Feasibility and Applicability of a Global Guarantee Mechanism in Humanitarian Energy Contracts

on behalf of

The Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement (GPA)

& Shell International B.V

Submitted by

Energy Market and Regulatory Consultants Limited (EMRC)

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Suite 3.03, 83 Princes Street, Edinburgh EH2 2ER United Kingdom

louise.thomson@energy-mrc.com douglas.caskie@energy-mrc.com

Table of Contents

List of Figures

List of Tables

List of Acronyms

Acronym	Definition
AEGF	Africa Energy Guarantee Facility
AFD	Agence Française Du Developpement
AfDB	African Development Bank
ATI	Africa Trade Insurance Agency
BBH	Becker Büttner Held
CAR	Construction All Risk insurance
CDP	Cassa Depositi e Prestiti
COD	Commercial Operation Date
DFC	International Development Finance Corporation (United States)
DFI	Development Finance Institution
DfID	Department for International Development (United Kingdom)
DSU	Delay in Start-Up insurance
EIB	European Investment Bank
EPC	Engineering, Procurement and Construction
ESCO	Energy Service Company

Acronym	Definition
FAO	Food and Agriculture Organisation of the United Nations
FCO	Foreign and Commonwealth Office (United Kingdom)
FME	Force Majeure Event
FMO	Netherlands Development Finance Company
GPA	The Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement
ICRC	International Committee of the Red Cross
IFC	International Finance Corporation
IFI	International Financial Institution
IPP	Independent Power Plant
KfW	Kreditanstalt für Wiederaufbau
L/C	Letter of Credit
LCOE	Levelised Cost of Electricity
LDs	Liquidated Damages
LTA	Long Term Agreement
MIGA	Multilateral Investment Guarantee Agency
MSF	Médecins Sans Frontières
Norad	Norwegian Agency for Development Cooperation
OPIC	Overseas Private Investment Corporation
PIDG	Private Infrastructure Development Group
PPA	Power Purchase Agreement
PCG	Partial Credit Guarantee
PRG	Partial Risk Guarantee
PRI	Political Risk Insurance
PV	Photovoltaic
RfP	Request for Proposals
RLSF	Regional Liquidity Support Facility
SIDA	Swedish International Development Cooperation Agency
ToR	Terms of Reference
TSO	Transmission System Operator
UN	United Nations
UNITAR	United Nations Institute for Training and Research
UNDP	United Nations Development Programme
US	United States
US$	United States dollars

Acronym	Definition
WACC	Weighted Average Cost of Capital
WBG	World Bank Group

1 Executive Summary

Shell International BV ("Shell") in association with the Coordination Unit of the Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement ("GPA") hired Energy Market and Regulatory Consultants Ltd ("the Consultant") to examine the feasibility of derisking energy service contracts with Humanitarian Agencies through the use of guarantee instruments or other derisking tools.

The purpose of the study is to find globally relevant, adaptable mechanisms that facilitate transactions supporting sustainable energy projects in different settings, geographies and for a range of partners. The study explores the potential for risk mitigation that facilitates increased private sector engagement in providing sustainable energy services in humanitarian settings globally.

1.1 Findings

- While several Humanitarian Agencies have installed photovoltaic (PV) facilities using grants to purchase equipment, there has been very limited experience in contracting for sustainable energy services through long-term agreements (LTAs), such as Power Purchase Agreements (PPAs) or leasing agreements, for off grid situations.
- The operating environment is characterised by uncertain length of tenure (term risk) and uncertain budget levels and cycles (budget risk), and a procurement approach aimed at the purchasing of goods rather than services on a long-term basis.
- For these reasons, standard procurement contracts in use contain clauses enabling termination at any point without the obligation to compensate the Seller for foregone earnings.
- These standard contract conditions are very unattractive for participants on the solar industry who generally require long term contracts for the cost of energy to be competitive and for the contract to run to term to recover a reasonable return on their investment.
- Many derisking tools and strategies have already been implemented to support large-scale solar projects, often with complex structures and rules between participants, primarily to mitigate credit risk and political risk for financiers to large-scale projects with sovereign or sub sovereign Offtakers.
- These are not readily suited to, and do not address all the risks of, small-scale humanitarian or development projects. The existing derisking tools may be limited in geographical scope, limited to guaranteeing project loans only, targeted to individual large-scale projects only and/or predicated on the involvement of host country government in the chain of obligations, rendering them structurally unsuitable.
- A range of institutions and companies offer Political Risk Insurance (PRI) and other construction and operating phase insurances for renewable projects. Africa Trade

Insurance Agency's (ATI's) PRI and liquidity products do provide useful precedents when considering mechanisms to customize and adapt for the humanitarian context.

1.2 Recommendations

- Adoption of an **appropriate risk allocation** in the template LTA.
  - To attract bidders, the risk allocation in the template Power Purchase Agreement (PPA)/lease will require market standard termination provisions as a starting point. Attempting to pass early termination risk to bidders will greatly reduce the pool of potential bidders (potentially to zero) and will materially increase the cost of any bids that are received.
  - Termination liability (when Humanitarian Agency ceases operation pre-term and for events other than Seller default) should therefore sit with the Humanitarian Agency (known contractually as the Offtaker), subject to the mitigants below.
  - The PPA/lease should have an obligation on both parties to try to minimise termination losses. At a minimum this should be a reasonable endeavours obligation to investigate the potential to find an alternative Offtaker or to redeploy the PV facilities.
  - Termination liabilities (and the circumstances thereof) should be set out as firm obligations in the PPA/lease between the Humanitarian Agency and the Energy Service Company (ESCO).
  - The force majeure clause in the PPA/lease should be carefully considered in the context of creating bespoke termination insurance for the Humanitarian Agencies. This would cover termination obligations in the PPA/lease in the event of early Offtaker termination for unforeseen circumstances.
- Work to establish a Termination Insurance Product.
  - Work with a reputable primary insurer familiar with the humanitarian context to develop a termination insurance product for the portfolio of Humanitarian Agency contracts.
  - This should take place in parallel with finalising the risk allocation under the PPA/lease, and with assessing the portfolio of sites to be decarbonised.
  - The product would have to provide coverage to the Humanitarian Agency for insurable early termination events, e.g. in the event of an Offtaker Termination Event which causes the PPA/lease to be terminated by the Humanitarian Agency for events outside of the Agency's control, the insurance policy would pay the termination liabilities out to the Humanitarian Agency, subject to retentions.
  - In the early stages of the insurance product, due to data limitations, donor funding would be required to be allocated on a first-loss basis. Through time, and as data on the portfolio of potential project sites and the risk of contract

termination is better understood, private sector reinsurance can be introduced to the insurance fund.

- Depending on the size of the underlying portfolio, it may be advisable to bundle other insurances (e.g. property insurance) into the fund to ensure that the premia are materially large enough to attract commercial reinsurers.

- The Offtaker under the PPA/Lease should offer short-term **Commercial Securities** as credit and term risk mitigants in the contract documentation.
  - Each commercial security is intended to provide post-termination cashflow for a period of up to twelve months for each energy service contract.
  - This provides an opportunity to redeploy equipment or relet the contract in the first instance.
  - The twelve-month period also acts as a time buffer for the Humanitarian Agency to draw down on insurance (if applicable) and/or to meet any residual termination liabilities in the next budget cycle.
  - The commercial security should be procured by each Humanitarian Agency as a letter of credit (L/C) through a relationship bank or drawn from an escrow facility particular to the contract/jurisdiction.
  - It should be sized according to the maximum 12-month exposure under the contract, which is a function of the contract payment profile.
  - Documentation in relation to the security should be included in the Request for Proposal package to prospective Energy Service Companies to enable them to assess the overall commercial risk associated with the contract.

- Humanitarian Agencies, with support from donors, should consider establishing a **Liquidity Facility,** to be used to channel first-loss donor funding for the following termination liabilities and costs:

  a. Ongoing funding for the series of short-term commercial securities.

  b. Reserve funding for any residual termination liabilities that are not covered by the Termination Insurance Product.

  c. Payment of recurring premia for the Termination Insurance Product.

  - The required capitalisation of the Liquidity Facility will primarily depend on the size and technical characteristics of the Agency's portfolio of PV contracts, the underlying fuel switching economics and the appetite for insurance from a primary insurer. Funds could be introduced in stages to match the build-up of the PV portfolio.
  - If Agencies had appetite to establish an Aggregate Liquidity Facility to serve more than one Agency, it could be hosted by an international bank and managed by the trust department of the bank on behalf of trustees from the participant Humanitarian Agencies. For the group of UN Agencies this could be done by the UN's Multi-Partner Trust Fund Office.

  - Aggregation between Agencies would take advantage of a portfolio diversification effect but would be more administratively complex than each Agency making their own arrangements.
  - When there is good visibility on the envelope of liabilities, a guarantor from the International Financial Institution (IFI) / Development Finance Institution (DFI) donor community *may* be able to provide a bespoke and firm guarantee to backstop the residual termination liabilities (see below).

- Further investigation of potential **Guarantors** for the Liquidity Facility.
  - In parallel with seeking seed funding, establish if any donor institutions or impact investors are willing to provide full or partial Guarantee coverage for any residual termination risks for the project portfolio.
  - Available IFI guarantee products for larger scale projects are unsuited to the portfolio of humanitarian projects.
  - Donors or other impact investors may be willing to assume residual liabilities i.e. guarantee the funding of the facility.
- Like primary insurers, Guarantors will require line of sight on the envelope of exposure. In practical terms this will mean:
  - Ability to assess the risk allocation in the underlying contracts.
  - Visibility on the project pipeline within the portfolio.
  - Demonstrable success in the decarbonisation programme.
- Potential guarantors may also require some optimisation of risk capital – in practice this means an insurance product with the potential to assume some termination risk.
- If Guarantors are found from the donor community, they may require visibility on the work program to extend the decarbonisation program to refugees and other vulnerable groups.

1.3 Implementation Issues

- Consider implementation support to the workstreams above:
  - Legal support will be required *inter alia* to turn the existing LTA analysis into a template contract document, to set out a term sheet for the insurance product and, if required, to articulate a trust deed (or similar) for the liquidity facility.
  - Specialist insurance support will be required for the insurance and risk-related workstreams.
  - Project Management and Commercial support will be required to support the entire process.
  - Technical expertise may be needed to evaluate the portfolio of potential projects and create business cases on which risk may be assessed.

2 Introduction

Shell International BV ("Shell") in association with the Coordination Unit of the Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement ("GPA"), which is housed at the United Nations Institute for Training and Research (UNITAR) hired Energy Market and Regulatory Consultants Ltd ("the Consultant") to examine the feasibility of derisking of energy service contracts with Humanitarian Agencies through the use of guarantee instruments or other derisking tools.

Humanitarian Agencies are transitioning from fossil fuel use to renewable generation. The preferred delivery model is to contract energy service companies ("ESCOs") to provide energy through long-term agreements. In the most common model, the ESCO builds, owns and operates the electricity generation equipment and sells electricity to the Humanitarian Agency over a period sufficient for the ESCO to recover the cost of the investment in the solar power system. This enables the Humanitarian Agency to avoid up-front costs of buying renewable energy equipment and, in any period, to be able to make savings from the forecast cost of consuming fossil fuels.

Operational uncertainties facing Humanitarian Agencies has led to them favouring contracts with flexible durations and no liabilities for early termination. While this has enabled Agencies to be unencumbered with termination liabilities if the operational circumstances of the Agency changes, the risk allocation is challenging for renewable energy ESCOs who require a high degree of investment certainty. Consequently, ESCOs have, in all but a single instance, deemed contracts with such terms as being too risky. In the single case that an ESCO has accepted early termination risk, a substantial risk premium on the price of energy has been negotiated in compensation.

In a workshop with private sector ESCOs, financial guarantees were identified as one of the key instruments which could resolve this issue, mitigate and/or transfer risks, reduce costs and make it easier to attract investors and lenders. Guarantees ensure that capital costs, and/or agreed annual revenue from consumption, could be paid to the ESCO should an event occur that triggers the termination clause, e.g. humanitarian facilities are closed or reduced as displaced persons return to their place of origin.

2.1 Terms of Reference

The Terms of Reference (ToR) for the assignment can be summarised as follows:

- Identification of a contractual risk allocation consistent with the attraction of private sector investment in PV to decarbonise the operations of Humanitarian Agencies in a range of jurisdictions.
- Where derisking tool(s) are required in addition to the contractual provisions in the LTAs, identify those tools;
- Identification of institutional arrangements for the implementation of such tools;

- Preliminary estimation of the of funding requirements.

The full ToRs are reproduced in Annex D.

2.2 Methodology

This report was compiled in April – June 2020 as follows:

- Initial brief from the GPA and Shell Project Team;
- Review of the risk environment;
- Review of available derisking mechanisms;
- Initial stakeholder consultation;
- Formulation of recommendations;
- Financial modelling;
- Second stakeholder consultation;
- Final recommendations.

