



PAYGo PERFORM

Financial, Operational, and Portfolio
Quality KPIs for the PAYGo solar industry

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FOREWORD

THE PAY-AS-YOU-GO (PAYGO) SOLAR INDUSTRY IS AT a pivotal moment. Over the last decade, pioneering companies have demonstrated the PAYGo business model’s potential to expand access to renewable energy and financial services among low-income populations. Along the way, they have generated considerable interest among investors and donors. However, this interest has not yet translated into the level and mix of capital investment that the PAYGo solar industry will need to help lift millions of people out of energy poverty.

While there is plenty of interest in PAYGo solar’s potential to help solve development challenges, the industry’s lack of a standardized reporting framework is holding it back from realizing its potential at scale. The industry is full of young companies with evolving business models and lacks standard metrics against which to analyze performance and base investment decisions. This lack of clarity not only serves as a barrier to investment, but also risks limiting the efficient flow of capital to companies that are growing sustainably. There is an immediate need for the industry to adopt common reporting standards that promote transparency, help companies to benchmark

“The standardized KPIs will help companies and investors better understand the risks, rewards, and impact of the PAYGo industry as well as unlock the necessary financing to achieve SDG 7.”

– Alex Brummeler, Head of Finance Innovation, Azuri Technologies

and improve their performance, and enable the industry to present a more accessible profile to investors that will stimulate further capital investment.

It is against this backdrop that some 600 off-grid solar (OGS) stakeholders collaborated over the last two years to develop a reporting framework and key performance indicators (KPIs) for the industry, under the guidance of CGAP, GOGLA, and IFC

Lighting Global. Investors, PAYGo solar executives, and experts in energy and financial inclusion from all over the world participated in this open, transparent industry process. This technical guide presents the outcome of this collective effort: a reporting framework and set of KPIs, along with detailed guidance on how to use them.

It is important for the PAYGo solar industry to continue working to make these indicators a success. Companies, investors, and other stakeholders are encouraged to start using the reporting framework and urging others to do so. Every stakeholder who adopts the framework brings us one step closer to making these KPIs the industry standard. When this happens, the industry, as a whole, will be able to help solve development challenges at greater scale.

Xavier Faz, Lead, Business Models, CGAP

Russell Sturm, Global Head, Energy Access – IFC Advisory Services, IFC

Koen Peters, Executive Director, GOGLA

“Standardizing metrics can help attract the diverse array of investors needed for the sector to scale up to meet energy access, economic development, and decarbonization goals.”

– Avi Jacobson, Investment Director, Sunfunder

ACKNOWLEDGEMENTS

THE PAYGO PERFORM KPIs WERE DEVELOPED

through an industry-led process governed by a Steering Committee of CGAP, GOGLA, IFC Lighting Global, and CDC. However, it has taken a tremendous collaborative effort involving hundreds of stakeholders to develop the KPIs presented in this guide. We would like to thank everyone who was involved for their help and patience along the way. Their input has been vital on this journey.

At the time of publishing this document, about 60 companies and investors had volunteered to participate in working group calls to co-create the PAYGo PERFORM KPIs. The Portfolio Quality working group was chaired by Tobias Ruckstuhl (Partner and Chief Financial Officer, Persistent), Anish Thakkar (Co-Founder, Greenlight Planet), and Fabio Eucalipto (CFO, candi). The Unit and Firm Level Economics working group was chaired by Geoffrey Manley (Director, Head of Energy Access and Efficiency, CDC Group) and Shagun Jain (Commercial Director, Rural Spark). Siten Mandalia (Co-Founder and CEO, Solaris Offgrid), João Magalhães (Chief Operating Officer, Solaris Offgrid), and Avi Jacobson (Investment Director, SunFunder) chaired the working group in which the Company Indicators and Operational KPIs were developed.

We would also like to acknowledge the significant contributions made by Alexander Brummeler (Head of Finance Innovation, Azuri) across the working groups. Further, special thanks go out to current and former team members Miguel Soriano, PhD (IFC), Daphne Pit (Pit Pure Power), Alexander Sotiriou (CGAP), Naomi Bruck (IFC), Bill Gallery (IFC), and Drew Corbyn (GOGLA) for their invaluable contributions throughout the project. An expression of gratitude also goes out to the sponsors of our organizations: CGAP would like to thank their members and, in particular, FCDO and Credit Suisse for their guidance and support; IFC Lighting Global would like to recognize the Government of Italy, the IKEA Foundation, and the Government of the Netherlands; and GOGLA would like to thank FMO and CDC (through CDC Plus, funded by UKAID) for their financial support.

Eight companies representative of the PAYGo solar sector worked with MicroFinanza Rating (MFR), a private and independent international rating agency specialized in inclusive finance, to pilot the PAYGo PERFORM KPIs for a period of 6 months. MFR added significant value through its extensive experience with the microfinance industry, accounting, and credit risk analysis. Without their commitment of time and resources, this guide would not have been possible. Finally, we would like to thank a Consultative Group of over 600 stakeholders who were proactively involved and informed in the development process of the KPIs and who provided input and feedback throughout the process.

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About the PERFORM Members

LIGHTING GLOBAL

Lighting Global (www.lightingglobal.org) is the World Bank Group's ("WBG") platform to support the acceleration of a sustainable international off-grid solar market as a means of rapidly increasing energy access to the approximately one billion people worldwide who live without access to affordable, reliable and safe modern energy. Through Lighting Global, the International Finance Corporation (IFC) and the World Bank work with the GOGLA, manufacturers, distributors, and other development partners to develop the modern off-grid energy market. The Lighting Global program — in partnership with industry — provides market insights, steers development of quality assurance frameworks for modern, off-grid lighting devices and systems, and supports the market's long-term sustainability. Underpinning this work, Lighting Global supports a broad portfolio of IFC-managed country-based market development programs, through Lighting Asia and Lighting Africa, which work along the supply chain to reduce market entry barriers and first mover risks in key off-grid solar markets.

CGAP

CGAP is an independent think tank that works to empower poor people, especially women, to capture opportunities and build resilience through financial services. We test, learn and develop innovative solutions through practical research and active engagement with our partners on building responsible and inclusive financial systems that help move people out of poverty, protect their gains and advance global development goals. Housed at the World Bank, CGAP is supported by over 30 leading development organizations committed to making financial services meet the needs of poor people. To find out more, go to www.cgap.org.

GOGLA

GOGLA is the global association for the off-grid solar energy industry. Established in 2012, GOGLA now represents over 180 members as a neutral, independent, not-for-profit industry association. Its mission is to help its members build sustainable markets, delivering quality, affordable products and services to as many households, businesses and communities as possible across the developing world. The products and solutions that GOGLA members sell transform lives. They improve health and education, create jobs and income opportunities, and help consumers save money. To find out more, go to www.gogla.org.

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I. ABOUT THE PAYGO PERFORM KPIS

THE DRIVE TOWARD A GENERALLY ACCEPTED SET of KPIs for the PAYGo solar industry is rooted in the desire to promote a healthy PAYGo solar industry – one that can sustainably accelerate achievement of energy access targets and deliver a positive social, economic, and environmental impact. Over the past decade, the industry has demonstrated the potential to achieve these goals. To unlock this potential at scale, however, the PAYGo solar companies will need to continually improve their performance and attract more and more diverse investment capital. Widespread use of a consistent set of KPIs can help the industry to achieve both of these objectives by providing a common language for comparison and analysis.

From the investor's perspective, standardized periodic reporting and benchmarking make it easier to assess industry risks and understand the potential for growth and return. In the current PAYGo solar environment, which does not have such standards, most investors are hard-pressed to make well-informed investment decisions and to design mitigation strategies for risks they are willing to take on. Answering questions like, "How is the industry progressing on the path to profitability?", "How is portfolio quality evolving?", and "How are companies responding to COVID-19 measures?" are costly and error-prone pursuits. In fact, during the development of this guide, numerous funders (investors and donors) pointed to the opacity of the risk in the sector as a barrier to investment. KPIs can address this barrier. Likewise, if the industry should seek support during a future crisis, a consistent set of KPIs would make it easier for investors, donors, and other stakeholders to quickly identify and evaluate issues and structure targeted interventions.

From a PAYGo solar company's perspective, an increase of investment flows into the off-grid solar sector is highly desirable in its own right. But having a standard language for comparison and analysis would be beneficial in other ways too. In particular, it would help companies measure and benchmark their performance and find areas for improvement. Better informed businesses can be more responsive to client needs and offer better service to their customers. This in turn can improve customer satisfaction and drive-up repeat sales and repayment rates in the long-term, benefitting the overall financial position of a PAYGo company.

The PAYGo Performance, Reporting, and Measurement (PAYGo PERFORM) KPIs presented in this guide are intended to serve as the industry's foundational indicators to communicate and contextualize the financial and operational performance, and the portfolio quality, of PAYGo solar companies at a high level. As with other financial and accounting standards-setting initiatives, the fundamental value of the KPIs is their relevance to the PAYGo sector and comparability, which in turn will encourage reporting and greater transparency. The intention is to define a set of simple yet adequate measures which, when used together, will allow a clear and distinct profile of a PAYGo solar company to emerge. The metrics act as a launching pad for more detailed analysis according to the specific needs of the user and for the establishment of industry-wide benchmarking.

The KPIs are classified into three groups that capture the financial, operational, and portfolio quality performance of a PAYGo solar company (see Figure 1).

How the KPIs Were Developed and by Whom

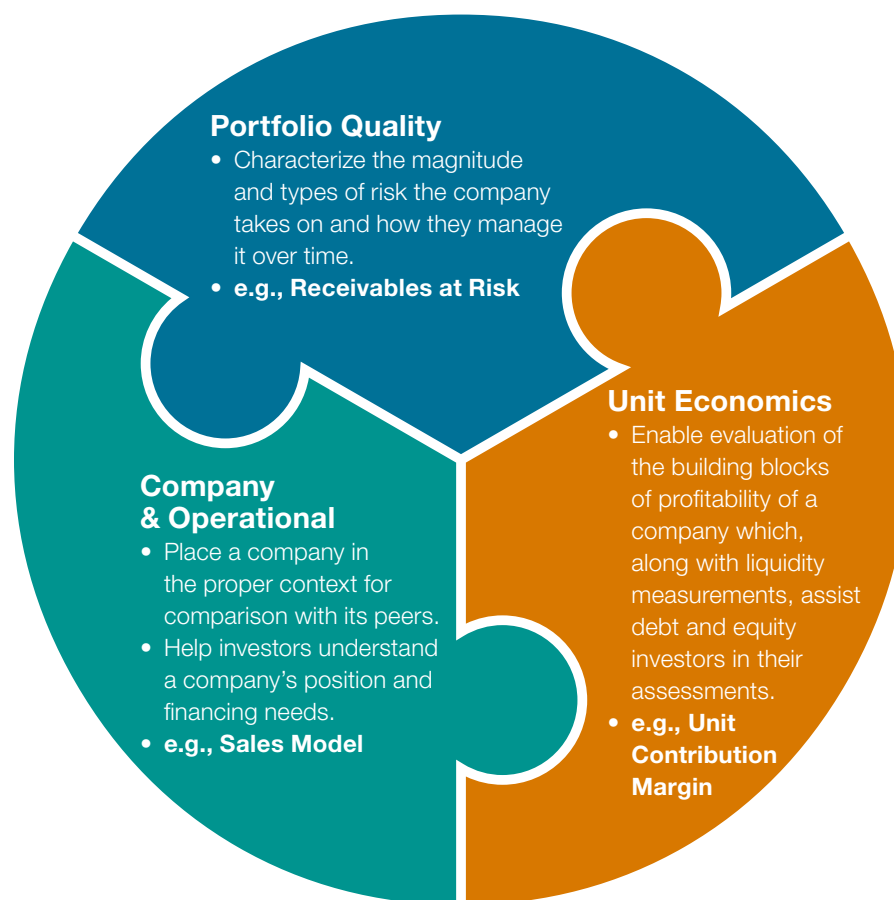
The PAYGo PERFORM KPIs build on an earlier set of KPIs developed by GOGLA and Lighting Global. An initial set of indicators “Version 1.0,” were first produced in 2017.¹ Given the early stage of the PAYGo solar industry at the time, many of the indicators were borrowed from different industries with similar characteristics. As the industry evolved it became clear that the KPIs needed to be more closely tailored to the business models that were emerging in order to communicate the distinct attributes of PAYGo solar businesses.

In 2018, CGAP joined GOGLA and IFC Lighting Global to update the KPIs. To get the necessary input from the industry and investment communities, the three organizations facilitated an open and transparent industry process that encouraged the active involvement of a diverse set of stakeholders. Some 600 PAYGo solar companies, investors (equity and debt investors, local and international banks, and development finance institutions), technical experts, development organizations, and others participated in this process through numerous engagements. These included webinars, industry conferences, workshops, and industry-led working groups that formulated the beta version of the new PAYGo PERFORM KPIs.

The working groups reviewed and offered final recommendations for the KPIs after they had been piloted with eight PAYGo solar companies over a six-month period. These recommendations were then shared broadly with the extended stakeholder community for comment before finalization.

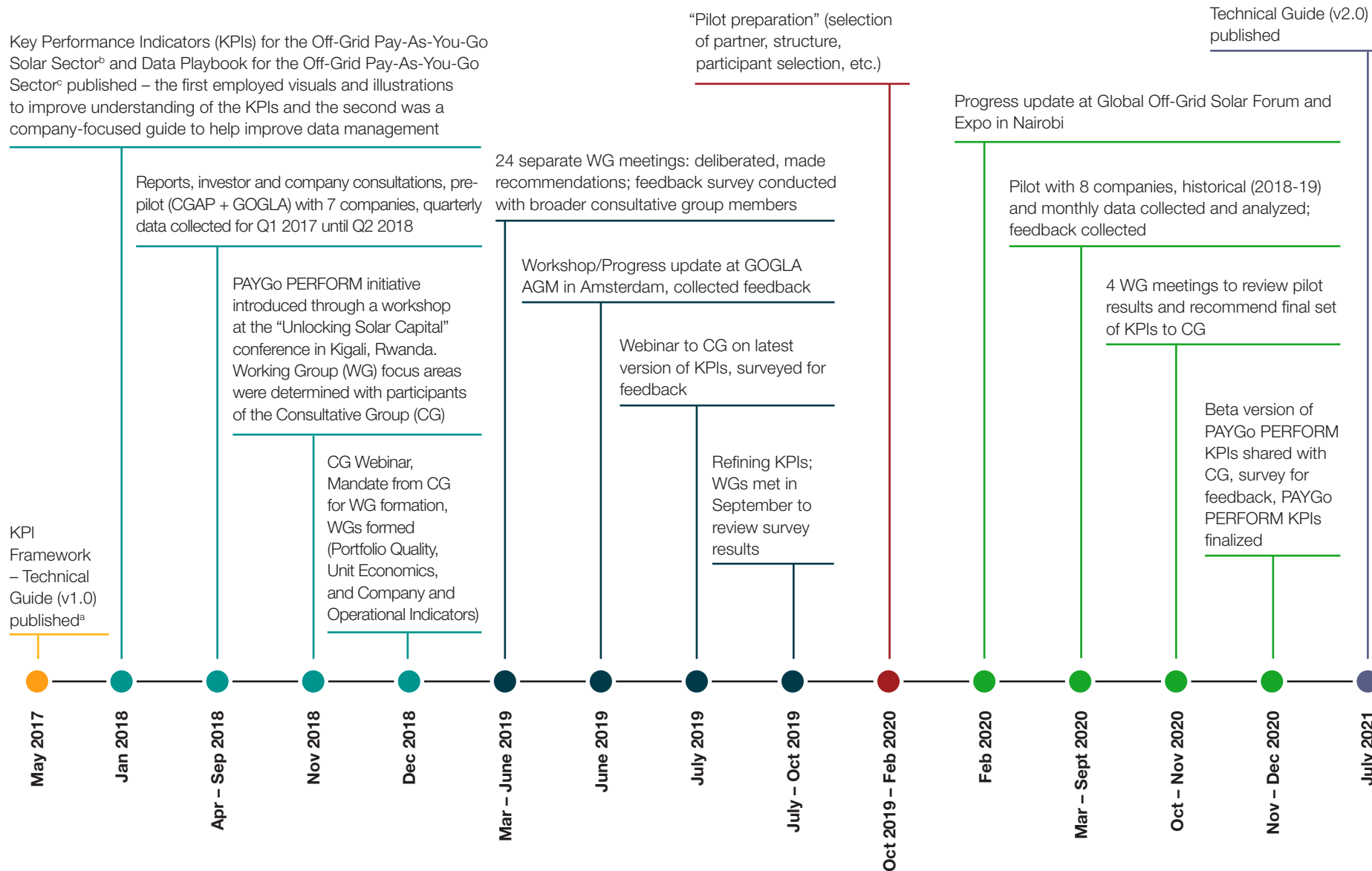
A fundamental objective of this initiative was to cultivate participation, discussion, compromise, and consensus through numerous methods of engagement. One of the most important outcomes of this effort, we hope, is the start of a tradition to periodically, rigorously, and inclusively review and update reporting standards and metrics as the industry matures (see Figure 2 for key development milestones).

FIGURE 1. PAYGo PERFORM KPI categories



¹ See https://www.lightingglobal.org/wp-content/uploads/2017/05/wbg_kpi_011818_yp_v20interactive-comp-1.pdf

FIGURE 2. **PAYGo PERFORM KPI development timeline**



a See <https://www.lightingglobal.org/wp-content/uploads/2017/05/Technical-Guide-for-KPI-Framework.pdf>
 b See <https://www.gogla.org/resources/kpi-technical-guide-for-the-off-grid-pay-as-you-go-sector>
 c See https://www.gogla.org/sites/default/files/resource_docs/playbook_draft_011818_v14interactive-comp.pdf

How to Get the Most Value out of the KPIs

USE THE FULL SET OF KPIs

PAYGo solar stakeholders are strongly encouraged to adopt the entire set of core metrics. The KPIs have been designed to work holistically to enable analysis of the financial and operational performance and portfolio quality of a company. If a company adopts only a subset of the KPIs important details and relationships may be lost. This could lead the company and its existing or prospective investors to misinterpret its performance and current state.

To make it practical for companies to adopt the entire framework, care was taken to limit the number of KPIs to 36. We acknowledge that such a number can be daunting for new companies entering the sector, but the working groups arrived at this set considering the complexity and distinguishing aspects of the PAYGo model. Even so, the 36 KPIs presented in this guide are not exhaustive, but are considered to be a foundational and accessible set of KPIs that the industry could begin reporting on. Stakeholders may want to conduct further analysis and go beyond the framework to gain a deeper understanding of certain trends or relationships in the sector.

