



Solar for Health (S4H) innovative financing feasibility study: Zambia summary report

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1. Energy demand and financing need

Many healthcare facilities in Zambia struggle with unreliable access to electricity, and off-grid solutions have yet to scale

The Government of Zambia (GoZ) targets 90% access to electricity in urban areas and 51% in rural areas by 2030. Currently, energy access rates are slightly above 67% in urban areas, and at only 4% in rural areas (national average of 30%). Although Zambia has benefited from a number of electrification initiatives over the years (e.g., the Climate Investment Funds' Scaling-Up Renewable Energy Program, IFC's Scaling Solar Program, and GoZ's Global Energy Feed-in Tariff programme), it seems unlikely that the GoZ can achieve its sustainable energy for all targets within the next decade. Additionally, even though GoZ's National Electrification Plan has identified off-grid technologies as the lowest-cost electrification solution, energy initiatives predominantly focus on on-grid strategies. The Ministry of Energy (MoE) lacks clearly-defined plans and timelines to implement an off-grid strategy; moreover, legislation remains inadequate to support renewable energy technologies, with incentives limited to exceptions for VAT and import duties on solar and battery technologies.

In the healthcare sector, specifically, achieving universal and reliable energy access remains an ever-present challenge. According to the 2019 national health facility census commissioned by the Ministry of Health (MoH), only 40% of Zambia's 2,300 public healthcare facilities are connected to the grid; though it is estimated that at least 50% have access to solar energy. With small health posts and rural health clinics accounting for over 80% of healthcare facilities, providing energy access to the marginal unconnected rural facility becomes increasingly costly. These energy access rates can also belie unreliable quality of service for many 'electrified' healthcare facilities, including: unstable access to grids, insufficient solar PV sizing for facility needs (i.e., only covering refrigeration and basic lighting), and premature system failures due to lack of proper maintenance being the norm rather than the exception.

UNDP's Solar for Health (S4H) programme aims to address these issues and bring reliable and clean energy to healthcare facilities across Zambia. By strengthening access to reliable solar energy, the S4H programme can significantly impact the quality of public healthcare, particularly for the most disadvantaged and remote populations, whilst also supporting local green growth and climate action. Specifically, S4H directly contributes to the following social, economic, and environmental Sustainable Development Goal (SDG) outcomes in Zambia:

- **Social**: SDG3 (Good Health and Well-being); SDG10 (Reduced Inequalities);
- **Economic**: SDG8 (Decent Work and Economic Growth); SDG9 (Industry, Innovation, and Infrastructure); and
- **Environmental**: SDG7 (Affordable and Clean Energy); SDG13 (Climate Action).

An estimated US\$30m in financing is urgently needed to provide reliable solar energy access to healthcare facilities

An estimated US\$30m in investment capital is needed in Zambia to finance the capital expenditures required to provide energy access to healthcare facilities, over an initial 7-year investment timeline.

The investment sizing assumes the following:

- Healthcare facilities within scope: on-grid facilities with diesel generators as backup and off-grid facilities without energy access. Facilities with existing off-grid solutions were excluded, though a further assessment should be conducted by MoH during programme implementation to determine if additional capacity may be needed for these facilities. Finally, small health posts were assumed to be out of scope for solar PV systems, given their small size and limited range of healthcare services. For these facilities, solar lanterns may be relevant and sufficient, though these are not included within the S4H programme;
- Energy needs, O&M, and autonomy assessment: an average energy needs and O&M assessment is assumed for different categories of healthcare facilities (from rural clinics to large hospitals) based on regional usage benchmarks. The exact needs assessment of each target facility will need to be conducted by MoH in collaboration with a local ESP to determine exact solar PV system sizing and investment need. Additionally, autonomy (i.e., through lithium batteries) is estimated at a half-day for on-grid facilities and two days for off-grid facilities. For the investment sizing, we have assumed that rural health centres in scope are off-grid while urban health centres and hospitals are connected to the grid. Incorporating a hybrid solution with a diesel generator as a back-up solution, where financially relevant, can reduce total investment need;
- Diesel versus off-grid solar for energy needs: although the estimated levelised cost of energy (LCOE) of solar PV systems (US\$0.59/kWh) is greater than that of diesel generation (US\$0.38/kWh) over the initial contract period, the investment sizing assumes the social and environmental benefits from providing off-grid solar energy to all public healthcare facilities within scope outweigh this unit cost difference. Furthermore, this conservative costing analysis: (i) is based on benchmark retail prices for diesel in urban centres and does not factor in transportation and other middlemen costs that may increase transaction costs to rural healthcare facilities, (ii) does not incorporate CAPEX costs for generators (as it is assumed many healthcare facilities may already have the relevant systems; this, however, is often not the case), and (iii) estimates unit cost based on 7-years of operation (given minimal marginal operations cost, unit cost should decline further as solar PV systems are used past this initial investment timeline and as replacement battery costs decline). Finally, diesel value chains may also experience other unreliability/unavailability supply issues that can generally hinder reliable energy access. Consequently, this can make any costing analysis an unfair comparison as off-grid solar costs are typically greater given the inherent systems needed to ensure continuous and reliable energy access; and
- Investment timeline: an initial 7-year timeline covering initial capital expenditures and long-term O&M. A properly maintained solar panel can last up to 25-30 years, a lithium-ion battery lifetime ranges between 5-15 years. Investment financing is structured on an 7-year timeline, though this may be extended if investors show a preference/appetite for longer investment horizons (i.e., in which case a new battery might have to be purchased prior to a new financing cycle).

