Evaluation of the Mwangaza Mashinani pilot in Kilifi and Garissa counties, Kenya

Technical Note on the Value for Money Analysis – Final Report

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Oxford Policy Management

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Oxford Policy Management Limited
Registered in England: 3122495

Level 3, Clarendon House
52 Cornmarket Street
Oxford, OX1 3HJ
United Kingdom

Tel: +44 (0) 1865 207 300
Fax: +44 (0) 1865 207 301
Email: admin@opml.co.uk
Website: www.opml.co.uk
Twitter: @OPMglobal
Facebook: @OPMglobal
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The Team Leader for this evaluation is Michele Binci and the Project Manager is Alexandra Doyle.

This report was co-authored by Paul Baker, Neetish Hurry, Alex Hurrell, and Virginia Barberis. All opinions expressed, and any mistakes, remain the responsibility of the authors.

The contact person for this evaluation at UNICEF Kenya is Susan Momyani (sumomanyi@unicef.org). For further information on the evaluation, contact Alexandra Doyle (alexandra.doyle@opml.co.uk).

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List of abbreviations

BCC	Behaviour Change Communication
BWC	Beneficiary Welfare Committee
CTR	Cost to transfer ratio
DSA	Directorate of Social Assistance
E4I	Energy4Impact
EFT	Electronic Funds Transfer
FCDO	Foreign, Commonwealth and Development Office
KES	Kenyan shilling
M&E	Monitoring and Evaluation
MIS	Management information system
NSNP	National Safety Net Programme
OPM	Oxford Policy Management
QA	Quality Assurance
SL	Solar Lantern
SHS	Solar Home System
SIDA	Swedish International Development Agency
TA	Technical Assistance
ToC	Theory of Change
UNICEF	United Nations Children's Fund
VfM	Value for Money

1 Introduction

Oxford Policy Management (OPM) has been contracted by UNICEF to conduct an independent evaluation, including a value for money analysis, of the Government of Kenya's (GoK) Mwangaza Mashinani pilot project. The Mwangaza Mashinani is an innovative pilot project designed to enhance energy access to the most vulnerable segment of the Kenyan population to increase their well-being in terms of health, education and livelihoods with a particular focus on women and children. Additionally, the project seeks to develop markets for solar energy by increasing the penetration of solar products to previously underserved communities. The purpose of the pilot is to generate evidence on the impact of solar devices on households', as well as to understand how a market for solar devices can be developed in underserved regions.

The Mwangaza Mashinani pilot project provides cash top-ups to purchase solar home systems (SHS) and behaviour change communication (BCC) to poor and vulnerable households in Garissa and Kilifi counties.

This report presents the final report of the evaluation's Value for Money (VfM) component. In line with the design set out in the VfM Design Note, the VFM analysis focussed on the cost of the project, the key cost drivers, and the extent to which resource use was optimised to achieve intended outcomes. The first phase of the VFM analysis was limited to assessing economy, efficiency. The cost-effectiveness analysis was conducted in the second phase.

It is important to note that the delivery cost of a pilot programme, with a significant 'proof-of-concept' objective, will often be high compared to an established comparable programme, operating at scale and in a 'steady state'.[1] By design, a pilot programme is often attempting something innovative and may require significant iteration in its design and implementation. Also, where pilot programmes are delivered together with a large-scale impact evaluation (which will hopefully deliver robust evidence of impact), as part of the 'proof-of-concept' objective, this will disproportionally drive up the apparent cost of the programme. However, this is generally not reflective of ongoing programme costs, since subsequent evaluation activities will usually be delivered through programmatic monitoring and evaluation (M&E) activities, integrated into routine management and reporting functions. Thus the ongoing M&E costs of a scaled-up programme will often be lower, and this will be spread over a much larger total spend, once a programme is at scale.

This technical note has been revised to respond to multiple rounds of UNICEF's comments.

1.1 Objectives and research questions

As mentioned above, the objectives of the VfM analysis are to review how much the Mwangaza Mashinani pilot project has spent and assess whether the project provided VfM, being '*the optimal use of resources to achieve intended outcomes*' (DFID, 2011). Based on discussions with UNICEF, for this analysis, we focus on three areas of VfM, namely economy, efficiency, cost-effectiveness. By looking at these areas, we have answered the following research questions:

[1] Steady state is used to describe a programme running under normal operating procedures without start-up costs, inception phases, and other costs associated with monitoring and learning that can be incurred in pilot programmes.

Table 1: VfM criteria and evaluation questions

VfM Criteria	Evaluation Question
Economy	• Is the project buying inputs of the appropriate quality at the right price? Inputs include staff, contractual services from external providers, and other goods and services that are used to produce outputs.
Efficiency	• How well does the project convert inputs into outputs? Outputs are results delivered by the project, as measured by the project log frame. In this case, the cost-efficiency analysis looks at the cost of delivering cash top-ups to beneficiaries and the cost incurred by the project per beneficiary household.
Cost-effectiveness	• How large were the impacts relative to the size of inputs and investment? The cost-effectiveness assessment examines whether the project achieved its intended outcomes on the beneficiaries' sense of ownership, usage, health, and quality of life of children and their families.

1.2 Methodology

Using the FCDO guidelines on VfM (DFID, 2011) and OPM's VfM approach (King and OPM, 2018), an assessment framework has been applied that sets out a transparent basis for making VfM evidence-based judgements. This clarity is achieved through the use of explicit criteria (aspects of performance) and standards (levels of performance) for each of the VfM dimensions. The criteria and standards are specific to the Mwangaza Mashinani pilot and aligned with the pilot's design and Theory of Change (ToC). The VfM assessment is based on the comparison between identified standards and project-level indicators for each criterion.

The core evidence base for this VfM assessment includes data that are routinely collected as part of the pilot M&E system, UNICEF annual reports to Sida, E4I quarterly reports to UNICEF, the project implementation plan, contracts and Memoranda of Understanding (MoU) with key input providers, and budget and expenditure data as recorded by UNICEF and E4I. The analysis also draws on a validation interview with UNICEF and E4I. This includes a mix of quantitative indicator-based measurement and qualitative contextual evidence.[2]

Annex A includes the VfM assessment framework, and a description of how each economy, efficiency and effectiveness indicator is measured, the benchmark standard, data source and some calculations used in the analysis.

1.2.1 Limitations

There exist some limitations to the VfM assessment analysis.

- The reference point for the VfM assessment of a pilot programme is never obvious. As discussed in the introduction, the cost of a pilot programme is unlikely to be representative of the scaled-up programme by design. This is because a pilot programme is often innovative, requiring iteration in its design and implementation model. Pilot programmes will also often have disproportionately costly impact evaluation costs, where there is an objective to generate robust measures of programme impact in line with an explicit proof-of-concept objective. In our analysis, we have (wherever relevant) distinguished between the VfM performance of the pilot (where the 'value' relates principally to broader influencing objectives, operational experience and the evaluation evidence generated), from the likely VfM performance of a scaled-up version of the programme, assuming the core elements of the programme remain the same.

[2] In the following report, costs have been reported in USD and KES. For reference, at present, the exchange rate applied is 1 KES = USD 0.0092

- A related limitation is that there are seldom other programmes against which the costs of a pilot programme can be compared. For this reason, the benchmarks for this analysis are set using project documents (i.e. proposals, budgets and contracts) rather than data from other programmes. However, throughout the narrative, where appropriate, we reference findings from other VFM studies to provide a comparator. For some indicators, due to the lack of appropriate benchmarks, assumptions have been made for comparisons. An example is the cost-effectiveness analysis for 'Child Time Study at home' where unsupervised home study time is assumed to be half as valuable when compared to an hour of tutor-led instruction.
- Budget data and actual spending are not reported based on a standardised coding approach. The budget is disaggregated by activity, while spending is coded according to the cost centre money was spent on (for example, personnel, travel, contractual services, etc.). This makes comparability of budget and spending data difficult and required the team to make a set of assumptions to analyse the efficiency of the project. This introduces some challenges to the robustness of the results.
- Lack of disaggregated data. The evaluation team was not able to access some data disaggregated at the appropriate level for the spending incurred by the consortium led by E4I, therefore limiting the extent to which certain aspects of the VfM assessment could be explored and expanded upon.
- Inconsistencies across the data sources further complicated the analysis. For example, the number of beneficiaries and default rates vary between the payroll data, the dashboard data, and the reconciliation reports provided as data sources. The main reasons shared for the inaccuracies were that, first, the dashboard was not always updated regularly since it pulls its data from banks and solar suppliers. Sometimes this data never came through or came late, causing some discrepancies. Second, it was challenging to get data on beneficiaries from the Cooperative bank.

1.3 Assessments

1.3.1 Economy assessment

The assessment of the project performance against the economy criterion assesses whether the project uses resources economically, buying inputs of the appropriate quality at the right price, and following good project management practices. When evaluating the pilot's performance against the economy criterion, the following sub-criteria are used:

1. Whether the project is meeting agreed benchmarks for technical assistance (TA) and management costs, and costs of key inputs: cost of contractual services for implementation and evaluation of project activities, prices of M-Pesa and bank charges, prices of the solar products;
2. Whether the project shows sound procurement practices and effective negotiation in respect of solar suppliers' services.

Performance standards for the economy area have been adapted to the design of the project and data received from UNICEF and E4I. The performance standards are as follows:

Performance	Criteria
A: Very Good	Evaluation deems that costs have been minimised, without compromising the integrity of expected results, and may even exceed expected results.
B: Good	TA and management costs, cost of key inputs meet benchmarks. Project comprehensively follows sound procurement practices for solar products and meets expectations for quality and price.
C: Average	Any of the Economy measurements do not consistently reach benchmarks, or any significant departures from benchmarks can be justified in terms of context and

Performance	Criteria
	evolving circumstances. Project generally follows sound procurement practices for solar devices and meets expectations for quality and price.
D: Low	Any one of the Economy measurements consistently under-perform benchmarks. Project does not follow sound procurement practices.

Note: Benchmarks are based on design documents and/or comparable figures for other similar projects.

1.3.2 Efficiency assessment

Drawing on FCDO's VfM framework, efficiency is concerned with the relationship between inputs and outputs, which are the goods and services the project delivers. The efficiency analysis focuses on the way in which the resources were managed for the project's delivery of outputs. We focus on three metrics within the efficiency area: allocative efficiency, technical efficiency and dynamic efficiency. Performance standards for the efficiency area have been adapted to the design of the project and data received from UNICEF and E4I. The performance standards are as follows:

Performance	Criteria
A: Very Good	Evaluation deems that the organisations have a capacity (HR and IT/financial) and system in place for determining cost efficiency (including outsourcing choices, appraisal, due diligence of partners etc.), regularly evaluate allocative efficiency and practice sound financial management techniques, and demonstrate the ability for the programme resources to adapt to changes in delivery costs or unforeseen events.
B: Good	Evaluation deems that the organisations have an adequate capacity (HR and IT/financial) and system in place for determining cost efficiency (including outsourcing choices, appraisal, due diligence of partners etc.), have good evaluate allocative efficiency practices, and have a system in place for the programme resources to adapt to changes in delivery costs or unforeseen events. Management of key drivers for efficiency is adequate.
C: Average	Any of the Efficiency measurements do not consistently reach benchmarks, or any significant departures from benchmarks can be justified in terms of context and evolving circumstances. The system in place for determining cost-efficiency is only partially effective.
D: Low	Any one of the efficiency measurements consistently underperforms benchmarks. System in place for determining cost efficiency is not effective.

Note: Benchmarks are based on design documents and/or comparable figures for other similar projects.

1.3.3 Cost-Effectiveness assessment

According to FCDO's VfM framework, cost-effectiveness measures how much impact the inputs or investments had on the project results. In this assessment, we measure cost-effectiveness against the following impact areas: education, child/women time use, livelihoods, and energy use. A benefit-cost ratio indicator is also included, in an attempt to summarise the overall value for money of the project.

Performance standards for the effectiveness area have been defined as follows:

Performance	Criteria
A: Very Good	There is sufficient evidence that the programme exceeded expectations for impacts based on the independent impact evaluation and progress achieved through the cost-effectiveness indicators. Cost-effectiveness is significantly lower than relevant benchmarks. The benefit-cost ratio is significantly higher than 1.
B: Good	The programme is judged to have met expectations for impacts based on the independent impact evaluation and progress achieved through the cost-effectiveness

Performance	Criteria
	indicators. Cost-effectiveness is somewhat lower than relevant benchmarks. The benefit-cost ratio is somewhat higher than 1.
C: Average	Any of the effectiveness measurements do not consistently exceed benchmarks, but do not fall below average. The benefit-cost ratio equals 1.
D: Low	Any one of the effectiveness sub-indicators scores below average. The benefit-cost ratio is lower than 1.

Note: Benchmarks are based on other projects and data sources. In cases where a benchmark was not available, results have been compared to the projected use of current energy sources.

2 Findings

Box 1: Key VfM findings

In the period under review, the **VFM performance of the pilot** was consistent with the agreed standards for **good economy, average efficiency, and average cost-effectiveness**.

However, the **expected VFM performance of the programme at scale** is on track to be **good** for all three dimensions, including efficiency and some aspects of effectiveness, provided current performance levels are maintained and a number of specific conditions hold.

Economy:

Based on available evidence, the project meets the definition of **'good'** in the standards for economy. This judgement applies both to the economy performance of the pilot project, as well as the expected economy of the scaled-up programme, provided robust procurement procedures are maintained. There would even be scope for improving expected economy performance, if (for example) the cost for contractual services can be contained and/or the price of solar devices can be reduced going forward.

The project managed to minimise the 'transaction' costs attached to the cash transfers (i.e. M-Pesa charges and banks' charges), as well as operational and staff costs, as measured by UNICEF's staff costs, general operating costs, costs for supplies and commodities and costs for travel. However, contractual services cost more than expected. Some reasons for this relate to delays and challenges emerging from contextual factors, some unforeseeable at the planning stage. While the project followed sound procurement practices for the selection of the solar suppliers, the final cost of the solar devices was above the budgeted amount. In addition, beneficiaries experienced several issues in activating and repaying the devices, raising concerns over the suitability of selected devices and repayment modality within the context of this pilot.

Efficiency:

Based on the available evidence the overall **pilot project** meets the definition of **'average'** in the standards for allocative, technical and dynamic efficiency. Despite the initial delays, by June 2020, most of the log frame targets had been achieved. Nonetheless, the project allocated larger resources to set up and inception activities, as well as implementation, compared to the budgeted amounts. In addition, 22% of enrolled households decided not to purchase the solar device and 30% of beneficiaries do not regularly repay the device. The analysis of costs by cost centre reflects the learning objective of the pilot, with the majority of costs incurred for consultancy services to implement and evaluate the project, and TA and QA activities to ensure coordination and strengthening capacity among stakeholders. Learning and start-up activities associated with a pilot phase, as well as ancillary services provided to beneficiaries (such as skills training and behavioural change communication) increase the cost of the project, compared to other cash transfer programmes in Kenya. With a unit cost per beneficiary of $ 296[3] compared to an average transfer of $151 per beneficiary to pay for the solar device, the pilot shows a modest level of efficiency in the use of resources, owing in part to the innovative approach tested by the project and learning and start-up costs associated with a pilot phase. While higher costs are expected in a pilot project, the combination of high unit cost and quite high attrition rate presents the project with some lessons for subsequent phases.

However, for the reasons discussed above, the operational model and cost profile of a project in the pilot phase will not be the same as that expected once it has been fully scaled up and is operating in its 'steady state'. The assessment here is that **the expected efficiency of the programme at scale has the potential to be 'good', provided a number of conditions hold**:

1. The programme takes measures to increase the percentage of enrolled households that follow through to purchase the solar device;

[3] This excludes the costs for the external independent evaluation and costs associated to UNICEF's TA and QA.

2. The programme takes measures to increase the percentage of beneficiaries that regularly repay the device (i.e. reduce the incidence of default). To the extent that default rates are caused by payment delays, measures should also be taken to support the National Safety Net Programme (NSNP) to minimise NSNP payment delays.

3. Implementation of the scaled-up programme is taken on by government agencies, and this brings down the cost of targeting and the community-level activities, for example by piggy-backing on existing government targeting and/or community support structures.

4. The design of the targeting process under the scaled-up programme is streamlined. This could include efforts to identify eligible households that are most likely to follow through to purchase the solar device after enrolment

5. Beyond the targeting process, community-level activities under the scaled-up programme can be streamlined, hopefully in line with a growing market for solar devices coupled with greater access to maintenance services.

6. Direct technical assistance and QA are no longer required from UNICEF and E4I or required to a much lesser extent as the programme is handed over to the government.

Meeting these conditions will be challenging, requiring some significant shifts from the current setup and performance of the pilot project. It will therefore will require deliberate attention and effective actions from UNICEF and other key stakeholders.

