# Impact Measurement Case Study

## NURU ENERGY

**nuru**
Energy to Empower

**LOCATION:**
**Rwanda**

**Target Beneficiaries:**
Rural Rwandans

This publication is part of a series of case studies on BCtA Impact Measurement Services (BIMS), a Business Call to Action (BCtA) initiative that demonstrates how inclusive businesses can measure and apply impact data.

BIMS provides 21 participating BCtA member companies with technical expertise and technology to design and implement survey-based data collection for assessing social and environmental as well as operational performance. BIMS is implemented by BCtA with support from implementing providers Arthify and Echo Mobile.

**Sector:** Energy

**Business model:** Nuru Energy is a social enterprise that provides clean energy and lighting via a "Shared Energy Access" model to rural Rwandans living in poverty who are without electricity. Nuru trains and equips village-level entrepreneurs (VLEs) to distribute LED lamps, mobile phones and other devices, then operate centrally located, pay-as-you-go, GSM-enabled, solar- and human-powered recharging platforms offering affordable fee-for-service recharging. These innovative platforms enable households to charge USB devices including portable LED lights and mobile phones.

## THE OBJECTIVE

Nuru's impact depends on the affordability of its lights and charging stations. As the company seeks financial sustainability while trying to reduce consumer costs, it is integrating mobile data collection in order to continuously monitor implementation costs and improve operational efficiency.

## HOW IT WORKS

**1 ASSESSING READINESS**

Nuru is a progressive-stage business that is testing and refining its processes. It has medium readiness for measuring impact since it lacks integrated data management, but has begun to develop operational data- collection instruments via a custom enterprise resource planning (ERP) system that aggregates data from products and personnel in the field.

Nuru has synced its mobile forms with its custom ERP system, merging operational data with automated real-time usage data from charging stations. The data are intended to assess implementation costs and expenses, and identify opportunities for improving efficiency.



**4 ANALYSING DATA AND REPORTING**

**2 PLANNING AND DESIGN**

**3 MONITORING IMPACT**

Nuru developed two mobile data-collection instruments:

- A form to track expenses and activities during meetings with sector and village leaders in order to market its products and recruit VLEs
- A form to track training and distribution expenses during follow-up meetings with interested VLEs

**Activities/outputs:**
- VLE training, preparation and light distribution, active VLEs, VLE income, device distribution and recharge sales

**Outcomes:**
- reduced carbon-emitting products and increased use of renewable products.

**Impact:**
- customer livelihoods, as measured by income, education and health

## RESULTS

Nuru has begun to use mobile forms to continuously monitor implementation expenses and determine whether they can be reduced to increase affordability and achieve financial sustainability. These data are being aggregated and analysed alongside usage data sent from charging stations, allowing the company to: monitor performance by VLE, sector and product; determine where the returns on implementation are highest; and adjust future expansion.

# About Nuru Energy

Nuru Energy was founded in 2009 as an inclusive business[1] to provide affordable renewable energy products to people living below USD 1.25 per day. The Nuru team believes that energy is a basic need, which is inextricably linked to poverty, and that access to affordable energy can empower people to escape poverty. While Nuru's vision is to reach scale, the company is currently focusing on Rwanda, where "energy poverty" is particularly acute.

Nuru's estimates show that 80 per cent of Rwandans live in rural areas and 80 per cent of them lack electricity. Off-grid household-level solar solutions are available, but remain prohibitively expensive for those living below the national poverty line. Instead of providing household power for large appliances such as TVs and refrigerators, Nuru seeks to meet two basic energy needs plaguing all ultra-poor households: charging mobile devices and "task lighting" for cooking, studying, walking outside and attending to children at night.