Companies, investors, and donors may also wish to look at other aspects of the business such as the environmental or social impact. Relevant and available industry standards and metrics include:²

- **The Consumer Protection Code:** A set of principles and an assessment framework to measure, demonstrate and improve good practice, aimed at strengthening impact and respecting the rights of consumers and mitigating brand and financial risks for companies, investors, and donors. The principles have been defined by GOGLA's Consumer Protection Working Group, with contributions from companies, investors, and other stakeholders.

- **Impact metrics:** Standardized metrics on energy access, income generation, CO2e reduction and more enable companies and investors to estimate the impact of their organization or investment.
- **VeraSol's Product Quality standards:** Quality standards address four core aspects of product quality: truth in advertising, safety, durability, and consumer protection.³

Stakeholders may also benefit from broader standard setting initiatives and metrics from related sectors, such as the IRIS+ Core Metrics Sets that are aimed to help impact investors measure, manage, and optimize their impact.⁴

COMPANIES SHOULD WORK WITH THEIR INVESTORS AND DONORS TO CHOOSE THE RIGHT REPORTING FREQUENCY TO OPTIMIZE EXTERNAL BENCHMARKING AND INTERNAL REPORTING

Benchmarking is an important goal of these KPIs. To best handle seasonality and to keep reporting periods consistent, we have recommended reporting periods for each KPI.

Internally, the needs of the business to respond quickly will favor more frequent calculation of the KPIs. For instance, it is expected that liquidity monitoring and portfolio quality assessment will happen more frequently than annually.

We recommend therefore that companies have the KPIs available for external use on a full year basis. For management accounting purposes, companies should choose the period suited to their needs and capacity.

² See <https://www.gogla.org/consumer-protection/principles>; <https://www.gogla.org/welcome-to-the-gogla-impact-hub>

³ See <https://verasol.org/solutions/quality-standards>

⁴ See <https://iris.thegiin.org/about/>

CLARIFY AND (WHEN POSSIBLE) ALIGN ACCOUNTING TREATMENT

Accounting policies are yet to be harmonized within the off-grid solar sector and vary considerably by company and country. Examples of misalignment include, but are not limited to, policies on revenue recognition, write-offs, and credit provisioning. Mismatched accounting treatment could pose a barrier for companies to implement the KPIs and a challenge when comparing across companies. It is therefore strongly advised that when companies report on the KPIs, they note whether any of their accounting policies may influence the outcomes of specific KPIs to mitigate the risk of overstating or undervaluing a company's performance. It is also important to note such accounting practices in internal reporting, especially when external benchmarks are being used for calibration or when a company is operating within multiple countries, as some accounting policies may vary due to legal requirements. That said, uniform application of the definitions and calculations of the KPIs will promote consistency independent of accounting policies.

Accounting policies that may influence the KPIs will be pointed out throughout the Technical Guide. To further assist companies in applying the KPIs and moving toward harmonization in accounting, IFC Lighting Global, CGAP, and GOGLA plan to publish a guide later this year that highlights accounting challenges faced by PAYGo solar businesses.

GENERATE, VALIDATE, AND STORE HIGH-QUALITY DATA

Data is the fuel needed to put the KPIs in motion. Some PAYGo solar companies generate vast sets of data that are automatically fed into sophisticated management information systems, while others have more manual processes as they wait for the right time to invest in more tailored and advanced systems. Companies across the spectrum can, and should, make use of the KPI framework. As the industry matures there will be a need to move beyond self-reporting to independent verification. Regardless of how companies collect their data quality, credibility, and consistency - as well as the ease of generating and accessing it - will play a large role in determining the value that can be derived from using the KPIs.

REFER TO THE PAYGO PERFORM DATA COLLECTION AND REPORTING TOOL

The PAYGo PERFORM spreadsheet tool is designed to help calculate and report on the metrics – it requires users to fill out basic building blocks and then calculates the results for the KPIs. It also includes guiding definitions for each building block. You can access the tool at: <https://www.cgap.org/research/data/paygo-perform-data-collection-tool>.

APPLY THE KPIs ACROSS MULTIPLE USE CASES

There are numerous applications for the PAYGo PERFORM KPIs for funders, companies, and other stakeholders, including:

i. **Analyzing financial, operational, and credit risk performance**

In the absence of well-designed metrics for tracking and analyzing performance, many companies are flying blind. The PERFORM KPIs are tailored to the unique context of the PAYGo solar industry and offer insights into company health by enabling more advanced and deeper analyses (e.g., input to analytical tools such as vintage curves and unit economics analysis). These are not just for the benefit of investors who may be analyzing performance externally, but, just as importantly, are powerful tools for companies to use for internal performance tracking and diagnostics.

ii. **Facilitating investment appraisals**

A lack of standardized indicators means that many PAYGo solar companies are a black box for the investors, donors, and others seeking to fund them. This lack of transparency may make some funders hesitant to engage in the industry or may lead to poor investment decisions. Companies can therefore use these KPIs when interacting with potential funders to explain how their business works and showcase their performance. By offering a standardized approach to measuring company health, the PERFORM KPIs help funders improve investment screening and due diligence.

iii. **Structuring deals**

Objective measures are often key to structuring deals. For investors and companies, the PERFORM KPIs offer a basis to set targets or even to track compliance to contractual covenants. This holds equally true for securitizations or off-balance sheet financing of receivables.

iv. **Designing milestone and disbursement payment structures**

For donors looking to support the PAYGo solar industry, the absence of standard KPIs makes it difficult to tie funding to results. By adopting the PERFORM KPIs, market development programs such as Results Based Financing and grants could be structured so that payments are triggered by achieving certain goals or milestones as defined and measured using industry standard KPIs.

v. **Reporting and Monitoring investments**

Investors, donors, and other funders or third parties currently have different approaches to measuring performance, which in turn leaves companies with the burden of developing bespoke reports to satisfy funding requirements. By standardizing reporting metrics funders will be able to stay on top of company performance, while also easing the reporting burden on companies and allowing for improved comparison of PAYGo solar companies across the portfolio.

vi. **Developing market intelligence**

Unlike most mature industries the PAYGo solar industry lacks common metrics, which means there is currently no way for companies and funders to consistently benchmark their performance against peers. The PERFORM KPIs could address this constraint by enabling a market reporting mechanism whereby company data is collected, anonymized, aggregated, and published across multiple markets. Once developed, this would allow benchmarking and enhance market insights across PAYGo solar stakeholders, informing strategic decisions and improving the overall understanding of sector performance.

II. HOW TO READ THIS GUIDE

THIS TECHNICAL GUIDE PRESENTS THE PAYGO PERFORM KPIs and explains how to calculate and use the metrics.

Since the guide is intended to be used by companies together with their funders in the PAYGo solar space, it assumes that readers are trained in financial analysis and familiar with the PAYGo solar business model. There is frequent use of terms and concepts associated with lending such as portfolio, receivables and provisioning. For those who are less familiar with the PAYGo solar industry, please see *Strange Beasts: Making Sense of PAYGo Solar Business Models*.⁵

The guide is organized by groups of metrics. **To jump directly to a group of metrics, click on the tabs on the right side of the page. At each chapter start, there is a table with specific KPIs that are also linked. The color and label on each page can help the reader navigate through the document.** Tables on each metric provide definitions, calculations, and notes. While the KPIs are best used as an integrated set, we have on occasion

highlighted especially important relationships among KPIs with the “Related KPIs” categorization. The “Recommended Headline Measurement” indicates a suggested period over which the KPIs can be measured and frequency for updating each KPI. The headline period of measurement is best suited for high-level insights and comparison, although different periods of measurement will also provide valuable information depending on the purpose (e.g., vintage analysis used to identify shifts in customer payment behavior based on the month of origination). The proposed frequency of measurement is geared toward internal tracking; however, the frequency of reporting can differ and can be less frequent as appropriate.

A companion spreadsheet tool is also available through <https://www.cgap.org/research/data/paygo-perform-data-collection-tool> to help calculate the KPIs.

⁵ Sotiriou et. al. 2018. “Strange Beasts: Making Sense of PAYGo Solar Business Models.” CGAP. <https://www.cgap.org/research/publication/strange-beasts-making-sense-paygo-solar-business-models>

III. KEY PERFORMANCE INDICATORS AND DEFINITIONS

Portfolio Quality Indicators: Measuring Credit Risk

THE PORTFOLIO QUALITY INDICATORS PROVIDE stakeholders with a high-level perspective on the risk posed by a PAYGo solar company's credit portfolio – in essence, a company's ability to translate a PAYGo sale or unit deployment into payment in full.⁶

Unlike the case with traditional lenders, most PAYGo solar contracts are characterized by flexible payment schedules enabled by tools such as remote lock-out technology and digital payments. The PAYGo solar industry's unique features fundamentally affect payment behavior and the expression of risk in a credit portfolio. For this reason, in developing the PAYGo PERFORM KPIs, we reviewed existing portfolio quality metrics from adjacent industries such as microfinance, but we also considered new indicators (e.g., Receivables at Risk using Collection Rate) that reflected some of the industry's distinguishing traits. The portfolio quality indicators presented below include measures of portfolio size, growth, and contract tenor, which are all essential to understanding the scale and nature of a portfolio's risk.

These indicators should be considered a starting point and can also be modified and combined to highlight different attributes of a company's receivables portfolio, illuminate relevant trends across peer groups, conduct cohort or vintage analysis, and more.⁷ Like the other groupings of KPIs in the technical guide, these should be viewed alongside the other sets for appropriate context.

For example, when comparing two companies, one may exhibit riskier portfolio quality than the other but may also be better at compensating for that risk in ways that would only be expressed in the Unit Economics KPIs (e.g., wider margins). This also means that it is best to align periods of measurement across relevant KPIs, especially amongst the related Portfolio Quality KPIs, to ensure a full and consistent accounting of credit risk and other portfolio-related dynamics.

TABLE 1. **Portfolio Quality KPIs overview**

	KPI	What it Measures
1.1	Outstanding Receivables	Portfolio Size
1.2	Outstanding Receivables Growth	Portfolio Growth
1.3	Collection Rate	Cash Conversion
1.4a	Receivables at Risk using Consecutive Days Unpaid – RAR(CDU)	Risk (ex-ante)
1.4b	Receivables at Risk using Collection Rate – RAR(CR)	Risk (ex-ante)
1.5	Write-off Ratio	Risk (ex-post)
1.6	Repossession Ratio	Risk (ex-post)
1.7	Contractual Credit Period	Tenor
1.8	Effective Credit Period	Tenor

⁶ While contracts and designations may vary from company to company, we use credit interchangeably with receivables, loans, or expected payments.

⁷ See <https://www.accion.org/risk-management-tool-guide-portfolio-quality-analysis-pqa>

1.1 Outstanding Receivables

Value of the company's gross outstanding receivables streams



CALCULATION

Gross Outstanding Receivables as Reported on the Balance Sheet at a Fixed Point in Time



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – Snapshot at end of period of interest

Frequency – Monthly



RELATED KPIS

- Growth in Outstanding Receivables
- Provides dimension of scale for Collection Rate, RAR(CDU), and RAR(CR)



USE OF METRIC

- Quantifies aggregate size of each company's outstanding receivables, providing context for portfolio quality metrics and comparison of scale across companies.
- Serves as a basis for growth and sales revenue generation.
- Can serve as a rough indication of diversification (larger companies with greater sales revenues tend to have more diverse sources, all things being equal).



NOTES

- Most of the companies in the pilot included both principal and interest in their outstanding receivables, while some separated them out. Best practice in the microfinance industry is to include only the principal. In the PAYGo solar industry, this would most likely translate to the cash sale price (including cost of goods sold and sales revenue margin mark-up but excluding interest or finance margin).
- Companies may use different accounting practices for receivables. For improved consistency and comparability, Outstanding Receivables

should include capitalized receivables that reflect the full amount of the contract value from moment of sale/activation.

- An emerging practice is to link additional loans to an active PAYGo solar unit (e.g., school fees, emergency loans, etc.).^a Given the limited practice relative to portfolios overall, it may be better to keep things simple and include these in the aggregate figure; however, this practice should be monitored, and if it becomes more common and of meaningful scale, should be reviewed.

^a A unit or device that has not been written-off or repossessed.

1.2 Growth in Outstanding Receivables

Growth in value of the company's gross outstanding receivables streams

CALCULATION

$$\left(\frac{\text{Gross Outstanding Receivables [T]}}{\text{Gross Outstanding Receivables [T-1]}} \right) - 1$$

Where T is the end period to which one is measuring growth and T-1 is the base period from which growth is measured

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Monthly

- Shorter-term periods can be helpful for risk trend analysis

RELATED KPIS

High levels of growth can make risk metrics such as Outstanding Receivables, Collection Rate, RAR(CDU), and RAR(CR) look better relative to a view that controls for growth (i.e., analyzing receivables that were generated around the same time).

USE OF METRIC

Growth is a key consideration for companies and investors as an indication of sales momentum, likelihood of achieving scale and sustainability, and for generating returns.

NOTES

- Excessive growth after the market entry phase may indicate that the company is extending loans to riskier customers to promote growth, negatively impacting portfolio quality.
- High growth can also mask certain portfolio quality risk measures, as newer PAYGo customers tend to make payments more frequently than older customers (see [Portfolio Risk Regression Analysis](#) in Appendix for additional background).

1.2 Growth in Outstanding Receivables (continued)

ILLUSTRATION

A company has a product that requires customers to make a \$10 payment to unlock their PAYGo solar device for a month. The nominal contract period is over 10 months. It sells this product to customers who exhibit the exact same payment patterns: they pay for the first three months (total of \$30) and then stop paying thereafter.

In the simplest case with only one customer in the portfolio, after six months, the number of payments over total number of payments due, the **Collection Rate**, would be 50% ($\$30 / (6 \text{ months} \times \$10)$).

If, however, the company were to add one additional customer each month with the same payment profile (as illustrated in the table below), the cumulative Collection Rate in the sixth month would be 71% ($\$150/\210). Note the cumulative Collection Rate steadily deteriorates when customer growth is halted after the sixth month.

Expanding on this, if the company were to start with one PAYGo customer, and then sell on credit to double the preceding amount of customers each subsequent month (i.e., going from adding 2 customers in the second month, 4 customers in the third month and so on until there are a total of 63 customers in the sixth month) then the overall percentage of payments collected over payments due would be 91% after the sixth month.

Thus, with the same customer profile that only pays 30% of the total due over the course of the nominal contract period, a company can show a far higher cumulative **Collection Rate** with growth.

These scenarios illustrate why, when analyzing a fast-growing company, it is important to dig deeper and analyze portfolio quality amongst customers joining up around the same time (cohorts or vintages). This can control for the distorting effect of growth.

How growth can distort portfolio risk measurement

Period	1	2	3	4	5	6	7	8	9	10
Customer 1	\$10	\$10	\$10	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Customer 2		\$10	\$10	\$10	\$0	\$0	\$0	\$0	\$0	\$0
Customer 3			\$10	\$10	\$10	\$0	\$0	\$0	\$0	\$0
Customer 4				\$10	\$10	\$10	\$0	\$0	\$0	\$0
Customer 5					\$10	\$10	\$10	\$0	\$0	\$0
Customer 6						\$10	\$10	\$10	\$0	\$0
Current Period Collection Rate	100%	100%	100%	75%	60%	50%	33%	17%	0%	0%
Cumulative Collection Rate	100%	100%	100%	90%	80%	71%	63%	55%	46%	40%

1.3 Collection Rate

Ratio of all collected receivables payments over total receivables payments due for a period (does not include deposits)



CALCULATION

Cash Receipts from Follow-on Payments
During the Period

Scheduled Follow-on Payments
During the Period



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Monthly

- Shorter-term periods of measurement can be helpful for risk trend analysis but should consider seasonality.



RELATED KPIS

Write-off Ratio and Repossession Ratio are KPIs that receivables streams can “escape to” from Collection Rate. If a company decides to write off a customer’s receivables or repossess their solar device, that customer’s receivables payment history will be removed from — and effectively improve — the Collection Rate calculation.



USE OF METRIC

- Collection Rate is a distinct metric for the PAYGo solar industry that captures the flexible nature of the payment plans.
- This KPI measures how quickly a company’s customers tend to pay-off their units, specifically how “on-track” their payments are relative to the [Contractual Credit Period](#) (see KPI below). Given fixed payment amounts, the lower the overall Collection Rate, the lower the internal rate of return on the unit/loan.
- Collection Rate has been shown to be a reliable indicator of risk as well. Customers with lower Collection Rates appear less likely to complete their payment obligations. As such, Collection Rate can be an effective tool to identify risky portions of a company’s portfolio or, equivalently, risky customer segments. (For further detail see [Receivables at Risk using Collection Rate – RAR\(CR\)](#) and [Portfolio Risk Regression Analysis](#) in the Appendix).



NOTES

- Collection Rate is tracked by all PAYGo solar companies but with different methodologies. In calculating **Scheduled follow-on payments during the period** (the denominator in the Collection Rate equation), companies are encouraged to move toward standardization and **include**:
 - Follow-on payments for all active contracts that fell due within the period (including contracts signed before and during the period);
 - Follow-on payments for customers past their initial contractual term;
 - The regular payment scheduled for the period, regardless of whether a customer makes a larger prepayment in the period or in the past (e.g., the scheduled payment should be \$10 in September and \$10 in October, even if the customer pays \$20 in September and \$0 in October). Resulting distortions are temporary and will smooth out over time and over an aggregate portfolio;

1.3 Collection Rate (continued)

NOTES (continued)

- o Payment promotions during the contract targeting low repayment customers (e.g., buy one week of light, get one week free); include the amounts corresponding to the free days of light as scheduled payments;
- o Follow-on payments for formally restructured portfolios; include the correct scheduled payments reflecting the restructured terms.
- Likewise, companies are encouraged to **exclude**:
 - o Any scheduled payments in the period covered by the initial deposit given that the customer is not expected to make follow-on payments in that timeframe (i.e., days of free light immediately after unit acquisition date, during which the first follow-on installment is not due);
 - » Note that these receivables should be included in Receivables at Risk segmentation (see [Receivables at Risk using Collection Rate – RAR](#)) as 100% payers;
 - o Receivables/units that have been formally written-off in an accounting sense, meaning that the receivable no longer appears as a receivable on the balance sheet (if the customer is late without a formal write-off, even if >180 days late, follow-on payments should still be included in the denominator of the Collection Rate calculation);
 - o Non-targeted promotions extended for marketing purposes during the contract (e.g., buy one week of light get three days of free light). Ideally, do not include the amounts corresponding to the free days of light as scheduled payments.
- For past-due expectations, it is suggested that the scheduled follow-on payment be entered as the usual/standard repayment frequency (e.g., 28 daily payments in February if daily repayment frequency and looking at Collection Rate for 1 month), rather than the entire full outstanding amount. The reason for this is that including the entire outstanding amount would underestimate the Collection Rate, given that in the most common PAYGo solar model, customers are not expected to pay the entire unpaid amount immediately after the contractual term passes, but to continue paying according to the usual repayment frequency to access light as needed, until the unit is permanently unlocked/fully paid for.
- Collection Rate (in contrast to [Consecutive Days Unpaid](#) or CDU) helps to identify slow payers, who have an impact on the company's profitability due to the cost of funds. There are customers that pay too slowly to be sustainable, which in some companies' view is <70% to <50% Collection Rate. Slow customer payments negatively affect sustainability because of higher cost of funds and management, in addition to increased likelihood of malfunction over a longer period. Actual sustainability thresholds are ultimately driven by company-specific dynamics such as margins, profitability and cost of funding.
 - o Companies may consider using Collection Rate as a segmentation tool to better understand their clients, suggesting profiles, segments and clusters for targeted engagement (e.g., reminders, disclosures, offerings, etc.) throughout the relationship to support higher repayment and improved satisfaction.
- The use of a fixed period of measurement rather than a cumulative measure for all active customers improves comparability across companies and limits the influence of legacy payment behavior.
- For funders: best to align period of measurement across companies being analyzed.

