



# The Empowa Platform

The Mathematics, Financial, and Risk Engineering Underpinning the Empowa Ecosystem of Financial and Utility Instruments

## **Empowa Quantitative Analysis and Risk Unit**

Version: Empowa Summary V.1

Prepared by: Andrew Forson & Empowa Technology Ltd

10 Oct 2022



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# A. Introduction

This document is a summary of the mathematics and financial principles that govern the Empowa platform. It is the theoretical framework upon which pricing and risk data is generated on the platform.

In principal the elements that contribute to the Empowa platform value are as follows:

1. Empowa Secured Defined Return Instruments (SDRI) as the primary capital raising instrument and built on digital NFT technology
2. EMP Token as the utility token that collateralizes platform transactions and serves as the platform's primary liquidity agent and medium of exchange
3. Empowa Platform as the ecosystem within which all components interact
4. Exchanges, both external and internal, as the supply and demand driven facilitation vehicles through which participants are able to engage with the digital Empowa instruments - SDRIs and EMP Tokens

This document attempts to provide a quantitative and analytical framework for defining the logical parameters to the supply and demand mechanisms that ultimately drive the decision to buy into or sell out of an Empowa position.

## B. SDRI (NFT) Pricing and Valuation

The primary capital raising instrument in the Empowa ecosystem is the Secured Defined Return Instrument (SDRI) built on NFT technology. The Empowa SDRI will have several different characteristics so the Empowa platform provides the framework to make a particular SDRI easy to identify, compare, value, and trade. This framework ensures that the holder of the SDRI is able to determine whether the instrument is listed at a discount or premium to its intrinsic value.

## C. FX Risk: Dynamic Forward Process Model

Since Empowa is operating across a broad range of emerging markets, exposure to foreign exchange risk is significant. We had to establish a means of:

- Protecting payments made by prospective house owners to the property developer
- Protecting repayments made by the property developers to the Empowa platform
- Minimizing FX risk for borrowers
- Minimizing FX exposure for lenders
- Taking steps to reduce the risk of FX risk related fixed income instrument default

Enter the FX Forward contract. Ordinarily, the FX Forward Contract is an agreement in place between a client and a financial institution to trade a currency pair at a predetermined rate at a particular date and time in the future.

The cost of establishing forward contracts for each SDRI borrowing arrangement and each payment would be prohibitive. Yet not accommodating FX risk when conducting business across volatile emerging markets would be unwise.

By leveraging the Empowa Pay application, the Platform is able to dynamically lock in future FX repayment rates at a competitive price thereby enabling payers to make frequent payments and ensuring that risks associated with future repayments across volatile FX currency pairs are significantly reduced.

We have modified standard practice which is generally based on bulk spot contract prices to:

- Accommodate the Platform's ability to leverage blockchain technology to have irrefutable evidence of cash flows received; and

- Dynamically accommodate the exceedingly high volume of payments, both large and small ticket, from prospective homeowners and developers that would normally be too economically inefficient and transaction fee heavy to hedge with FX Forward Contracts

## D. Rates: Required Rates of Return

There are four fundamental values of importance when it comes to the determination of price and required rate of return on an Empowa Secured Defined Return Instrument.

- **Risk Free Interest Rate** is the lowest rate interest rate at which the most creditworthy borrower (normally government) is able to borrow for the shortest possible time period (normally from overnight up to 3 months)
- **The maturity**
- **The cost of capital** of the entity seeking funds which is closely aligned with the credit worthiness of the company seeking the financing
- The market's **required rate of return** as determined by the general level of interest rates

## E. Risk Management

Risks generally fall into three categories:

1. **Business Risks** are taken by businesses in an attempt to maximize profits and ultimately shareholder value.
2. **Non-Business Risks** are beyond the control of the business and reflect risks that arise out of the environment that the firm exists in – like political and economic imbalances.
3. **Financial Risk** tends to arise due to volatility and loss in the financial markets caused by variations in token prices, equity prices, currencies, interest rates, and more.

The Empowa ecosystem generally has risks specific to the:

1. Platform and institutions serviced by it; and
2. Individual investors and participants

The Empowa risk management approach is designed to mitigate, quantify, or elucidate the risks associated with the projects that are underwritten through the Empowa platform.

Where possible, we aim to manage risk by:

- leveraging accepted financial industry practice
- leveraging the native transparency, speed, and immutability of blockchain and decentralized ledger technologies
- Using international standards compliant indices, metrics, and approaches to ensure qualitative decisions are tied to proven standards and approaches

Ultimately our goal is to be able to explain every decision that is made in a clear and logical manner.

## Foreign Exchange Risk

In dealing with emerging markets, capturing, quantifying, and controlling foreign exchange risk is paramount.

Doing this in an effective way that will be accepted by the broader investment community has required Empowa to be innovative.

## United States Patent Pending 63359069

In July 7 2022, an Empowa research team received Patent Pending Status acknowledgement for the filing of US Patent 63359069, “Dynamic Variable Input Declining Balance Forward Contract Pricing Engine”.