Cost-effectiveness:

Based on available evidence, the project meets the definition of **'average'** in the cost-effectiveness of its education impacts. Excluding pilot related costs, it is estimated that the cost of the project requires **$11.40** to be consumed to increase attendance in school for one child by one day. When compared to the benchmarks of other programmes that calculate the additional years of education delivered per child per $100 spent, the Mwangaza Mashinani project fairs better than most and even has the best score among projects related to cash transfer programmes.

The project meets the definition of **'low'** in terms of cost-effectiveness concerning children's time spent studying at home. It costs **$2.30** to increase the study time for one child by one hour at night. The benchmark used is an alternative to provide private education/tuition to the students. Data from the teacher platform[4] state that the median tutor hourly pay in Kenya for Kilifi and Garissa counties is **$2.84** per hour to educate children privately. Assuming that studying alone generates half the benefit of studying wth a tutor, we calculate the benchmark to be **$1.42**, which is lower than the cost of the project.

In the area of energy use, the project meets the definition of **'good'**. The cost-effectiveness indicator states that it costs **$0.13** for one extra hour of energy using solar devices as an extra source of energy. Our benchmark of using mini-grids as an alternative source of renewable energy is at **$0.23** per hour, higher than the costs of the Mwangaza Mashinani programme.

The cost-effectiveness meets the definition of **'average'** in education impacts**, 'low'** in child time in use and **'good'** in energy use**,** when compared to the chosen benchmarks over the three years of the project. The analysis of the available evidence through benefit-cost ratio calculations indicates that the project benefits only slightly overweigh the costs of the project in the fifth year of the project. Hence, the project meets the definition of **'low'** in the 3rd and 4th years and in the 5th year of the use of the devices the benefits of the project will slightly surpass the costs of the pilot project and will meet the definition of **'average'**.

The remainder of this Chapter presents the findings from the economy, efficiency and cost-effectiveness analysis in more detail.

[4] See https://www.teacheron.com/ for more details

2.1 Economy analysis

According to FCDO's VfM framework, economy is concerned with the cost and value of inputs (DFID 2011). In summary, the evidence was gathered to address seven indicators: 1) average monthly UNICEF staff cost; 2) average monthly UNICEF operational cost; 3) cost of E4I contractual services, 4) cost of OPM contractual services; 5) transaction costs as a percentage of total transfer value; 6) unit cost of the solar device and 7) existence of operational evidence of procurement policies and procedures being documented and followed.

Based on available evidence, the project meets the definition of **'good'** in the standards for economy. **This judgement applies both to the economy performance of the pilot project, as well as the expected economy of the scaled-up programme, provided robust procurement procedures are maintained**. There would even be scope for improving expected economy performance, if (for example) the cost for contractual services can be contained and/or the price of solar devices can be reduced going forward.

2.1.1 Staff and operational costs

TA and project management is captured under UNICEF's staff costs and operational costs.

Table 2 shows that the monthly average staff cost is below the benchmark, as set up in the budget proposal. This can be explained by the involvement of a mix of experts combining different levels of seniority, with larger involvement observed for more junior or locally based staff.[5] UNICEF staff also explained that, while the pilot timeframe experienced some delays, the experts' involvement was mainly concentrated over 12-18 months, roughly covering the period of the top-up payments. Staff members allocated relatively less time to the project before and after the payment cycles. In addition, some senior roles have been vacant for some periods.[6] This drove staff costs down, although it might also have affected UNICEF's capacity to provide the expected support for some periods.

Regarding operational costs, UNICEF spent $1,532 per month on average. This includes the costs of supplies and commodities, travel and general operating and other direct costs. The monthly average cost is 59% lower than the expected budget allocation, as specified by UNICEF's original budget proposal to SIDA (see Table 2). Non-staff costs decrease along with the project cycles and are primarily driven by travel costs (see Figure 1). The highest expenses were incurred before the first payment cycle in May 2019 and cover travel to Kilifi and Garissa for coordination and stakeholder engagement, as well as the official launch of the pilot in April 2019. While at the start of the project (Cycle 0) several members of the project team participated in these trips, this decreased in the later cycles. High operational costs in July and August 2019 are attributable to the stakeholders' joint field monitoring in Kilifi and Garissa, while operational costs incurred between January and April 2020 cover travel for coordination activities in Kilifi and the stakeholder validation workshop of the evaluation baseline findings and presentation of the recommendations emerging from the project national implementation review in Nairobi. UNICEF clarified that continuous support at the county level was critical given the large number of stakeholders engaged in the project and the innovative nature of the pilot.

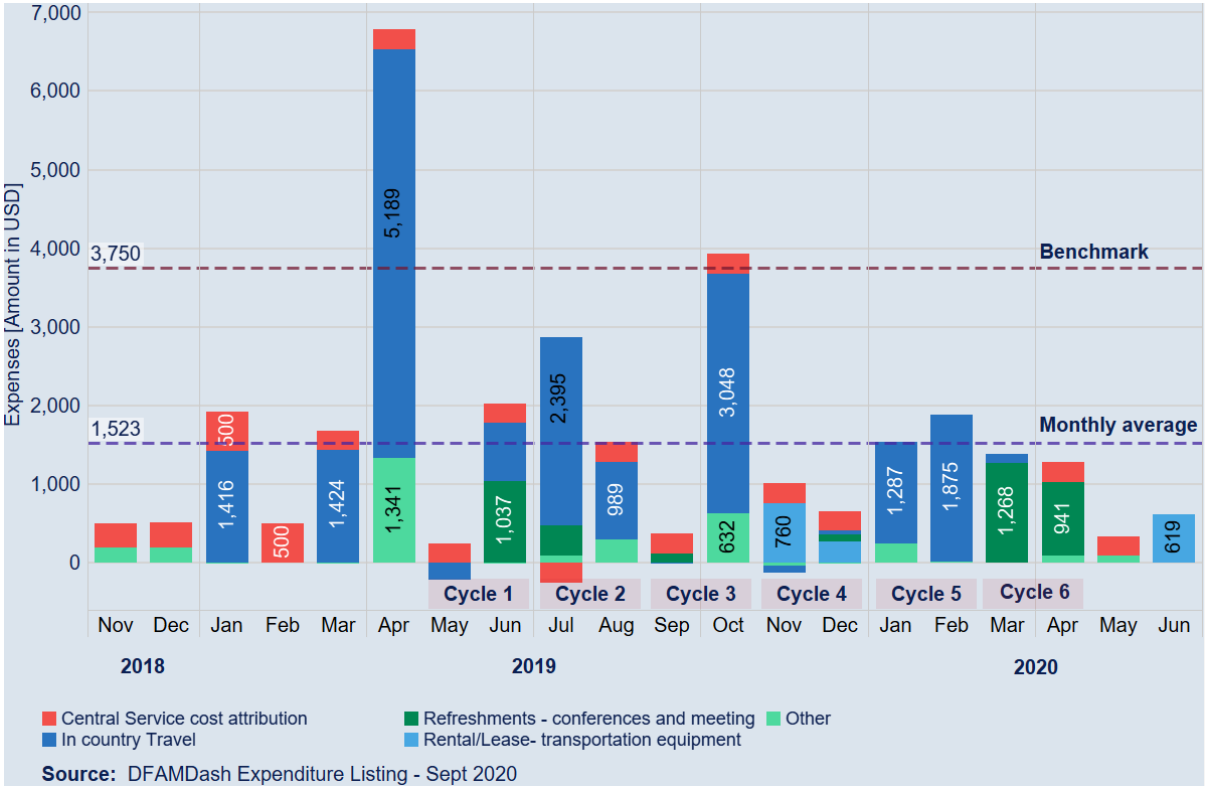
[5] These staff members have been recruited when the project was already running and show relatively more time allocated to the project activities than senior staff. Senior staff include: two social protection specialists, one evaluation specialist and the Chief of Social policy. The estimated work experience is minimum 5 years, on the basis of each role's annual salary. Team composition is presented in Annex A.

[6] One of the two social protection specialist positions was vacant between July and October 2019, which coincides with the second and third payment cycles to the households (eventually combined in one single payment in November 2019). The chief of social policy position was vacant for 10 months from November 2019 to September 2020, corresponding to three out of six expected cycles of payment.

Table 2: UNICEF's monthly average staff costs and operational costs

Indicator	Actual spending ($)	Benchmark ($)	Difference between benchmark and actual value ($)	% Difference between benchmark and actual value
Monthly average staff cost	2,986	6,667	3,681	55%
Monthly average operational cost	1,532	3,750	2,218	59%
Note: Benchmarks for average staff costs are derived from expected monthly budget allocation for UNICEF TA and QA. Staff costs are derived from data on annual salary, number of months each staff worked on the project and percentage of FTE worked on the project. Benchmark for average operational cost is estimated on the basis of the UNICEF budget.				

Figure 1: UNICEF's operational costs



2.1.2 Cost of contractual services

The analysis of key inputs look at contractual services provided by the implementing consortium (E4I, Busara Centre and Somali Aid), and OPM's evaluation services. Both suppliers received additional funding on top of their original contracts, to expand their scope of work and finance unexpected activities (see Table 3). The contractual service fees are high, but understandable for the purposes of testing an innovative approach and learning from the evaluation. However, unrealistic underlying assumptions during the planning and costing process seem to explain some of the observed extra costs. For example, the project likely lacked full information on the evolving conditions in the local context. This resulted in the definition of programme eligibility criteria that were too stringent, and the underestimation of transport costs and costs for engaging with county government officials.

E4I received additional funding because the initial vulnerability assessment to identify eligible households took more time and resources than initially expected.[7] The project documents explain that after the vulnerability assessment, a first round of data verification found that too few households met the eligibility criteria to reach the targeted number of 1,500 households. For this reason, the project agreed to target not only beneficiaries from the Cash Transfer for Orphans and Vulnerable Children cash transfer programme, but also beneficiaries of the Older Persons Cash Transfer and of the People with Severe Disabilities. In addition, during the set-up phase of the project, the Directorate of Social Assistance (DSA) conducted a recertification and migration exercise (where beneficiaries were moved to full bank accounts), which resulted in the temporary exclusion of many households from the government's cash transfer programmes. For the pilot project, households that were unable to open a bank account and therefore, not re-registered in the government's management information system (MIS) were considered ineligible for the project. After this migration process, approximately 75% of the households initially deemed eligible for the pilot project were no longer found in the MIS. This required a second round of verification to update the list of eligible beneficiaries. Project documents only indicate that the project had to cater for the facilitation and county government engagement costs, which was not planned at the design stage.

Disaggregated data on staff and operational costs provided by E4I shows that the contract value was not sufficient to cover actual expenses incurred by the consortium and additional financing has been provided by E4I (see Table 4). E4I explained that the over-expenditure is attributable to extensive geographical coverage driving up travel costs and staff expenses costs, more staff time and resources spent during implementation, especially to coordinate repayment exercises and to manage and analyse beneficiaries' data, due to challenges in tracking beneficiaries. The consortium also incurred unforeseen security- related costs in Garissa, due to the deterioration of security conditions on the ground. Lastly, the consortium faced some additional costs due to the COVID-19 crisis, such as costs of procurement and supply of hygiene equipment, as well as extra coordination costs necessary to implement the last payment cycle in light of the government's restrictions on travelling.

The first extension to OPM's contract was necessary to fund a second round of baseline data collection, due to the effects of the migration process and changes to the targeting criteria explained above. The second extension to OPM's contract was attached to the production of a supplementary evaluation output to ensure timely dissemination of the findings from the national implementation review ahead of the second phase of the pilot.

Table 3: Costs of contractual services

Indicator	Current contract value ($)	Original contract value ($)	Difference between benchmark and actual value ($)	% Difference between benchmark and actual value
Contractual services - E4I	530,126	449,933	80,193	18%
Contractual services - OPM	605,989	544,939	61,050	11%
Note: Original contract values are taken as benchmarks. A positive difference represents overspending while a negative difference represents underspending.				

[7] Two separate contracts have been issued for E4I's services. UNICEF explained that the existence of two contracts is due to the fact that the first contract was funded through a grant/resource stream that then expired and hence a second contract with a new funding source had to be made.

Table 4: E4I staff and non-staff costs

Indicator	Actual spending ($)	Contract value ($)	Difference between benchmark and actual value ($)	% Difference between benchmark and actual value
Staff costs	261,689	183,719	77,970	42%
Non staff costs	396,608	346,407	50,201	14%
Note: Non-staff costs include E4I sub-contracts to Busara Centre ($94,594) and Somali Aid ($85,830). A positive difference represents overspending while a negative difference represents underspending.				

Table 5: Breakdown of budget of evaluation services by staff and non-staff cost

Contract	Original contract ($)	First extension ($)	Second extension ($)	Total ($)
Staff costs	274,748	-	16,560	291,308
Non-staff costs	270,191	40,000	4,490	314,681
Note: Non-staff costs include OPM sub-contracts to data collection firm				

2.1.3 Payment transaction costs

Evidence on the transaction charges attached to the transfer are in line with expectations, despite some inconsistencies in data reporting.

Total charges as captured by the sum of M-Pesa charges, EFT charges and zoning charges[8] represent 5% of the total amount disbursed to beneficiaries. Table 6 shows that this is lower than the projected costs put at the maximum of 10% by UNICEF's budget proposal to SIDA. Nevertheless, UNICEF's Mwangaza Mashinani Additional Financing paper states "*Bank fees were underestimated […]*" although there is no information to clarify the reasons for this statement. We also observed some discrepancies in the data reporting. The same paper reports that the project negotiated fixed EFT charges applied by the financial providers. "*The Mwangaza Mashinani program is riding on the Ministry of Labour, State Department of Social Protection, Inua Jamii contracts with the selected payment service providers being Kenya Commercial Bank, Equity Bank and Cooperative Bank. The charges agreed are; EFT KES 120 per household, M-Pesa transaction cost KES 60 per household to the suppliers […]*". However, the payroll data used to transfer funding to the banks presents slightly different figures. See Table 7 below. M-Pesa rates applied in the payment cycles vary depending on the amount transferred and match the rates as available online.[9] In terms of the EFT charges applied by the banks, it is not clear why EFT charges vary by cycle. While EFT rates charged by KCB and Equity Bank are lower than the tariff charges usually applied by these banks, showing that the project could benefit from lower rates as negotiated by the Inua Jamii programme, EFT charges for Coop Bank's accounts seem to be higher than commercial fees. See Table 7 and Table 8.

[8] Zoning charges applied to the transfer depending on the beneficiary location.
[9] These are available from the Safaricom website: https://www.safaricom.co.ke/personal/m-pesa/getting-started/m-pesa-rates

Table 6: Transaction costs and percentage of total transfer

Indicator	Indicator value	Benchmark	(%) Difference between benchmark and actual value
% of transaction charges over total amount to beneficiaries	5%	10%	50%
Note: charges include M-Pesa charges, EFT charges and zoning charges for KCB accounts. Benchmark is derived from UNICEF budget			

Table 7: Average transfer for solar device, M-Pesa rates and EFT charges per transfer, by payment cycle

Cycle	Average transfer to cover solar device cost (KES)	M-Pesa rate per transfer (KES)	EFT charges per transfer (KES)		
			KCB	EB	Coop
Cycle 1	2,952	56	120	60	240
Cycle 2&3	4,200	61	120	60	360
Cycle 4	2,099	28	0	60	240
Cycle 5&6	4,996	Multiple rates - 41, 61, 77, 87, 97	0	60	240
Note: estimates are reported as stated in the payroll data used to instruct banks on payments to beneficiaries.					

Table 8: EFT commercial tariff charges by financial provider

Bank	EFT charges (KES)
KCB (from one KCB account to another KCB account)	150
Equity Bank (from one EB account to another EB account)	100
Coop Bank (from a non-Coop Bank account to a Coop Bank account)	0 to 200
Coop Bank (from one Coop Bank account to another Coop Bank account)	150
Source: KCB bank tariff guide 2019, EB bank tariff guide 2016, Coop Bank tariff guide 2019 Note: Exchange rate KES 1 = USD 0.0092	

2.1.4 Cost of solar devices

Table 9: Cost of solar devices

Indicator	Indicator value ($)	Benchmark ($)	Difference between benchmark and actual value ($)	% Difference between benchmark and actual value
Biolite Home 620 cost	125	100	- 25	-25%
D-31 cost	127	100	- 27	-27%
Note: benchmarks are derived from UNICEF budget.[10]				

[10] We compared negotiated prices and market prices (as available on the provider's website, https://www.jumia.co.ke/solarhome-620-blue-biolite-mpg151539.html) but we decided against using market prices as benchmark. As per project proposal, the project agreed to pay an estimated 30 percent of margin over the market price to cover financial risks taken by the solar providers to extend the repayment period to 9-12 months. Thus, the price negotiated by the project would always be higher than the market price.

There is operational evidence of procurement policies and procedures being documented and followed in the selection of the solar device suppliers.[11] However, the project underestimated the cost of the solar devices, eventually being between 25% and 27% higher than expected (see Table 9).

As shown in Table 10, there are many solar devices available on the Kenyan market with features that are similar to the devices offered through the Mwangaza Mashinani project. There is scope for the project to procure cheaper devices but there is a need to ensure that the products are of equal quality and have a similar lifespan to those offered in Phase 1.