As a result, the company has pioneered a unique suite of products and the "Shared Energy Access" business model, which utilizes rural entrepreneurship to make devices affordable and accessible. Instead of selling direct to consumers, Nuru trains and equips village-level entrepreneurs

(VLEs) to sell rechargeable Nuru Lights and fee-for-service recharging via a 60 watt solar panel or the company's patented POWERCycle pedal-powered generator. Both the solar panel and POWERCycle charge Nuru's Octopus Charger portable recharge box, which can subsequently charge up to five mobile phones or five Nuru Lights simultaneously in 20 minutes – with each light lasting 28 hours.

# Step 1: Assessing readiness

Effective impact measurement[2] begins with **determining the reason for measuring impact**. A wide variety of tools are available for businesses to measure, manage and report on their social and environmental impact. Approaches range from those generating quick feedback to those requiring a longer timeframe to prove systemic impact. BCtA believes it is important for companies to choose the right approach that meets their business needs given the available resources.

Assessing the company's readiness for impact measurement is a critical first step in determining what impact data to collect, how to collect them and how to use the data for business development and impact performance. In assessing a company's readiness to measure its impact, BCtA considers its maturity stage and capacity, which is determined based on the company's clarity of purpose, data-driven culture and resources available for data monitoring and collection.

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1   Inclusive businesses are commercially viable business ventures that engage people living at the base of the economic pyramid – people with less than USD 10 per day in 2015 purchasing power parity – as consumers, producers, suppliers, distributors of goods and services and employees.

2   In this case study, 'impact measurement' refers to the measurement of social, economic and environmental performance of inclusive business.

Prior to engaging with BIMS, Nuru's primary business needs were operational and focused on sustainability as the company sought to adjust its pricing model and reduce implementation costs; internal resources for data collection and management were undeveloped. The company lacked an integrated system and had not yet fully developed its ERP software to collect and analyse real-time usage data from VLEs. It had only just begun to explore using Open Data Kit Collect, a free open-source mobile app that deploys forms on mobile phones to track expenses from product distribution, VLE recruitment and training. Second, the company operated with a lean eight staff members servicing a remote and dispersed customer base.

Nuru was nevertheless interested in measuring impact. The company had received donor funding for a long-term randomized controlled trial to measure its impact on customer and VLE livelihoods. However, this was a one-time study implemented by a third-party research organization and was not integrated into Nuru's daily operations. Nuru's staff remained fully occupied with day-to-day business activities, which were also reliant on outside donor funding. Instead of continuously conducting sales and marketing, the team waited for grants to set targets for new rounds of VLE recruitment and preparation.