This innovation, quite simply, can be described as a financial technology that leverages the immutability of blockchain technology to:

- Record each and every small payment from prospective property owners in emerging markets on a flexible schedule of payments in their domestic currency
- Use Empowa as the counterparty to define, calculate and establish dynamically generated forward foreign exchange contracts in currencies that align with the currency in which financing was issued
- Reduce the outstanding balance for debt instruments in the issuing currency on validated receipt of payment in their domestic currency

The key innovation here is that since Empowa is the financing platform, we have the ability to provide the forward foreign exchange pricing on a dynamic basis using the risk-free interest rates of our choosing from preferred markets thereby reducing the cost of debt for entities seeking to borrow for property projects within emerging markets.



## Empowa Technology Innovation

The innovation reduces credit risk, foreign exchange risk, and operational risk of both the Empowa platform and the counterparties seeking to fund projects through the platform.

### Purpose

Our objective was to capture and process payments received in one currency (assuming cross-border international payments) that are associated with a fixed principal repayment amount in another currency. The repayment duration is downwards flexible potentially without penalty. The approach is to recapture these repayments such that the ultimate forward contract principal repayment accurately reflects the reduction in risk inherent to the pricing engine. This process needs to be conducted in a zero-trust immutable manner to be a reliable means of reducing the expected principal repayment amount.

### Mechanism

Our utility process invention permits us to:

1. Value and set prices of electronic Secured Defined Return Investment Products
2. Calculate the Yield to Maturity of electronic Secured Defined Return Investment Products
3. Determine the PV of Coupons or Annuities of electronic Secured Defined Return Investment Products
4. Determine the Foreign Exchange Carry Total Return on the electronic Secured Defined Return Investment Products
5. Determine the Forward Price of an electronic Secured Defined Return Investment Product
6. Determine expected returns, sinking fund contributions, and dynamic forward value with recalculated repayment balance based on periodic and unscheduled foreign currency and native currency repayments
7. Dynamically establish forward rate and reduce outstanding balance accordingly for excess unexpected payments
8. Determine a reduced risk profile for foreign investments by incorporating the spot fx price with long dated international risk free rate along with periodic and prepayments lodged in a Decentralized Ledger in order to quantify, record, and definitively reduce cost of capital / risk.

## Empowa Pay Payment Tracking

The Empowa Pay Payment Tracking app mitigates risk by performing the following functions:

- Irrefutably proving payment cash-flows that secure Empowa Secured Defined Return Investment Products at source
- Irrefutably proving the nature of the payment including amount, currency, date, time, payor, and recipient
- Facilitating the foreign exchange risk mitigation processes of Empowa



The Empowa Pay app is the fundamental driver of the risk reduction mechanisms and principles that prove the efficacy of the entire Empowa concept.

## Sinking Fund

Empowa Secured Defined Return Investment Products should automatically provide an in-built sinking fund provision. Such a provision requires and enables borrowers to put money aside within the Empowa platform to repay SDRIs at maturity.

The sinking fund provision ensures a segregated fund or account is established into which payments in excess of required interest payments are submitted on a regular basis to repay the SDRI principal / face value at maturity.

This structure is a core tenant of the Empowa ecosystem risk mitigation approach.

## Progress Based Disbursements

Another risk mitigation approach is to time the disbursement of borrowed capital to the needs of the project. Between the implementation of a sinking fund and timed disbursement of return, the ultimate result is:

- To reduce foreign exchange risk by serving to reduce the quantity of funds converted into volatile domestic currencies for the purpose of housing project completion
- To reduce default risk by reducing the amount of time funds spend in the market of the volatile domestic currency through the use of an Empowa platform managed sinking fund
- To reduce operational risk by closely correlating disbursements with project progress

# F. SDRI Marketplace

The main goal of all of the tools, risk assessments, measurements, and metrics is to provide a high degree of:

- Consistency
- Transparency
- Comparability
- Reliability

These elements of consistency are needed to allow the market to define a price floor beyond market driven supply and demand based pricing for each Empowa Secured Defined Return Instrument.

At a fundamental level the Empowa Marketplace should provide traders the opportunity to:

- Know whether the Empowa SDRI is trading at a premium or discount to the par value

- Get a sense of what the demand and supply is of a particular SDRI or portfolio of SDRI's
- Gain access to SDRI specific financial and qualitative metrics that are relevant to an investor's ability to initiate and terminate a successful trade

# 1. Participants

In traditional debt markets, 90% of debt instruments are held by institutions. 10% are held by private individuals.

## Buyers of Funds

The buyers of funds are the borrowers. These are the parties for whom the raise is targeted either directly or as part of a portfolio of projects. The cost of borrowing is the interest rate they must pay.

## Sellers of Funds

The sellers of funds are those participants who are lending their funds to the borrowers in exchange for a fee which is the interest rate.

### Individual

In the ordinary course of business, individuals would represent 10% of the traded volume of financing instruments. Individuals may operate in the secondary market, generally speaking.

### Institutions

In the ordinary course of business, institutions would represent 90% of the traded volume of financing instruments. Institutions may operate in both primary and secondary markets and as market makers.

# 2. Markets

## Primary Market

The primary market is where borrowers, who are buyers of funds, issue their new debt. This is where the debt instrument is issued to the public for the first time. It is effectively where the debt instrument is created. In the primary market, participants are purchasing the digital debt instrument from Empowa directly since Empowa is the issuing, or minting, platform.