Table 10: Comparison of cost of solar devices

Brand	Product	Features	Cost (USD)	% of $100 benchmark
Azuri	Quad system	4 bulbs, USB charger, radio	216.72	216%
BioLite	Home 620	3 bulbs, USB charger, radio	125	125%
D.Light	D31	3 bulbs, USB charger, radio	127	127%
Ecozoom	Solar multi-light	3 bulbs, USB charger	57.50	57%
GDLite	Solar Lighting Kit	3 bulbs, USB charger,	22.11	22%
M-Kopa solar	M-Kopa solar home system	4 bulbs, USB charger, torch, radio	212.29	212%
Nokero	N233	3 bulbs	49.99	50%
Sun King	Home 60	3 bulbs, USB charger, radio	90.67	91%
Sun King	Home 120	3 bulbs, USB charger, radio	141.09	141%

Note: prices are illustrative only as they are from December 2021 and in some cases, lower prices may also reflect the payment terms (e.g. payment on a cash basis results in lower prices than a pay-as-you-go model).

In addition, beneficiaries experienced several issues in activating and repaying the devices. This could indicate that the selection process of the solar suppliers and related devices did not adequately take into account the characteristics of the beneficiaries.[12] The negotiation also did not adequately factor in the potential impacts of implementation issues on the beneficiaries' capacity to repay and use the devices. In this context, the suppliers reduced the deposit amount for the PAYG option to be activated (KES 1,000 instead of KES 2,000). They allowed for a longer repayment period for the product from an average of 6 months to one year. They also extended the monthly repayment for solar devices from 30 days to 75 days (BioLite devices) and 120 days (d.light devices).[13] See Table 11.

Table 11: Comparison between original repayment plan and negotiated terms by the project

	Original plan	Negotiated terms
Deposit amount	KES 2,000	KES 1,000 (KES 250 paid by the beneficiary and KES 750 paid by the project)
Repayment for the solar device	6 months	12 months
Day allowance for light	30 days	75 days (BioLite devices) 120 days (d.light devices)
Note: Exchange rate KES 1 = USD 0.0092		

[11] MoU with solar suppliers, Project operational manual, UNICEF KCO SIDA Project Proposal 2017, UNICEF KCO Energy for the Poor Progress Utilization Report June 2020

[12] The consortium advertised an expression of interest for solar suppliers and competitively selected three providers. After the selection of the two suppliers, the consortium signed MoUs with each of them. The selected suppliers were d.light, Green Light Planet and Bright Sky Solar Solution. However, during the deployment process, Green Light Planet pulled out citing challenges of hard to reach areas and inability to modify their business model to fit to the Mwangaza Mashinani design. The project managed to negotiate with the remaining suppliers who partially adjusted their system and design.

[13] Usually, households repay the solar device every 60 days (i.e. covering two 30 day periods) in order to retain functionality of the device. However, due to delays in the NSNP payments, the solar suppliers extended the repayment period so that the device remained functional for 75 or 120 days without additional payment.

The implementers' quarterly reports indicate that there were some technical difficulties related to the solar activation period, as well as use of cash transfer for solar device cost repayment, especially at the beginning of the project. Some products were deactivated after the usual 30-day cycle lapsed due to internal miscommunication at d.light. In addition, almost all the systems were switched off from mid-September 2019, because they ran out of the day allowance due to the delay in the repayment schedule. The project managed to agree with the providers to extend the activation period until the following payment cycle (mid-November 2019) on an exceptional basis. However, beneficiaries faced challenges in re-activating the systems through the tokens. Findings from the household survey conducted by E4I seem to indicate this was due to the fact that many beneficiaries did not know how to upload tokens into their solar devices.[14]

2.1.5 Functionality of solar devices

The functionality of solar devices is relevant to economy insofar as it is an indicator that the devices purchased by the programme were of adequate quality and appropriate for the context in which they will be used.

As reported in the final endline evaluation report, at both midline and endline, 15% of beneficiary households reported that their device was not working at all. A further 17% of households reported that their device was only partially functional at endline, up from 14% at midline. Furthermore, for the households reporting non-functional devices at endline, the devices have not been functional for a long time, around six months on average.

Households with faulty devices at endline were asked about which parts were not working. The most common parts of the device that were reported to be faulty were the wires (28%), lamps (26%), battery (20%) and radio (9%). About 15% of households did not know what issue was causing the device to not operate fully. For those with a partially working device, the main issues reported were with the lamps, wires and radio. While for households with a completely malfunctioning device, the main issues were with the battery and base unit, or the reason was unknown.

The relatively high proportion of faulty devices potentially indicates that more attention needs to be paid to device quality and hardiness when purchasing additional devices under subsequent phases of the programme.

2.2 Efficiency analysis

In line with FCDO's VfM framework, efficiency is concerned with the relationship between inputs and outputs, which are the goods and services the project delivers. The efficiency analysis focuses on the way in which the resources were managed for the project's delivery of outputs. We focus on three metrics within the efficiency area: allocative efficiency, technical efficiency and dynamic efficiency. Performance standards for the efficiency criterion are presented in Annex A.

[14] "Not knowing how to top up the tokens to the device" is the main reason for complaining, as reported by the project dashboard. However, the number of beneficiaries complaining varies depending on the version of the dashboard used. Based on the dashboard for cycle 1, 7% of beneficiaries complained during cycle 1. Based on the dashboard for cycle 1 to 4, number of people complaining is about 2% across all cycles. Regarding repayment, the first quarterly report mentions that almost all devices have been switched off due to late repayment of the 2nd instalment and that "*The technical matters around systems being switched off, problems with reactivation of tokens, accessing mobile phones, and receiving customer call centre calls requesting for payments had a serious impact on beneficiary experience and payment morale*".

On the basis on the available evidence the **pilot project** meets the definition of '**average**' in the standards for allocative, technical and dynamic efficiency.

- **Allocative efficiency**: we assess allocative efficiency as '**average'** in the standards for efficiency. We see overspending for implementation, yet the total amount transferred to beneficiaries is lower than the budgeted resources. This might indicate that, despite the large resources allocated to administering the pilot project, it only partially succeeded in retaining identified beneficiaries.
- **Technical efficiency**: our judgement suggests that the project meets the definition of '**average'** in terms of technical efficiency. The project implementation plan is only partially delivered with regard to quantity, quality, timeliness, or budget. Despite the initial delays, by June 2020, most of the log frame targets have been achieved. Nonetheless, 22% of enrolled households decided not to purchase the solar device, and 30% of beneficiaries do not regularly repay the device, compared to an expected repayment rate of 100%.
- **Dynamic efficiency**: from a dynamic perspective, the project achieved an '**average**' level of efficiency. The project modified the payment schedule to minimize the risks associated to delayed repayment of the solar devices. In response to a lack of awareness on the project payment process and the functioning of the solar devices, the implementers set up communication campaigns and capacity building sessions to better support households. However, some risks that could have been foreseen, were not sufficiently identified ahead of time and tackled proactively and in a timely manner. For example, only after most of the devices had been switched off, the project negotiated with the solar providers an extension to the activation period. Furthermore, the project lacks a solid MIS and some cases of data inconsistencies and data gaps were observed. This makes knowledge management more cumbersome and less efficient, limits effective tracking of beneficiaries and adaptive learning.

However, for the reasons outlined in the introduction, the operational model and cost profile of a project in pilot phase will not be the same as that expected once it has been fully scaled-up and is operating in its 'steady state'. Our assessment is that the **expected efficiency of the programme at scale** has the potential to be '**good'**, provided the following conditions hold:

- The programme takes measures to increase the percentage of enrolled households that follow through to purchase the solar device, for example by refining the targeting process to identify households most likely to follow through to purchase a solar device.
- The programme takes measures to increase the percentage of beneficiaries that regularly repay the device.
- Implementation of the scaled-up programme is taken on by government agencies, and this brings down the cost of targeting and the community-level activities
- The targeting process under the scaled-up programme can be streamlined
- Community-level activities under the scaled-up programme can be streamlined, hopefully in line with increasing general awareness of the benefits and maintenance requirements of devices
- Direct technical assistance and QA no longer required from UNICEF, or required to a much lesser extent.

The remainder of this section outlines findings for each one of the efficiency metrics in detail.

2.2.1 Allocative efficiency

The allocative efficiency dimension addresses the issue of using an appropriate combination of resources to achieve the maximum advantage for a given cost. We look at the project expenditure and identify how much has been spent on specific activities and items to assess whether the project activities were delivered with regard to budget. We also explore evolution of expenditure over time, to assess whether the system in place considers changing variables to rebalance the resources and create a more efficient use of the resources.

It is important to reiterate that budget data and actual spending are not reported based on a standardised coding approach. This required the team to make a set of assumptions to analyse allocative efficiency. Assumptions have been disccused and corroborated with UNICEF and are presented in Annex A.

The evidence was gathered to address three indicators: expenditure by activity compared to budgeted amounts; time series of expenses by cost item from the beginning of the project until September 2020; spending by cost centre and the cost to transfer ratio.

Table 12 presents the difference between the project budget and spending until September 2020. The total project budget amounts to $1,670,882 with funding provided by three sources. A first SIDA grant of $1,082,540 financed the period August 2017 to November 2019. A second SIDA grant in November 2019 provided $163,800 to increase resources allocated to the transfers to beneficiaries. The project documents report that this is because the projected costs of the solar devices and bank fees were underestimated and because the target population increased from 1,500 households to 2,130,[15] reflecting a change in the eligibility criteria. UNICEF contributed to the project through the Kenya country office's funds and regional funds for the purpose of fieldwork monitoring and evaluation activities. By September 2020, the project had spent 72% of the total budget (i.e. total spending is 28% below the budget), excluding known committed amounts.

Some important factors affect efficiency of the project from an allocative perspective:

- Spend on cash transfers to beneficiaries is 20% lower than the projected amount. This is potentially due to the fact that the project ended up supporting fewer households than expected. Furthermore, 25% of beneficiaries defaulted after the first payment cycle, i.e. got the device but did not make the first repayment. About 13% defaulted after the second payment tranche, combining the second and third instalments. This resulted in a reduction in actual spend on cash transfers, given that the project ended up supporting a smaller number of beneficiaries.[16]
- Spend on E4I's contractual services is currently 20% above the budgeted amount and would be 57% higher at completion of E4I's activities. As described in Section 2.1, implementation of activities on the ground was challenging and required additional funding. However, the original contract to E4I was already higher than the projected amount (see Table 3). This suggests that more accurate forecasting is necessary at the budgeting stage.

[15] Actual number of enrolled households is 2,175, as reported by UNICEF KCO Energy for the Poor Progress Utilization Report June 2020

[16] The project disbursed the last payment to beneficiaries in May 2020, and no further payments are expected. The project necessitated an increase to the cash transfer budget in November 2019 due to overspending in payment cycle 1 and cycle 2&3. However, the assumption that about 2,100 beneficiaries would be supported in cycles 4, 5 and 6 proved to be wrong. In fact, the project enrolled 2,175 households but only 2,137 committed to buy the solar product and received the first payment. In addition, about 25% of beneficiaries dropped out of the pilot after the first payment cycle and about 13% after the second payment tranche. While the project managed to reinstate some of the beneficiaries, only 1,502 households were paid in cycle 4 and 1,640 in cycle 5&6. The pilot provides a guarantee for up to 85% of the remaining value of the solar product for defaulting beneficiaries. Factoring this in, preliminary estimates indicate that the total spending on cash transfers will still be lower than the budgeted amount.

- Spend on inception phase activities is 11% higher than the allocated amount. The procurement process of the implementing partner was delayed by six months due to a disagreement between UNICEF and the strongest bidder on the contract modality. The process required additional negotiations, which potentially increased overhead costs. In addition, due to issues emerging during the community mobilisation and engagement, as well as due to the effects of the migration exercise undertaken by DSA, the project had to adjust the design, which might have increased costs to coordinate stakeholders' inputs and agree on roles and responsibilities. In particular, three separate assessments have been conducted to identify beneficiaries, which increased the costs associated to the targeting and enrolment phase. While the implications of the migration were outside the control of the project, the project potentially underestimated the risks to the targeting and enrolment activities. Especially because the project stakeholders were aware of the recertification exercise during the set-up phase of the pilot project.[17]
- Spend on UNICEF TA costs and QA costs, as captured by the total costs for UNICEF staff incurred by the project, is below the budgeted amount. This may, in fact, represent a potential efficiency saving that might have freed up resources to directly support the implementing partner through further financing.

The project budget and spending by activity is presented in Annex A.

Table 12: Difference between budget amount and actual spending

	Until September 2020	By the end of the project first phase
Cash transfer to beneficiaries	-20%	-20%
Inception phase: Sensitisation, enrolment, targeting and identification/recruitment of potential beneficiaries including service providers	+11%	+11%
Community level activities and cost of implementing partner: BWC training and incentives, community education before and after payments, development of communication materials, community livelihood development support	+20%	+57%
UNICEF TA and QA	-33%	-33%
Field monitoring	-19%	-19%
Procurement of a certified research institution including baseline, midline and endline surveys	-56%	-20%
Total	-28%	-95%

Note: given that most of the activities of the pilot are completed, we assume remaining expenditure will only cover committed amounts. Difference within 15% above/below budget is considered to be acceptable. Spend on evaluation services are 56% below the budgeted resources, because some of the evaluation activities are currently ongoing and due to be finalised in the last quarter of 2020. A + indicates actual is over budget while a – indicates actual is under budget

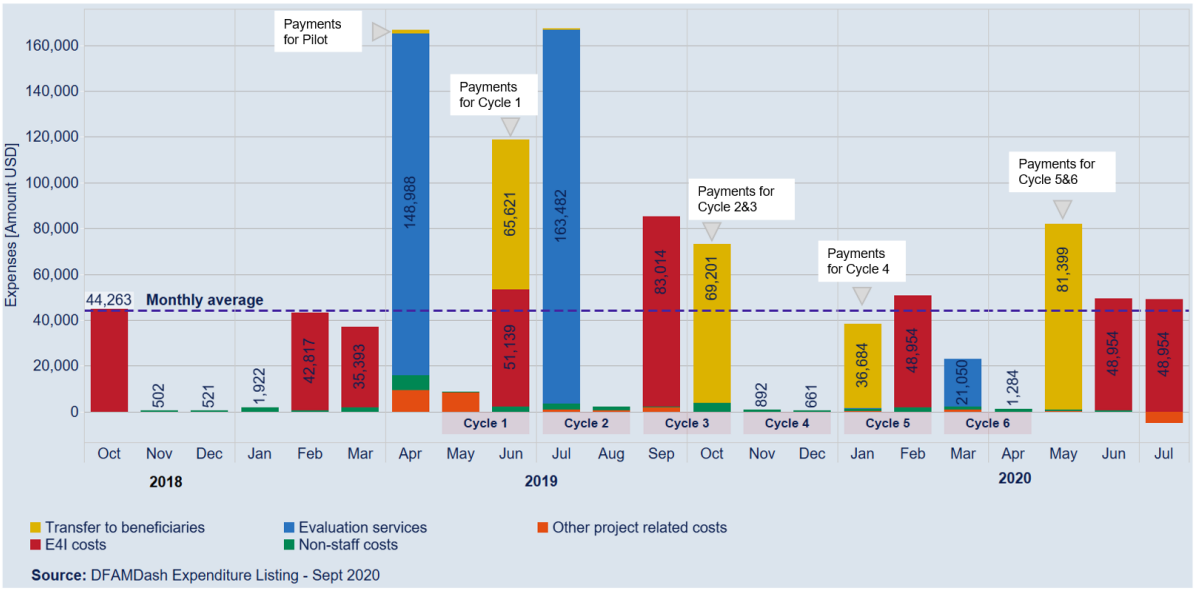
Figure 2 presents the evolution of cost over time by cost centre, excluding staff costs.[18] The trend reflects the progress into the project activities and milestone payments agreed with the contractual service providers. Expenditure before the first payment cycle (May 2019) results

[17] A vulnerability assessment was meant "to be used to identify both the communities for project implementation and the beneficiary households" (MM additional financing SIDA 2019). However, this exercise had to be complemented "with a verification exercise to be able to identify households that meet the project's eligibility criteria" (MM additional financing SIDA 2019). There is not enough clear evidence to justify why this verification exercise was needed. A second verification exercise was also necessary to make sure that project potential beneficiaries were still enrolled in the Inua Jamii, after the recertification and migration undertaken by SAU.

[18] Staff costs are excluded because they represent a fixed monthly amount, depending on the number of staff employed, which is not associated to the payment cycles. Trend analysis of the staff costs is presented in Annex A.

from the accumulated costs over the very long set-up and inception phase, experiencing multiple delays and extra costs due to issues on the ground. While we would expect six payment cycles of similar amount to the beneficiaries (as per MoU with the solar suppliers), the project ran four payment cycles (and one pilot payment) and the amount disbursed varies by cycle. In fact, the project payment cycle is aligned to the governments' payment cycles and there has been a substantial delay on the payments due to the DSA migration and data cleaning. Some payments had to be combined to align to the 12-month repayment schedule agreed with the solar suppliers (cycle 2 and 3 and cycle 5 and 6). The last payment (May 2020) includes the instalments for cycle 5 and 6 as well as any outstanding balances. In addition, while the number of beneficiaries was expected to remain constant across the cycles, about 25% of beneficiaries defaulted after the first cycle, some beneficiaries joined the project at a later stage, and others had some payments skipped due to implementation issues. This contributed to the observed variation in the amount spent on cash transfers.