2.3 This Report

This report is presented in the following remaining sections:

- Section 3 reviews the **Energy Contracting Structures.**
- Section 4 reviews the **Derisking Products and Strategies.**
- Section 5 presents the **Proposed Derisking Options.**
- Section 6 considers **Implementation Issues.**
- Annex A contains a **List of Consultees.**
- Annex B summarises a normal **Solar PV Risk Allocation.**
- Annex C presents our **Modelling Methodology.**
- Annex D contains the **Terms of Reference**.

3 Energy Contracting Structures

This section examines some specific derisking aspects relating to energy contracting structures.

The structures under consideration here are Power Purchase Agreements (PPAs) and leasing agreements. These are collectively referred to as Long Term Agreements (LTAs). For the purposes of this report, no distinction is made between the two structures as the basic risk mitigants are substantively the same.

LTAs are designed to regulate the delivery of energy to a consumer on a long-term basis. The long-term nature of the agreements enables the Offtaker under a PPA or lease to spread energy purchase costs over a period of time and to avoid the up-front costs associated with equipment purchase. The Seller under a PPA/lease typically owns the equipment and recovers the cost of that equipment over the term of the agreement. Terms of fifteen years or more – up to the technical lifetime of the equipment – are common, as the longer the term, the lower the Levelised Cost of Electricity (LCOE).

3.1 Key Risks of LTAs in the Humanitarian Setting

In Annex B we discuss a "normal" risk allocation in a standard solar PV LTA. While market practice can move in time, the basic risk allocation has been developed over many transactions.

In addition to the usual risks of long-term contracting for PV, there are some risk aspects particular to LTAs in the humanitarian setting that need to be addressed:

- **Term Risk:** Term risk is the risk that a Humanitarian Agency ceases operations before the term of the LTA runs its course. This risk can arise in several ways – for example, a cessation of hostilities leading to the Agency's continued presence being unnecessary, a change in the host government's attitude towards the intervention of an Agency or non-availability of funding for an Agency to continue operations in a certain jurisdiction.

- **Budget Risk:** Budget risk is the risk that a Humanitarian Agency does not have pre-allocated funding to meet its obligations to pay for energy under an LTA, including any liability to pay unforeseen termination payments for a contract which is terminated early. This can arise because of a mismatch between an Agency's short-term budget cycle (i.e. one to two years) and the long-term payment obligation under the LTA.

- **Credit Risk:** In many PV transactions, Offtaker credit risk is the main concern of the Seller to the transaction, and most existing risk mitigation mechanisms serve to address that risk. In the humanitarian setting, the Humanitarian Agency's ability to

honour routine payments under an LTA is not a primary concern to Sellers. Extreme credit risk in the form of non-existent or incomplete termination provisions are significantly more concerning to potential private sector participants than credit risk.

- **Participation Risk:** Participation risk is the risk that insufficient bidders respond to a tender to supply electricity e.g. the commercial terms offered to potential suppliers of electricity are not attractive enough to appeal to quality bidders. Ultimately the risk is that a tender process fails or results in bids priced well above market costs. This can arise from several causes – for example, from passing unmitigated Term Risk to bidders under a PV tender.

3.2 Termination Provisions

The termination provisions are one of the key components of an LTA. The circumstances around which a termination right occurs for a Buyer and a Seller, and the financial consequence of those rights being exercised, are key components of the overall risk allocation. Termination provisions are closely scrutinised in any Seller's investment decision making process.

Several termination options are given in the Becker Büttner Held (BBH) report "Identification and Analysis of Standard Clauses of PPA and Leasing Agreements". Two of these options[1] are not investable and will either lead to no bids or to limited, expensive temporary solutions. The other two options are close enough to market standard to attract long-term investment, so long as there is additional contractual articulation of the financial consequences of termination.

The Consultant's recommendation is that the LTA which is used to attract private sector investment in PV systems contain market standard termination provisions. If implemented properly this should greatly mitigate **Participation Risk** for the procurement entity and Termination Risk, the most extreme form of **Credit Risk,** for bidders.

3.3 Summary

While several Humanitarian Agencies have installed PV facilities using grants to purchase equipment, there has been very limited experience in contracting for sustainable energy services through LTAs.

To attract bidders, the risk allocation in the template LTA will require market standard termination provisions as a starting point; attempting to passing early termination risk to bidders will greatly reduce the pool of potential bidders (potentially to zero) and will materially increase the cost of any bids that are received.

[1] Options 2 and 4

Termination liabilities (and the circumstances thereof) should be set out as firm obligations in the PPA/lease between the Humanitarian Agency and the ESCO.

The LTA should have an obligation on both parties to try to minimise termination losses. At a minimum this should be a reasonable endeavours obligation to investigate the potential to find an alternative Offtaker or to redeploy the PV facilities.

4 De-Risking Products and Strategies

Energy contracting has many well-established strategies and mechanisms for risk mitigation. Table 1 below summarises these common strategies. Comment is made on the applicability to small-scale humanitarian context and expanded on in the sections which follow.

Table 1: Risk Mitigation Strategies:

Risk Mitigation Strategies	Applicability to Humanitarian Context
Seeking host government support.	No
Benefiting from a "halo effect" from Development Finance Institution (DFI) co-investment.	No
Obtaining 3rd party guarantees from WBG or other bilateral or multilateral DFIs.	Limited [1]
Obtaining insurance from bilateral and multilateral DFIs and private insurers.	Yes
Obtaining commercial credit support.	Yes
Use of temporary or modular structures.	Yes
Reliance on a contractual portfolio effect.	Limited [2]
Tariff sculpting.	Limited [3]

Notes:

1. Existing guarantee structures are not appropriate but bespoke guarantees could be sought for residual termination liabilities (see below and 5.5).

2. A contractual portfolio effect is commonly relied upon to mitigate potential termination and credit risk in large portfolios of many customers (e.g. households connected to minigrids). This has some applicability to the humanitarian context if used in conjunction with other mitigants.

3. Tariff sculpting is a potential risk mitigant which, again, is commonly used as a mitigation in large portfolios of many customers. See also 4.6.1.

These measures are further described below.

4.1 Host Government Support

Host governments frequently support long-term power projects in a variety of ways – from providing soft letters of comfort to providing sovereign guarantees to backstop payments under PPAs. These measures have limited application in the current context:

- While some Humanitarian Agencies operate in country with host government cooperation, others are constitutionally required (or choose) to operate independently of host governments. Host government reliance is therefore not suitable for all Humanitarian Agencies.
- Host government mechanisms are usually deployed where a government utility is the Offtaker under the LTA and the power is provided for onward distribution to the general population. This is not the case for the portfolio under consideration here.

While there may be exceptions,[2] host governments are unlikely to see direct benefit of such support.

- Transaction sizes in the current proposed portfolio are small. Complex jurisdiction-specific support mechanisms are unlikely to be cost-effective.[3]

Host government support is therefore not thought a likely risk mitigant in the context of early termination risk.[4]

4.2 DFI Co-Investment

Raising debt and equity from DFIs is extremely common mechanism to mitigate risks as well as to raise concessional funding for a PV projects. The risk mitigation aspect arises from the potential for a default against a DFI to lead to cross-defaults against other projects with DFI concessional financing. This is described as a "halo effect" in large-scale projects.

This has less relevance in the present context in which Humanitarian Agency is an Offtaker of electricity from a small-scale project. There are no appreciable cross-default protections, the projects are frequently too small to need DFI financing, and circumstances of Offtaker default are unlikely to relate to a general credit default.

DFI co-investment is therefore not thought a likely risk mitigant in this context.

4.3 Guarantee Structures

Guarantees have been identified by stakeholders as a key potential instrument to mitigate termination risk. The benefit of a guarantee is that the credit risk of the beneficiary under the guarantee (the "primary obligor") is effectively substituted for the guarantor's risk profile. The World Bank Group (WBG) and other bilateral and multilateral DFIs are active guarantors in the power sector. These are briefly examined below.

4.3.1 WBG / AFDB

The WBG's Partial Risk Guarantees (PRGs) and Partial Credit Guarantees (PCGs), which have been in existence since the 1990s, have frequently been used to support large-scale power sector transactions. The African Development Bank (AFDB) offers similar PRG and PCG guarantee products to the WBG. They work as follows:

- PRGs are designed to protect private lenders against defaults on loans caused by government's failures to meet contractual obligations.

[2] There may be cases where initial energy provision is extended to refugee communities at a later date, in which case Government involvement may be relevant.
[3] In the case of large multi-agency compounds which are expected to revert to host government control, Government involvement may be relevant.
[4] Host governments can help mitigate regulatory risk e.g. expediting regulatory/licencing approvals or customs clearances.

- PCGs primarily protect private lenders against defaults on loans issued by host governments for a specific project in certain jurisdictions.
- While there are precedents for PRGs being structured for a multi-country deals, this is the exception rather than the rule.

Since these guarantee products are project-specific, structurally intertwined with host government obligations and designed as a credit enhancement for finance providers, they are not suited to guarantee the termination obligations of Humanitarian Agencies either individually or as a portfolio.

4.3.2 GuarantCo

GuarantCo is an AA- rated entity under the ownership of the Private Infrastructure Development Group, which is funded by the International Finance Corporation (IFC) and by the governments of the UK, the Netherlands, Switzerland, Australia, Sweden and Germany.

It provides guarantees to lenders to support local currency finance for infrastructure projects, promoting domestic infrastructure financing and capital market development. GuarantCo invests in projects that offer "scale, replicability, affordability and transformation" in Sub Saharan Africa and South Asia.

GuarantCo's existing guarantee offerings are not immediately suited to guarantee the termination obligations of Humanitarian Agencies, as they focus their guarantees on large-scale, project financed projects.

4.3.3 European Commission

The European Commission supports investment in sustainable energy in Sub-Saharan Africa through the European Guarantee for Renewable Energy, which is part of the European Union External Investment Plan. This guarantee fund is aimed at reducing credit risk for private investors in grid-connected solar and wind projects. It is implemented by Kreditanstalt für Wiederaufbau (KfW), Agence Française Du Developpement (AFD), the European Investment Bank (EIB) and Cassa Depositi e Prestiti (CDP). It is targeted at partner countries and comes packaged with technical assistance for the facilitation of private sector investment in renewable generation.

4.3.4 Other Bilateral Guarantors

A range of governmental bodies are active in the renewable energy finance space without offering products that are immediately suited to Humanitarian Agency termination guarantees. These include the institutions AFD, CDP, Swedish International Development Cooperation Agency (SIDA), Department for International Development (DfID) (now the Foreign and Commonwealth Office, FCO), Norwegian Agency for Development Cooperation (Norad), KfW and others. These institutions may have appetite for providing risk capital in some form in the humanitarian context.

4.3.5 Summary

Existing guarantee products are not immediately suited to the humanitarian context. Some are limited in geographical scope (for example the European Commission's European Guarantee for Renewable Energy which is focussed only on sub Saharan Africa). Others are aimed at credit risk mitigation for large-scale projects only (for example, GuarantCo's guarantees). Others are structurally unsuitable (for example the WBG's guarantees, which are predicated on the involvement of host country government in the chain of obligations). There are a range of national governmental bodies active in the renewable energy finance space who may be willing to provide risk capital in the humanitarian context.

4.4 Insurance Products

Renewable energy projects are frequently derisked by a range of insurances, including political risk insurance (PRI), construction all risk insurance (CAR), delay in start-up insurance (DSU), and various operating period insurances (e.g. insurance against material damage, business interruption and mechanical breakdown). Key insurers are briefly examined below.

4.4.1 MIGA

The Multilateral Investment Guarantee Agency (MIGA), part of the World Bank Group, offers PRI guarantees and credit enhancement to private sector investors and lenders. Coverage includes protection from war, terrorism and civil disturbance, government expropriation, government breach of contract, currency inconvertibility and transfer restrictions and protection against losses from a failure by a sovereign, sub-sovereign or state-owned enterprise from making a payment when due.

Like other WBG entities, MIGA's coverage is structured around backstopping host government obligations in a project. This is structurally unsuited to the humanitarian context.

4.4.2 DFC

The US International Development Finance Corporation (formerly the Overseas Private Investment Corporation (OPIC)) provides a range of products including PRI and loan guarantees in low and lower-middle income countries. Products are offered on a project-by-project basis. Projects (and project developers) and are subject to a rigorous assessment against DFC's investment policies. The DFC products are designed for large stand-alone projects and not thought to be suitable for the portfolio of humanitarian projects under consideration here.

4.4.3 ATI

The Africa Trade Insurance Agency (ATI) provides PRI and credit risk products to developers, lenders and investors in certain African member countries. Two facilities are particularly relevant for renewable projects – the Africa Energy Guarantee Facility (AEGF) and the Regional Liquidity Support Facility (RSLF).