## Secondary Market

The secondary market is where participants buy or sell debt that was issued in the primary market.

The Empowa marketplace will essentially be divided into two functions:

1. The initial digital debt offering function; and
2. The secondary purchase, sale, and resale trading function.

### 3. Bid / Ask Spread

*"Make a Bid to Buy; Make an Ask to Sell"*

*"Bid yields are always higher than ask yields."*

*"The bid price will almost always be lower than the ask or "offer," price."*

The term "bid" refers to the highest price a buyer will pay to buy a specified number of units of an item at a given price at a given time. The term "ask" refers to the lowest price at which a seller will sell the item.

The bid price will almost always be lower than the ask or "offer," price. The difference between the bid price and the ask price is called the "spread" or "bid/ask spread".

SDRI quotes should be given in terms of Yield to Maturity (YTM) rather than price, because the YTM is a representation of the expected return of the SDRI through maturity. The bid YTM is the YTM figure that represents what the long-term return would be if the bid price is paid for the SDRI. The ask YTM is the figure that results when the same calculation is made but based on the higher ask price.

Bid YTM are always higher than ask YTM. The spread between bid and ask YTM is wider when markets are illiquid with little trading activity and narrower when there is a lot of trading activity.

The difference between bid and ask prices, or the spread, is a key indicator of the liquidity of the asset. In general, the smaller the spread, the better the liquidity.

#### Key Points

- The bid price refers to the highest price a buyer will pay for a SDRI.
- The ask price refers to the lowest price a seller will accept for an SDRI.
- The difference between these two prices is known as the spread; the smaller the spread, the greater the liquidity of the given SDRI; the larger the spread, the lower the liquidity of the given SDRI.

## How Are Bid and Ask Prices Determined?

Assuming sufficient transaction history, bid and ask prices are set by supply and demand established within the marketplace. The prices are therefore set by the actual buying and selling decisions of marketplace participants who have transacted in that particular SDRI. If demand is greater than the supply, then the bid and ask prices will trend up.

If supply is greater than demand, bid and ask prices will trend down. The spread between the bid and ask prices is determined by the degree of trading activity in the SDRI - greater trading activity in a particular SDRI leads to narrow bid-ask spreads. Low trading activity in a particular SDRI will result in wider bid-ask spreads.

## Market Makers

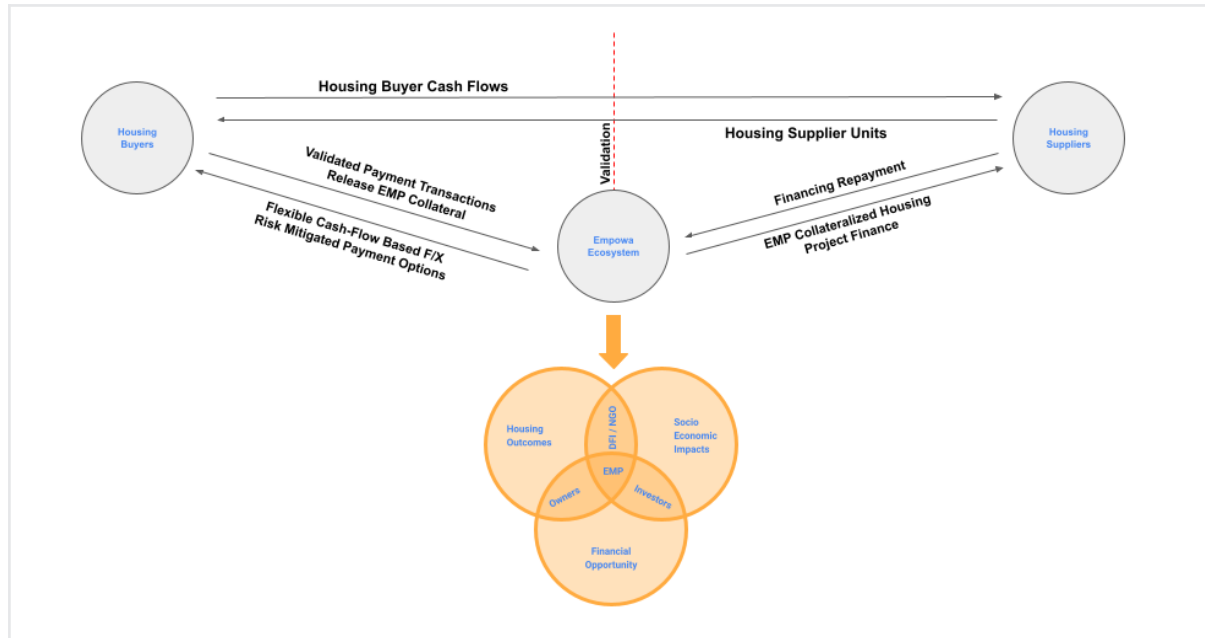
For a smooth functioning Marketplace a range of market making activities will be needed. Market Making is a risky activity and will require a segregated fund or independent entities whose main purpose is to execute trades in exchange for the bid / ask spread.

## 4. Responsibilities

- operate the Empowa SDRI Marketplace and make the Empowa SDRI Marketplace available to Individual and Institutional Participants;
- maintain the register of authorized marketplace member participants
- admit authorized marketplace Member Participants into the Empowa Marketplace
- maintain the Distributed Ledger of investments, payments, and the marketplace trading system System; and
- ensure that there is a Designated Custodian and a Banker at all times while the Empowa platform is operating.