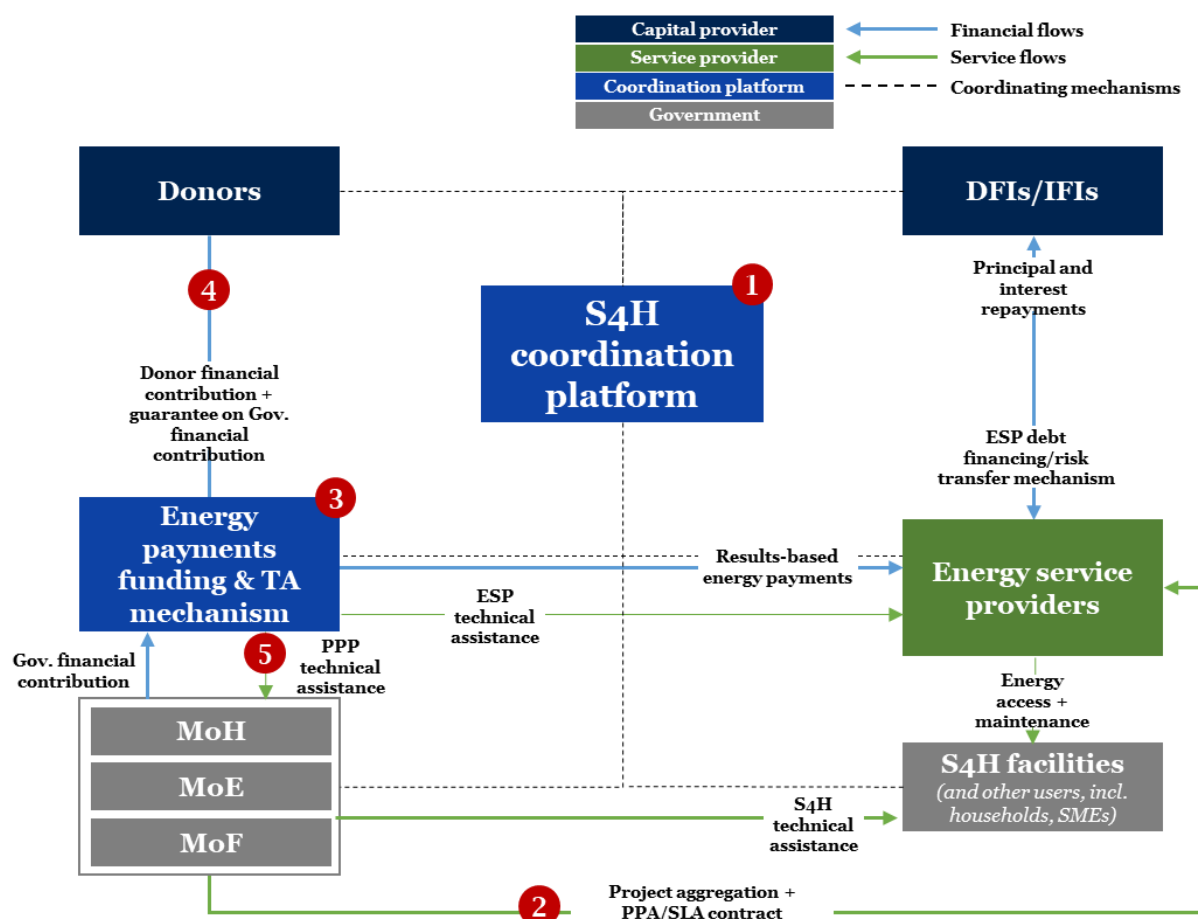
	Rural health centre	Urban health centre	1st level hospital	2nd level hospital	3rd level hospital	TOTAL
Initial investment outlay (unit)	US\$44,304	US\$29,105	US\$44,930	US\$81,855	US\$118,780	
Annual O&M cost (unit)	US\$1,581	US\$1,750	US\$2,200	US\$3,250	US\$4,300	
Number of facilities	540	258	105	27	11	941
Total hardware cost	US\$18.53m	US\$5.38m	US\$3.44m	US\$1.64m	US\$0.97m	US\$29.97m
Total turnkey cost	US\$23.92m	US\$7.51m	US\$4.72m	US\$2.21m	US\$1.31m	US\$39.67m

