DFI as a primary lender to a single counterparty. Intermediated finance routes capital through financial institutions or specialized funds and is structurally suited to smaller firms and projects as they are better able to screen and monitor borrowers (Liberti & Petersen, 2019). C&I solar projects are small by DFI standards, which makes the intermediated channel the structurally appropriate mode for this sector. Intermediation itself takes several forms, including commercial banks, specialist funds raising third-party capital alongside the DFI commitment, and dedicated platforms structured around a particular sector or geography (Léon, 2025a).

Instrument choice within these channels is uneven. Debt accounts for two-thirds to three-quarters of DFI portfolios. Equity is used selectively, notably by BII and the Nordic DFIs. Guarantees are used sparingly despite being theoretically the most cost-efficient instrument for closing financing gaps without distorting market pricing (Arping et al., 2010; de Aghion, 1999; Eslava & Freixas, 2021; Hainz & Hakenes, 2012). Dos Santos and Kearney (2018) attribute the underuse of guarantees to demand-side problems where guarantees are seen as expensive and lacking simplicity, and to supply-side problems where guarantees are treated as loans in DFI portfolios and consume significant capital.

The IFC Performance Standards function as the de facto reference framework for Environmental, Social and Governance (ESG) standards, with most bilateral DFIs adopting or adapting them through institutional harmonisation efforts coordinated through EDFI (the european DFI group) and similar bodies (EDFI, n.d.-b; International Finance Corporation, 2012). It is well established that DFIs impose strict due diligence, know-your-customer (KYC), and ESG requirements as conditions of investment (Léon, 2025a). The impact of these requirements on the intermediaries and downstream actors who must absorb them remains largely unstudied.

Internal organization shapes how DFIs translate mandate into practice but remains understudied (Léon, 2025a). Sundberg (2023) documents a shift in decision-making from field offices to headquarters, raising concerns about over-reliance on hard information over soft information (Liberti & Petersen, 2019). This potentially excludes firms that cannot provide hard data, which is directly relevant to how DFIs assess intermediaries and developers in frontier markets where soft information dominates.

P. Carter et al. (2021) observe that DFI capital allocation is demand-led, since borrowers self-select into approaching the DFI based on whether commercial alternatives are available to them. The borrower pool is thus shaped by who arrives rather than by who the DFI seeks out.

2.1.4 Additionality and Mobilization

The fundamental principle of DFI operation is additionality (Léon, 2025a). Additionality is an ambiguous term defined in various ways across the literature, and we follow the OECD definition of an additional intervention as one that "will lead, or has led, to effects which would not have occurred without the intervention" (OECD, 2021). The DFI Working Group on Blended Concessional Finance for Private Sector Projects (2018), including 23 multilateral and bilateral DFIs, states that DFI support should make "a contribution that is beyond what is available, or that is otherwise absent from the market, and should not crowd out the private sector". The literature distinguishes two types of additionality: financial and development (OECD, 2021).

Financial additionality asks whether a given investment would have happened without the DFI. When it would not, DFI involvement raises total investment in the market rather than substituting for capital that was already available (OECD, 2021). The concept also extends to the terms on which capital flows, so that finance offered on longer tenors, at lower collateral requirements, or in capital-stack positions the commercial market will not take falls within financial additionality where these terms are themselves what makes the investment possible (OECD, 2021). P. Carter et al. (2021) note that financial additionality is hard to measure with standard econometric methods, because the counterfactual of what would have happened without the DFI cannot be directly observed.

Mobilization is the related question of whether DFI investment crowds in private capital alongside its own and is treated as a dimension of financial additionality by the OECD (OECD, 2021). The DFI Working Group on Blended Concessional Finance for Private Sector Projects (2018) frames mobilization as a positive obligation, stating that DFI support should "contribute to catalysing market development

and the mobilization of private sector resources" alongside the requirement not to crowd out commercial capital. Mobilization can be explicit, through co-financing arrangements in which DFIs and private investors contribute to the same transaction, or tacit, through demonstration effects and the absorption of first-mover costs that lower the risk facing later investors (Collier et al., 2020; Léon, 2025a). The intended outcome is that a small public intervention levers a larger private capital response.

Development additionality asks what DFI involvement adds once capital has arrived, namely the non-financial contributions that the private sector would not have provided on its own (OECD, 2021). These contributions typically include environmental, social, and governance standards that raise behaviour above the market floor, and technical assistance and knowledge transfer that build capacity inside the investee (Léon, 2025a; OECD, 2021). Development additionality is closer to the development-impact concept used in the wider evaluation literature and is easier to assess than financial additionality, since the non-financial contributions are observable in ways the financial counterfactual is not (OECD, 2021).

A sceptical strand of literature questions whether DFI allocation in practice meet these claims. DFI lending decisions may be influenced by the political interests of sponsoring countries. Dreher et al. (2019) document board composition effects on IFC lending, and Boucher et al. (2024) show electoral cycles in DFI allocation. Léon (2025a) notes that DFIs can serve as promotion vehicles for originating-country commercial interests even when this is not explicitly stated.

Further empirical patterns raise similar concerns about whether claimed additionality is delivered in practice. Humphrey (2016) and Humphrey (2017) find that DFIs favor lower-risk projects to maintain access to international capital markets, a tendency reinforced by the growing role of rating agencies. Gajigo et al. (2023) finds that DFIs across Africa favor extending Letters of Credit to larger rather than smaller local banks, increasing concentration in the banking sector and possibly restricting loan approval for SMEs since bank size correlates positively with firm size.

A theoretical concern underlies these empirical patterns. P. Carter et al. (2017) frame the central tension for DFIs as the balance between achieving financial additionality and avoiding the crowding out of private markets. Without effective screening to distinguish projects that need DFI investment from projects that are commercially viable at market rates, DFIs can crowd out private capital as a byproduct of asymmetric information between the DFI and market actors. They argue therefore that DFIs operate in a second-best world where some misallocation and

crowding-out is unavoidable, and where the realistic task is to approximate good mechanisms that exhibit desirable properties rather than to implement a theoretical optimum.

DFIs sometimes price debt above market comparators to demonstrate non-crowding out, but the full package they offer (debt alongside political risk mitigation and TA) can still be more appealing to sponsors than what commercial investors offers, producing crowding out nonetheless (P. Carter et al., 2021).

DFI activity is sometimes embedded in blended finance structures that combine concessional public capital with commercial capital to alter the risk-return profile of a transaction (Flammer et al., 2025). The Kenyan C&I PV market examined in this study operates predominantly outside such structures, and blended finance is therefore not analysed in detail.

2.1.5 What the Literature Has Not Studied

The literature on DFIs is itself still in its early stages, and Léon (2025a) characterises the interaction between private investors and DFIs as almost entirely unstudied in a recent literature review of DFIs. This blind spot has analytical consequences. A range of outcomes attributed to DFI activity have been documented at the portfolio level, including allocation patterns that track originating-country interests (Boucher et al., 2024; Dreher et al., 2019), preferences for lower-risk projects (Humphrey, 2016, 2017), concentration toward larger intermediaries (Gajigo et al., 2023), and unintended behavioural effects on supported banks (Léon, 2025b). These studies establish that such patterns exist, but the actor-level mechanisms producing them sit largely outside what the data can show. De Haas and González-Uribe (2025) observe that evidence on intermediated public lending programs is limited and rarely extends to estimates of impact on final beneficiaries, and Léon (2025b) describes the screening, selection, and monitoring processes of DFIs as understudied.

What is missing is an account from inside the chain: how capital and conditions actually move between DFIs, through intermediaries, to their final beneficiaries, and what each actor requires from the next. Without this operational logic, the portfolio-level patterns remain difficult to interpret beyond the patterns they describe. This study addresses that gap by qualitatively examining this chain in the Kenyan C&I market, a setting which relies on DFI capital and intermediated deployment, and in which the interfaces between DFI, intermediary, developer, and offtaker can be observed from the inside.

2.2 Renewable Energy Finance

2.2.1 Investing in Renewable Energy

Energy infrastructure carries a financing profile distinct from most other private sector investments. Projects span long lifetimes, typically twenty to thirty years, require large upfront capital before any cash flow is generated, and the assets themselves are physically fixed to a site and cannot easily be moved or repurposed (L. Carter & Bond, 1996). Within this asset class, C&I solar, i.e., solar PV (photovoltaic) panels installed at a commercial or industrial host facility for on-site electricity generation and consumption, carries an additional layer of complexity. The amount invested per project is small, projects are physically dispersed across many customers, and the company paying for the electricity is a private business rather than a government entity, so each project carries its own credit risk that has to be assessed individually (International Renewable Energy Agency, 2024).

Two Financing Arrangements: Project Finance and Corporate Finance

Two financing arrangements have emerged to accommodate this profile. Corporate finance involves the company developing the project (the "sponsor") raising capital against its own balance sheet, with project risk borne by the sponsor and debt capacity determined by the firm's overall financial standing (Damodaran, 2015). Project finance involves the creation of a separate legal entity that holds the project(s) and nothing else, kept legally walled off from the parent company. It is funded by equity and by non-recourse debt, meaning debt that lenders can only collect from the project(s) itself, not from the parent (Esty & Sesia, 2007; Yescombe, 2014). Lenders therefore depend entirely on the project's own cash flows, which come from a long-term offtake agreement (typically a power purchase agreement, or PPA) that fixes the price of electricity sold over the contract life. The choice between the two structures determines where project risk sits and what makes the project "bankable", i.e., acceptable to finance from a risk against return perspective. Corporate finance relies on the sponsor's overall financial strength, project finance relies on the offtake contract and on how risks are divided between the parties through that contract (Yescombe, 2014). For C&I solar, project finance is typical at scale because it allows lenders to provide debt with long repayment periods (long "tenor") secured against a portfolio of PPAs, without the parent company having to guarantee it.

The Capital Stack and Its Instruments

In either structure, capital is supplied in layers, ranked by who gets paid first if the project performs and who absorbs losses first if it does not. This ranking is called seniority, and the layers together are called the capital stack. Senior debt sits at the top, repaid first and carrying the lowest return expectation. Mezzanine or junior instruments sit in the middle, absorbing losses before senior capital is touched and carrying a higher return to compensate (Habbel et al., 2021; Hussain, 2013). Equity sits at the bottom, fully exposed to project performance and demanding the highest return. Mezzanine is structurally important to the capital stack because it can be implemented as junior equity, junior debt, convertible grants, or first-loss guarantees, and it is the primary instrument through which concessional capital encourages (or "catalyzes") senior commercial investors to enter deals they would otherwise stay out of (Habbel et al., 2021; Hussain, 2013). Junior equity sits below senior investors and absorbs losses first, which makes senior positions safer and lets them accept a lower return. Junior debt does the same job for senior debt: by taking first loss, it lowers the price senior lenders charge and makes them willing to lend for longer. Within clean energy globally, the capital structure relies more on debt than on equity, with debt accounting for more than half of renewable energy financing, a share that has grown as lenders have become more comfortable with the cash flow predictability of operating renewables (International Energy Agency, 2021; International Renewable Energy Agency, 2024).

Renewable Energy Investment in Developing Economies

This pattern does not hold in emerging market and developing economies (EMDEs). Clean energy projects in EMDEs carry a higher equity share, reflecting both the higher cost of debt and the limited supply of long-tenor debt willing to finance the asset class (OECD, 2022). Surveys place the cost of capital for clean energy in EMDEs at roughly twice that of advanced economies, driven by a combination of country-level political and currency risk, financial-sector underdevelopment, and project-level execution risk (International Energy Agency, 2024a; UNEP Copenhagen Climate Centre, 2024). Local banking systems are often underdeveloped, with limited ability to offer the long tenors renewable energy assets require, and credit history on EMDE borrowers is sparse, raising perceived risk and the interest rates at which capital is deployed (International Energy Agency, 2021; Prasad et al., 2022).

When the local financial markets are undeveloped, the industry needs to rely on international capital for growth. International capital is typically supplied in hard currency, i.e., currencies with stable exchange rates, usually US dollars ($) or eu-

ros (€), while EMDE company revenues accrue in local currency. This produces a currency mismatch as the local currency is more unstable than the hard currency. Foreign exchange risk has to sit somewhere, either with the project sponsor or with the offtaker, and it is expensive to insure (or "hedge") against (El Aynaoui & Canuto, 2022; International Energy Agency, 2021). The consequence is that relying on international capital carries a built-in currency exposure that cannot easily be removed. The combined effect is that the financing recipe that works for renewable energy in advanced economies, mostly long-term senior debt with a small layer of equity on top, is not available in most EMDE settings. This creates space for development finance institutions and other concessional capital providers to occupy positions private commercial capital cannot or will not.

2.2.2 The Kenyan Commercial and Industrial Solar Setting

Kenya's Electricity Sector

Kenya's electricity sector is organized as a chain (generation, transmission, and distribution), with most of each layer held by a single dominant entity and little competition at the consumer end. Total installed generating capacity is approximately 3.3 GW, dominated by renewables, which accounted for roughly 90% of generation in 2023, with geothermal at 47%, hydro at 21%, wind at 16%, and solar PV at around 4% (International Energy Agency, 2024a). For comparison, Sweden's installed capacity was more than fifteen times larger at roughly 57 GW in 2024 (International Energy Agency, 2024b). Generation is led by the majority-government-owned Kenya Electricity Generation Company (KenGen), with independent power producers (IPPs), private companies that generate electricity and sell it to the utility under long-term contracts, supplying around 30% of grid power (International Energy Agency, 2024a). The Kenya Electricity Transmission Company (KETRACO) is responsible for the high-voltage transmission network (the long-distance lines that move electricity from where it is generated to where it is distributed), a role formally assigned to it under the Energy Act of 2019. The Kenya Power and Lighting Company (KPLC), majority government-owned and listed on the Nairobi Securities Exchange, holds an effective monopoly over both the local distribution network (the lines that carry power to homes and businesses) and the sale of electricity to end customers (International Energy Agency, 2024a). The sector is regulated by the Energy and Petroleum Regulatory Authority (EPRA), established under the Energy Act of 2019 as the successor to the Energy Regulatory Commission (Gregersen & Bhamidipati, 2020). C&I customers represent a small share of grid connections but account for approximately half of total electricity consumption, which makes them disproportionately important to KPLC's revenues and gives them political

and commercial weight in the sector (Gregersen & Bhamidipati, 2020).

Demand Drivers

Three structural conditions create the demand for C&I captive solar (PV installed at a commercial or industrial host facility for on-site consumption) in Kenya. The first is cost savings. Grid tariffs for industrial customers range from approximately \$0.044 to \$0.105 per kWh and for commercial customers from \$0.052 to \$0.148 per kWh (Global Solar Council, 2026), against the all-in cost of generating power (the levelised cost of electricity, or LCOE) from C&I solar (covering equipment, installation, financing, and maintenance averaged across the project's life), reported in the range of \$0.07 to \$0.09 per kWh (Gregersen & Bhamidipati, 2020), with BloombergNEF (2019) projecting the benchmark cost falling from \$0.14 per kWh in 2018 to \$0.07 per kWh by 2030. Second, grid reliability is poor enough to materially affect business operations: outages average 5.8 hours per occurrence, 94% of large enterprises operate diesel back-up generators (Gregersen & Bhamidipati, 2020), and the World Bank Enterprise Survey reports losses equivalent to approximately 5.4% of annual sales due to outages (World Bank, 2019). However, PV systems connected to the grid without back-up generation (commonly diesel generators or batteries), cannot operate during blackouts. Third, the underlying customer base is substantial. As of 2016, around 800 manufacturing establishments had annual turnover above \$1 million, the rough turnover threshold above which a 500 kW captive system (a typical mid-sized C&I installation) pays back fast enough to be worth installing, with the majority concentrated in Nairobi, Mombasa, Kiambu, Nakuru, and Kisumu counties (Gregersen & Bhamidipati, 2020). The combination of cheaper electricity than the grid offers, a hedge against unreliable supply, and a sufficient pool of creditworthy customers underpins the sector's growth from approximately 15 MW of installed C&I capacity in 2018 (BloombergNEF, 2019) to approximately 283 MWp by 2026 (Global Solar Council, 2026), making C&I the single largest segment of installed solar PV in Kenya by capacity.

Regulation

The regulatory framework permits distributed C&I solar but does not actively support it. Captive installations below 1 MW require no generation licence under the Energy Regulations of 2012. Installations above 1 MW require a generation licence or permit from EPRA, with PPA review forming part of the licensing process (BloombergNEF, 2019; Gregersen & Bhamidipati, 2020). Solar modules and inverters are exempt from import duty though subject to a 16% VAT (Global Solar Council, 2026). KPLC retains its statutory monopoly on electricity distribution and retail, which means that arrangements where a third party generates electricity and

sells it to a customer using KPLC's grid as a delivery channel (sometimes called wheeling) operate in a regulatory grey zone, and PPAs above the 1 MW threshold can take a long time to approve as a result. Net metering (a mechanism that lets self-generators feed surplus power back into the grid in exchange for credits) was provided for in Section 162(1) of the Energy Act of 2019, but the rules needed to operationalise it had not been formally issued at the time of writing (Global Solar Council, 2026; Gregersen & Bhamidipati, 2020).

Contracting Structures

In practice, three contracting structures dominate: direct purchase, operating lease, and PPA. Direct equipment purchase is favoured by offtakers who can self-finance and benefit from tax credits available on this kind of capital investment (Gregersen & Bhamidipati, 2020). In an operating lease and a PPA structure, the offtaker pays for the service of receiving energy, not for the equipment itself. The developer continues to own the system and is responsible for operations and maintenance (O&M) over fifteen years, while the offtaker pays for the energy. In an operating lease, the offtaker pays a fixed monthly fee to the developer, regardless of the quantity of energy consumed, this is the most common third-party-financed structure due to its simplicity. In a PPA, the offtaker pays an agreed upon price per kilowatt-hour of electricity delivered from the system, and their bill might therefore differ each month depending on the level of sun irradiation. PPA is the rarest of the three structures because of the regulatory friction described above (Gregersen & Bhamidipati, 2020).

In direct purchase, the developer engages an engineering, procurement and construction (EPC) contractor for the build only, and once the system is handed over, the contractor's role ends and the offtaker owns and operates the system itself. In lease and PPA structures the developer plays the role of an energy service company, owning, and operating the captive installation and recovering capital through service fees over the contract life (Gregersen & Bhamidipati, 2020). The service role and the EPC role are sometimes performed by the same company and sometimes by separate firms. The contracting choice determines what kind of financing is needed. Leases and PPAs require outside capital that is willing to lend for long periods against the credit of a corporate customer, while direct purchase is typically paid for by the offtaker itself or covered by short-term commercial debt.