1.3 Collection Rate (continued)

ILLUSTRATION

The table below outlines the profiles of four different customers and their Collections Rates over 10 periods. The cumulative nature of the Collection Rate enables it to “remember” and account for missed payments. This allows segmentation by speed of repayment which is an informative metric in the PAYGo solar industry.

Collection Rate illustrated through customer payment profiles

	1	2	3	4	5	6	7	8	9	10	Collection Rate
Customer #1	\$		\$	\$	\$	\$		\$	\$		70%
Customer #2	\$						\$				20%
Customer #3	\$			\$			\$			\$	40%
Customer #4	\$		\$	\$	\$	\$	\$	\$	\$	\$	90%

Each \$ represents 10 days of payment

THE PAYGO PERFORM KPIs AND THEIR RELATION TO CUSTOMERS



The PAYGo PERFORM KPIs were developed as a tool for analyzing financial and operational performance and the portfolio quality of PAYGo solar companies. These were areas identified by stakeholders as key to unlocking investment and supporting sustainable growth. Despite their technical and company-focused perspective, these KPIs are also impacted by the relationship that PAYGo companies have with their customers. It is a priority for companies to provide their customers with a service that meets or exceeds expectations and to ensure that they are not financially overburdened. A company’s success in delivering in these areas is reflected through its operational and portfolio quality and most directly through total cash receipts, which impact many of the firm-level and unit-level KPIs.

These KPIs are not, however, a sufficient substitute for close monitoring of the drivers of customer value-creation and satisfaction. We expect stakeholders to develop and use separate metrics for this. Over time, we hope customer-focused metrics that are the most widely applied and relevant for the PAYGo solar industry can be folded into an updated set of KPIs.

1.4a Receivables at Risk using Consecutive Days Unpaid – RAR(CDU)

Identifies risky proportion of receivables portfolio using consecutive days unpaid threshold(s)



CALCULATION

$$\frac{\text{Gross Outstanding Receivables} > [X] \text{ Consecutive Days Unpaid}}{\text{Gross Outstanding Receivables}}$$



USE OF METRIC

- Provides a single, easy-to-use-and-interpret estimate of the risky portion of a portfolio using a leading indicator.
- Application of a variety of thresholds can be used to better understand portfolio risk characteristics across the distribution.
- As it identifies non-payers, it can be used alongside a Collection Rate-based measure, which identifies slow-payers, to improve performance of Receivables at Risk (see [Portfolio Risk Regression Analysis](#) in Appendix).



RELATED KPIS

RAR(CR), Outstanding Receivables, Growth in Outstanding Receivables.



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – Snapshot at end of period of interest

Frequency – Monthly (or more frequently)

- For a single comprehensive headline measure, it is recommended to use the joint measure of Receivables at Risk using 30 Consecutive Days Unpaid (RAR30) OR Collection Rate < 50%^a (see definition of [Receivables at Risk using Collection Rate – RAR\(CR\)](#) below).
 - It can be instructive to calculate each (RAR30 and RAR(CR<50%)) separately, if possible, and then use the joint measure for a combined view.
 - As companies use the measures separately and jointly while comparing to actual write-offs or equivalent measures of default, they will be able to improve their confidence in appropriate segment-specific risk levels.
- RAR30, i.e., using 30 Consecutive Days Unpaid, can be used as the primary segmenting threshold if the joint measure is not feasible.
- Shorter/other periods of measurement can be helpful for risk trend analysis.

^a It is important not to double count as there can be meaningful overlap between the two different measures (i.e., receivables for which the customers have not paid for 30 days and have an overall Collection Rate under 50%).

1.4a Receivables at Risk using Consecutive Days Unpaid – RAR(CDU) (continued)

NOTES

- Full set of RAR aging categories suggested are RAR30, 90, 120, 180, and 365 days. RAR30, 90, and 180 are expected to be the most useful headline RAR aging categories.^a
- Companies have differing views on what level of CDU risk becomes a concern, but it typically ranged from RAR15 to RAR60 among the companies that participated in the pilot.
- Companies that formally restructure receivables are encouraged to track these receivables separately unless a sufficiently conservative threshold of payments is met and the grouping's risk profile can be deemed similar to those of non-restructured receivables.
- Like Collection Rate, CDU can be used as a segmentation tool to better understand their clients, suggesting profiles, segments and clusters for targeted engagement.
- See [Portfolio Risk Regression Analysis](#) in Appendix for additional background.

^a Shorthand references to the different RAR segmentation methodologies are used throughout the guide. For RAR(CDU), Consecutive Days Unpaid > X days, CDU>X days, or, simply, RARX may be used. For RAR(CR), Collection Rate > Y%, CR<Y%, or RAR(CR<Y%) may be used. Refer to the corresponding definitions for additional details.

1.4a Receivables at Risk using Consecutive Days Unpaid – RAR(CDU) (continued)

ILLUSTRATION

Data in the table below (see [Portfolio Risk Regression Analysis](#) in Appendix for further details) was sampled from a subset of companies that participated in the data collection pilot. While the subset is too small to support definitive conclusions about the industry as a whole, it suggests that joint segmentation of receivables by Consecutive Days Unpaid > 30 days OR a Collection Rate < 50% may balance capturing a high portion of eventual defaults while maintaining a reasonable level of accuracy. As these tools are used more frequently, this accuracy can be better calibrated generally across companies and specifically within companies. Furthermore, these segmentation tools may also be used for the purposes of credit provisioning.

Receivable and default sample data^a

	CDU >30		CR <50		Aggregate Default			Total
					CDU >30 or CR <50	CDU >30 & CR <50	CDU >30 & CR >50	
Observations	52,273	125,969	138,646	39,596	12,677	86,373	329,642	468,288
Defaults	38,275	68,537	72,948	33,864	4,411	34,673	6,914	79,862
Default % (wt. by observations)	73%	54%	53%	86%	35%	40%	2%	17%
Default % (wt. by company)	58%	49%	45%	72%	32%	33%	2%	14%
Default % of total (observations)	48%	86%	91%	42%	6%	43%	9%	
Default % of total (company)	54%	64%	80%	38%	16%	26%	20%	

^a Data sampled from three companies that participated in PAYGo PERFORM Data Collection Pilot. A standardizing approach was used where a customer was determined to be in default if they failed to make at least one payment within the 6-month time interval (RAR CDU of >180 days); additionally, customers who made some payments within the period but maintained a CR of below 30% were also regarded to be in default. See [Portfolio Risk Regression Analysis](#) in Appendix for further details.

1.4b Receivables at Risk using Collection Rate – RAR(CR)

Identifies risky proportion of receivables portfolio using Collection Rate threshold(s)



CALCULATION

$$\frac{\text{Gross Outstanding Receivables of Customers with Collection Rate} < [Y]\%}{\text{Gross Outstanding Receivables}}$$



USE OF METRIC

- Provides a practical single estimate of the risky portion of a portfolio using a leading indicator.
- Application of a variety of thresholds can be used to better understand portfolio risk characteristics across the distribution.
- Since it can be used to identify slow-payers it complements the Consecutive Days Unpaid-based measure, which identifies non-payers, to improve performance of RAR (see [Portfolio Risk Regression Analysis](#) in Appendix).



RELATED KPIS

Collection Rate, RAR(CDU), Outstanding Receivables, Growth in Outstanding Receivables.



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – Snapshot at end of period of interest

Frequency – Monthly (or more frequently)

- For a single comprehensive measure, the joint measure of RAR30 OR Collection Rate < 50% is recommended.
 - If possible, it is instructive to calculate each (RAR30 and Collection Rate < 50%) separately and then use the joint measure for a combined view.
 - As companies use the measures separately and jointly while comparing to outcomes, they will be able to improve their confidence of appropriate segment-specific risk levels.
- Standalone measure: CR < 50%, i.e., using < 50% Collection Rate for customers as primary segmenting threshold.
 - If it is not possible to use both screens (CDU and CR) to segment risky portion, CDU > 30 is recommended.
- Shorter/other periods of measurement can be helpful for risk trend analysis.

1.4b Receivables at Risk using Collection Rate – RAR(CR) (continued)

NOTES

- It is recommended that Collection Rates of receivables since activation/sale of the unit be used here to provide a fully cumulative measure for the purposes of RAR segmentation. (Note: this differs from the standard Collection Rate measure which tracks payments over a fixed period, e.g., over the past year).
- Fully paid off units and written-off units/receivables are not included – this is due to the metric's purpose to assess risk of the current outstanding portfolio.
- Receivables within the deposit grace period (days of free light immediately after unit acquisition date, during which the first follow-on installment is not due) are considered to have 100% Collection Rate, so that the sum of the outstanding receivables by Collection Rate interval matches the total Outstanding Receivables.
- While more granular intervals were analyzed in the pilot, the recommendation is to track RAR(CR<50%) as the primary measure and RAR(CR<70%) as a secondary measure of risk.
- Similar to the reasoning behind the value of the Collection Rate, RAR(CR) helps capture a different, while overlapping, profile of risky customer to that of RAR(CDU), i.e., slow payers vs. nonpayers (the latter being best captured by CDU).
- In cases where companies find it difficult to segment the outstanding portfolio by Collection Rate and to avoid double-counting (i.e., customer receivables that have fall into the risky category for both Collection Rate and CDU measures), RAR(CDU) can be used on a standalone basis.

1.4b Receivables at Risk using Collection Rate – RAR(CR) (continued)

ILLUSTRATION

Using the same table of customer payment profiles from the previous Collection Rate example, we note how a customer payment profile can be considered risky (e.g., Customer #3) while not being captured by RAR(CDU). Further, Customer #2 would fall under screens of both measures and should only be counted once when using a joint approach. Finally, it should be noted that this table measures Collection Rates starting at the same time – this need not be the case. Receivables at Risk using Collection Rate should segment using each receivables' Collection Rate since unit-specific inception as cumulative payment behavior is important to measuring risk.

Portfolio risk segmentation using Collection Rate

	1	2	3	4	5	6	7	8	9	10	Collection Rate
Customer #1	\$		\$	\$	\$	\$		\$	\$		70%
Customer #2	\$						\$				20%
Customer #3	\$			\$			\$			\$	40%
Customer #4	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	90%

Consider the above 4 customers, with each \$ representing 10 days of payment.

- If we use traditional Portfolio at Risk 30 (PAR30), all customers are "at risk" by period 5.
- If we only use RAR30 (CDU) evaluated after period 10, only Customer #2 is "at risk".
- If we instead apply a threshold of 50% collections, Customers #2 and #3 are considered "at risk".

WHY RECEIVABLES AT RISK AND NOT PORTFOLIO AT RISK?



A reader that is familiar with the Portfolio at Risk (PAR) indicator most commonly used in the microfinance industry may be understandably curious as to why a different terminology was applied for the PAYGo PERFORM KPIs. The reasoning behind this decision was to signal that these are dissimilar and not necessarily comparable measures of risk. PAYGo solar employs flexible payment plans and lockout technology to promote payment – these factors and others mean that the risk profiles and their expression are meaningfully different from those in the microfinance industry and PAR levels are not equivalent to RAR levels in the PAYGo solar space (notwithstanding the differences in calculation). As such a decision was made by the working group members to change the terminology to encourage and reinforce this distinction.

1.5 Write-off Ratio

The sum of the remaining payments of receivables streams that have been written-off in a given period divided by the sum of the remaining payments of the receivable streams for the entire portfolio

CALCULATION

$$\frac{\text{Outstanding Receivables for Written-Off Contracts During the Period}}{\text{Average Outstanding Receivables During the Period}}$$

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Quarterly

- Shorter/other periods of measurement can be helpful for risk trend analysis.
- Since Write-off Ratio is taken over a given period, it is important to align the end point of the period in question when used alongside other fixed-point metrics such as RAR.

RELATED KPIS

- Written-off receivables are not included in the Collection Rate calculation.
- While not always the case, ideally Repossession Ratio should be a subset of Write-off Ratio providing additional information on the proportion of write-offs that are coming from repossessed units. If a company is effective in redeploying units, it can help recoup a portion of lost payments.
- Outstanding Receivables for scale

USE OF METRIC

Although backward looking, it is important to track as it relates to other risk metrics.

- Since written-off receivables are not included in Outstanding Receivables and, in turn, the denominator of the Collection Rate and the RAR-related measures, these measures will understate risks. Thus, the Write-off Ratio should also be analyzed to have a more comprehensive view of risks.

NOTES

- The Write-off Ratio is dependent on company-specific policy and is a lagging indicator of receivables risk.
- There may be a seasonal effect as companies assess write-offs at differing intervals (e.g., end of year, semiannually, or monthly).
 - Reasons for varying approaches include internal credit risk management strategy, risk appetite, profit and loss impact, and tax considerations.
- Write-off Ratio should capture the write-off of a payment stream (receivable) and not the unit itself as the former relates to the company's outstanding portfolio and is most relevant in the context of portfolio risk.
- Companies typically fully write-off receivables associated with repossessed units, but this is not always the case. As such, it is important to be mindful when looking at both the Write-off Ratio and the Repossession Ratio as there may be only a partial overlap.

1.5 Write-off Ratio (continued)

ILLUSTRATION

Write-off policy impacts risk metrics

KPI	Company A	Company B
Collection Rate	71.8%	71.2%
RAR30	12.9%	10.5%
RAR(CR<50%)	17.1%	13.3%
RAR30 or RAR(CR<50%)	20.6%	16.6%
Write-off Ratio	2.6%	9.7%

In this simple illustration we have two companies with comparable Collection Rates. By only looking at the RAR metrics, Company A appears to generate riskier receivables than Company B. However, Company B is more aggressive with write-off policy and hence has a significantly higher Write-off Ratio. Had Company B's receivables not been written-off, its RAR metrics would indicate a riskier portfolio – write-offs are significantly impacted by company policy so a higher Write-off Ratio on its own does not necessarily mean that a company has a riskier portfolio, on the other hand a higher Collection Rate on its own does not mean a company has a less risky portfolio – one must have a comprehensive view across a suite of metrics to get a more accurate picture.

1.6 Repossession Ratio

The sum of the remaining payments in receivables streams of repossessed units in a given period divided by the sum of the remaining payments of the receivables streams for the entire portfolio



CALCULATION

$$\frac{\text{Outstanding Receivables of Units Repossessed During the Period}}{\text{Average Outstanding Receivables During the Period}}$$



USE OF METRIC

Backward looking, although important to track as it relates to other risk metrics.



NOTES

- Repossession policy varies from company to company based on an array of factors.
- A low rate is not necessarily a positive indicator as it could be that repossession efficiency is low, and companies that re-sell repossessed units vs. only using them for spare parts have differing levels of prioritization for repossession.
- Repossession may be a net gain for the company if the value of the repossessed unit is still high, and the customer has already made some payments (no compensation is due back to the customer). However, repossession may be a net loss if the residual value is low and the operating cost of deploying agents to repossess is relatively high. Although difficult to isolate the impact, the effectiveness of a company's repossession process should, all things being equal, translate into stronger profitability metrics (e.g., [Sales and Maintenance Cost Ratio](#), [Unit Contribution Margin](#), etc.).
- Repossession policy also has an impact on repayment culture, it provides further incentive to repay assuming the customers value the product/service.
- Because written-off receivables and repossessed units (when also written-off) are not included in Outstanding Receivables (unless they are redeployed) and thus the denominator of the Collection Rate and the RAR-related measures, these measures will understate ongoing risk unless the Repossession and Write-off Ratios are also considered.
 - However, as mentioned earlier with the Write-off Ratio, companies do not always fully write-off outstanding receivables for repossessed units so one must use caution when interpreting both the Write-off and Repossession Ratios if the accounting treatment is not clear.
- While a unit-based measure was originally considered (units repossessed / average total installed units), a value-based measure was ultimately selected to improve understanding of portfolio quality and comparison with the Write-off Ratio. The value basis also improved comparison across companies with markedly different product mixes (e.g., companies with less expensive units vs. companies with more expensive units).



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Quarterly

- Shorter/other periods of measurement can be helpful for risk trend analysis.
- Since Repossession Ratio is taken over a given period, it is important to align the end point of the period in question when used alongside other fixed-point metrics such as RAR.



RELATED KPIS

- Collection Rate – receivables of repossessed units if also written-off are not included in this calculation.
- Write-off Ratio – outstanding receivables for repossessed units are typically also fully written-off. If a company is effective in redeploying units, it can help recoup a portion of lost payments.
- Outstanding Receivables for indication of scale

1.7 Contractual Credit Period

Average nominal number of days between system acquisition and expected final payment (formerly Average Credit Period)^a



CALCULATION

$$\frac{\text{Contractual Repayment Term (Days) of Active Units}}{\text{Number of Active Units}^b}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – Snapshot at end of period of interest

Frequency – Annually/Quarterly

- Best collected and updated along with Effective Credit Period



RELATED KPIS

Effective Credit Period



USE OF METRIC

Measures the nominal tenor of receivables associated with an active unit.



NOTES

- Number of active units should be entered as per the following definition: units in possession of active customers. Does not include written-off units, new units not yet deployed, repossessed units not yet re-deployed, or permanently unlocked units. Includes locked units prior to repossession or write-off.
- In the case of non-PAYGo receivables (e.g., a top up loan in parallel with an existing loan for the device), only one unit should be counted, with “unit” referring to the physical device (solar panel and control/battery system).
- These subsequent non-unit-based receivables (i.e., associated with a loan other than the purchase of the original device) are still a small portion of aggregate loans in the space. If they were to increase in size and importance, this convention would likely need to be revisited and/or separate measures set up to capture the distinct characteristics of the associated receivables.

^a In case acquisition is not contractually defined, deployment, installation, delivery, transfer of possession, or other equivalent term can be substituted here.

^b Active units are those whose expected receivables are included in the company’s gross outstanding receivables figure.