Unlocking the quantum of investment capital needed to scale-up the S4H programme remains challenging given inherent financing and operational challenges in Zambia

- Low MoH ability-to-pay: high levels of public debt, inflation, and budgetary mismanagement have resulted in decreasing allocations for healthcare spending. Additionally, recent cases of budgetary leakage from government accounts have reduced donor appetite in providing direct financial support to MoH. Against this constrained budgetary backdrop, MoH necessarily prioritises payment of staff salaries and medicines over other ancillary expenses, including energy access. Consequently, low MoH ability-to-pay and creditworthiness creates high payment default and public counterparty risk for potential S4H investors;
- Lack of access to local financing to develop local markets: traditional commercial off-grid energy investors have expressed little appetite for undertaking public counterparty risk in Sub-Saharan Africa. This has significantly limited access to affordable capital for local energy service providers (ESPs) that may focus on public infrastructure, including healthcare facilities. Where local financing may be available, it can come at prohibitively onerous terms (typically only offering rates >20%);
- Poor incentives for long-term operational and environmental sustainability: existing grant-financing models fail to incentivise long-term sustainability. Due to donor programmatic timelines (typically 3-5 years), specific priority mandates and funding processes, and shorter-term impact metrics, many donor-funded projects prioritise disbursing funding upfront to cover initial capital expenditures (CAPEX) versus financing longer-term annual commitments. This often results in premature failure of solar PV systems within the first few years and reduces potential for impact. Importantly, from a donor perspective, this CAPEX-only financing represents low value-for-money: it can often be the case that a revolving set of donors will finance new off-grid solar initiatives for the same healthcare facility every few years; and
- Lack of coordination and technical capacity to support project development: short-term donor mandates and preference for direct financing of technical assistance and/or discrete projects can often create ad-hoc and short-term focused initiatives that fail to deliver long-term impact. This lack of coordination between different government ministries, donor agencies, and project implementers (in this case, often large international players with limited local presence) prevents effective implementation of national off-grid energy strategies and increases transaction costs related to project procurement, aggregation, due diligence, and delivery.

2. Solar for Health coordination platform financing model

A holistic approach bringing together stakeholder coordination, long-term de-risked financing, and technical assistance can be instrumental in scaling the S4H programme



1. A S4H coordination platform will support MoH with procurement and tendering to aggregate projects that can attract development finance institution (DFI) financing

The S4H coordination platform will coordinate a partnership between MoH, GoZ's PPP Unit, MoE, local representatives, commercial investors, and local ESPs. UNDP, through its facilitation role, will supervise and support the entire investment process from procurement through to investment monitoring to ensure proper quality standards and successful implementation of the programme.

- PPP procurement and tendering to support project development:
 - o *Coordination with PPP Unit in the Ministry of Finance (MoF):* GoZ has established a PPP Unit within MoF and developed a standardised PPP framework. Although these initiatives have predominantly targeted on-grid generation, there are opportunities for MoH and other S4H coordination platform stakeholders to leverage MoF's experience with PPPs and adapt relevant best practices for procurement and tendering;
 - o *Coordination with MoE:* the S4H coordination platform will coordinate with the Rural Electrification Authority (REA), MoE's Office for Promoting Private Power Investments, and MoH to ensure alignment between the national electrification master plan, existing and planned power investments, and priority healthcare facilities that may overlap with other ministries' development plans. Additionally, MoH can leverage

MoE's expertise and technical knowledge, including experience with private power investments, independent power producer (IPP) contract negotiations, and energy project management;

- *Coordination with local representatives*: project selection, energy needs assessment, project preparation, and community engagement will be conducted in close collaboration with community leaders and MoH national and district representatives to ensure buy-in, adapt projects to local context and needs, and allocate budgets to the programme;
- Project aggregation to create investable portfolios: although investment in S4H and the public sector is a non-starter for most commercial investors, DFIs have explicit development mandates (often coupled with an appetite for public sector exposure) and large balance sheets for investment in larger-scale infrastructure and energy projects. The investment needs of an individual healthcare facility, however, cannot meet the minimum investment ticket sizes for DFIs (>US\$10-100m versus typical individual healthcare facility investment needs of US\$35-135k). By aggregating a portfolio of projects through a S4H coordination platform, the S4H programme can create larger investment ticket sizes of sufficient relevance for DFI capital.