International and Local Capital in Kenyan C&I Financing

Local banks have stayed largely on the sidelines of C&I solar financing, even where dedicated green credit lines are available to them. Of the 43 commercial banks active in Kenya in 2020, only three (Diamond Trust Bank, Commercial Bank of Africa,

and Co-operative Bank) had lent meaningfully to C&I solar projects (Gregersen & Bhamidipati, 2020). They did so almost entirely through the SUNREF green credit line, funded by the French DFIs AFD and Proparco. SUNREF gave participating banks long-term US dollar loans at below-market rates of 5–6%, on the condition that the banks pass the financing on to renewable energy and energy efficiency projects (BloombergNEF, 2019; Gregersen & Bhamidipati, 2020). The structural reasons local banks remain absent are documented in the practitioner literature. Banks typically lend for three to seven years, while solar projects need to recover their cost over fifteen to twenty-five years. The repayment period banks offer is too short for the project economics to work (Gregersen & Bhamidipati, 2020). Loans are full-recourse (meaning the bank can claim against the borrower's other assets, not just the project, if the loan is not repaid) and require collateral and guarantees. Banks generally refuse to count the solar system itself as collateral, so borrowers have to pledge other assets on their balance sheet instead (Gregersen & Bhamidipati, 2020). Because SUNREF lends in US dollars, an offtaker earning revenue in Kenyan shillings ends up bearing the currency risk, and the practitioner literature identifies this as a significant reason offtakers turn the financing down (Gregersen & Bhamidipati, 2020). For smaller offtakers, the problem is compounded by the absence of long-term shilling-denominated credit history, which makes it harder for banks to assess them as borrowers in the first place. Third-party guarantees exist but banks describe them as inadequate and the providing institutions as bureaucratic (Gregersen & Bhamidipati, 2020). Beyond SUNREF, conventional commercial bank lending to C&I solar remains rare as market interest rates on Kenyan-shilling loans of 11–13% sit far above the SUNREF concessional rate, making non-SUNREF debt economically unattractive for most C&I offtakers (BloombergNEF, 2019).

The structural absence of long-tenor local debt creates the space that international capital occupies. Since 2014, a set of private financiers and energy service companies has emerged to provide tailored financing to C&I offtakers, including Crossboundary Energy, Solarise Africa, Ecoligo, Maris (via Equator Energy), responsAbility, SunFunder, Faber Capital, Ariya Capital, and SolarAfrica (BloombergNEF, 2019; Gregersen & Bhamidipati, 2020). Most are headquartered outside Kenya, with capital raised in international markets and deployed into Kenyan offtakers through equity, lease, and PPA structures. The capital stack supplying these intermediaries has the layered form described in Section 2.2.1, with one critical difference. In advanced markets, the senior debt layer is supplied by domestic commercial banks. In Kenya, it is supplied largely by development finance institutions, either directly or through DFI-backed funds. Equity at the developer level is supplied by a mix of impact-oriented funds and strategic investors, with developers reporting that equity investors in this market expect annual returns of 15–22% in local currency terms (BloombergNEF, 2019). Mezzanine and junior debt sit predominantly with inter-

mediaries funded by DFIs. The mechanics of how this capital flows from the DFI through the intermediary to the developer, and what conditions are attached at each handoff, are the subject of the empirical chapter.

3

Theoretical Framework

This section introduces the theoretical framework that will be used to analyze the capital structures, frictions, and outcomes within the Kenyan C&I solar financing system and the research questions. The framework allows the study to move beyond describing the visual parts of the system, as asked by *RQ1*, to explaining *why* the actors in the system behave the way they do, as asked by *RQ2*. So, while empirical data can answer how the financing system is structured and identify visible frictions, the theoretical framework is needed to explain the underlying behaviour.

The framework is structured by Information asymmetry and Principal-agent theory. Information asymmetry theory explain how actors with different information interface. In this context, it identifies a gap in project quality and counterparty creditworthiness between upstream investors, local developers and offtakers. Principal agent theory complements this by acting as a behavioral and relational lens, explaining why the specific frictions and outcomes arise as these actors interface in the financing chain.

3.1 Information Asymmetry

The theory of information asymmetry originates from the article The Market for "Lemons": Quality Uncertainty and the market mechanism by Akerlof (1970). The study shows how an uneven distribution of information between buyers and sellers can lead to market failure, where worse products crowd out better. Later, Stiglitz (1993) provided a foundation for understanding how information asymmetries shape the allocation of credit in capital-intensive markets, making it highly suitable for analysing investment behavior in the Kenyan C&I solar sector. Their model shows that when lenders cannot perfectly observe borrower risk, higher interest rates worsen the pool of applicants (adverse selection) and weaken borrowers' incentives to exert effort (moral hazard). Because of this, banks may keep interest

rates at a certain level and limit how much they lend, rather than just charging a higher rate to everyone who wants a loan. This logic is very close to what we saw in 5.2.1 and analyzed in 6.1, where DFIs, funds, and banks have trouble judging which developers and offtakers are truly safe or risky. Projects are capital-intensive, returns are uncertain, and local track records can be thin, so traditional lenders may respond by restricting credit or requiring very strict terms, even for projects that are socially valuable and could, in principle, be profitable. According to Stiglitz (1993), credit rationing leads to under-investment in socially desirable projects because imperfect information and risk aversion prevent lenders from offering contracts to all viable borrowers. They also show that when information is imperfect, lenders rely not only on price, in this case interest rates, but also on non-price tools like credit limits and collateral requirements to manage risk.

When verifying the quality of actors in a system is costly, markets rely on signaling. Spence (1973) develops a foundational signaling theory that assumes high-quality actors can separate themselves from lower-quality types by undertaking observable, costly actions. Therefore, signaling theory explains how high quality actors can communicate their type under asymmetric information, but also how receivers interpret these signals when making decisions. The theory dictates that for a signal to be effective and credible, it must incur a cost. Whether that cost is financial, temporal, or reputational does not matter. What matters is that fraudulent signaling becomes economically irrational. In the Kenyan C&I PV context, this helps to conceptualise how developers and intermediaries try to position themselves in the eyes of DFIs and other financiers. It also explains how DFIs and private co-investors interpret those signals when deciding whom to finance and on what terms.

If information were complete and transaction costs negligible, there would be little reason for financial intermediaries to stand between capital providers and the final beneficiary (Claus & Grimes, 2003; Diamond, 1984). However, under conditions of asymmetric information, direct exchange becomes costly and uncertain, particularly when lenders face difficulty assessing project quality pre-contract and borrower behavior post-contract. This creates a fundamental information gap between international capital providers and local actors. In such contexts, financial intermediaries arise because they can specialize in information production, borrower evaluation, screening, and monitoring more efficiently than dispersed capital providers can on their own.

This logic is particularly relevant in development finance, where projects can be small, heterogeneous, and context specific. Intermediaries reduce frictions by aggregating transactions, standardizing due diligence, pooling risks, and generating soft information through repeated interactions (Claus & Grimes, 2003). This information

gap explains why financing systems adopt layered structures rather than direct links. Once intermediaries are established, however, the analytical focus shifts to governance within this chain. Expertise in screening and monitoring can be delegated to specialized organizations, creating structured capital flows despite uncertainty and weak disclosure (Diamond, 1984).

3.2 Principal-Agent Theory & Mechanism Design

When capital is delegated through a chain of actors, a series of principal-agent relationships emerges. Agents pursue their own objectives, which systematically diverge from those of principals due to differences in information, risk tolerance, and incentives (Jensen & Meckling, 1976). Jensen & Meckling also established that these relationships inherently involve agency costs resulting from divergent goals and the principal's inability to perfectly monitor the agent.

These costs are not merely transactional but structural. Principals get [1] monitoring costs to observe agent behavior while agents bear [2] bonding costs to signal alignment (Jensen & Meckling, 1976). Despite such mechanisms, [3] residual losses persist because the agent's actions still deviate from the principal's preference (Laffont & Martimort, 2002).

In contrast to the standard principal-agent model where one owner delegates to one manager, common-agency theory emphasizes situations in which several principals with partly divergent incentives exert control over the same agent through contracts, mandates, and monitoring arrangements (Voorn et al., 2019). This multiple-principal setting can produce conflicting demands, higher governance costs, duplicated oversight, and blurred accountability, where the agent has to balance the demands and may end up choosing the safest and easily defensible action rather than the most optimal one.

To explain how DFIs and intermediaries structure financing instruments under asymmetric information, mechanism design and contract theory are used in a complementary way to principal-agent theory. Mechanism design highlights that DFIs do not only choose projects but also design rules (P. Carter et al., 2017). Rules such as ticket sizes, eligibility criteria, risk-sharing terms, and concessional layers determine which types of agents find it attractive to participate. These instruments function as selection mechanisms and can be interpreted as attempts to mitigate adverse selection and moral hazard along a principal-agent chain (Bolton & Dewatripont, 2005). In the context of C&I solar financing, this is directly relevant for interpreting why certain actors appear repeatedly in DFI-backed portfolios, while others

remain systematically under-served. In this sense, the framework treats observed DFI–Intermediary–Developer–Offtaker arrangements as mechanisms that transform informational and agency problems into particular patterns of access, exclusion, and risk allocation.

4

Method

4.1 Research Design

This study adopts a qualitative case study design to examine how C&I solar financing systems in sub-Saharan Africa with DFI capital operate. The C&I financing system in Kenya is used as an instrumental case. Instrumental cases are used to get insights into broader issues than the case itself (Stake, 1995). In this study, the case serves to reveal the interactions, frictions, and underlying mechanisms of C&I financing systems in sub-Saharan Africa.

The philosophical foundation this research adopts is critical realism. According to Bell et al. (2022) collected data can be viewed through two lenses. There is the visible part, in our case what the interviewees say, but there is also the hidden part that explains what was brought up by the interviewees. When analyzing the results, it allows research to move beyond just reporting what was said in the interviews to explaining the reasons they said it. This philosophy combines realist ontology, that there is a reality independent of our knowledge of it, with relativist epistemology, our understanding of this reality is always socially and historically conditioned (Bell et al., 2022).

In alignment with this ontology, the study employs abductive logic and the method of retroduction. Bell et al. (2022) note that abduction involves an iterative process of moving back and forth between the empirical findings and theoretical framework, adapting the framework as new data emerge. The research started with pilot interviews to map the system and understand overarching dynamics. Bell et al. (2022) explain this as an open-ended qualitative approach that allows the researcher to capture the complex nature of a context before attempting to define strict categories. These empirical findings seemed to be best described by theories such as information asymmetry (Akerlof, 1970; Stiglitz & Weiss, 1981). These theories were used as sensitizing concepts rather than for testing a hypothesis deductively. As

Bell et al. (2022) explain, concepts and theories in qualitative research often serve as an open-ended starting point to help reflect on and organize the data, rather than acting as definitive concepts that dictate exactly what must be measured. As new findings emerged, the theoretical framework was continuously adapted in accordance with new empirical findings (Bell et al., 2022). This is the abductive logic. Then, the retroductive method was used to identify mechanisms that cause these findings, working backwards from observed patterns to select the best explanation and identify the conditions that have the potential to explain the phenomenon.

4.2 Data Collection

The data collection process combined primary data with secondary data to strengthen credibility through triangulation. Triangulation entails using more than one method or source of data in the study of social phenomena, allowing for the cross-checking of claims across different sources and stakeholder groups (Bell et al., 2022).

4.2.1 Case Justification

The Kenyan C&I solar market was selected as a relevant instrumental case for two reasons. First, it concentrates the structural conditions the research questions concern, which is a market reliant on DFI capital with intermediated financing structures. Second, it is one of the more mature C&I markets in sub-Saharan Africa, and many of the developers and intermediaries operating across the region built their initial projects in Kenya before expanding to nearby countries. This means participants accessed through the Kenyan market can carry experience that spans the broader regional system, allowing the study to draw on regionally-informed accounts while remaining anchored in a specific institutional context.

4.2.2 Primary Data

Primary data were gathered through semi-structured interviews with key actors within the entire C&I solar financing chain. To select participants, purposive sampling was used. In qualitative research, purposive sampling is a non-probability approach where the goal is to select cases or participants in a strategic way, ensuring that those sampled are highly relevant to the research questions (Bell et al., 2022). The sample involved a fair distribution among the categories of actors from across the financial ecosystem, with a larger focus on the developers and intermediaries since these actors have interfaces both downstream and upstream. This is

visualized in figure 4.1.

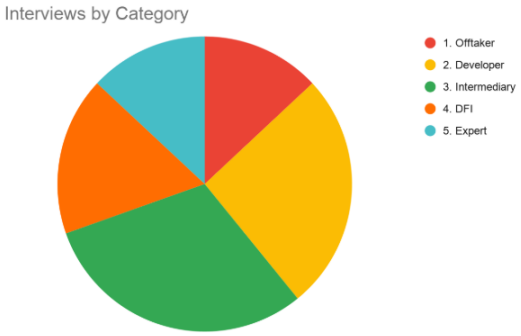

Figure 4.1: Distribution in categories of actors

Interviewees were primarily identified through targeted outreach via professional networks, industry platforms such as LinkedIn, and snowball sampling. Snowball sampling is a technique in which the researcher makes initial contact with a small group of people relevant to the research topic and then uses these individuals to establish contacts with others (Bell et al., 2022). More specifically, two companies in the space were used as access points to actors. A developer who introduced the offtakers and some intermediaries, and an intermediary who provided guidelines on which intermediaries and DFIs to contact.

The primary data collection was divided into an exploratory pre-study comprising five initial interviews to map the landscape and refine the interview guides, followed by the main data collection phase. As Bell et al. (2022) note, using qualitative interviews in a pilot stage is highly useful for exploring areas where the researcher initially has limited knowledge, allowing them to keep an open mind before the main study is launched. These exploratory interviews were conducted with one external expert, two developers, and two intermediaries.

The main data collection relied on a sample of 23 semi-structured interviews with offtakers, developers, intermediaries, and DFIs, supported by external experts. The semi-structured interviews were conducted either face-to-face or via video calls. In alignment with qualitative research best practices, the majority of the interviews were recorded and transcribed, a process that is crucial for capturing exactly what is said and enabling rigorous, detailed thematic analysis (Bell et al., 2022). In instances where recording was not possible, detailed field notes were taken either during or immediately after the interview was held.

In qualitative research, sample size is often evaluated through the concept of theoretical saturation (Bell et al., 2022). Saturation was determined to have been reached when, despite some new insights emerging from the final interviews, the

core themes and theoretical categories remained consistent, and no substantially new data emerged. Respondent actor group and role are summarized in Table 1, with an extended version in Appendix A. Throughout this thesis, interviewees are referred to by coded identifiers whose prefix denotes which actor they belong to: offtakers (OFF), developers (DEV), intermediaries (INT), development finance institutions (DFI), and external experts (EXP).

Table 4.1: Interviewees Overview

ID	Title	Organisation
OFF-1	Managing Director	Kenyan Industrial Park
OFF-2	General Manager	Kenyan Food Manufacturer
OFF-3	Plant Manager	Kenyan Pharmaceutical Manufacturer
DEV-1	Head of Business Development	Mature C&I Solar Developer
DEV-2	Former Bus. Dev. Associate	Early-stage C&I Solar Developer
DEV-3	CEO	Mature C&I Solar Developer
DEV-4	Head of Fundraising	Mature C&I Solar Developer
DEV-5	Co-founder	Early-stage C&I Solar Developer
DEV-6	CFO	Early-stage C&I Solar Developer
INT-1	Senior Investment Manager	European Impact Lender
INT-2	Associate Investment Director	Multilateral Guarantee Facility
INT-3	VP, Strategic Initiatives	Energy Credit Platform
INT-4	Finance & Analytics Specialist	Energy Credit Platform
INT-5	Senior Investment Officer	Energy Credit Platform
INT-6	Senior Partner	Nairobi-based VC firm
INT-7	CEO	European Impact Lender
DFI-1	Regional Director, East Africa	Nordic DFI
DFI-2	Senior Portfolio Coordinator	German Development Bank, prev. French DFI
DFI-3	Senior Investment Manager	Nordic DFI
EXP-1	Development & Trade Specialist	Swedish Development Institution
EXP-2	Finance Specialist	Kenyan National Treasury
EXP-3	Finance Catalyst	European Technical Assistance Facility
EXP-4	Founder & Advisor	Independent Development Finance Advisor

4.2.3 Secondary Data

Secondary data in the form of academic literature, organizational documents, public DFI policy guidelines, and industry reports were used to contextualize and cross-reference interview accounts. Documents are a valuable complement in qualitative research, but they must be evaluated critically and used in combination with other sources to fully interpret their context and meaning (Bell et al., 2022). The study only used public sources, which included investor and developer websites, white papers, industry statistics, and relevant sector reports. Bell et al. (2022) explain that utilizing secondary data is a strategy to increase the value of an investigation by contextualizing the primary findings without the need to collect all background information first-hand.

4.2.4 Development of the interview guide

As previously mentioned, exploratory interviews were used to form the basis of the research, refine the focus of the questions, and set the theoretical framework for the thesis. The interview guides were then designed to serve two purposes, reflecting the different types of questions necessary for comprehensive qualitative data collection. First, they were structured to probe for concrete, factual answers regarding how the financing system operates, specifically mapping what terms and conditions upstream investors demand, and what downstream actors require or can feasibly deliver. Second, the guides were formulated to capture the respondents' underlying opinions and subjective experiences. Guided by the principal-agent and information asymmetry frameworks, the interviews sought to uncover behavioral drivers of the system, probing into the actors' incentives, goals, and values. An aggregated interview guide for the different actors can be found in Appendix B.

4.3 Data Analysis

Data analysis proceeded alongside data collection, enabling the refinement of prompts, identification of data gaps, and active seeking of contrasting perspectives as themes emerged (Bell et al., 2022).

The study utilized a matrix-based thematic analysis, adapted from the Framework Method (Gale et al., 2013; Ritchie & Spencer, 1994). This approach was selected to manage the data for two primary reasons. First, the filtering enabled the comparison of data across the actors to understand the contrasting perceptions of the same category of frictions. Second, the thematic method allowed for a clear structural division between descriptive empirical data and analytical data, upon which the research is built.

The analysis followed this coding process using Excel for the creation and management of the coding matrix. Each interview was audio-recorded and transcribed, allowing the analysis to be grounded in exactly what the interviewees said (Bell et al., 2022). These extracts were then categorized into specific interfaces (e.g., DFI-Intermediary), topics, and relevance to research questions. We identified recurring codes across the extracts and grouped them to form the broader themes presented in 5.2. This workflow is visualized with the illustration of a Gioia structure in figure 4.2 (Gioia et al., 2013). A Gioia structure is a visual framework designed to map the progression from raw data to abstracts and themes. This visual structure complements the retroductive approach to the analysis by illustrating the analytical progression

from empirical observations to underlying causes. Codes were elevated to themes where the underlying mechanism was viewed or described differently across actor groups or where the theoretical framework offered explanatory leverage. The remaining codes captured basic market conditions on which actor accounts converged, such as the currency mismatch or grid costs. Because every actor in the system holds a broadly similar view of these conditions, they offer little for the information-asymmetry framework to analyse. They were therefore retained as part of the case description in section 5.1 rather than treated as themes in their own right.