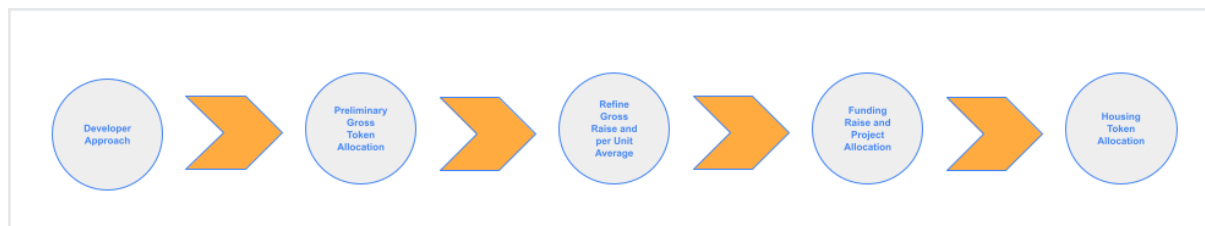
# G. EMP Token Valuation

## EMP-Enabled Collateralization Flow



## 1. SDRI Collateralization Model

### Developer



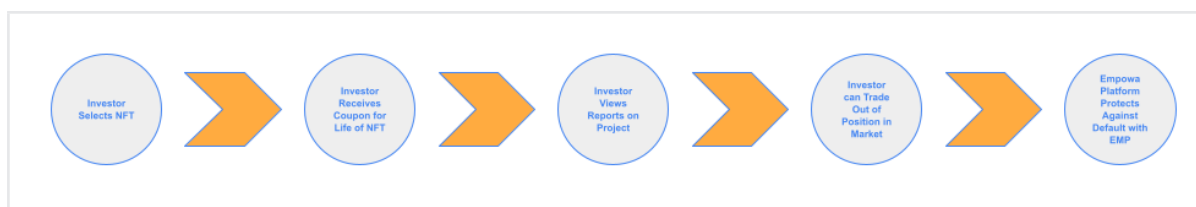
1. **Developer Approach:** Developer Approaches Empowa with an Affordable Housing Project in Africa
2. **Preliminary Gross Token Allocation:** Empowa Evaluates Project and Conducts Preliminary Project Valuation and Associated Prospective EMP Allocation
3. **Refine Gross Raise and per Unit Average:** Empowa Determines Offering Raise and Conditions with Baseline Per Housing Unit EMP Collateralization Allocation
4. **Funding Raise and Project Allocation:** Funding Raise Occurs and on Assignment to Developer and Preliminary EMP Allocation prepared as security against the loan based on houses to be financed

## Buyer



1. **Buyer Selects House:** Buyer Selects House
2. **Buyer Regines and Contracts House Selection:** Buyer Makes Refinements to House, Agrees to Price, Payment Plan, and Enters Contract
3. **Buyer Makes Minimum Payments:** Buyer makes minimum payments with flexibility granted for excess payments
4. **Buyer Payments are Validated the Logged:** Buyer payments are validated by the developer and logged to the blockchain and Dynamic F/X Valuation of Payment Determined
5. **Buyer Payments Allocated to House to Reduce Collateral:** Buyer payments allocated to house to automatically reduce outstanding balance