There are promising examples of other financing initiatives that have similarly leveraged DFI capital (in the form of concessional loans, equity, or grants) for the renewable energy sector in Zambia. For example, the Green Climate Fund, in partnership with the African Development Bank, underwrote a US\$154m programme to support GoZ's Renewable Energy Feed-in Tariff (REFiT) policy to develop 100MW of renewable projects; the European Union launched the Electrification Financing Initiative (ElectriFI) with a €40m window for Zambia; and the Beyond the Grid Fund uses innovative finance (such as results-based finance) to support renewable energy companies in their off-grid electrification activities; and

- Mobilisation of private capital to finance local ESPs: the S4H coordination platform will also be responsible for coordinating the financing and investment due diligence processes with different GoZ stakeholders, DFIs, and local ESPs. Specifically, the S4H coordination platform will develop investment due diligence criteria as part of its support to MoH during the procurement and tendering process to local ESPs, as well as explicitly coordinating with different DFIs and incorporating respective investor considerations. DFIs may still run separate investment due diligence processes as part of their own organisational processes in parallel to the S4H coordination platform. But already incorporating their investment considerations as part of the PPP procurement can (i) help streamline the investment process for both DFIs and local ESPs and (ii) ensure linkages between the tendering process and investor capital mobilisation. For example, by making S4H tenders contingent on a satisfactory DFI investor due diligence of the project bid and of the local ESP, the S4H coordination platform ensures that winning bidders necessarily also receive access to affordable financing.

2. A power purchase agreement (PPA) and leasing mechanism will align financial incentives and smooth payments over time to ensure long-term financial, operational, and environmental sustainability

A PPP/PPA and leasing mechanism will set out the contractual and financial obligations between DFIs, MoH, and the local ESP over the 7-year contract lifetime to ensure long-term sustainability:

- Financial sustainability and local market development:
 - *Investor returns matching respective risk-return appetites*: the financing capital structure is expected to blend senior debt at USD-denominated market returns (i.e., DFI capital) with concessional climate finance funds and/or donor grant capital. This blended finance approach will match interest rate returns to the respective risk-return appetites of different capital providers, whilst ensuring that access to financing remains affordable for local ESPs (versus current local financing rates >20%). The interest rate returns will depend on the expectations of committed capital providers identified during financial structuring negotiations, as well as the degree of blending between commercial and concessional financing;
 - *MoH and donor value-for-money*: as the contracted off-taker for energy access to public healthcare facilities, MoH will be liable for payment obligations under the PPP. Currently, high upfront CAPEX can be prohibitively expensive and reduce the number

of healthcare facilities that can be targeted. By spreading the total energy access costs across a series of smaller leasing payments, MoH and/or donor funders can reduce their monthly costs and improve affordability. Additionally, financial incentives for long-term operational sustainability will support increased impact and value-for-money. Donor mandates focused only on upfront CAPEX funding, however, will need to be adapted to support these recurring payments;

- *Local ESP market development:* monthly leasing payments will be paid to the local ESP by a coordinated energy payments funding mechanism comprised of donors and MoH over the 7-year contract duration. These leasing payments will be priced to include capital expenditure, long-term O&M, cost of capital, and local ESP commercial margins to support local market development. Additionally, access to affordable blended financing through the S4H coordination platform will enable solar PV asset ownership to remain with the local ESP throughout the PPP contract duration (before ownership transfer to MoH). By bearing this financing risk, the local ESP will also benefit from earnings on leasing financing margins. This can support the financial sustainability of local ESPs, as well as strengthen their track record and ability to access capital markets in the future.

- Operational and environmental sustainability:

- *Long-term local ESP operational performance obligations:* under the current grant-based model, donors typically only finance the upfront cost of solar PV panels and initial installation. Long-term O&M (and proper disposal) is often not priced into contracts. Although GoZ's REA provides training to on-site healthcare staff on solar PV maintenance across some of these public facilities, it remains insufficient and both REA and MoH have limited capacity to manage O&M across a larger portfolio.

Under the S4H coordination platform model, the local ESP (in collaboration with MoH) will conduct an energy load needs assessment across its project portfolio and provide appropriately-sized solar PV systems and installation services. The local ESP will then be responsible for long-term O&M and will need to ensure solar PV system availability and achievement of minimum-service level operational performance criteria, as defined under an SLA. Additionally, given the potential geographic spread of project portfolios, local ESPs may need to train healthcare staff or community-based technicians for more frequent and basic maintenance (e.g., cleaning panels).

