



# FINANCIAL MODELING TOOL FOR PAYGO ENERGY ACCESS COMPANIES

## USER GUIDE

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## **Disclaimer**

The Financial Modeling Tool for PAYGO Energy Access Companies (the Tool) is intended for use by companies evaluating pay-as-you-go (PAYGO) technology and business models. The Tool is designed primarily for solar home system (SHS) and productive use of energy companies. The Tool is designed for illustrative use in connection with internal financial management processes, such as liquidity management, unit economics analysis, and forecasting. The Tool is provided to the public in good faith and based on the objectives stated above and is not to be sold by third parties. The Tool is not comprehensive. USAID does not make any representations or warranties (expressed or implied) as to the accuracy or completeness of the Tool. Users of the Tool should neither treat nor rely on the contents and calculations of the Tool as advice relating to legal, taxation, investment, accounting, or other matters and are advised to consult professional advisors in those areas. Interested parties should conduct their own inquiries, investigation, and analysis of the information set forth in the Tool. The Tool may include forward-looking statements that represent opinions, expectations, beliefs, intentions, estimates, or strategies regarding the future, which may not be realized. Actual and future results and trends could differ materially from those described by such statements and from projections made by the Tool. To the fullest extent permitted by law, USAID and Power Africa shall have no liability whatsoever to the user or any third party, with regard to the usage of the Tool, output of the Tool, or decisions made based upon the Tool, including the accuracy or completeness thereof. USAID and Power Africa expressly disclaim any and all legal responsibility and liability that may be based on the use of, or information provided by, the Tool or errors or omissions therein. Use of the Tool should not be construed as an endorsement by the U.S. Government of any particular company, possible investment, technology or business model. USAID did not verify the accuracy of any information derived from public sources. USAID may update, replace or withdraw the Tool or the information contained herein, in part or entirely, at any time, and undertakes no obligation to notify users.

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# ACRONYMS

<b>ARPU</b>	Average revenue per unit	<b>KPI</b>	Key performance indicator
<b>BoP</b>	Beginning of period	<b>LCY</b>	Local currency
<b>CapEx</b>	Capital expenditure	<b>MoM</b>	Month on month
<b>CF</b>	Cash flow	<b>OpEx</b>	Operational expenditure
<b>COGS</b>	Cost of goods sold	<b>PAYGO</b>	Pay-as-you-go
<b>DCF</b>	Discounted cash flow	<b>P&amp;L</b>	Profit and loss
<b>DP</b>	Downpayment	<b>PV</b>	Present value
<b>EBITDA</b>	Earnings before interest, taxes, depreciation, and amortization	<b>VAT</b>	Value added tax
<b>EoP</b>	End of period	<b>WACC</b>	Weighted average cost of capital
<b>FCF</b>	Free cash flow	<b>X-rate</b>	Exchange rate
<b>FOB</b>	Free on board		
<b>FTE</b>	Full time equivalent		
<b>FX/Forex</b>	Foreign exchange		
<b>IRR</b>	Internal rate of return		
<b>IT</b>	Information technology		

# INTRODUCTION

THE TOOL IS AVAILABLE FOR DOWNLOAD AT:  
[WWW.USAID.GOV/POWERAFRICA/BEYONDTHEGRID/OFF-GRID-SOLAR-MARKET-ASSESSMENTS](http://WWW.USAID.GOV/POWERAFRICA/BEYONDTHEGRID/OFF-GRID-SOLAR-MARKET-ASSESSMENTS)

FOR MORE INFORMATION, PLEASE CONTACT:  
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## PURPOSE OF THE TOOL

To serve as an **industry benchmark model** for the pay-as-you-go (PAYGO) sector. The Tool is designed to **guide and enable internal financial management processes**, such as liquidity management, unit economics analysis, and forecasting.

Applicable to companies considering applying **PAYGO technology and business models to their existing business** or expanding into new segments with a PAYGO business model.

Enables **projections of company financials** based on a set of different scenarios (worst case, base case, best case).