- **Africa Energy Guarantee Facility**

  The AEGF provides ATI with access to a large pool of reinsurance capacity for African sustainable energy projects. ATI provides this capacity through a partnership with the insurance company Munich Re and the EIB. Products offered under AEGF include insurance against sovereign or sub-sovereign non-payment and traditional political risk insurance perils like expropriation or currency inconvertibility. The facility is designed as an adjunct to MIGA's PRI offering. It aims to mobilise significant debt and equity from banks and developers that are currently constrained to participate in the African energy sector.

- **Regional Liquidity Support Facility**

  The RLSF enables renewable energy developers to procure six-month stand-by letters of credit from selected banks to mitigate against potential Offtaker default. The RSLF is backed by a first-loss KfW cash collateral guarantee up to EUR 31m, with ATI providing matching funds as a second-loss on demand guarantee.

ATI's products are designed for large scale grid connected projects and only cover certain member countries in Africa, but the risk mitigation features are a useful precedent for the bespoke derisking tool and structures that are required in the humanitarian context. These are examined in Section 5.

4.4.4 Other Commercial Insurers

Other commercial insurance brokers (such as Willis, Aon and Marsh) offer commercial PRI products and more general insurance (e.g. CAR) which renewable energy developers may elect to purchase. While these products are useful to cover certain PRI type perils, the availability of coverage in fragile environments may be relatively shallow and the scope narrower than is required in the humanitarian context.

4.4.5 Summary

A range of actors offer PRI and other relevant insurances for renewable project developers. ATI's PRI and liquidity products are useful precedents when considering mechanisms appropriate for the humanitarian context.

4.5 Commercial Credit Support

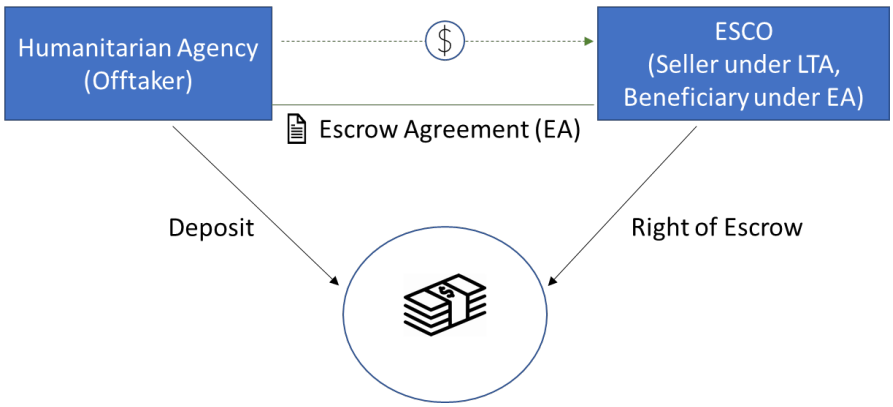
Commercial credit support can take several forms, including guarantees by credit worthy affiliates, cash collateral or escrow accounts, irrevocable standby letters of credit, or performance bonds.

4.5.1 Escrow Structures

The simplest form of instrument to address Offtaker credit risk is an escrow account in favour of the ESCO. The escrow account will be funded with a certain amount of cash to cover

expected revenues under the LTA (for instance, six- or twelve-months' worth of expected Offtaker payments).

Figure 1: Simple Escrow Structure



If the Offtaker fails to make a payment under the LTA, the ESCO/Project Company can exercise its right to draw on the account, so that it has funds to meet its ongoing operating costs and debt service (if applicable).

Following any draw on the escrow account, the Offtaker is obliged to replenish the account to the required level of expected revenues.

As a mechanism, an escrow account is simple, functional and relatively low direct cost. It is also favourable for sponsors / lenders because the project has access to immediately available cash.

Escrow accounts are, however, relatively rare in the context of commercial solar PV transactions. Offtakers are frequently reluctant to lock away cash that could be used for other investments and earning higher return by doing so.

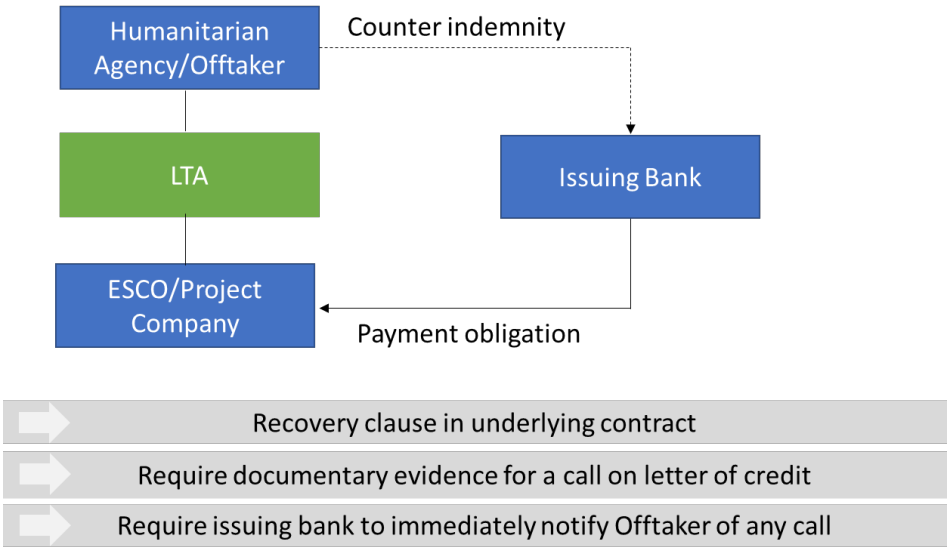
Nevertheless, in the current context in which the Humanitarian Agency/Offtaker may be unfamiliar with or constrained in procuring Letters of Credit (L/Cs), escrow arrangements may be a reasonable option. [5]

4.5.2 Letters of Credit

An on-demand guarantee or a standby L/C, in which the Offtaker procures the delivery of a letter by a credit-worthy financial institution to the ESCO/Project Company, are the more commonly employed derisking tool. The letter contains a promise by the financial institution to pay the ESCO a certain amount of money on the ESCO's demand.

[5] The Consultant understands that there are precedents for the use of L/Cs in the humanitarian sector (e.g. by ICRC) but these are relatively rare.

Figure 2: Letter of Credit Structure



To call on the L/C the ESCO/Project Company must issue a demand to the issuing bank which complies with the L/C. If the demand appears to comply, the bank must honour the demand by paying out the requested amount.

The issuing bank is not entitled to refuse to pay unless the demand is non-compliant or the bank suspects fraud. Following payment, the bank will recover the amount paid out from the Offtaker.

While the mechanics of the L/C do not give the Offtaker much protection against a fraudulent call, there are a few protections the Offtaker can take:

1. The Offtaker can provide for a recovery clause in the LTA, so that in the event of a call on the L/C where it is later shown that a call should not have been made, the ESCO/Project Company is under an obligation to return the called amounts, plus interest, to the Offtaker.

2. The Offtaker can try to impose additional conditions on any call on the L/C, so that the ESCO/Project Company would have, for instance, to include a sworn statement that the Offtaker has defaulted under the LTA – or some form of proof that the Offtaker has failed to pay.

3. The Offtaker may request the issuing bank to immediately notify it of any call, so that the Offtaker can take steps – perhaps through an emergency court injunction – to prevent an unjustified call.

As a quid pro quo for the putting in place of an escrow account or L/C, the Offtaker will typically require a relaxation of the payment default regime in the LTA. Instead of any non-payment resulting in an immediate event of default, it may be that an event of default will only occur if the escrow account is not replenished within a certain number of days following a call.

4.6 Other Derisking Mechanisms

4.6.1 Tariff Sculpting

If an ESCO is willing to accept energy termination risk, one strategy to mitigate against the risk of early termination is to recover more at the start of the contract term relative to the end, with an overall risk premium to be charged. While this is a common construct in off grid solar for residential customers, there are some drawbacks:

- The field of ESCOs willing to invest on such a basis is likely to be limited for more capital-intensive installations.[6]
- The front-loading of the tariff and the charging of a risk premium is likely to reduce the number of sites that can be converted economically relative to annual expenditure on alternative fuels such as diesel.
- It is imprecise and inefficient as a cost recovery mechanism – early termination could lead to investment under recovery and, if the contract runs to term, it may lead to investment over-recovery.
- Bespoke tariffs are time-consuming to negotiate and difficult to directly compare with competing tariff offers.

4.6.2 Modularisation

Some companies offer a range of standardised and partially containerised modules which can be sized to approximate an electricity demand profile. These can be usefully deployed and redeployed for small-scale solar applications, especially if the deployment is expected to be short-term and temporary. The advantage of containerised or modular solutions is that they have pre-assembled components which can be installed relatively quickly and redeployed if necessary. The potential for redeployment is useful additional risk mitigation tool for ESCOs when the payment environment is uncertain.

A potential disadvantage is that in deploying standardised modules, the overall solution may not be an optimised for the particular demand profile, the cost of which is passed through to the Offtaker.

4.7 Summary

Many traditional methods of derisking solar projects are not readily suited to, and do not address all the risks of, small-scale humanitarian projects. Existing derisking solutions are largely aimed at ameliorating credit risk and political risk for financiers to large-scale projects with sovereign or sub sovereign Offtakers.

[6] It is common for off-grid solar providers with many micro-offtakers to charge an up-front deposit and/or front-loaded tariff in lieu of any penalty on termination. In this case, early termination risk is mitigated by the number of customers in the portfolio and the improbability of mass customer delinquency. The same structure applied to capital intensive installation with a single offtaker carries more risk for investors.

Credit risk solutions including commercial securities and guarantees are commonly employed for large-scale renewable projects, although not yet for small-scale humanitarian projects. There is significant interest among donors and development institutions to provide guarantee products to mitigate credit risk. Existing products are not immediately suited to the humanitarian context because they may be:

- Limited in geographical scope (AfDB).
- Limited to guaranteeing project loans only (GuarantCo).
- Targeted to individual large-scale projects only (GuarantCo).
- Predicated on the involvement of host country government in the chain of obligations, rendering them structurally unsuitable (WBG).

Similarly, a range of institutions and companies offer PRI and other construction and operating phase insurances for renewable projects. PRI products from MIGA and DFC are usually only used on large scale projects, again with project finance and host government involvement in the structure. ATI's PRI and liquidity products do provide useful precedents when considering mechanisms to customize and adapt for the humanitarian context.

5 Proposed Derisking Mechanisms

In this section we set out the proposed combination of derisking instruments that we recommend are developed in support of the Humanitarian Agency decarbonisation programme. These are in addition to the termination provisions and risk allocation recommendations made in Section 3.3.

5.1 Design Objectives

The following design objectives have guided our thinking in making these derisking recommendations.

- **Targeted:** Targeted towards the specific risks in the humanitarian energy sector.
- **Optimised**: Maximising overall risk capacity and minimising donor risk capital.
- **Independent**: Independent of host government or any single Humanitarian Agency involvement.
- **Scalable**: Capable of increasing in scope and/or coverage with the growth of the PV portfolio.
- **Replicable:** Capable of implementation in each jurisdiction (where applicable).
- **Cost-effective**: The recommendations should be cost-effective. [7]
- **Simple**: Not "over engineered" for the size of portfolio.

5.2 Commercial Securities

The characteristics of commercial securities that are commonly employed in solar transactions were outlined in Section 4.5. We recommend that a commercial security is offered as part of the Request for Proposals (RfP) package to bidders for each individual project that will be subject to an LTA. The salient points are:

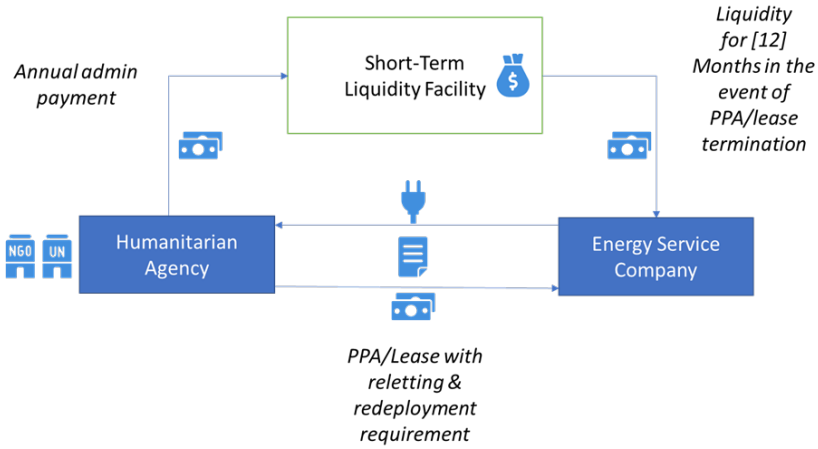
- The security will provide short-term liquidity in the event of a payment interruption or termination under an LTA to a Humanitarian Agency site.
- Will provide twelve months of temporary liquidity support.[8]
- The sizing of the security will depend on the commercial terms of the LTA and will be capped at twelve months of payments under the LTA.
- Can be provided in the form of a L/C or escrow, depending on the preferences of the parties to the LTA and any procurement constraints.
- Administered by a bank in the jurisdiction of the LTA.
- Will be subject to a fee to cover administration costs.