Figure 2: Evolution of cost over time



The analysis of costs by cost centre reflects the learning objective of the pilot. The pilot project has been set up to provide clear evidence on how to enhance access to energy for the poorest segment of the population while increasing their wellbeing. As such, the majority of costs have been incurred for consultancy services to implement and evaluate the project and TA and QA activities to ensure coordination and strengthening capacity among stakeholders (about 72% of total spending until September 2020). Direct transfers to beneficiaries to repay the solar device amount to 21% of the total project expenditure. See Table 13.

Table 13: Analysis of costs by cost centre

Cost centre	Percentage of total spending
Cash transfer to beneficiaries	21%
Inception phase: Sensitization, enrollment, targeting and identification/recruitment of potential beneficiaries including service providers	6%
Community level activities and Cost of implementing partner: BCC training and incentives, Community education before and after payments, Development of Communication materials, Community livelihood development support	34%
UNICEF technical assistance and QA	9%

Cost centre	Percentage of total spending
Field monitoring	2%
Procurement of a Certified research institution including baseline, midlines and endline surveys	28%
TOTAL	100%

This gives a 'cost to transfer ratio' (CTR) of 3.7 by September 2020, which is the ratio of the project costs to the total value transferred to a recipient. This means that for every $ 1 received by a household so far under the pilot project, the project has spent about $ 3.7 in delivering the transfers and financing pilot related activities. For this project, the CTR includes costs relating to the external evaluation. These could be treated as a one-off cost of the pilot that would not recur – at least not on the same scale – in the scaled up phase. The CTR also includes a variety of other costs plausibly treated as fixed costs associated with design and setting up operations and UNICEF TA and management costs, which we would expect to decrease given that the government would ultimately take over the implementation of this initiative. When we exclude the cost incurred so far for the evaluation and UNICEF's TA and management costs, the CTR goes down to $1.96 per $1 transferred. The ratio is higher than CTRs for a range of cash transfer programmes in Kenya, regardless of the size of the payment, payment mechanism and implementer (See Table 14).

Focusing on CTRs would be appropriate to evaluate a project solely aimed to disburse transfers. However, as outlined above, the Mwangaza Mashinani project has more ambitious goals and specific design features to achieve them (i.e. a combination of 'hardware' solare devices, complemented by 'software' awareness-raising activities). For these reasons, it is not necessarily relevant to benchmark the project against cash transfer projects. In fact, lessons learnt from other Cash Plus programmes reveal that the provision of "Plus" components to cash disbursement can be costly (Roelen et al 2017). Especially when the intervention aims to improve access to services for beneficiaries and provide follow-up support (Roelen et al 2017). In this regard, WASH or Education sector programmes that provide a combination of 'hardware' and 'software' support may be more suitable comparitors. For these types of programme the 'benefit' to the beneficiary is both the value of the 'hardware' –in this case the purchase value of the device—in addition to the value of the 'software' (i.e. sensitisation, behavioural change, awareness raising, etc). If we conceive of the CTR in this regard the "Cost to Benefit Ratio" would be $0.31, which is favourable compared to the other programmes listed in the table below. It also compares favourably to a number of WASH interventions covered by a previous OPM VFM study, which had a "Cost to Benefit Ratio" of between $0.13 and $0.48.[19]

In any case, it is the combination of start-up activities, beneficiary targeting, monitoring of repayment and ancillary services provided to beneficiaries (such as skills training and behavioural change communication to own and manage the solar device and improve the learning performance and health of beneficiary children) makes the pilot project operationally and administratively complex and expensive compared to a programme that simply provides direct cash support to households. If the programme is to operate successfully at scale, we would expect many of these costs to be reduced. If the scaled-up programme can be implemented by government agencies this would reduce the cost of targeting and community-level activities. If these could be reduced by half, with direct technical assistance and QA no longer required from UNICEF, this would bring the CTR down further to $1.05 per $1 transferred for device purchase. Using our alternative "Cost to Benefit Ratio", this falls from $0.31 to $0.21.

[19] Value for Money anlaysis of DFID-funded WASH programmes in six countries – Synthesis Report. OPM, 2015.

Furthermore, and irrespective of its cost compared to other interventions, the programme will still be cost-effective if the incurred costs result in sufficient achievement of the project objectives in terms of outcomes and impacts. This is assessed below in secion 2.3.

Table 14: CTRs of recent cash transfers programmes in Kenya

Programme	Agency	Payment mechanism	Total Cost	Cost-transfer ratio
Mwangaza Mashinani pilot	UNICEF, E4I, Busara centre, Somali Aid, Government of Kenya	Transfer to bank account	$1,197,067	1.96*
CT OVC – pilot phase	UNICEF, DFID, Government of Kenya	--	$9,960,00	1.03
Nairobi Urban Livelihoods and Social Protection	Oxfam	Mobile money (M-Pesa)	$ 926,000	0.64
Marsabit Emergency Programme	SOS Children's Villages Kenya	Smart card	$ 1,594,000	0.15
Marsabit County Emergency Response	Concern Worldwide	Manual	$ 263,000	0.29
HSNP Phase 2	Government of Kenya	Transfer to bank account	$113M	0.4

Source: Bahri, O'Brien (2018), O'Brien, Hove (2013)
Note: (*) CTR excludes costs for the external **evaluation and UNICEF's TA and management costs.**

2.2.2 Technical efficiency

The technical efficiency dimension addresses the issue of using given resources to maximum advantage. We investigate the management of delivery of project outputs compared to the project implementation plan and targets. In particular, we assess whether the project implementation plan is delivered with regard to quantity, quality, timeliness and budget.

The evidence was gathered to address three indicators: adherence to implementation timeline, key log frame achievements are on track to meet targets; cost per beneficiary enrolled into the project and cost per beneficiary purchasing the solar device.

The project experienced severe delays during the procurement process and at the inception phase. The procurement process of the implementing partner was delayed by six months. Project documents report that "The reason for the delay was to mitigate the financial risk exposure of UNICEF and the SIDA funds. As the preferred modality of Programme Cooperation Agreement was not acceptable by the strongest bidder, for a lack of resources to provide the needed contribution UNICEF had to switch to institutional contract option, which required additional negotiations with both the internal management and the potential bidder". At inception, there was about four months delay, due to issues in the beneficiary identification process. This subsequently delayed the start of payments to beneficiaries, with the first payment delivered in June 2019.[20] Furthermore, as mentioned in the allocative efficiency section (2.2.1), the Inua Jamii Payments experienced delays during the Mwangaza Mashinani implementation period between June and October 2019. As the Mwangaza Mashinani top-ups are aligned with the timing of the Inua Jamii payments, they were delayed

[20] Some adjustments had to be made to first payment cycle due to the fact that M-Pesa charges were not catered in the first transfer to the banks. Additional funding had to be transferred, potentially contributing to delays.

as well. This caused defaults and late payments by several households. In order to ensure the beneficiaries catch up with the repayment of the solar systems to the suppliers, the project combined payment cycle 2 and 3. Instalments for cycle 5 and 6 were also combined and disbursed in May 2020 to allow beneficiaries to repay the suppliers by June 2020. This is because the solar suppliers expressed the concern of not extending the payments beyond 12 months from the time of system deployment.

As of June 2020, most key log frame achievements are on track or exceed target: a total of 2,175 households have been enrolled in the project and 1,692 purchased a solar device (1,147 in Kilifi and 545 in Garissa). All households have been engaged in capacity building activities on solar equipment use and awareness raising on their benefits, and some beneficiaries received training on income generating activities (56 beneficiaries), although the target seems not to be specified. All beneficiaries purchasing a device are reported to understand how to use the devices and almost all beneficiaries use their devices regularly. Nonetheless, project performance in terms of repayment remains well below target expectations. 30% of households do not regularly repay the device and the average length of payment delays is about 6 times higher than the target. In addition, some reported findings seem to differ from the recent midline survey results. For example, in Garissa 33% of midline survey respondents reported that the device is not working, while the percentage of functioning devices was 99% as reported by the project in June 2020. See Table 15.

As of September 2020, the unit cost per beneficiary ranges between $296 and $557, depending on whether costs of the external evaluation and UNICEF's TA and QA costs are included. The unit cost per beneficiary is the total cost of the pilot excluding direct transfer to repay the solar device divided by the number of beneficiaries purchasing a solar device. Costs for delivery of the transfer and pilot related activities are between 1.96 and 3.7 times higher than the cash transfer to repay the solar device ($151 on average). While this is partly explained by monitoring and evaluation acitivities for the learning purpose of the pilot, activities to facilitate the repayment of the devices underperform compared to the target, indicating a modest level efficiency in the use of resources.

Table 15: Project key log frame indicators

Objectives	Indicators	Target	By June 2020	% Difference over target
Households have accessed an off-grid SHS and/or solar lantern (SL) to improve their wellbeing	Number of households purchasing an SHS or SL	1500	1692	13%
	Number of beneficiaries using a SL or SHS regularly	1500	1669	11%
Beneficiary households can access a SHS and/or SL and regularly repay it	% of households regularly repaying	100%	70%	-30%
	Percent of beneficiaries that complete repayment	100%	70%	-30%
	% of payments delayed	--	33%	--
	The average length of payment delays (days)	10	66	560%
Beneficiaries and their communities are provided with skills and knowledge to own and manage their SHS and or SL and improve the learning performance and health of their children	Beneficiaries understanding of utilisation of SHS and SL	1500	1692	13%
	Number of the beneficiaries engaged in livelihood activities (capacity building activities)	1500	1692	13%
	BWC or local entrepreneurs trained to support beneficiaries	All	65	--
	Number of beneficiaries with working SL or SHS	100%	99%	1%

Objectives	Indicators	Target	By June 2020	% Difference over target
Source: Energy for the Poor – Mwangaza Mashinani. Progress Report (June 2020) UNICEF Kenya Note: Percent of beneficiaries who completed the repayment is computed as per the last payroll, out of total beneficiaries of last payment cycle (5&6 cycles).				

2.2.3 Dynamic efficiency

The dynamic efficiency dimension considers how well the project reallocated resources to reflect evolving circumstances and opportunities in the context of the project's implementation. It considers the systems in place for learning and evaluating performance and considers the ability of the institutional framework to adapt to new financial challenges. The assessment of dynamic efficiency is based on a qualitative judgment drawing on three considerations:

The project used findings from the M&E's system.[21] Targeting of beneficiaries and beneficiary's contribution to the purchase of the solar device have been adapted to reflect changes in the Inua Jamii's migration process, findings of the households' vulnerability assessment and affordability considerations emerging from the verification exercises in communities. However, the adjustment process required considerable efforts and additional data verification and collection activities, which delayed the project launch. After the first payment cycle, evidence collected through the grievance mechanism and fieldwork activities indicated that multiple beneficiaries were not aware that they had received the cash transfer and as a consequence they could not pay the solar provider or they had to rely on their own financial resources to make the payment. In response to this learning, ad-hoc strategies have been designed to increase beneficiaries' awareness of the transfer mechanism (e.g. communication campaigns). Lessons learnt are systematically reported by monitoring tools and annual reviews and there is a clear intention to use them for course correction in phase two of the pilot. UNICEF also commissioned an additional research piece to disseminate the independent evaluation's findings from the national implementation review to generate evidence on key aspects of the project and inform the design of the expansion phase.

The project adapted to evolving circumstances during implementation. In this regard, the project modified the payment schedule and made two double payments to minimise the impact of the delayed disbursement of the Inua Jamii payments on the beneficiaries' capacity to pay for the solar device. This limited further delays in the payment disbursement, but it did not prevent solar providers from switching off the devices due to delayed repayment. In fact, almost all devices were switched off by the suppliers due to delayed disbursement of the second cycle of transfers. The project took up communication on the matter in order to manage beneficiary expectations on payment timing. It also provided capacity building sessions to help beneficiaries to reactivate the devices, switched off due to delayed payment. However, given the crucial importance of regular repayments to use the solar devices, we would have expected a mitigation strategy to be in place, as part of the project planning to prevent deactivation of the devices.[22]

The project adapted its implementation strategy to reflect movement restrictions and safety measures imposed by the COVID-19 global pandemic. The project mobilised agents and community champions in each location to support the payments implementation process and facilitate the adoption of hygiene and safety measures. In addition, evaluation activities were

[21] The project M&E system includes several data sources: thematic reports, project reviews, beneficiary survey data, qualitative feedback from fieldwork activities and the project grievance process

[22] UNICEF was committed to implementing the project through government systems and therefore, in the face of delays, decided against making direct repayments to the suppliers (which might undermine beneficiaries' commitment to repayments or sense of ownership of the device) or making an out-of-cycle payment to households (which would make communications around repayments more difficult and increase transaction costs for households). They very carefully considered these trade-offs but in the end decided to wait for the Inua Jamii payments.

pivoted to ensure that research activities could continue remotely (i.e. through a remote midline survey) and to fulfil additional research objectives determined in consultation with UNICEF, with regards to the COVID-19 outbreak and its effects on vulnerable households and individuals, including women and children.

The project lacks a solid MIS and some cases of data inconsistencies were observed[23]. This limits effective tracking of beneficiaries, knowledge management and adaptive learning. Due to the involvement of multiple stakeholders in the payment process, the project experienced challenges in the reconciliation of data coming from the bank's reporting system and solar suppliers' customer management system. Delays in getting the data from the banks and the solar suppliers, as well as the lack of a unique beneficiary identifier to use for data matching hindered the reconciliation process and payroll preparation. The project implementers noted that some beneficiaries had to be matched manually, which took a lot of time and effort. The project also conducted additional follow-ups in the targeted communities, to verify reasons for exclusion and allow erroneously excluded beneficiaries back into the project. Fieldwork activities identified that beneficiary tracking was particularly problematic for about 200 beneficiaries (about 12% of total beneficiaries) who used phones of relatives and friends to pay the solar suppliers. In these cases, the solar suppliers registered the phone owners' name and details as their customer details. As a consequence, beneficiary information provided by the solar suppliers did not match the beneficiary information as recorded in the project MIS. Figure 3 shows that this led to discrepancies in the number of beneficiaries and default rate reported by different data sources. In particular, number of beneficiaries and default rate are wrongly calculated in the dashboard because the dashboard tracked beneficiaries using information from the government information system, which did not match the information provided by the solar suppliers in some cases[24].

Figure 3: Number of beneficiaries by data source (left); Default rate by data source (right)

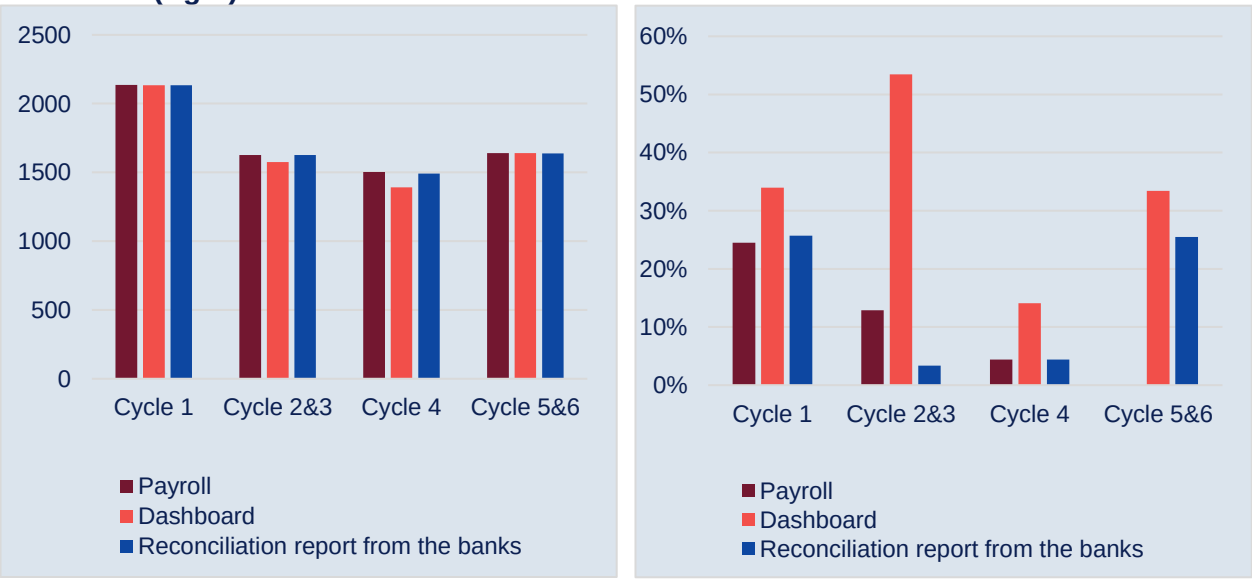


Table 16 shows that the payroll data used to instruct financial providers on the amount to be paid to the beneficiaries includes duplicate entries. For example, in cycle 1 we identified 25 duplicate entries, as defined by the beneficiary's Inua Jamii programme number, bank account number and name of the bank account's owner. This can potentially represent a problem in tracing beneficiaries and flow of funds, and could lead to duplicate disbursements and false estimation of the project beneficiaries. Implementers clarified that duplicates are beneficiaries who acquired multiple devices or households registered under the same

[23] The research team has been recommended to rely more on the payroll data as compared to the other sources.
[24] Beneficiaries incorrectly categorised as defaulters in the dashboard have been assumed to be performing beneficiaries and retained in the payroll by the implementer. This was discussed and agreed among UNICEF and the implementer during a meeting of the Technical Working Group in August 2019.

caregiver in the government system. Duplicates haven't received multiple payments, although the lack of a constient unique beneficiary identifier makes beneficiary tracking cumbersome and inefficient.[25]

Table 16: Number of duplicate entries by payment cycle

Cycle	Number of duplicate entries by payment cycle
Cycle1	25
Cycle2&3	34
Cycle4	102
Cycle5&6	30

Table 17 outlines the inconsistencies in the way the amounts disbursed by payment cycle is reported across data sources. For example, the payroll data indicates that KES 6,634,757 have been disbursed in cycle 1, while UNICEF monitoring data on transfers to the banks report KES 6,682,751. There is limited information to clarify these inaccuracies and there seems not to be a unique explanation for the observed discrepancies. Inaccuracies in the amounts reported to be transferred to the banks might derive from challenges in the data reconciliation process and missing data on beneficiaries from Co-operative Bank.