Considering that the company was already operational but still working on several components of its value chain and reviewing its pricing model to track and increase impact, Nuru was classified as a **progressive-stage business** with **medium readiness** for measuring impact (see the figure below).
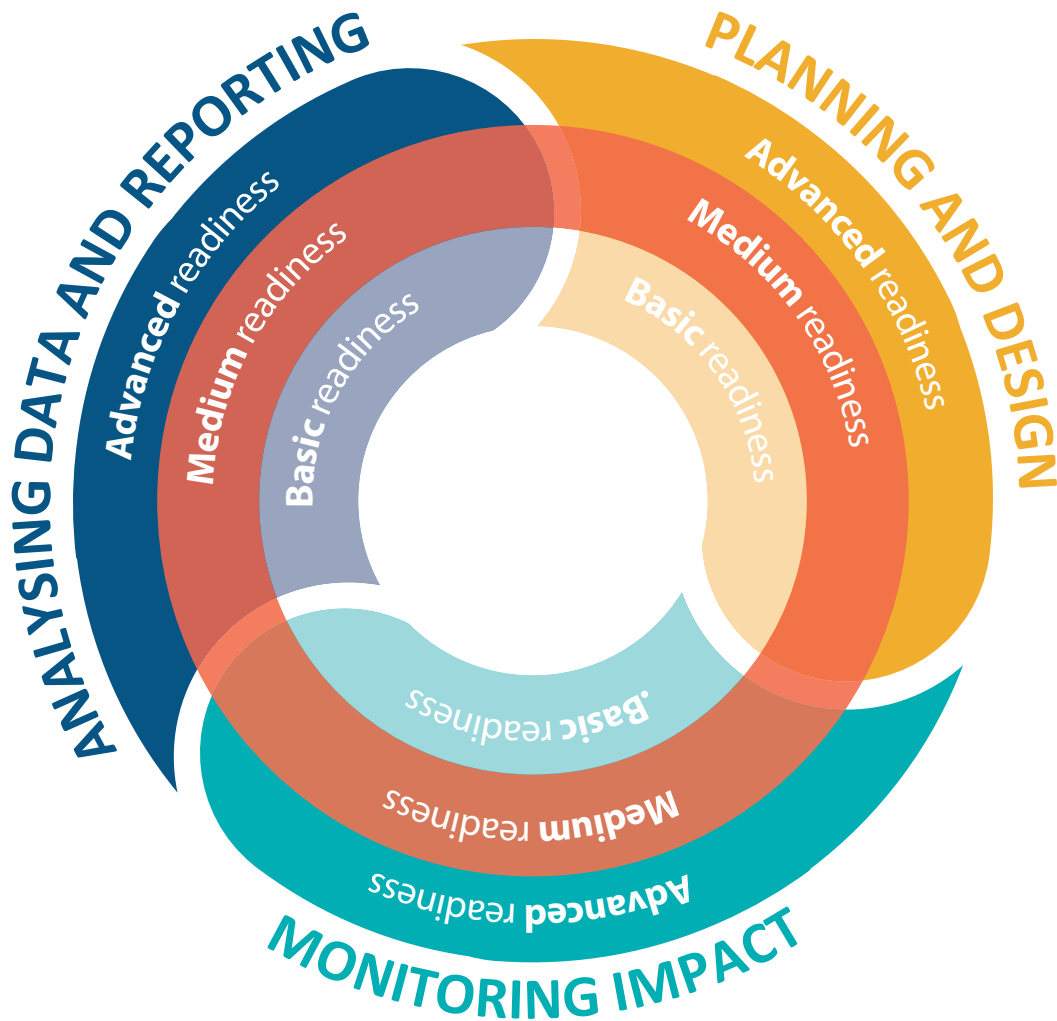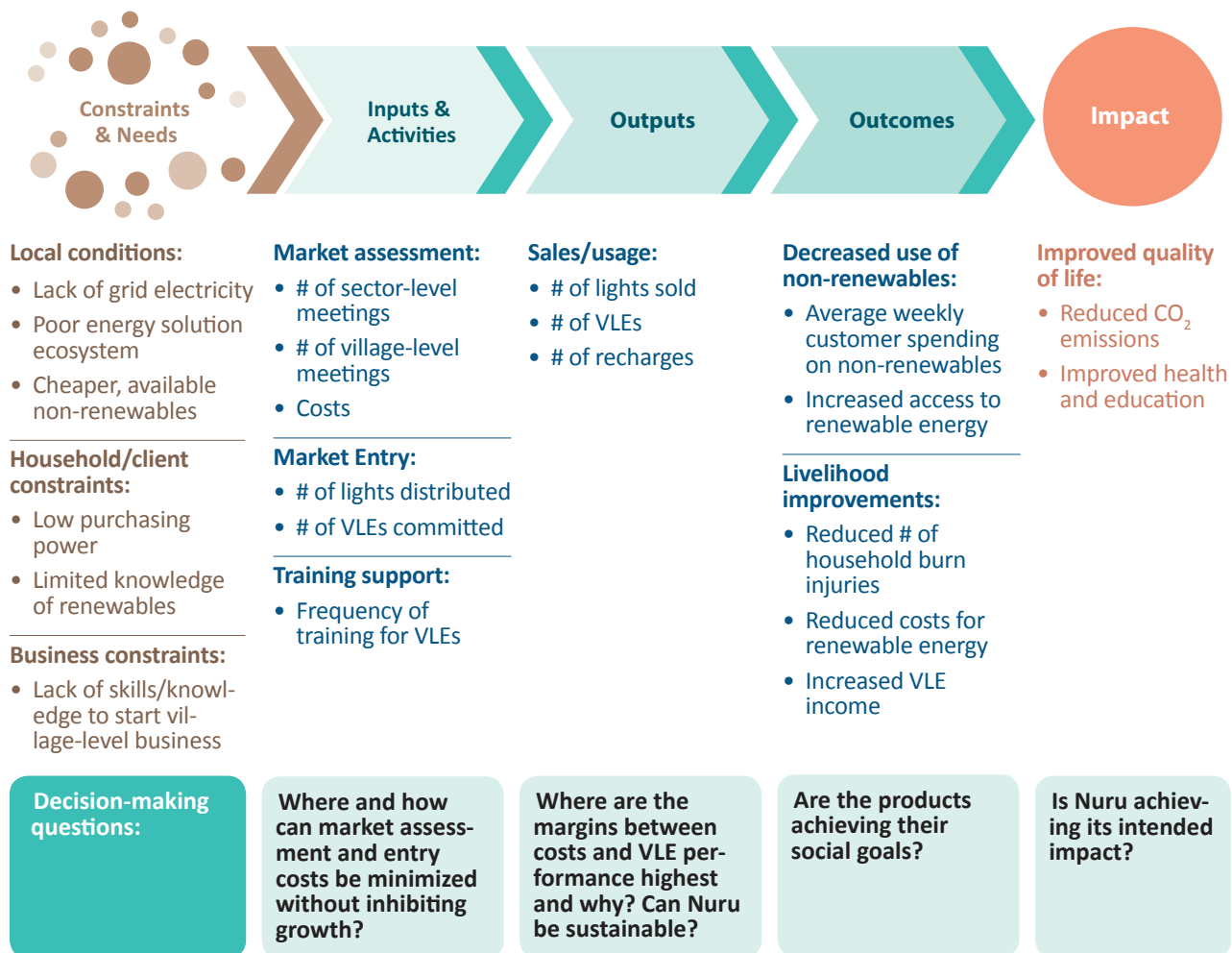
# Step 2: Planning & design