1.8 Effective Credit Period

Effective (actual) length of time taken for an average customer to pay off their solar device



CALCULATION

$$\frac{\text{Effective Repayment Term (Days) of Repaid Units}}{\text{Number of Repaid Units}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Annually/Quarterly

- Best collected and updated along with Contractual Credit Period



RELATED KPIS

- Contractual Credit Period – see notes and illustration below
- Write-off Ratio and Repossession Ratio – see notes below
- Used in calculation of profitability KPI [Unit Servicing and Maintenance Cost](#)
- Provides a measure of how quickly a company cycles through a portfolio



USE OF METRIC

Measures the number of days a customer takes to fully pay-off their unit.



NOTES

- This measure provides a more accurate measure of the actual credit period vs. the Contractual Credit Period.
 - Similarly, it provides a measure of how quickly a company cycles through its portfolio. This is important in providing a context for other measures, e.g., if the Write-off Ratio is measured over a period of a year and the Effective Credit Period is 6 months, then the ratio, in effect, includes two cycles of the portfolio, whereas an Effective Credit Period of 18 months would imply that the Write-off Ratio includes 67% of a portfolio cycle.
- If only looking at the time taken for fully paid-off devices, this measure ignores periods for customers that do not finish paying off their units.
 - For a rough measure of the average payment period for all receivables generated, including those units which are not eventually paid off, one can use Contractual Credit Period / Collection Rate; ensuring that both components are measured over the same period.
- A large discrepancy and high volatility between Contractual Credit Period and Effective Credit Period may indicate that the company is not accurately assessing risk (especially if embedded interest rates do not account for the actual amount of time it takes to fully pay off a unit).

1.8 Effective Credit Period (continued)

ILLUSTRATION

The table below shows the expected cash flows to a PAYGo solar company from three different customers. The company's contracts are nominally set to 5 months with a payment of \$20 due at the beginning of each month (for a total payment of \$100). Let's assume the all-in cost for the company (device, delivery, installation, service, maintenance, etc.) is \$90 and is fully incurred at the moment the unit is handed over to the customer and the first collection is made.

Customers A, B, and C take 4 months, 7 months, and 10 months respectively to pay off their units, the annualized internal rates of return for their contracts are 92%, 51%, and 30% respectively. So even though all three customers end up paying off their units, slower pay-off can significantly impact returns. One must also consider the positive correlation between the time it takes for a customer to pay off a unit and risk of nonpayment as well as the likelihood of a device malfunctioning which puts additional strain on returns the longer it takes to get fully paid.

Effective Credit Period drives returns

Customer	Months Out											Total	IRR ^a
	Today	1	2	3	4	5	6	7	8	9	10		
A	-\$70	\$20	\$20	\$20	\$20	-	-	-	-	-	-	\$10	92%
B	-\$70	\$20	\$0	\$20	\$0	\$20	\$0	\$20	-	-	-	\$10	51%
C	-\$70	\$0	\$20	\$0	\$0	\$20	\$0	\$0	\$20	\$0	\$20	\$10	30%

a Approximate Annualized Internal Rate of Return

Ancillary Risk Metrics

A few additional risk metrics may help form a more comprehensive view of portfolio risk. Note these are not viewed as essential as the preceding Portfolio Quality KPIs (1.1 – 1.8) and may be considered optional:

- **Write-off Ratio 180** – since write-off decisions are ultimately based on company policy, it is recommended that companies report a measure on contracts that have not been paid for more than 180 days. This will improve cross-company comparisons.
 - $$\frac{\text{(Outstanding receivables for written-off contracts during the period + Outstanding receivables >180 Consecutive Days Unpaid at end of period)}}{\text{Average outstanding receivables during the period}}$$
 - It should be noted that this is merely a tool to align write-offs across diverse company policies and that it will not be aligned with other KPI measures that draw from financial statements. In developing the PAYGo PERFORM KPIs, the decision was made to avoid the potential confusion and unwieldiness of a full set of parallel indicators. A large difference between the Write-off Ratio and Write-off Ratio 180 may indicate the need for further adjustments and analysis.
 - Note this is equivalent to Write-off Ratio + RAR180.
- **RAR30 + Write-off Ratio** – this is a complementary KPI (fully derived from two headline indicators) that more fully captures “total” credit risk. Since RAR30 is included, it will capture more of the “risky” portion of the current portfolio (from RAR30 to RAR180 to be precise) than Write-off Ratio 180.
 - This measure will allow for more consistent risk comparison across companies with differing write-off policies.
 - It is important to align the end point of the period of the Write-off Ratio with the timing of the RAR30 snapshot.
- **Restructured Receivables Ratio** – this optional KPI is suggested to separately track formally restructured receivables, given their inherently high risk. Since restructuring seems to occur infrequently, this measure has been excluded from the list of headline KPIs for the time being. However, it will be important to monitor restructuring over the medium term and consider formally adding this metric if it becomes a more common practice.
 - Defined as the outstanding receivables of restructured loans divided by the total outstanding receivables, as of one point in time.
 - » Contracts impacted by certain types of promotions and payment waivers should be included in the numerator as well. Promotions that do not require a payment to trigger access to the promotional benefits may mimic a restructured receivable and increase credit risk
 - This class of receivables appear as performing in RAR(CDU) and are not reflected in what would be an otherwise lower Collection Rate due to restructuring.

Unit and Firm Level KPIs: Measuring Profitability

THE UNIT AND FIRM LEVEL METRICS PROVIDE insights into profitability, the overarching measure of whether a company is prospering or not. A solid understanding of profitability is crucial to attracting the investment needed to help companies and the overall sector grow, and to achieving the energy access targets of development funders. In this situation a standardized set of metrics, as has been developed here, unpacks the components of sales revenue and expenses. It can be useful in numerous contexts, such as helping assess the ability of a company to service and repay its loans, identify where it is on its path to profitability, and understand potential for its business model to reach its customers at scale.

THE CHALLENGE OF REPORTING SALES REVENUE

The challenge of reporting sales revenue when customers are paying in installments is determining at what point to recognize that a sale has been made. There are many possibilities. For instance, a company can record a sale when the equipment has been delivered to the customer. A conservative approach would be to record the full sale only when the final payment has been received. In between, one could report sales in proportion to the payments received by the end of the accounting period. One can already see that reported sales revenue will vary greatly depending on the chosen policy.

Throughout the guide and particularly in the unit level and firm level KPIs there are multiple references to cash, cashflow, cash receipts. The key building blocks for these financial KPIs is cash receipts – namely the cash received from customers without deducting any cash outflows. We have chosen this term to avoid confusion with a generic usage of the term cashflow, which has a specific accounting meaning when used in financial

TABLE 2. Unit and Firm Level KPIs Overview

	KPI	What it Measures
2.1	Total Cash Receipts from PAYGo Customers	Cash Inflows [Component Metric]
2.2	Cost of Goods Sold Ratio ^a	Variable Cost [Component Metric]
2.3	Sales and Maintenance Cost Ratio ^a	Variable Cost [Component Metric]
2.4	Provision Expense Ratio ^a	Fixed Cost [Component Metric]
2.5	Total Contribution Margin ^a	Profitability [Compound Metric]
2.6	Financial Expense Ratio ^a	Fixed Cost [Component Metric]
2.7	Fixed Operating Cost Ratio ^a	Fixed Cost [Compound Metric]
2.8	Fixed Cost Ratio ^a	Fixed Cost [Component Metric]
2.9	Total EBT Margin ^a	Profitability [Compound Metric]
2.10	Unit Follow-on Payments	Cash Inflows [Component Metric]
2.11	Unit Customer Deposits	Cash Inflows [Component Metric]
2.12	Unit Cash Sales	Cash Inflows [Component Metric]
2.13	Unit Device Cost	Cash Outflows [Component Metric]
2.14	Unit Sales and Distribution Cost	Variable Cost [Component Metric]
2.15	Unit Servicing and Maintenance Cost	Variable Cost [Component Metric]
2.16	Unit Provision Cost	Fixed Cost [Component Metric]
2.17	Unit Contribution Margin	Profitability [Compound Metric]
2.18	Liquidity	Cash Buffer

a Cash Receipts

statements. However, as progress is made in harmonizing the accounting policies in the industry in the medium-term, it is likely that sales revenue will replace cash receipts. This is because cash on its own ignores accruals, and rarely matches the expenses and income over the full life of a multi-year transaction.

The Profitability KPIs fall into 3 groups. **Firm level** KPIs measure elements of profitability at the level of the financial statements. They represent performance that includes all the activities of the company. **Unit Economics** KPIs, by contrast, look only at variable costs and provide insights at a product level - for instance, the average device cost. This information would not normally be available on financial statements. Finally, a single measure of **Liquidity** is also included as useful in a sector with a high cash burn rate.

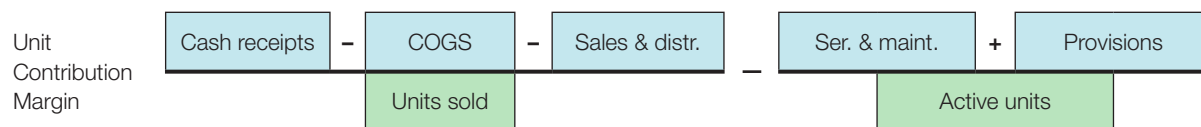
Within each group, individual metrics sum up to other compound metrics, just as individual lines in the Profit and Loss statement do. Margins are the sum of sales revenues, or in this case cash receipts minus certain categories of costs. Unit Contribution Margin both at the firm level and unit level is the sum of its component parts, each of which are informative.

Below is a quick visual guide on how to calculate all the profitability metrics, showing what appears above the line [numerator] and what is below the line [denominator]. It also shows how the metrics combine to generate compound metrics such as margins. Note Figure 3 for the calculation of Total Cash Receipts.

FIGURE 3. **How to Calculate Unit and Firm Level KPIs**

Firm level KPI	Numerator		Denominator	
Cost of Goods Sold Ratio ^a	COGS		Cash receipts	
Sales and Maintenance Cost Ratio ^a	Sales & distr.	+ Ser. & maint.		
Provision Expense Ratio ^a	Provisions			
Contribution Margin ^a	Cash receipts	- COGS		
	Ser. & maint.	- Provisions		
Financial Expense Ratio ^a	Financial			
Fixed Operating Cost Ratio ^a	Fixed operat.			
Fixed Cost Ratio ^a	Financial	+ Fixed operat.		
EBT Margin ^a	Cash receipts	- COGS		
	Sales & distr.	- Ser. & maint.		
	Provisions	- Financial		
	Fixed operat.			
Liquidity	Liquidity ^b		COGS	+
			Sales & distr.	+
			Ser. & maint.	+
			Provisions	+
			Financial	+
			Fixed operat.	+

Unit level KPI	Numerator	Denominator
Unit Follow-on Payments	Follow-on payments	PAYGo units
Unit Customer Deposits	Deposits	PAYGo units
Unit Cash Sales	Cash sales	Cash units
Unit Device Cost	COGS	Units sold
Unit Sales and Distribution Cost	Sales & distr.	Units sold
Unit Servicing and Maintenance Cost	Ser. & maint. ^b	Active units
Unit Provision Cost	Provisions	Active units



a Cash Flow
 b Adjusted for Effective Credit Period

2.1 Total Cash Receipts from PAYGo Customers

The total cash receipts received from PAYGo customers including customer deposits and follow-on payments



CALCULATION

The Sum of Customer Deposits and Follow-on Payments Received from All PAYGo Customers over a Period of Time



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- One month for internal purposes depending on cash reserves and risk of running out of cash. The higher the risk the shorter the period with daily monitoring possible in extreme situations

Frequency

- Annually for external users
- Monthly for internal purposes though many companies will generally monitor cash at a finer level of detail



RELATED KPIs

When combined with cash receipts from cash sales and deposits, Total Cash Receipts from PAYGo Customers represent the total cash receipts into the company from sales.



USE OF METRIC

- This metric counts only the cash received from customers and is not net of other cash inflows and outflows such as funding and purchases of fixed assets.
- Cash receipts are a metric of primary importance in any business. Ultimately all flows in and out of the business are manifested in a change in cash. However, the timing of payments and receipts vary greatly. In PAYGo solar companies where investment in building a customer portfolio and organization is particularly large, requiring large amounts of equity and borrowing, all parties are sensitive to how much of the investment is coming back into the business in repayments, and whether this money is sufficient for current expenses, together with other cash reserves.

2.1 Total Cash Receipts from PAYGo Customers (continued)



NOTES

- If a company reports PAYGo sales and cash sales, it is sensible to combine the receipts from cash sales to capture all the cash received.
- Cash receipts in this context will be directly impacted by the number of customers, the term of the repayment and the absolute size of each installment.
- Low cash receipts will constrain the growth of the company and repayment of loans and may trigger a need to raise funds.
- High cash receipts enable early repayment of loans and dividends, and further expansion through reinvestment.
- Insufficient cash in the absence of fund raising will result in insolvency.



ILLUSTRATION

Same customers, same equipment, different cash flows

	Company A	Company B
Number of customers	1,000	1,000
Term of repayment	12 months	24 months
Repayment/month	10	6
Cash received/month	10,000	6,000
Total cash received	120,000	144,000

2.2 Cost of Goods Sold Ratio (Cash Receipts)

Total cost of goods sold expressed as a proportion of cash receipts received from customers

CALCULATION

$$\frac{\text{Cost of Goods Sold}}{\text{Total Cash Receipts from Customers}}$$

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs

RELATED KPIS

This is a classic variable cost as all equipment sold must be first sourced.

ILLUSTRATION

Company A and Company B have similar scale and staff numbers, but Company B has negotiated a better deal with its supplier.

	Company A	Company B
Cash Receipts	100	100
S&M Costs	(20)	(20)
COGS	(60)	(50)
Other Costs	(10)	(10)
EBIT	10	20

In this example despite having the same levels of sales, Company B has a higher margin than A based on a lower COGS. As a result, Company B has a larger buffer to cover other costs and achieve a profit.

USE OF METRIC

Within the PAYGo solar sector there are key categories of costs to be covered by the sales revenue received from customers. These are the costs of goods, the costs of borrowing money, the costs of sales and operations, and the costs of credit losses suffered. COGS is the category which captures the input cost of acquiring (or manufacturing) the equipment for sale and is typically the largest component of variable and semi-variable costs.

NOTES

- The denominator is formulated as cash receipts from all customers, including both PAYGo and cash customer receipts.
- The tendency if costs of goods are high is to push up prices to maintain margins. This may result in reduced market share, higher risk of nonpayment and the subsequent lower access achieved would be less attractive to governments and development funders.
- Increased scale and therefore larger order sizes from OEMs can reduce relative COGS by achieving a lower price per unit of stock bought. This is a key tactic for improving profitability.
- While there would be value in understanding the PAYGo-specific picture in this KPI and other expense ratios, it is not feasible for companies to split institutional expenses (e.g., Cost of Goods Sold) into PAYGo and cash customers, and expenses appear together in one line item in financial statements for both sales models.
- The calculation using cash receipts generally lowers the metric relative to the calculation using sales revenues.

2.3 Sales and Maintenance Cost Ratio (Cash Receipts)

Sales and Maintenance cost as a proportion of the total cash receipts from customers

CALCULATION

$$\frac{\begin{aligned} &\text{Sales and Distribution Cost} \\ &+ \text{Servicing and Maintenance Cost} \\ &+ \text{Other Variable and Semi-variable Costs} \end{aligned}}{\text{Cash Receipts from Customers}}$$

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs

RELATED KPIs

- As a metric made up of variable and semi-variable costs the KPI will rise and fall in relation to sales.
- As seen from Figure 3, this metric forms part of the calculation of Contribution Margin.

USE OF METRIC

This metric is significant because it captures major costs of businesses in the PAYGo solar industry, which is not only employing technology, but also substantial labor due to the need to engage with last-mile distribution face-to-face. Multiple factors determine the maintenance cost besides the product itself, including the warranty duration and the cost control strategies (e.g., minimum number of customers needed to provide maintenance depending on their distribution).

NOTES

- The long-term goal of the sector to achieve economies of scale for long term profitability can only be achieved if there is a relative decrease in sales and maintenance cost. Hence its importance to investors and donors.
- The product mix will greatly affect this metric. Larger solar systems requiring installation will have a relatively higher sales and maintenance cost, and a higher price to cover this.
- In a high volume, low price business a high sales and maintenance cost

suggests that a company is not achieving the benefits of scale and that each individual sale has a high cost to bring it into the portfolio. Without a long-term strategy to reduce sales and maintenance costs it is unlikely a company will achieve break-even or profitability.

- In contrast a low sales and maintenance cost is a key indicator of an efficient business model.
- The calculation using cash receipts generally lowers the metric relative to the calculation using sales revenues.

ILLUSTRATION

Same S&M cost, different product

	Small Systems	Big Systems
Number of sales	10,000	2,000
Unit Value	100	500
Sales Revenue	1,000,000	1,000,000
Distribution Cost	100,000	50,000
Sales Support	100,000	100,000
Installation	0	50,000
Total S&M	200,000	200,000

2.4 Provision Expense Ratio (Cash Receipts)

Loan loss provisioning expenses as a proportion of the total cash receipts from customers



CALCULATION

$$\frac{\text{Provisioning Expenses}}{\text{Cash Receipts from Customers}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

This metric is highly relevant to considerations of portfolio quality and should be read in conjunction with them.



USE OF METRIC

- This KPI captures the expense related to changes in the loan loss reserve that companies expense due to expected credit losses from doubtful receivables.
- A provision expense and the accompanying reserve on the balance sheet

is an opportunity for smoothing income and avoiding negative surprises for investors and donors when losses are seasonally high.

- The quality of the portfolio and effectiveness of collections will be partially captured by how low this metric is relative to sales.



NOTES

- Currently, some companies provision according to a policy directly based on portfolio quality, while for others it is a general estimation based on a percentage of receivables generated and rough estimates of historical performance. Some companies have a loan loss reserve on the balance sheet (deducted from the gross outstanding receivables) with an expense on the income statement, while others display a net sales revenue on the income statement which is the result of gross sales revenue minus the provisioning expense.
- Provision Expense Ratio shows high variability due to the different approaches to provisioning and risk appetites of companies.

- This KPI measures the extent to which the existing loan loss reserve was insufficient at the beginning of the year to cover growth in the portfolio and the potential credit loss that arose during the current year, rather than a direct measure of the portfolio quality status.
- Generally, a high provision expense would be considered negatively, unless the company can clearly show that this is part of a high margin pricing strategy and that the collections success ratios are consistent.
- A low provision expense may also have potential negatives implications in the situation where a company may be too conservative in its credit policies and leave potential business on the table.

