KPI Framework – Technical Guide

The KPI Framework seeks to improve information flow between investors and companies in the PAYG industry by establishing standardized definitions and reporting standards. The KPIs are not designed to replace an appropriate appraisal process and an investment officer, however they will allow for a more structured assessment and comparable values. However, given the highly variable – and continuously changing business models of PAYG companies, the KPI framework is not meant to be a scorecard of a company's operational performance, but offer a more structured way to continuously assess the performance of different parts of the company and its customer base.

This Technical Guide seeks to provide an overview of each KPI along with a more detailed explanation of each definition. With a handful of exceptions, each of the KPIs is defined across a portfolio of PAYG solar assets, generally a cohort in time, contained within a single country or region. Indicators are defined at a point in time, and measuring the KPIs on a periodic basis (monthly or quarterly) will help to monitor performance over time. It is also recommended that, if possible, distributions be provided for the high-priority KPI/ratios of KPI (such as Average Revenue Per User (ARPU), Portfolio at Risk (PAR) and unit cost), in addition to the summary statistics specified in the definitions.

Since digital technologies and sensors are intrinsically a part of PAYG business models, the industry naturally lends itself to the generation and use of large, heterogeneous, and fast- moving streams of information, otherwise known as "big data." Examples include customer consumption and payment data, customer credit histories, and web server logs, as well as cell phone records and satellite imagery from partners and third-party vendors. As concluded in the 'State of the Data' report, these data sets are not necessarily captured in a structured way by PAYG companies today, due to lack of priority, capacity, or feasibility. As discussed in a recent World Bank publication, the tools for dealing with such data – from distributed computing to machine learning and data mining—have evolved over the last decade to the point where they are readily usable in commercial settings. Potential uses in the PAYGO industry include customer targeting and marketing, credit assessment, collections, and market research. By establishing standardized definitions and reporting standards, the KPI framework could complement the broader vision of increasing the sector's sophistication in data and analytics.

Box 1: Example on how to compute KPIs

With the exception of EBITDA Breakeven, all of the shortlisted KPIs can be computed from a simple ledger-style data extract, which includes all scheduled and completed transactions for each customer, plus a table of product characteristics.

The ledger columns should include:

- Date
- Customer ID
- Receipt ID
- Amount
- Currency
- Expected/Completed (completed only for pay-per-use models)
- Type (deposit, return, monthly payment, repair, etc)
- Product type

For example, a new customer purchase of a financed product would result in a Completed deposit entry and N expected monthly payment entries. Each month (ideally), a new completed payment with the same Receipt ID would be entered into the ledger. This structure makes it easy to calculate the KPIs across a wide range of business models.

Key Performance Indicators

1. Average Monthly Revenue per User (ARPU)

1.1. Definition: Total payments (including interest) received over the last 30 days divided by portfolio size.

1.2. Formula: (Total revenue over most recent 30 days [Local Currency])/(Total # of active [Units])**.**

1.3. Explanation of Definition: This definition is inclusive of all revenue, including deposits and maintenance. Revenue is denominated in the relevant local currency; in the rare case, where a portfolio includes revenue denominated in multiple currencies, the dominant one should be used for reporting, with the other(s) converted using the present day exchange rate.

1.4. Commentary: In this calculation and in all that follow, active users are defined as those who have made at least some payment in the preceding 90 days.

2. Average Unit Cost

2.1. Definition: Mean of cost of active units, inclusive of hardware, international and in-country transportation and installation, import taxes and stock insurance, but exclusive of customer acquisition and maintenance

2.2. Formula: Sum of (Cost of hardware plus cost of transportation and installation on active units [Local Currency]) / (# of active [Units]).

2.3. Explanation of Definition: This indicator quantifies the average unit cost to the company, not to the consumer.

2.4. Commentary: Customer acquisition and maintenance costs were excluded of the KPI composition due to the wide variability in marketing and service arrangements among distributed energy service companies (DESCOs), which might lead to meaningful inconsistencies in accounting.

3. Average Credit Period

3.1. Definition: Average nominal number of months between system acquisition and expected final payment.

3.2. Formula: Sum of (Expected final payment date - system acquisition date [Months]) / (Total # of active [Units]).

3.3. Explanation of Definition: Expected final payment is defined in the nominal sense, under the assumption that no payments are skipped or postponed – even if such flexibility is explicitly allowed in the contract.

3.4. Commentary: In the case of true pay-as-you-go business models, where there are no "expected" obligatory payments per se, the contract end date should be used as the expected final payment date.

4. Average Customer Deposit as a Proportion of Unit Cost

4.1. Definition: Average customer deposit as a fraction of total unit cost.

4.2. Formula: Mean over active units of (Deposit received [Local Currency])/(Cost of hardware plus cost of transportation and installation [Local Currency].

4.3. Explanation of Definition: As in Average Unit Cost, the cost here is defined inclusive of hardware, international and in-country transportation, and installation, but exclusive of customer acquisition and maintenance. Deposit, or down payment, is defined as the total amount paid at time of unit acquisition, exclusive of payment per use.

4.4. Commentary: A case where a portion of the payment remitted at time of unit acquisition might be excluded from this definition of "deposit" includes, for example, a purchase of some number of days or a payment of the first regular billing cycle.