The planning step involves developing an Impact Value Chain[3] that links business goals, strategies and operations to outcomes and impacts related to the Sustainable Development Goals (SDGs).[4] The Impact Value Chain is the basis for developing impact indicators that address the needs identified in the previous step.

Impact Value Chains guide companies in determining what to measure and where to collect data by mapping business goals, strategies and operations against outcomes related to the SDGs. In Nuru's case, this did not result in direct impact measurement, but instead enabled the tracking of important cost metrics that underlie the key to its impact: affordability. Nuru's founder, Sameer Hajee, noted that, *"Real-time access to operational data [is] crucial in helping Nuru to ask more specific questions and move more rapidly to finding answers, for example: 'Are we over or under budget in particular sectors[5]?' and if so, 'why are we over and what can we do about it?'"*

An abridged version of Nuru's Impact Value Chain, with a limited number of social and environmental impact metrics[6], is presented here:

## Nuru's Impact Value Chain



| Constraints & Needs | Inputs & Activities | Outputs | Outcomes | Impact |
|---|---|---|---|---|
| **Local conditions:** <br>• Lack of grid electricity <br>• Poor energy solution ecosystem <br>• Cheaper, available non-renewables | **Market assessment:** <br>• # of sector-level meetings <br>• # of village-level meetings <br>• Costs | **Sales/usage:** <br>• # of lights sold <br>• # of VLEs <br>• # of recharges | **Decreased use of non-renewables:** <br>• Average weekly customer spending on non-renewables <br>• Increased access to renewable energy | **Improved quality of life:** <br>• Reduced $CO_2$ emissions <br>• Improved health and education |
| **Household/client constraints:** <br>• Low purchasing power <br>• Limited knowledge of renewables | **Market Entry:** <br>• # of lights distributed <br>• # of VLEs committed | | **Livelihood improvements:** <br>• Reduced # of household burn injuries <br>• Reduced costs for renewable energy <br>• Increased VLE income | |
| **Business constraints:** <br>• Lack of skills/knowl-edge to start vil-lage-level business | **Training support:** <br>• Frequency of training for VLEs | | | |
| **Decision-making questions:** | Where and how can market assessment and entry costs be minimized without inhibiting growth? | Where are the margins between costs and VLE performance highest and why? Can Nuru be sustainable? | Are the products achieving their social goals? | Is Nuru achieving its intended impact? |