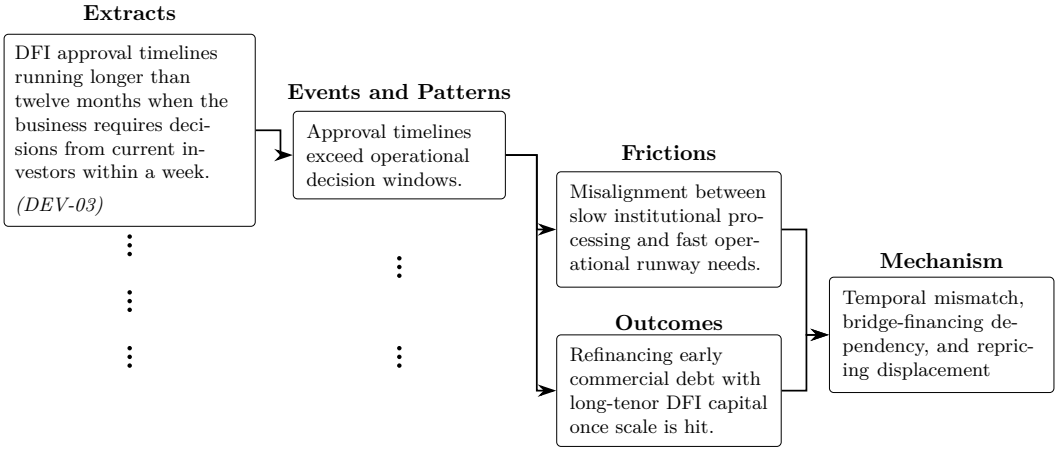

Figure 4.2: Gioia data structure illustrating temporal mismatch in DFI financing processes.

The combined empirical design produced two different analytical outputs as a result of critical realism philosophy and the retroduction method. First, the study constructed a comprehensive mapping of the system by capturing both the subjective descriptions of the interviewees and the actual events, actions, and structures that occurred. This makes it possible to interpret actors' reasoning and explain the underlying dynamics of how the system functions (Bell et al., 2022).

Lastly, to explain why these frictions or outcomes happened or why the actors behave in a certain way, we used retroduction to understand the underlying mechanisms that cause these events. This approach to data analysis enables us to rationally explain each actor's reasoning behind their actions and, therefore, explain why the system functions the way it does.

4.4 Research Quality and Credibility

To establish the rigor and trustworthiness of this qualitative study, the research design was evaluated against the Lincoln and Guba (1985) foundational criteria

for qualitative inquiry. Qualitative researchers often argue that traditional criteria such as reliability and validity are too firmly rooted in quantitative research (Bell et al., 2022). Trustworthiness is therefore frequently employed as an alternative standard containing the four aspects credibility, transferability, dependability, and confirmability.

Credibility asks how believable the findings are (Bell et al., 2022). Given the inherent risk of response bias in the data collection, credibility was a primary concern in this study. Bell et al. (2022) explain this type of bias with the social desirability effect, noting that respondents often show a tendency to give answers they perceive to be socially desirable or acceptable instead of providing an honest one. Because actors actively seeking capital may deliberately misrepresent their preferences to appear more favorable, the research employed data triangulation to cross-check the data. Claims made by one stakeholder were cross-checked against actors in the same category but also with actors in other categories. These were also cross-checked against external, neutral experts who lack the same incentive to skew their answers. With that being said, the interview accounts are personal, and their views do not represent those of the whole firm.

Transferability parallels external validity and asks whether the findings apply to other contexts (Bell et al., 2022). Because Kenya was utilized as an instrumental case study, many of the findings in the results are not specific to the Kenyan market. While some findings, particularly regarding downstream interactions, are specific to the local offtaker and developer level, the upstream dynamics reveal broader mechanisms. Therefore, while transferability can be partially ensured, it is ultimately up to readers and future researchers to conduct comparative research and assess which boundary conditions and data points are applicable to other specific markets in SSA. The details regarding transferability are discussed in more detail in section 7.1.

Dependability parallels reliability and questions whether findings are likely to apply at other times (Bell et al., 2022). This was secured through the use of the matrix-based Framework Method (Gale et al., 2013; Ritchie & Spencer, 1994). Although all participant data were anonymized, the coded identities (e.g., DEV-1) were used in the matrix. This spreadsheet also contains the date when the interviews were held together with transcripts and summaries. Therefore, the results can be traced back through the spreadsheet.

Confirmability is concerned with objectivity and ensuring that the investigator has not allowed their personal values or theoretical biases to intrude to a high degree (Bell et al., 2022). This was established by maintaining an open-ended, inductive approach to the interviews, which allowed for unanticipated themes. For example,

the initial theoretical framework was centered around blended finance and cost of capital, however this was challenged by the empirical data and later changed.

4.4.1 AI use and transparency

In this study, artificial intelligence (AI) was utilized as a supportive tool to streamline administrative, structural, and linguistic tasks. The software Klang AI was selected to generate initial interview transcripts and summaries due to its high standards in data security, privacy and compliance in accordance with EU law. To ensure empirical accuracy, we manually reviewed and corrected these outputs directly after each interview, specifically addressing potential exaggerations and misinterpretations of terminology and industry-specific abbreviations (e.g., correcting "ENS" to "E&S").

The Large Language Models Gemini and Claude were used during the early stages of the research to brainstorm the outline, research scope, and the structural framework of the methodology. Furthermore, these models were used for linguistic polishing and grammar refinements. All thematic coding, qualitative interpretations, and conclusions were developed and finalized by the authors. The AI tools served solely as a functional aid for processing, structuring, and linguistic refinement.

5

Results

This chapter presents the empirical findings. Section 5.1 answers RQ1 and describes the actors in the system and how they interface. Section 5.2 answers RQ2 and describes the frictions, outcomes, and mechanisms in the system.

5.1 Case Description

This section describes the actors identified in the C&I financing system, namely DFIs, Intermediaries, Developers, Offtakers, and Local Banks. It starts by introducing the actors and showing the sequence in which a C&I project is commissioned in Figure 5.1. Then, the actors are described in depth in isolation. Finally, a summary of how the actors are interlinked through the capital flows is presented. Taken together, these answer RQ1. Table 5.1 summarises the actor overview in this section.

Introduction of Actors

Two actors take part in building a C&I solar PV project. The *offtaker* is the commercial or industrial business, for example a manufacturing plant, that consumes the electricity from the project. The *developer* is the energy-service company that builds, operates, finances, and owns the project and sells its output to the offtaker.

Three actors take part in financing the project. The *intermediary* is a specialist fund that channels capital to suitable developers. The *DFI* is a publicly owned development finance institution that supplies the capital to the intermediary. DFIs can also invest directly into developers, although this is rare. A fifth actor, the *local bank*, is largely absent from the system and is treated separately below.

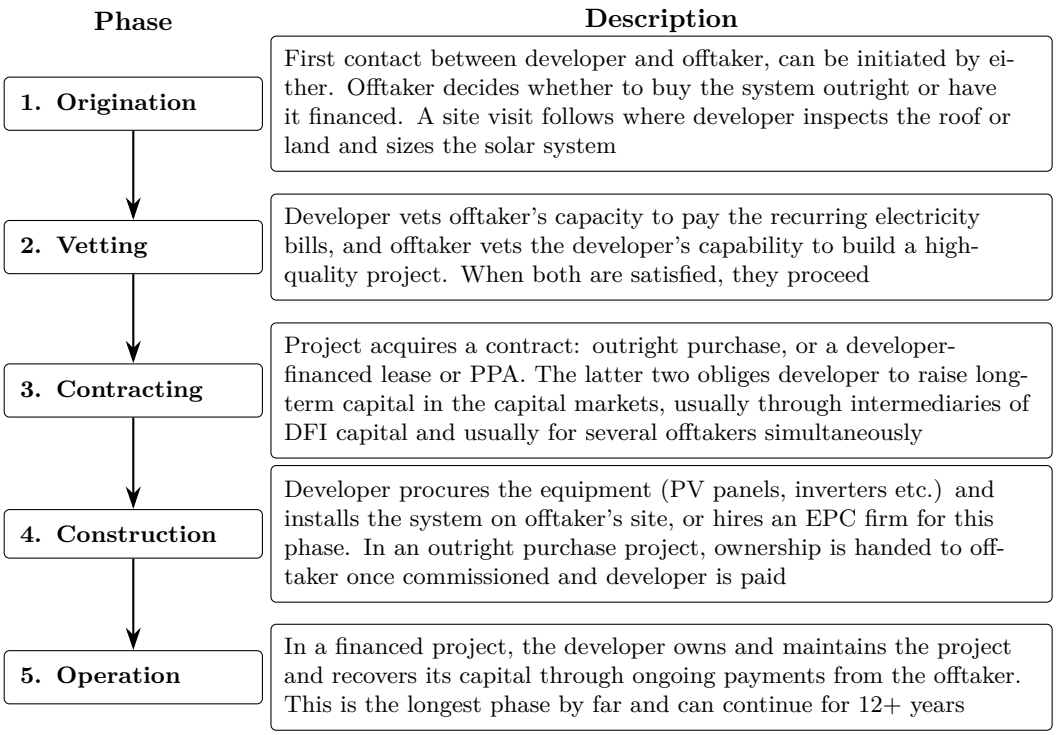

Figure 5.1: Generic C&I project development phases and descriptions

5.1.1 Offtakers

Offtakers are the commercial and industrial businesses purchasing electricity in Kenya, typically manufacturers, exporters, or multinational subsidiaries. They sit at the demand end of the capital stack. Without a creditworthy offtaker, no deal exists and no capital flows upstream.

The primary driver of offtaker adoption is cost reduction against the current grid tariff, and a hedge against rising future grid tariffs. OFF-2 identifies energy as accounting for approximately thirty percent of their unit cost and names it as a core operational KPI, with solar functioning as one of the most impactful levers for margin improvement. OFF-1 frames the same logic at the multi-tenant landlord level, with grid tariff savings and reliability combining into a dual financial and infrastructure case. Secondary drivers are present but structurally weaker. OFF-3 cites a global group mandate to cut CO2 emissions as a contributing factor alongside direct cost savings, noting that on-site renewable generation contributes meaningfully to the multinational parent's global carbon accounting even where the Kenyan grid is itself largely clean. Export-oriented offtakers face similar pressures through customer-side sustainability expectations.

The offtaker's decision between financing or purchasing the solar projects has generally moved towards financing for risk and capital focus reasons. OFF-2 describes

Table 5.1: Actor interfaces in the Kenyan C&I solar financing system

Actor	Downstream interface *(toward energy end-use)*	Upstream interface *(toward capital)*
Offtaker	None (located at the demand end)	Commits to a multi-year contract on cost-savings logic; vets developer for build quality and durability.
Developer	Builds, owns, and operates the system; carries multi-year contract exposure; vets offtaker creditworthiness.	Must demonstrate operational maturity, governance, ESG readiness, and equity skin-in-the-game to access debt.
Intermediary	Deploys stage-appropriate tickets; imposes operational, financial, and ESG conditions; may provide TA and fundraising support.	Offers diversified deployment DFIs cannot reach directly; commits to ESG, reporting, and impact terms; must show fundraising track record and pipeline.
DFI	Deploys long-tenor capital, mostly through intermediaries; imposes ESG and impact conditions; crowds in other DFIs.	Accountable to treasuries, boards, and political principals; must show financial soundness, impact, and additionality under competing ministry pressures.
Local bank	Could lend in local currency but largely absent; offers ~7-year tenor against 15-year project need; demands hard collateral.	Short-term deposit base; prefers government securities and retail products with better risk-adjusted return.

lease financing as the default mode in Kenya, reflecting established market norms and their and other offtakers' preference to invest in their core business rather than electricity generation. OFF-3 issued a competitive tender to several developers, as did OFF-1, and selected a twelve-year lease over purchase because the lease transferred operations, maintenance, and twenty-five year equipment performance risk to the developer, whereas a purchase would have placed that risk on the offtaker after roughly seven years.

Offtakers face three challenges that the following sections develop further. The first is FX exposure. Offtakers are generally reluctant to commit to twelve to fifteen year USD-denominated obligations and many do not fully grasp the embedded currency components of the grid tariff to which they are already exposed. OFF-3 is a specific exception, earning USD revenues through export manufacturing and therefore matching the hard-currency lease cleanly. The mechanism and its consequences for deal structuring sit in the case summary. The second is savings expectation mismatch. Offtakers frequently expect larger savings than the financing structures can deliver once the full capital cost chain is priced through, and this gap drives disengagement. The third is developer credibility concern. OFF-3's vendor onboarding and OFF-1's track-record requirement reflect careful pre-contract vetting in a market where developer failure or fraud would produce cascading reputational damage.

5.1.2 Developers

Developers are the Energy-as-a-Service companies that originate, build, own, and operate C&I solar assets under long-term contracts. They sit at the hinge of the system, facing the offtaker commercially and the capital market financially, and their business model is defined by the need to reconcile the two.

The central business logic is offering an electricity price lower than the grid tariff. The developers interviewed approach this differently. DEV-1 offers a fixed price set beneath the offtaker's current grid tariff, targeting gross saving between a quarter to a third against the national grid price. DEV-2 offers a floating price structured as a discount to the prevailing grid tariff that can range from marginal to more than half, so the saving tracks the grid price as it moves. The importance of the grid tariff is illustrated by DEV-1's quote:

> "The grid tariff is our North Star. If we aren't cheaper than the utility, we don't have a business. It's as simple as that." — DEV-1

Client targeting reflects this pricing constraint together with the FX and credit risk the developer cannot fully absorb. DEV-1 prioritises USD-earning offtakers such as flower and tea exporters to match hard-currency debt cleanly, alongside large industrials and rural clients facing higher grid tariffs, both of which improve margin and deal size. DEV-1 and DEV-2 both describe a preference for multinational clients with head-office sustainability mandates because the decarbonisation directive lowers negotiation friction and reduces reliance on pure financial sustainability. DEV-1 identifies the top-tier market as approaching saturation, with hundreds of developers competing for a shrinking pool of large structured offtakers and compressing margins, and flags smaller and less-structured offtakers, or international expansion as a growth necessity.

Developers interact with the capital markets to fund the projects they are building. INT-1 categorizes developers into two archetypes based on how they interact with the capital providers. He distinguishes finance-oriented developers, with strong internal capital structuring capabilities, from engineering-oriented developers, with strong operational and technical competence but lack the internal financial capabilities to successfully fundraise and manage DFI capital.

The business is organised around structural separation of the asset and operating layers. DEV-4 describes how debt investors lend to the asset company and are protected at the project level, while the operating company bears the fixed overheads

and may remain loss-making until portfolio scale covers them. Scale is therefore the precondition for overall profitability rather than a consequence of it, and platforms which fail to reach scale are consumed by overheads.

Developers pass through a predictable lifecycle sequence as they grow. DEV-3 traces seed-stage equity raised on team and plan alone, through growth stage where per-asset cash flow substantiation becomes the assessment basis, to scale at which large-ticket debt becomes accessible. DEV-5 describes raising roughly fifty million Swedish kronor in equity and shareholder loans before DFI conversations were relevant, confirming the early-stage reliance on concessional and sympathetic capital.

Developers face three recurring operational challenges. The first is FX mismatch, with hard currency debt typically funding local-currency revenues and the unresolved portion of the mismatch absorbed on the developer's own balance sheet. The second is cost of financing, which DEV-1 identifies as the single largest structural constraint on the business, with dollar debt at roughly eleven percent pushing PPA prices close to grid parity. The third is payment culture. DEV-5 observes that issuing an invoice in Kenya does not automatically trigger payment, with collection typically requiring personal follow-up, escalation to senior management, and direct engagement with finance departments, a dynamic described as widespread across sectors and one that determines whether a structurally profitable project is operationally profitable.

5.1.3 Local Banks

Domestic Kenyan capital plays only a small role in financing C&I solar, driven by an institutional incompatibility between the risk-averse local banks and requirements of C&I lending.

Local banks have green strategies and are not motivated solely by short-term returns (EXP-1). They have the capacity to lend in local currency, which would remove the FX risk currently absorbed somewhere in the stack. Several interviewees identify the South African local capital market as the precondition for that country's C&I market depth (DEV-3, DEV-4). The structural setup therefore exists for local banks to fill the financing gap.

In practice, several barriers prevent them from doing so. EXP-2 reports local bank tenors of seven to eight years against C&I project requirements of fourteen to fifteen, with deposit bases too short-term to support project finance. INT-2 confirms that across African markets excluding South Africa, most banks can only lend up to seven years. Banks are extremely risk-averse and benefit from high, safe, and quick returns on government securities and on simpler products such as auto loans, real

estate, foreign exchange, and short-term commercial credit, none of which carry the technical complexity of C&I project finance (EXP-2, DEV-3, EXP-4). This profitable alternative is always considered by the banks as the capital for a C&I project would come off the same balance sheet "as capital for a guy buying a car or a guy applying for a mortgage" (DFI-2). Their lending model requires hard collateral on the borrower's balance sheet rather than future cash flows from offtaker contracts, with collateral demands reaching one hundred percent of loan value (DEV-5, EXP-2, EXP-4). DEV-5 partnered with a local bank attempting a direct-to-offtaker financing model that ultimately failed because the bank demanded personal guarantees and a lien on the customer's entire commercial activity, leading the anchor customer to withdraw. DEV-5 also reports a workshop diagnosis that local banks lack a framework for evaluating solar equipment as a bankable asset, with panel prices having fallen from roughly three hundred to one hundred dollars per kilowatt further weakening the asset-backed case. DFI-1 names the same three barriers from the DFI side, namely insufficient cash flow track record, residual risk uncertainty, and a collateral framework that does not accept PV assets or offtake contracts. Local lending rates compound these structural barriers, with rates ranging from ten to twenty-five percent across sub-Saharan Africa and reaching thirteen to fourteen percent in Kenya, a level structurally incompatible with the margin C&I leasing can support (EXP-2, EXP-4).

A set of catalytic instruments has been deployed to shift risk away from local banks and encourage their participation. INT-2 and EXP-1 describe partial credit guarantees covering fifty to seventy percent of loan value through a guarantor's AAA-equivalent rating, with EXP-1 noting that perceived risk in Africa substantially exceeds actual risk and that guarantees can therefore achieve high crowding-in ratios. INT-2 also operates liquidity extension guarantees that act as refinancing guarantees, allowing local banks to lend at their seven-year sweet spot with the option to re-issue or be replaced at maturity. EXP-2 notes that DFIs have attempted to activate local banks through letters of credit issued at concessional rates, but banks have found that their own credit lines are more profitable and consequently do not actively promote the DFI lines, leaving the responsibility on the offtaker to identify the cheaper option. DFI-2 reinforces this from AfD (the French DFI) who ran the concessional Sunref credit line facility to local banks in East Africa between 2011 - 2016 to demonstrate that C&I did not require special facilities. The local bank response, as DFI-2 describes it, was a clear credit focus questioning structuring, securitization, return on investment. The banks ultimately reverted to their own logic of lending and the credit line failing to produce the behavioural shift it assumed. EXP-1 notes that even where instruments succeed, banks still require technical assistance to assess pipeline risk and follow through on green strategies. DFI-1 confirms early signs of local bank emergence in C&I, citing senior debt from

a Kenyan bank made possible by guarantees, but identifies tenor mismatch and the persistent absence of equity and mezzanine capital from local sources as remaining structural gaps.

Even with these instruments developing, local bank participation has not reached the scale at which it could meet the rates and tenors that developers need to beat the grid tariff. The structural dependence on hard currency from international capital therefore persists as a fixed feature of the market.