5. Portfolio At Risk (PAR)

5.1. Definition: Total amount owed on units with any balance billed in the last 90 days which is overdue by 30 or more days, divided by total amount owed by customers (inclusive of interest and exclusive of any potential late payments).

5.2. Formula: Sum of (Total amount owed by customers with any balance billed in the last 90 days which is overdue by 30 or more days) / Sum of (Total amount owed on

active units).

5.3. Explanation of Definition: This is a rolling definition of Portfolio At Risk, which is "forgiving" of missed payments. **5.4. Commentary**: A stricter definition of PAR, in which any 30+-day overdue balance designates an asset as at-risk, would cause many portfolios to appear >50% at-risk due to occasional missed payments. This definition treats a customer who missed a payment six months ago but is now back on track as "not at risk," which many industry actors regard as appropriate.

6. Portfolio Size

6.1. **Definition**: Total number of customers in portfolio.

6.2. **Formula**: # of active [Units].

6.3. **Explanation of Definition**: As in the above definitions, customers who have made no payments in the preceding 90 days are deemed to be inactive and are not included in the portfolio size.

6.4. **Commentary**: Larger portfolios are expected to have more stable performance.

7. Churn

7.1. Definition: Fraction of units that have gone inactive over the previous 90 days.

7.2. Formula: Sum of (# of units on which no payment was made in the preceding 90 days) / (# of active [Units] as calculated 90 days ago).

7.3. Explanation of Definition: "Churn" here is used to denote customers dropping out of the portfolio.

7.4. Commentary: This indicator was chosen in place of percent write-off due to widespread variability in standards and practices surrounding write-offs.

8. Standard Deviation of Amount Ahead/Behind on Payments

8.1. Definition: Total revenue received minus total amount expected up to present date, in local currency, divided by number of active units.

8.2. Formula: Mean/Standard Deviation over active units of (Total revenue received from unit acquisition to present, exclusive of unscheduled maintenance - Total revenue expected from unit acquisition to present [Local Currency]).

8.3. Explanation of Definition: For true pay-as-you-go business models, a customer who has paid for credits but not yet used them would count as "ahead," while a customer who has used days for which (s)he has not paid would count as "behind." For asset finance business models, a customer who has prepaid their regular payments would count as "ahead" and a customer who has missed or is late on a payment would count as "behind."

8.4. Commentary: Due to the important differences between hardware and business models, these KPI are primarily useful for monitoring a portfolio's performance over time or for cross-comparing the portfolios of two DESCOs with similar business models. They are extremely valuable for these purposes, but should be used carefully – if at all – for comparing performance across a wide range of portfolios.

9. Average Total Expected Revenue

9.1. **Definition**: Mean total anticipated payments, including deposit but excluding unscheduled maintenance and late fees, in local currency.

9.2. **Formula**: Sum of (Total expected payments from active units, excluding any unscheduled maintenance [Local Currency]) / (# of active [Units]).

9.3. Explanation of Definition: Taken together with Average Unit Cost, this KPI bears on the portfolio's anticipated profit margin.

9.4. **Commentary**: Does not apply to true pay-as-you-go business models.

10. EBITDA Breakeven

10.1. Definition: EBITDA breakeven yes/no for the company as a whole.

10.2. Explanation of Definition: Explicitly, for companies providing services in addition to distributed solar generation, EBITDA breakeven is still evaluated for the company as a whole rather than for the distributed solar division.

10.3. Commentary: This KPI was highlighted as important for a variety of reasons. Among them is portfolio maintenance, due to the risk of unprofitable DESCOs eventually becoming unable to effectively service their equipment and/or collect their payments.

11. Average Maintenance Cost

11.1. Definition: Total payments received in local currency for scheduled and unscheduled maintenance, over the last 30 days.

11.2. Formula: (Total maintenance payments received over most recent 30 days [Local Currency])/(Total # of active [Units]).

11.3. Explanation of Definition: Maintenance includes both scheduled and unscheduled service, whether provided by the DESCO itself or by a contractor. **11.4. Commentary**: This indicator was identified as an important proxy for system reliability and technology disruption risk.

12. Standards Compliance

12.1. Definition: Percentage of systems complying with Lighting Global quality standards.

12.2. Formula: (Total # of active units complying with LG standards)/(Total # of active units).

12.3.Explanation of Definition: Standards are specified here: https://www.lightingglobal.org/qa/standards/.

12.4. Commentary: This indicator was highlighted as an important indicator for both operator and technology disruption risk, as well as for regulatory risk.

13. FX Exposure: Net Open Position as a Percentage of Equity

13.1. Definition: Net open position divided by equity, calculated on absolute value basis.

13.2. Formula: (Assets - (Liabilities + Equity))/(Equity in Local Currency)**.**

13.3. Explanation of Definition: In the rare case where a portfolio includes assets paid in multiple local currencies, this KPI should be calculated separately for each currency.

13.4. Commentary: During consultations, stakeholders highlighted currency risks as an important factor to consider. This is the most widely-used metric for FX exposure in microfinance, and has also been highlighted by several IFIs as a critical indicator. The team behind 'The Currency Exchange Fund' has more insights on how to manage FX exposure.