The PPP/PPA will specifically aim to incentivise long-term operational sustainability by pricing in O&M into the contract over its 7-year term. Monthly leasing payments will be conditional on achieving the SLA operational performance standards to provide financial incentives for high-quality service over the full life of the PPP/PPA contract. In the event solar PV systems fail to meet minimum service-level performance standards required by the healthcare facility, for example, payments to the local ESP may be reduced and/or withheld. As the S4H coordination platform envisions an initial 7-year investment timeline, the PPP/PPA contract will need to be extended with a new long-term O&M contract (including coverage of any replacement parts) after this investment horizon to maintain on-going sustainability after eight years; and

- *Local ESP environmental sustainability and disposal obligations:* the PPP contract might additionally price in disposal costs as part of the local ESP's long-term sustainability obligations. From a technical perspective of disposal, however, there are no standardised best-in-practice guidelines and little practical experience with disposal and recycling of components from medium- to large-scale solar energy systems. There are no hazardous materials in silicon PV panels and lithium batteries (as opposed to lead acid batteries) that should present an environmental concern. The details of where and how it should be disposed (as well as the existence and/or capabilities of relevant ecosystem players), however, need to be further developed. Encouragingly, recycling PV panels and battery components can have economic value and is of relatively low complexity. The market for local recycling value chain actors is expected to grow as these technologies further develop.

3. An energy payment funding mechanism will coordinate healthcare energy contributions from donors and MoH to support ability-to-pay on payment obligations under the PPP

The energy payments funding mechanism will coordinate financial contributions from international donor agencies and local public institutions (i.e., MoH), including incorporating existing budgetary allocations for healthcare energy spending. Those monthly energy payments will remunerate the local ESPs as part of the PPP/PPA contractual frameworks and are fundamental to mitigating MoH payment default risk (in order to attract DFI investor capital):

- Support for MoH ability-to-pay through coordinated donor funding: donor contributions within the energy payments funding mechanism will cover a pre-defined proportion of the monthly leasing payments to local ESPs. MoH will be contractually obligated to finance the remaining balance, with covenants in place in the event of default. These can include removing defaulting healthcare facilities from the S4H programme and/or reduced future donor funding to MoH as penalties.

Currently, around 40% of healthcare expenditures are funded by donors, though these donor budgets are primarily focused on HIV/AIDS and SDI programmatic funding (and only 50% of this grant capital is actually channelled through MoH). MoH may need to seek additional support or reallocate some of those existing sources of healthcare financing to cover its financial obligations under the PPP/PPA contracts.

The proportion of donor funding versus MoH contributions to the leasing payments will thus need to be negotiated amongst relevant stakeholders during structuring of the PPP to ensure ability-to-pay. Donor commitments are an essential component needed to balance MoH's low ability-to-pay and should be sufficient in size to reduce payment default risk (and attract investor financing). This coordinated funding mechanism, however, can still face a funding shortfall: as donor programmatic mandates are typically shorter-term (i.e., 3-5 years), many donor agencies are unable to commit to the full 7-year investment horizon and can only conditionally commit to funding in later years if programmatic mandates are renewed. This risk can be partially addressed by (i) putting MoH contributions into escrow during the first years of a secured donor mandate and using only donor capital during this period for PPP payments (if applicable), with MoH funding from escrow released in later years and/or (ii) using guarantee mechanisms (though these can be costly) and donor first-loss capital. Alternatively, certain donor funding windows, such as the Green Climate Fund, may be able to provide funding commitments up to 7 years;

- Potential additional revenue streams to minimise MoH liabilities: MoH, with implementation support from local ESPs, TA providers, and UNDP can explore additional revenue streams to help off-set payment obligations, including selling excess energy generation to local communities, feeding into the grid, and/or carbon credits in global carbon markets. For example, the S4H programme can reduce carbon emissions by an estimated 10k tCO_{2e} per annum (assuming full off-grid solar energy access for target facilities versus equivalent diesel usage). Under Article 6 of the Paris Agreement, there may be potential for these internationally transferred mitigation outcomes (ITMO) carbon credits to be sold in global carbon markets: at benchmark prices of \$10-\$15 per tCO_{2e}, MoH can potentially reduce its payment obligations by up to \$100-150k per annum. Although these additional revenue streams will likely remain small and unable to cover full payment obligations, they are nonetheless welcome upsides to help offset MoH liabilities;
- Partial foreign exchange risk mitigation: as international donor contributions are typically denominated in hard currencies (e.g., USD, EUR), such funding will partially mitigate foreign exchange risk (up until the proportion of its share of the energy payments) on financing liabilities (i.e., repayments to investors) that are also denominated in hard currencies;
- Reduced budgetary leakage: donor contributions through UNDP will minimise risk of leakage into GoZ's general budgetary allocations and spending outside of the S4H programme. Ensuring a direct link between financial contributions and repayment to investors will additionally reduce investor perception of public counterparty risk; and
- MoH buy-in and long-term asset ownership: although MoH's partial financial contributions to leasing payments will expose investors to a measured level of public counterparty risk, it is also important to ensure MoH has financial obligations as part of the PPP financing. This skin-in-