5.1.4 DFIs

Development Finance Institutions are bilateral and multilateral state-backed investors with a dual mandate combining development impact in private markets and an adequate financial return on the capital deployed. The legitimating concept around which the mandate is constructed is additionality, namely the requirement that DFIs demonstrate they are providing something the private commercial market is unwilling or unable to supply, and that they are not crowding out commercial investors but filling structural gaps such as longer tenors or higher risk absorption (DFI-1, DEV-3).

DFIs operate as institutional investors with large balance sheets to deploy, small country teams covering multiple sectors, and high transaction costs that drive up minimum ticket sizes. INT-1 notes Swedfund covering agriculture, water, financial institutions, and energy with a team under ten, which constrains both market insight and the depth of operational engagement the DFI can offer any single investee. Investments must satisfy commercial terms comparable to private investors alongside ESG and impact requirements that meet public scrutiny.

DFIs deploy into the C&I space through both direct investment in developers and indirect investment via intermediary funds, with the indirect route the most widely used (EXP-4, DFI-1). DFI-1 cites three reasons for working through intermediaries. The first is equity diversification, since infrastructure investments carry limited upside but full downside. The second is ticket size, since direct deployment at the DFI's ten to twenty million dollar sweet spot does not match the seventy-five thousand dollar individual project ticket common in C&I (DEV-1). The third is operational capability, since the DFI cannot create value for investees in markets where its country teams have limited insight, making it economically rational to pay an intermediary fee rather than build dedicated internal expertise.

Direct deals are reserved for large-scale standardized transactions involving mature developers. DEV-3 and INT-1 identify Norfund, IFU, BII, Finnfund, FMO, and

Proparco as the DFIs capable of skipping the intermediary layer, with the venture arms of BII and Proparco occasionally handling smaller tickets. DFI-1 confirms the maturity threshold required for direct C&I investment, namely sound financial structure and repayment capacity, appropriate governance, a sustainable business model, and credible EPC and O&M partners, and notes that Swedfund itself has not yet executed direct C&I deals despite having the capacity.

When investing in an intermediary, DFI-1 assesses the platform across multiple dimensions including organisational track record, team experience, pipeline credibility, syndication ability, governance and ESG, and risk-adjusted return. The selection process is designed to identify intermediaries capable of carrying the operational and compliance load DFI capital arrives with.

DFIs rarely invest alone. DFI-1 explains that Swedfund avoids solo positions because multiple voices in the room produce a more comprehensive risk assessment, with co-investment among DFIs the established norm in energy and climate. INT-6 confirms the rationale at the venture stage, noting that syndication makes it easier to support a portfolio company in difficulty when several pockets of capital are available rather than a single investor.

DFIs are not all the same. INT-4 distinguishes impact-first from profitability-first orientations, with some DFIs accepting deferred profitability in exchange for impact performance and others described as strict and politically constrained, producing different expectations on the same intermediary depending on which DFI is the counterparty.

5.1.5 Intermediaries

Intermediaries are the investment vehicles that are positioned between the DFI layer and the developer layer, raising capital from DFIs and deploying it into developers. The term covers a heterogeneous set of business models rather than a single archetype, and the intermediary's specific position in the stack shapes both what it can do and how it interacts with the actors above and below it.

Five distinct intermediary profiles have been interviewed, operating at different points of the system. INT-1 and INT-7 are a hybrid investment bank and loan platform providing growth debt and mezzanine at mid-stage. INT-2 is a late-stage guarantor operating through AAA-equivalent rating transfer rather than direct lending. INT-3 is a DFI-backed working capital and procurement finance provider adjacent to grant and results-based finance (RBF) structures. INT-4 and INT-5 refer to the same DFI-backed debt fund targeting mid-stage C&I transactions. INT-6 is

a DFI-backed venture-style equity fund focused on energy and climate. Different instruments, different ticket sizes, and different developer stages, but a common intermediating role between DFIs and developers. INT-5 notes a general preference across impact funds for captive offtaker risk over utility-scale sovereign risk, which frames why C&I is the segment most intermediaries concentrate in.

The intermediary business model is built on fee and spread income derived from sitting between capital providers. INT-1 describes three concurrent revenue streams on the same transaction, comprising an origination and structuring fee charged to the developer, a spread on DFI returns above the guaranteed rate, and a spread on crowdfunding returns above the fixed promise to retail investors. INT-3 operates a simpler but directionally identical fee structure combining a handling fee and a monthly charge on the facility amount. INT-6 describes a standard fund management structure with two funds, an older energy access fund and a newer pan-African climate and tech fund, with commercial terms set independently of DFI conditionality.

Upstream, intermediaries raise capital from DFIs through structures designed to address the DFI's institutional constraints. INT-1 describes a co-investment arrangement where DFIs invest alongside the intermediary on specific transactions with the intermediary retaining skin-in-the-game, reducing the DFI's deployment friction and shortening turnaround relative to direct deployment. INT-3 describes a credibility cascade in which the first DFI anchor is the hardest to secure, with subsequent DFIs and impact funds following once one is in place. The fundraising process itself is shaped by the receiving DFI's profile. INT-4 notes that some DFIs require minimum tickets of fifty million dollars and fund-level profitability thresholds smaller intermediaries cannot meet, while others direct the intermediary toward smaller transactions the DFI cannot efficiently serve itself, making the DFI pool effectively segmented by intermediary size.

Intermediaries operate under legally binding ESG and reporting conditions flowing down from their DFI investors, impose operational, financial, and equity requirements on developers as conditions of deployment, and occupy distinct positions in the developer lifecycle that together determine how capital is sequenced. INT-1's hybrid mezzanine product, designed to assemble the full capital stack itself and lock in its position against refinancing by cheaper DFI debt at later stages, is one intermediary-level response to the lifecycle dynamic.

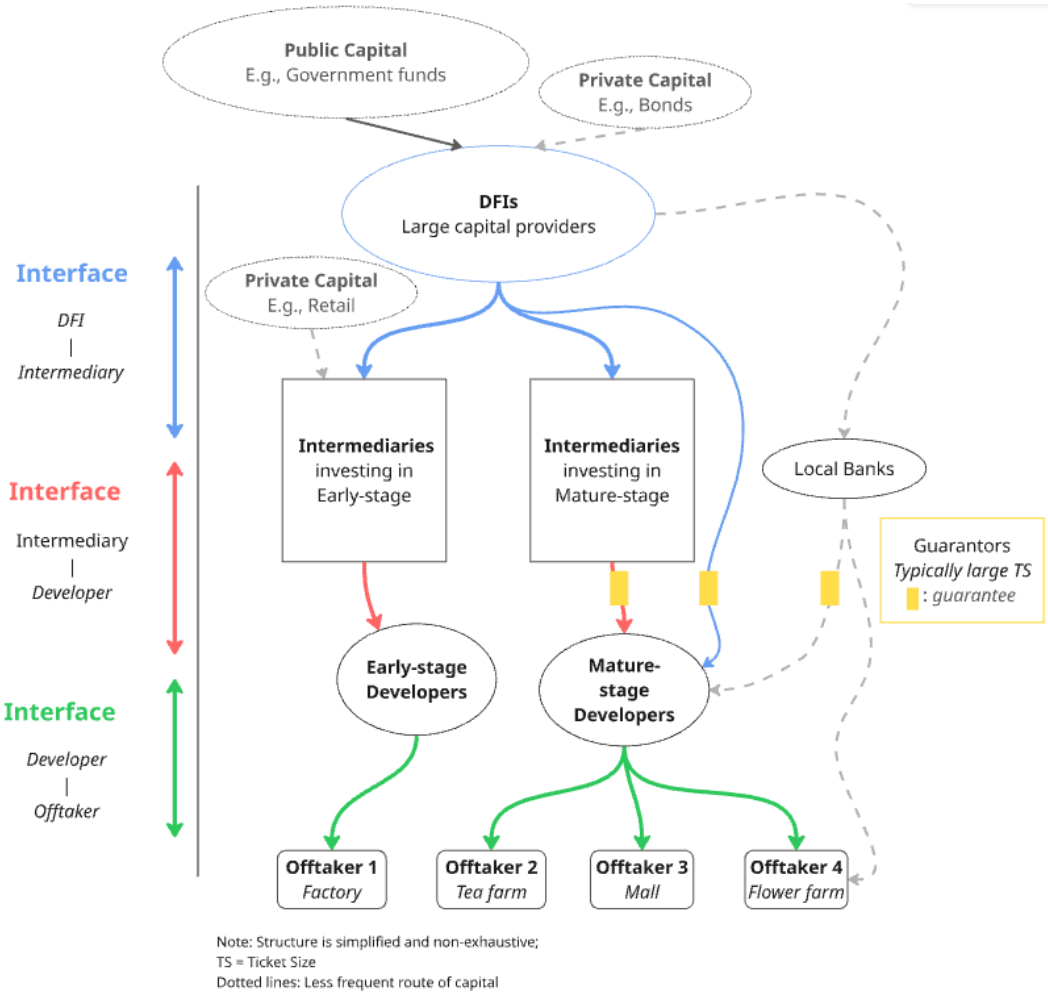

Figure 5.2: Capital flow structure in the Kenyan C&I solar financing chain

5.1.6 Overview of Capital Flow

Capital flows through these actors as displayed in Figure 5.2. Capital enters the Kenyan C&I market predominantly in hard currency, reflecting the dollar and euro denomination of DFI and fund balance sheets. This sets the entry price of commercial-terms development capital into the market.

At the intermediary layer, this capital is repriced to cover the intermediary's own operating cost and risk. Capital therefore exits the intermediary layer priced above the DFI entry rate, with the intermediary taking compensation for the origination, monitoring, and risk-bearing services it performs on both interfaces.

The developer receives this capital as its cost of debt and must construct a PPA or lease price that covers it alongside operating margin, fixed overheads, and the developer's own return. The upper bound on this price is set by the KPLC grid

tariff. DEV-1 is explicit that the cost of capital rather than hardware cost is now the single largest structural constraint, with dollar debt pushing PPA prices close to grid parity and threatening the offtaker's incentive to switch.

The offtaker is where this cost chain finally lands. Each markup added upstream shrinks the savings the offtaker is offered against the grid, and because the offtaker only switches if those savings are material, the cumulative cost of the stack decides whether the deal closes at all.

A second layer of friction runs in parallel with the cost chain and compresses the same space further. The stack operates in hard currency because the capital entering it is hard currency, and this forces USD denomination through the PPA layer or forces the developer to absorb the currency mismatch itself. The structural solution to this currency mismatch would be local currency financing at scale, and the evidence collected in the preceding local banks actor section establishes why this solution is not available.

The net effect is the structural picture that the following section takes as its starting point. The grid tariff sets the ceiling on what the developer can charge, the cost of hard currency DFI capital plus the intermediary layer plus the developer's own operating costs set the floor on what the developer must charge, and the FX risk absorbed somewhere in the stack compresses the space between them further. The absence of local currency capital at scale means this structure is not a temporary inefficiency but a fixed feature of the market.

5.2 How Capital Flows Across the System

The previous section established who the actors are and how capital is configured between them. This section turns to what happens as capital moves through that configuration, providing an empirical answer to RQ2. The findings are organized across three sections, which cover different mechanisms, frictions, and outcomes observed throughout the system. Section 5.2.1 describes those relating to credit vetting and counterparty trust. Section 5.2.2 describes those relating to ESG conditionality. Section 5.2.3 describes those relating to the timing of investment in the sense of how mature the developer is. Per section 1.3, a mechanism is a recurring measure that one actor in the chain imposes on another. Friction is a financial or non-financial cost that an actor bears as a result of this. An outcome is the structural pattern that arises once a mechanism and its associated frictions propagate across the financing chain.

5.2.1 Credit Vetting

The mechanisms, their frictions, and their outcomes within this theme are summarized in Table 5.2.

Table 5.2: Credit vetting mechanisms, frictions, and outcomes

Mechanism	Friction	Outcome
Direct vetting at every interface	Each actor, as the same counterparty is verified multiple times across the system.	Compounding transaction cost not attributable to any single actor's inefficiency.
Cascading financial discipline	Engineering-oriented developers without internal finance capability; intermediaries absorbing DFI reporting requirements and passing them through.	Credit and reporting functions installed or developed inside developers through contract terms or seconded staff.
Skin-in-the-game	Early-stage developers who struggle to inject the required equity layer.	Deals for developers without independent equity access are filtered out.
Trust-by-association	No cost absorbed; this is a fallback mechanism that reduces verification cost.	Concentrated capital allocation around already-credentialled actors.

The Kenyan C&I solar market operates without reliable collateral or enforceable recourse against the developer's project assets, and OFF-3 puts the symmetric risk on the offtaker side bluntly:

> "Of course I vet the developer! This is Kenya. You can be sold air." — OFF-3

This reality is driven by a systemic lack of mature credit rating systems and financial data. Each layer of the stack responds to this absence of formal enforcement and institutional credit infrastructure by constructing its own counterparty verification process before capital or contract flows across the interface. As EXP-4 highlights, the market is paralyzed by a lack of empirical data and track records. Without an information infrastructure to demonstrate actual risk profiles, actors cannot rely on standardized credit metrics.

Direct Vetting

At the developer-offtaker interface the developer-side faces significant risk as the developer carries fifteen-year contractual exposure that cannot be unwound if the counterparty deteriorates, such as by delaying or defaulting on payments. DEV-1 describes a three-year audited financial history, low leverage, low-risk industry exposure, and ownership of a structurally sound roof as baseline prerequisites before any engineering spend, with physical site visits to observe actual commercial activity treated as equally important as the desktop financial review. DEV-2 applies the same logic with a tighter industry screen, requiring both a financial audit and specific industry fit in sectors with stable and predictable electricity consumption. DEV-1 characterises the absence of recourse on the developer side as a defining feature of the market. The physical solar asset is the only security for the contract, but there is a practical difficulty of removing a site-specific plant. This lowers developers leverage and places them at the bottom of the client's invoice payment priority list. The offtaker-side vetting is lighter but reciprocal. OFF-3 describes a full vendor onboarding process covering financial audits, KYC, and physical site visits, with specific evaluation of the developer's team size relative to its pipeline to ensure the developer can credibly provide technical support at scale. OFF-1 describes a similar, technically focused, vetting focusing on performance risk.

At the intermediary-developer interface, the vetting tightens into operational and financial thresholds. INT-1 requires a minimum of one megawatt of operating assets, twelve months of track record, and does not lend on an unsecured basis (i.e., without collateral) or provide construction finance or corporate finance. INT-6 applies a two-part team screen, assessing ability to fundraise and ability to execute in Africa alongside market size and solution competitiveness. INT-2 uses a minimum transaction size of ten million dollars to select for scaled opportunities and aggregating smaller C&I projects through portfolio guarantees where individual deals would otherwise fall below its threshold.

At the DFI-intermediary interface, the vetting broadens into a multi-criterion platform assessment. DFI-1 describes evaluating intermediaries across impact case, team experience, organisational track record, credible pipeline, strategy, proven technology, value-add differentiation, platform efficiency, team retention, ability to attract co-investors, governance, ESG, and return and risk profile. DFI-3 narrows this to three decisive criteria: prior fundraising track record, scaling capability assessed through the speed of pipeline build-out and execution, and the depth of the pipeline relative to the price paid for it. Where DFI-1 invests directly rather than through an intermediary, the screen shifts to developer-level criteria including financial structure, repayment capacity, governance, business model, and credible EPC and O&M partners. DFI-2 cites a similar direct-deal checklist of bankability with proven ROI, securitisation against the facility, and resolution of land, environmental, and social licences. Together the criteria imply a maturity threshold well above what most early-stage developers can meet.

Skin in the Game

Where direct vetting establishes expected counterparty quality, a second mechanism establishes counterparty loss exposure through required equity commitment. A downstream party that has committed its own capital bears a portion of the cost of any deterioration it might otherwise conceal, aligning its incentives with those of the upstream capital provider. INT-1 requires developer equity to be already deployed in the asset base before entering a transaction. INT-5 caps its financing at fifty to seventy per cent of a project, requiring the developer to cover the remaining equity layer directly, and reports that failure to inject this equity is one of the three main reasons deals fall through at engagement stage, particularly for early-stage developers. INT-3 operates a different version of the same mechanism in its supply chain model, charging a fifteen per cent upfront deposit as explicit skin-in-the-game against the equipment financed. At the offtaker interface the same requirement is rare but present in constrained form. DEV-1 reports occasional thirty to forty per cent upfront deposits from offtakers as one of the few tools available to secure alignment in the otherwise unsecured market, although this is rarely used.

Cascading Financial Discipline

The third trust mechanism operates not by vetting the counterparty's output but by prescribing the structure of the counterparty's own internal processes. Upstream capital providers impose credit disciplines, reporting practices, and governance structures that downstream actors would not voluntarily implement at the scale required. INT-5 illustrates the mechanism most directly at the intermediary-developer interface. Rather than only assessing the developer's offtaker decisions, INT-5 requires

the developer to operate a documented, multi-level credit policy subject to regular review as a condition of deployment, installing a formalised internal credit function inside the developer. INT-6 describes the same mechanism one layer up. The heavy reporting requirements INT-6 commits to when raising from DFIs cannot be absorbed at the fund level alone and must flow through to portfolio companies, embedding reporting discipline into the operational routine of each investee regardless of whether the developer would choose to implement it independently.

The mechanism becomes most visible where the downstream counterparty lacks the underlying capability the upstream is requiring. INT-1 distinguishes between finance-oriented and engineering-oriented developers, noting that developer type materially affects structuring capacity and the quality of the investor relationship. Where an engineering-origin developer cannot supply the demanded credit and reporting discipline on its own, the solution INT-1 describes is to install the missing capability through either technical assistance or upskilling. Seconded finance professionals can be placed inside the developer organisation, funded through external TA that ultimately trace back to DFI or government sources, with the effect that the upstream's credit and reporting standards become operative inside the developer through embedded personnel rather than through contract terms alone.

Trust-by-Association

Where direct verification is costly or impossible, participants substitute the identity of another verifier as a proxy signal. OFF-3 describes this mechanism from the offtaker position. Through its own due diligence, OFF-3 formed a view of the developer's capital stack composition, reading DFI backing and Scandinavian grant donors and pension funds as an indicator of reliable funding and durable operational support. DEV-5 reports the weaker version at the same interface, noting that offtakers typically do not track the origins of developer financing but accept "green financing" framing as a credibility marker. The same logic operates further up the stack. INT-3 describes DFI backing as a credibility cascade in which the first DFI anchor is the hardest to secure, with subsequent DFIs and impact funds following once one is in place. DFI-1 confirms the pattern, observing that a DFI's presence on a transaction can itself attract further DFI participation. DFI-3 describes the mechanism explicitly as a deliberate practice. They position their DFI network itself as part of the value proposition to portfolio companies, offering introductions to other DFIs and active participation in subsequent fundraising rounds as a service apart from the capital provided.

Cost and Friction

The four mechanisms described in this section, which are direct vetting, skin-in-the-game requirements, cascading financial discipline, and trust-by-association, are individually rational responses to a market operating without credit rating systems, reliable collateral, enforcement infrastructure. Collectively, they generate a compounding transaction cost. Every interface replicates a verification process, so the same underlying counterparty is effectively vetted multiple times as it moves through the stack, and the intermediary layers absorb the cost of maintaining credit processes, equity verification, and governance compliance on both sides of their own position. The cost is not a function of inadequate expertise. INT-1 reports relying on external technical due diligence consultants for components of its own verification work despite operating full-time in the space, underscoring that the verification cost is structural rather than a shortfall at any particular layer.