[7] The aggregate cost of the derisking options can be offset against future diesel use, like any other project operating cost.

[8] On large scale solar transactions, market standard is six months of liquidity support. The period of twelve months is suggested in this case as it will allow the humanitarian agency to bridge between budget periods, thereby mitigating budget risk. If an escrow account is used, it will require the humanitarian agency to have a 12 months' budget set aside as liquidity reserve. This could be donor funded.

- Repaid by:
  - defaulting / terminating Humanitarian Agency in the next available budget cycle (non-insurable event); or
  - insurance payout in the next period (insurable event).
- Ultimately backstopped by Humanitarian Agency (see also 5.5 below).
- In case circumstances are disputed, will pay out until any dispute is solved.
- PPA will set out best endeavours obligations to relet the facilities (Agency) or to redeploy the equipment (Agency/ESCO).

Figure 3: Commercial Security



5.3 Termination Insurance Product

In addition to the commercial securities to be provided as part of the RfP process, we recommend investigating the provision of a bespoke insurance product to underwrite the specific risks of early Offtaker termination.

Preliminary discussions with insurers familiar with the Humanitarian setting indicate that a bespoke insurance product is conceptually feasible and indeed could be attractive to the insurance community. A bespoke product is required because the existing commercial and PRI products (examined in 4.4) are not adequately targeted to the triggers which would lead to a humanitarian Offtaker terminating an LTA. Since these causes (of an offtaker terminating an LTA) will have limited overlap with the triggers of "normal" PRI, such a policy could be an attractive component of a primary insurer's portfolio of insurance products.

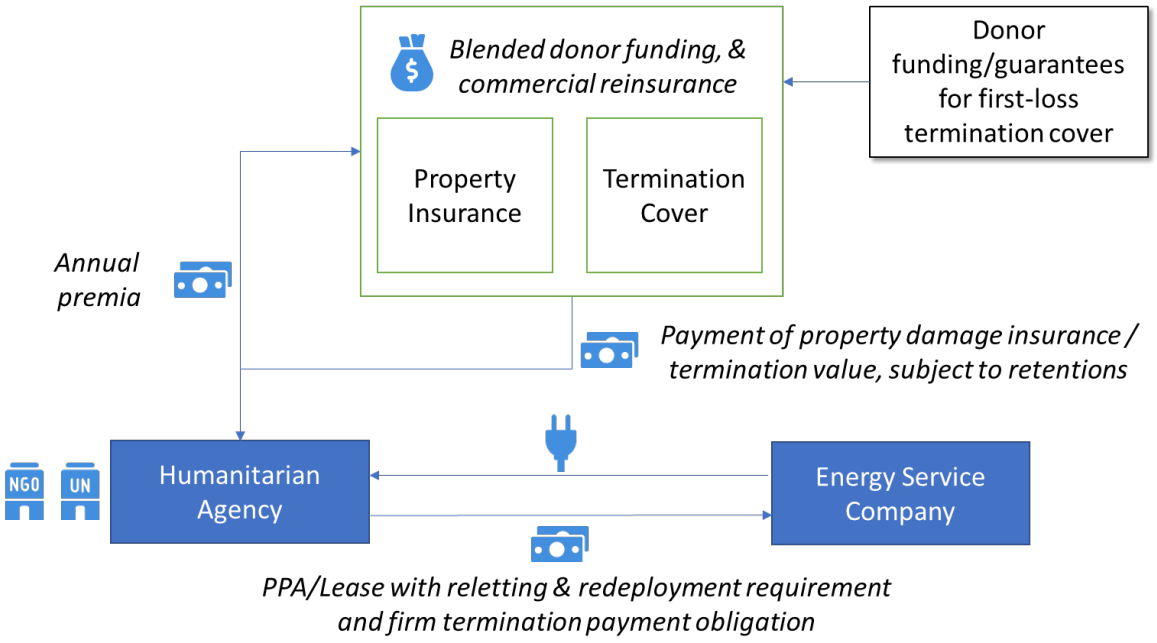
The insurance product would have the following salient features:

- Provides cover for insurable Offtaker termination risks;
- Will pay out to the Humanitarian Agency on pre-defined, risk-assessable trigger points set out in the PPA.
- These may include force majeure events as customarily defined in a LTA (e.g. security concerns), as well as a bespoke category of "Offtaker Termination Events" such as:

  - Cessation of humanitarian operations due to a reduction in the affected refugee or internally displaced person population (if applicable).
  - Cessation of an Agency's operations at the behest of a host government or responsible authorities.
  - Cessation of humanitarian operations due to a cessation in hostilities (if applicable).
  - Takeover of an Agency's operations by a national humanitarian entity.
  - Other such trigger points as may be required by an individual Agency and agreed with the primary insurer.

- Assumed conditions precedent:
  - LTA will set out best endeavours obligations to relet the facilities (Agency) or to redeploy the equipment (Agency/ESCO).
  - LTA will set out termination payment obligations which will apply.
- Funded by blended donor capital and private insurance funds:
  - Initial capitalization by donor and/or Humanitarian Agency funding on a first loss basis.
  - Private (re)insurance capital is crowded in as the risks of termination are better understood.
- Administered by an international insurer/reinsurer.
- Annual insurance premia payment by Humanitarian Agencies.
- Retention provisions which can be reflective of the individual Agency's risk appetite.
- Can be extended to other categories of insurance required by the Humanitarian Agency (or by supplier's extension to the ESCO) property damage.

Figure 4: Insurance Product



The insurance product would cover insurable termination liabilities and as such would partially mitigate Term Risk. There will be a category of residual termination liabilities (for example termination for offtaker convenience) that would not be covered by insurance. The extent of these liabilities will only be known after the risk appetite of the insurance market has been tested.

These residual termination liabilities would sit with the Humanitarian Agency and would need to be funded when terminating an energy contract or leaving a site which had been served by an ESCO. To that extent, the liability would be similar to other demobilisation expenses such as termination of a land lease.

The twelve-month commercial security will act as a buffer between one budget period and the next. The extra funding required to make the balance of a termination payment (if not funded by insurance) would be required in the budget period following the termination event. This provides partial mitigation to budget risk.

If Agencies do not wish to fund residual termination liabilities in routine budget periods, an advance funding reserve/liquidity facility could be established. An approach to establishing a liquidity facility is examined below.

5.4 Liquidity Facility

In addition to mitigating term risk and budget risk through the provision of commercial securities and a bespoke insurance product, Humanitarian Agencies could consider establishing a Liquidity Facility. The Liquidity Facility could be used to channel first-loss donor funding for the following termination liabilities and costs:

- Ongoing funding for the series of short-term commercial securities.
- Reserve funding for any residual termination liabilities that are not covered by the Termination Insurance Product.
- Payment of recurring premia for the Termination Insurance Product.

The required capitalisation will primarily depend on the size and technical characteristics of the Agency's PV portfolio, the underlying fuel switching economics and the quantum of risk assumed by the primary insurer. Funds could be introduced in stages to match the build-up of the PV portfolio build-up.

This could be done individually by each Agency or as an aggregate facility for all Agencies.

Establishment of an individual Agency facility would be relatively straightforward. Essentially the facility would be established internally within the Agency in line with each Agency's existing fund allocation practice.

If Agencies chose to collaborate on establishing an aggregate facility, the Liquidity Facility could be hosted by an international commercial bank and managed by the trust department of the bank on behalf of trustees from the participant Humanitarian Agencies.

If UN Agencies were to set up such a facility it could be managed by the UN's Multi-Partner Trust Fund Office.

Aggregation between Agencies would take advantage of a portfolio diversification effect but would require an extra layer of inter-Agency administration.

When there is good visibility on the envelope of liabilities, a guarantor from the IFI/DFI donor community *may* be able to provide a bespoke and firm guarantee to backstop the residual termination liabilities (see below).

5.5 Residual Termination Liability Guarantees

If the suite of derisking products outlined above are implemented, the remaining risk is that from time to time the Liquidity Facility is not funded sufficiently to cover all post-insurance termination liabilities that might arise. In these circumstances the offtaking Humanitarian Agency would be obliged to meet any residual termination liabilities. The provision of a guarantor for the Liquidity Facility would remove any risk that Humanitarian Agencies would be required to backstop residual termination payments.

In Section 4.3 it was concluded that there were no ready-made guarantee products available to underwrite the termination risks of Humanitarian Agencies, primarily because most common guarantee products are project-specific, structurally intertwined with host government obligations and designed as a credit enhancement for finance providers.

In parallel with seeking seed funding for the Liquidity Facility, we recommend establishing if any donor institutions or impact investors are willing to provide full or partial Guarantee coverage for any residual termination risks for the project portfolio.

Like primary insurers, Guarantors will require line of sight on the envelope of exposure. In practical terms this will mean:

- Ability to assess the risk allocation in the underlying contracts.
- Visibility on the project pipeline within the portfolio.
- Demonstrable success in the decarbonisation programme.

Potential guarantors may also require some optimisation of risk capital – in practice this means an insurance product with the potential to assume some termination risk.

If Guarantors are found from the donor community, they may require visibility on the work program to extend of the decarbonisation program to refugees and other vulnerable groups.

5.6 Risk Mitigation Summary

Table 2 overleaf summarises the recommended risk mitigation mechanisms and the risks that are mitigated.

5.7 Termination Event Process Flow

Figure 5 summarises the termination event process flow, showing the main interactions with the key risk mitigation mechanisms.