Table 17: Funds Transfer to Partner Service Providers by data source (KES)

	Payroll data (KES)	Reconciliation reports (KES)	UNICEF monitoring data on transfers to the banks (KES)
Cycle 1	6,634,757	6,645,695	6,682,751
Cycle 2&3	7,240,949	7,240,949	7,188,559
Cycle 4	3,366,366	3,332,992	3,711,705
Cycle 5&6	8,511,414	8,497,974	8,498,094
Note: Exchange rate KES 1 = USD 0.0092			

2.3 Cost-Effectiveness analysis

The cost-effectiveness analysis examines whether the project achieved its intended impact based on the inputs of the programme. The analysis compares the impacts achieved by making use of the resources allocated to the programme.

As per the theory of change, several objectives were identified for the programme, such as the need to generate evidence on how improving customer affordability for SLs and SHSs impacts the recipients' sense of ownership, usage, and quality of life of children and their families. Children are expected to benefit from an increased number of study hours, improved health through the reduction of indoor pollution which is expected to reduce the prevalence of respiratory diseases, eye irritation and burns that they are most vulnerable to. Meanwhile, the families are expected to benefit from enhanced livelihood and income-generating activities.

Based on available evidence, the project meets the definition of **'average'** in the standards for effectiveness. This judgement applies both to the cost-effectiveness performance of the pilot project, as well as the expected cost-effectiveness of the scaled-up programme, provided robust procurement procedures are maintained.

[25] Implementers clarified DSA changed the way beneficiaries are identified in early 2020. Under the new system a beneficiary cannot be a caregiver and a caregiver can only be responsible for one beneficiary household. This should facilitate the identification of beneficiaries and minimise the risk of duplicates going forward.

2.3.1 Impact results overview

The latest endline survey results provide deep insights on the impacts across the different areas to be assessed, namely **child time use, education, livelihoods, women's time use, health, and energy use** (for full details see the Endline Evaluation Report). Table 18 provides a summary of the endline survey results for the different impact areas. For each impact area, the impact of the project on 2-5 indicators is assessed.

Table 18: Summary of Endline survey results

Impact area	Indicator (all defined at the household level)	ATT[26]	Significance Level
Child time use	Number of hours per day spent studying outside school	0.14	***
	Number of hours per day spent studying at home at night	0.22	***
Education	Proportion of children (aged 3-8) who attended school from Jan-Mar 2021 (in percentage points)	5.74	***
	Proportion of children (aged 3-8) who regularly attended school from Jan-Mar 2021 (in percentage points)	4.36	***
Livelihoods	Total household income in Ksh (including remittances)	-805.66	*
	Number of working members per household	0.24	*
	Number of productive activities per household	0.41	
	Number of productive activities per household started in the last year	0.06	
	Proportion of productive activities per household conducted at home (in percentage points)	1.12	
Woman time use	Number of hours per day spent on productive activities	0.32	
	Number of hours per day spent on productive activities at home at night	0.05	
	Number of hours per day spent on leisure activities	-0.14	
	Proportion of women who are time poor (in percentage points)	0.87	
Health	Proportion of household members with symptoms of eye irritation in last month (in percentage points)	1.31	
	Proportion of household members with burns related to lighting fuel in last 6 months (in percentage points)	-0.30	
Energy use	Proportion of households using kerosene or paraffin for lighting in the last month (in percentage points)	-19.59	***
	Total household expenditure on all lighting sources in the last month in Ksh	-254.85	***
	Total household expenditure on mobile phone charging in the last month in Ksh	-152.06	***

Significance Level: Asterisks indicate statistically significant impact estimates: * significant at 10% level, ** significant at 5% level, *** significant at 1% level. All results without an asterisk are non-significant with p>0.1 (i.e., no impact detected).

The endline survey results indicate that the results for livelihood (mostly related to productive activities measurement), women's time use and health were statically non-significant

[26] Column ATT refers to the average treatment effect on the treated. Impact is measured only for those households that were enrolled in the pilot project and that received the solar devices (i.e., the treatment group is defined as the group of households that ended up actually enrolling in the project, while the control group is defined as the control group from baseline + any households that were intended to be treated at baseline but didn't end up enrolling in the project). The proportion % were derived from the comparison of endline to the baseline surveys.

(significance level above 10%), meaning that no clear impact was detected with any confidence. These impact areas are not analysed for cost-effectiveness.

The impact areas that are used for this cost-effectiveness analysis are children's time use, children's education and household energy use. The significance for the results of their related indicators is at 1% level, meaning that there is strong confidence that the measured results are attributable to the Mwangaza Mashinani pilot project.

2.3.2 Steady cost estimations

As mentioned in the introduction to this report**,** the cost associated with any pilot programme is high. Once the programme is implemented at scale, it is expected that the early learning and set-up costs will reduce. Hence, for the cost-effectiveness analysis, we also estimate the cost of the programme running at a 'steady state' cost (see).

Box 2: Our assumptions of the 'steady state' cost

Steady state costs are the regular operational costs of running the programme at a large scale i.e., excluding the initial costs involved in initiating the project. For the evaluated programme this will entail excluding the start-up costs and some specific activities linked to monitoring and evaluating the pilot, namely:

- Preparation of an inception report;
- Project launch;
- Preparation of the initial beneficiary list;
- Initial contractual services;
- Research services in parallel to the project;
- M&E activities will be reduced to $100,000.

The total expenditure on the pilot programme as of September 2020 was $1,197,067.

The project key log frame indicators show that 1,692 households purchased an SHS or SL of which 1,669 are using the system regularly. Hence our calculated total cost per beneficiary household is estimated to be:

$$\frac{Total\ Expenditure}{Number\ of\ household\ purchasing\ an\ SHS\ or\ SL} = \frac{1{,}1197{,}067}{1{,}692} = \mathbf{\$707}$$

The above calculations involve initiation costs. To obtain the 'steady state' costs, the expenses related to the following activities are removed.

Table 19: Activities not included in the calculation of 'Steady state' costs

Initiation activities	Cost ($)
E4I – inception report	44,993
E4I – beneficiary list for payroll	51,139
Project launch	17,598
Private contractual services at the beginning of the programme	48,399
Evaluation services (some M&E activities will remain in steady-state - $100,000)	233,520
Total initiation activities	**395,649**

Our estimation of the steady state cost to be used in the cost-effectiveness evaluation is hence $1,197,067 less $395,649 = $801,418

The 'steady state' cost per beneficiary household purchasing an SHS or SL is thus:

$$\frac{Steady\ state\ cost}{Number\ of\ household\ purchasing\ an\ SHS\ or\ SL} = \frac{801{,}418}{1{,}692} = \textbf{\$474}$$

Note: The 'steady state' cost per beneficiary household is used in our cost-effectiveness calculations.

2.3.3 Cost-effectiveness in Education

To align with the sustainable development Goal 4 that ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all, Kenya recognises the need to provide education for all boys and girls. Through the Basic Education Act of 2013[27], Kenya's constitution stipulates that any parent who is Kenyan or whose child resides in the country must enrol them for primary and secondary education.

Summary of results

The cost-effectiveness indicator reveals that it costs $14.40 in project resources to increase one child's attendance in school by one day. As compared to benchmarks in Table 20, this score can be categorised as '**average'**, since it is within the range of the benchmarks and the score for the Mwangaza Mashinani project is better than other cash transfer programmes in the region.

Approach

The endline survey results indicate that there is a strong relationship between the inputs in the programme and the increase in the number of children regularly attending school. Attendance is recorded to have increased by 4.36% in the treatment group.

Our aim in this cost-effectiveness calculation is to estimate the **'steady state' cost of the programme to increase the regular school attendance of one child by one day** (equivalent to 7.5 hours). The 'steady state' cost can be spread over the school days during the 3 years of the project. Hence, we can estimate the money the programme has been injecting per school day.

The impact on the increase in school attendance is measured using the endline survey metric "The proportion of children (aged 3-8) who regularly attended school from Jan-Mar" which is measured in percentage points.

Cost-Effectiveness Calculations

Box 3: Cost-effectiveness calculations to measure the cost to increase school attendance [28]of a child by one day.

The steady cost = **$801,418**

Estimate of steady cost per school day

The pilot programme duration is estimated to be 3 years.

[27] https://kippra.or.ke/achieving-100-per-cent-transition-from-primary-to-secondary-school-status-challenges-and-opportunities-for-sustainability/

[28] https://www.infoplease.com/world/social-statistics/school-years-around-world#:~:text=Kenya,about%20thirty%20students%20in%20them.

The number of school days in Kenya for 3 years is approximately (see footnote) = 3 (years) * 3 (semesters) * 13 (weeks in a semester) * 5 (school days in a week) = 585 days.

The estimated investment of the programme per school day = $\frac{\$801,418}{585}$ = **$1,370**

Estimate of children going to school per beneficiary household

The Mwangaza Mashinani first quarterly report provides a survey of the number of children going to school per household in the different locations.

Using that survey, the average number of children going to school per household = **3.2** *(Calculations are provided in Annex A.2)*

The number of families in the treatment sample = **1,692**

From the Endline survey results, the proportion of children (aged 3-8) who regularly attended school from Jan-Mar 2021(3 months) increased by **4.36%.**

An increase of 4.36% means that (4.36/100) * 1,692 * 3.2 = **236** more children attended school regularly during the programme.**

Cost-effectiveness calculations

Since 236 more children attended school regularly from Jan to Mar (3 months equivalent to approximately 60 days of schooling)***, the total attendance in school days also increased.

Assuming that all the 236 children did not start attending school regularly as from Jan, we estimated a linear increase in the attendance e.g 1st day (236/60 = 3.93 students attended school regularly), 2nd day (7.86 students attended school regularly), etc

In terms of the number of additional days in school attendance, the calculations are as follows:-

$$Total\ number\ of\ additional\ days = \sum_{n=0}^{60} Daily\ linear\ increase\ in\ no.of\ students\ attending\ school * (60 - n)$$

Where the 'daily linear increase in no. of students attending school' = 236/60 = 3.93

and n = number of school days in 3 months = 60

Total number of additional days = 7,192

Estimated investment of the programme for the 60 days = 60 * $1,370 (Investment for one school day) = $82,200

Cost-Effectiveness indicator = $\frac{The\ steady\ costs\ for\ 60\ days}{Increase\ in\ additional\ days}$ = $\$\frac{82,200}{7192}$ = **$11.40** to increase child attendance per day.

** assuming the proportion also applies to older age students.

*** Assuming 4 weeks of schooling per month, 4 * 5 school days * 3 months = 60 school days

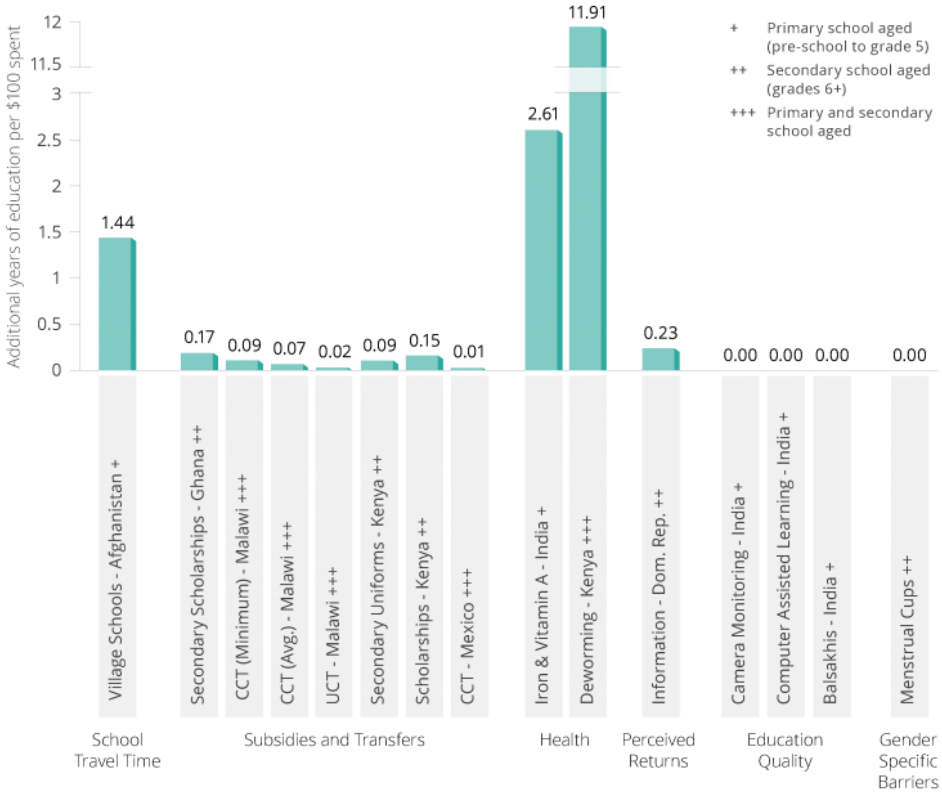
Benchmark

The identified benchmarks to compare the cost-effectiveness of the programme are drawn from the J-PAL and allows us to compare several programmes aimed towards improving student participation in schools (see Figure 4).

Figure 4 displays different projects that have implemented measures to reduce barriers to education such as school travel time, costs (via subsidies and transfers), health, perceived

returns, education quality and analyses whether they increase students' years of education. The additional year of education per $100 spent is plotted on the y axis.

Figure 4: Cost-effectiveness of programmes to improve student participation (additional years of education per $100 spent)



Source: J-PAL, available: https://www.povertyactionlab.org/resource/conducting-cost-effectiveness-analysis-cea

To compare against the benchmark, the estimates of the cost to increase attendance of a child by a day are used to project additional attendance days if $100 was invested.

Current Project: ***$11.40*** *daily to bring a child to school.*

Number of days of schooling using $100 = $\frac{100}{11.4}$ *= 8.8 days*

*1 year at school in Kenya = 3 (semesters) * 13 (weeks) * 5 (days) = 195 days*

Additional years of education per $100 spent 8.8/195 = ***0.045***

Table 20: Comparison of the Mwangaza Mashinani programme against the other projects

Activity	Project	Country	Targets	Additional years of education per $100 spent
Health	Deworming	Kenya	Secondary school aged (grade 6+)	11.91
Health	Iron & Vitamin A	India	Primary school aged (pre-school to grade 5)	2.61
School Travel Time	Village Schools	Afghanistan	Primary school aged (pre-school to grade 5)	1.44
Perceived Returns	Information	Dominican Republic	Primary and secondary school aged	0.23

Activity	Project	Country	Targets	Additional years of education per $100 spent
Subsidies and Transfers	Secondary Scholarships	Ghana	Secondary school aged (grade 6+)	0.17
Subsidies and Transfers	Scholarships	Kenya	Secondary school aged (grade 6+)	0.15
Subsidies and Transfers	CCT (Minimum)	Malawi	Primary and secondary school aged	0.09
Subsidies and Transfers	Secondary Uniforms	Kenya	Secondary school aged (grade 6+)	0.09
Subsidies and Transfers	CCT (Average)	Malawi	Primary and secondary school aged	0.07
SHS and SL	CCT - Mwangaza Mashinani project	Kenya	Children aged 3-8	0.05
Subsidies and Transfers	UCT	Malawi	Primary and secondary school aged	0.02
Subsidies and Transfers	CCT	Mexico	Primary and secondary school aged	0.01
Education Quality	Camera Monitoring	India	Primary school aged (pre-school to grade 5)	0
Education Quality	Computer Assisted Learning	India	Primary school aged (pre-school to grade 5)	0
Education Quality	Balsakhis	India	Primary school aged (pre-school to grade 5)	0
Gender-Specific Barriers	Menstrual Cups		Primary and secondary school aged	0

CCT - Conditional cash transfer programmes provide money in return for fulfilling specific behavioural conditions.
UCT - Unconditional cash transfer programmes provide money without any specific conditions.