5.2.2 Environmental, Social, and Governance (ESG)

The mechanisms, their frictions, and their outcomes within this theme are summarized in Table 5.3.

Table 5.3: ESG and impact mechanisms, frictions, and outcomes

Mechanism	Friction	Outcome
E&S due diligence and remediation	Developers without dedicated ESG staff treat it as a distraction from core operations; intermediaries run assessments on behalf of DFIs.	Developers lose scarce resources needed for business survival; Behavioural change at the developer level where absorbed; self-reporting dominates at the C&I site level.
Impact reporting and mandate-alignment	Smaller developers asked to demonstrate full-SDG alignment they cannot operationally meet.	Produces extensive paperwork to qualify the impact; substantive change is contested.
Legal and regulatory compliance	Intermediaries absorb the legal overhead and manage exclusions through contractual excuse rights and harmonisation.	DFIs' legal-political accountability is carried downstream.
Technical assistance	DFI absorbs some cost as TA mitigates downstream burden.	Possibility to lower compliance burden for developers.

DFIs deploy capital across distance into contexts they cannot directly observe. Labour conditions in panel manufacturing, environmental practices at distributed installation sites, and supply chain integrity across the financed assets all sit beyond what their headquarters teams can verify firsthand. They are nevertheless accountable upstream for what their capital funds. The non-financial conditionality described in this section is the response to that gap, and the cascade through which it travels is how it becomes operative at the layers the DFI cannot reach itself.

Conditions

DFI capital arrives bundled with a set of non-financial conditions whose scope extends beyond the terms of the commercial agreement. At the core sits the IFC Environmental and Social Management System (ESMS), a cross-sector framework which, as INT-1, DFI-2, and DFI-3 observe, serves as the template or "gold-standard" (DFI-3) from which individual DFIs draw and adapt the sections relevant to their mandates. For the C&I segment specifically, the focus falls heavily on solar panel supply chain risks, particularly labour conditions in manufacturing, scrutiny of Chinese panel producers, and child labour exposure (INT-1; INT-3; INT-5). These performance standards are operationalised at investment entry through an E&S due

diligence which produces a E&S gap, and binding the investee to a three-year implementation window with quarterly progress tracking and annual independent audits (DFI-1; DFI-3).

Layered on top of this E&S technical compliance is a set of regulatory and reporting conditions carried through separate agreements that sit apart from the commercial contract (referred to as side letters). INT-6 describes these as covering AML and sanctions compliance, EU regulatory provisions, a named ESG manager requirement, and in some cases a fund-level ESG committee, with the standards applied drawn explicitly from European regulatory bodies. Alongside the compliance track runs a parallel impact-metrics reporting track, which INT-6 identifies as a distinct second layer of DFI conditionality. DFI-1 names GHG emissions avoided as a headline measure and evaluates intermediaries against a broader impact case as part of its entry due diligence.

At the most expansive end of the spectrum, the conditions broaden into mandate-alignment and geopolitical requirements. EXP-4 reports that developers receiving DFI equity are expected to demonstrate simultaneous alignment with all seventeen SDGs alongside gender ownership composition requirements and stringent policy documentation. The geopolitical layer sits alongside this. INT-4 reports that DFC required the fund to formally exclude South Africa from its investment scope as a function of US-South Africa political tensions, despite the fund having no South African portfolio. INT-6 describes these jurisdictional restrictions as a distinct category, not ESG-standard disagreements but government-imposed country exclusions and use-of-funds restrictions, managed through contractual excuse rights that allow a fund to opt out of specific transactions rather than through standard harmonisation.

Cascade

From that origin the conditions are contractually replicated at every handoff point in the capital stack, travelling from DFI to fund to developer and, at the edge of the system, into the developer's supply chain. DEV-2 transfers the same terms to intermediaries as when they do direct investment so they "do not have exposures" on their part, and that after this, "the whole mandate is then handed over to the fund manager". INT-1 describes the upstream binding. When DFIs co-invest through the fund, the fund is required to adopt or upgrade its E&S screening processes, embedding an E&S checklist in its own due diligence and generating action plans for identified gaps amongst developers. INT-6 describes the downstream replication of the same procedural logic, and characterising ESG conditionality at the portfolio company as "100% driven by DFIs." For every portfolio company, a current state is

assessed, a target state is defined, and a gap-closing action plan is attached to the transaction as a condition of deployment. INT-5 describes their fund's DFI investors imposing performance standards on forced labour and responsible sourcing, and the fund passes these downstream so that developer partnerships and supply chains must comply.

One feature complicate the picture of pure passthrough, namely harmonisation of DFI requirements at the intermediary layer. INT-6 notes that DFI requirements differ in presentation but converge on the same European ESG base:

> "Their requirements are similar but different at the same time. It's like running shoes. They're all different but you can run in Asics, Adidas and Nike. It depends more on you." — INT-6

The operational response is to unify the requirements of all LPs into a single portfolio-company template, absorbing presentational divergence at the fund level before anything reaches the developer. The cascade is therefore not a pure sum of every DFI's distinct requirements but a consolidated version of the shared European core.

The cost of operating under this cascade falls heavily on the developer layer, where the compliance burden is structurally mismatched with operational capacity. INT-1 identifies hiring dedicated E&S staff as prohibitive for early-stage developers, most of whom resist it as a distraction from core operations and try to avoid it where possible. A second cost arises from the geographic structure of C&I itself. INT-1 notes that while utility-scale projects can be monitored by a retained consultant at a single site, distributed C&I portfolios involving dozens or hundreds of small systems across a country cannot be audited the same way, and the cost of attempting to do so would be prohibitive. The practical accommodation that emerges from this structural mismatch is that most E&S compliance in C&I is self-reported by developers, with no independent audits at the site level. INT-7 describes the same pattern from inside an intermediary, observing that DFI diligence is extensive with consultants engaged across several dimension of risk before an investment decision is taken, while post-investment follow-up is perceived to be comparatively lighter, a characterization INT-7 qualifies by noting they have not tracked a DFI investment over a long enough horizon to confirm it. INT-1 notes an internal debate about whether the current DFI screening volume is proportionate to the monitoring capacity available.

The compliance load is not only burdensome but also directly determinative of whether deals complete. DFI-2 reports that fund managers handle DFI requirements as routine business, characterising East and Southern African fund-manager

populations as experienced and accustomed to operating with multiple institutional capital providers simultaneously. INT-5 reports that by the stage at which the fund is engaged, financial analysis is typically already satisfied, but deals fall through primarily on non-financial grounds, primarily ESG policies not being in place, or a developer's unwillingness to commit to a remediation timelines. Deal failure on ESG grounds therefore occurs independently of financial soundness. Partial mitigation exists in the form of technical assistance. INT-6, DFI-1 and DFI-3 describe grants and seconded staff deployed directly to portfolio companies to help implement or create a roadmap for acting on the required policies. INT-6 notes the underlying tension this creates. The same DFIs that generate the compliance requirement also provide the resources that partially offset it.

Thoughts on Benefits / Cost

Interviewees are not uniform in how they assess the net value of the ESG cascade. INT-1 offers the clearest pragmatic defence. He acknowledges the burden and notes that most E&S compliance remains self-reported, but argues that the substantive screening questions now embedded in due diligence, whether workers are given safety harnesses when working at height, whether supply chain labour practices are defensible, would not be asked otherwise. He illustrates with the flower farms around Lake Naivasha, historically flagged for chemical runoff and carrying reputational liability that can damage commercial relationships in European markets. His conclusion is that E&S requirements are imperfect and burdensome but have introduced a meaningful level of awareness and behavioural change at the developer level that would not exist otherwise. INT-6 sits between the two poles, acknowledging that European standards do not map cleanly to African market conditions and that the mismatch is genuine for early-stage startups already fighting for survival, while resisting a blanket characterisation of the conditions as unreasonable. He frames the fit as a function of market development level rather than a categorical problem. The most critical voice is EXP-4, who presents the volume and specificity of DFI conditionality, including the 17-SDG alignment expectation and gender ownership composition requirements applied to a small C&I developer, as evidence that the conditions reflect institutional self-justification rather than market logic. INT-7 echoes this by arguing that the conditions are detached from the operational reality of the companies they are imposed on, effectively "killing them" with their requirements.

5.2.3 Investment Timing

The mechanisms, their frictions, and their outcomes within this theme are summarized in Table 5.4.

Table 5.4: Investment timing mechanisms, frictions, and outcomes

Mechanism	Friction	Outcome
Maturity threshold for DFI access	Early-stage developers cannot clear the threshold; smaller developers find DFI ticket sizes too large and admin too heavy.	DFI capital available only after developers have already survived without it long enough to qualify; developers pursue weak projects to become DFI-ready.
Temporal mismatch	Developers deplete runway during evaluation; intermediaries can lose deals to faster commercial venture capital.	Bridge-financing layer emerges to keep developers solvent through the DFI investment process, often at punitive terms.
DFI arrival after commercial anchor and refinancing	Early-stage commercial intermediaries carry the risk of pricing first.	Risk crowding-out private capital, unless DFIs match profiles that did not exist when earlier capital was deployed.

Lifecycle Sequence

The developer lifecycle described in section 5.1.2 runs from founder and seed equity through institutional debt at scale to eventual strategic acquisition. This section revisits that progression as a capital-matching problem and asks which instruments are available at which stages.

The development lifecycle begins below the threshold at which institutional capital is available. DEV-3 traces their lifecycle to begin with a seed round in which equity investors committed on the basis of team, market, vision, and business plan alone with no cash flow to assess. DEV-5 describes a comparable early-stage pattern, raising equity and shareholder loans before DFI conversations were relevant, and observing that early DFI engagement showed ticket sizes were too large and administrative requirements too heavy at the developer's volume.

Debt becomes accessible once equity is in place and the developer has scaled, i.e., grown their portfolio of projects. DEV-3 describes a shift in what investors assess at this stage. Later-stage debt or equity providers require financial models, cash flow histories, non-performance records, and lease contract approval for each installation. DEV-3 attributes the hardening to the developer's own growth and sector-wide investor learning, as the market has faced losses and become more conservative. INT-

1 confirms this pattern of borrowing against existing offtaker contracts. Portfolio scale changes investor risk perception at the same time as it lowers the cost of capital. DEV-1 describes aggregating the project portfolio from twenty to sixty megawatts as the step that unlocked cheaper DFI debt, with scale as a diversification argument that moves the developer from standalone-project risk to portfolio risk. DEV-4 identifies the same logic from the investor side, with scale as the precondition for overall profitability because fixed overheads remain constant while revenue grows. DEV-3 names roughly fifty megawatts of assets, alongside recurring revenue and a stable team, as the threshold at which DFI debt becomes an appropriate match.

DEV-4 describes that for further debt to be raised, equity also has to be in place as borrowers become wary of too high leverage, and of the developer not having enough skin in the game. Equity at this scale ($5–10m), when developers have outgrown seed and venture capital but remain too small for infrastructure and private equity funds is however scarce in the industry which DEV-4 identifies a structural funding gap where there is a lack of investors. For equity beyond this, DFI-3 has a $15m minimum, and $50m maximum ticket size, and a mandatory minority position, targeting a 4–5 year hold period. One of their key considerations is whether the company will survive without a further fundraising round. This together forces any portfolio company to have reached a scale and maturity sufficient to justify the entry valuation.

Commercial capital enters primarily through strategic acquisition of scaled developers, but such commercial exits are rare in Kenya. DEV-4 and DFI-3 name few across SSA, but none in Kenya, each involving a global energy major (e.g., Shell foundation) or specialist infrastructure fund acquiring a C&I platform that had reached scale. DEV-3 predicts consolidation of the Kenyan market to approximately two viable scaled players acquired by international buyers, and is explicit that the commercial capital entering at this stage will remain international because Kenya has no domestic pension and insurance capital equivalent to the South African market.

Temporal Mismatch

Alongside the lifecycle gaps runs a second mismatch between the speed at which DFI capital moves and the speed at which developers need to transact. DEV-3 characterises DFI approval timelines as running to twelve months where the business requires decisions within a week from existing investors, and frames the incompatibility as institutional rather than personal, adding that DFI mandates are tied to political cycles so that a government election can shift priorities mid-investment. EXP-2 reports that DFI-funded loan applications take up to three months and that processing time is explicitly flagged by banks as a significant friction. EXP-4 pro-

vides the most concrete case in the record, with a DFI spending approximately one year on due diligence before the board rejected a positive staff recommendation, and identifies the year of evaluation time itself as a material cost that depletes the developer's runway regardless of whether the deal ultimately closes. DFI-2 confirms the speed gap from inside the institution itself, describing public and sovereign capital as much slower than the private side due to institutional governance. INT-6 reports a similar pattern at the fund level, with commercial venture capital able to close in a week against a one to two month cycle at their DFI-backed fund, attributing the gap to independent investment committee members, two committees rather than one, and heavier due diligence. INT-6 notes that the fund has lost deals to European venture capital firms that can move faster. INT-7 reports that closing a transaction with a DFI takes at minimum one year and incurs legal costs in the range of one hundred thousand euros per transaction, and that "unfortunately no options exists" to DFI capital in the market.

INT-1 confirms the pattern from an intermediary that sits alongside the DFI channel. DFI-linked conditions consistently cause delays, DFI-aligned funds operate at similar speed because they are already meeting DFI compliance requirements, and developers pursuing DFI capital effectively have no alternative because both the direct DFI path and the fund path carry comparable delays. INT-1 describes the operational response developers have evolved. Developers large enough to absorb a one to two year process wait it out, bridging the interim with faster and smaller sources of capital specifically to hold the company over a process they know will take that long. EXP-4 highlights that these bridge finances often come at punitive terms to the developer. The temporal mismatch therefore does not simply slow transactions. It selects for developers already at sufficient scale to survive the delay and produces a distinct bridge-financing layer whose function is to keep the developer solvent through the DFI evaluation cycle.

DFI Arrival and Repricing

The material above on the lifecycle and temporal mismatch establishes when DFI capital enters relative to the developer's growth trajectory. This section describes what happens at the stack level when it does.

The interview evidence converges on a picture of DFI capital arriving after other actors have established the deal, with counter-evidence from the DFI side on how this pattern is interpreted. DEV-3 provides the clearest articulation from the developer side. DFIs structurally cannot take the lead investor role and always need to follow an existing anchor, a claim EXP-4 reinforces from a position of extensive DFI-side experience. EXP-4 reports that DFIs informally but almost universally require a

private sector lead investor before committing to project finance and identifies this as a structural contradiction, because DFIs exist to crowd in private capital by going first yet in practice wait for private capital to lead. INT-1 characterises the pattern from the intermediary side, describing DFIs as lacking local presence and relying on local partners for pipeline and deal structuring, gravitating toward standardised deals with execution outsourced to intermediaries.

A repricing dynamic follows from this arrival pattern. Commercial intermediary debt is priced to cover the origination, monitoring, and risk-bearing costs of early-stage lending. Once the developer has reached scale, the same developer becomes eligible for DFI debt whose tenor, ticket size, and pricing are built for a more mature risk profile. Refinancing the earlier commercial position with cheaper DFI debt is the rational developer response to this pricing gap. INT-1 describes the pattern as very common in sub-Saharan Africa and reports that developers explicitly plan to become "DFI-ready" with refinancing of earlier loans, possibly commercial ones, once developers reach two to three million dollars of scale. DEV-5 confirms the staging logic from the developer side, seeing early intermediaries as a first-stage financier to build track record and volume with the chance of transitioning to other DFI-backed instruments at a greater scale. INT-1 has designed around the dynamic rather than accept it through their hybrid debt with performance-linked flexible interest intended to remain in the capital stack as it evolves, combined with senior DFI debt the intermediary assembles directly on behalf of the developer.

DFI-1 provides the view from inside the institution by confirming the boundaries of the pattern. DFI refinancing of early commercial investors is rare and covers only ten to fifteen per cent of overall financing, and where it occurs it is limited to two specific contexts, namely replacing a bridge loan always intended as temporary or restructuring an old small debt position whose profile is blocking new financing. DFI-1 has not observed them crowding out commercial players. Additionality is a non-negotiable requirement in their every investment memo. DFI-1 frames the additionality argument not through pricing but through instrument design, with additionality delivered through longer tenors, different capital stack positioning, or willingness to absorb risks commercial capital will not take. DFI-1 articulates a self-selection mechanisms limiting crowding out:

> "At no point do we want to compete with commercial capital. We price like commercial capital, so we don't underprice. Why come to a DFI with all the ESG requirements when you can get the exact same instrument from a commercial actor that doesn't have these requirements and can move faster? There's a natural sort of selection that happens through this." — DFI-1

The arrival pattern produces a behavioural response at the developer level. Because DFI engagement requires a minimum portfolio scale, typically described in megawatts of installed capacity or minimum ticket size, developers face structural incentives to optimise toward this threshold even where the projects added to reach it would not pass independent commercial diligence. INT-7 describes the pattern explicitly. Below the threshold, no DFI is interested. Above it, the developer becomes structurally eligible for institutional capital. Some developers therefore pursue projects with weak fundamentals to clear the threshold, with the implicit assumption that the DFI capital, once accessed, will solve the prior overreach.

Observations complicate the arrival pattern. DFI-1 describes a one-off live exit problem in one direct investment, where a developer has grown to a scale at which even large strategic investors could not absorb it, making exit structurally difficult. DFI-1 frames the situation as one that the DFI did not anticipate even as it fulfilled its additionality mandate by providing long-term capital. Separately, INT-1 observes that developers from foreign countries disproportionately access DFI capital from their home-country DFIs, INT-7 and EXP-1 confirm this through a political account of how Sweden's agencies are instructed to coordinate to promote the nation's business interests. DEV-5 describes reaching finance through an intermediary linked to their home country, a route made easiest by a shared national connection and personal familiarity. The observations suggest that capital allocation in the market is shaped by network and national channels alongside the formal criteria that govern it.

6

Analysis

In this chapter, the study does two things. In section 6.1, the answer to RQ2 is completed by providing a theoretical explanation for why the observed friction and outcomes occur, by explaining the rationale behind the mechanisms that create them. The explanation relies on the theoretical framework set out in Chapter 3. In section 6.2, RQ3 is answered by comparing the case against the literature: The outcomes in section 5.2 and the analysis in section 6.1 are compared with the mandate for DFI existence as found in the literature review in Chapter 2.

6.1 Explaining the Mechanisms: Information Asymmetry and Principal-Agent Dynamics

DFIs and other upstream investors cannot observe projects and counterparties directly. Instead, they rely on intermediaries and developers to find, structure, and monitor deals on their behalf. This creates a chain of principals and agents (Jensen & Meckling, 1976). Each step in the chain adds extra costs and frictions because the principal and agents do not share the same information or objectives.

The ESG conditionality cascade is a clear example of these problems. As outlined in section 5.2.1, DFIs set detailed rules for what counts as acceptable environmental and social performance. These rules are then passed on to funds, local banks, and developers, who must implement them and pass them on again to offtakers. In principal-agent terms, the DFI uses ESG templates, reports, and audits as monitoring tools to reduce information gaps (Jensen & Meckling, 1976). Developers and intermediaries invest time and money in internal systems and personnel as bonding costs to prove that they follow the rules. Smaller developers might not afford this and drop out, as confirmed by INT-5, who reports that deals rarely fall through due to underlying financial weakness but instead they break down over compliance issues.