## Investor

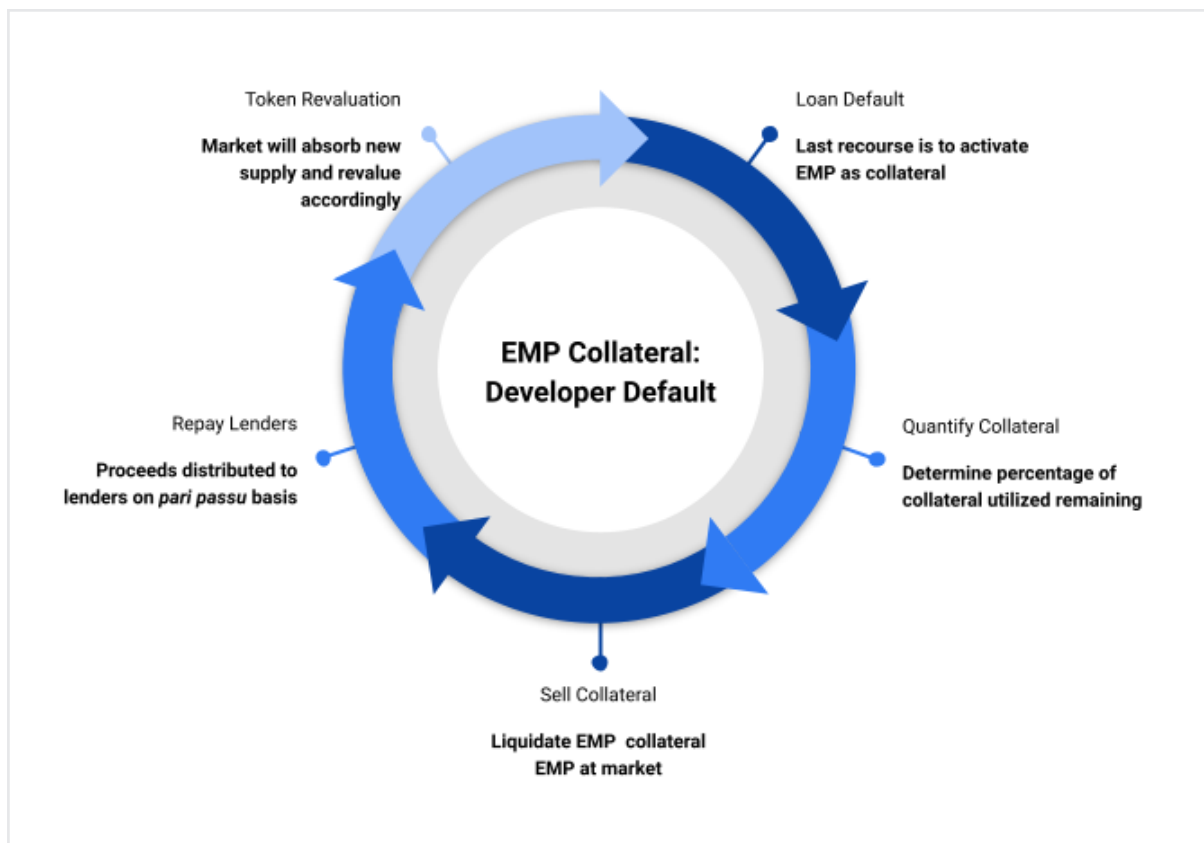


1. **Investor Selects SDRI:** Investor can select SDRI based on financial and qualitative features
2. **Investor Receives Coupon for Life of SDRI:** Investor can sell the SDRI for a value that incorporates future cash flows
3. **Investor Views Reports on Project:** Quantitative characteristics are fixed whilst qualitative factors may vary over the life of the SDRI
4. **Investor can Trade Out of Position in Market:** As qualitative characteristics change in a manner that may, in the view of the investor, impact the value of the financial returns of the SDRI, the price will change and Investors can choose to increase or decrease their position
5. **Empowa Platform Protects Against Default with EMP:** In the event of coupon or ultimate principal repayment default, the quantity of EMP used to secure the position can be sold on the open market to protect investors from total loss

## Default

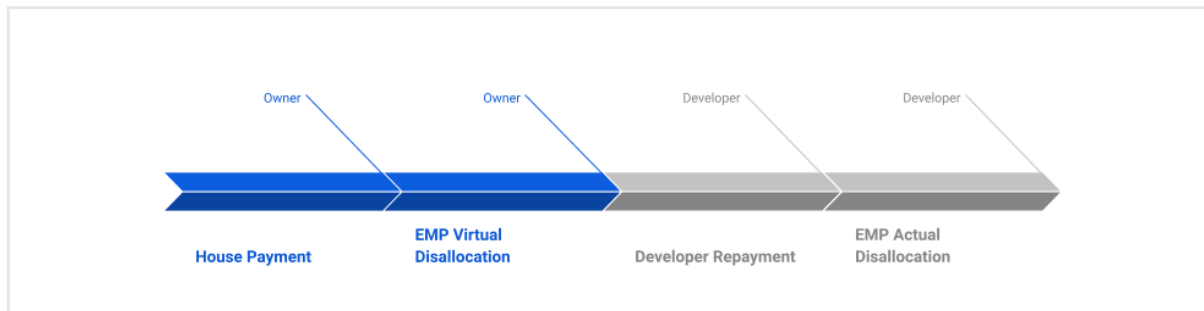


1. **Investor Selects SDRI:** Investor can select SDRI based on financial and qualitative features
2. **Investor Receives Coupon for Life of SDRI:** Investor can sell the SDRI for a value that incorporates future cash flows
3. **Investor Views Reports on Project:** Quantitative characteristics are fixed whilst qualitative factors may vary over the life of the SDRI
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5. **Empowa Platform Protects Against Default with EMP:** In the event of coupon or ultimate principal repayment default, the quantity of EMP used to secure the position can be sold on the open market to protect investors from total loss





## Dual Collateralization Concept



1. **House Payment:** Payment made and lodged to the decentralized ledger via Empowa Pay.
2. **EMP Virtual Disallocation:** House is paid for in full so EMP may be released virtually from securing the home finance via partial payments.
3. **Developer Repayment:** Payment made by developer and lodged to the decentralized ledger .
4. **EMP Actual Disallocation:** Loan is repaid in full so EMP is actually released from securing the loan financing.