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3   The Impact Value Chain integrates multiple approaches such as Theory of Change, Results Chain, logframes and business value chains.

4   Adopted in September 2015 by all United Nations member states, the SDGs are a set of 17 global goals and 169 targets related to key development issues facing society today. Countries aim to achieve them by 2030.

5   Sectors are the third level administrative subdivision in Rwanda. The Provinces of Rwanda are subdivided into 30 districts, and each district is in turn divided into sectors.

6   Nuru is collecting outcome and impact data through its donor funded randomized controlled trial.

# Step 3: Monitoring impact

To monitor impact, BIMS recommends that companies continuously collect data on operations and social performance. Businesses can access data from individuals or from secondary sources like invoices, inventories, customer registrations, market research reports, social media, surveys and polls.

Identifying sources of data is critical for developing data-collection plans using the Impact Value Chain. Many companies have already collected data that can be used for impact measurement, so BIMS suggests that they first determine if they can analyse existing data. If additional data are needed, it is important for companies to consider how different sources and data sets can be integrated or merged with existing resources to maximize the value of data collection, enabling more efficient analysis and knowledge sharing.

Nuru's core need was for financial sustainability through the 'Shared Energy Access' model by increasing its margins through reduced operational expenses and customer costs. Nuru was already collecting impact data through its donor funded randomized controlled trial, and its team had already begun deploying mobile forms on the 'ODK Collect' application to track field expenses. Rather than developing new tools or data streams, BIMS helped the team to improve and refine these forms into two core instruments:

1. A market-entry tracking form to record and aggregate expenses and activities during meetings with local leaders to market Nuru and recruit VLEs.

2. A delivery and training tracking form to capture expenses during follow-up meetings with interested VLEs for training and product distribution.

**Survey implementation**

The goal of both mobile tracking forms was to enable a comparison of operational data with data on usage and sales. To achieve sustainability, Nuru needed to analyse its data on implementation costs and identify patterns across villages, sectors, and VLEs that lead to profitability and impact. Where returns on implementation costs were highest, Nuru could focus future expansion. Where returns were lowest, the company needed to investigate how to improve efficiency.

Due to the operational nature of these data needs, Nuru did not administer a customer survey and therefore did not require a sampling strategy. Instead the company integrated the mobile data collection instruments into existing implementation processes, collecting data at all market entry and delivery meetings. However, during the first year of engagement with BIMS, Nuru's donor funding for VLE recruitment was delayed and the company's model and staff underwent changes. As a result, regular sales and marketing activities did not take place during that time – and Nuru did not have an opportunity to collect data.