At each link in the chain, the principal cannot easily observe the agent's actual behaviour. Working conditions inside a solar panel factory in China, installation practices at a small C&I site in rural Kenya, the internal credit policies of an early-stage developer, or the long-term financial strength of an industrial offtaker over a fifteen-year PPA are all essentially invisible from a DFI's headquarters. The problem is not that no information exists, but that it is scattered, costly to collect, and hard to verify at a distance. The conditions documented in sections 5.2.1 and 5.2.2 are the mechanism's response to this information asymmetry. They replace direct observation of behaviour with contractual rules set in advance and with audit trails that can be checked later. ESMS templates, gap assessments, three-year implementation windows, quarterly reports, and annual audits from section 5.2.2, and credit policies, track-record thresholds, skin-in-the-game requirements, and platform benchmarks from section 5.2.1 are two sides of the same response. They operate in different information areas (ESG and credit) but produce the same structural outcome, which are layered, legible, contractually binding conditions that flow downstream. In principal-agent terms, this pattern can be read as a cascade of monitoring and bonding costs created by the need to manage information asymmetry along the chain.

However, these mechanisms do not fully work as intended. Most E&S compliance is self-reported. The audit model used for large plants does not translate to several small C&I sites spread across a country. In practice, the formal verification tools exist on paper, but the underlying observation of what happens on the ground is limited. There is a gap between the appearance of strict verification and the reality of what can practically be checked. When direct verification is costly and fails in this way, two substitute mechanisms appear in both areas.

The first is trust-by-association. Under conditions of information asymmetry, this mechanism functions as a form of delegated monitoring to mitigate adverse selection (Diamond, 1984; Stiglitz & Weiss, 1981), i.e., the pre-contract risk of partnering with a low-quality developer. Since direct verification is costly, actors rely on prior screening conducted by credible actors upstream as a signal of quality (Spence, 1973). OFF-3's view of the developer's DFI and Scandinavian pension-fund backing as a mark of credibility, INT-3's description of the first DFI anchor as the hardest to secure with others following, and DFI-1's observation that one DFI's presence attracts further DFIs are all examples of the same signaling mechanism working at different points in the chain.

The second substitute is skin-in-the-game. This is a mechanism designed to mitigate the problems of unobservable effort and moral hazard (Stiglitz & Weiss, 1981). In this context, moral hazard refers to the post-contract risks that a developer might

reduce their effort towards project quality once the funding is secured (Jensen & Meckling, 1976; Stiglitz & Weiss, 1981). INT-1's requirement that developer equity is already deployed, INT-5's fifty-percent leverage cap, and INT-3's fifteen-percent upfront deposit all work on the same logic. The actor whose behaviour cannot be monitored is required to take enough first-loss risk that their incentives align with the counterparty's without constant observation. The ESG and Credit vetting mechanisms therefore contain what information asymmetry and principal agency theory predicts should appear when verification is weak. This is evidence that the mechanisms are a structural response to uncertainty and agency costs rather than an arbitrary regulatory layer.

To understand why these conditions are imposed, the perspective needs to move one step up. The DFI is not the final principal in the system. It is itself an agent with its own principals. DFIs report to state treasuries that provide their capital, to political bodies that scrutinise how that capital is used, to boards whose preferences for development versus commercial return differ, and to financial performance benchmarks that sit alongside the development mandate. EXP-4's description of the European DFI board dynamic makes this visible, explaining that DFI board governance is frequently divided between foreign affairs ministries holding the development mandate and finance ministries prioritizing financial performance and that the European DFI network has converged on an implicit equity IRR target of 8% to 15%. Finance-ministry board representatives push toward the higher end of that range, and members sceptical of aid question whether frontier risk is acceptable at all. Staff-level due diligence can recommend a deal on impact and risk grounds, but boards may still reject it based on level of return.

This tension is further illustrated by INT-4's distinction between DFIs with impact-first and profitability-first mandates. Some are willing to accept delayed profitability in exchange for impact, while others are significantly more constrained. This divergence was also observed when comparing DFI-1 and DFI-3. DFI-1 explicitly describes their organization as "impact-first" where the primary consideration during due diligence is the quantifiable impact case. Conversely, DFI-3 pushes back against what he terms a "persistent information asymmetry" in the market regarding DFI risk appetite, noting that their role has shifted significantly over the last decade toward requiring commercial market-based returns. This suggests that the principals DFIs answer to differ in their preferences and transmit different requirements down the chain. DEV-3 also adds that DFI mandates are tied to political cycles, so priorities can even shift mid-investment during elections.

When an agent faces several principals with different goals and strong information asymmetries, governance becomes more difficult. According to common agency

theory, these dynamics predict higher governance costs, duplicated oversight, and blurred accountability as the agent must demonstrate adherence to each principal's requirements (Voorn et al., 2019). Mechanism-design theory makes a similar point, when a principal cannot observe an agent's true risk profile or effort, it designs mechanisms that force the agent to reveal information and align incentives (Bolton & Dewatripont, 2005; Laffont & Martimort, 2002). The ESG and credit mechanisms match this logic. INT-4 describes credit vetting as trying to ensure that "what happened in the past does not happen again", which expresses an obligation to an upstream principal watching for repeated failures. EXP-4's characterisation of the conditions as institutional self-justification rather than market logic can be read as a critical description of the same process. The conditions are the DFI's observable output to its own principals, and the burdens they place on intermediaries and developers are a consequence of this upstream accountability.

Taken together, these analytical steps point to a structural interpretation of both section 5.2.1 and section 5.2.2. Principal-agent theory predicts that monitoring costs will be highest where information is scarcest and where differences in goals between principal and agent are greatest (Jensen & Meckling, 1976; Laffont & Martimort, 2002). In this market, both conditions are most pronounced at the developer layer, especially for early-stage developers whose internal governance is informal, operational capacity is small, and whose behaviour is hardest for DFIs to verify from a distance. The contractual layer that DFIs build to satisfy their own principals therefore becomes heaviest exactly where it is hardest to absorb. The mechanisms are not random frictions, but structural outcomes of layered accountability in a high information asymmetry environment. Their combined effect is to screen in agents that can bear the cost of compliance while screening out those that cannot. This is a form of screening mechanism, which is intended to mitigate adverse selection (Stiglitz & Weiss, 1981). However, in practice, the mechanism generates a reverse outcome. As the requirements of accessing DFI-backed capital rise in the form of monitoring and bonding costs, the pool of potential borrowers shrinks toward larger, better-resourced developers. Consequently, borrowers who cannot bear the cost of compliance also do not reach DFI capital, so the mechanisms filter the pipeline before any formal DFI decision is taken, which is exactly the kind of selection effect predicted by credit-rationing models under asymmetric information. The consequences of this selection for who ends up receiving DFI capital, and for the additionality claims that DFIs make, are the focus of section 6.2.

6.2 Evaluating the Outcomes against the DFI Mandate

Additionality is the central legitimating claim for DFI activity. As established in the literature review, it requires DFIs to demonstrate that their capital is doing something private markets would not do on their own (DFI Working Group on Blended Concessional Finance for Private Sector Projects, 2018; Léon, 2025a). The OECD (2021) framework decomposes this requirement into two distinct types of additionality against which we can qualitatively assess the Kenyan C&I financing system. This allows us to answer RQ3 in a structured way. The first type, *financial additionality*, asks whether the investment would have happened without the DFI, and on what terms. The second type, *development additionality*, asks what DFI involvement adds once the capital has arrived. Mobilization, the question of whether DFI capital crowds in private capital alongside its own, sits inside financial additionality. We assess financial additionality first, development additionality second, and close by drawing the link between the two. We also distinguish between deal-level, being evidence for individual transactions, and market-level, being evidence on how the system behaves in aggregate.

6.2.1 Financial additionality

Financial additionality asks whether the investment would happen without the DFI, and if it would, on what terms. The deal-level evidence is the structural absence of local commercial capital established in sections 5.1.3 and 5.1.4. Local banks do not serve C&I solar at the required pricing and tenor, and the catalytic instruments designed to activate them have not yet produced the behavioural shift they were intended to produce. The DFI response is to price debt at commercial rates while offering longer tenors and subordinated capital-stack positions that commercial lenders will not take. Under the OECD (OECD, 2021) framework, terms-improvement of this kind falls inside financial additionality, where the terms are what make the investment possible at all. The structural absence documented in section 5.1.3 supports that reading at the deal level. EXP-4 qualifies the picture by reporting that finance-ministry board pressure pushes DFIs toward safer senior positions, so the subordinated positions are applied unevenly. In conclusion, the instrument DFIs provide aligns with the OECD framework, but its delivery is shaped by the multi-principal pressures section 6.1 identified.

Mobilization regards whether DFI capital crowds in private capital that would not otherwise have come. The mechanism exists in principle. DEV-3 provides the clearest example, having refinanced its DFI-backed fund with a purely commercial South African pension-backed fund as its South African portfolio matured. This is the text-

book mobilization mechanism that the additionality framework anticipates (Collier et al., 2020; Léon, 2025a). DEV-3 and INT-1 are explicit, however, that no Kenyan equivalent has yet occurred and that DFIs in this market generally substitute for capital rather than catalyze capital. The Kenyan C&I segment has not reached the maturity at which DFI capital cycles out and is replaced by commercial capital. While there exist smaller deal-level instances where commercial and DFI-capital invests alongside each other, the affirmative case for mobilization on a market-level is, as such, not supported in Kenya at present.

On the market-level, the case complicates the deal-level claim in three ways. The first complication operates at the developer interface itself. As section 6.1 concluded, the combined ESG and credit-vetting mechanisms documented function as a filter that selects developers who can absorb compliance costs and excludes those who cannot. Table 5.4 documents the same dynamic in temporal terms through the *maturity threshold for DFI access* mechanism. The developers interviewed cited a minimum scale threshold coupled with the financial maturity requirements DFIs apply at the developer interface. The outcome row of Table 5.4 shows the consequence: direct DFI capital becomes available only once developers have already survived without it long enough to qualify for it.

The second complication concerns the timing of DFI capital relative to private capital. DFI-3 need to invest in the winners of the C&I market to meet their financial return requirements, and they can only identify the winners at a mature stage. EXP-4 reports a related pattern from DFI-side experience. DFIs informally but almost universally require a private-sector lead investor before committing to project finance, which reverses the crowding-in mechanic the mandate claims. Once developers have reached scale, the timing dynamic extends into a refinancing dynamic, documented as the *DFI arrival after commercial anchor and refinancing* mechanism in Table 5.4. Developers actively plan to refinance earlier-stage commercial intermediaries with cheaper DFI debt once they reach scale. This is the clearest observed mechanism by which DFI capital can substitute for commercial capital that has already done the hard work of pricing early-stage risk. DFI-1 contests the substitution reading. They report that DFI refinancing of early commercial investors covers only ten to fifteen per cent of overall financing, and that where it occurs the DFI matches a risk profile that did not exist when the earlier commercial debt was deployed. These patterns are the deal-level expression of what Humphrey (2016, 2017) identify in DFI portfolio behaviour more broadly, namely a preference for lower-risk projects within the available set of opportunities.

DFI-1 offers the strongest defence against crowding-out at the deal level. Pricing at commercial rates means borrowers with access to commercial capital have no reason

to approach a DFI given the stringent ESG requirements. A natural self-selection mechanism therefore filters the borrower pool from above to establish financial additionality. The argument is internally coherent and is the clearest articulation in the case of how a DFI maintains the additionality discipline while operating on commercial terms. The argument is partial, however, and the reason is the package effect that P. Carter et al. (2021) identify. The package effect describes how non-price elements of a financing offer, including tenor, capital-stack position, and covenant structure, shape who participates even when the headline price is set at market rates. Tenor is part of the price of capital in this sense, and DFI-1's own description of the instrument, namely commercial rates combined with tenors no commercial lender will match, fits the package effect directly. The self-selection mechanism DFI-1 describes therefore protects against one form of crowding out, where a borrower with full commercial alternatives chooses DFI capital instead, while leaving another form open, where a developer refinances commercial debt with DFI debt because the package, not the price, has improved. A narrower observation cuts across this picture. The home-country patterns documented in section 5.2.3 indicate that capital flows along channels not directly tied to the scarcity of capital among Kenyan developers. One explanation is *trust-by-association* as a way to bring down the transaction cost, as credit risk can be more easily verified, but EXP-3 names the pattern in stronger terms as exhibiting neocolonial dynamics in which expatriate-led companies access international capital through shared networks while local entrepreneurs without those connections struggle to compete. The latter pattern is consistent with the literature documenting the implicit connection between DFI allocation and originating-country commercial interests (Boucher et al., 2024; Dreher et al., 2019; Léon, 2025a). It rests on a small number of accounts and is therefore best read as a qualifier on the two complications above rather than a third complication standing alongside them.

6.2.2 Development additionality

Development additionality asks what DFI involvement adds once the capital has arrived. The case offers reasonably affirmative evidence across three forms of non-financial contribution.

The first is the *environmental and social conditions* above the market floor that DFI conditionality imposes, documented in detail in Table 5.3. The relevant point for additionality is that, where the conditions are absorbed, they produce behavioural change that private capital alone would not produce. INT-1 captures this mechanism plainly. Most E&S compliance is self-reported, but the screening questions now embedded in due diligence, on worker safety at height and on supply-chain labour

practices, would not be asked in the absence of DFI conditionality. The *E&S due diligence and remediation* mechanism in Table 5.3 operates through this logic.

The second is the *credit discipline* that propagates through the system, documented in 5.2.1. The *cascading financial discipline* mechanism installs credit and reporting functions inside developers through contract terms or seconded staff, producing the same kind of behavioural change as the ESG cascade but on the financial-governance dimension. DEV-6 illustrates the absorbed version of this mechanism. They updated their internal credit vetting system to filter out clients carrying excessive counterparty risk, a change in practice that the surrounding commercial market would not have driven on its own. This corresponds to the demonstration-and-standard-setting strand of the literature, where DFIs are theorised as market-shaping actors raising behavioural floors rather than only filling financing gaps (Fernandez-Arias & Xu, 2020; Mazzucato & Penna, 2016).

The third is *technical assistance*, documented as a mechanism in its own right in Table 5.2.2. Sections 5.2.1 and 5.2.2 describe finance and environmental professionals placed inside, or consulting for, developers, funded through DFI-supported TA, with INT-1 and INT-6 reporting active engagement of this kind on top of their own intermediary work. The function of the TA is to help developers reach the maturity at which further debt or investment becomes appropriate or contribute towards ESG commitments, and EXP-1 frames this explicitly as a prerequisite for bankability for projects. The contribution extends development additionality beyond the DFI's own portfolio, because the capacity built to make a developer DFI-ready also serves any subsequent commercial investor who engages that developer. At the intermediary level, INT-6 reports their DFI investors as beneficial on infrastructure deals through substantive technical and financial experience that those investors were willing to share. Whether this counts toward development additionality depends on whether it exceeds what a private investor would do, and since INT-6 had a private investor in their fund and did not describe that investor as supportive in the same way, we read the contribution as additional.

The case is not uniform. EXP-4 and INT-7 present the most critical view. They argue that the E&S conditions DFIs impose are excessive relative to what they achieve on the ground, producing detrimental paperwork without proportionate substantive change. The critique does not deny that DFIs fulfill development additionality by imposing conditions private capital would not impose, it argues that the conditions are heavier than they need to be to deliver the development outcome. The critique therefore qualifies the development claim. It does not, however, remove it. As section 6.1 established, the conditions take the form they do because they are the most legible evidence a DFI can give its upstream principals, being contractual, auditable,

and repeatable across deals. Much of the paperwork EXP-4 and INT-7 describe as excessive is therefore the cost of producing defensible proof that the development contribution happened, not a sign that it did not. The aggregate reading is that DFIs in the Kenyan C&I market deliver development additionality on behavioural floors, credit discipline, and technical assistance at the level of the deals they actually close, with the qualification, established in section 6.1, that the same mechanisms exclude actors who cannot absorb them. The exclusion question is what binds the two assessments together.

6.2.3 Assessment

Taking the deal-level and market-level evidence together, the system serves a middle band of developers. The lower edge is set by the maturity threshold the ESG and credit-vetting mechanisms produce, which excludes developers who cannot absorb the conditions DFIs apply. The upper edge is set by the self-selection mechanism DFI-1 describes, which excludes developers who can access commercial capital on terms they prefer to the DFI package. The developers who receive DFI capital in Kenyan C&I are therefore those who can access some capital but not the tenor and capital-stack positions DFIs offer. The case supports financial additionality at the deal level for these developers, particularly on terms-improvement, while complicating it at the market level, because the maturity threshold and the timing-and-refinancing dynamic together mean that DFIs select from substantially the same population that commercial capital would select from if it were present, using maturity and governance criteria that are not meaningfully more permissive at the developer interface.

The link between the two assessments is causal, not coincidental. The same ESG and credit-vetting mechanisms through which DFIs deliver development additionality require the receiving developer to be able to absorb them, and developers who cannot are filtered out before any allocation decision is taken. The maturity threshold that constrains financial additionality at the developer interface is therefore not a separate phenomenon but the direct consequence of the conditions that deliver development additionality. The implications of this linkage for how the additionality mandate should be read are the subject of the discussion.

7

Discussion

In this chapter, we summarize the answers to the research questions to facilitate a discussion around them. Section 7.1 contains the summarized answers to the research questions and their transferability beyond Kenya. Section 7.2 contains an evaluation of the additionality framework, the financing system, and the alternatives to DFIs. Section 7.3 contains the limitations of the study.

7.1 Answers to Research Questions

Although the empirical material for this study is drawn from Kenya, the findings demonstrate a high degree of transferability to the broader Sub-Saharan African (SSA) region. They arise from agency costs, information asymmetries, and structural frictions that are not bound to the Kenyan markets, but rather to the broader interface between international development finance and local market conditions. As Kenya has one of the most mature C&I solar markets in the region, the frictions observed here likely exist in other, less developed SSA markets. Consequently, the same outcomes are likely to be displayed across the region wherever DFIs finance C&I solar projects through intermediaries.

RQ1: *How is the commercial and industrial solar financing system in Kenya structured?*

The C&I financing system in Kenya is structured as a chain of actors as illustrated by Figure 5.2. *Offtakers* sit at the end of system, they face the developer upstream to which they commit to a multi-year contract with the developer on cost-savings logic and vet the developer for build quality and durability. *Developers* build, own, and operate the system at the offtaker's site, carrying the multi-year contract exposure and vetting the offtaker for creditworthiness. Upstream they raise equity and debt from intermediaries and, at scale, from DFIs, which requires demonstrating

operational maturity, governance, ESG readiness, and equity skin-in-the-game. *Intermediaries* sit between DFIs and developers, deploying stage-appropriate tickets and imposing the operational, financial, and ESG conditions the DFI requires. Upstream they offer DFIs a diversified deployment channel and commit to ESG, reporting, and impact terms while demonstrating fundraising track record and pipeline. *DFIs* deploy long-tenor capital mostly through intermediaries, imposing ESG and impact conditions and co-investing with other DFIs. Upstream they are accountable to treasuries, boards, and political principals, and must demonstrate financial soundness, impact, and additionality under competing ministry pressures.