**Introduces different methods** that can guide company valuation.



## PLEASE NOTE

Some trade-offs have been deliberately made to keep the Tool **as simple as possible, while allowing to model key aspects of PAYGO companies**. Accounting for all potential differences among companies would have reduced usability significantly.

The Tool **does not**:

- include a detailed modeling framework of company operational expenditures
- allow for detailed inventory planning
- accommodate a multi-country operation model
- take level of seniority of different financing types into account

# KEY COMPONENTS OF THE TOOL

## Main Model



### Assumptions

- Model assumption sheet includes all inputs that need to be provided in order to build the projections.
- Model assumption scenario sheet enhances flexibility by allowing three different scenarios for certain inputs.

### Detailed and macro model

- Shows projections of company profit and loss (P&L), cash flow statement, and balance sheet for up to 10 years.
- Shows evolution of key performance indicators (KPIs) and covenants.
- The detailed model shows monthly values and the macro model shows yearly values.

### Dashboard

- Illustrates the evolution of key financial and impact indicators over the model's lifetime.

## Additional Analysis



### Unit economics

- Provides an assessment of the company's unit economics based on the inputs provided.
- Shows the gross margin and contribution margin per product as well as across the portfolio of products.

### Valuation

- Provides different methods to estimate the value of a company (discounted cash flow, transaction multiples, Silicon Valley rule).
- Given that each approach has its advantages and pitfalls, a mix is often used to derive the company value.

### Sensitivity analysis

- Allows analysis of sensitivities of key parameters (net income and equity value).

## Add-ons



### Simplified business model

- Standalone tool, which provides a simplified presentation of the PAYGO business model.
- Can be used to explain the business model to a third party (e.g. investor) in a way that is easy to understand.

### Additional products sheet

- Support sheet, which can be used if a company offers more than five products or product categories.

# KEY FUNCTIONALITIES



## Projections of company financials and KPIs

- Allows to make financial projections of P&L, cash flow statement, and balance sheet on a monthly and yearly basis for up to 10 years.
- Allows to project revenues and cost of goods sold for up to five products or product categories; if the number of products exceeds five, an additional sheet is provided which can be used to aggregate the input for additional products.
- Shows the evolution of key KPIs<sup>1</sup> and standard covenants over the model period:
  - Demonstrates understanding and management of key metrics to investors and increases credibility.
  - Allows to identify potential future covenant breaches early enough to take corrective actions.



## Two accounting views

- Shows both, the accrual and cash view of the P&L statement:
  - A cash P&L view can guide understanding and management of path to actual profitability.
  - Having both views shows how different revenue recognition can impact tax and VAT obligations.



## Currency effects

- Allows to calculate the implications of currency fluctuations on company financials, for example when taking on hard currency debt against local currency receivables.



## Additional analysis

- Allows to perform additional analysis:
  - Unit economics, i.e. to calculate gross and contribution margin on a per product basis, based on inputs.
  - Three different scenarios on sales growth, collection rate, churn, and costs can be computed.
  - Sensitivities on key parameters (net income and company value) are automatically calculated based on inputs.
  - Different methods to guide assessment of company value are demonstrated.



## Seasonality effect

- Allows to adjust monthly sales for a seasonality effect, for example to reflect a seasonal drop in sales during crop planting season.