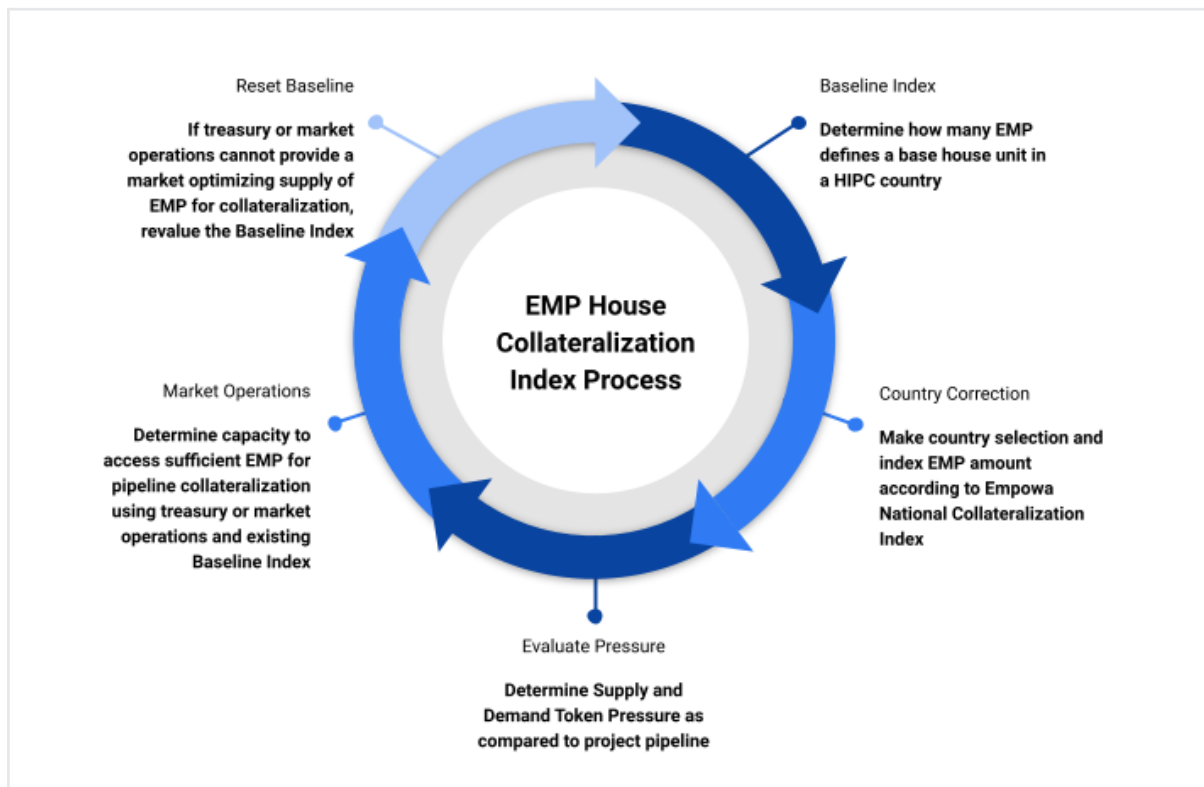
## 2. EMP House Collateralization Model

Unit Type / Bedrooms	Baseline EMP per Home	Room Factor	Included Bathrooms	Features	EMP Per Extra Unit	Feature Factor	Number of Units	Additional EMP	Unit Type / Bedrooms	Imputed EMP per Unit
Efficiency	EMP 5,000.00	0.5	1	Bathroom	EMP 2,500.00	0.25	2	EMP 5,000.00	Efficiency	EMP 18,000.00
Studio	EMP 7,500.00	0.75	1	Solar panels	EMP 4,000.00	0.4	1	EMP 4,000.00	Studio	EMP 20,500.00
1	EMP 10,000.00	1	1	Garage	EMP 2,000.00	0.2	2	EMP 4,000.00	1	EMP 23,000.00
2	EMP 12,500.00	2	1	Land	EMP 1,000.00	0.1	0	EMP 0.00	2	EMP 25,500.00
3	EMP 15,000.00	3	1.5	Total Features				EMP 13,000.00	3	EMP 28,000.00
4	EMP 17,500.00	4	2						4	EMP 30,500.00
5	EMP 20,000.00	5	2.5						5	EMP 33,000.00
Valuation	Metric	Year 0	Year 3							
Baseline 1 Bedroom	EMP 10,000.00	2022	2025							
Feature Increment Rate		25%	23.00%							
Bedroom Increment		EMP 2,500.00	EMP 2,254.00							
Year	EMP Baseline Value	EMP Baseline Differential	Feature Increment Rate	% Change	EMP Home Collateralization Index	Percentage				
2022	EMP 10,000.00	EMP 2,500.00	25%	0.00%	100	100.00%				
2025	EMP 9,800.00	EMP 2,254.00	23.00%	-2.00%	98	98.00%				

### 3. EMP House Collateralization Baseline Index

The EMP Token is deflationary since it is a fixed supply token that will be servicing a new infinite demand.

#### EMP House Collateralization Index Process



#### EMP House Collateralization Index Baseline Reset

- 200 MM EMP Token Outstanding
- What happens if housing projects consume all of the tokens in the collateralization process?
  - Fixed allocation means the EMP Token is by default deflationary
- Option 1: Obtain more EMP Token on the open market for use in projects. An advisable approach of the open market EMP Token value is lower than the intrinsic EMP Token value
- Option 2: Revalue the baseline EMP Home Collateralization Index
  - Initial year is index baseline
  - Subsequent years are indexed to initial year using indexing formula

## Implications

- The lower the EMP Home Collateralization Index the higher the value of the EMP Token
- The fewer EMP required to collateralize a house the higher the value of the EMP Token
- The greater the pipeline of expected housing development projects the higher the value of the EMP Token
- The greater the number of projects that are in process via the Empowa platform's collateralization function, the higher the value of the EMP Token