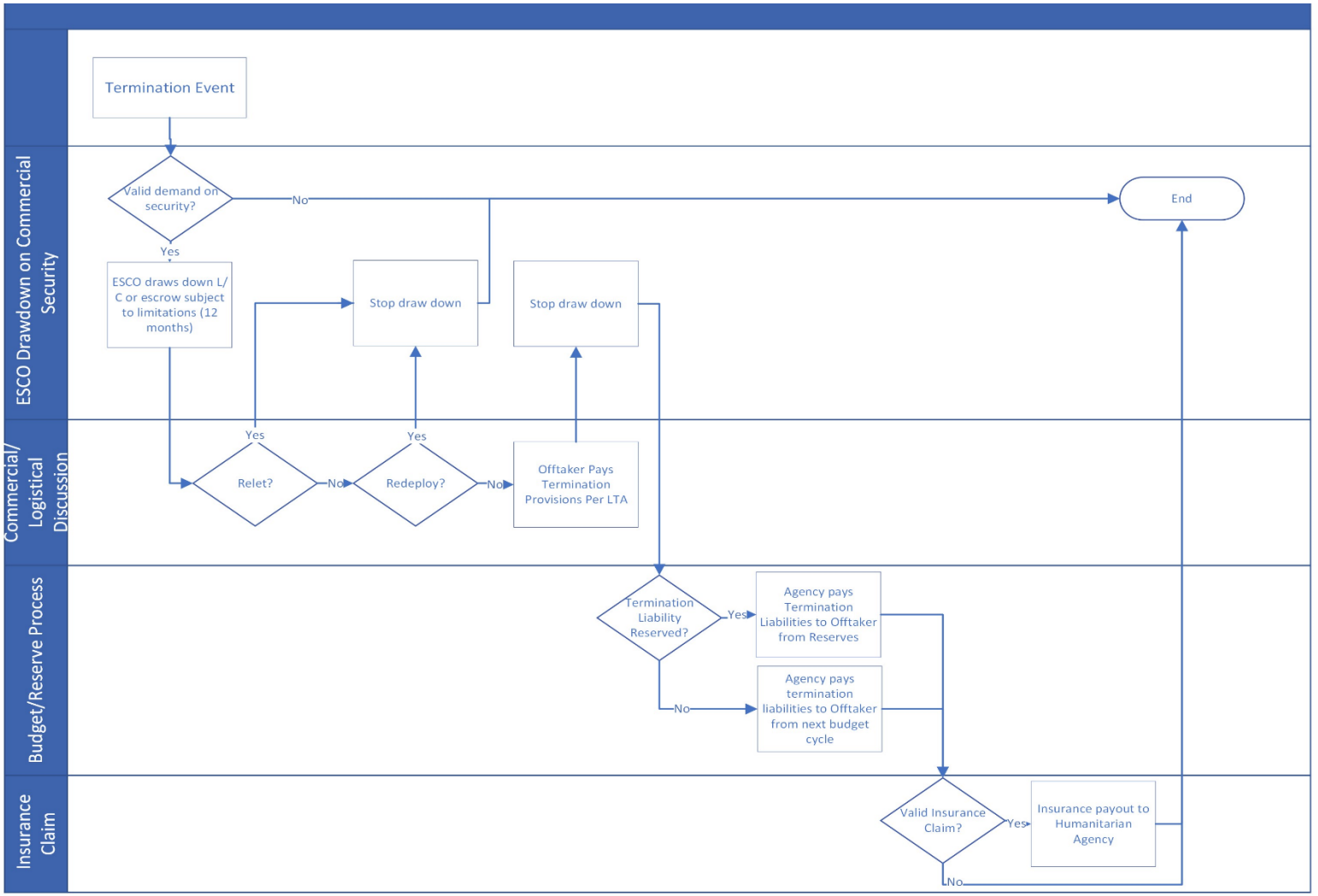
Table 2: Risk Mitigation Summary

	Mitigation for:				
	Participation Risk[1]	Credit Risk[2]	Budget Risk[3]	Term Risk[4]	Comment
Market standard risk allocation in LTA	Yes	Yes			Minimises risk of not attracting bidders; maximises competition
Offtaker Termination Event Provisions in LTA	Yes	Yes			Minimises risk of not attracting bidders; maximises competition
Obligation to minimise termination losses in LTA				Yes	Limits moral hazard associated with triggering early termination, thereby increasing insurance capacity
Commercial Securities (6-month capacity)	Yes	Yes			Helps to mitigate routine credit risk and termination-related credit risk for bidders; maximises competition
Commercial Securities (1-year capacity)	Yes	Yes	Yes		Mitigation as above plus acts as an intertemporal buffer to minimise budget risk for Offtaker; maximises competition
Bespoke Insurance Product for Offtaker Termination Events			Yes	Yes	Minimises budget & term risk for Offtaker; crowds in private capital
Insurance Policy for Termination Liabilities plus extensions	Yes		Yes	Yes	Mitigation as above plus bidder participation if enhanced property insurance coverage for bidders is offered
Liquidity Facility			Yes	Yes	Partially mitigates any remaining budget and term risk not captured by mitigants above
Liquidity Facility backed by third party guarantee for uninsurable liabilities			Yes	Yes	Fully mitigates any remaining budget and term risk not captured by mitigants above

Notes:

1. Participation risk is the risk that insufficient bidders respond to a tender to supply electricity e.g. the commercial terms offered to potential suppliers of electricity are not attractive enough to appeal to quality bidders. Ultimately the risk is that a tender process fails. This can arise from several causes – for example, from passing unmitigated Term Risk to bidders under a PV tender.
2. Credit Risk: In the humanitarian setting, the Humanitarian Agency's ability to honour routine payments under an LTA is not a primary concern to Sellers. Extreme credit risk in the form of non-existent or incomplete termination provisions are more concerning to potential private sector participants than credit risk per se.
3. Budget risk is the risk that a Humanitarian Agency does not have pre-allocated funding to meet its obligations to pay for energy under an LTA, including any liability to pay unforeseen termination payments for a contract which is terminated early. This can arise because of a mismatch between an Agency's short-term budget cycle (i.e. one to two years) and the long-term payment obligation under the LTA.
4. Term risk is the risk that a Humanitarian Agency ceases operations before the term of the LTA runs its course. This risk can arise in several ways – for example, a cessation of hostilities leading to the Agency's continued presence being unnecessary or a change in the host government's attitude towards the intervention of an Agency.

Figure 5: Termination Risk Mitigation Process Flow



6 Implementation Issues

In this section we articulate the issues associated with implementing the proposed risk mitigants, highlighting any time criticality and interdependent actions that are required.

6.1 Development of Long-Term Agreement

Additional work is required to develop the BBH Report into a template LTA with a market standard risk allocation that can be further tailored for each transaction. There are three broad categories of work required:

1. Selection of the options closest to market standard. Several contractual options have been set out in BBH Report. These clauses have been sourced from different precedent agreements with different risk allocations, some of which are consistent with normal commercial practice, others of which are not. Time should be spent reducing the optionality and developing a single template LTA. We recommend that market standard should be followed to the extent possible – this will translate into competitive offers.
2. Language within the template LTA should be developed to be consistent with normal commercial practice and bankability standards. Several areas need to be reviewed in this respect, including:
    - Guarantee of minimum electricity production.
    - Liability and indemnification.
    - Pricing/invoicing.
    - Calculation of deemed generation.
3. Development of the LTA to be consistent with the derisking provisions recommended in this report. The main areas to be developed include:
    - Best endeavours language for reletting the LTA and redeploying facilities to minimise termination liabilities.
    - Termination provisions:
        - Provisions setting out commercial formulae to be developed.
        - Definitions of insurable Offtaker Termination Events to be developed with the Primary Insurer (see below also).
    - Force Majeure provisions to be developed with the primary insurer (see Section 6.3 below also).
    - Cross reference to the securities and bonding requirements (see 6.2 below also).

6.2 Development/Procurement of Commercial Securities

We recommend that a commercial security is offered as part of the RfP package to bidders for each project that will be subject to an LTA. As discussed in 4.5 security can be offered either in the form of an escrow account or as a L/C as the circumstances allow.

6.2.1 Escrow Facility

The main preparatory workstream is the development of a tripartite escrow agreement between the escrow agent and the parties to the LTA. The escrow agreement will typically cover:

- Instruction to the escrow agent to act as trustee for the Humanitarian Agency/Offtaker and ESCO in respect of the escrow sum (12 months of payments under the LTA).
- Declaration that the escrow agent will act independently.
- Duration of the escrow account.
- Provisions relating to establishment and operation of the escrow account.
- Details of release events which will trigger payment of funds to the ESCO.
- Process for release of monies from the escrow account to the ESCO.
- Top up provisions requiring the Humanitarian Agency to maintain the account balance.
- Indemnity from the ESCO and the Humanitarian Agency to the escrow agent.
- Interest – who any interest accrued will be due to.

Each transaction will require an escrow agent to be identified. A bank acceptable to both the ESCO and Humanitarian Agency could perform this function.

6.2.2 Letter of Credit

The workstreams associated in setting up an escrow arrangement are similar to those for an L/C.

Template L/C documentation will be needed to regulate L/C drawdown and reimbursement similar to the escrow provisions above. Two interrelated bipartite agreements will be required:

- Letter of Credit between the L/C Bank and the Beneficiary (i.e. ESCO).
- Reimbursement and Credit Agreement between the Humanitarian Agency/Offtaker and the L/C Bank.

ATI and/or IFC documents may be useful precedents.

Humanitarian Agencies may have the option to procure standby L/Cs on a commercial basis (usually priced at London Inter-bank Offered Rate plus a margin) from relationship commercial banks on a competitive basis.

6.3 Development of Insurance Product

The insurance product should be developed in parallel with development of the LTA by insurance, commercial and legal specialists in association with a primary insurer. The following workstreams will be required:

- Analysis of historical operations. Primary insurers will need visibility on the operational performance of Humanitarian Agency operations, both existing and historical. Data on the length of tenure and the reasons for demobilisation will need to be analysed to assess the risks associated with underwriting the termination provisions.
- Definition of insurances against more advanced PPA/lease documentation. Related to the point above, the trigger points for termination will need to be closely defined following the empirical analysis and included in the LTA and insurance Term Sheet documentation.
- Refinement of market size. As each Humanitarian Agency develops its PV portfolio, the size and timing of the portfolios will be closely analysed to accurately assess the funding and pricing requirements of the insurance product.
- Production of Term Sheet. An insurance term sheet will need to be developed for negotiation with the primary insurer.
- Identification of, and market testing with, primary insurers.

6.4 Timeline and Dependencies

The chart below depicts a high-level timeline for next steps of the de-risking exercise.

In addition to the work to develop the LTA, the commercial securities and the insurance product, we depict a workstream in support of the PV procurement process.

We understand that the Humanitarian Agencies aim to procure a first tranche of PV capacity by 2Q of 2021.

The insurance workstream is likely to last 8 to 10 months, and so will not be complete by the time the RfP is sent to prospective bidders. This should not be a material concern to bidders if the termination regime is fully developed and supported by Humanitarian Agencies.

6.4.1 Drafting of LTA

Completion of the LTA drafting requires some four to six weeks of effort to refine the work done to date, followed by intermittent support on key clauses in support of the insurance workstreams. As the procurement timeline is expected to be progressed earlier than the insurance workstreams, certain insurance-related clauses in the LTA (e.g. Offtaker Termination Events) may need to be square-bracketed in the initial RfP version of the LTA that is sent to bidders.

6.4.2 Drafting of Security Documentation

The drafting of the generic security documentation can be done relatively quickly. IFC's Scaling Solar or ATI's documents could be useful precedents, albeit subject to simplification.

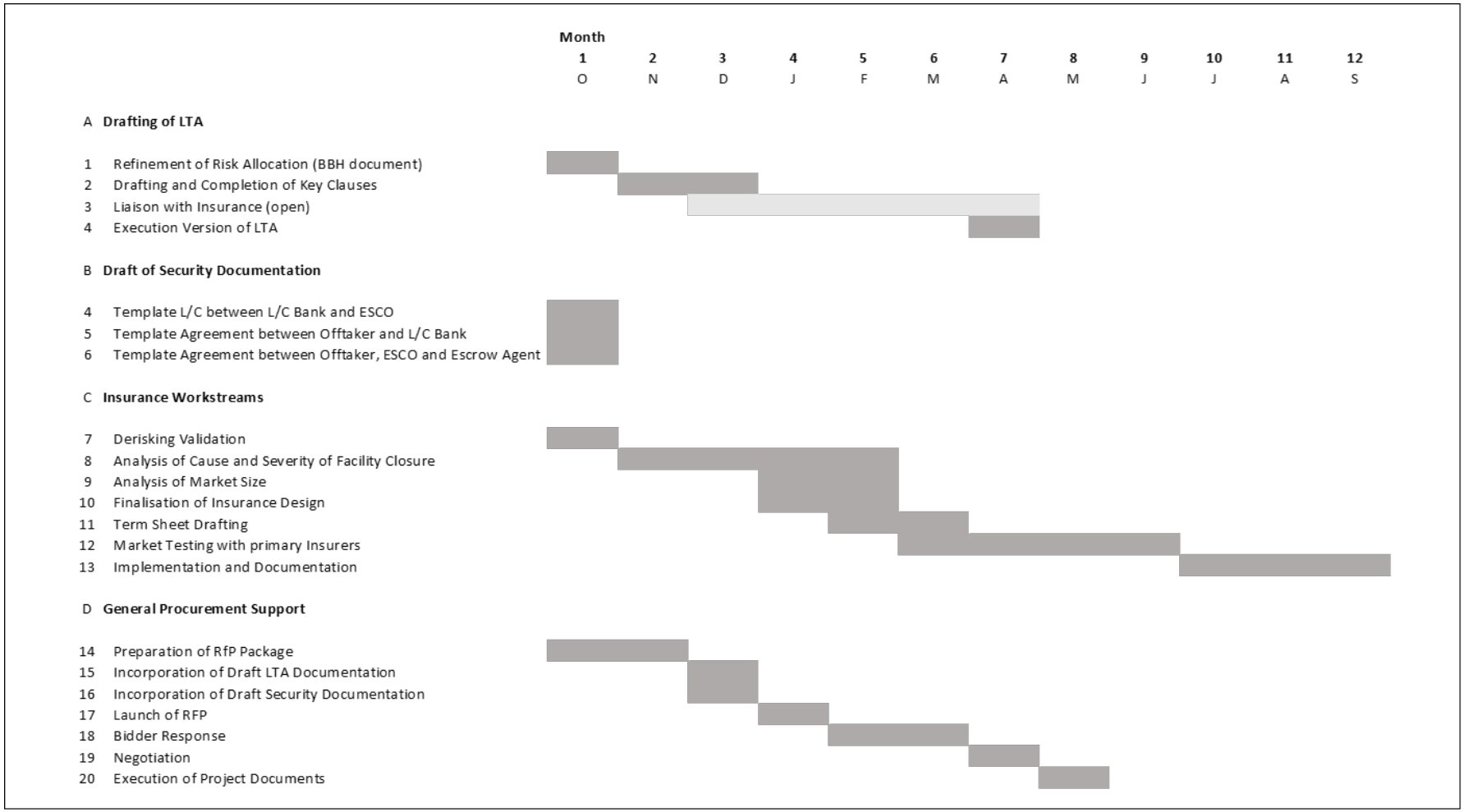
6.4.3 Insurance Workstreams

The insurance workstreams are likely to take several months to complete. The simplified GANTT chart shows a preliminary estimate of the elapsed time required to complete each task. A key factor in the timely completion of the insurance analysis and subsequent placement will be the availability and quality of data from the Humanitarian Agencies.