2.4 Provision Expense Ratio (Cash Receipts) (continued)



NOTES

- More straightforwardly, a low provision expense may reflect that a company is underestimating its losses or unable to calculate them correctly. This is why it should be assessed over time to see the trends.
- When considering high Provision Expense Ratios, the age of the company should be considered. Younger or smaller companies may not have had time to track and provision for losses.
- The calculation using cash receipts generally lowers the metric relative to the calculation using sales revenue.



ILLUSTRATION

General provision smooths impact of losses

With Provision

Year	1	2	3	4	5	Total
Sales Revenue	100	100	100	100	100	500
Provision 1%	1	1	1	1	1	5
Actual Losses	0.5	0.5	2.0	0.5	1.5	5
Cumulative	0.5	1.0	0.0	0.5	0.0	0.0
P&L Impact	1	1	1	1	1	5

Without Provision

Year	1	2	3	4	5	Total
Sales Revenue	100	100	100	100	100	500
Actual Losses	0.5	0.5	2.0	0.5	1.5	5
P&L Impact	0.5	0.5	2.0	0.5	1.5	5

Investors generally prefer a management that shows insight and uses provisions to smooth the impact of losses.

2.5 Total Contribution Margin (Cash Receipts)

The total profit based on variable costs for the PAYGo solar firm as a proportion of the total cash receipts from customers



CALCULATION

$$\frac{\text{Cash Receipts from Customers} - \text{Total Variable and Semi-variable Costs}}{\text{Cash Receipts from Customers}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- One month for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

- Contribution Margin is a composite metric derived from variable costs (see [Provision Expense Ratio](#), [Total Contribution Margin](#), and [Financial Expense Ratio](#)). Change in variable costs will track directly to changes in Contribution Margin.
- For PAYGo solar companies, and particularly young companies, the Contribution Margin is looked at in combination with fixed costs (see [Financial Expense Ratio](#)). It is critical that fixed costs are covered by the Contribution Margin over time i.e., that as the business scales the Contribution Margin is sufficient to cover fixed costs (see illustration below).



USE OF METRIC

Sales revenue or its proxy cash receipts must be sufficient to cover all the costs of a company and still have enough margin left over for distribution to shareholders or reinvestment. Therefore, it is a primary metric for assessing if a company is profitable.



NOTES

- This metric may also be called the 'Gross Margin' and it shows how much sales revenue net of variable costs can cover fixed costs, interest payments and what is available to distribute to investors, or to retain for growth.
- The calculation using cash receipts generally lowers the metric relative to the calculation using sales revenue, which is recommended for adoption as soon as sales revenue recognition harmonization will allow.
- A high Contribution Margin is generally regarded positively. However, depending on the profile of customers a high selling price may raise concerns as it may indicate limited potential to expand to low-income customers.
- A low margin leaves little room for maneuver in the event of unexpected costs, or to invest in infrastructure to grow the business.







2.5 Total Contribution Margin (Cash Receipts) (continued)

ILLUSTRATION

Contribution Margin and sustainability

Sales need to cover costs through the margins they generate. An early-stage company can be an exception as long as it has identified a path to profitability that is satisfactory to investors.

A company with persistently higher costs than are covered by the Contribution Margin is not sustainable. In the following graphic HQ costs are used as a proxy for all fixed costs.

	Sales	Costs	
Early stage			Fixable
Imbalanced			Unsustainable
Ideal			Sustainable

Each company has a similar contribution margin, but differences in sales and costs have implications for their sustainability.

2.6 Financial Expense Ratio (Cash Receipts)

Financial expenses as a proportion of the total cash receipts from customers



CALCULATION

$$\frac{\text{Financial Expense}}{\text{Cash Receipts from Customers}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

As seen from [Figure 3](#), this metric forms part of the calculation of the [Fixed Cost Ratio](#).



USE OF METRIC

The KPI gives an idea of whether funding is maintained at affordable terms. The PAYGo business model involves high short-term cash outflows of equipment purchases and operating costs, balanced by medium-term cash inflows from repayments. The need for short-term cash is met from a combination of equity and debt, and proportionately more debt than other non-PAYGo companies of similar sales volumes. This metric is key to tracking the relative cost of debt.



NOTES

- This KPI measures financing incurring measurable costs, i.e., loans. It will not capture the cost of equity.
- This is another cost category that benefits from scale and profitability. Interest rates are higher for SMEs who have a perceived higher risk. A stable larger company with a good track record will borrow money at a lower cost.
- Grant funding can help reduce leverage and therefore financial expense in the early stages of a PAYGo solar company.
- A high finance expense ratio will be driven by both the leverage of the company and the cost of debt.
- If the company has high levels of debt relative to equity, it will pay more interest than a similar company with lower leverage.
- If a company is in a high interest rate environment, even low levels of debt will result in high levels of finance interest expense.
- The calculation using cash receipts generally results in worse performance than the calculation using sales revenue.

2.7 Fixed Operating Cost Ratio (Cash Receipts)

Other fixed costs expressed as a percentage of cash receipts



CALCULATION

$$\frac{\text{Other Fixed costs}}{\text{Cash Receipts from Customers}}$$


RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

As seen from Figure 3, this metric forms part of the calculation of the [Fixed Cost Ratio](#).



USE OF METRIC

This KPI seeks to cover all operating expenses which are not variable or semi-variable, excluding financial expenses.



NOTES

- The calculation using cash receipts generally results in worse performance than the calculation using sales revenue.
- Costs in this category are the key reason why early-stage PAYGo solar companies are not profitable. The low volume of sales as the business establishes itself in the market are insufficient to cover these expenses. Investors and donors will pay close attention to how quickly this situation changes as any debt servicing and ultimately dividend distribution depends on fixed costs being well covered.
- Persistent high fixed costs could indicate fundamental problems with the company structure such as a management team that is too large or too expensive, or HQ costs that are out of proportion to the real scale of the business.
- A marketing campaign that did not result in increased sales revenue would be manifested in a high Fixed Operating Cost Ratio.

2.8 Fixed Cost Ratio (Cash Receipts)

All Fixed costs as a proportion of the total cash receipts from customers.



CALCULATION

$$\frac{\text{Financial Expense} + \text{Other Fixed Costs}}{\text{Cash Receipts from Customers}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

- By nature of being fixed, the costs in this category do not track other costs.
- This metric forms part of the calculation of EBT Margin.



USE OF METRIC

This indicator represents the impact of fixed costs on cash receipts, an important factor to analyze the cost structure and the effect of economies of scale on sustainability.



NOTES

- Costs in this category are a key reason why early-stage companies in the PAYGo solar industry are not profitable. The low volume of sales as the business establishes itself in the market is usually insufficient to cover these expenses. Investors and donors will pay close attention to how quickly this situation changes as any debt servicing and ultimately dividend distribution depends on fixed costs being well covered.
- High fixed costs are indicative of a capital-intensive business or could indicate a startup phase. To cover high fixed costs a business needs

high margins or scaling to bring down the relative impact of fixed costs.

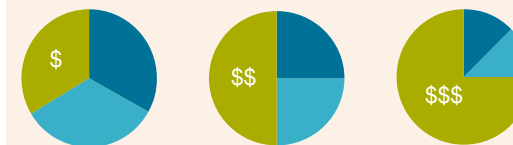
- Persistent high fixed costs could indicate fundamental problems with the company structure such as a management team that is too large or too expensive, or HQ costs that are out of proportion to the size of the business.
- A marketing campaign that did not result in increased sales revenue would manifest in a higher fixed operating cost ratio.



ILLUSTRATION

Fixed costs graphic

- Sales
- HQ - Infrastructure
- HQ - People



How scale works to lower the impact of fixed costs

2.9 Total EBT Margin (Cash Receipts)

The total profit after taking into account all costs (variable and fixed) for the PAYGo solar firm as a proportion of the total cash receipts from customers



CALCULATION

$$\frac{\text{Cash Receipts from Customers} - \text{Total Costs}}{\text{Cash Receipts from Customers}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- From one month for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

This metric is a compound metric and the net of cash less COGS and all fixed and variable costs. As such it will be directly affected by all fluctuations in its component parts.

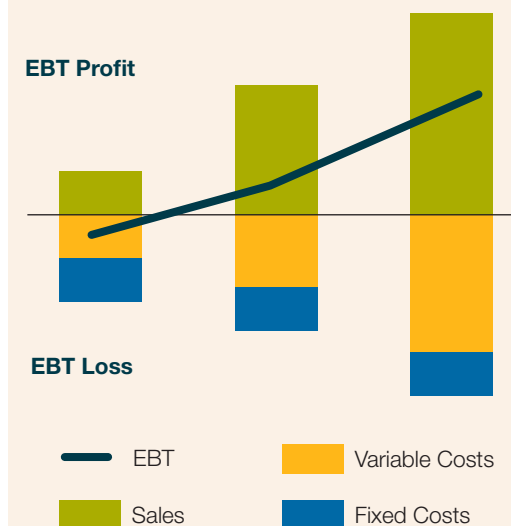


ILLUSTRATION

Progression toward EBT profitability

The combination of low sales revenue, variable costs and relatively high fixed costs pushes early stage PAYGo solar companies into loss.

As sales grow and fixed costs do not increase at the same rate, the company reaches profitability.



USE OF METRIC

Shows earnings generated from core operations including fixed costs, and therefore what is available for tax and reinvestment or dividend.



NOTES

- EBT Margin (cash receipts) is likely currently negative for the majority of PAYGo solar companies. This may be largely explained by the young age of companies and the ongoing progress toward achieving economies of scale (medium scale firms display significantly better results than small scale firms).
- High EBT Margin will be driven by high cash receipts or low costs. While low costs will be broadly welcomed by stakeholders as the mark of efficiency, high cash receipts from customers may also indicate that prices are high, which might raise concerns about opportunities for scaling.
- The calculation using cash receipts generally lowers the metric relative to the calculation using sales revenue, which is recommended for adoption as soon as sales revenue recognition harmonization will allow.

2.10 Unit Follow-on Payments

Average contractual follow-on payments until system is permanently unlocked, net of customer deposits, per unit sold PAYGo



CALCULATION

$$\frac{\text{Receivables Generated During the Period}}{\text{Number of PAYGo Units Sold During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

[Unit Customer Deposits](#) and [Unit Follow-on Payments](#) should be considered together as they represent the total cash receipts from a PAYGo customer.



ILLUSTRATION

The impact of deposits

Even for the same product the level of deposit will be a major influence on Unit Follow-on Payments

Unit Cost is \$60, Unit Repayments are \$120

Scenario	A	B
Deposit amount	\$30 (25%)	\$6 (5%)
Follow-on payments	\$90	\$114



USE OF METRIC

This metric shows the potential future cash receipts of the company. It is particularly important for a business model that borrows upfront against a promise of future cash receipts from the contractual repayments of customers.



NOTES

- The calculation is based on receivables generated and not collected. Unless there is 100% repayment there will be a difference between receivables generated and collected, and this gap has its own importance.
- Unit Follow-on Payments measure the future cash receipts from a unit. The key influencer on the level of future payments is the level of deposit taken in the first instance. If a deposit is high, then proportionately more money is received upfront and less in the future. Conversely a low deposit will push the unit follow-on metric higher. To understand the metric the priorities of management will need to be understood. Low deposits could be justified by the need for rapid customer acquisition, lower priority of cash recovery or alternatively, it may indicate the company's assessment that credit risk is low or that credit risk has been assessed in another manner (e.g., by credit scoring).
- Conversely low Unit Follow-on Payments imply a high deposit which may be a response to high credit risk or a need to more rapidly recover cash.
- If a PAYGo solar company is growing fast as would be expected in the markets of Sub-Saharan Africa, the Unit Follow-on Payments should also be growing as more customers at the start of their payment terms are added to dilute those approaching the end of term.
- The relative size of the Unit Customer Deposits with respect to the Unit Follow-on Payments is one of the pricing and underwriting decisions to be taken by management.
- In the development of these KPIs the decision to use actual receivables rather than present value of receivables was taken both to avoid debate about the discount rate to be used and to simplify the metrics for smaller and new entrant companies.

2.11 Unit Customer Deposits

Average customer deposits received per unit sold PAYGo



CALCULATION

Customer Deposits
Number of PAYGo Units
Sold During the Period



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

- The cash receipts from deposits will impact liquidity, representing probably the largest inflow of cash from a customer during the repayment period.
- The higher the relative contribution of deposits the lower the average Unit Follow-on Payments. This KPI is suggested to be complemented by [Unit Follow-on Payments](#) to complete the picture of cash receipts from the PAYGo sales model.
- Considering this in combination with [RAR\(CDU\)](#) and [RAR\(CR\)](#) helps to identify and better understand different customer profiles.



USE OF METRIC

- Customer deposits have two functions in a PAYGo solar business model. The first is to immediately receive a part of the sales revenue proceeds in cash. The second is to act as a proxy for in-depth credit screening in the absence of reliable credit scoring methodologies.
- Knowing the Unit Customer Deposits acts as a guide and benchmark to the sales revenue, cash, and underwriting approach of a company.



NOTES

- Companies adopt different strategies in seeking the balance between maintaining a level low enough to be accessible to customers but high enough to screen out lower creditworthiness likelihoods.
- A high deposit will recover cash more quickly but may adversely impact customer acquisition.
- A low deposit may run the risk of the rapid acquisition of customers who can afford the deposit but not the full cost of the system, resulting in a poor overall payment performance.
- In the pilot supporting this Technical Guide the Unit Customer Deposits value represents less than 10% of the average Unit Follow-on Payments in the same period but it is still 27% of the average monthly GNI per capita in Kenya for instance.
- The need for low-income customers to gather the initial deposit is often reported as the main reason for sales to require time and several follow-ups. Firms with large outreach display, on average, a lower Unit Customer Deposits value and a higher RAR30 than firms with small and medium outreach.

2.12 Unit Cash Sales

Average cash receipts from cash sales per unit sold for cash



CALCULATION

$$\frac{\text{Cash Receipts from Cash Customers During the Period}}{\text{Number of Units Sold Cash During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIs

A building block in the [Unit Contribution Margin](#) for companies with different payment models.



USE OF METRIC

This KPI, along with deposits and follow-on payments, completes the sales revenue picture of companies with different payment models.



ILLUSTRATION

Cash receipts elements

Cash Receipts from cash sales are needed to complete the picture of total cash inflows



NOTES

- High levels of cash sales suggest a higher purchasing power of a target market.
- High cash sales may also suggest that the customer base has a negative perception of the total financed cost versus a single payment.
- On the other hand, high cash sales can indicate lower risk and lower cost source of funds that can be used for working capital or other needs vs. a fully PAYGo-based business.
- Companies with high credit sales may start to deprioritize cash sales in order to focus on higher margin credit and to simplify sales procedures.

2.13 Unit Device Cost

Average cost of the device inclusive of hardware, transportation to the warehouse, import taxes and duties, and stock insurance per unit sold



CALCULATION

$$\frac{\text{Cost of Goods Sold}}{\text{Number of Units Sold During the Period}}$$


RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Quarterly to yearly depending on systems reporting capacity

Frequency

- Quarterly to yearly



RELATED KPIS

Both this metric and Contribution Margin are calculated with COGS



USE OF METRIC

This metric is an important benchmark with other firms. Given the increasing standardization amongst OEMs, Unit Device cost can provide an insight into order size and procurement effectiveness, and the targeting of the company which may choose to prioritize lower priced devices sold in higher volumes.



NOTES

- Device Cost on Unit Follow-on Payments appears to be smaller in firms selling mainly small size products, than in firms selling mainly large and medium size products, possibly reflecting the lower payment capacity of customers buying small size products, or a higher implied interest rate (the contractual credit period is not shorter in small product size firms than in medium and large product size firms).
- A high Unit Device Cost puts pressure on the Contribution Margin and the sustainability of the business model. A key element of the drive to scale is to achieve order quantities that will reduce Unit Device Costs.



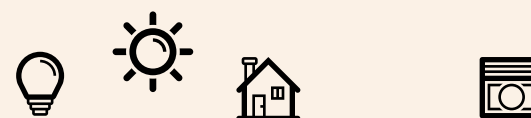
ILLUSTRATION

Unit device cost vs. blended device cost

The following example shows the benefit of understanding device cost at a unit level.

In Example 1, expensive SHS units skew the blended cost to a higher unit metric.

In Example 2, the opposite is true with higher numbers of lower cost lanterns. A product specific unit cost is much more informative in both cases.



	Solar Lantern	Solar Home System	Top Up Loan
Unit Device Cost	\$10	\$300	\$50
Example 1: Blended Unit Device Cost \$259 - Not Useful			
No. of Units	10	85	5
Example 2: Blended Unit Device Cost \$41 - Not Useful			
No. of Units	85	10	5

2.14 Unit Sales and Distribution Cost

Average cost of installing the device at the customer site and transportation from warehouse to customer per unit sold



CALCULATION

$$\frac{\text{Sales and Distribution Cost}}{\text{Number of Units Sold During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIs

There is a clear relationship with [Servicing and Maintenance Cost](#) as both are mainly driven by the number of sales completed. At the firm level both are combined in [Sales and Maintenance Cost](#).



USE OF METRIC

For this unit-level indicator there is a trade-off between usefulness for management purposes to see Sales and Distribution Cost separate from Servicing and Maintenance Cost, and the complexity of separating the two costs in some cases. As the two areas will often be separately managed within an organization, tracking costs separately is therefore relevant.



ILLUSTRATION

Factors in sales and distribution costs



	Shops	Salaried Sales	Commissioned Agents
Pluses	Known location Hold stock	Mobile	Commission only
Minuses	Fixed rent	Transport costs	Motivation and management



NOTES

- Unit Sales and Distribution Cost is the second largest unitary cost after Unit Device Cost and therefore a key focus for management and funders.
- A high Sales and Distribution Cost may be incompatible with a high volume, low margin business, which is characteristic of high volume consumer electronics. There is a common intention to have a low touch sales and distribution model to minimize this expense.

2.15 Unit Servicing and Maintenance Cost

Average cost of servicing a customer (collection of payments, customer service) and providing maintenance per active unit



CALCULATION

$$\frac{\text{Servicing and Maintenance Cost Expressed as Monthly Equivalent} \times \text{Effective Credit Period Expressed in Months}}{\text{Average Active Units}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

There is a clear relationship with [Sales and Distribution Cost](#) as both are mainly driven by the number of sales completed. At the firm level, both are combined in Sales and Maintenance Cost.



USE OF METRIC

For this unit-level indicator there is a trade-off between usefulness for management purposes to see Sales and Distribution Cost separate from Servicing and Maintenance Cost, and the complexity of separating the two costs in some cases. As the two areas will often be separately managed within an organization, tracking costs separately is therefore relevant.



