Virtuo Finance SARL - Compartment 2022-3

Public Rating Report / Project Finance

Scope Ratings

Rating: Class A1 Guaranteed secured securities / USD 84.50m / maturing in March 2041

Rating	Expected loss	Expected risk horizon*	Notional	Payment period	Coupon (fixed)	Final maturity
BBB+	1.20%	8.76 years	USD 84.5m	6 months	5.60%	2041

The transaction closed on 18 May 2022. The final rating is based on the information provided as of May 2022 by MUFG Securities EMEA plc. Scope's ratings definitions are available at www.scoperatings.com

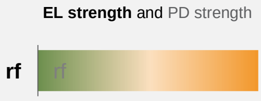
* The expected risk horizon is equal to the instrument's probability-weighted average duration under all scenarios when assuming a 0% discount rate. For more details please refer to the General Project Finance Rating Methodology.

Transaction and instrument details

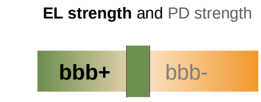
Country / sector / status	Egypt / Power / Operational
Group / sector / asset	Renewable power / Solar power generation / Photovoltaic power generation
Purpose	Refinancing six operational photovoltaic power plants with a total capacity of 300MW located near Benban city, Egypt. The plants are part of the 1.8GW Benban solar cluster.
Issuer	Virtuo Finance SARL - Compartment 2022-3
Sponsors	Scatec ASA, Africa50 – Project Finance, KLP, Norfund Investments
Structure / seniority / amortisation	Standalone project / Class A1 Guaranteed secured securities / Full amortisation

Rating rationale (summary)

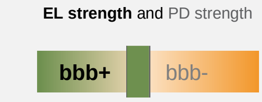
The BBB+ rating reflects the total expected loss (EL) of 1.20% over the loan's life until maturity (equivalent to a 8.76-year constant-exposure expected risk horizon). The project benefits from stable and predictable cashflows, low operational risk and a solid financing structure. Strong financial covenants and a subordinated liquidity facility by EBRD further enhance the credit quality of the bonds. Political risk insurance by MIGA mitigates the severity of potential country risk events related to the weak credit quality of the Egyptian sovereign, transfer & convertibility risks, and the risk of expropriation. The project's high dependency on the power purchase agreements with the Egyptian Electricity Transmission Company, some sensitivity to future US CPI inflation, and some exposure to EGP/USD exchange rate volatility constrain the rating.



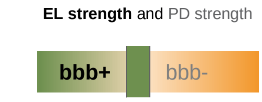
Construction risks account for 0.0% of total EL. Bondholders are not exposed to construction risk. All six PV plants have been operating since 2019.



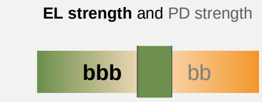
Operational risks account for 22.3% of total EL. Production levels were above P50 in 2021. Operational complexity is low, and the technology used is suitable. The project benefits from a 25-year, full-service O&M contract with Scatec Solar Solutions Egypt LLC.



Revenue risks account for 23.9% of total EL. The six power plants sell its power under a 25-year power purchase agreement on a take-and-pay basis. Solar resource risk is very low due to the excellent quality and low variability of solar irradiation.



Financial strength risks account for 21.5% of total EL. Debt repayment risk is low because of low expected cashflow volatility in combination with solid DSCRs: 1.29x minimum (2025) / 1.44x average in Scope's rating case. A six-months debt service reserve account and a subordinated, revolving liquidity facility by EBRD provide substantial liquidity support.



Project structure and compliance risks account for 32.4% of total EL. The financial and legal framework conforms to international project finance standards. The security package is comprehensive, covers all material project assets, and includes direct agreements with all major project parties. Finally, the bonds benefit from political risk insurance by MIGA, which substantially mitigates the severity of potential country risk events.