The chain operates in hard currency, because DFIs, the capital suppliers, are evaluated on hard currency metrics. This forces an FX mismatch that must sit somewhere in the stack, and it usually ends up pushed down to the offtaker. The cost of capital compounds as it flows down the stack, and the developer's contract price is bounded above by the KPLC grid tariff and below by the full cost chain. *Local banks* could in principle resolve the currency mismatch by lending in local currency, but are largely absent from C&I solar, offering tenors shorter than the project requirement and demanding hard collateral.

Are the findings transferable beyond the case?

Although the chain of actors in Figure 5.2 is based on Kenya, the system's architecture is highly transferable to the broader SSA region. Where there is an absence of local capital and the domestic currency is fluctuating, private capital will not have the same incentives to participate. This aligns with the additionality mandate and gives DFIs the incentive to invest. Furthermore, where there are high grid tariffs, there is a business case for C&I solar. Therefore, if these conditions exist, the same financing chain, FX mismatches, and capital cost compounding are expected to emerge. However, transferability is bounded by grid composition. Kenya has a high share of renewable electricity, whereas many SSA countries rely on fossil-heavy grids. This difference affects the overall business case for the offtaker as decarbonization becomes another large value driver.

RQ2: *What frictions and outcomes arise as capital flows through the system, and why?*

The frictions and outcomes observed in the system are clustered around three overarching themes: Credit Vetting, Environmental, Social, and Governance (ESG), and Investment Timing. *Credit Vetting* captures how counterparty trust is established in a market without reliable collateral or enforceable recourse, with verification cost as the central driver. Within Credit vetting, friction arises as each actor is verified

multiple times throughout the chain. Developers without internal finance capabilities face a high cost in demonstrating creditworthiness. Early-stage developers face costs to inject required equity in the market. The outcomes of this are that transaction costs compound throughout the chain, credit and reporting functions get installed or developed within developers, and capital concentrates around the already-credentialled actors. The mechanisms driving these behaviours are *direct vetting at every interface*, a *cascading financial discipline*, *skin-in-the-game* requirements, and *trust-by-association*. Principal–agent theory explains the rationale for these mechanisms. They operate as a cascade of monitoring and bonding costs created by the need to manage information asymmetry along the financing chain, with skin-in-the-game as a response to unobservable effort, and *trust-by-association* substituting for too costly direct verification.

ESG captures how DFIs translate their development mandate into contractual conditions that travel downstream. Friction arises as developers treat conditionality as a distraction from core operations, and smaller developers are asked to demonstrate full alignment, which they cannot operationally meet. Intermediaries run these assessments on behalf of DFIs and manage exclusion through harmonisation and contractual excuse rights. The outcomes are contested amongst the developers and intermediaries. Some behavioural change at the developer level in alignment with the ESG requirements occurs within the system. However, extensive paperwork and reporting requirements lead to self-reporting of ESG targets, and the direction of scarce resources needed for business survival toward non-core business activities. The DFIs absorbs some of these costs by offering *technical assistance* directed toward ESG. The mechanisms driving these behaviours are *E&S due diligence and remediation*, *impact reporting and mandate-alignment*, *legal and regulatory compliance*, and *technical assistance*. The ESG cascade replaces direct observation of behaviour with contractual rules set in advance and audit trails checked later, functioning as the DFI's observable output to its own upstream principals.

Investment Timing captures the temporal misalignment between when developers need capital and when DFI capital becomes available. Within investment timing, friction arises as early-stage developers cannot clear the maturity threshold, while smaller developers find DFI ticket sizes too large and administrative requirements too heavy, developers deplete runway during heavy evaluation and early-stage commercial intermediaries carry the risk of pricing first. The outcomes of this are that DFI capital becomes available only after developers have already survived without it long enough to qualify, with developers pursuing weak projects to scale and become investable in the eye of the DFI. Bridge financing emerges to keep developers solvent over a DFI investment process, and there is a risk of crowding out private capital. The mechanisms driving these behaviours are a *maturity threshold for DFI access*,

a *temporal mismatch*, and *DFI arrival after commercial anchor and refinancing.*

When evaluating this temporal mismatch alongside the frictions in Credit Vetting and ESG compliance, a pattern emerges. The contractual layer that DFIs build to satisfy their upstream principals becomes heaviest exactly where it is hardest to absorb. By setting maturity thresholds and compliance burdens that only highly resourced actors can clear, the system systematically selects in favour of mature agents who can bear these costs and signal low risk.

Are the findings transferable beyond the case?

Credit vetting is likely to generate similar frictions across SSA because lenders in many of these markets face the same information asymmetry problem, therefore difficult to accurately price risk. If similar patterns such as, lack of collateral, thin track records, and uncertain recourse enforcement appear in other parts of the SSA financiers will rely on costly vetting and proxy signals wherever they deploy capital. When intermediaries use skin-in-the-game mechanisms, it systematically exclude developers without independent liquidity. As a result, the same outcome of compounding transaction costs, concentrated capital allocation and exclusion of smaller or earlier-stage firms is likely to appear elsewhere in the region.

The mechanisms regarding ESG are transferable for the SSA region since the mandates derive from the origin countries and are not designed for a specific country. The same mechanism can also produce similar outcomes across the region since wherever DFIs operate through intermediaries, they need rules that make development goals observable, reportable, and auditable. Extensive paperwork, self-reporting, and resources directed to non-core business activities become features of the system rather than country-specific circumstances. It is therefore likely that these mechanisms will cause the same outcomes in other parts of SSA as well.

Finally, the timing and matching mechanisms are transferable in the same way as the ESG mechanisms are. The mechanisms dictating maturity thresholds for DFI access, temporal mismatch, and DFI arrival after commercial anchor are structural products of DFI governance and how it interfaces with finance itself. The agile capital needs for solar projects and the requirements for DFI capital are fundamentally misaligned. In broader SSA markets, this dynamic is likely to reproduce the need for bridge financing, delayed entry, and a risk that public capital crowds out, rather than crowd in, private capital.

RQ3: *How do these outcomes align with the DFI mandate?*

As developed in section 6.2, the case offers a layered assessment of the additional-

ity mandate. On financial additionality, asking whether the investment would have happened without the DFI and on what terms, the case is defensible on a deal-by-deal basis. The structural absence of local commercial capital at the relevant scale and tenor means that the longer tenors and subordinated capital-stack positions DFIs offer are what make the investments possible at all. Mobilization of private capital is demonstrated as a mechanism in more mature SSA markets, but the Kenyan C&I segment has not yet seen DFI capital being replaced by commercial capital. At the market level, three complications work against the deal-level claim. The first is the entry filter produced by the combined ESG and credit-vetting mechanisms, which sets a maturity threshold below which developers cannot reach DFI capital. The second is the timing-and-refinancing dynamic, in which DFIs wait for private capital to validate the deal and later refinance earlier-stage commercial capital that has already priced the risk. The third is the relational and national channels through which allocation actually flows. On development additionality, asking what DFI involvement adds once the capital has arrived, the evidence is reasonably affirmative across three forms of non-financial contribution: environmental and social conditions above the market floor, credit discipline propagated through contract terms and seconded staff, and technical assistance that helps developers move toward bankability.

The two assessments are linked rather than independent. The ESG and credit-vetting mechanisms documented in sections 5.2.1 and 5.2.2 are the system through which DFIs deliver development additionality. To deliver these conditions, however, the mechanisms require the receiving developer to be able to absorb them. A developer must have the governance, financial structure, and operational maturity to implement an ESG roadmap, operate a multi-level credit policy, and supply the reporting which the conditions demand. Developers who cannot meet these requirements are filtered out before any allocation decision is taken. The maturity threshold that limits financial additionality at the developer interface is therefore not a separate phenomenon. It is the consequence of the conditions that deliver development additionality. This outcome is what principal-agent and mechanism-design theory would predict in this setting, where an agent must produce legible, defensible compliance outputs for multiple upstream principals while operating in a market it cannot fully verify (P. Carter et al., 2017). Within this architecture, the two halves of the assessment cannot be optimized independently.

Are these findings transferable beyond the case?

These findings are transferable to the region as the DFI mandate is not Kenya-specific. DFIs are guided by additionality wherever they operate. The financing system that produced this assessment on additionality transfers across SSA under

the conditions already identified. The assessment of how well that system meets the mandate therefore transfers with it. Still, Kenya's position as one of the more mature C&I markets in the region shapes the assessment of the two types of additionality. On development additionality, the Kenyan case likely understates the regional potential. Fossil-heavy grids elsewhere in SSA strengthen the emissions-reduction component of the development case relative to Kenya's largely renewable grid. On financial additionality, the picture is once again more divided. The developer pool able to absorb the compliance load is smaller in less mature markets, so the maturity threshold filters more aggressively, and the share of the segment that DFIs can reach with their current terms is smaller. On the other hand, local banks are likely even further from participating in these markets, increasing the additionality on the deal-level. What this means for DFI involvement is taken up in the following section.

7.2 Evaluations

Evaluation of the Additionality Framework

Section 6.2 established that the two halves of additionality cannot be optimized independently in the Kenyan C&I market. Tightening conditions to strengthen development additionality narrows the developer pool that can absorb them, which narrows reachable financial additionality at the market level. This raises a question the framework does not address: Is the framework asking DFIs to meet a standard the system can, or can not, meet?

The case suggests the framework remains useful but should be read as a diagnostic of trade-offs rather than as a pass or fail test on two independent axes. DFIs in the case behave as commercially as the mandate permits. They price at commercial rates and treat the self-selection of borrowers as the discipline that prevents crowding-out, while treating additionality as non-negotiable in every investment memo. Striving toward commercial behaviour is therefore not a deviation from the mandate but an expression of it, consistent with what the theory predicts should develop the market. The closer DFIs sit to commercial behaviour, however, the harder financial additionality becomes to demonstrate, because the counterfactual against which it is measured becomes narrower.

This tension runs along four edges. On the financial side, the more commercial a DFI appears, the harder financial additionality is to prove, but the less commercial it appears, the more it risks subsidising a market and deterring the commercial entry the mandate seeks to catalyze. On the development side, the more conditionality a

DFI demands, the fewer developers can absorb it, which narrows the population over which financial additionality can be realised, but the less conditionality it demands, the weaker the legible evidence it can return to its upstream principals, on which the mandate institutionally depends. Each axis trades against the other, and the two axes trade against themselves. Scoring high on both dimensions simultaneously is not a matter of better implementation. It is constrained by the framework applied to a market with this structure. The framework therefore has value as a vocabulary for naming what DFI capital is supposed to do, but it cannot supply a scalar score on both dimensions at once. The more productive use of the framework is diagnostic, namely identifying which corner of the trade-off a given deployment occupies and asking whether that corner is the right one for the market in question. This sets up the second evaluation, which asks whether the corner currently occupied by DFIs in Kenyan C&I is one that justifies their continued presence.

Evaluation of the system

The structural case for continued presence in the Kenyan C&I market is the lack of local capital. It cannot yet supply the instruments the market requires, with tenor mismatches and collateral frameworks documented across the developer and intermediary interviews remaining unresolved. Commercial players are beginning to engage at the senior-debt level through guarantee structures, as in the Offgen-ABSA arrangement DFI-1 cites, but equity and mezzanine capital from local sources remain structurally absent. Within the case as observed, no other actor offers what DFIs offer at the scale and tenor C&I projects require, and the structural argument for DFI presence in the Kenyan market therefore holds.

The developmental argument is more ambiguous. DFI-1 frames market graduation in concrete terms, citing South Africa as a market approaching the point where commercial banks offer the same tenors and structural flexibility as DFIs and local pension funds are beginning to enter, and arguing that the marginal DFI dollar generates more development per unit deployed in markets where the gap remains wider. All European DFIs combined hold roughly forty to fifty billion dollars in assets under management against a financing gap running into hundreds of billions. Whether Kenyan C&I is the deployment that best satisfies that marginal-resources test is a question the case raises rather than answers. Kenya's grid is already approximately ninety-three percent renewable, as EXP-1 notes, which weakens the emissions-reduction component of the developmental case relative to markets where C&I solar displaces fossil generation. The offtaker base in the segment is concentrated in the Indo-Kenyan business community, as INT-1 documents and EXP-3 corroborates, and the savings the C&I model delivers accrue largely to firms that are wealthier than the median Kenyan business. EXP-1 captures the institutional

version of this tension in noting that the current Swedish government's shift toward C&I and cleantech is a departure from the historical focus on off-grid solutions and the rural poor, and that the segment is therefore not the traditional sweet spot for a poverty-reduction mandate.

Reading the two together, the case for continued DFI presence in Kenyan C&I is stronger on financial-structure grounds than on developmental grounds. DFIs are present in the segment because no other actor can supply the instruments, not because the segment offers the largest development return per dollar deployed. This does not amount to a recommendation that DFIs withdraw from the segment, since the structural absence is real and exit would produce a financing gap with no obvious successor. It does suggest that the segment is closer to graduation than others and that the marginal-resources question DFI-1 raises in the South African context applies in Kenya as well, in a weaker but still valid form. The mandate would be better served by treating C&I in commercially-mature segments of relatively decarbonised grids as a transitional rather than a permanent commitment, with explicit attention to which forms of participation or instruments should be wound down first as commercial capital deepens.

Evaluation of the Alternatives to DFIs and Their Trajectory

If the case for DFI presence in Kenyan C&I rests primarily on the structural absence of local capital at the relevant tenor and scale, the natural follow-up question is what local capital viability would actually require, and whether the trajectory of a comparable market offers a usable template. The South African case appears repeatedly across the interviews as the regional reference point, with DFI-1, INT-1, and DEV-3 converging on a picture in which commercial banks offer DFI-equivalent tenors, local pension funds enter the segment, and DFIs are increasingly outcompeted by local capital. The convergence makes the description credible as a picture of what graduation looks like.

Whether that picture is reachable from a Kenyan starting point is a different question, and the case offers reasons for caution. The South African position rests on institutional and macro conditions that the rest of sub-Saharan Africa does not currently share, including a deep domestic pension and insurance pool and a currency regime that, as INT-1 notes, deters foreign hard-currency capital and leaves more space for local lenders. DEV-3 predicts that the Kenyan market will consolidate to approximately two scaled players acquired by international rather than local capital, which is the opposite of the South African endpoint. The South African case therefore describes the form a graduated market takes without providing a transferable sequence of steps for reaching it.

In the interim, the case points to a range of alternative instruments that work on the specific frictions identified in section 5.2. Guarantees structured to absorb tenor and collateral risk, portfolio-level credit lines enabling local-currency lending, and reimbursable grants that build repayment data without requiring it upfront all appear across the interviews as mechanisms designed for a market where local commercial capital will yet engage. The case does not allow a full evaluation of these instruments, but it does suggest that the alternative to direct DFI debt and equity is not a single replacement but a portfolio of tools attached to the specific frictions of tenor, collateral, currency, and track record.

The question that follows is whether the current structure is moving the market toward these alternatives or away from them. The case suggests the direction is less clear than the mandate would predict. DEV-3's consolidation prediction and INT-1's refinancing-out dynamic, taken together, describe a trajectory in which the Kenyan market matures into a small number of internationally-owned platforms financed by international capital, with earlier-stage commercial intermediaries refinanced out of the stack as developers reach DFI eligibility. The demonstration effect that follows from such a trajectory runs in a direction that does not obviously build local capital viability. It builds the case for the next international acquirer rather than for the local lender, and it concentrates the segment around actors who can absorb the compliance load the cascades require rather than around actors embedded in the local financial system. The home-country and alumni-network patterns documented in section 5.2.3 add a further layer to this observation. EXP-3 names the underlying dynamic in stronger terms, characterising the segment as exhibiting neocolonial features in which expatriate-led companies access international capital through shared networks while locally-led firms without those connections do not. The interpretation is contested in the case and rests on a small evidence base, but the structural pattern it describes is consistent with the home-country allocation observations of INT-1 and DEV-5. The implication for the alternatives question is that the system is producing a market shape that the alternative instruments would need to work against rather than alongside, which raises the bar on what those instruments would have to achieve.

This study as constructed does not allow a full evaluation of these alternatives. Local banks were not interviewed, and the account given of them throughout the thesis is therefore the account other actors give of them based on their interactions with them and their perception of them. What local banks themselves perceive as the binding constraints on their participation, and what would shift their commercial motives toward C&I solar specifically, are questions we cannot answer. The actor perceptions documented across the case nevertheless retain analytical weight on their own. In this market where counterparty trust governs whether transactions

occur at all, what developers and intermediaries believe local banks will and will not do shapes whether they approach those banks in the first place, and therefore shapes the pace at which any graduation pathway can proceed. The perceptions documented here are part of the system being studied, not a substitute for direct evidence about the local banks.

7.3 Limitations & Methodological Choice

The qualitative case study design with the use of semi-structured interviews carries limitations. First, the reliance on purposive and snowball sampling introduces network bias. Because initial contacts were used to access further participants, the sample naturally clusters around a specific ecosystem of actors who already interact with one another. Therefore, there is a risk of an echo chamber effect, where perspectives and ideas are mutually shaped by shared industry narratives rather than being independent observations. This also risks excluding the perspectives of actors such as developers who systematically fail to access DFI capital or local banks disconnected from international finance networks.

Second, as mentioned in section 4.4 the data collection is vulnerable to social desirability bias. Actors actively seeking capital or managing public funds have strong incentives to present their business favorably. While this was partially mitigated through data triangulation and the inclusion of neutral experts, the interview accounts regarding ESG compliance and operational competence likely contain an optimistic skew. The data is also susceptible to positional and effective bias, since DFIs in SSA is a highly politicized topic within the industry. Respondents frequently hold strong ideological views or personal frustrations regarding DFI mandates, market interventions, and bureaucratic processes. This is effective when studying subjective views of a system and its frictions, but less effective when evaluating the objective DFI additionality or crowding dynamics.

Finally, the abductive logic and method of retroduction rely heavily on the researchers' interpretation. While the Framework Method matrix ensures traceability, identifying the hidden mechanisms causing market frictions is an inherently subjective analytical process, and therefore the findings are not provable outcomes.

Transferability

While Kenya serves as an effective instrumental case for the SSA region, the transferability of the findings is subject to boundary conditions. Kenya being one of the most mature C&I solar ecosystems in the region is used as a factor of transferability,

but it can also be a limitation.

The scale of both solar developers and their project portfolios is a factor that dictates profitability, access to financing, and, in the end, the survival of C&I solar developers. This potential for scale might not exist in many other countries in the region, so there could be a lack of a commercial business case for a C&I solar developer. Where a commercial business case cannot be sustained, developers have to rely on concessional capital. When concessional capital is present, it is uncertain if the system is structured in the same way and contains the same mechanisms and frictions since the rules of concessional capital will most likely differ from those of institutional commercial debt.

Importantly, however, this limitation is bound to the current maturity stage. As these broader SSA markets mature and achieve the necessary scale, they might be able to transition away from concessional funding. Should they cross that developmental threshold, the mechanism, outcomes and friction points mapped in this study are likely to emerge. Therefore, while these findings may not perfectly describe the current state of less developed markets in the SSA region, they provide a case for what the trajectory of those markets may face as they evolve.