In comparison to subsidies and transfer projects in Kenya, the Mwangaza Mashiani project has **average** performance. It ranked in the middle of other conditional cash transfer programmes listed in Table 20.

2.3.4 Cost-effectiveness in relation to child time use

In 2003, the Kenyan government introduced the free primary education policy hoping that education will support the full development of children's potential as well as help the country in its social and economic development. Despite the provision of free primary education, there are still a substantial number of children not attending school due to difficulties in pursuing education due to travel, child labour, the inability to study at home or other costs associated with education (e.g. school uniform, examination fees).

Summary of results

The cost-effectiveness indicator states that it costs $2.30 to increase one child's study hours by one hour at night. As compared to the benchmark of seeking a tutor to help the child study one extra hour, the cost-effectiveness score can be categorised as "**low**" since it is lower than the benchmark (tutor fee) of $1.42.

Approach

Our aim in this cost-effectiveness calculation is to measure **the cost to enable one child to study one extra hour at night.**

The impact on the increase in study hours is measured using the endline survey metric "The number of extra hours per day spent studying at home at night". There is strong evidence from the endline survey results that the increase in the number of study hours at home at night per student is related to the investment in the programme.

In our calculations, we can derive the average 'steady state' cost that has been injected over the 3 years of the programme and how it is related to the increase in the number of hours of study.

Cost-Effectiveness Calculations

Box 4: Cost-effectiveness calculation to measure the cost to study 1 extra hour at night per child.

The steady cost = $**801,418**

Estimate of increase in the number of hours of study

The average number of children going to school per household = 3.2 *(see Annex A.2)*

The number of families in the treatment sample = 1,692

Number of students going to school = 1692 * 3.2 = 5,414

Impact on the number of hours per day spent studying at home at night= 0.22

Assuming that not all students started studying extra hours on day 1 but there is a linear increase in the average number of study hours during the 585 days *(as per Box 3 calculations)* of schooling.

The linear increase rate of daily study hours = 0.22/585

In terms of the number of extra hours of study, the calculations are as follows:

$$Total\ number\ of\ extra\ hours\ of\ study = \sum_{n=0}^{585} Daily\ increase\ in\ daily\ study\ hours * (585 - n) * Number\ of\ students\ going\ to\ school$$

Total of number of extra hours of study: **349,012**

Cost-Effectiveness calculations

Cost-effectiveness = $\frac{The\ daily\ steady\ costs\ per\ school\ day}{Number\ of\ hours\ of\ extra\ duty} = \frac{801,418}{349,012}$ = $**2.30** per child to study 1 extra hour at night.

Benchmark

The benchmark to consider is to have the students' study after school hours through the provision of private education/tuition. The extra study hour costs of the programme can be compared to the average tutor hourly pay in the Kilifi and Garissa counties. The benchmark makes two major assumptions: 1) that the market rate for tutors represents the expected benefits arising from tutoring on future scholastic results of the student; 2) that studying with

a tutor is twice as beneficial as studying alone[29]. Data from a tutoring portal, teacheron [30] was used to estimate the average fees of the tutor. Table 21 provides a summary of the average fees of some tutors. A median value of the fees was taken as the value to be used i.e. ($2.43 + $3.24)/2 = $2.84. Assuming that studying alone generates half the benefit of studying wth a tutor, we set the benchmark at $1.42, which is lower than the cost of the project.

Table 21: Tutor fees in Kilifi and Garissa counties

Tutor	Region	Subject	Minimum per hour ($)	Maximum per hour ($3)	Average per hour ($)
Tutor 1	Kilifi	Preschool, pre-primary teacher	0.59	1.18	0.88
Tutor 2	Kilifi	Physics and mathematics	0.59	2.36	1.47
Tutor 3	Garissa	Maths (ICSE), Physics (A-Level)	2.21	2.65	2.43
Tutor 4	Kilifi	Geography tutor/ teacher	0.59	5.90	3.24
Tutor 5	Kilifi	A level	7.08	8.85	7.97
Tutor 6	Garissa	Quran, Tajwed and Islamic studies	8.85	44.24	26.55

This cost-effectiveness calculation of $2.30 per child to study 1 extra hour, is below the benchmark from the teacheron platform.

2.3.5 Cost-effectiveness of energy use

Kenya is one of the world leaders in the number of solar power systems installed per capita as more Kenyans are now turning to solar power. Yet most benefits from solar markets have not reached the poorer and vulnerable households, which are still using battery-operated torches and kerosene lamps for lighting.

Summary of results

The cost-effectiveness indicator states that the programme spends $0.13 to provide one household with one extra hour of energy using the solar device as extra sources of energy. When comparing to the benchmark of using existing sources of non-renewable energy for one extra hour of energy use, the cost-effectiveness score can be categorised as "**good**" since $0.13 is less than the benchmark estimates of $0.23.

Approach

The use of solar panels has not only reduced the use of expenditures on non-renewable lighting and mobile charging resources but also prolonged the use of energy daily. Endline survey results show that, on average, households are using an extra 3.4 hours of solar energy per day.

Our aim in this cost-effectiveness calculation is to measure the cost of one additional hour of energy use. The resources from the endline survey results used for the analysis are the

[29] This second assumption is an estimate subjectively chosen by the authors and is likely to underestimate the true value of a tutor. The assumption has been elaborated based on the following logic. Assuming that a tutor offers the same benefits as self study, this would imply that there is no reason to pay for a tutor. Moreover if tutors offered the same value as self study, there would be no need for formal education, since education could be self taught. As a result the authors assume that the value of studying alone is lower than studying with a tutor, which means it must be below the market rate for a tutor. A ratio of 1 hour of tutoring equates 2 hours of self study was therefore chosen arbitrarily for the benchmarking exercise.

[30] https://www.teacheron.com/assignment-tutors-in-kilifi

"monthly expenditure on lighting & mobile recharge" and the "average hours solar device is used for lighting each day".

Cost-effectiveness Calculations

Box 5: Cost-effectiveness calculations to measure the cost per hour of energy use

Estimate of 'steady state' cost per household per month

The 'steady state' cost of the programme = $801,418

The pilot programme duration is estimated to be 3 years, equal to 3 * 12 = 36 months

Hence, the estimated expenditure of monthly 'steady state' cost per household

$= \frac{801{,}418}{36\ (months) * 1692\ (households)}$ = $13.16

Estimate of additional hours of energy use from solar panels

The endline survey results state that an extra 3.4 hours (equivalent to a 47% increase) of lighting is used from solar devices daily.

Total number of extra hours monthly (assuming 1 month is equivalent to 30 days) = 3.4 * 30 = 102

Cost-effectiveness calculations

Cost-effectiveness = $\frac{Monthly\ steady\ costs\ per\ household}{Number\ of\ extra\ solar\ hours\ per\ month}$ = $\$\frac{13.16}{102}$ = $0.13

per hour of lighting from solar devices instead of a non-renewable source.

Benchmark

The benchmark considered is the use of mini-grids as an alternative source of renewable energy for lighting and charging devices. The upfront cost of connecting households to mini-grids is high at approximately $856 per household as per the Kenya National Electrification Strategy 2018[31].

Over the 3 years of the programme, the monthly cost per household would be $\frac{856}{36}$ = $23.70.

Considering the 102 extra hours of monthly renewable energy used per month, the cost per hour of using mini-grids instead of the solar devices = $\$\frac{23.7}{102}$ = $0.23

This cost-effectiveness calculation of $0.13 per hour of using the solar devices for energy is below the benchmark of the mini-grid solution.

2.3.6 The benefit-cost ratio of the pilot project

The benefit-cost ratio is calculated as the ratio of benefits to costs and assesses whether the project has created at least as much value as it consumes.

In terms of the costs, the direct **'steady state'** cost of the programme as well as indirect costs such as anticipated **repair costs**, gathered from the endline survey, are considered. The **benefits** of the project are estimated from the positive impacts gathered from the

[31] See https://newclimate.org/wp-content/uploads/2019/11/The-role-of-renewable-energy-mini-grids-in-Kenya%E2%80%99s-electricity-sector.pdf

endline and baseline survey comparisons. The main impact areas identified are education, improved livelihood due to additional activities, and energy use.

For fair assessment terms of cost and benefit analysis, the costs and benefits are evaluated over the period when the beneficiaries of the programmes are still benefiting from the investment. The proposed period for our analysis is to be aligned to the lifespan of the solar devices[32] which is approximately 5 years (in line with the expected battery life of the products).

Cost estimations

Regarding the cost estimations, the direct 'steady state' cost is taken to span over 3 years, which is the investment period of the programme, while the repair costs are extended up to 5 years. The calculations shown in Box 6 indicate that the expected maintenance costs make up less than 1% of the total estimated cost of the programme.

Box 6: Estimation of the maintenance costs

The endline survey results are used to estimate the repair costs.

The following indicators are used to calculate the yearly repair costs

- Household intends to repair their faulty solar device (requiring repair): 53.2%
- The anticipated cost of solar repair (intend to repair): KES 499
- # times households needed to repair the device since getting it (3 years): 0.6

No of households = 1,692

The total estimated repair cost over the 3-year duration of the programme (adding those intending to repair + those needing to repair)

$= (\frac{53.2}{100} * 499 * 1692) + (0.6 * 499 * 1692) = KES\ 449{,}172 + KES\ 50{,}658$ = KES 499,830

Using 0.0092 as KES to USD conversation rate, estimated repair cost for 3 years = $4,498

Estimated yearly repair cost = $ 1,533

The number of times the solar devices needed repair is 0.6 for the three years, meaning 60% of the devices got repaired on average over the three years. This equates to 20% of devices being repaired per year. Assuming, the repair rate is constant over the lifetime of the solar devices.

Cost for 4th year = 0.2 * KES 499 ($ 4.59) * 1692 = $1,553

Cost for 5th year = 0.2 * KES 499 ($ 4.59) * 1692 = $1,553

Table 22: Costs forecasts over 5 years

Cost area	During the 3 years of the programme ($)	Cumulative 4th Year ($)	Cumulative 5th Year ($)
Steady state costs	801,418	801,418	801,418
Repair costs	4,498	6,051	7,604

[32] See for example: https://www.dlight.com/product/s3/#:~:text=60%2C000%2Dhour%20life,5%20years%20(inclusive%20of%20battery)

Cost area	During the 3 years of the programme ($)	Cumulative 4th Year ($)	Cumulative 5th Year ($)
Total costs	803,897	807,469	809,022

Benefit estimations

The main areas in which the project has had a positive impact, as deduced from the endline analysis, are listed in Table 23. For a proper comparison to the costs of the programme, a monetary estimation of the benefits is made.

Table 23: The benefit areas to be measured

Impact Area	Benefit	How to estimate the benefit
Child time use and education	More students are graduating to the next grade.	The government of Kenya has a considerable budget for supporting the primary and secondary education sectors. When a student is not graduating, the invested money on the child can be considered as lost. The increase in the number of children graduating can be considered as extra savings by the government and can be estimated.
Livelihoods	Many households have adopted an additional income-generating activity which is the charging of mobile phones of neighbours.	Estimate the increase in revenue through the charging of mobile phones by using the cost of mobile recharge and estimating the number of recharges for neighbours by household.
Energy Use	Economic benefits through savings on lighting and charging	Use the energy savings of the households per month and estimate the total savings.

Benefit: More students are graduating at the next level

It is interesting to note from the endline survey results that there is strong evidence that the increase in the proportion of children graduating to the next level is related to the adoption of solar devices (i.e. attributable to the project). The increase in children graduating to the next level is estimated to be 6.9%, which is considerable given that a very high proportion of children were promoted to the next grade at baseline. Our calculation on the net benefits from the extra number of students graduating to the next level shows a yearly benefit of $52,734 or $158,202 over the three years of the programme. Projected over 5 years, the benefits are calculated as $263,670.

Benefit	During the 3 years of the programme ($)	Cumulative 4th Year ($)	Cumulative 5th Year ($)
More students are graduating at the next level	158,202	210,936	263,670

Calculations of the benefits

Box 8: Calculations of the benefits of more students graduating at the next level

The endline survey results state that the proportion of children being promoted to the next grade since the last academic year increased by 6.9% due to the project.

The average number of additional students graduating to the next level

The average number of students per household = 3.2

Number of households = 1,692

The additional number of students graduating yearly = 6.9/100 * 1692 * 3.2 = 374

Annual investment by the Government of Kenya per student

The annual investment by the Government per pupil was around **$141** according to the 2018/2019 Education and Training Budget Brief supported by UNICEF.

Estimation of the benefits

Since more students are graduating and not failing, the government's investments in education are achieving additional savings of 374 * 141 = $**52,734** per year.

Benefit: Additional income-generating activity of charging of mobile phones of neighbours

In the first quarterly Mwangaza Masinani project report, feedback collected by households revealed that some households were spending up to $30 per month on charging their mobile phones.

Solar devices allow households to charge their own mobile phones. Further, the endline survey results show that 17% of the families are using their solar device to charge other households' mobile phones for a fee.

Our calculations on the net benefits from this additional activity estimate an additional yearly revenue of $44,044 and $132,134 over the three years of the programme. Projected over 5 years, the lifespan of the solar devices, the benefits are estimated at $220,224.

Calculations of the benefits

Benefit	During the 3 years of the programme ($)	Cumulative 4th Year ($)	Cumulative 5th Year ($)
Income generating activity	132,134	176,179	220,224

Box 9: Calculations of the benefits of an additional income generating activity

The endline survey results show that 17% of the households with the solar device are using the devices to charge neighbours mobile phones

Calculation of revenue from mobile charging

Reviewing the quarterly Mwangaza Mashinani report, we note that households have around 3 to 5 mobile phones.

Using the endline survey results, stating that each household has approximately 6.9 members of whom 3.2 are children going to school, we assume they are around 3.7 adults in a house.

From a GeoPoll mobile penetration survey[33], in 2017, 80% of the adults owned a mobile phone.

We assume 3 (80% of 3.7 = 2.96) mobile phones per house for our calculations.

Endline survey results state that the cost per mobile recharge is KES 15.2

Assuming that a household is charging the mobile phones of only one neighbour and the mobile phones are charged once daily, the total revenue in the community for one year is:

= 17% * 3 (no of phones) * 15.2 (cost per charge) * 1,692 (households) * 365 (no of days) = 4,787,480 ($44,044)

Exchange rate used: 1 KES = 0.0092 USD

Benefits by savings on lighting and charging

The endline survey results state that the monthly savings on energy use as the expenditure on lighting sources as well as the mobile phone charging have dropped by KES 406.91 when compared to the baseline results.

Our calculations on the net benefits from monthly savings on energy expenditure suggest an additional yearly revenue (saving) of $76,026 and $228,079 over the three years of the programme. Projected over 5 years, the lifespan of the solar devices, the benefits are estimated at $380,131.

Benefit	During the 3 years of the programme ($)	Cumulative 4th Year ($)	Cumulative 5th Year ($)
Savings on lighting and charging	228,079	304,105	380,131

Box 10: Calculations of the benefits savings on lighting and charging

The endline survey results state that the monthly savings on energy use as the expenditure on lighting sources as well as the mobile phone charging have dropped by KES **406.91** when compared to the baseline results.

Calculation of savings from lighting and charging

The monthly savings per household = KES 407

Total savings for the year = KES 4,884

Total savings per year for the households which procured solar devices = KES 8,263,728 ($76,026)

Exchange rate used: 1 KES = 0.0092 USD

Summary of the Benefit-Cost ratio

The benefit to cost ratio is calculated by dividing the present value of expected benefits over the present value of expected costs. A ratio above one indicates that the project is financially viable.

Our calculations show that the project becomes financially viable only in the 5th year of the use of solar devices at which point the cost-effectiveness can be categorised as "**average**".