NOTES

- Unit Servicing and Maintenance Cost is on average at a significantly lower level than the Unit Sales and Distribution Cost. However, it is important to remember the difficulty in allocating costs of mixed nature to the two categories of sales and distribution on one side, and servicing and maintenance on the other side.
- High Service and Maintenance Costs may indicate a number of issues with the business beyond inefficiency in the delivery of the service.
- Poor quality equipment requires more maintenance and will push up this expense.
- Customers who do not understand the equipment prior to purchase will require more support subsequently.
- If the business accepts customers with poor capacity to pay (i.e., low credit quality) this will result in slower payment or nonpayment and a greater burden on the operations.



ILLUSTRATION

Service and maintenance cost dependent on unit size



Customer Support

Large Systems
Small Systems



Warranty Service

Large Systems
Small Systems



Installation

Large Systems
Small Systems

2.16 Unit Provision Cost

Average loan loss provisioning cost per active unit



CALCULATION

$$\frac{\text{Provisioning Expenses}}{\text{Average Active Units}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs



RELATED KPIs

Used in combination with portfolio quality KPIs to describe the cost and effectiveness of credit operations in a company



USE OF METRIC

This metric allows a view of provision cost per unit which is useful for benchmarking between products and companies.



ILLUSTRATION

Unit Provision Cost – look deeper

	Small System	Large System
Unit Device Cost	\$100	\$500
Strategy	High Margin/High Losses	Low Margin/Low Losses
Margin	40%	10%
Write-offs	5%	1%
Unit Provision Cost	\$5	\$5



NOTES

- Like the Provision Expense Ratio (Cash Receipts), this KPI depends on how conservative the provision policy of each firm is.
- Provision Expense is good example of a metric that needs context and knowledge of the company's credit policy to reach the right conclusions. While generally a high provision expense would be considered negatively, a company could be pursuing a high margin pricing strategy where it accepts and prices in a higher degree of risk and has a robust and active collections approach to support this policy.
- Similarly, a low provision expense may have negative implications if it results from an overly conservative credit policy accepting only the very best credits. This approach can leave potential business on the table where a higher level of loss well managed would deliver more returns. More straightforwardly, a low provision expense may indicate that a company is underestimating its losses or unable to calculate them correctly.
- When considering high provision expense ratios, the age of the company should be considered. Younger or smaller companies may not have had time to track and provision for losses.

2.17 Unit Contribution Margin

Average margin after variable and semi-variable costs per unit

CALCULATION

$$\left[(\text{Unit Customer Deposits} + \text{Unit Follow-on Payments}) \times \frac{\text{Number of Units Sold PAYGo}}{\text{Total Number of Units Sold}} \right] + \left(\text{Unit Cash Sales} \times \frac{\text{Number of Units Sold Cash}}{\text{Total Number of Units Sold}} \right)$$

– Unit Device Cost – Unit Sales and Distribution Cost – Unit Servicing and Maintenance Cost – Unit Provision Cost

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- Quarterly for internal purposes

Frequency

- Annually for external users
- For internal purposes monthly/quarterly/annually dependent on resources and needs

USE OF METRIC

Unit Contribution Margin is a key revenue metric which allows management and investors to assess either how much each additional unit contributes to profitability or, at a product level, which products are successful, and which are not.

RELATED KPIS

Unit Contribution Margin is a compound metric built up from the other unit level metrics as per Figure 3.

NOTES

- This metric does not include fixed costs.
- To be used at a product level would require breakdown of all component costs by product.
- While cash receipts can be negative for timing reasons, the pilot seemed to suggest that scale plays a large role in whether this metric is positive or negative. For instance, medium-scale firms in our pilot tended to display positive Unit Contribution Margins whereas smaller firms tended to be negative on this measure. Similarly, firms selling mainly large and medium size products tended to display a positive Unit Contribution Margin (UCM), while firms selling mainly small size products tended to show negative Unit Contribution Margins. This may be due to the underlying differences in cash receipts and costs for companies selling smaller or larger equipment.
- A positive UCM is a key indicator that the product line is viable.
- When assessing a negative UCM the analyst should be aware of what stage in the lifecycle the product is. If it is early, a negative UCM may be permissible as long as it is trending in the right direction. A sustained negative UCM would need detailed justification by management.

2.18 Liquidity

Liquidity (90 days) as a proportion of total costs in a quarter



CALCULATION

$$\frac{\text{Cash and Liquid Assets Convertible to Cash in the Next 90 Days at End of Period}}{\text{Total Costs Over the Next 90 Days}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement

- Full year for external users
- From daily for internal purposes

Frequency

- Annually for external users
- For internal purposes daily, monthly/quarterly/annually dependent on resources and needs



RELATED KPIS

This metric is a descriptor of the readiness to meet future expenses and purchases. It should be interpreted with reference to forecasts and validated according to past performance.



USE OF METRIC

- This metric shows how much liquid funding is available to the company. If the company is growing rapidly, it should have sufficient liquidity to purchase inventory stock and pay operating expenses up to and prudently slightly beyond the next inflow of borrowed or invested funds.
- A ratio with a result of 1 would mean that the company has liquidity to cover 3 months of costs. The reality of the operating environment is of course that sales revenue would be coming in during this timeframe as well, such that this KPI is meant as more of a worst-case scenario approximation.



NOTES

- The fundamental challenge for PAYGo solar companies when it comes to liquidity is that stock purchases happen in bulk at the start of the sales process while repayments from customers are spread over the repayment terms of up to 36 months. Careful management of cash is therefore required.
- A key role of management is to raise funding in a timely manner. As funding rounds can take up to a year between first approach and final disbursement, planning liquidity is essential to avoid losing growth momentum, or 'grounding' the company which would pose a severe reputation risk.
- Low levels of liquidity will severely constrain a company's expansion and may indicate potential insolvency risks.
- High liquidity while superficially a 'good' thing should provoke consideration of early repayment of debt or accelerated sales drive to speed up company scaling.



ILLUSTRATION

The liquidity challenge for PAYGo solar companies is the timing difference between acquiring and paying for stock, versus the more drawn-out receipt of repayments from customers. The following example shows how even with positive and growing sales, the need to buy stock in advance can cause the company to run out of money.

The challenge of liquidity: Fast stock, slow sales

Month	Stock (\$)	Sales (\$)	Cash
1	100	30	(70)
2	-	30	(40)
3	-	30	(10)
4	100	60	(50)
5	-	30	(20)
6	-	30	10
7	100	60	(30)
8	-	30	0
9	-	30	30
10	-	30	60
Total	300	360	60

Company and Operational Indicators: Contextualizing Companies and Tracking Operations

THIS GROUP OF METRICS IS MADE UP OF TWO distinct categories: **Company** and **Operational Indicators**.

Company Indicators were inspired by some of the current metrics that are tracked to inform the Global Off-Grid Solar Market Report and generate a profile of a business and its products.⁸ The basic sales metrics that comprise this category of indicators tell the main story of a company's sales performance and provide meaningful context for the rest of the PAYGo PERFORM KPIs. As such, they can help investors and other stakeholders to make sense of a company's business model and infer its financing needs. Operational Indicators cover a company's operational performance, which contributes to financial performance in the long run and should therefore also be tracked alongside the Company Indicators. Operational Indicators contribute to a fuller understanding of a company's performance and can be used to make operational improvements.

Both sets of indicators are relevant when assessing the performance of a company, comparing companies or analyzing sector trends. Importantly, they can provide the basis for categorizing companies into peer groups and comparing their performance using other metrics. Such categorization makes it possible to benchmark performance against peers and to measure performance against internal milestones. Benchmarking can reveal whether a company's actions are helping to improve its results and achieve its goals. This will assist business leaders or stakeholders in making projections, taking corrective actions if necessary, and guiding the organization toward growth and profitability.

The Company Indicators and Operational Indicators contain only a few basic indicators. Due to the diversity of business models in the PAYGo solar industry,

it proved challenging to provide more tailored KPIs for now. The headline KPIs should typically be calculated at least once per one-year period of evaluation, though major business model and sales strategy changes may necessitate more frequent reporting. Companies, investors, and other stakeholders are encouraged to track the indicators more often or within different periods to keep a closer eye on their business. Tracking additional indicators specific to a region, business model, product or company can shed additional light on potential causes for meaningful change in any one metric.

TABLE 3. **Company and Operational Indicators overview**

KPI	Grouping	What it Measures
3.1 Sales Model	Company Indicator	Business Model & Context
3.2 Sales Distribution Model	Company Indicator	Business Model & Context
3.3 Country Sales	Company Indicator	Sales Performance
3.4 Total Net Sales	Company Indicator	Sales Performance
3.5 Repeat Sales	Company Indicator	Sales Performance & Consumer Satisfaction
3.6 Product Sales	Company Indicator	Sales Performance
3.7 Average Selling Price	Operational KPI	Business Model & Context
3.8 Sales per Distribution Channel	Operational KPI	Sales & Distribution Performance
3.9 Sales Point Rate	Operational KPI	Sales & Distribution Performance
3.10 Net Promoter Score® (NPS)	Operational KPI	Consumer Satisfaction & Loyalty

⁸ See <https://www.gogla.org/global-off-grid-solar-market-report>

3.1 Sales Model

Percentage of sales revenue (0 – 100%) by sales model: PAYGo and Cash

- **PAYGo sales:** Sales whereby a customer pays for the product in installments over time or pays for use of the product as a service. This includes products sold by distributed energy service companies (DESCOs), as well as those sold as lease-to-own.
- **Cash sales:** Sales whereby a customer pays before or upon receipt of the product in a single transaction.



CALCULATION

$$\frac{\text{Sales Revenue Generated per Individual Sales Model During the Period}}{\text{Total Sales Revenue During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

- It is important to look at portfolio quality metrics in case a company predominantly sells through a PAYGo model. This will help describe how the company goes about translating PAYGo sales to cash receipts.
- The metric is also relevant to considerations of unit economics and should be read in conjunction with them e.g., other costs should be considered for PAYGo sales, [Total Contribution Margin](#) might differ, etc. Note that Unit and Firm Level KPIs use cash receipts instead of sales revenue when comparing these metrics.



USE OF METRIC

It promotes understanding of a company's business model and related financing needs.



NOTES

- Given that this KPI utilizes sales revenue, it is impacted by the different revenue recognition approaches of companies.
- For example, a company with a conservative revenue recognition policy may appear to have lower percentage sales revenue through the PAYGo sales model than a company with a more aggressive revenue recognition policy.
- Companies are therefore advised to outline their revenue recognition policies when reporting this metric.



ILLUSTRATION

Company A and B are two Kenyan companies and only sell solar lanterns. The Sales Model for both companies is as follows:

Company	A	B
PAYGo Sales	90%	30%
Cash Sales	10%	70%

For Company A, it may take more than three years to fully convert its

product inventory into cash receipts as they predominantly sell services and/or products to customers through a pre-paid model and

provide the necessary financing.

Company B sells most of its products through a cash model and receives most payment directly upon sale of its product.

The time it takes for Company A to recover unit costs and convert PAYGo product inventory into cash receipts is therefore likely to be higher. Company A may therefore tend to have a higher financing need and demand for more frequent capital injections to fund its inventory.

3.2 Sales Distribution Model

Percentage of sales revenue (0 – 100%) by sales distribution model, either B2B, B2C or Other:

- B2C (Business-to-Consumer) Model: a B2C sale is defined as any product and/or service that is sold directly to the consumer.
- B2B (Business-to-Business) Model: a B2B sale is defined as any product and/or service that is sold directly to a business, typically OGS distributors.
- Other: sales considered under the “other” business model are sales that are not directly sold to the consumer or another business. Sales that are typically considered here include sales to NGOs, institutional sales and Business-to-Government (B2G) sales.



CALCULATION

Sales Revenue Generated by Individual Sales Distribution Model During the Period

Total Sales Revenue During the Period



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – a year in the absence of major business model and sales strategy changes, more frequently otherwise.



RELATED KPIS

- The Sales Distribution Model and [Sales Model](#) will give the user an understanding of the sales business model.
- The metric is highly relevant to considerations of unit economics and should be read in conjunction with them, for example unit costs for B2B market can be more expensive than the B2C market as a B2B transaction often takes more consideration, requires more decision-makers, etc.



USE OF METRIC

- Provides context on how companies reach their customers
- The nature and level of sales revenue and costs for both primary business models categories typically differ, which affects the level of financing required. This metric can therefore contribute to the understanding of a company’s financing needs.



NOTES

- Companies with a B2C business model typically distribute OGS products and companies with a B2B model typically manufacture OGS products. For clarity, it is advised for companies to state what type of company they are when reporting externally: distributor, manufacturer or vertically integrated.
- Given that this KPI utilizes sales revenue, it is impacted by the different revenue recognition approaches of companies.

For example, a vertically integrated company that primarily sells B2B sales under a cash model and B2C sales under a PAYGo model and recognizes sales revenue upon receipt of payments may seem to derive a higher percentage of sales revenue from B2B.

Companies are therefore advised to outline their revenue recognition policies when reporting this metric.

3.3 Country Sales

Percentage of sales revenue (0 – 100%) by country



CALCULATION

$$\frac{\text{Sales Revenue During the Period by Individual Country}}{\text{Total Sales Revenue During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year
Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

The unique market features of a country may impact a wide range of metrics and should therefore be considered across all KPIs.



USE OF METRIC

- Shows the concentration of sales revenue by country
- Unique market features are influenced by a country's unique social, economic and political environment. These may therefore affect a company's sales strategy and dictate what type of products and approaches work best.
- A company with sales spread across numerous countries is more insulated against a single country's macroeconomics including foreign exchange fluctuations. Yet, it may also be a sign of being spread thin and thus losing out on the benefits of scale when it concerns a young company.



NOTES

- Investors or other stakeholders may choose to report across companies per region to protect confidentiality. In this case, regional groups should follow classifications outlined by the World Bank country and lending groups. Sub-regional groupings should follow the United Nations' categorization of geographical sub-regions.^a
- Companies may want to segment sales data even further to track sales revenue by demographics and other factors that help them understand their ideal customer profile.
- The share of sales revenue derived from one country is influenced by many factors and a low share of sales revenue could simply be explained by the number of years a company is operating in a particular region.
- Yet, a consistently low share of sales revenue derived from one country may signify that this market is not performing well and merit further inquiry if the trend persists.
- Changes in variables could signify that the company is growing rapidly. The percentage of sales revenue per country could indicate where the growth push is occurring. The evolution over time can give a sense of where the company may be finding success (as opposed to only looking at the static KPI).

^a See <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> and <https://unstats.un.org/unsd/methodology/m49/>

3.4 Total Net Sales

Total number of units sold during the period, net of returned and repossessed units



CALCULATION

(Total Number of Units Sold During the Period)

– (Returned and Repossessed Units)



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

- The metric is related to the [Repossession Ratio](#).
- The size of the company may impact a wide range of metrics and could be used to group companies for peer comparison across other metrics.



USE OF METRIC

- The KPI measures the size of the company according to the units sold and not returned or repossessed.
- It can be useful for understanding the overall performance of the company.



NOTES

Repossessed units are only relevant for a company with PAYGo sales.

3.5 Repeat Sales

Percentage of sales revenue (0-100%) from repeat customers (current or former)



CALCULATION

Sales Revenue Generated
by Units Sold to Existing
or Former Customers During the Period

Total Sales Revenue Generated
by all Units Sold During the Period



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year
Frequency – Once a year in the absence of
major business model and sales strategy
changes, more frequently otherwise



RELATED KPIS

The metric should be read in conjunction with [Net Promoter Score](#). This KPI may be a more reliable measure of customer satisfaction as you may find customers purchasing additional products because they have no choice due to no or little competition.



USE OF METRIC

- This KPI is an indication of customer satisfaction and can be used to forecast how many current commercial relationships will translate into future opportunities. This is important when evaluating the business on a long-term basis.
- It is an essential factor in all improved energy access metrics and therefore important to track for impact investors.
- The numerator could also give a sense of the total customer lifetime value (CLV).



NOTES

- Companies should use cash value to estimate the value of all items sold to existing or former customers.
- Any repeat sale can be included in the numerator, e.g., small or large add-on to the current system, new system (upgrade), spare parts, others.
- Companies can record the sale of solar-powered appliances sold in a bundle with a solar home system or sold standalone. Yet, companies should note a rough percentage split (unbundled vs. bundled) on a global level, which can then be applied further to each country of sales.
- The sales focus of this KPI allows including items of very different sizes without a risk of distortion, as small value and large value sales will automatically weigh accordingly in the result.
- Companies are advised to use unique customer identifiers or national IDs to tag data on numbers of units sold to existing versus new customers. Using a mobile phone number as an identifier is possible, yet it is less accurate since a repeat customer using a new/different mobile number will not be recorded as a repeat customer. It is therefore recommended for companies to track customer activity with a unique customer identifier or national ID going forward.
- Like the other Company Indicators, this metric utilizes sales revenue and is impacted by the different revenue recognition approaches of companies. Companies are therefore advised to outline their revenue recognition policies when reporting this metric.

3.5 Repeat Sales (continued)

ILLUSTRATION

Company A and Company B are two Ivorian companies and sell similar products. The Sales Revenue Generated by Units Sold to Existing or Former Customers and Sales Revenue Generated by all Units Sold in 2019 and 2020 are as follows for both companies:

Company A	2019	2020
Sales Revenue from Repeat Sales	\$40k	\$30k
Sales Revenue All Units Sold	\$100k	\$100k

Company B	2019	2020
Sales Revenue from Repeat Sales	\$40k	\$40k
Sales Revenue All Units Sold	\$100k	\$150k

The Repeat Sales for Company A is 40% in 2019 and 30% in 2020. The Repeat Sales for Company B is equal to Company A in 2019, but is 26% in 2020.

The decrease in Repeat Sales for Company A may indicate that customers have had a bad experience in 2019 with a company's product or service or that the company is facing increased competition in 2020.

A similar conclusion cannot be made for Company B as the percentage of Repeat Sales is expected to be low in times of high growth, simply because of the high share of new customers.

3.6 Product Sales

Percentage of sales revenue (0-100%) by product category. Product categories are as per GOGLA standards (see figure below)



CALCULATION

$$\frac{\text{Sales Revenue by Product Category During the Period}}{\text{Total Sales Revenue During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year
Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

The product types that a company sells may impact a wide range of metrics and should therefore be considered across all KPIs.



USE OF METRIC

- This KPI will give an indication of the sales distribution and popularity of different product types as well as a sense of the customer base.
- It is an important metric to understand the energy access impact of the company.



NOTES




- Companies can record the sale of appliances sold in a bundle with a solar home system or sold standalone. However, companies are encouraged to note a rough percentage split on a global level, which can then be applied further to each country of sales.
- Companies, investors and other PAYGo solar stakeholders may want to segregate solar OGS appliances further. Please use the GOGLA outlined standards seen in illustration below.^a
- Given that this KPI utilizes sales revenue, it is impacted by the different revenue recognition approaches of companies.
- For example, a company with a conservative revenue recognition policy may appear to have lower percentage sales revenue through the PAYGo sales model than a company with a more aggressive revenue recognition policy.
- Companies are therefore advised to outline their revenue recognition policies when reporting this metric.
- The share of sales revenue derived from one product class is influenced by many factors and a low share of sales revenue could simply be explained by when the product was introduced in the market. Yet, a consistently low share of sales revenue derived from one product class may signify that product class is not performing well. Further research may be warranted to better understand such a trend.