6.4.4 General Procurement Support

A draft procurement timeline is also depicted, based on our understanding that the first half of 2021 is targeted for the procurement of the first tranche of PV facilities. The chart shows a key subset of the procurement tasks required. This can be recalibrated as necessary as the timeline develops.

Figure 6: Implementation Timeline for De-Risking Mechanisms



6.5 Funding

6.5.1 Modelling Methodology and Preliminary Calculations

A methodology for modelling the derisking capex requirements and some preliminary calculations are set out in Annex C.

The aggregate funding required for the derisking program is a function of many inter-related factors. These include:

- the size and build-up of the aggregate PV portfolio;
- microeconomics of each fuel switching decision;
- System capex
    - Offtaker load characteristics – peak and average demand
    - Technical and quality specification
    - Storage capacity and technology
    - Soft costs (development, design, warranties, cost of financing (if applicable))
  - Price of alternative fuels
  - Risk allocation between ESCO and Offtaker
  - ESCO return expectations
  - Import and other taxes
- The mix of derisking instruments used
- If the instruments are fully funded (e.g. funds in commercial escrow, many guarantee products) or based on actuarial calculations of drawdown (e.g. insurance products).
- Probability of premature termination
- Causes of termination.

6.5.2 Funding for Insurance Product

With the specific assumptions described in Annex C, seed donor funding of USD6m is required for an insurance product to underpin the termination payments for a simple 70 MW PV portfolio, which could potential unlock USD63m of capital investment by the private sector.

This can be introduced in tranches as the portfolio develops. Private sector capacity funding will be crowded in and (donor funding retired) as the portfolio grows.

This calculation should be refined by the primary insurer in the next phase of the derisking project.

6.5.3 Other Budget Items

- Funding for Commercial Securities

In addition to seed funding for the insurance product, we recommended that Humanitarian Agencies budget (or, if necessary, seek donor funding for) for the commercial securities as described in Section 5.2. The budget should be sized for one year of contractual payments for each LTA that is contemplated.

- Funding for Liquidity Facility

  To the extent that Agencies wish to reserve funding for non-insurable risks, a quantum of funding could be set aside in a liquidity facility as described in Section 5.4. We recommend that the costs and benefits of this approach are examined on a case-by-case basis once the scope of the insurances are finalised.

- Support for Continued Technical Assistance

  Technical assistance funds are also required for further support in commercial, procurement, legal and insurance aspects of implementation.

6.6 Implementation Risks

In this section we set out the key risks associated with the implementation of the derisking strategy.

Table 3: Implementation Risk Assessment and Management

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Brief title	*Description*	*e.g. High, medium, low*	*e.g. High, medium, low*	*Avoidance (eliminate, withdraw)* *Reduction (optimize – mitigate)* *Sharing (e.g. insure, transfer)* *Retention (accept and budget)*
Non-Adherence to Market Standard Risk Allocation in PPA – Termination Payments	Non-inclusion of termination payments in the PPA, i.e. passing all termination risk to ESCOs, is likely to kill or severely dampen investment interest and curtail the decarbonisation programme.	Medium	High	**Avoid** *(eliminate, withdraw).* We recommend that this risk is avoided, and that the consequential financial exposure is managed and shared through insurance.
Non-inclusion of security in RfP package	Non-inclusion of a pre-arranged security (escrow or L/C) as protection against early termination or payment interruption. This is a risk in two ways: a) the risk allocation in the LTA will be less attractive to potential ESCOs; and b) the Humanitarian Agency may be exposed to immediate and current liabilities.	Medium	Medium	**Avoid** *(eliminate, withdraw).* We recommend that this risk is avoided.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Data Availability for Actuarial Calculation of Termination Risks	The development of an insurance product will require the primary insurer to analyse the probability associated with early termination. This requires a significant amount of Humanitarian Agency operational data (for example on the historic causes of termination/ demobilisation of Agency facilities) to be made available for analysis. The risk here is that the data is not available, or is not sufficiently detailed, for the termination probabilities to be understood.	High	Medium	**Retention** *(accept and budget).* The first risk management strategy is to allow adequate time budget (with contingency) for the data gathering and analysis in the insurance workstreams. **Reduction** *(optimize – mitigate)* The second risk management strategy is to use a buffer of first loss funding to mitigate the initial uncertainty; such a buffer can be reduced through time as the risk certainty increases.
Engagement of Humanitarian Agencies	Risk that the implementation of the de-risking program is deprioritised due to competing priorities for Humanitarian Agency staff time.	High	Medium	**Retention** *(accept and budget).* Recommend budgeting/engaging adequate specialist support to core procurement functions (insurance, legal, commercial, project management etc) to implement the risk management programme. Maintain close project management of the programme.
Engagement of Primary Insurer	Risk that the primary insurer is unable to make a commercial commitment to the development of the insurance product due to unclear risk profile or immaterial PV project pipeline.	Medium	Medium	**Reduction** *(optimize – mitigate)* Maintain close engagement with Humanitarian Agency energy teams to maximise information flow and clarity for the design of the insurance product.
Non-availability of funding for de-risking instruments.	Donor funding will be required for the commercial securities, on a first loss basis to seed the insurance fund, and for any residual non-insurable risks.	Low	High	**Retention** *(accept and budget).* Early engagement with the donor community is desirable to minimise the risks of underfunding.

A Annex A: List of Consultees

Name	Function	Institution
Irene Sun	Finance	UNHCR
Marc Schachter	Legal	UNHCR
Tina Mittendorf	Facilities Management	FAO
Giulia Cavo	Facilities Management	FAO
Nyasha Mtengwa	Finance	WFP
William Abi Abdallah	Energy	UNICEF
Richard Bailey	Finance	UNICEF
Gregory Soneff	Procurement	UNDP
Mateo Salomon	Finance	UNDP
Lucas Black	Finance	UNDP
Paul Quigley	Energy	Independent Consultant
Hoda Atia Moustafa	Guarantees	MIGA
Nkemjika Onwuamaegbu	Guarantees	MIGA
Cecilia Ragazzi	Energy	Mercy Corps
Catherine Howell	Finance	International Committee of the Red Cross
Dikolela Kalubi	Energy	International Committee of the Red Cross
Daniel Mangel	Energy	MSF
Jannike Berg	Private Sector Development	Norad
Igor Fenitiuc	Head of Support	Norwegian Refugee Council
Prashant Murthy	Finance	FMO
Wennie Waeijen	Communications	FMO
Morten Langsholdt	Guarantees	ScatecSolar
Hans Olav Kvalvaag	Project Development	ScatecSolar
Allan Baker	Energy Finance	Société Générale
Christian Pettenkofer	Insurance	MunichRe
Michael Roth	Insurance	MunichRe
Thomas Mahl	Insurance	SFR
Franz Karmann	Insurance	SFR
John Graham	Project Development	Schneider
George Harris	Project Development	Powergen Renewables

Name	Function	Institution
Richard Mori	Project Development	MeshPower
Jake Cusack	Project Development / Finance	CrossBoundary
Matt Tilleard	Project Development / Finance	CrossBoundary
Adit Mehta	Project Development	CrossBoundary
Lauren Gaffney	Legal	CrossBoundary
Roman Kovac	Finance	Kois
Kate Montgomery	Business Development	Acumen
Rolline Skehan	Legal	Becker Buttner Held

B Annex B: Solar PV Risk Allocation

Common risks can be grouped into three broad categories: (i) risks occurring during the development phase; (ii) risks occurring during the tendering and contracting phase, and (iii) those that arise once the project begins to operate.

Note that this has been written from the perspective of contracting for solar PV assets, but the risk allocation is typical of all renewable energy technologies.

As a rule, "risk should be managed by the party that is best placed to manage that risk." Placing risk with the party best able to manage it should lead to:

- Optimal pricing from all involved in the supply chain, including finance parties;
- Fewer performance and commercial issues during the contract term;
- Reduced likelihood that the contract fails, and the supplier prematurely exits the agreement or becomes insolvent; and
- A climate of open and honest business dealings for mutual benefit.

This approach can help avoid inappropriate risk allocation being a divisive influence between the parties throughout the contract term, which can negatively impact performance and relationships.

The question of what is a 'fair' risk allocation is, ultimately, a subjective one. The procurement agency will need to weigh up the theoretical efficiency of the risk allocation with political and market dynamics.

Table 4 provides some discussion of potential risks and common allocation decisions.

Table 4: Risk allocation considerations for solar photovoltaic independent power plants (IPPs)

Risk Category	Risk Allocation
Development phase	
Site Acquisition and Permitting Risk	This may include: land expropriation (with any necessary Government involvement), compensation where it is necessary to displace existing owners and/or occupiers of land, wayleave acquisition in relation to site access and the shallow grid connection and various permits (e.g. planning permission, a construction permit etc.). The responsibilities in relation to Site acquisition will depend on the underlying circumstances of each individual Project. As discussed above, the procurement agency could choose to secure the site and necessary permits and wayleaves to reduce the bidding costs and encourage a more competitive process. If the Government or another parastatal entity will be responsible for supplying the site, the relevant entity will need to transfer either ownership or a long lease of the site to the successful bidder.

Risk Category	Risk Allocation
	The Government may choose to commit to provide all reasonable support and cooperation to assist the Generator[9] in obtaining all necessary permits and authorisations. Provided that the Generator and/or the Procurement Agency have made diligent and proper efforts to apply for a permit, then any delay or failure to issue a required permit could then be accepted as a Government risk.
Construction Risk	Typically, the Generator is solely responsible for the design and construction of the Plant, and the Generator will be liable for delay liquidated damages (LDs) if Commercial Operation Date (COD) is delayed beyond the scheduled date. The COD will extend for a period, typically up to 180 days, for force majeure and/or Government, Procurement Agency or Offtaker 'fault' ("Excused Events"). If the effect of Excused Events continues beyond the maximum extension period, this will give the Generator a termination right. It is expected that the Generator's financiers will require construction risk to be passed onto the Generator's engineering, procurement and construction (EPC) Contractor (other than in respect of any matters 'caused' by or the responsibility of the Generator). Accordingly, ultimately the delay LDs in the EPC Contract should be set at a level which is sufficient to cover PPA penalties plus any other costs incurred by the Generator. Some Offtakers will wish to set the LDs at an amount which fully compensates the difference between the electricity tariff in the PPA and the cost of alternative emergency power. However, in practice this is likely to be either (a) prohibitively expensive, and/or (b) not acceptable to the EPC Contractor. There is therefore a careful balance to be struck between all parties.
Shallow Grid Connection (relevant to grid-connected projects only)	Typically, in the case of grid-connected projects, a Generator will construct the shallow grid connection (including transmission lines and substation if necessary) and transfer the shallow grid connection to the domestic Transmission System Operator (TSO) on (or before) COD. The Generator may be compensated for constructing the shallow grid connection via the tariff. After the transfer, the shallow grid connection shall form part of the electricity grid and be the responsibility of the TSO. The TSO will be responsible for any deep grid strengthening works required in order to evacuate power from the Plant (beyond the shallow grid connection). The Generator's Lenders will need to be satisfied that there is capacity on the grid and the grid will remain stable. In a simple bilateral IPP arrangement between a Generator and a national utility:

[9] In this context the Generator is the entity which builds, own and operates the IPP and sells electricity. It performs the function of the entity referred to as the ESCO or "Seller" elsewhere in this report.