## Considerations

- This is the equivalent of the US Federal Open Market Committee from a government perspective or a dividend issuance decision from a corporate perspective
- Index changes should be done infrequently - i.e. no more than annually at maximum
- Decisions should be made to maintain or alter regularly - a null decision is a decision
  - Focus should be on ecosystem stability and evaluating the market price of the Empowa token in relation to the decision to reindex. Open market actions are always preferred to index manipulation
- Phased approach:
  - Pre-full EMP Token Utilization
  - Peri-full EMP Token Utilization
  - Post-full EMP Token Utilization

## 4. EMP Utilization: Revenue Sources

Revenue	Description
<b>Underwriting and Issuance Fees</b>	Fees for primary market functions for every underwriting instance in an ultimate utilization of EMP as an administration and / or facilitation fee.
<b>Transaction Fees</b>	Fees for secondary market functions for every trade in an ultimate utilization of EMP as a trade initiation and facilitation fee on a per transaction fee basis.
<b>Direct Broker Dealing Fees</b>	Fees through providing liquidity through market making services within the secondary market (SDRI Marketplace)
<b>Qualified Broker Dealer Fees</b>	Invite qualified institutional partners to act as market makers. In exchange market makers must pay marketplace access fees (to be lodged in EMP) with the expectation that their bid ask spread revenue opportunity and trading is conducted in EMP.
<b>AUM Fee</b>	Implement, in addition to a flat SDRI Marketplace transaction fee, an annual platform access utilization fee representing a small percentage of AUM.

## 5. EMP Token Value Models

The EMP Token is a utility token with a fixed quantity of 200 000 000. The token's primary function is as a means of collateralizing property transactions quickly and efficiently. The value of 1 EMP Token multiplied by 200 000 000 provides the value for the entire Empowa Ecosystem. The value of the EMP token is determined by the cash flow operations that are secured by the token in addition to the sum of the revenue generated through transactions and fees retained through the Empowa platform.

In the early phases of the platform external exchanges do not have sufficient liquidity or trading activity to accurately determine the comprehensive value of the Empowa ecosystem.

The external markets require a comprehensive understanding of the interaction of:

1. Debt financing provided by the Empowa platform to in-country property developers / financial service providers for lease-to-own, managed, reported and verified through Empowa Pay
2. How the EMP token is used to collateralize the financing operations
3. Cash flows from operations generated by Empowa platform activities
4. The supply and demand driven market value of the EMP token as taken from exchange traded sources

These four elements can be used in whole or in part to determine:

- An aggregate platform value,
- A per token value, or
- Both

It should be noted that the intrinsic value and the market value of the EMP Token can differ. The difference will be greater in the earlier Web3 phases and in markets with insufficient liquidity or information. The fundamental utility of the token may have value that is not captured by inefficient markets - particularly early in the trading history of the EMP Token. The intrinsic value in our modelling also includes the market value.

The market value should reflect the intrinsic value of the EMP token; however absent guidance on how to value the EMP token, the market value is not likely to be accurate. This section aims to provide a global framework for determining the value of the EMP token, and by corollary the EMP ecosystem.

The existence of a range of models and approaches is designed to accommodate the different foci that stakeholders may have. There are also models that are specifically designed to provide a rapid proxy for the value of the EMP Token. The idea behind a quick proxy valuation is in order to provide stakeholders the ability to quickly determine whether the exchange traded EMP token is being valued at a premium or discount to the intrinsically valued EMP token.

## General Empowa Platform Value Model

Empowa does not collateralize the house; we collateralize the EMP tokens that represent the generic house value. Ultimately a basket of EMP represents a particular house in a particular market hence the importance of the EMP House Collateralization Index Model. Each house in a specific country will have a different EMP allocation based on a formula which accommodates factors such as Baseline Index, Country, house features, and the transaction year.

## Revenue Model

A valuation method focused on net platform revenue and rent to own revenues up to the and equal to the level of property developer debt, or cash flows from the debt repayments.

## Collateralized Debt Model

A valuation method focused on net platform revenue and the market value of houses up to the proportion of the house secured by the level of collateralization.

## Expected Future Return Model

A valuation method focussed on the expected present value of net platform revenue and the expected present value cash flow from net debt operations.

## Weighted Average Portfolio Model

A comprehensive weighted average portfolio model that accounts for transaction fees, the individual house purchase price, the proportion of each home that is collateralized and weights them accordingly against allocated and unallocated EMP Tokens.

## Proxy Debt Model

A simple valuation model that approximated the total value of collateralized debt within the EMP ecosystem against the EMP Tokens employed in collateralization activities to give a quick “floor” to the EMP token price.

## Proxy Purchase Price Model

A simple valuation model based on percentage of the sum of all house purchase price per EMP token engaged in collateralization activities.

## Collateral Allocation Model

Comprehensive valuation model that is a weighted average of allocated and unallocated EMP Tokens.



# H. Impact Measurement:

Empowa unlocks affordable housing markets by enabling financially excluded Africans to buy safe, resilient and sustainable homes. Being on a pathway to ultimately owning such an asset has impacts on household wealth, livelihoods, and the prospect of inclusive growth. The impact of enabling access to climate smart affordable homes reaches far beyond a house's four walls; it creates impact on 16 out of 17 Sustainable Development Goals (SDGs) under one roof.