^a See https://www.gogla.org/sites/default/files/resource_docs/global_off-grid_solar_market_report_h2_2018_opt.pdf page 13, Table 5.

3.6 Product Sales (continued)

ILLUSTRATION

Product Categories – Off-Grid Lighting Products

Overall category	Solar module capacity, Watt Peak (Wp)	Categorization by services provided by product	Corresponding level of Multi-Tier Framework energy access enabled by use of product
 Portable Lanterns	0 – 1.499 Wp (indicative)	Single Light only	Enables partial Tier 1 Electricity Access to an individual person
	1.5 – 2.999 Wp (indicative)	Single Light & Mobile Charging	Enables full Tier 1 Electricity Access to at least one person and contributes to a full household
 Multi-light Systems	3 – 10.999 Wp (indicative)	Multiple Light & Mobile Charging	Enables full Tier 1 Electricity Access to at least one person up to a full household
 Solar Home Systems	11 – 20.999 Wp	SHS, Entry Level (3-4 lights, phone charging, powering radio, fan etc.)	Enables full Tier 1 Electricity Access to a household
	21 – 49.999 Wp	SHS, Basic capacity (as above plus power for TV, additional lights, appliances & extended capacity)	Enables full Tier 2 Electricity Access to a household when coupled with high-efficiency appliances
	50 – 99.999 Wp	SHS, Medium capacity (as above but with extended capacities)	Enables full Tier 2 Electricity Access to a household even using conventional appliances
	100 Wp +	SHS, Higher capacity (as above but with extended capacities)	

Solar OGS appliances: Household appliances and productive equipment (e.g. TVs, fans, refrigerators, water pumps, mills, clippers, etc.)

Other: phones, other products

3.6 Product Sales (continued)

ILLUSTRATION (continued)

Product categories – Off-Grid Solar Appliances



Appliance Type	Categorization (in orange) and definition (in blue bold)
TVs	Screen Size (diagonal, inches)
Small	12–17"
Medium	18–23"
Large	24–29"
Extra large	30+"



Fans	Diameter (inches)
Table Fan	A smaller-diameter propeller-bladed fan having two or more blades and intended for use with free inlet and outlet of air. It may be a table fan or bracket-mounted fan for wall or ceiling mounting.
Small	<12"
Large	12+"
Pedestal Fan	A propeller-bladed fan having two or more blades mounted on a pedestal of fixed or variable height and intended for use with free inlet and outlet of air.
Ceiling Fan	A propeller-bladed fan having two or more blades and provided with a device for suspension from the ceiling of a room so that the blades rotate in a horizontal plane.
Small	<48"
Large	48+"

3.6 Product Sales (continued)

ILLUSTRATION (continued)

Product categories – Off-Grid Solar Appliances (continued)



Refrigeration Units

Size (litres)

Refrigerator One or more fresh food compartments for the storage and preservation of unfrozen food and beverages.

Small 5-50 L

Medium 51-100 L

Large 101+ L

Refrigerator-Freezer Combination Unit At least one fresh food compartment and at least one freezer compartment

Small 5-100 L

Medium 101-150 L

Large 151-200+ L

Extra Large 201+ L

Multi-temperature Refrigerator One or more compartments that can be operated either as a refrigerator or freezer by adjusting the thermostat control.



Solar Water Pumps

No breakdown was possible due to limited variety of data reported

3.7 Average Selling Price

Average price of units sold, by sales model: PAYGo and Cash

Refer to KPI [Sales Model](#) for the definition of PAYGo and Cash sales

CALCULATION

FOR THE CASH MODEL:

$$\frac{\text{Cash Sales Revenue During the Period}}{\text{Number of Cash Units Sold During the Period}}$$

FOR THE PAYGO MODEL:

$$\frac{(\text{Customer Deposits Collected} + \text{Receivables Generated from Units Sold During the Period})}{\text{Number of PAYGo Units Sold During the Period}}$$

USE OF METRIC

- Important to understand the share of sales from large to small units and the preferences of the company's customers.
- Average Selling Price (including segmented into sales models) is more generally an important contextual point that should be taken into consideration when comparing performance across companies and analyzing sector trends.

NOTES

- The calculation for the cash and PAYGo model differs as the KPI utilizes sales revenue and would otherwise be impacted by the different revenue recognition approaches of companies.
- The calculation method for the PAYGo model uses Receivables Generated and not Collected in the numerator. Receivables generated do not include deposits.

RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year

Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise

RELATED KPIS

N/A

ILLUSTRATION

Let's assume that the sector's Average Selling Price was the following for 2019 and 2020:

	2019	2020
Average selling price	\$250	\$300

The increase in Average Selling Price could be explained by an increase of prices across products or by a company/sector moving toward higher margin products/customers.

Before drawing a conclusion, one should therefore look at the Product Sales. Suppose that the rough Product Sales is as follows:

	2019	2020
Portable Lanterns	20%	10%
Multi-Light	10%	10%
SHS	60%	60%
OGS Appliances	10%	20%
Other	0%	0%

The Average Selling Price, thus, likely increased as the sector started selling more OGS appliances that are typically higher in value than portable lanterns.

3.8 Sales per Distribution Channel

Percentage of sales revenue (0-100%) by distribution channel: agents, wholesalers, shops, financial institutions, e-platforms, governmental projects



CALCULATION

$$\frac{\text{Sales Revenue by Distribution Channel During the Period}}{\text{Total Sales Revenue During the Period}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – One year
Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

The KPI should be looked at in concert with [Sales Point Rate](#).



USE OF METRIC

Important indicator to evaluate the performance of each sales distribution channel over the total. Interesting insights around distribution trends could be identified when comparing this KPI across the industry.



NOTES

Given that this KPI utilizes sales revenue, it may be impacted by the different revenue recognition approaches of companies.

As illustrated in [Sales Distribution Model](#), a vertically integrated company that primarily sells B2B sales under a cash model and B2C sales under a PAYGo model and recognizes sales revenue upon receipt of payment may seem to derive a higher percentage of sales revenue from B2B. Given that agents are typically used as a distribution channel within the B2C model and the other distribution channels are typically used within the B2B model, the same holds for this indicator.

Companies are therefore advised to state their revenue recognition policies when reporting this metric.

3.9 Sales Point Rate

Fraction of sales points that have gone inactive over the previous 90 days, grouped by distribution channel – Agents (%), Wholesalers (%), Shops (%) and/or Other (%)



CALCULATION

$$\frac{\text{Sales Points Inactive Over the Previous 90 Days per Individual Distribution Channel}}{\text{Total Sales Points [T-1]}}$$



RECOMMENDED HEADLINE MEASUREMENT

Period of measurement – 90 days
Frequency – Quarterly



RELATED KPIS

In case there is a high fraction of sales points that have gone inactive over the previous 90 days and high agent turnover, this indicator should be looked at in conjunction with the [Collection Rate](#) as:

- Agents build relationships with clients and, when moving from one company to another, may encourage clients to stop paying units of the previous company and purchase from their new company;
- If an agent is no longer present in an area with existing units, it increases the likelihood of nonpayment as existing clients may receive less assistance; and
- Agent training or incentives may not be sufficient, which could influence a customer's payment behavior. Agents should be trained to help assess a customer's ability and willingness to pay, to ensure consumers can afford to pay for the product and/or service without becoming overburdened. Agents should furthermore be incentivized based on sales, credit performance and repossession of units sold.



USE OF METRIC

Related to sales strategy, this indicator helps to evaluate the reliability of each sales distribution channel. Important indicator for the overall performance of the company due to the direct link to sales performance.



NOTES

- Sales Point Rate is an important indicator to track for the reasons stated above. Yet not all PAYGo solar companies currently track when a sales point becomes inactive. The KPI has therefore been classified as a second priority KPI. If the Sales Point Rate cannot be tracked, it is advised to look at the fluctuation of the Sales share of the individual distribution channels per period. This may indicate that there is a high turnover that should be examined further.
- Note that a period of 90 days may identify more performance issues for some distribution channels (e.g., agents) than others that are less likely to have a high turnover (e.g., governmental projects).

3.9 Sales Point Rate (continued)

ILLUSTRATION

The CEO of Company A reviews the performance of the company on Sales Point Rate.

Company A recorded the following selling points per quarter:

	Q1	Q2	Q3	Q4
Agents	100	60	80	60
Shops	10	10	10	10

Company A therefore recorded the Sales Point Rates as a result (please note that the necessary data for Q1 is not available in this example):

	Q1	Q2	Q3	Q4
Agents	–	40%	–	25%
Shops	–	–	–	–

The CEO notes that there was a high fraction of Sales Points that became inactive over the previous 90 days and that there was a high fluctuation over the different periods. She therefore requests the sales department to explain this trend and revise whether the company has the appropriate sales strategy in place.

3.10 Net Promoter Score

Percentage of customers who rate their likelihood to recommend the service to friends or family as high, net of the percentage of customers who rate as low

The NPS should be calculated based upon customers' responses to the question, 'On a scale of 0 to 10, how likely are you to recommend the product/service to a friend or family member, where 0 is not at all likely, and 10 is extremely likely'



CALCULATION

- (% of responses which are 9 and 10)
- (% of responses which are 0-6 responses)

This will result in a score between 100 and -100.



RECOMMENDED HEADLINE MEASUREMENT

- Period of measurement – One year
- Frequency – Once a year in the absence of major business model and sales strategy changes, more frequently otherwise



RELATED KPIS

- Customer satisfaction is of paramount importance, not only to consumer protection and to growth, but also to portfolio quality. Evidence suggests that NPS is a useful predictor of payment trends, as is customer challenge rates and issue resolution. In data from 60 Decibels surveys in July of 2020, clients with unresolved service challenges were 30% more likely to report that they had reduced their payments to the company^a.
- The metric should be read in conjunction with [Repeat Sales](#) as this KPI also measures customer satisfaction.

^a See https://www.gogla.org/sites/default/files/consumer_insights_covid19_webinar3_03.09.20_for_website.pdf



USE OF METRIC

- The metric is used globally as a proxy for customer satisfaction and loyalty (as evidenced by repurchase and referral) to a product, service, brand, or company or predict future purchases and referrals of individual respondents.
- It is a useful temperature gauge of how customers feel about a product/company.

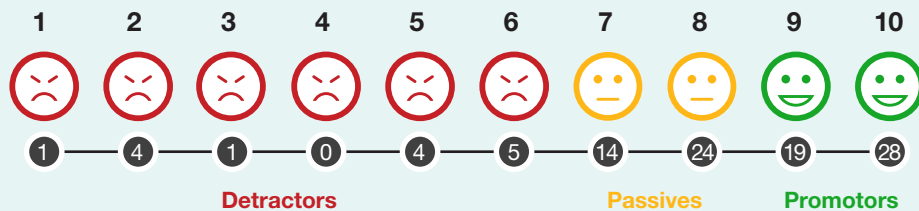


NOTES

- Net Promoter Score is an important indicator to track. Yet, not all PAYGo solar companies currently track this indicator, and the metric has therefore been classified as a second priority KPI.
- Survey frequency depends on business and goals. Common practice is to send a survey every quarter or twice a year.
- Consideration should be taken when conducting this internally as inherent biases are likely to be present.

3.10 Net Promoter Score (continued)

ILLUSTRATION



$NPS = \%Promoters - \%Detractors$

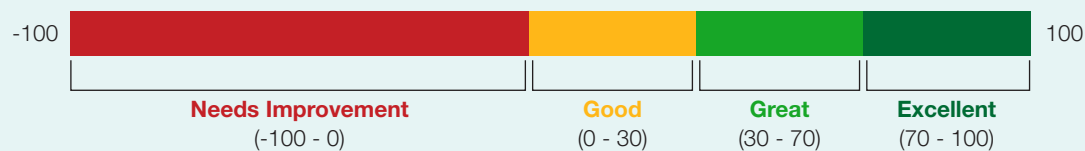
$NPS = \% \text{ (Happy Face)} - \% \text{ (Sad Face)} = 47\% - 15\% = 32\%$

Promoters (9-10): Customers will actively talk positively about the company and/or product and recommend it to their networks.

Passives (7-8): Customers are not dissatisfied but are unlikely to actively talk about the product or company.

Detractors (0-6): Customers will likely talk negatively about the company or product.

What is a good NPS score?



Generally speaking, a negative NPS is very poor. Anything above 50 is very good.

It should be stressed that one cannot tell a lot about a company just by looking at their absolute NPS, without considering their relative performance within the industry (NPS levels vary broadly across industries). While for some businesses an NPS of 30 might be considered as poor performance, they might be ranked among market leaders within another industry.

The 60 Decibels Energy Benchmark for NPS (with 90+ off-grid energy companies) is 43 (March 2021). An industry benchmark is likely to be established once companies can report their data to a centralized entity.

APPENDICES

A. KPI Summary Tables

Portfolio Quality Indicator	Definition	Calculation
Outstanding Receivables	Value of the company's gross outstanding receivables streams	Gross Outstanding Receivables as Reported on the Balance Sheet at a Fixed Point in Time
Growth in Outstanding Receivables	Growth in value of the company's gross outstanding receivables streams	$\left(\frac{\text{Gross Outstanding Receivables [T]}}{\text{Gross Outstanding Receivables [T-1]}} \right) - 1$
Collection Rate	Ratio of all collected receivables payments over total receivables payments due for a period (does not include deposits)	$\frac{\text{Cash Receipts From Follow-on Payments During the Period}}{\text{Scheduled Follow-on Payments During the Period}}$
Receivables at Risk (RAR)	<p>Identifies risky proportion of receivables portfolio. Recommended to use both Consecutive Days Unpaid or Collection Rate below threshold to identify risky portion of receivables portfolio.^a Key thresholds are > 30 days for consecutive days unpaid and < 50% collection rate since activation, although using ranges of thresholds (e.g., CDU of 30, 90, 180 and CR < 70 and 50%) will likely provide valuable insights.</p> <p>When difficult to use both methods, consecutive days unpaid is recommended as a standalone measure.</p>	<ol style="list-style-type: none"> $\frac{\text{Gross Outstanding Receivables} > [X] \text{ Consecutive Days Unpaid}}{\text{Gross Outstanding Receivables}}$ $\frac{\text{Gross Outstanding Receivables of Customers with Collection Rate} < [Y]\%}{\text{Gross Outstanding Receivables}}$

^a There can be meaningful overlap between the two different measures so care must be taken to avoid double counting.

Portfolio Quality Indicator	Definition	Calculation
Write-off Ratio	The sum of the remaining payments of receivables streams that have been written-off in a given period divided by the sum of the remaining payments of the receivables streams for the entire portfolio	$\frac{\text{Outstanding Receivables for Written-off Contracts During the Period}}{\text{Average Outstanding Receivables During the Period}}$
Repossession Ratio	The sum of the remaining payments of receivables streams of repossessed units in a given period divided by the sum of the remaining payments of the receivables streams for the entire portfolio	$\frac{\text{Outstanding Receivables of Units Repossessed During the Period}}{\text{Average Outstanding Receivables During the Period}}$
Contractual Credit Period	Average nominal number of days between system acquisition and expected final payment	$\frac{\text{Contractual Repayment Term (Days) of Active Units}}{\text{Number of Active Units}}$
Effective Credit Period	Effective (actual) length of time taken for an average customer to pay off their solar device	$\frac{\text{Effective Repayment Term (Days) of Repaid Units}}{\text{Number of Repaid Units}}$
Unit or Firm Level Indicator	Definition	Calculation
Total Cash Receipts from PAYGo Customers	The total cash receipts received from PAYGo customers – including customer deposits and follow-on payments	The Sum of Customer Deposits and Follow-on Payments Received from All PAYGo Customers Over a Period of Time
Cost of Goods Sold Ratio^a	Total cost of goods sold expressed as a proportion of cash receipts received from customers	$\frac{\text{Cost of Goods Sold}}{\text{Total Cash Receipts from Customer}}$
Sales and Maintenance Cost Ratio^a	Sum of all sales and maintenance costs expressed as a proportion of cash receipts received from customers	$\frac{\text{Sales and Distribution Cost} + \text{Servicing and Maintenance Cost} + \text{Other Variable and Semi-variable Costs}}{\text{Cash Receipts from Customers}}$

a Cash Receipts

Unit or Firm Level Indicator	Definition	Calculation
Provision Expense Ratio^a	The cost of credit provisions expressed as a percentage of cash receipts	$\frac{\text{Provisioning Expenses}}{\text{Cash Receipts from Customers}}$
Total Contribution Margin^a	The total profit based on variable costs for the PAYGo solar firm as a proportion of the total cash receipts received from customers	$\frac{\text{Cash Receipts from Customers} - \text{Total Variable and Semi-variable Costs}}{\text{Cash Receipts from Customers}}$
Financial Expense Ratio^a	The cost of financial expenses expressed as a percentage of cash receipts	$\frac{\text{Financial Expense}}{\text{Cash Receipts from Customers}}$
Fixed Operating Cost Ratio^a	Other fixed costs expressed as a percentage of cash receipts	$\frac{\text{Other Fixed costs}}{\text{Cash Receipts from Customers}}$
Fixed Cost Ratio^a	Sum of all fixed costs (Marketing, Sales, etc.) of a PAYGo solar firm divided by total cash receipts received from customers	$\frac{\text{Financial Expense} + \text{Other Fixed Costs}}{\text{Cash Receipts from Customers}}$
Total EBT Margin^a	The total profit after all costs for the PAYGo solar firm as a proportion of the total cash receipts received from customers	$\frac{\text{Cash Receipts from Customers} - \text{Total Costs}}{\text{Cash Receipts from Customers}}$
Unit Follow-on Payments	Sum of contractual follow-on payments until system is permanently unlocked, net of customer deposits, per unit sold	$\frac{\text{Receivables Generated During the Period}}{\text{Number Of PAYGo Units Sold During the Period}}$
Unit Customer Deposits	Total contractual PAYGo customer deposits per unit sold	$\frac{\text{Customer Deposits}}{\text{Number of PAYGo Units Sold During the Period}}$
Unit Cash Sales	The total cash received from Cash sales per unit sold	$\frac{\text{Cash Receipts from Cash Customers During the Period}}{\text{Number of Units Sold Cash During the Period}}$

a Cash Receipts

Unit or Firm Level Indicator	Definition	Calculation
Unit Device Cost	The total Cost of Goods Sold during the period per unit sold	$\frac{\text{Cost of Goods Sold}}{\text{Number of Units Sold During the Period}}$
Unit Sales and Distribution Cost	The total cost of installing the device at the customer site, transportation cost (from warehouse to customer) per unit sold	$\frac{\text{Sales and Distribution Cost}}{\text{Number of Units Sold During the Period}}$
Unit Servicing and Maintenance Cost	The total cost of servicing a customer (i.e., collection of payments, customer service) and providing maintenance of installed units	$\frac{\text{Servicing and Maintenance Cost Expressed as Monthly Equivalent} \times \text{Effective Credit Period Expressed in Months}}{\text{Average Active Units}}$
Unit Provision Cost	The contractual follow-on payments that will not be recognized due to write offs on a per unit basis	$\frac{\text{Provisioning Expenses}}{\text{Average Active Units}}$
Unit Contribution Margin	The average profit based on variable costs on a unit basis for a particular product	$\left[\begin{aligned} &(\text{Unit Customer Deposits} + \text{Unit Follow-on Payments}) \\ &\times \frac{\text{Number of Units Sold PAYGo}}{\text{Total Number of Units Sold}} \end{aligned} \right]$ $+ \left(\text{Unit Cash Sales} \times \frac{\text{Number of Units Sold Cash}}{\text{Total Number of Units Sold}} \right)$ <ul style="list-style-type: none"> - Unit Device Cost - Unit Sales and Distribution Cost - Unit Servicing and Maintenance Cost - Unit Provision Cost
Liquidity	The liquidity of a company represented by cash and liquid assets convertible in the next 90 days	$\frac{\text{Cash and Liquid Assets Convertible to Cash in the Next 90 Days at End of Period}}{\text{Total Costs Over the Next 90 Days}}$