Risk Category	Risk Allocation
	■ Generator may owe LDs for delay in attaining COD (which would include delays in shallow grid construction where that task has been allocated to the Generator); ■ Utility/Offtaker may owe deemed energy payments to the Generator if there are delays caused by the utility/Offtaker; and ■ If the shallow grid connection construction obligation is taken on by the host Government, then any delay (of sufficient magnitude) may mean deemed energy payments will be owed by the host Government and/or the TSO to the Generator.
Availability of finance	Typically, the Generator bears the full risk on its ability to source adequate debt and equity funding and may be obliged to provide a bid bond which can be called if it fails to achieve financial close by an agreed longstop date.
Tendering and contracting phase	
Information availability for proposal	Publicise information well in advance to alert prospective bidders. Consider whether site identification, resource monitoring and permitting will be carried out by the procurement agency in advance. This avoids bidders incurring heavy costs in securing prospective sites which for most will be an abortive expenditure. Securing permits and wayleaves removes a significant uncertainty if a bidder were to face permitting challenges. Cost is not the only consideration. If site identification and permitting is to be the responsibility of bidders, then the duration of the bidding cycle will necessarily be greatly extended.
Bidding criteria	Note that strict bidding criteria can be extremely unpopular with domestic industry stakeholders, as they can effectively preclude local bidders (and indeed, in some cases, seemingly well qualified and experienced international bidders). Bid criteria will need to be designed sensitively with this in mind.
Cost of bidding relative to depth of competition	Bid preparation will be time consuming when most power companies have limited bid preparation capacity; this too will deter bidders. Power firms look at the depth of competition relative to the costs of bidding in deciding whether to bid. There are metrics to calculate the likely cost of bid preparation for each bidder and this can be used to judge how many firms might need to be shortlisted to get the best balance of effective competition versus erecting barriers to bidding.
Operation phase	
Availability and suitability of source of energy (solar resource)	**Risk typically borne by the Generator** Under an 'all energy' tariff model (as typically used on renewable IPPs), the Generator is only paid for electrical energy which it delivers (or is deemed to have made available), and in this sense the Generator bears

Risk Category	Risk Allocation
	the risk regarding its ability to generate power based on the source energy. The Generator is incentivised to make as much electrical energy available as possible under prevailing climatic conditions to maximise revenue. Where the procurement agency is securing the site, some onsite measurements might be carried out to minimise the costs to bidders. **Risk typically borne by the Offtaker** The Offtaker, is typically obliged to take all of the energy produced or to pay for energy that could have been produced. Mitigation strategies may be desirable if demand or transmission capacity is sometimes insufficient to evacuate the full capacity of the solar PV generator.
Decommissioning	The Government may require decommissioning of solar PV at the end of the term either as a matter of current or future law and/or contractually. As the Generator will be a special purpose company, any decommissioning obligations may need to be backed by a decommissioning bond. If there is no domestic law decommissioning requirement at the Effective Date but decommissioning is required under international standards, then a subsequent change in domestic law to impose decommissioning may not give rise to a stabilising payment (i.e., the associated increased cost will not be compensated by the host Government or Offtaker).
Despatch Risk; Grid Outages and/or Constraints (relevant only to grid connected projects)	Generator to enter into a grid connection agreement with the local TSO to secure firm rights to deliver all the power it generates to the delivery point. Project lenders will generally not accept 'grid risk', even when grid outages or constraints are caused by a Non-Political Force Majeure Event.
Transformer and Transmission Losses	The Generator is typically paid for delivered and/or deemed energy measured at the Generator's Delivery Point. Care should be taken in specifying/agreeing whether the PPA Delivery Point is before or after any step-up transformers. Whoever operates the transformers should bear the risk and responsibility of minimising transformer losses. Typically, the step-up transformers at or around the PPA Delivery Point would be transferred to the domestic TSO, so the PPA Delivery Point would be immediately before the step-up transformers.
Exchange Rate Risk	Virtually all IPPs in developing countries present an unavoidable currency mismatch. A large majority of IPP costs are denominated in hard currency, whereas most if not all end users of the power generated by IPPs pay in local currency. Typically, the tariff will be denominated in the same currency as the Generator's primary source of funding (usually US$) but may be paid in local currency at the prevailing buy rate for each payment period.

Risk Category	Risk Allocation
	It may be possible to consider a 'split' tariff, with a hard currency portion of the tariff reflecting costs incurred in hard currency, and a local currency portion of the tariff reflecting costs incurred in local currency. However, local costs are likely to be a very small proportion of total project costs and therefore may not merit the complication of a split tariff approach.
Payment terms	Typically based on monthly billing cycles. Late payment will trigger default interest sized to cover at least the Generator's cost of debt.
Offtaker credit risk and payment guarantee	The payment guarantee instrument may be in the form of: ■ An Offtaker's L/C from an acceptable bank; ■ An Offtaker's cash escrow account; ■ In appropriate cases, diverting the Offtaker's revenue from identified customers to secured collateral accounts; ■ International mechanisms such as World Bank partial Risk Guarantee or KfW's RLSF; or ■ Government guarantee.
Convertibility and repatriation of funds	In a normal IPP structure, if the Government imposed material restrictions on currency conversion and/or repatriation, ultimately this would lead to: ■ Termination of the Concession/Implementation/Government Support Agreement for Government Event of Default; ■ Cross-termination of the PPA, with no liability either way between the parties to the PPA; and ■ (Assuming the resulting put option is exercised) an obligation on the host Government to purchase the Plant.
Refinancing	Debt service costs represent the largest element of the Generators costs and have a significant impact on the level of the tariff. To the extent the debt service costs reduce from the costs assumed at financial close and factored into the tariff as a result of changes in the market, the benefit of such cost reduction could be shared between the Generator and Offtaker, otherwise the Generator would receive a potentially significant windfall gain.
Change in Law / Tax	With limited exceptions, e.g. changes in domestic law which merely bring domestic law up to existing international standards, the Generator and its Lenders will not take Change in Law/Tax risk above an agreed 'de minimis' threshold. Broadly speaking, there are two types of Change in Law/Tax; i.e. changes which: ■ Render the Project less profitable, which should be addressed under 'economic stabilisation' provisions; or ■ Frustrate the carrying out of the Project, e.g. by rendering Project related activities unlawful, which should be addressed under

Risk Category	Risk Allocation
	Government Event of Default. As a matter of public policy, the economic stabilisation regime should be reciprocal. The Generator should not get a windfall if e.g. corporation or other taxes are reduced.
Force Majeure affecting Generator	The Generator will be relieved from its obligations under the PPA to the extent it is not able to perform those obligations as a result of a Force Majeure Event (FME) affecting it or its subcontractors. Either party has the right to terminate for prolonged FME. Except in relation to Local Political FMEs, while the Generator is excused from its obligation, it typically does not receive any revenue when it does not deliver electrical energy as a result of an FME.
Force Majeure affecting Offtakers	Power generation projects are reluctant to take the risk of force majeure events on the electricity grid, on the basis that: ■ The risk is too broad; ■ The risk is uninsurable by an individual project (at costs that are economic for the project); and ■ It is the TSO's job to be able to 'bounce back' and restore the grid quickly after it suffers from an FME. However, Offtakers often push back against paying deemed energy charges as a result of non-political FMEs such as natural disasters over which they have no control.
Events of Default and Termination Events	The Offtaker / Generator may typically terminate the PPA if the other party fails to remedy events of default, for example failure to pay any amount due, insolvency related events, failure to maintain consents or abandonment of the Project. Either party may terminate for prolonged (e.g. 180 days) Political or Non-Political FMEs. Only a party who is not at fault may exercise a right of termination, save in the case of Local Political Force Majeure where the Offtaker may be incurring significant Deemed Energy Payment liabilities and may wish to terminate.
Early Termination Payment	The early termination amount payable to the Seller will depend on the reason for termination. On termination of the PPA, the Generator will have no customer, and will possibly not have associated rights such as a generation licence. Although Lenders take security over the assets, they lend against contractual promises to pay from the Offtaker and host Government, and not solely against the value of the physical assets of the Plant. The asset value of the Plant is negligible if the PPA has terminated. The termination payment is often linked to a put / call option, exercisable by the non-defaulting party or by either party in case of Non-Political Force Majeure or Foreign Political Force Majeure (i.e. Generator can 'put' the Plant to the Offtaker/Government in case of Offtaker Default/Local

Risk Category	Risk Allocation
	Political Force Majeure, and the Offtaker can 'call' the Plant in the case of Generator Default (but is not obliged to). This 'put and call option agreement' model as has been used in Nigeria (and recently taken up by Ghana) and is also usually replicated in the Concession / Implementation / Government Support Agreement with the Government.
Assignment and Change of Control	As the PPA is the Generator's main source of revenue, the lenders will require "step-in" rights in case of Generator Default. The Generator is permitted to assign the PPA to its lenders by way of security. Any other assignment by the Generator will require the Offtaker's consent.
Governing Law and Dispute Resolution	International investors will be considerably more comfortable with a legal regime they understand (e.g. English Law or New York Law) and in respect of which experienced international lawyers can be appointed. However, Governments may prefer local law. International investors and lenders they will need to be familiar and confident with the dispute resolution forum under the PPA. Any disputes that cannot be resolved by management-level negotiations will be subject to final, binding resolution by arbitration, in a neutral location, under rules generally acceptable to the international community (e.g. LICA-MIAC (Mauritius), UNCITRAL or LCIA (London)).

C Annex C: Modelling Methodology

In this section we calculate of the quantum of termination liabilities for a notional PV portfolio of 30 MW, 50 MW and 70 MW. The calculations are used to estimate the funding required to maintain an insurance product to underwrite the termination liabilities for the portfolio. Key assumptions such as the assumed portfolio build up, installed cost of the PV portfolio, ESCO Weighted Average Cost of capital (WACC), probability of termination, and termination cost in any one year are based on the Consultant's best estimate.

C.1 Site Assumptions and Scenarios Used in the Model

The site assumptions are an important input to be able to establish and simulate how the facility is going to work. For this, we have worked with the information made available to us and with examples from previous works with other United Nations (UN) Agencies. The sources of data are:

- One of the UN Agencies zone offices provided a file named 'Identified Zone Offices Energy Use' with the annual grid electricity demand, the annual diesel demand, and the location of the offices, and
- Information of UN Agency humanitarian sites in Sub-Sahara Africa.

The two sources above give details of about 75 sites. A rough estimation of the sites possible required solar photovoltaic is about 53MW and their split by regions are:

- **Sub Saharan Africa:** 55 humanitarian sites from two UN Agencies with an estimated required capacity of 31.3 MW solar PV,
- **South Asia:** 12 sites from one UN Agency with an estimated required capacity of 14.7 MW solar PV, and
- **Middle East:** 8 sites from one UN Agency with an estimated required capacity of 7.5 MW solar PV.

The geographical location of the sites can be seen in Figure 7.

Figure 7: Humanitarian site geographical locations

To define the scenarios, we have used the information of three sites. For those sites we have better data about their consumption pattern and their energy use. With this information we could estimate their diesel savings (including operations and maintenance) and use it as the upper limit of the capacity payment that the sites are able to pay to potential renewable ESCOs. The site details are in Table 5.

Table 5: Site Details

Site	Diesel Cost year US$000s	PV capacity kW	Diesel Savings US$000s
Site 1	280	500	149
Site 2	360	750	216
Site 3	1200	1700	655

To accurately determine the best system for those sites requires a proper on-site metered energy survey. Understanding the actual demand of the sites is essential for initial scoping and to facilitate the private-sector proposal and design of the plant.

Based on the requirements of those three sites we formulated a Base, High and Low Scenario. In the Base scenario we have rounded to 50MW capacity from all sites, while for the Low and High scenarios are stressed versions based on the assumptions used for the Base scenario. The

cost of capital for all three scenarios are roughly estimated based on what we have seen in Africa and the number of years the site is operational ("facility duration") is based on our conversations and email exchanges with a UN Agency. For the CAPEX we have considered a cost per MW of solar PV system according to EMRC's previous projects in the Gambia and Nigeria, those prices are in line with IRENA's report[10] 'Renewable Power Generation Costs' (2019).

Table 6: Site Assumptions

Scenarios	Base	Low	High
Facility Duration (number of years)	14	17	11
Peak demand (MW)	50	30	70
Cost per MW[11] (US$m)	0.85	0.8	0.9
Cost of Capital (WACC, %)	15%	12%	18%
CAPEX US$m	43	24	63

*OPEX: the operation and maintenance cost of the simulation is equal to 10% of the annual diesel genset running cost.

C.2 Fund Assumptions

To be able to evaluate the size of the required capitalization and the fund performance, we have taken some other common assumptions into the model:

- We included into the calculation an administration fee of 0.1% of the yearly capacity payment,
- Starting period of the sites were split in 5 years with the starting year as 2021,
- The fund returns of the finance required to pay for the termination payments as 3%,
- The depreciation of the PV system that is used in the case of early termination to evaluate the PV system actual value as 18 years.

Another model assumption is the contract duration. To find the contract duration we have used our internal financial model considering the assumptions described in the previous section for the 3 chosen sites. The contract term is basically the necessary period to remunerate the project developer considering the capacity payment (Table 5) at a certain cost of capital (Table 6). Table 7 presents the contract term for each site and scenario.

Table 7: Contract Term (years) by Site and Scenario

Contract term (yrs)	Base	Low	High
Site 1	12	9	16
Site 2	12	10	18
Site 3	7	6	9

[10] https://irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Power_Generation_Costs_2019.pdf
[11] For Capex it includes: Solar modules, inverter, engineering, installation and labour (it does not consider cost of land, system design, nor grid connection).

C.3 Probability of termination

A requirement of the global guarantee mechanism model is to calculate the probability of a facility closing during the life of the contract term. If it closes early, then a termination payment will have to be made. Its objective in calculating this probability is to figure out how large a fund is needed to backstop the termination payments for a portfolio according to the scenarios and the average life or duration of the facilities.

The probability of a facility closing in any year can be best modelled by a Poisson distribution with the mean being the average "life" of a site and defined according to the scenario. This gives the following probability distribution for closure in any year and its shown in Figure 8.