[33] https://www.geopoll.com/blog/mobile-penetration-kenya/

Table 24: Summary of the benefit-cost ratio results

	Area	During the 3 years of the programme	Cumulative 4th Year	Cumulative 5th Year
Costs ($)	Steady state costs	801,418	801,418	801,418
	Repair costs	4,498	6,797	10,246
	Total costs	**803,897**	**808,215**	**811,664**
	Total costs discounted to Net present value	**765,470**	**768,484**	**773,013**
Benefits ($)	More students are graduating at the next level	158,202	210,936	263,670
	Income generating activity	132,134	176,179	220,224
	Savings on lighting and charging	228,079	304,105	380,131
	Total benefits/savings	**518,415**	**691,220**	**864,025**
	Total benefits/savings discounted to Net present value	**492,391**	**656,521**	**820,651**
	Benefit Cost Ratio	**0.64**	**0.85**	**1.06**

Note average discount rate ® for the net present value calculations: average inflation rate from 2018 to 2020 = 5.02%, 2021 estimation (4th year) = 5.17%, 2022 estimation (5th year) = 5%. Source: Statista

3 Conclusions and recommendations

This report presents the findings from the full VfM analysis conducted as part of the evaluation of the Mwangaza Mashinani pilot project. The VfM assessment took place in two phases. As part of the midline assessment, the VfM analysis focused on economy and efficiency and covered a period of 36 months from October 2017 to September 2020. The VfM analysis focussed on cost-effectiveness assessment at the endline.

The VfM analysis evaluated whether the pilot project used resources economically bought inputs of the appropriate quality at the right price, and followed good project management practices.

The VfM analysis also assessed whether the project resources were managed efficiently, for the project's delivery of outputs. In evaluating the project performance against the efficiency criterion, we looked at:

- **Allocative efficiency:** delivery according to budget and allocation of resources reflecting the relative priority given to project activities and associated costs;
- **Technical efficiency:** delivery according to the project implementation plan (at required quality and quantity, on time), allowing for reasonable exceptions or changes due to adaptive programming, to capitalise on opportunities and/or to manage risks;
- **Dynamic efficiency:** ability of the project institutional framework to adapt to new financial challenges and existence of systems in place for learning and evaluating performance

Finally, the VfM analysis estimated the cost-effectiveness of the project by assessing the impacts on education, child time use, livelihoods, and energy use. In evaluating the project we looked at:

- **Cost-effectiveness**: measurement of desired impacts of the project as compared to the inputs in the project, and estimating the degree to which the inputs have been effective in relation to the costs.
- **Benefit-cost ratio**: measurement of the overall relationship between the relative costs and benefits of the project by taking into consideration the duration of the investment.

3.1 Conclusions

Economy:

From an economy perspective, the **pilot project** meets the definition of '**good**'. **This judgement considers the economy performance of the pilot project, which may be expected to carry forward for the expected economy of a scaled-up programme, provided robust procurement procedures are maintained**. There would even be scope for improving expected economy performance, if (for example) the cost for contractual services can be contained and/or the price of solar devices can be reduced going forward.

The project managed to minimise the transaction costs attached to the cash transfers (M-Pesa charges and banks' charges) as well as staff and operational costs. However, contractual services cost more than expected. Some reasons for this relate to delays in the procurement practices and challenges emerging from contextual factors, some of them unforeseeable at the planning stage (for example, effects of the COVID-19 pandemic or security issues emerging in Garissa). In other cases, poor underlying assumptions during the planning and costing process seem to explain the observed extra costs. For example, the project likely underestimated the resources necessary to operate in the targeted counties and risks associated to piggy-backing on the government's systems for the project's

operations. This led to overspending for targeting households, underestimation of transport costs and costs for engaging with county government officials.

While the project followed sound procurement practices for the selection of the solar suppliers, the final cost of the solar devices was above the budgeted amount. In addition, beneficiaries experienced several issues in activating and repaying the devices, raising concerns over the suitability of selected devices within the context of this pilot.

Efficiency:

From an efficiency perspective, the **pilot project** is assessed to meet the definition of '**average'**. The project allocated significantly larger resources to set-up and inception activities, as well as implementation, compared to the budgeted amounts. Overspending was partially due to delays in the procurement practices, which increased overhead costs, issues in conducting the vulnerability assessment and adapting the design of the project to the effects of the Directorate of Social Assistance migration and recertification process, and coordination of the repayment exercises. While some design adjustments are expected in a pilot project, a more proactive management, and a better risk mitigation strategy would have reduced overspending.

Despite the initial delays, by June 2020, most of the log frame targets had been achieved. However, the project only partially succeeded in retaining beneficiaries, with 30% of households not regularly repaying the device, compared to an expected repayment rate of 100%. The attrition rate is quite high and presents the project with some lessons for subsequent phases.

We have seen that the pilot has cost nearly $1.2 million to support 1,692 households purchasing a solar device, out of 2,175 households enrolled. This comprises about $255,000 of cash distributed to recipient households, and about $ 942,000 spent on expenses related to the provision of complementary services to beneficiaries, as well as administration and evaluation of the programme. These complementary services include skills training and behavioural change communication to own and manage the solar device and improve the learning performance and health of beneficiary children. The observed spending reflects the learning objective of the pilot, and its intention to test an innovative approach to improve access to energy for the poorest segment of the population. In the second phase, the goal is to spend more on solar lanterns. There will therefore need to be emphasis on increasing efficiency while scaling up. Alternative delivery models could also be explored as part of this, for example providing the device purchase transfers to primary schools, who would purchase the devices and then distribute them onto pupils, whose families would only be expected to cover ongoing maintenance costs. Under this model community-level sensitistation and communication could also be delivered via schools. Such an approach would maintain the 'market creation' objective, but may be more efficient. It would be particularly appropriate if the endline evaluation reveals particularly strong education-related impacts.

A final concern is that the project lacks a solid MIS and some cases of data inconsistencies and data gaps were observed. This makes knowledge management more cumbersome and less efficient, limits effective tracking of beneficiaries and adaptive learning.

Despite these concerns, our assessment is that the **expected efficiency of the programme at scale** has the potential to be '**good'**, provided the following conditions hold:

1. The programme takes measures to increase the percentage of enrolled households that follow through to purchase the solar device.

2. The programme takes measures to increase the percentage of beneficiaries that regularly repay the device (i.e. reduce the incidence of default). To the extent that default rates are caused by payment delays, measures should also be taken to support NSNP to minimise NSNP payment delays.

3. Implementation of the scaled-up programme is taken on by government agencies, and this brings down the cost of targeting and the community-level activities, for example by piggy-backing on existing government targeting and/or community support structures.

4. The design of the targeting process under the scaled-up programme is streamlined. This could include efforts to identify eligible households that are most likely to follow through to purchase the solar device after enrolment.

5. Beyond the targeting process, community-level activities under the scaled-up programme can be streamlined, hopefully in line with a growing market for solar devices coupled with greater access to maintenance services.

6. Direct technical assistance and QA no longer required from UNICEF and E4I, or required to a much lesser extent as the programme is handed over to government.

Meeting these conditions will be challenging, requiring some significant shifts from the current set-up and performance of the pilot project. It will therefore will require deliberate attention and effective actions from UNICEF and other key stakeholders.

Cost-effectiveness:

From a cost-effectiveness perspective, the **pilot project** meets the definition of '**average**'. There are certain impact areas such as education, child time use and energy savings that, in the long run, will benefit from the investments in the programme when considering the implementation period of 3 years, as well as the extended use of the solar devices during their lifespan.

The endline impact analysis provides strong evidence of impact in relation to education, specifically in terms of increasing children's study hours, increasing regular attendance at school, and seeing more students being promoted to the next grade. These benefits to the community will not only help to improve the level of education within the community and possible income in the economy but also help in the fight against child labour, poverty etc.

In terms of energy use, households are benefiting from an average of 3.4 hours of extra energy use per day. In addition, the use of small home solar devices for this additional energy use is estimated to be more cost-effective than using mini-grids which can be considered an alternative source of renewable energy. There are additional potential benefits of shifting to renewable energy sources that have not been captured and are out of scope of this current analysis. A study of the cost savings in CO_2 emissions will certainly help to further support the cost-effectiveness in terms of energy use.

Further, the fact that the solar devices afford households the opportunity to charge their mobile phones at home instead of going to the market to have their devices charged has been beneficial. Not only are the households able to charge their own devices, but some households have gained an additional revenue-generating activity through charging the mobile devices of their neighbours. Endline survey results show that up to 17% of households enrolled in the programme are engaged in this activity. For households paying to charge their mobile device, the price of mobile charging has fallen by 43% to KSH 144 per charge.

The endline survey results do reflect some impact areas that have not benefitted from the programme, in particular in relation to health.

3.2 Recommendations

The evaluation team proposes the following recommendations:

- The project should intensify its efforts around better budgeting and forecasting of expenses to minimise overspending. Improve its documentation of unexpected expenses, and what risk mitigation strategy is at hand. Budgets could be combined with sensitivity analysis based on risks to estimate financial implications of potential risks.
- The accuracy of the MIS should be enhanced to better track the project performance and the beneficiary's account. This would improve ability to identify beneficiaries, and to track payments to suppliers and transfers to the banks. A standardised system should be in place, agreed and used across stakeholders to consistently report project information.
- The project should consider updating targets to the evolving circumstances and clearly outlining data sources and how indicators are derived.
- Using existing government system is likely to enhance harmonisation of service delivery and to be a sustainable solution if the government is willing to take ownership and scale-up the project. The ownership should be both at the county- and national-level for sustainability, and national for streamlining in the existing systems However, the pilot should have more thoughtfully consider the implications of piggy-backing on existing systems on the pilot objectives and modalities of implementation. For example, given the crucial importance of regular repayments to use the solar devices, a mitigation strategy needs to be in place, as part of the project planning to prevent deactivation of the devices, due to delayed repayment caused by delayed disbursement of the Inua Jamii transfers. The project could explore ways to better integrate data and better handle information management across the different parties involved in the project implementation and the government systems. This would improve tracking of beneficiaries and payments. The project should also improve its understanding of default risks to ensure this is addressed in the second scale up phase.

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Project Documentation

List of documents shared by UNICEF and E4I:

- UNICEF-E4I institutional contract. Contract number 43253093 July 2018-February 2020
- Amendment to UNICEF-E4I institutional contract. Contract number 43253093 July 2018-August 2020
- UNICEF-E4I institutional contract. Contract number 43268045 January 2019-February 2020
- E4I-Busara Centre for Behavioural Economics contract for consultancy services. Contract number 082018246 August 2018- February 2020
- Addendum to E4I-Busara Centre for Behavioural Economics contract for consultancy services. August 2018- August 2020
- E4I-Somali Aid contract for consultancy services. Contract number 092018247 August 2018- February 2020
- Addendum to E4I- Somali Aid contract for consultancy services. August 2018- August 2020
- Memorandum of understanding between E4I and Biolite Energy Kenya Bright Sky Solar Solutions Ltd. On the development of sustainable distribution of portable solar lanterns and solar home systems in Garissa and Kilifi counties. March 2019
- Memorandum of understanding between E4I and D-Light solar company Limited. On the distribution of portable solar lanterns and solar home systems in Garissa and Kilifi counties. June 2019
- E4I Mwangaza Mashinani Project Quarterly Report 1 November 2019
- E4I Mwangaza Mashinani Project Quarterly Report 2 April 2020
- E4I Mwangaza Mashinani Project Quarterly Report 3 July 2020
- E4I, UNICEF Mwangaza Mashinani Project Bank Reconciliation Report October 2019
- E4I, UNICEF Mwangaza Mashinani Project Bank Reconciliation Report May 2020
- E4I, UNICEF Mwangaza Mashinani Project Bank Reconciliation Report June 2020
- E4I, UNICEF Mwangaza Mashinani Project Bank Reconciliation Report August 2020
- Mwangaza Mashinani Project Operational Manual July 2019
- Energy 4 Impact, Busara Center and Somali Aid Institutional Consultancy to support the implementation of the Energy and Cash Plus Initiative LRFP NO – 2018-9137855. A Kick-off Report from the Partnership of Energy 4 Impact, Busara Center and Somali Aid. December 2018. Revised January 2019
- UNICEF Concept Note To Swedish International Development Cooperation Agency (SIDA) Additional Financing – Mwangaza Mashinani Maisha Bora Project (Energy Plus Cash Pilot). Kenya 2018
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- UNICEF KCO Energy for the poor – Mwangaza Mashinani Second Annual Progress Report prepared for SIDA Sweden November 2018-November 2019. November, 2019
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- Energy 4 Impact, Busara Center and Somali Aid Energy and Cash Plus Pilot Project in Kilifi and Garissa Counties. Vulnerability Assessment Report December 2018

Annex A VfM Technical Annex

A.1 VfM framework

Table 25: VfM assessment framework

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
1 Economy criterion: the pilot uses resources economically, buying inputs of the appropriate quality at the right price, and following good programme management practices					
Sub-criterion: the project is meeting agreed benchmarks for TA and management costs, and costs of key inputs: cost of contractual services for implementation and evaluation of project activities, prices of M-Pesa and bank charges, prices of the solar products					
1.1	Difference between average monthly UNICEF staff cost and benchmark as a percentage of the benchmark	Quantitative (monetary)	Total UNICEF staff costs divided on months till Sept 2020. Staff costs are derived from data on annual salary, number of months working on the project and percentage of FTE worked on the project	Budget estimation for TA and QA activities over planned project duration;	Actual: UNICEF staff costs as provided by Social Protection Specialist. Benchmark: UNICEF budget as presented UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017
1.2	Difference between average monthly UNICEF operational cost and benchmark as a percentage of the benchmark	Quantitative (monetary)	Total non-staff costs excluding transfers to beneficiaries divided on months till Sept 2020	UNICEF budget for inception activities and fieldwork monitoring over planned project duration	Actual: UNICEF spending accounts. Benchmark: UNICEF budget as presented in UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017
1.3	Difference between actual cost for E4I contractual services and benchmark as a percentage of the benchmark	Quantitative (monetary)	Final contract(s) value vs original contract value	UNICEF -E4I original contract (July 2018- February 2020)	Actual: Contracts and contract extensions between UNICEF and E4I. Benchmark: UNICEF-E4I institutional contract. Contract number 43253093 July 2018-February 2020

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
1.4	Difference between actual cost for OPM contractual services and benchmark as a percentage of the benchmark	Quantitative (monetary)	Final contract(s) value vs original contract value	UNICEF -OPM original contract	Actual: Contracts and contract extensions between UNICEF (November 2018 to December 2020) and OPM. Benchmark: UNICEF-OPM original contract value (November 2018 to 31 March 2020)
1.5	Difference between actual transaction costs as percentage of total transfer value and benchmark as a percentage of the benchmark	Quantitative (monetary)	Total value of M-Pesa charge, EFT charges and zoning charges as a percentage of total cash transfer to beneficiaries	UNICEF budget for transaction costs	Actual:E4I payroll data and interviews with implementers. Benchmark: UNICEF budget as presented in UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017
1.6	Difference between actual unit cost of solar product and benchmark as a percentage of the benchmark	Quantitative (monetary)	Actual costs paid vs budgeted amount	Expected amount as presented in UNICEF KCO SIDA Project Proposal Clean 5th September 2017 (003)	Actual: MoU with solar suppliers. Benchmark: UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017
Sub-criterion: the project shows sound procurement practices and effective negotiation in respect of solar suppliers' services.					
1.7	Existence of operational evidence of procurement policies and procedures being documented and followed	Qualitative – document review	Evidence of competitive tendering and multiple quotes for solar device suppliers	UNICEF procurement policy	Actual: UNICEF KCO SIDA Project Proposal, UNICEF SIDA Annual Report June 2020, Project MoU with Solar suppliers, Project Operational Manual. Benchmark: UNICEF procurement policy

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
2 Efficiency criterion: the project has the capacity (HR and IT/financial) and systems in place for determining cost efficiency (including outsourcing choices, appraisal, due diligence of partners etc.), regularly evaluate allocative efficiency and practice sound financial management techniques, and demonstrate the ability for the project resources to adapt to changes in delivery costs or unforeseen events.					
Sub criterion: Allocative efficiency. Allocation of resources across intervention pathways in appropriate proportion; that is, reflecting the relative priority given and associated costs.					
2.1	Difference between actual expenditure on cost centre and budgeted amount as a percentage of the budgeted amount	Quantitative (monetary)	For each cost centre: (total budget- total spent) for this cost centre as a % of total budgeted for this cost centre by the time of the evaluation and by the end of the project	Difference within 20% above/below budget is considered to be adequate	Actual: UNICEF spending accounts and additional staff costs provided by Social Protection Specialist. Benchmark: UNICEF budget as presented in UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017; UNICEF Concept Note To Swedish International Development Cooperation Agency (SIDA) Additional Financing – Mwangaza Mashinani Maisha Bora Project (Energy Plus Cash Pilot). Kenya 2018 and UNICEF KCO and ESARO funds allocated to the project
2.2	Time series of expenses by cost item	Quantitative (monetary)	Disaggregation of expenses by cost item across payment cycles	Trend - assumption that expenses on cash transfers to beneficiaries reflect planned payment schedule; UNICEF TA and QA costs are high initially and decreasing over time. Expenses on contractual services meet agreed payment schedule and delivery of services. Operational costs increasing in line with fieldwork activities	Actual: UNICEF spending accounts, Benchmark: Implementation plan, Contracts with service providers (E4I and OPM); payment cycle schedule
2.3	Cost to transfer ratio	Quantitative (monetary)	Ratio of the project costs (excluding cash transfers to beneficiaries) to the total value transferred to a recipient	CTRs from other cash transfer projects in Kenya	Actual: UNICEF spending accounts. Benchmark: Bahri, O'Brien (2018), O'Brien, Hove (2015)
Sub criterion: Technical efficiency. Delivery according to the project implementation plan					