the-game will incentivise MoH's commitment to the long-term sustainability of the solar PV systems (versus often-limited buy-in under the current grant-based funding model).

4. Guarantees will be necessary to backstop MoH contributions to the leasing payments and further mitigate GoZ public counterparty risk for DFI capital

Despite donor contributions to the leasing payments through the energy payments funding mechanism, a complementary set of contingent grants/guarantees may still be required to de-risk investor capital against MoH public counterparty exposure and short-term donor commitments. Specifically:

- **MoH public counterparty risk:** guarantees to backstop energy payment obligations can mitigate partial exposure to MoH defaults on its payment obligation under the PPP and provide credit enhancements to investors. As guarantee mechanisms can be costly and donor contributions do not fully mitigate investor risk, a structured combination of both financial tools may be more effective at attracting DFI capital. These guarantees can be structured to either backstop payments to the ESP or directly on payment obligations to investors. The specific terms and payment coverage will depend on the cost and availability of guarantee mechanisms and donor capital; and
- **Short-term donor commitments:** guarantees can play an additional role at temporarily backstopping donor commitments to energy leasing payments in later years of the PPA. This risk that a potential donor may fail to renew its commitment in later years may need to be covered by a partial guarantee to attract longer-term investor capital.

5. Technical assistance and capacity-building will support GoZ's regulatory and PPP framework development and strengthen procurement, project development, investment due diligence, and project delivery and monitoring capabilities

MoH, given its limited expertise with PPP and energy procurement tenders, will require technical assistance (TA) and capacity-building from procurement through project management. Additionally, a nascent local off-grid ecosystem will depend on international/regional partnerships and S4H coordination platform support to strengthen local market capabilities. Specifically, a TA provider financed by donor grant capital through the coordinated TA funding mechanism (managed by the same executing entity for the energy payments funding mechanism) can support MoH and local ESPs with the following:

- **Project preparation support:** healthcare facility selection and prioritisation, specific energy needs assessment, scope of work definition, and investment sizing across hundreds of potential facilities will need to be completed in an initial phase of S4H implementation;
- **Procurement and tendering process:** although MoH can leverage heavily on expertise learned from the GET FiT programme and other energy initiatives on the PPP procurement process for solar and hydro power plants (including, standardised procurement processes, tender/contractual terms and templates, and bid evaluations), additional TA may be relevant to adapt best practices to the MoH and S4H context;
- **Contract and project management:** TA can additionally be provided to support PPP contractual and term sheet negotiations with DFIs and local ESPs, PPP governance, and portfolio management; and
- **Local ESP project delivery capabilities:** the local market ecosystem is growing in Zambia (currently c.30 locally-licensed solar companies) and several companies such as Vitalite, Fenix and Standard Microgrid have been scaling up with the support of the Beyond the Grid Fund for Africa. The larger local players primarily focus on urban markets for solar home systems. Otherwise, most local ESPs are small enterprises that are not of sufficient size and/or technical capability to bid for large public procurement tenders. Consequently, large international actors continue to play an outsized role in Zambia's energy initiatives. Technical assistance financing will encourage development of the local market by supporting business plan development, contract procurement, and technical project delivery capabilities (including the upskilling of local and community-based O&M technicians). A large regional player or international joint venture may be relevant in an initial phase to bring in necessary technical expertise; REA and/or the University of Zambia can also support capacity-building given existing support in other energy initiatives.

3. S4H social, economic, and environmental impact

Scaling up the S4H programme in Zambia is expected to deliver better healthcare quality, strengthen local economic green growth, and support climate action

1. Improved energy access and healthcare quality (especially for patients in rural areas)

- Improved healthcare quality across 941 facilities: S4H is estimated to provide access to reliable energy to 941 healthcare facilities. This improved availability and strengthened resilience of healthcare facilities are expected to significantly improve health outcomes across the board, from quantitative indicators (e.g., reduced HIV/AIDS infection rate and neonatal mortality rates, improved access to medicines) to softer qualitative indicators (e.g., improved patient comfort); and
- Reduced inequalities in health services: lack of access to reliable energy disproportionately affects rural healthcare facilities located in areas where the poorest populations live. Bringing reliable energy access to rural areas can reduce the healthcare quality gap between rural and urban communities in terms of healthcare quality.