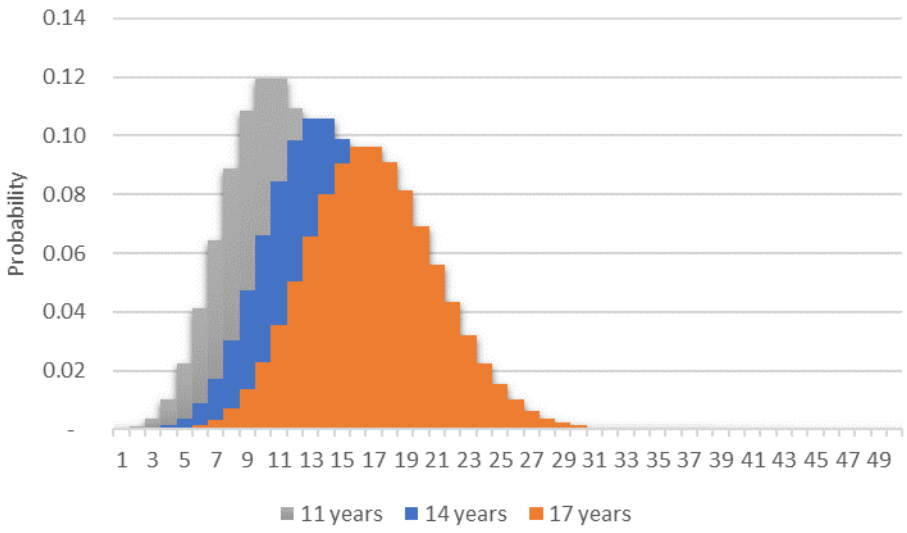


Figure 8: Probability of 1 Closure in Year X

If the probability of a facility m closing in year n is P_{mn} and if there are 2 facilities, then:

the probability of either closing in year 1 is: $P_{11} + P_{21}$

the probability of both closing in year 1 is: $P_{11} * P_{12}$

If there are 10 facilities, then the probability of 5 facilities closing in years 1 to 10 would be:

$$\sum_{X=5}^{X=1} \left(\sum_{Y=10}^{Y=1} P_{xy} \right)$$

We can derive the expected cost of closure. If the cost of closure of Facility x in year y is C_{xy} then the expected cost of closure might be:

$$\sum_{X=5}^{X=1} \left(\sum_{Y=10}^{Y=1} P_{xy}\, C_{xy} \right)$$

We can use this calculation to estimate what would be the fund find size considering the probability of a facility closing and the capacity payments.

C.4 Model Results: Estimated Termination Pay-Out

The GPA Financial Model simulates the operation of the Fund over a period 'X' including the expected pay-outs on termination using the formulae described previously in this report.

The termination payment was calculated based on the net present value of the future capacity payments. The total expected pay-out times the probability of any sites closing give the expected pay-out per scenario and the results are shown in Figure 9.

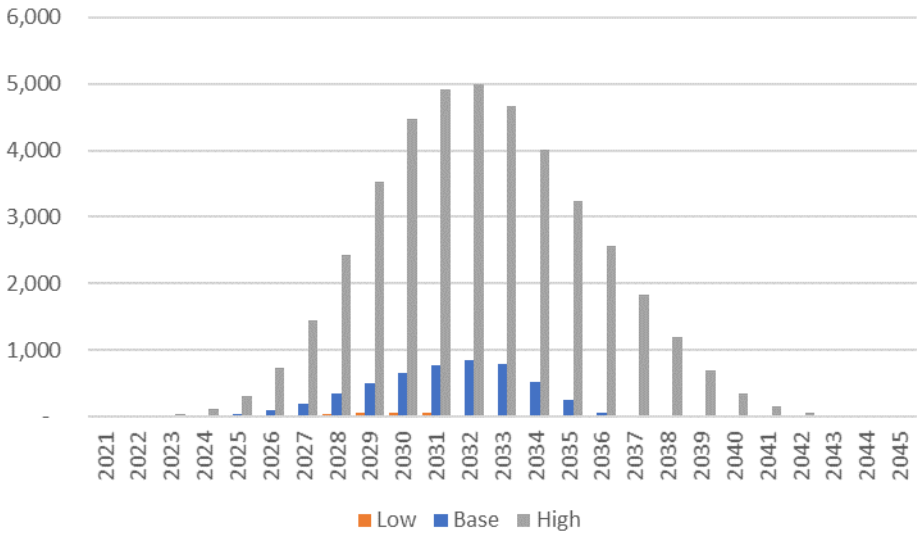


Figure 9: Expected Pay-out per Scenario ($US 000s)

C.5 Model Results: Fund Size and Premium Payments

To determine the fund size and premium, some points needs to be considered:

- The fund needs to remain positive throughout the whole fund life, and
- The premiums need to be at a level that would cover the pay-outs and guarantee a return to the allocated finance.

The defined fund size is equal to the highest expected pay-out in one year. Figure 10 shows the required fund size for each scenario.

Figure 10: Expected Fund Size

Considering the assumptions described in this report, for each scenario, the premiums would be:

- Low: ~ 0.3%,
- Base: ~ 2%,
- High: ~ 10.5%.

Based on the premiums above applied to the total capacity payment, the Figure 11 presents the premium payments for each scenario per year.

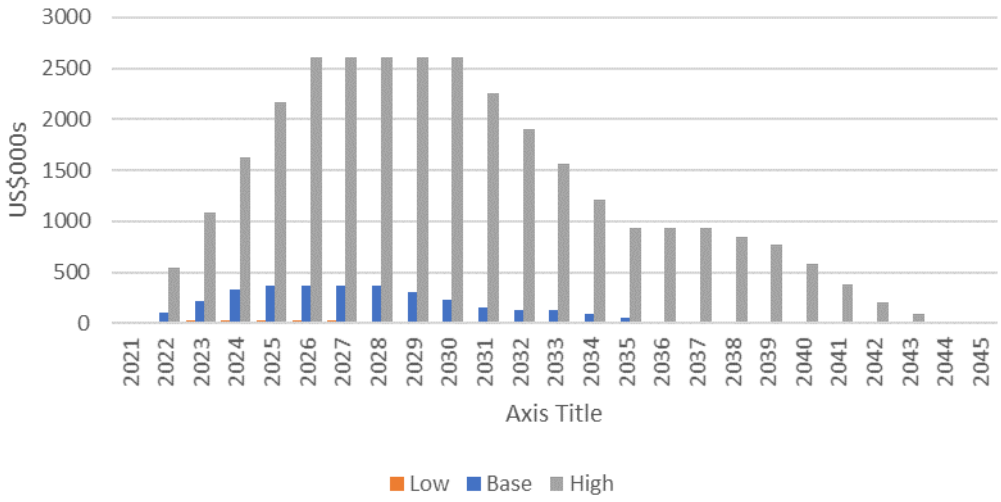


Figure 11: Annual Premium Payments

D Annex D: Terms of Reference

On behalf of the Global Plan of Action for Sustainable Energy Solutions for Situations of Displacement ("GPA"[12]) working group, Shell International BV ("Shell") is sponsoring a study to determine the feasibility and applicability of a Global Guarantee Mechanism ("GGM") that would provide third party financial guarantees to ESCOs under humanitarian sector renewable energy contracts. Shell wishes to retain a consultant to prepare a report on the viability of GGMs on the terms outlined in this Terms of Reference ("ToR").

D.1 Background

Humanitarian Agencies aim to transition to more sustainable approaches to generating and using electricity; shifting from their dependence on fossil fuels. Long-term agreements (5+ years) that underpin deployment of renewable energy solutions are possible between Humanitarian Agencies and private sector ESCOs. Such long-term agreements are currently preconditioned on termination clauses in which the humanitarian entity, for example the United Nations, may terminate the contract at any time by providing written notice to the contractor. For example, when the mandate of the United Nations applicable to the performance of the contract or the funding of the United Nations applicable to the contract is curtailed or terminated.

Given the upfront cost of renewable energy solutions, these termination clauses significantly increase the risk to private sector energy companies. This either discourages private sector participation and/or increases renewable power contract prices, thereby making the transition to sustainable energy more costly.

In a workshop[13] with private sector ESCOs, financial guarantees were identified as one of the key instruments which could resolve this issue, mitigate risks, reduce costs and make it easier to attract investors and lenders. Guarantees ensure that capital costs, and/or agreed annual revenue from consumption, could be paid to the ESCO should an event occur that triggers the termination clause, e.g. humanitarian facilities are closed or reduced as displaced persons return to their place of origin.

[12] The Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement (GPA) is a non binding framework that sets out concrete actions for accelerated progress towards the vision of "safe access to affordable, reliable, sustainable, and modern energy services for all displaced people by 2030". The GPA is directed by a Steering Group of 13 international organisations: UNHCR, IOM, UNITAR; WFP, FAO, UNDP, Mercy Corps, UNEP-DTU Partnership, SEforAll, GIZ, MEI, Practical Action and the Clean Cooking Alliance. The Coordination Unit of the GPA is hosted by the United Nations Institute for Training and Research (UNITAR).

[13] Workshop report titled Electricity for UN Agencies in Humanitarian Settings. This report reviews the outcomes of two Workshops, exploring how UN Agencies approach electricity generation in humanitarian settings, highlighting the obstacles to change, opportunities for private sector engagement and outlining discussions on potential delivery models that can be used to shift to cleaner and cheaper electricity.

D.2 Purpose

The purpose of the study is to find globally relevant, adaptable mechanisms that facilitate transactions supporting sustainable energy projects in different settings, geographies and for a range of partners. The consultant should explore the potential for risk mitigation that facilitates increased private sector engagement in providing sustainable energy services in humanitarian settings globally. While GGMs have been identified as one option, the study should not preclude other financial de-risking methods. The report should be impartial and reflective of experiences of a diverse range of actors and needs to cater to a diverse audience from both private and humanitarian actors.

D.3 Methodology

The consultant will be briefed by the Global Plan of Action (GPA) coordination unit and Shell on the work completed to date on the humanitarian sector's transition to sustainable energy. The consultant will then need to work independently to ensure an objective analysis. The findings and analyses in the report should reflect information and opinions gathered from primary and secondary sources including internally produced reports via the GPA initiatives. Prior to starting any work, the consultant will be required to submit a detailed methodology for GPA and Shell feedback.

The consultant will have [45] days for the entirety of the work, including methodology design, data collection and analysis, and reporting and presenting the results to GPA and Shell.

D.4 Proposed Report Format

The report should include at least three sections that cover:

1. Initial Assessment:
a. Is a GGM the optimal solution in humanitarian settings?
b. If yes, does an existing GGM system apply?
c. If yes, but the existing system does not apply, what is required to set up a new GGM.

2. Alternatives: If 1a. is answered in the negative, what alternatives exist to GGM and what would be required to implement them?

3. Recommendation: Outline concrete steps to implement risk mitigation and financial support mechanisms, GGM or otherwise, that can enable sustainable energy contracts while addressing the early contract termination requirement of the humanitarian actors.

For all of the above requirements, please see the additional questions outlined in Annex 1.
Suggested Consultant Profile:

1. An understanding of the renewable power business, preferable in off-grid contexts
2. An understanding of challenges faced by organisations working in displacement settings
3. Demonstrated independence and professional credentials in contract reviews, including credit support instruments

D.5 Outputs

There will be two final deliverables:

1. A clear, accessible, and compelling written report;
2. A concise, engaging PowerPoint to disseminate the findings to large audiences.

D.6

1. If there is no existing GGM, what would be required to set up a new GGM? Provide detailed answers to the following questions:
   a) What are the practical steps required to set up a new GGM, including a realistic timeline?
   b) What organization should host the GGM and where are they located?
   c) What legal form would the GGM take (corporate entity, insurance, applicable law, regulatory requirements, ownership)?
   d) How could such a facility be funded (set up and ongoing)?

2. How would such an entity be managed and by whom?
   a) Are there natural fits with existing organizations/funds?
   b) What is the ideal size of the GGM, in terms of funding and scope of coverage?
   c) What are the administrative costs of managing such a guarantee facility?
   d) How would the GGM be monitored for effectiveness?
   e) How would funds held in the GGM be invested?
   f) What are the general terms and conditions of the guarantees issued, for example? Comment on:

      i. Obligation the guarantee would cover
      ii. Percent of obligations covered
      iii. Tenure of underlying contracts
      iv. Pricing model
      v. Materiality threshold
      vi. Application procedure to obtain the guarantee
      vii. Procedures for accessing the guarantees and subsequent claims

3. Other considerations. Comment on:
   a) Worldwide applicability of system

b) Qualifications for projects/contracts to be supported
c) Examples of transaction/flow chart of process
d) How can the GGM be expanded to include sustainable energy provision to the displaced persons and host communities?