The company did continue to develop its ERP system during this time however, deciding not to use the technology platforms that BIMS had provided to manage the tracking forms and data collected from ODK Collect. Instead, ODK was synced directly with Nuru's system, which allowed for automated, real-time registration of VLEs, and immediate monitoring of usage and sales. Having completed the system a year after beginning the BIMS process, Nuru resumed VLE recruitment with an investment from a major African clean-energy programme. Within two months, the company had successfully recruited over 200 new VLEs and was able to implement expense tracking forms for each of them.
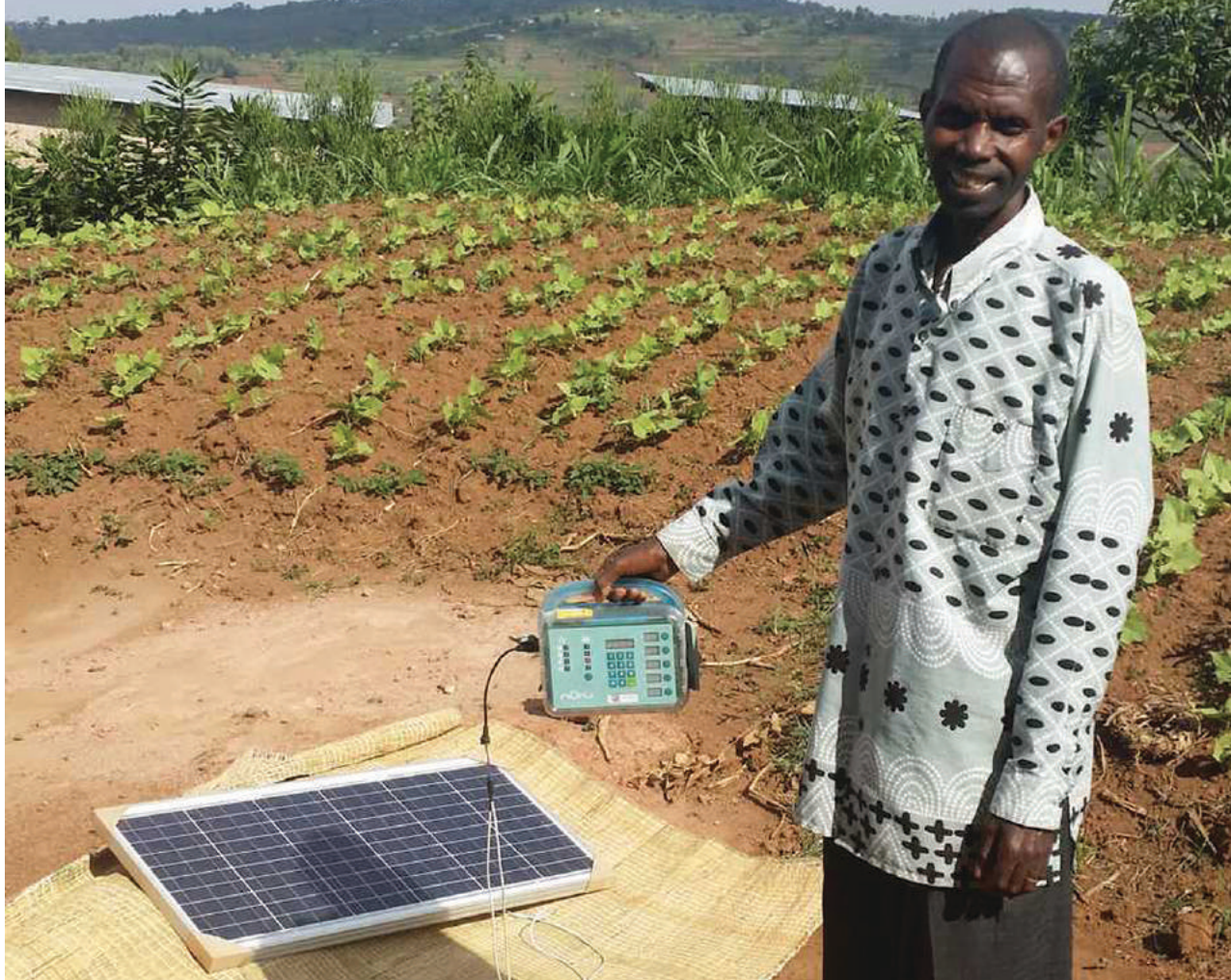
# Step 4: Analysing data and reporting

While the purpose and usability of impact data vary for each inclusive businesses, BIMS recommends that they be used to answer one or more of the following questions:

1. Who is being impacted?
2. How are they being impacted?
3. What are the drivers contributing to or limiting this impact?
4. How can this impact be scaled up and linked to the SDGs?