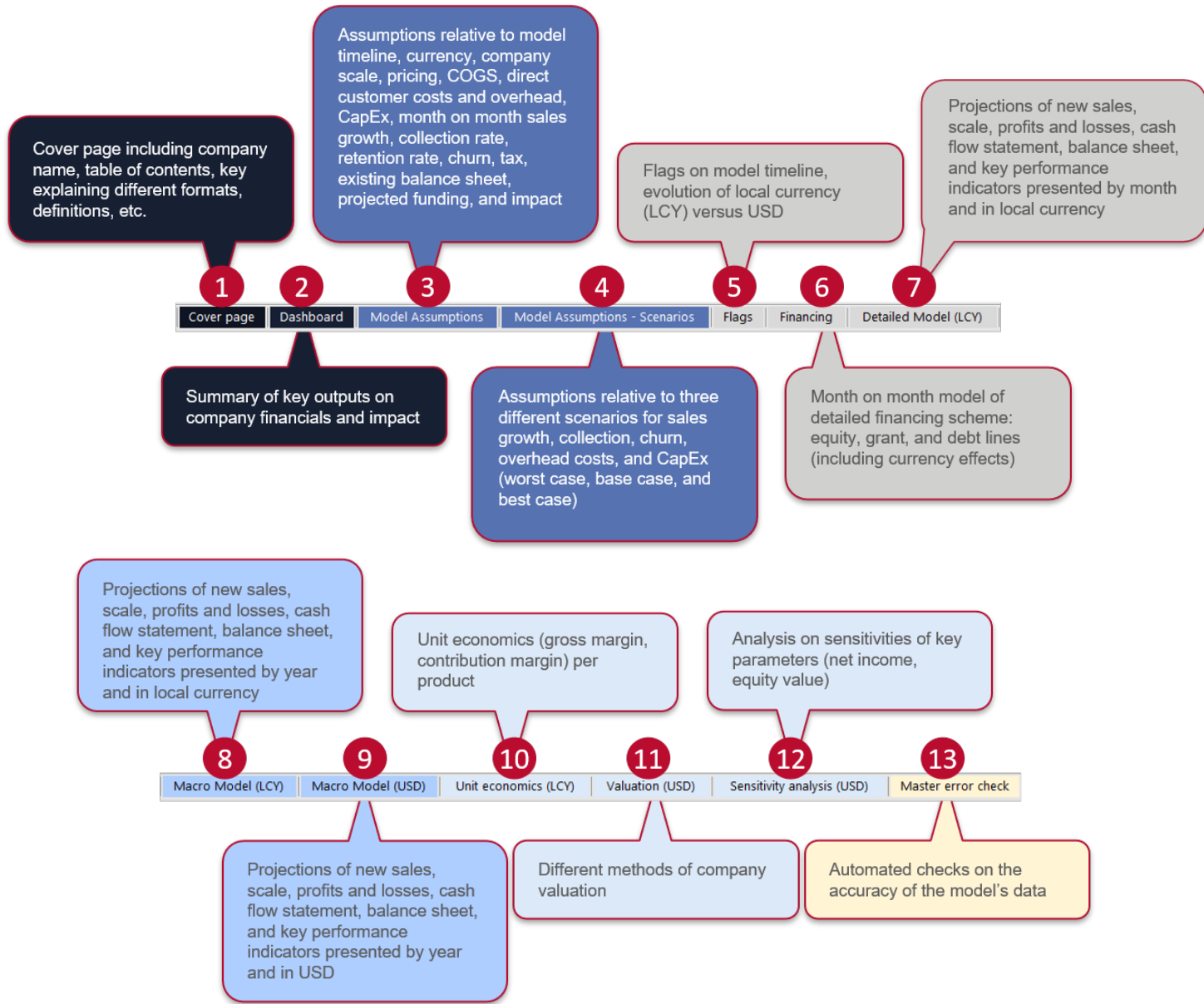


## Error checks

- Includes some automated checks (visible indicators), which make it clear to the user when certain parameters do not produce the expected results.