2. Economic green growth and job creation

- Local economic development through green growth: S4H can catalyse foreign direct investment inflows (an estimated US\$30m for this programme alone), develop the local energy ecosystem, and create green jobs (particularly in rural communities);
- Renewable energy sector capacity-building: technical assistance and capacity-building of government ministries and local ESPs will contribute to further market transformation and national implementation of off-grid solar technologies; and
- Creation of new value chains: the recycling and disposal of solar PV systems can create demand for new value chains and develop new local green enterprises. Zambia is already extracting cobalt for battery production and is therefore well placed to develop value added activities within that sector.

3. Cleaner energy and environmental benefit

Moving from providing full energy access to public healthcare facilities through off-grid solar (versus equivalent diesel usage) will reduce carbon emissions by approximately 10k tCO₂e per annum:

	Total	Rural health centre	Urban health centre	Hospitals
Diesel efficiency	24%	20%	25%	30%
Diesel MWh	5,997	2,957	1,413	1,628
Grid MWh	10,052	2,957	3,296	3,799
tCO ₂ /year	10,003	4,853	2,526	2,623

4. UNDP role and implementation roadmap

UNDP can play three key roles to support implementation of the S4H innovative financing S4H coordination platform in Zambia

- Create a convening platform for stakeholder coordination and buy-in: given its networks and track record in Sub-Saharan Africa, UNDP is uniquely-positioned to play a convening role through the S4H coordination platform with all relevant public (i.e., MoF, MoE, MoH, community leaders, donors) and private (i.e., DFIs, local ESPs) stakeholders; ensure stakeholder buy-in and alignment of respective mandates and incentives with S4H objectives; and provide oversight of roles and responsibilities for successful collaboration;

- Support capacity-building and strengthening of regulatory frameworks:
 - *Off-grid/renewable energy regulatory frameworks:* although a number of large-scale energy initiatives exist in Zambia, these have predominantly targeted on-grid generation. UNDP can support MoE and REA in strengthening their off-grid development strategies and incorporating clearer targets and timelines into MoE's national electrification master plan. As part of these development strategies, UNDP can further strengthen incentives and favourable policies for the renewable energy sector based on global best. And through off-grid initiatives like S4H, UNDP can support GoZ in developing new off-grid/distributed energy models that could be scaled up under the relevant national master plans;
 - *PPP regulatory framework and management:* UNDP can support MoH to leverage expertise from MoF's PPP Unit and incorporate global best practices to existing PPP regulatory frameworks. By supporting capacity-building of GoZ's PPP Unit to include healthcare off-grid energy infrastructure, UNDP can strengthen MoH's PPP and contractual frameworks, increase private sector investor appetite through budgetary allocation ringfencing, and reduce transaction costs on PPP procurement and management;
 - *Local ESP capabilities:* although the local ESP ecosystem is growing in Zambia, it still remains underdeveloped and will require support to reduce dependence on large international off-grid solar actors. Through UNDP-supported TA providers, UNDP can encourage development of the local market and its project procurement and delivery capabilities (including the upskilling of local and community-based O&M technicians outside major urban areas); and
- Align and mobilise donor and investor capital to S4H objectives: UNDP can leverage its partnerships development and fundraising platforms to mobilise global development capital providers (i.e., donors, DFIs, climate funds, guarantees providers) to provide grant, guarantees, and investor capital for the S4H innovative financing facility.

Additionally, UNDP may also play a key role in coordinating with international donor agencies to align existing and future off-grid energy programmatic initiatives with S4H objectives (including coordinating the energy leasing payments and TA grants and/or incorporating flexibility into short-term funding timelines and mandates).

Finally, UNDP can support global alignment around the development of ITMO carbon markets under Article 6 of the Paris Agreement, to mobilise climate finance as a potential additional revenue stream for S4H healthcare facilities.

Initial feedback from a consultative workshop with GoZ stakeholders indicate interest in further developing the S4H programme

The MoH and MoE representatives have confirmed their interest in pursuing discussion to investigate how the S4H proposed solution could be implemented in Zambia. As next steps, the participants to the workshop are seeking a more detailed ecosystem analysis that will identify the key stakeholders and further define their roles and responsibilities for the implementation phase.