## Who and how are being impacted

Nuru seeks to impact households earning less than USD 1.25 per person per day, which comprise approximately 50 percent of Rwanda's population.[7] Nuru believes that increased access to affordable clean-energy products allows rural households to save money compared to purchasing disposable batteries, candles and kerosene.

## What are the drivers contributing to or limiting this impact?

In Nuru's Shared Energy Access model, the key driver of impact is the frequency of recharging devices – the amount of energy demanded from the customers of Nuru's VLEs. And early indication is that Rwanda's poorest[8] households spend an average of USD 0.30 per month on energy services – much less than what has been reported elsewhere. But Nuru is finding that energy consumption among households living below USD 1.25 per day is not as high a priority as other pressing needs such as food; most of Nuru's customers eat only one meal per day. The poverty level of these households therefore limits how much impact can be delivered, especially in market-based models in which households are asked to pay for the energy that they consume.

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7    http://www.minaloc.gov.rw/index.php?id=469&tx_ttnews%5Btt_news%5D=461

8    Ubudehe classification of poverty: http://www.newtimes.co.rw/section/read/75756/

## How can this impact be scaled and linked to SDGs?

BIMS supports inclusive businesses in adopting impact-measurement practices that help them to plan, monitor, and deliver social and environmental impact that contributes to achieving the SDGs. As part of the Impact Value Chain, Nuru identified the following SDGs that are aligned with its intended impact:
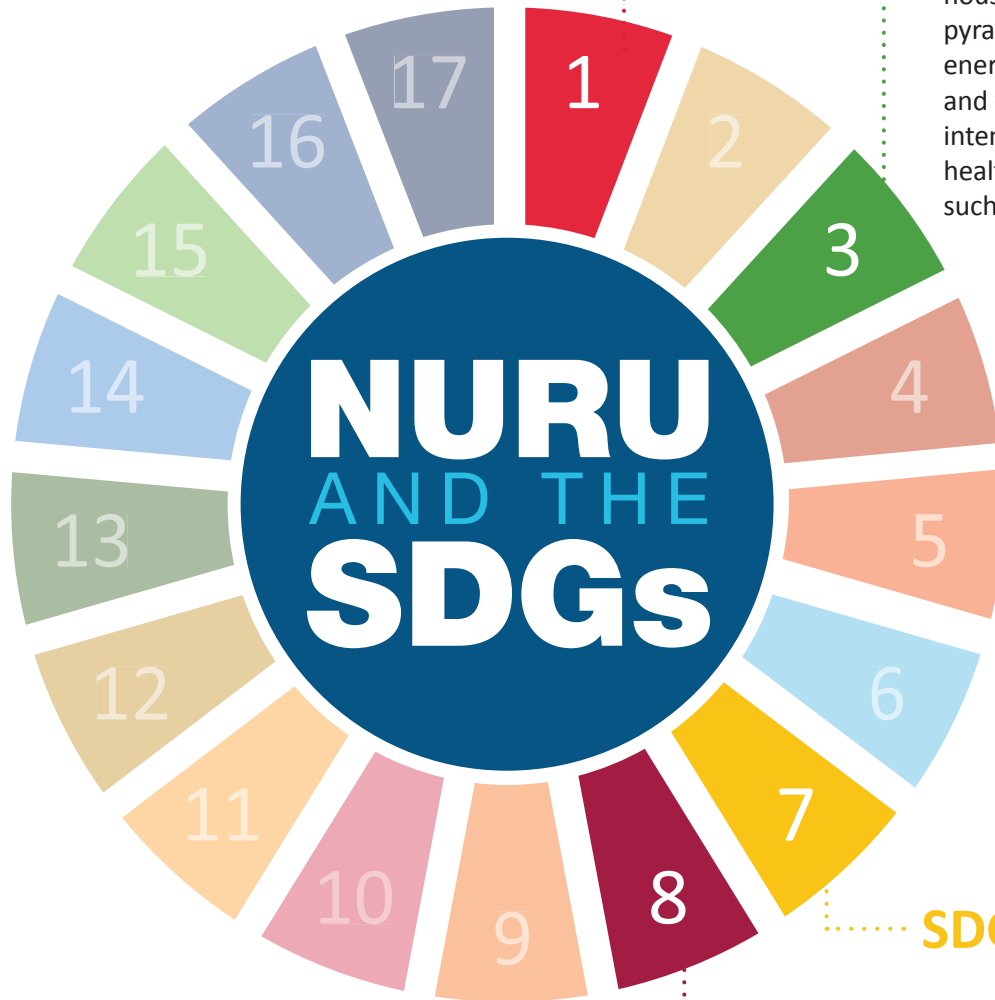
## SDG 1 NO POVERTY