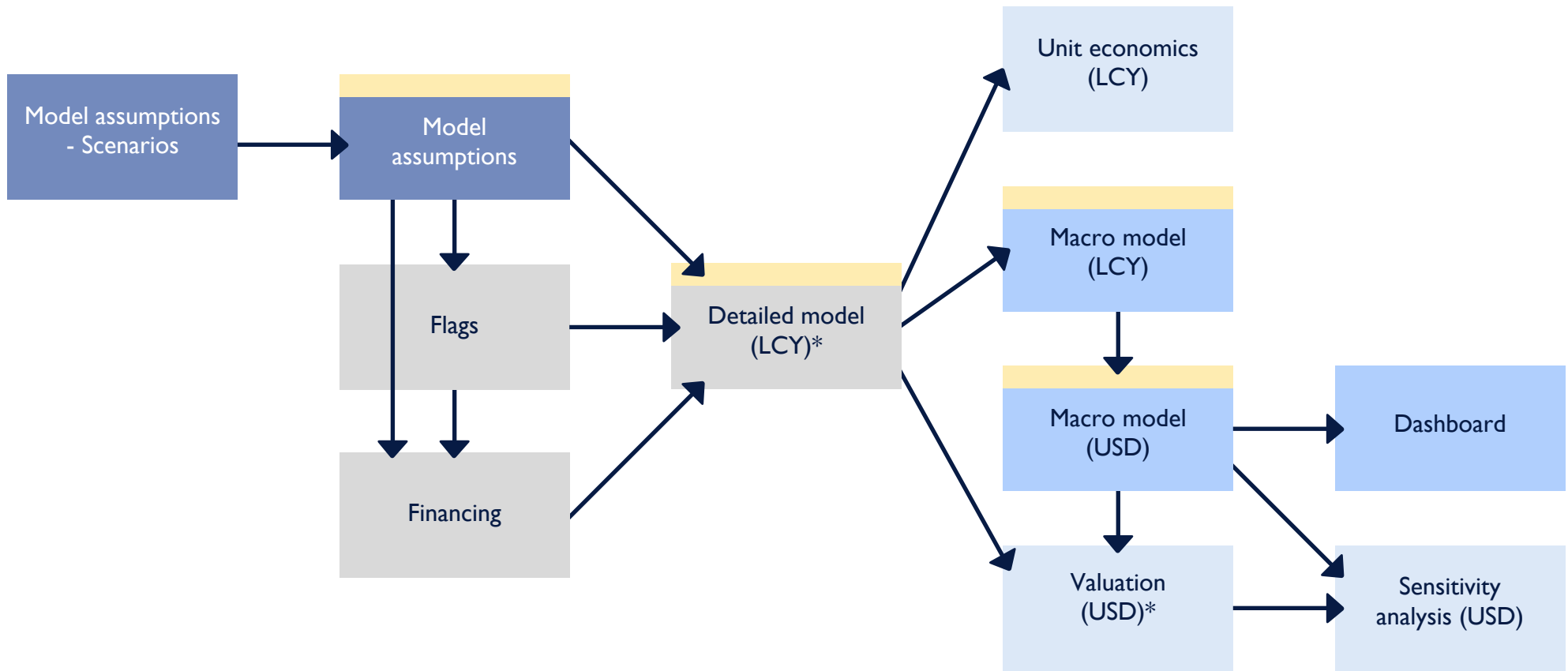
<sup>1</sup> Key performance indicators included in the model are in line with GOGLA KPIs 2.0 definitions and calculations: [https://www.gogla.org/sites/default/files/quick\\_reference\\_paygo\\_perform\\_indicators\\_v3\\_.pdf](https://www.gogla.org/sites/default/files/quick_reference_paygo_perform_indicators_v3_.pdf)

# MODEL STRUCTURE & FLOW





# UNDERSTANDING THE FLOW



## LEGEND

- Input sheets
- Output (additional analysis)
- Sheets with error checks
- Output (main model)
- Calculation sheet
- \* Input cells

## STEPS TO FOLLOW FOR DATA ENTRY

Main inputs are to be provided on the following sheets:

Model Assumptions

Model Assumptions - Scenarios

### Step 1

Complete all the cells formatted as input cells ( **xy** ) on the **Model Assumptions** sheet.

Only the input for month on month sales growth, collection rate, churn, overhead costs, and CapEx has to be left as is, given that the related input is automatically taken from the “model assumptions – scenarios” sheet (see step #2).

### Step 2

Complete the input cells ( **xy** ) on the **Model Assumptions - Scenarios** sheet for the different scenarios on month on month sales growth, collection rate, churn, overhead costs, and CapEx.

Inputs provided in this sheet flow into the **Model Assumptions** sheet, based on the scenario selected (see step #3).

### Step 3

Select the desired scenario in the **Model Assumptions** sheet for month on month sales growth in the cell F72, collection rate in the cell F79, churn in the cell F82, overhead costs, and CapEx in the cell F95.