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
2.4	Adherence to implementation timeline	Qualitative – document review	Whether there has been any changes to the implementation timeline, whether those were agreed in advance, whether those were justified	Implementation timeline as agreed with project stakeholders during the set up phase	Actual: E4I Quarterly reports to UNICEF, UNICEF KCO Energy for the poor – Mwangaza Mashinani Progress Report prepared for SIDA Sweden November 2018-June 2020. June, 2020, E4I contract addendum. Benchmark: Implementation timeline at project set up
2.5	Key logframe achievements are on track to meet targets	Quantitative	Achievement against logframe targets of key outputs	Project Logframe June 2020	Actual: Logframe indicators in UNICEF KCO Energy for the poor – Mwangaza Mashinani Progress Report prepared for SIDA Sweden November 2018-June 2020. June, 2020 Benchmark: Logframe targets in UNICEF KCO Energy for the poor – Mwangaza Mashinani Progress Report prepared for SIDA Sweden November 2018-June 2020. June, 2020
2.6	Actual spend per household per device	Quantitative (monetary)	Ratio of the project costs (excluding cash transfers to beneficiaries) to total number of households purchasing the solar device	Actual cost of solar devices	Actual: UNICEF spending accounts and logframe indicators. Benchmark: MoU with Solar suppliers
Sub criterion: Dynamic efficiency. Appropriate use of M&E findings to support adaptive management and appropriate reallocation of resources to reflect evolving circumstances and opportunities in the context of the project's implementation.					
2.7	Narrative evidence of use of M&E to support adaptive management and learning and changes to implementation activities reflecting	Qualitative – document review and KIIs	Whether project is showing proof of adaptive management	Systems are in place to allow for adaptive management. Some project-generated evidence is being used	Actual: Vulnerability assessment, outputs of the external independent evaluation, implementer's quarterly reports, UNICEF annual progress reports to SIDA, beneficiary survey data, qualitative feedback from fieldwork activities, the project grievance process, project dashboard, TWGs' minutes

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
	evolving circumstances				

Table 26: VfM assessment for each indicator

Indicator	Indicator	Actual	Benchmark	Difference between benchmark and actual value	% Difference between benchmark and actual value	VfM assessment
1 Economy criterion: the pilot uses resources economically, buying inputs of the appropriate quality at the right price, and following good programme management practices						
Sub-criterion: the project is meeting agreed benchmarks for TA and management costs, and costs of key inputs: cost of contractual services for implementation and evaluation of project activities, prices of M-Pesa and bank charges, prices of the solar products (within 25% above/below benchmark is **considered to be acceptable)**						
1.1	Monthly average staff cost ($)	2,986	6,667	3681	55%	Good (potentially lower capacity to provide necessary QA and TA)
1.2	Monthly average operational cost ($)	1,532	3,750	2,218	59%	Very good
1.3	Contractual services - E4I ($)	530,126	449,933	- 80,193	-18%	Average
1.3.1	E4I Staff costs ($)	261,689	183,719	-77,970	-42%	Low
1.3.2	E4I Non staff costs (4)	396,608	346,407	-50,201	-14%	Good
1.4	Contractual services – OPM ($)	605,989	544,939	- 61,050	-11%	Good
1.5	% of transaction charges over total amount to beneficiaries	5%	10%	50%		Very good
1.6.1	Cost of Biolite Home 620 ($)	125	100	- 25	-25%	Average
1.6.2	Cost of D-31 cost ($)	127	100	- 27	-27%	Low
Sub-criterion: the project shows sound procurement practices and effective negotiation in respect of solar suppliers' services.						
1.7	Existence of operational evidence of procurement policies	--				Very good - There is evidence of competitive tendering and

Indicator	Indicator	Actual	Benchmark	Difference between benchmark and actual value	% Difference between benchmark and actual value	VfM assessment
	and procedures being documented and followed					multiple quotes for solar device suppliers
2 Efficiency criterion: the project has the capacity (HR and IT/financial) and systems in place for determining cost efficiency (including outsourcing choices, appraisal, due diligence of partners etc.), regularly evaluate allocative efficiency and practice sound financial management techniques, and demonstrate the ability for the project resources to adapt to changes in delivery costs or unforeseen events.						
Sub criterion: Allocative efficiency. Allocation of resources across intervention pathways in appropriate proportion; that is, reflecting the relative priority given and associated costs. (within 15% above/below benchmark is considered to be acceptable)						
2.1.1	Cash transfer to beneficiaries ($)	254,995	318,840	63,845	20%	Low. We would expect full amount to be disbursed to beneficiaries
2.1.2	Inception phase: Sensitisation, enrollment, targeting and identification/recruitment of potential beneficiaries including service providers ($)	77,735	70,000	- 7,735	-11%	Acceptable (average), although some risks could have been foreseen
2.1.3	Community level activities and cost of implementing partner: BWC training and incentives, community education before and after payments, development of communication materials, community livelihood development support ($)	404,219	337,500	- 66,719	-20%	Not acceptable (low)
2.1.4	UNICEF technical assistance and QA ($)	107,491	160,000	52,509	33%	Acceptable (good).
2.1.5	Field monitoring ($)	19,108	23,492	4,384	19%	Acceptable (average)
2.1.6	Procurement of a certified research institution including baseline, midline and endline surveys ($)	333,520	761,050	427,531	56%	Acceptable (average). This is in line with project timeline

Indicator	Indicator	Actual	Benchmark	Difference between benchmark and actual value	% Difference between benchmark and actual value	VfM assessment
2.2	Time series of expenses by cost item	Trend - assumption that expenses on cash transfers to beneficiaries reflect planned payment schedule; set up and inception follow original timeline; UNICEF TA and QA costs are high initially and decreasing over time. Expenses on contractual services meet agreed payment schedule and delivery of services. Operational costs increasing in line with fieldwork activities				Low at set up/ inception. Good during implementation, reflecting changes in timeline due to Government's delays
2.3	Cost to transfer ratio	3.69	0.502	-3.19	-636%	Low, although primarily driven by pilot related costs and deliver of additional activities on top of cash
Sub criterion: Technical efficiency. Delivery according to the project implementation plan (within 15% above/below benchmark is considered to be acceptable)						
2.4	Adherence to implementation timeline	Implementation timeline as agreed with project stakeholders during the set up phase				Low – we observed severe delays during the procurement process and at the inception phase.
2.5.1	Number of households purchasing an SHS or SL	1500	1692	-192	-13%	Acceptable (Good)
2.5.2	Number of beneficiaries using a SL or SHS regularly	1500	1669	-169	-11%	Acceptable (Good)
2.5.3	% of households regularly repaying	100%	70%	30%	30%	Not acceptable (Low)
2.5.4	Percent of beneficiaries that complete repayment	100%	70%	30%	30%	Not acceptable (Low)
2.5.5	% of payments delayed	--	33%			--
2.5.6	The average length of payment delays (days)	10	66	-56	560%	Not acceptable (Low)
2.5.7	Beneficiaries understanding of utilisation of SHS and SL	1500	1692	-192	13%	Acceptable (Good)
2.5.8	Number of the beneficiaries engaged in livelihood activities (capacity building activities)	1500	1692	-192	13%	Acceptable (Good)

Indicator	Indicator	Actual	Benchmark	Difference between benchmark and actual value	% Difference between benchmark and actual value	VfM assessment
2.5.9	BWC or local entrepreneurs trained to support beneficiaries	All	65		--	--
2.5.10	Number of beneficiaries with working SL or SHS	100%	99%	1%	1%	Acceptable (Very Good)
2.6	Actual spend per household per device ($)	1) 557 2) 296 (excluding evaluation and TA and QA costs)	1) 151 2) 151	1) -406 2) -145	1) -269% 2) -96%	Low, although mostly driven by pilot related costs.
Sub criterion: Dynamic efficiency. Appropriate use of M&E findings to support adaptive management and appropriate reallocation of resources to reflect evolving circumstances and opportunities in the context of the project's implementation.						
2.7	Narrative evidence of use of M&E to support adaptive management and learning and changes to implementation activities reflecting evolving circumstances	Systems are in placed to allow for adaptive management. Some project-generated evidence is being used				Average. Some project-generated evidence is being used, although the project lack a solid MIS.

Table 27: Pilot team composition

Staff Role	Salary (annual $)	Recruited	Number of months worked on the pilot (till Sept 2020)	Revised % work time for the pilot*	Original % work time for the pilot shared by UNICEF	Note
Chief of Social Policy	283,642	At project start	26	3%	10%	Position was vacant for 10 months from November 2019 to September 2020
Social Protection Specialist	187,460	At project start	33	10%	30%	Position was vacant for 3 months (July-October 2019)
Evaluation Specialist	187,460	At project start	36	1%	5%	Only involved in the impact evaluation and not in other programme aspects

Social Protection Specialist	106,162	At project start	36	5%	15%	
Social Policy Consultant	60,060	January 2020	8	10%	30%	
Social policy programme associate	45,888	At project start	36	3%	10%	
Social Policy UNV based in Nairobi	14,986	May 2019	16	10%	30%	
Social protection UNV based in Kilifi	17,743	March 2020	6	30%	75%	
Social Protection UNV based in Garissa	21,073	March 2020	6	30%	75%	
Note: * revised estimates of percent of time work on the pilot have been shared after submission of the first draft of this note. Indicators presented in the current version of the note are constructed using these revised estimates.						

Table 28: Project budget and actual spending

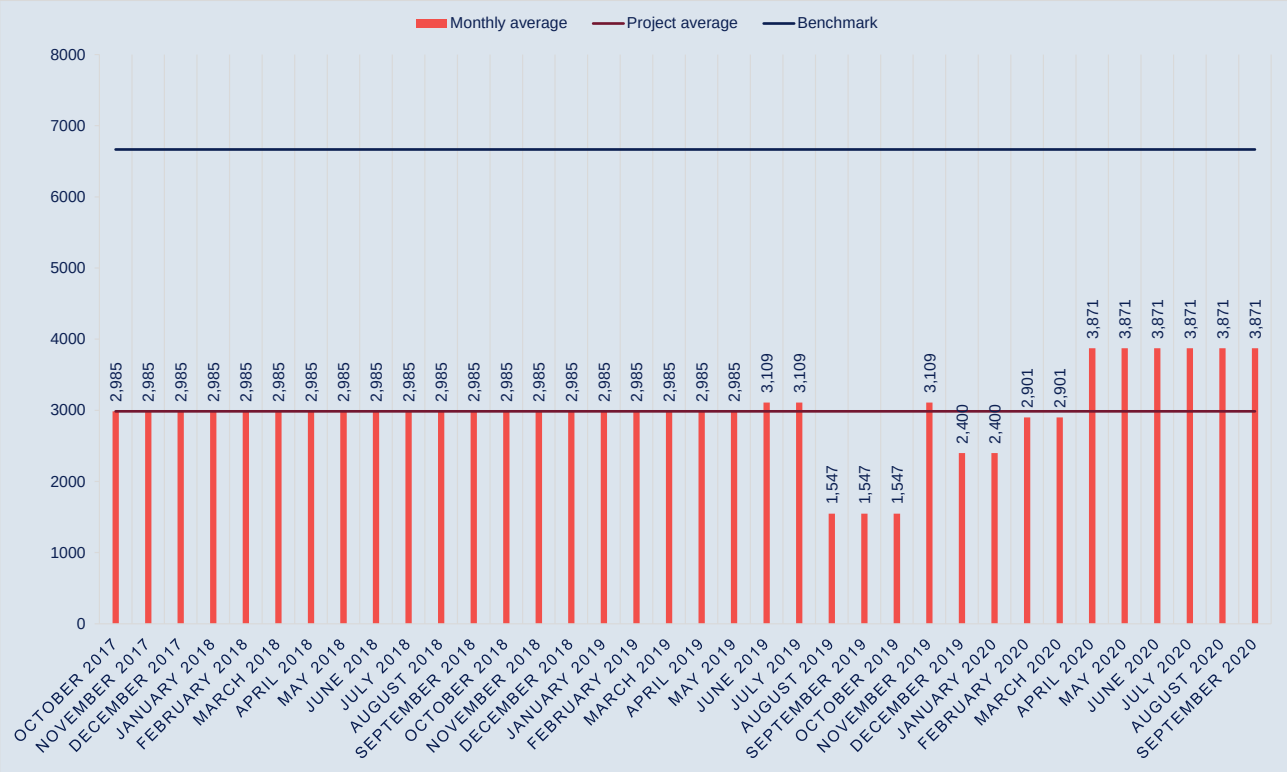
	Budget (by source of funds)				Spending (by September 2020)		
	SIDA 1 (Aug 2017-Nov 2019)	SIDA 2 (Nov 2019 onward)	Other grants	TOTAL	Spending till Sept 2020	Known commitment	TOTAL
Cash transfer to beneficiaries	$ 155,040	$ 163,800		$ 318,840	$ 254,995		$ 254,995
Inception phase: Sensitization, enrollment, targeting and identification/recruitment of potential beneficiaries including service providers	$ 70,000			$ 70,000	$ 77,735		$ 77,735
Community level activities and Cost of implementing partner: BWC training and incentives, Community education before and after payments, Development of Communication materials, Community livelihood development support	$ 337,500			$ 337,500	$ 404,219	$ 125,907	$ 530,126
UNICEF TA **and QA**	$ 160,000			$ 160,000	$ 107,491		$ 107,491

	Budget (by source of funds)				Spending (by September 2020)		
Field monitoring	$ 20,000		$ 3,492	$ 23,492	$ 19,108		$ 19,108
Procurement of a certified research institution including baseline, midlines and endline surveys	$ 340,000		$ 421,050	$ 761,050	$ 333,520	$ 272,470	$ 605,989
TOTAL	**$ 1,082,540**	**$ 163,800**	**$ 424,542**	**$ 1,670,882**	**$ 1,197,067**	**$ 398,377**	**$1,595,443**

Note: Budget excludes UNICEF indirect costs (8%). Spending and budget lines. The comparison maps expenditures incurred by the project until September 2020 against the original budget lines. We use the budget proposal presented in UNICEF KCO Energy and Cash Plus (draft concept note) 31 August 2017 and UNICEF Concept Note To Swedish International Development Cooperation Agency (SIDA) Additional Financing – Mwangaza Mashinani Maisha Bora Project (Energy Plus Cash Pilot). Kenya 2018 to estimate the project budget and DFAM Expenditure Listing Summary Report till September 2020 and additional information on staff costs shared by UNICEF's team to estimate the project expenditures by activity. Estimates of spending by activity relies on assumptions because the DFAM Expenditure Listing Summary Report reports costs by cost item rather than activity. Assumptions are as follows:

- Spend on Cash transfer to beneficiaries: total value of transfers to beneficiaries, including Bank charges and Mpesa charges.
- Inception phase: total costs incurred before June 2019, excluding evaluation activities; transfers to beneficiaries (pilot cycle in April 2019), E4I's contractual services and UNICEF staff costs;
- Community level activities and Cost of implementing partner: total value of contractual services provided by the consortium partner.
- Field monitoring: costs incurred after May 2019, excluding UNICEF staff costs, transfers to beneficiaries and contractual services provided by E4I and OPM;
- Procurement of a Certified research institution including baseline, midlines and endline surveys: total value of contractual services provided by OPM;
- UNICEF technical assistance and QA: total UNICEF staff and other personnel costs derived from information on staff costs shared by UNICEF Social Protection Specialist.

Figure 5: Trend analysis of staff cost. Average staff cost per month ($)



Staff costs are generally below the expected benchmark, derived by UNICEF budget allocation for TA, QA and support to project implementation. Staff costs are lower in August-October 2019 because one social protection specialist left and his role was vacant for three months. The position of chief of social policy was also vacant for 10 months from November 2019 to September 2020. The increase in costs in February 2020 is attributable to the expansion of the project team. In fact, the project team hired a new staff member in January 2020. Staff costs increase again in April 2020 because the project hired new personnel to coordinate the last two payment cycles and facilitate transition to the second phase of the pilot in both counties.

A.2 Calculations

In the first **quarterly report** of the Mwangaza Mashinani project, community feedback was gathered through various channels. It was observed that most households (21.85%) have 2 school-going children; 19.26% have 3 school-going children, and 16.67% have 4 school-going children. Less than a third of households have more than 5 school-going children (27.77%), and only a few have 1 or no school-going children (14.45%).

From this feedback, an assumption of the average number of children going to school per household was estimated.

Category	Number of children attending school	Share in (%) according to the community	The calculated number of children going to school
2 Children going to school	2	21.85	739.4
3 Children going to school	3	19.26	977.6
4 Children going to school	4	16.67	1,128.2
More than 5 Children going to school	5	27.77	2,349.3
1 or fewer	1	14.45	244.5
		Total	5,439.1
		Number of households	1,692.0
		The average number of children going to school per household	3.2