The impact data shown below is for illustration purposes only but represents an indication of the impact Empowa has already created but is illustrative of the impact measurements in 2022. These will be continually developed based on investor requirements.

Financial Inclusion impact	Socio-economic impact	Climate impact
Growth of local 'home loan' market / country: <i>Mozambique: 5%</i>	% of women led households accessing lease-to-own financing: <i>50%</i>	% of families living in a climate-resilient home: <i>100%</i>
Number of housing related jobs created: <i>155</i>	Number of lives improved: <i>129</i>	Ton CO2 reduced: <i>Under final assessment</i>

## Impact Measurement Utilization

- Frequency: quarterly reporting
- Updates on material changes
- Conservative and verified evaluations with no-vapourware
- Maintain historical ratings with dates for time series graphical representations

# I. Rating Instruments

## 1. Credit Rating: House Risk and Price Index

### Empowa National Risk Index

The higher the Empowa National Risk Index, the more risky the country. 100 is maximum risk, 0 is minimum risk. This includes both Gini Index and the OECD Country Risk.

#### Gini Index

A country in which every resident has the same income would have an income Gini coefficient of 0. Conversely, a country in which one resident earned all the income, while everyone else earned nothing, would have an income Gini coefficient of 1.

**Source:** <https://data.worldbank.org/indicator/SI.POV.GINI>

#### OECD Country Risk

The country risk classifications are meant to reflect country risk. Under the Participants' system, country risk encompasses transfer and convertibility risk (i.e. the risk a government imposes capital or exchange controls that prevent an entity from converting local currency into foreign currency and/or transferring funds to creditors located outside the country) and cases of force majeure (e.g. war, expropriation, revolution, civil disturbance, floods, earthquakes).

**Source:**

<https://www.oecd.org/trade/topics/export-credits/arrangement-and-sector-understandings/financing-terms-and-conditions/country-risk-classification/>

## SDRI Credit Rating

Quantitative Rating	Main Criteria	Description	
<b>A</b>	<b>Ahead of Schedule</b>	<b>No Default:</b> Operationally ahead of schedule with considerable Prepayments and Sinking Fund Contributions	
<b>B</b>	<b>On Schedule</b>	<b>No Default:</b> Operationally on time or marginally ahead and all payments on time	
<b>C</b>	<b>Behind Schedule</b>	<b>No Default:</b> Operationally behind but making payments on schedule	
<b>D</b>	<b>Behind Schedule</b>	<b>With Default:</b> Operationally behind and will be or is late on coupon or principal repayments	
<b>Qualitative Analysis +/- Ratings</b>			
Criteria	Quantification 1	Quantification 2	Quantification 3
<b>1:</b> Project Construction Progress Percentage	Percentage Constructed	Percentage Change	Percentage Constructed / Percentage Time Remaining
<b>2:</b> Homes Sold Percentage	Percentage Sold	Percentage Change	Percentage Sold / Percentage Time Remaining
<b>3:</b> Home Owner On-Time Payment Percentage	Percentage Paid	Percentage Change	Percentage Paid / Percentage Time Remaining
<b>4:</b> SDRI Coupon / Principal On-Time Payment Percentage	Percentage Paid on Time		Percentage Paid On Time / Percentage Time Remaining
<b>5:</b> Sinking Fund Percentage	Percentage Paid	Percentage Change	Percentage Paid / Percentage Time Remaining
<b>6:</b> GDP per Capita / Average Project Home Price			
<b>7:</b> Management and Staff Turnover and Growth			
<b>Geopolitical Analysis +/- Ratings</b>			
Notes	Examples		
<b>1:</b> Legal Risk	FX Controls		
<b>2:</b> Political Risk	Elections / Coups		
<b>3:</b> Operational Risk	Material Change in Ownership / Management		
<b>4:</b> Inflation and F/X Changes	High Percentage Change		
<b>Ancillary Assessments</b>			
Strength of Qualitative and Geopolitical Analysis will determine null, ++, +-, -+, or -- assessments			
Rating	Description		
<b>++</b>	+ Qualitative / + Geopolitical		
<b>+-</b>	+ Qualitative / - Geopolitical		
<b>-+</b>	- Qualitative / + Geopolitical		
<b>--</b>	- Qualitative / - Geopolitical		
<b>Null</b>	No remarkable ancillary assessments		

## 2. EMP National Collateralization Index

The EMP Collateralization Index is designed to provide an equalization factor for EMP used to collateralize a property.

The principle behind the creation of this index is the acknowledgement that EMP is a unit of measure of housing. As such it can be used as a value based proxy for formal collateralization.

## J. Institutional Investment

The mathematics and tooling provided here are designed to satisfy the analytical needs of technical analysts, active investors, and institutional investors.

The main approaches vis a vis the institutional investment offering are as follows:

1. Provide standardized investment structures that facilitate and encourage investment and trading
2. Provide analytics, tooling, and pricing mechanisms that mirror the decision making tools that facilitate investment evaluation
3. Facilitating the ability for active strategic impact investing with market-driven liquid on- and off-ramps; and finally
4. Provide a passive investment vehicle that leverages the Empowa platform's investment instruments to generate returns, mitigate risk, and report on verified impact in the African affordable housing market space.

# K. Disclaimer

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