Additional sheets that require input:

Detailed Model (LCY)

Valuation (USD)

### Step 4

Indicate the requirement for covenants (if any) and the assumptions on present value (PV) receivables and borrowings capacity on the **Detailed Model (LCY)** sheet (input cells in G309 to I320).

### Step 5

Complete all the cells formatted as input cells ( **xy** ) on the **Valuation (USD)** sheet, e.g. perpetuity growth rate, revenue multiple, EBITDA multiple, discounts/premiums, etc.

# TIPS AND TRICKS FOR BUILDING THE FORECAST

## Include more than five products/ product categories (if needed)

- Open the additional products sheet to group more than one product per category.
- Fill in the input cells **xy** in the additional product sheet.
- The weighted average for the input values of the product group selected will be displayed.
- Copy the weighted average cells needed and paste them in the financial model in the sheet for **Model Assumptions**.

## Include and continuously conduct error checks

- To minimize mistakes, the model includes error checks on the following sheets:
  - Assumptions: cell F127, H127
  - Detailed Model (LCY): lines 20, 243, 244, 266, 267, 268, 290, 291, 292
  - Macro Model (LCY): lines 120-123, 199-202
  - Macro Model (USD): lines 121-122, 199-202
- The **Master error check** sheet shows the number of errors found for every check as well as the overall sum of errors.
- This sum of errors can be seen on every sheet, in cell B4. Hence, the user can see the result of the master check from everywhere in the model instantly.

## Consider currency effects

- The financial projections are calculated in local currency (LCY).
- By indicating the interest rate differential in cell D20 of **Model Assumptions** sheet, the model calculates the expected evolution of the LCY/FCY exchange rate (calculation can be seen on **Flags** sheet) and takes that into account for any debt raised in foreign currency (as indicated in **Model Assumptions** sheet, line 133 to 142) and stock purchased in foreign currency.

## Disable sensitivities for a “quicker” model

- The included sensitivity analysis slows down the model. To prevent this, disable automatic calculations of sensitivities [on the “Formulas” tab, click “Calculation Options” and select “Automatic Except for Data Tables”].

## Keep track of covenants

- To keep track of covenants, related ratios should be included in the model.
- Line 317 to 320 of the **Detailed Model (LCY)** sheet include commonly applied covenants: these should be adjusted to the covenants that apply to the debt lines of your business.
- Once determined the formulas for the covenants, indicate the related requirements in column G: monthly values will turn red if the requirement is not respected.

## Seasonality

- Allows to take into account seasonal effects by applying a discount on new sales of certain months.
- To incorporate seasonality effects, complete the input cells F161 to F172 in the **Model Assumptions** sheet.

# TIPS AND TRICKS FOR BUILDING THE FORECAST

## Include more detailed operational expenditure (OpEx) calculations

- OpEx is calculated by making simple assumptions to compute the costs for the following categories:

### Direct cost of sales

- Field team: Cost per new sale
- Field team: Fixed cost
- Field team: Cost per repossession
- Field team: Maintenance cost
- Mobile money costs
- Bank charges
- Call center

### Overhead

- Management team
- Marketing (including salaries)
- IT (including salaries)
- Other salaries (excluding field team, marketing, IT, management)
- Travel
- Office
- Other overhead costs

- The Tool includes a high level OpEx model with main cost categories relative to sales. Companies are encouraged to do more detailed calculations in a separate OpEx model that can be linked directly to lines 164 to 177 of the Tool's [Detailed Model \(LCY\)](#) sheet.

# DEEP DIVE: CURRENCY EFFECTS

## At what level does the currency risk occur?

One must expect that the exchange rate between two currencies will change in the future. Accordingly, when dealing with cash flows in the future that are in a different currency than the model currency, one needs to adjust the cash flow with an **expected future exchange rate**.

Assume a company operates in Kenya and this company models all its cashflows in Kenyan Shilling (KES). Then, if a 2 million USD loan needs to be repaid in two years, the future cash outflow of 2 million USD needs to be adjusted with a forward exchange rate.

Similarly, if the company buys all its inventory with USD (i.e. orders equipment from abroad), all the cash outflows for such asset purchases should be adjusted with forward exchange rates.