Company Indicator	Definition	Calculation
Sales Model	Percentage of sales revenue (0 – 100%) by sales model: PAYGo and Cash	$\frac{\text{Sales Revenue Generated per Individual Sales Model During the Period}}{\text{Total Sales Revenue During the Period}}$
Sales Distribution Model	Percentage of sales revenue (0 – 100%) by sales distribution model: B2B, B2C, and Other	$\frac{\text{Sales Revenue Generated by Individual Sales Distribution Model During the Period}}{\text{Total Sales Revenue During the Period}}$
Country Sales	Percentage of sales revenue (0 – 100%) by country	$\frac{\text{Sales Revenue During the Period by Individual Country}}{\text{Total Sales Revenue During the Period}}$
Total Net Sales	Total number of units sold during the period, net of returned and repossessed units	$(\text{Total Number of Units Sold During the Period}) - (\text{Returned and Repossessed Units})$
Repeat Sales	Percentage of sales revenue (0-100%) from repeat customers (current or former)	$\frac{\text{Sales Revenue Generated by Units Sold to Existing or Former Customers During the Period}}{\text{Total Sales Revenue Generated by all Units Sold During the Period}}$
Product Sales	Percentage of sales revenue (0-100%) by product category. Product categories are as per GOGLA standards	$\frac{\text{Sales Revenue by Product Category During the Period}}{\text{Total Sales Revenue During the Period}}$

Operational Indicator	Definition	Calculation
Average Selling Price	Average price of units sold, by sales model: PAYGo and Cash	<p>FOR THE CASH MODEL:</p> $\frac{\text{Cash Sales Revenue During the Period}}{\text{Number of Cash Units Sold During the Period}}$ <p>FOR THE PAYGo MODEL:</p> $\frac{(\text{Customer Deposits Collected} + \text{Receivables Generated from Units Sold During the Period})}{\text{Number of PAYGo Units Sold During the Period}}$
Sales per Distribution Channel	Percentage of sales revenue (0-100%) by distribution channel: agents, wholesalers, shops, financial institutions, e-platforms, governmental projects	$\frac{\text{Sales Revenue by Distribution Channel During the Period}}{\text{Total Sales Revenue During the Period}}$
Sales Points Rate	Fraction of sales points that have gone inactive over the previous 90 days, grouped by distribution channel – Agents (%), Wholesalers (%), Shops (%) and/or Other (%)	$\frac{\text{Sales Points Inactive Over the Previous 90 Days per Individual Distribution Channel}}{\text{Total Sales Points [T-1]}}$
Net Promoter Score (NPS)	<p>Percentage of customers who rate their likelihood to recommend the service to friends or family as high, net of the percentage of customers who rate as low.</p> <p>The NPS should be calculated based upon customers' responses to the question, 'On a scale of 0 to 10, how likely are you to recommend the product/service to a friend or family member, where 0 is not at all likely, and 10 is extremely likely.'</p>	<p>(% of Responses which are 9 and 10) – (% of Responses which are 0-6 Responses)</p> <p>This will Result in a Score Between 100 and –100.</p>

B. Portfolio Risk Regression Analysis – Selecting an Appropriate Headline Portfolio Risk Measure

THE DATA COLLECTION PILOT AFFORDED THE opportunity to test the external validity of the risk segmentation tools borrowed from the microfinance industry as well as the performance of new PAYGo solar-specific tools such as Collection Rate. Regression and cohort analyses were conducted on data provided by a subsegment of pilot participants over a 6-month period, representing data from over 450,000 active customers.⁹

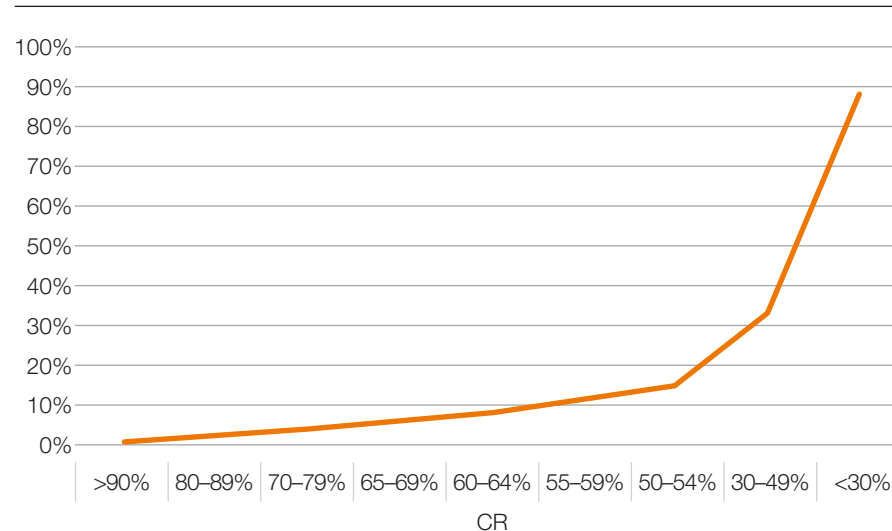
We examined the performance of two methods of segmentation for Receivables at Risk (RAR), Consecutive Days Unpaid (CDU) and Collection Rate (CR) in predicting poor payment performance.¹⁰ “Default” as understood in traditional finance does not translate perfectly to the PAYGo solar space. Due to the prevalence of flexible payment plans, there are varying approaches to determining default or a signaling event (or set of events) for which to write off any expectation of future payment for a given contract. As such, for the purposes of the analysis, contracts were considered to be in a state equivalent to default (we will simply refer to this state as “default” going forward) if they failed to yield any payments (CDU>180 days) or averaged a Collection Rate of less than 30% for the entire 6-month period of evaluation.

The regression analysis evaluated numerous relationships including the strength of CDU and CR independently and jointly in predicting default.¹¹ Samplings of these results are summarized below.

UNIVARIATE REGRESSION RESULTS

The results of the regressions of CDU and CR, respectively, against default indicated that there was a positive and meaningful relationship.¹² In particular, the analysis shows a significant increase in likelihood of default for groups as early as CDU 8 to 30 days and particularly, CDU>30 days. Similarly, likelihood of default exhibited elevated levels at just above CR 50% and significant increases in likelihood of default when CR declines to levels below 50% (see Figures A and B below).

FIGURE A. **Probability of default for RAR (Collection Rate) groups**



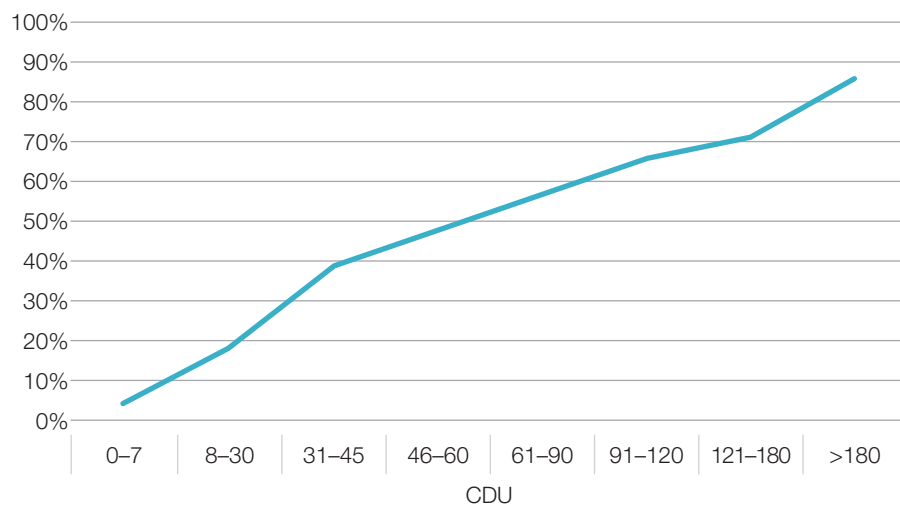
⁹ While this analysis could in theory be subject to impacts of seasonality, the exact periods analyzed were different for each company and cumulatively cover all months throughout the year, hence seasonality impacts are expected to be minimal and the periods are also deemed to be indicative of normal (and pre-pandemic) periods.

¹⁰ Please refer to the descriptions of RAR(CDU) and RAR(CR) in the main body of the technical guide. The recommended convention is RAR(X) where X indicates the methodologies (CR or CDU) and the threshold employed, e.g., RAR30 for CDU>30 days and RAR<50% for CR<50%. We use a different notation for clarity as we focus on the different segmentation tools.

¹¹ Specifically, logistic regression analysis – these are statistical analyses used to model the probability of a certain binary event occurring such as pass/fail, win/lose or default/non-default.

¹² Positive independent correlations with an increase in CDU and a decrease in CR, respectively. In all the regressions carried out, p-values demonstrated strong statistical significance in null hypothesis significance testing.

FIGURE B. Probability of default for RAR (CDU) groups



The aggregate default probabilities of selected univariate thresholds are summarized below:

CDU >30	CDU >90	CR <70%	CR <50%
60%	73%	27%	61%

Further, cohort analyses were conducted to help illustrate the relationship between contract/unit age on the probability of default. Both charts indicate that younger contracts tend to exhibit higher default probabilities per CR or CDU category. In other words, younger contracts' likelihoods of default are inclined to be more sensitive to change in payment category.

FIGURE C. Probability of default for Collection Rate groups - cohorts

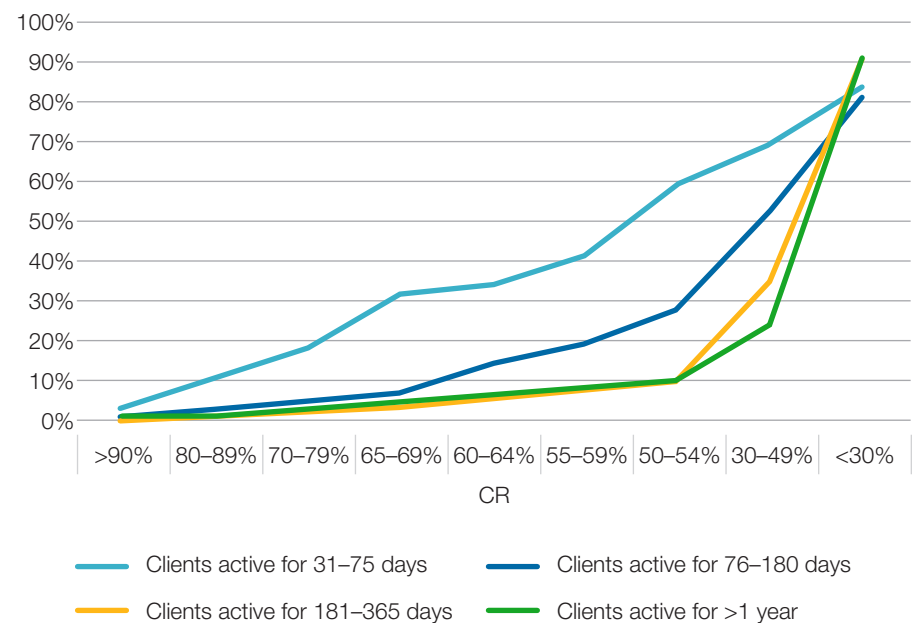
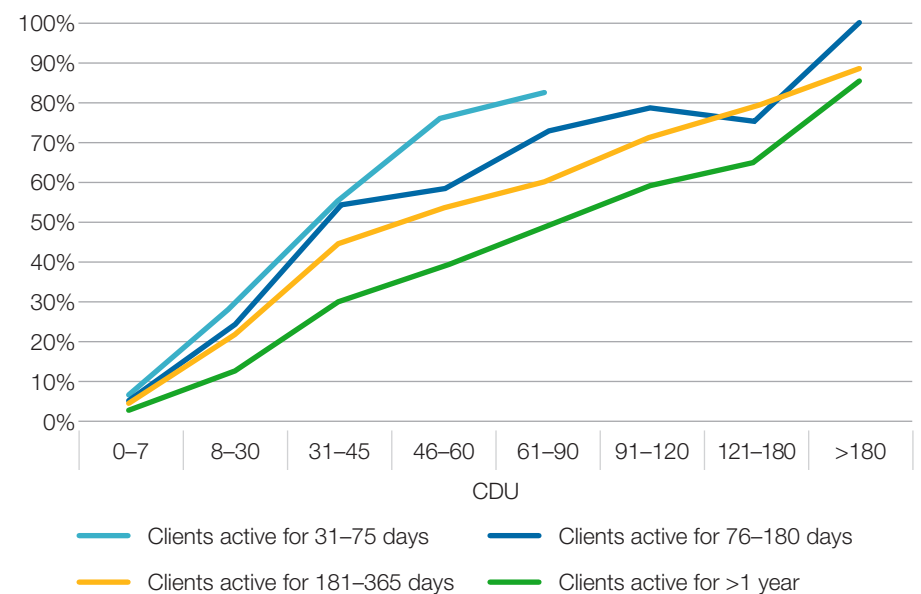


FIGURE D. Probability of default for CDU groups - cohorts



JOINT REGRESSION RESULTS

The matrix below highlights the aggregated trend for the full set of contracts showing the various combinations of RAR(CR) and RAR(CDU) ranges and their corresponding 6-month default probability. Joint combinations that are rare in practice have been greyed out.¹³

TABLE B1. **Probability of default for CR and CDU combinations**

	CDU							
	0-7	8-30	31-45	46-60	61-90	91-120	121-180	>180
>90%	1%	3%	6%	9%	12%	18%	15%	35%
80-89%	1%	4%	10%	13%	17%	24%	14%	33%
70-79%	2%	6%	14%	18%	23%	31%	21%	46%
65-69%	3%	7%	15%	20%	24%	33%	27%	54%
CR 60-64%	3%	8%	19%	24%	29%	38%	31%	58%
55-59%	4%	11%	23%	29%	35%	44%	35%	63%
50-54%	5%	12%	26%	33%	38%	47%	39%	67%
30-49%	13%	27%	48%	56%	62%	70%	70%	88%
<30%	69%	86%	93%	95%	96%	97%	96%	99%

The data above is further summarized in the table below:

TABLE B2. **Aggregate default probability matrix**

	CDU >30	CDU >90
CR ≥70%	20%	26%
CR <70%	51%	59%
CR <50%	81%	87%

While the joint thresholds of CDU>30 days/CDU>90 days and CR<50% display a high rate of prediction for eventual default, when applied as screens to the sample they miss a high proportion of actual defaults. In other words,

¹³ The 21 categories that have been greyed out account for 0.97% of total observations.

TABLE B3. **Aggregate actual default**

	CDU >30	CR <50	CDU >30 or CR <50	CDU >30 & CR <50	CDU >30 & CR >50	CDU <30 & CR <50	CDU <30 & CR >50	Total
Observations	52,273	125,969	138,646	39,596	12,677	86,373	329,642	468,288
Defaults	38,275	68,537	72,948	33,864	4,411	34,673	6,914	79,862
Default % (wt. by observations)	73%	54%	53%	86%	35%	40%	2%	17%
Default % (wt. by company)	58%	49%	45%	72%	32%	33%	2%	14%
Default % of total (observations)	48%	86%	91%	42%	6%	43%	9%	-
Default % of total (company)	54%	64%	80%	38%	16%	26%	20%	-

while the CDU>30 days and CR<50% screen contained a higher percentage of eventually defaulting contracts *within* the screen, it also missed a significant number of the total defaulting contracts (-60%) *left out of* the screen. Therefore, the composite measure of CDU>30 days or CR<50% was selected to better balance the dual desire to cast a wide enough net to capture a high proportion of total risky contracts while still having an acceptable level of accuracy.

SUMMARY

Both Collection Rate and Consecutive Days Unpaid appear to be effective tools to segment a company's portfolio of expected payment streams by risk. Joint use (CR<50% or CDU>30 days) seems to effectively balance capturing a high proportion of eventual defaults while maintaining a suitable level of accuracy. It may, however, be the case that companies find it difficult to track and/or convey this joint distribution, in such a case a CDU<30 days screen is suggested based on considerations of ease of calculation, interpretation, and effectiveness. Additional considerations, such as contract age, may be effective in improving portfolio segmentation. As companies collect and share more data, the indicators and their levels can be further calibrated against industry averages and company-specific outcomes to provide greater confidence and accuracy. As confidence improves, these tools may also be used to support credit provisioning policy.

Profitability KPIs That Would Change with a Different Sales Recognition Accounting Policy

Any future shift to a sales base rather than cash receipts would affect the following KPIs:

- Earnings Before Tax (EBT) Margin = $(\text{Sales} - \text{Total Costs}) / \text{Sales}$
- Contribution Margin = $(\text{Sales} - \text{Total Variable and Semi-variable costs}) / \text{Sales}$
- Cost of Goods Sold Ratio = $(\text{Cost of Goods Sold}) / \text{Sales}$
- Sales and Maintenance Cost Ratio = $(\text{Sales and Distribution Cost} + \text{Servicing and Maintenance Cost} + \text{Other Variable and Semi-variable Costs}) / \text{Sales}$
- Provision Expense Ratio = $\text{Provisioning Expenses} / \text{Sales}$
- Fixed Cost Ratio = $(\text{Financial Expense} + \text{Other Fixed Costs}) / \text{Sales}$
- Financial Expense Ratio = $\text{Financial Expense} / \text{Sales}$
- Fixed Operating Cost Ratio = $\text{Other Fixed Costs} / \text{Sales}$