Questions on financial sustainability have been raised during the workshop. For instance, mechanisms and agreements shall be put in place in case the grid is extended to the health centres benefiting from the S4H programme. However, grid extension is not expected to put at risk the financial sustainability of S4H given the high level of load shedding and limited reliability of the grid. It shall rather be seen as an opportunity to reduce the cost by developing agreement for feed-in tariffs or net metering agreements.

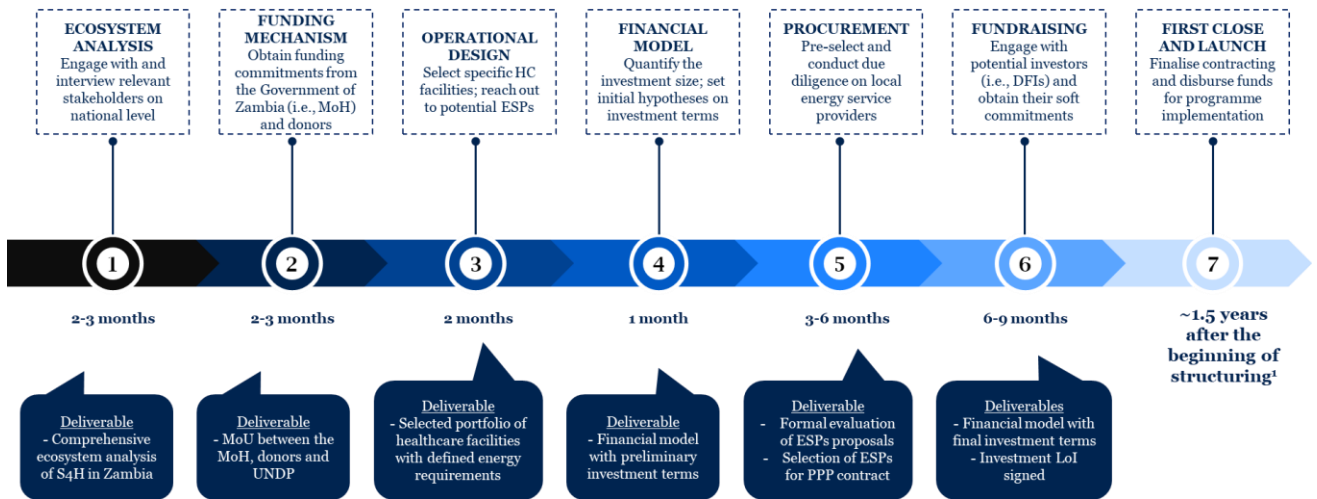
The long term sustainability of the installation has also been discussed by the participants given that the project only foresees 7 years of O&M as part of the programme while those installation can have a lifetime of up to 20-25 years. The time limited mandate of donor grants do not allow to go further than 7 years, however it is recommended that the MoH tenders out an O&M contract at the end of the grant funding to ensure that the installation are correctly maintained for the remaining lifetime of the assets.

The GoZ representatives highlighted that a first mission with MoH and MoE has established a working group to seek Green Climate Fund funding. Within that framework, a note to the GCF has already been

prepared by the National Designated Authority (NDA). In collaboration with the UNDP energy team, NDA will review that note and confirm if it is in line with the requirements for this initiative or if it shall be adapted. This note could then be used to move rapidly to the next phase of the project implementation.

Based on these learnings, the following are recommended next steps and an implementation roadmap

- Review and submit the Letter of Interest for the Green Climate Fund (GCF): as a concrete outcome of the country consultative workshop, UNDP is to coordinate with relevant government ministries and the NDA to execute a Letter of Interest supporting a proposal request for funding from the GCF and its Project Preparation Facility (PPF);
- Develop memorandums of understanding between GoZ and UNDP: UNDP will formalise partnership with relevant GoZ stakeholders (including MoH, MoE, MoF) setting out guiding principles for engagement on S4H innovative financing programme;
- Define S4H programme scope: MoH will conduct a comprehensive energy needs assessment, project selection and prioritisation, and budget sizing across its portfolio of healthcare facilities, in collaboration with UNDP and REA; and
- Engage with donors, DFIs, and other capital providers: UNDP, relevant GoZ stakeholders, and its financial transaction advisor will engage with donors and investors to mobilise early interest and/or commitments for the S4H programme; and
- Design and structure the S4H coordination platform financing model: based on the initial design of the PPP model in this feasibility study and MoH’s operational design requirements, UNDP and its financial transaction advisor will develop a financial model and investment term sheet to fundraise with donors, DFIs, and other investors. The full design and launch of an S4H innovative financing facility in Zambia is expected to take 1-1.5 years.



¹ Timeline assuming sequencing of activities, activities 3 and 4 or 4-5 could partially run in parallel reducing the implementation timeline.