**Loan repayments and hardware imports are the largest sources of currency risk for PAYGO companies in emerging markets. A good model adjusts these payments for expected changes in the exchange rate.**

## Forward exchange rate calculation

One can calculate the best estimate of the forward exchange rate with three key inputs:

- **Spot exchange rate**, i.e. the rate of exchange today.
- **Interest rate differential** between the two capital markets.
- **Length of time** between today and the time of the forward exchange

This formula is an approximation of the expected exchange rate in the future:

$$\text{forward FX} = \text{spot FX} * (1 + \text{rate differential}) ^ (\text{months}/12)$$

*Spot FX:* Current exchange rate

*Rate differential:* Reference rate currency sold in the exchange (e.g. KES) less reference rate currency bought in the exchange

*Time:* Time in years

CCY Pair Symbol	Spot Exchange Rate	Think	Reference Rate CCY sold	Reference Rate CCY bought	Rate Differential	Forward Exchange Rate Estimate end of year				
						1	2	3	4	5
USD/KES	110	sell 110 KES to buy 1 USD	15%	3%	12%	123.20	137.98	154.54	173.09	193.86

Using this formula, one can create a forward exchange rate estimate for any model and apply such an exchange rate estimate to relevant cash flows.

### Notes

- This method renders a rough approximation only. The detailed financial math to calculate the ‘right’ forward exchange rate is much more complicated.
- The rate differential is not easy to establish as it is complex to establish the right rates that should be used. Recommendation: Use rates provided by a country’s central bank and use the same type of rate for each currency. The rates should reflect the interest a highly secure borrower (i.e. a local bank) has to pay (a lender can expect to receive from a highly secure borrower).

# GENERAL THOUGHTS ON VALUATION



**Valuation methodology:** A company valuation can be conducted using different methods, each with its own advantages and disadvantages.



**Most commonly used valuation methods include:**

- Discounted cash flow method
- Transaction multiples (Revenue and EBITDA)
- Silicon Valley rule



**Valuation mix:** Given that each valuation method comes with pitfalls (see following pages), companies are advised to compute the value using a mix of methods and applying premium/discounts where needed as a basis for negotiations: the average value across different methods likely provides a good indication of company value.



**NOTE:** Early stage companies should be cautious when setting initial valuations because inflated early-stage valuation can lead to down rounds (achieving lower prices per share than in the previous financing round) when raising additional funding.

# DIFFERENT VALUATION METHODS

## Silicon Valley rule<sup>1</sup>

This valuation method is based on the amount of cash a company is seeking and the ownership stake the investors need to warrant their time and money.

For example, if the owners want to raise \$4 million equity and they want to sell 25% shares in the company, the proposed pre-money valuation should be \$12 million.

### Pros:

- Quick and simple.
- Useful for calculating valuations for pre-revenue businesses.

### Cons:

- Does not consider specific aspects related to the business (i.e. team, product, traction, risks, etc.) in determining a valuation.
- Can be very subjective.

## Transaction multiples

The multiples approach is a valuation theory based on the idea that similar assets sell at similar prices: It assumes that a ratio comparing value to a firm-specific variable, such as EBITDA or revenue, is the same across similar firms.

When using this method, companies have to consider multiples that best suit their business in terms of industry, size, geography, growth, risk, etc.

### Pros:

- Provides a “standard” company worth for a specific industry.
- Easy to calculate if industry data is available.

### Cons:

- Influenced by temporary market conditions or non-fundamental factors.
- Can be difficult to find appropriate comparable companies.
- High dependence on the peer’s sample.

<sup>1</sup> <https://www.svb.com/blogs/kamal-hassin/determining-seed-startup-valuation>

# DIFFERENT VALUATION METHODS

## Discounted cash flow method

The discounted cash flow (DCF) method provides the value of an investment today, based on projections of how much money it will generate in the future.

Works best when a company is mature enough and has enough historic numbers to make realistic assumptions around future performance.

Not suitable for a company which has negative free cash flows.