Nuru's founding belief is that energy poverty contributes to economic poverty. By enabling access to affordable, renewable energy that provides light and mobile connectivity, the company seeks to empower its customers to climb out of poverty.

## SDG 3 GOOD HEALTH AND WELL-BEING

Nuru's products offer off-grid households at the bottom of the pyramid with an alternative to dirtier energy sources such as kerosene and wood. In doing so, the company intends to reduce the negative health effects from these sources such as smoke inhalation and burns.



NURU AND THE SDGs

## SDG 7 AFFORDABLE AND CLEAN ENERGY

This goal is the essence of Nuru's product line and business model, which provide more affordable and sustainable alternatives to poor rural households.

## SDG 8 DECENT WORK AND ECONOMIC GROWTH

While Nuru's products impact SDG 7 by providing energy alternatives, the company's business model provides employment opportunities for people in rural villages. Successful VLEs are able to generate reliable sources of income for themselves and their families while developing marketable skills through VLE training.

# Lessons learned from Nuru's impact measurement

### Engaging key stakeholders in the development of impact and operational metrics is necessary.

"Although the process of working with stakeholders is often time-consuming," explained founder Sameer Hajee, "we have found that there is ultimately a much higher degree of buy-in, which we believe will make it easier for us to expand our initiative across the country". External stakeholders include government authorities responsible for rural electrification as well as Nuru's research partners, which developed the randomized controlled trial. Internal stakeholders include field staff and VLEs.

### When planning for data collection, businesses should consider existing data sources, and prioritize improving on them before initiating new efforts.

During the early stages of engagement with BIMS, Nuru's management discussed the development of an ERP system connected to its products, and shared the expense tracking forms it had already been deploying. During field visits, the BIMS team trained Nuru's staff on deploying the forms using BIMS off-the-shelf technology. Nuru later integrated the forms into its ERP system, syncing data from the field directly with the system to establish VLE profiles. This integration improved analytical efficiency by streamlining Nuru's data collection and processing channels. "Survey instruments need to ease the data entry process while maximizing the amount of data being collected," explained Mr. Hajee.

### The Impact Value Chain provides businesses with a foundation for measuring and assessing their operations and impacts.

While the data-collection instruments deployed through BIMS focused on operational rather than impact data, the process of developing an Impact Value Chain contributed to Nuru's efforts to improve efficiency and grow towards sustainability. The company has now integrated a data-analysis dashboard that draws data from its ERP system to show progress against impact indicators identified in the Impact Value Chain.

### Start backwards from the end goal, and look at easy-to-use, low-cost data visualization and analysis tools.

Impact framework provides businesses with a foundation for measuring their impacts and operations. As Nuru developed and refined its data-collection processes and instruments, it became clear that there were still difficulties in acting on the data. Ultimately, the company decided that a visual representation of the data was necessary and chose an off-the-shelf dashboard software product that allows users to design and share their own data visualization dashboards in real time, without any technical expertise. This software "proved necessary in order for us to see what is actually going on", reported Mr. Hajee. "As we continue to develop this dashboard, we will experiment with new ways of 'cutting' the data, which will surely result in new insights."

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