8

Conclusion & Contributions

This chapter contains the conclusion and contributions of the study for the actors within the system, for academia, and provides avenues for further research.

8.1 For Practitioners

For practitioners in the sub-Saharan C&I ecosystem, this study contributes a map of the market and how it works. The system architecture (RQ1) and the frictions it produces (RQ2) show that compounding transaction costs, long approval timelines, and heavy reporting burdens are not administrative inefficiencies. They are rational responses to a market defined by severe information asymmetry, a lack of enforceable recourse, and the absence of local commercial capital. Because upstream investors cannot directly verify project quality or developer behaviour, they rely on contractual rules and proxy signals instead.

This explanation is itself the main contribution to practitioners. There are many views on what DFIs, and by extension intermediaries, should and should not do. This thesis does not try to settle that question. What it offers is a reasonable, theoretically grounded account of why they act as they do. That account matters, because it lets practitioners build their strategies in line with how the system actually works, rather than against it.

For *developers*, this means treating financial capability as a core competency rather than a back-office function. In a frontier market without local credit infrastructure, every interface in the capital stack manages risk through repeated due diligence and strict skin-in-the-game requirements. Institutional debt depends on locally established trust, and the developer earns that trust by being legible to lenders. Credit policies and audited financial reporting are not optional extras. They are the price of admission for institutional debt, and a dedicated ESG management system is a

further threshold a developer must clear to mature. Where these capabilities look too expensive for an early-stage company, the developer should use the concessional facilities that exist to cover exactly this gap, such as subsidised Technical Assistance.

For *intermediaries*, the central value lies in translating information and building trust across the system. Their advantage is absorbing the friction of compounding transaction costs so that the actors on either side do not have to. Making this role visible to early-stage developers also has strategic value, because a developer is more willing to take on new financial and reporting practices, even when these strain limited operational resources, once it understands that this is what unlocks access to cheaper capital later.

For *DFIs*, the study makes the downstream outcomes of their choices visible. It shows how their conditions travel through the intermediary layer and shape which developers can participate at all. These outcomes are necessary to judge whether the result is the one intended. The absence of alternative capital sources does not, on its own, mean a DFI serves its mandate best by pursuing maximum developmental impact. The balance between financial additionality and developmental additionality is a choice each DFI makes, ultimately in every transaction, and a more structured approach to that choice could serve them well.

When applying the logic to other regions than Kenya, the reader carries the responsibility of judging how far these dynamics extend to the specific region in mind. The realities mapped here, however, offer strategic imperatives that should hold wherever the same underlying conditions are present.

8.2 For Academia

This study makes three contributions to the literature on DFIs and intermediated development finance.

The first contribution is an actor-level mechanism for patterns the literature has so far observed only at the portfolio level (Boucher et al., 2024; Dreher et al., 2019; Gajigo et al., 2023; Humphrey, 2016, 2017; Léon, 2025a). The credit-vetting and ESG mechanisms documented in sections 5.2.1 and 5.2.2 and analysed through information asymmetry and principal-agent dynamics in section 6.1 are the operational counterpart of those patterns. They specify how DFI conditions propagate through the intermediary layer, which actors can absorb them, and which are filtered out before any allocation decision is taken. The investment timing dynamics in section 5.2.3 add the deal-level expression of the originating-country and lower-risk patterns

the portfolio literature describes. The contribution is therefore not new patterns but a mechanism that connects existing patterns to the actor-level processes that produce them.

The second contribution extends the chain one step beyond where the existing literature ends. De Haas and González-Uribe (2025) observe that evidence on intermediated public lending rarely traces effects past the bank, leaving downstream actors empirically unaddressed. By including developers and offtakers in the actor set, this study follows DFI capital and conditions through the intermediary layer to the actors that ultimately use the capital, and shows that the conditions imposed upstream are absorbed differently at each layer rather than passing through unchanged. The extension is qualitative rather than causal, and does not estimate impact on final beneficiaries, but it maps the layer the existing impact literature has not been able to enter.

The third contribution is methodological. The literature on DFI screening, selection, and monitoring is largely quantitative and, as Léon (2025a) notes, still underdeveloped. The qualitative, actor-level evidence assembled here documents how these processes operate from the inside and how the actors who bear them perceive them. The contribution is less generalisable than aggregate evidence but offers an interpretive layer the quantitative literature on its own cannot supply, useful for explaining the patterns those studies surface.

8.3 Avenues for Further Research

The contributions outlined are bounded by the design choices of this study. The case is single-market, the actor set excludes local banks as primary respondents, and the evidence is qualitative throughout. Each of these boundaries marks a direction in which the work can be extended.

Academic work could extend the study in three directions. The ESG and credit-vetting mechanisms documented here are characterised qualitatively from inside the chain, and quantitative estimation of their effects, for instance the compounding compliance cost at each layer of the stack or the size of the developer population filtered out at each maturity threshold, would close the loop between the mechanism described in this thesis and the portfolio-level patterns the existing literature documents. A comparative multi-case design across SSA markets at different stages of maturity would test whether the mechanisms generalise or whether they reflect the specific Kenyan structural configuration, and would allow a more direct test of the graduation trajectory the case surfaces but cannot evaluate against alternative

endpoints. Direct interview-based work with local banks would complete the actor map this study leaves partial, establishing what they themselves identify as binding constraints on C&I participation rather than what the rest of the chain perceives those constraints to be.

Practitioner-facing work could extend the study oriented toward decision-relevant outputs. An empirical evaluation of the alternative DFI instruments the case identifies, namely guarantees structured to absorb tenor and collateral risk, portfolio-level credit lines enabling local-currency lending, and reimbursable grants that build repayment data without requiring it upfront, would inform instrument selection in markets with this structure. The case documents home-country allocation and refinancing-out patterns but cannot size them. Quantifying these patterns would resolve magnitude disputes that bear directly on the additionality and crowding-out claims justifying continued DFI presence. Finally, a systematic mapping of how principal-level heterogeneity within DFIs, namely the political and financial principals each institution answers to, translates into downstream conditionality would help practitioners match the right DFI to the right transaction, and would specify a mechanism the principal-agent analysis in this study identifies but does not fully map.

Glossary

Additionality	The fundamental justification for public Development Finance Institutions (DFIs) to invest in a private project...
Additionality	The fundamental justification for public Development Finance Institutions (DFIs) to invest in a private project. It means that the DFI provides something that the private commercial market is unwilling or unable to supply. In this thesis, it is divided into Financial Additionality, which asks whether DFI invests in that commercial capital would not, and Developmental Additionality, which asks whether the capital actually reaches the actors the development mandate is meant to support.
Adverse Selection	An economic concept describing a situation where lenders restricting credit or requiring strict terms unintentionally filter out good candidates. In the context of this thesis, it refers to how the strict environmental and reporting requirements imposed by DFIs cause smaller, potentially high-impact solar developers to avoid seeking funding, leaving only the largest, best-resourced companies in the funding pool.
Blended Finance	A financial structure that combines concessional public capital with commercial capital to alter the risk-return profile of a transaction. While the Kenyan C&I solar market operates predominantly outside such structures, it is a tool used to encourage private commercial investors to enter deals they would otherwise avoid.
Bonding Costs	Component of agency costs under Principal-Agent theory. Bonding costs are incurred by the agent (like investing time and money into internal ESG systems) to prove they are following the rules.
Bridge Financing	Short-term capital used to keep companies, in this case developers, afloat before larger funding is secured.
Capital Stack	The layered structure of the different types of money used to fund a project, ranked by who gets paid first and who absorbs losses first. Senior debt sits at the top and is repaid first, mezzanine or junior instruments sit in the middle, and equity sits at the bottom, absorbing losses first and demanding the highest return.

Captive Solar	A solar photovoltaic (PV) system installed directly at a commercial or industrial host facility specifically to generate electricity for that facility's own on-site consumption.
Common-agency theory	A framework describing situations where an agent must answer to multiple principals with divergent goals.
Concessional Finance	Funding provided on more favorable terms than the open market, such as subsidized debt or grants. DFIs generally avoid providing concessional finance to avoid distorting market pricing, though other entities like family foundations or specific green credit lines may offer it.
Corporate Finance	A financing arrangement where a company raises capital against its own balance sheet, meaning the project risk is borne by the company and debt capacity is determined by its overall financial standing.
Credit Rationing	A situation where lenders keep interest rates at a certain level and limit how much they lend, rather than simply charging a higher rate to everyone who wants a loan. This happens because higher interest rates can worsen the pool of applicants and lead to under-investment in socially desirable projects.
Credit Vetting	The process of evaluating the financial history, behavior, and creditworthiness of a potential borrower or business partner.
Crowding-In	Also called mobilization. The intended outcome where a small public intervention or DFI investment encourages private capital to enter the market. This can happen explicitly through co-financing or tacitly through demonstration effects and the absorption of first-mover costs.
Crowding-out	The unintended outcome where DFI capital substitutes for commercial capital rather than mobilizing it.
Developer	In the Kenyan solar market, an energy service company that originates, builds, owns, and operates C&I solar assets under long-term contracts. They sit at the hinge of the capital stack, facing the offtaker commercially and the capital market financially.
Direct vs. Intermediated Finance	Two channels through which DFIs operate. Direct finance involves the DFI acting as a primary lender to a single counterparty, usually for large projects. Intermediated finance routes capital through financial institutions or specialized funds, which is structurally better suited for smaller firms and projects like C&I solar.
Frictions	Refers to fiscal and non-fiscal costs that fall on one actor due to actions or perceptions of another.
Foreign Exchange (FX) Risk	The financial risk that arises when a project's revenues and debts are in different currencies. In Kenya, solar projects usually earn revenue in local currency (Kenyan shillings) but are funded by international capital supplied in hard currency (US dollars or euros), creating a mismatch that is expensive to insure against.

Soft vs. Hard Information	Soft information is subjective, context-dependent. It reflects opinions, feelings, and qualitative insights. Hard information is quantifiable, factual data.
Information Asymmetry	A market condition where one party in a transaction has more or better information than the other. In this thesis, it explains the difficulties DFIs, funds, and banks face when trying to accurately judge the risks of developers and offtakers in frontier markets where local track records are thin.
Intermediary	Investment vehicles or funds that sit between the DFI layer and the developer layer. They raise capital from DFIs and deploy it into developers, reducing frictions by aggregating transactions, standardizing due diligence, and pooling risks.
Levelised Cost of Electricity (LCOE)	The all-in cost of generating power from a system, which covers equipment, installation, financing, and maintenance, averaged across the project's life.
Maturity Threshold	Specific level of maturity a developer must reach before being eligible for DFI capital.
Mechanism Design	A theoretical framework used to explain how organizations set rules to achieve specific outcomes. In this study, it helps interpret how DFIs and intermediaries use financing instruments, ticket sizes, and eligibility rules as selection mechanisms to screen agents and allocate risk.
Mezzanine / Junior Debt	A middle layer of funding in the capital stack that absorbs losses before senior capital is touched. By taking the first loss, it lowers the price senior lenders charge and makes them willing to lend for longer periods.
Moral Hazard	The risk that borrowers might weaken their effort or take undue risks because the lender cannot perfectly observe their behavior.
Monitoring Costs	Component of agency costs under Principal-Agent theory. Monitoring costs are incurred by the principal to observe the agent.
Non-recourse Debt	A type of loan used in project finance where lenders can only collect repayment from the project itself, rather than claiming the parent company's other assets if the loan is not repaid.
Offtaker	The commercial and industrial businesses, such as manufacturers or multinational subsidiaries, that purchase the electricity generated by the solar systems. Without a bankable offtaker, no deal exists.
Operating Lease	A contracting structure where the offtaker pays a fixed monthly fee to the developer for the service of receiving energy, regardless of the exact quantity consumed. The developer continues to own the system and is responsible for operations and maintenance.
Partial Credit Guarantees	Instruments used to shift risk away from lender and encourage commercial capital to participate.

Power Purchase Agreement (PPA)	A contracting structure where the offtaker pays an agreed-upon price per kilowatt-hour of electricity delivered from the solar system. The bill fluctuates depending on how much energy is generated, and the developer owns and operates the installation over the contract life.
Principal-Agent Theory	A theory describing the tensions that arise when one party (the principal) delegates work or capital to another party (the agent). It explains the friction in the solar market because agents pursue their own objectives, which diverge from those of principals due to differences in information, risk tolerance, and incentives.
Project Finance	A financing arrangement that involves creating a separate legal entity, known as a special purpose vehicle (SPV), to hold the project. It is funded by equity and non-recourse debt, meaning lenders depend entirely on the project's own cash flows to be repaid.
Refinancing	The process when replacing existing debt with a new one, often with better terms.
Signaling Theory	A behavioral theory explaining how high-quality actors can separate themselves from low-quality actors by engaging in observable actions that are too costly for low-quality actors to fake. It conceptualizes how developers try to position themselves credibly in the eyes of DFIs and other financiers.
Skin in the Game	A requirement for a downstream party, such as a developer, to commit its own capital to a project. This ensures they bear a portion of any potential losses, aligning their incentives with those of the upstream capital provider.
Syndication	The process where multiple investors, such as DFIs or funds, co-invest in a transaction together. It makes it easier to support a portfolio company, especially in difficulty, when several pockets of capital are available rather than relying on a single investor.
Technical Assistance (TA)	Non-financial developmental support, such as grants or seconded staff. In Kenyan C&I, TA is used to help developers build capacity, upgrade their internal credit functions, and implement ESG roadmaps to reach bankability.
Temporal Mismatch	The structural disconnect between the slow processing timelines of DFIs and the fast operational runway needs of developers.
Tenor	The length of time a borrower has to repay a loan. C&I solar projects require long tenors (such as 15 to 25 years) to recover their upfront costs, which local banks are often structurally unable to offer.
Ticket Size	The minimum size of a transaction for it to be eligible for an investor. An investor with high transactions costs will require a high ticket size.

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A

Appendix 1

Table A.1: Overview of Anonymized Interview Participants

ID	Respondent Role	Time (Min)	Format	Date
DEV-01	Head of Business Development	60	In person	04/03/2026
DEV-02	Former Bus. Dev. Associate	30	Link	05/03/2026
DEV-03	CEO	50	Link	17/03/2026
DEV-04	Head of Fundraising	45	Link	23/03/2026
DEV-05	Co-founder	30	Link	27/03/2026
DEV-06	CFO	60	In person	24/04/2026
INT-01	Senior Investment Manager	60	In person	09/03/2026
INT-02	Associate Investment Director	30	Link	12/03/2026
INT-03	VP, Strategic Initiatives	45	Link	18/03/2026
INT-04	Finance & Analytics Specialist	60	Link	27/03/2026
INT-05	Senior Investment Officer	60	Link	27/03/2026
INT-06	Senior Partner	45	Link	08/04/2026
INT-07	CEO	45	Link	20/04/2026
OFF-01	Managing Director	30	In person	11/03/2026
OFF-02	General Manager	30	In person	11/03/2026
OFF-03	Plant Manager	45	In person	18/03/2026
DFI-01	Regional Director, East Africa	60	Link	07/04/2026
DFI-02	Senior Portfolio Coordinator	30	Link	12/04/2026
DFI-03	Senior Investment Manager	30	Link	29/04/2026
EXP-01	Development & Trade Specialist	60	In person	13/03/2026
EXP-02	Finance Specialist	30	Phone	14/03/2026
EXP-03	Finance Catalyst	90	In person	17/03/2026
EXP-04	Founder & Advisor	60	Link	25/03/2026

B

Appendix 2: Interview guides

This appendix presents an aggregated, stakeholder synthesis of the utilized semi-structured interview guides. The framework is organized around four themes designed to trace the flow of international capital down the Kenyan Commercial & Industrial (C&I) solar financing chain. Within the themes, the bulletpoints explain which questions was asked to which actor. In line with the abductive approach of this study, the interview guides were continuously refined as new insights emerged. Consequently, certain questions were introduced in later stages, meaning that not all participants were prompted with the exact same set of questions.

Theme 1: Capital Allocation, Mandates, and Entry Conditions

This theme explores the baseline prerequisites, institutional mandates, and operational thresholds required to trigger the deployment of capital at each level of the stack.

- **Development Finance Institutions (DFIs):** What do you require before engaging with a fund or developer? What is your minimum ticket size, and what requirements do you attach to your capital?
- **Intermediaries:** What makes you trust a developer's track record before a deal is signed? What do you find is the hardest thing for developers to show at your target stage?
- **Developers:** What do you look for in an investment partner beyond the capital itself? What must an offtaker look like financially, operationally, and contractually for you to pursue a deal?
- **Offtakers:** What did you need to see from the developer before taking them seriously? What did they require from you to move the deal forward?

Theme 2: Operational Frictions, Financial Structures, and Macro Risks

This theme examines the technical breakdowns, pricing points, macro exposures, and systematic bottlenecks encountered during real-world transaction execution.

- **Development Finance Institutions (DFIs):** When a deal approaches you but fails to close, what is the most common reason? How do you handle lending tenors and foreign exchange (FX) exposure, and do you work through local commercial banks?
- **Intermediaries:** What terms do developers push back on the most? What is the hardest thing to demonstrate to your own DFI lenders, and how do you handle currency mismatches in your underwriting?
- **Developers:** What currency denominations are your loans typically held in, and how do fluctuations between hard currency (USD) and local currency (KES) impact your financial operations? What has been your experience trying to secure financing from local banks? What contract terms do offtakers push back on most?
- **Offtakers:** How did international currency pricing affect your evaluation of the deal's risk? What internal pushback or hesitation did you face from stakeholders like finance or procurement, and how long did the process take from first contact to signing?

Theme 3: Additionality, Crowding Dynamics, and Market Evolution

This theme evaluates market distortions, signaling effects, and the overarching alignment between international development mandates and true private sector mobilization.

- **Development Finance Institutions (DFIs):** How does your explicit goal to de-risk and exit translate into practice? What challenges have you encountered in trying to achieve this? How does your presence affect commercial lenders? Have you ever deployed capital that, in retrospect, was not additional?
- **Intermediaries:** How, if at all, does the presence of DFI capital influence the participation of commercial investors? Does the expectation of downstream DFI capital arriving make you more willing to take early-stage construction risks? What happens to your contracts when a developer scales?

- **Developers:** Has what you require from investors or offtakers changed as you have grown and scaled? Was there ever a growth stage where available capital simply did not match your maturity level?
- **Offtakers:** To what extent are you aware of how your developer is financed?(If no:) If a developer is backed by international Development Finance Institutions (DFIs) rather than purely commercial capital, would that influence your trust or perception of the deal? Why/why not?

Theme 4: Strategic Diagnostics and Market Misconceptions

This theme surfaces high-level qualitative observations regarding systemic binding constraints within Sub-Saharan Africa's renewable energy ecosystem.

- **Cross-Stakeholder Baseline Inquiry:** What do you see is the primary binding constraint holding back capital deployment in the Kenyan C&I market right now? If you could change one thing to unlock capital flow, what would it be?
- **Systemic Diagnostics:** What fundamental aspect of how the Kenyan C&I market and its capital stack operate do people most consistently misunderstand?

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