- Pros :
  - Detailed, includes all major assumptions about the business.
  - Determines the intrinsic value of a business based on the future projections.
- Cons:
  - Very sensitive to assumptions, which are abundant.
  - Prone to overcomplexity, errors, and overconfidence.
  - Looks at a company valuation in isolation without any consideration of valuation of competitors.

## Football field chart

- The football field chart can be used to summarize the range of values obtained for a business, based on the different valuation methods described:
  - Silicon Valley rule
  - Transaction multiple: Both revenues and EBITDA multiples
  - DCF
- It enables the comparison of different valuation results and shows the average across methods, which can be used as a basis during negotiations.





# FINANCIAL MODELING BEST PRACTICES TO KEEP IN MIND

## Calculation technique

- Keep formulas short and simple.
- Include as inputs all values that could possibly change in the lifetime of the model.
- Avoid unnecessary rounding.

## Clarity

- Use clear formatting, for example number formats, and highlighting of anomalies and values of interest, conditional formatting in modest quantities, etc.
- Include a formatting key in the model to explain the meaning of styles and/or formats.

## Consistency

- Include only one timeline on each worksheet.

## Error reduction

- Consider checks in the development of every section of a model.

## Layout and structure

- Segregate inputs (assumptions), calculations, and outputs (results).
- Include one or more dashboards summarizing important outputs.
- Set the model up to read like a book: Top to bottom and left to right within each worksheet.
- Display time periods horizontally.
- Make it clear and obvious which values are linked to and from other workbooks.
- Include a table of contents, a diagram of the model's logic flow, and clickable hyperlinks.
- Distinguish input cells from other cell types using a defined cell fill color and/or a cell border, not just a defined font color.

## User interface and transparency

- Add contextual user guidance throughout the model where appropriate.
- Create a unique location for each input value, and structure all calculations that need the value to refer to that single input location.
- Group (and do not hide) and collapse rows and columns that the user may wish to exclude to aid readability.

## RESOURCES

- Aswath Damodaran. [Country Default Spreads and Risk Premiums](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html). 2020. [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/ctryprem.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html)
- CFI. [Financial Modeling Guides \(Self-study Resources\)](https://corporatefinanceinstitute.com/resources/knowledge/modeling/). <https://corporatefinanceinstitute.com/resources/knowledge/modeling/>
- EY. [The Ultimate Guide to Financial Modeling for Startups](http://www.ey.com/en_nl/finance-navigator/the-ultimate-guide-to-financial-modeling-for-startups). [www.ey.com/en\\_nl/finance-navigator/the-ultimate-guide-to-financial-modeling-for-startups](http://www.ey.com/en_nl/finance-navigator/the-ultimate-guide-to-financial-modeling-for-startups)
- GOGLA et al. [Quick Reference Guide for the Provisional PAYGO PERFORM Indicators](http://www.gogla.org/sites/default/files/quick_reference_paygo_perform_indicators_v3_.pdf). [www.gogla.org/sites/default/files/quick\\_reference\\_paygo\\_perform\\_indicators\\_v3\\_.pdf](http://www.gogla.org/sites/default/files/quick_reference_paygo_perform_indicators_v3_.pdf)
- Institute of Chartered Accountants in England and Wales. [Financial Modeling Code](http://www.icaew.com/technical/technology/excel/improve-your-financial-modelling-practice). 2018. [www.icaew.com/technical/technology/excel/improve-your-financial-modelling-practice](http://www.icaew.com/technical/technology/excel/improve-your-financial-modelling-practice)
- Institute of Chartered Accountants in England and Wales. [Twenty Principles for Good Spreadsheet Practice - Third Edition](http://www.icaew.com/technical/technology/excel/twenty-principles). 2018. [www.icaew.com/technical/technology/excel/twenty-principles](http://www.icaew.com/technical/technology/excel/twenty-principles)
- Trading Economics. [GDP Growth Rate Forecast 2020-2022](https://tradingeconomics.com/forecast/gdp-growth-rate). <https://tradingeconomics.com/forecast/gdp-growth-rate>

*Power Africa aims to achieve 30,000 megawatts of new generated power, create 60 million new electrical connections, and reach 300 million Africans by 2030.*



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