Analytical Team

Aaron Konrad
+49 30 27891-307
a.konrad@scoperatings.com

Team Head

Torsten Schellscheidt
+49 40 524 724-100
t.schellscheidt@scoperatings.com

Business Development

Marc-Orell Stadthaus
+49 30 27891-243
m.stadthaus@scopegroup.com

Carlos Terré
+49 30 27891-242
c.terre@scopegroup.com

Related Research

General Project Finance Rating Methodology
November 2021

Legal Risks in Project Finance: Analytical Considerations
April 2020

General Project Finance Analytical Considerations
September 2017

Scope Ratings GmbH
Lennéstraße 5
10785 Berlin

Tel. +49 30 27891 0
Fax +49 30 27891 100

info@scoperatings.com
www.scoperatings.com

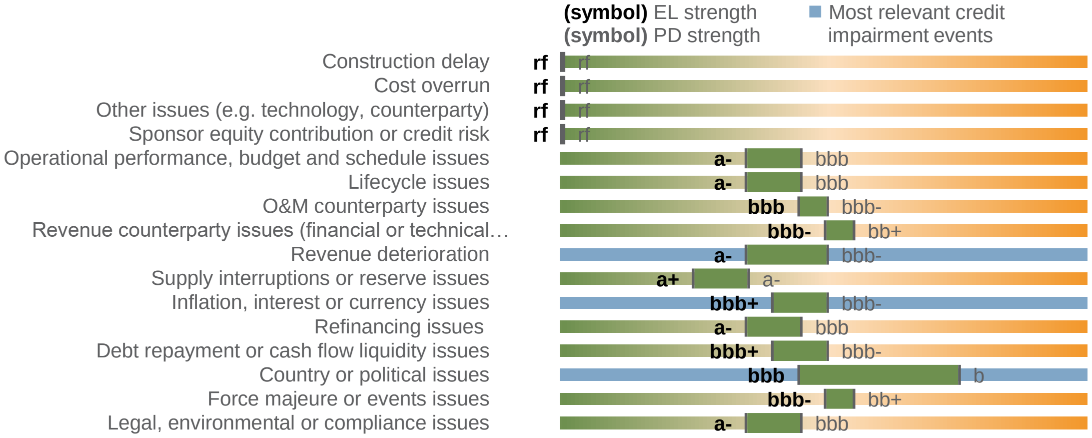
Bloomberg: SCOP

Rating drivers and mitigants

Positive rating drivers	Negative rating drivers and mitigants
Political risk insurance. The project benefits from political risk insurance (PRI) by the Multilateral Investment Guarantee Agency.	**Country risk.** The Egyptian sovereign has weak credit quality (privately rated by Scope). Transfer & convertibility risk and the risk of expropriation are concerns. The PRI substantially mitigates the severity of country risks because of the comprehensive scope of its coverage.
No construction risk. All six PV plants have been operating since 2019. Most teething issues have been resolved and performance in 2021 was in line with expectations. Despite the teething issues, total production was close to P50 since commissioning.	**High dependency on the PPAs with EETC.** The project fully depends on EETC to purchase its output with no real alternative route-to-market in the event the PPAs are terminated. The PPAs' termination provisions in combination with the PRI and a subordinated liquidity facility by EBRD mitigate this risk.
Stable and predictable cashflows. The Egyptian Electricity Transmission Company (EETC) has agreed to purchase all of the project's produced power for a fixed tariff of USD 84/MWh equivalent until 2044. The project's geo-graphical location enjoys exceptionally high levels of solar irradiation year-round.	**Unusually high insurance deductible.** Marsh, the lenders' insurance adviser, has highlighted an unusually high "special deductible" of 30% in the projects' property damage & business interruption insurance policy. Marsh recommends its removal at the earliest opportunity, and the process for this removal has been initiated by the opcos and the insurer. Our sensitivity analysis of insurance cost increases gives additional comfort.
Low operational risk because of the well-known technology used and the 25-year full-service O&M contract with Scatec Solar Solutions Egypt LLC. Lifecycle investment costs are small and supported by a maintenance reserve account. RINA, the lenders' technical adviser, is satisfied with the sizing of the MRA and the O&M budget.	**Sensitivity to US CPI inflation.** A prolonged increase in US CPI inflation would drive up operational expenditures because c. 75% of operational costs are indexed to US CPI. The project's reassuring cashflow buffer over debt service, the EBRD subordinated liquidity facility, and the debt service reserve account mitigate this risk.
Solid financing structure conforms to international project finance standards. The assets are ringfenced and the security package is comprehensive. A USD 30m revolving, subordinated liquidity facility by EBRD supports debt service in the event of PPA payment interruptions. Financial covenants are strong.	

Positive rating-change drivers	Negative rating-change drivers
Smooth performance and continued deleveraging could lead us to upgrade the rating.	A failure to make payments or disputes under the PPA, or operational underperformance, could result in a downgrade.

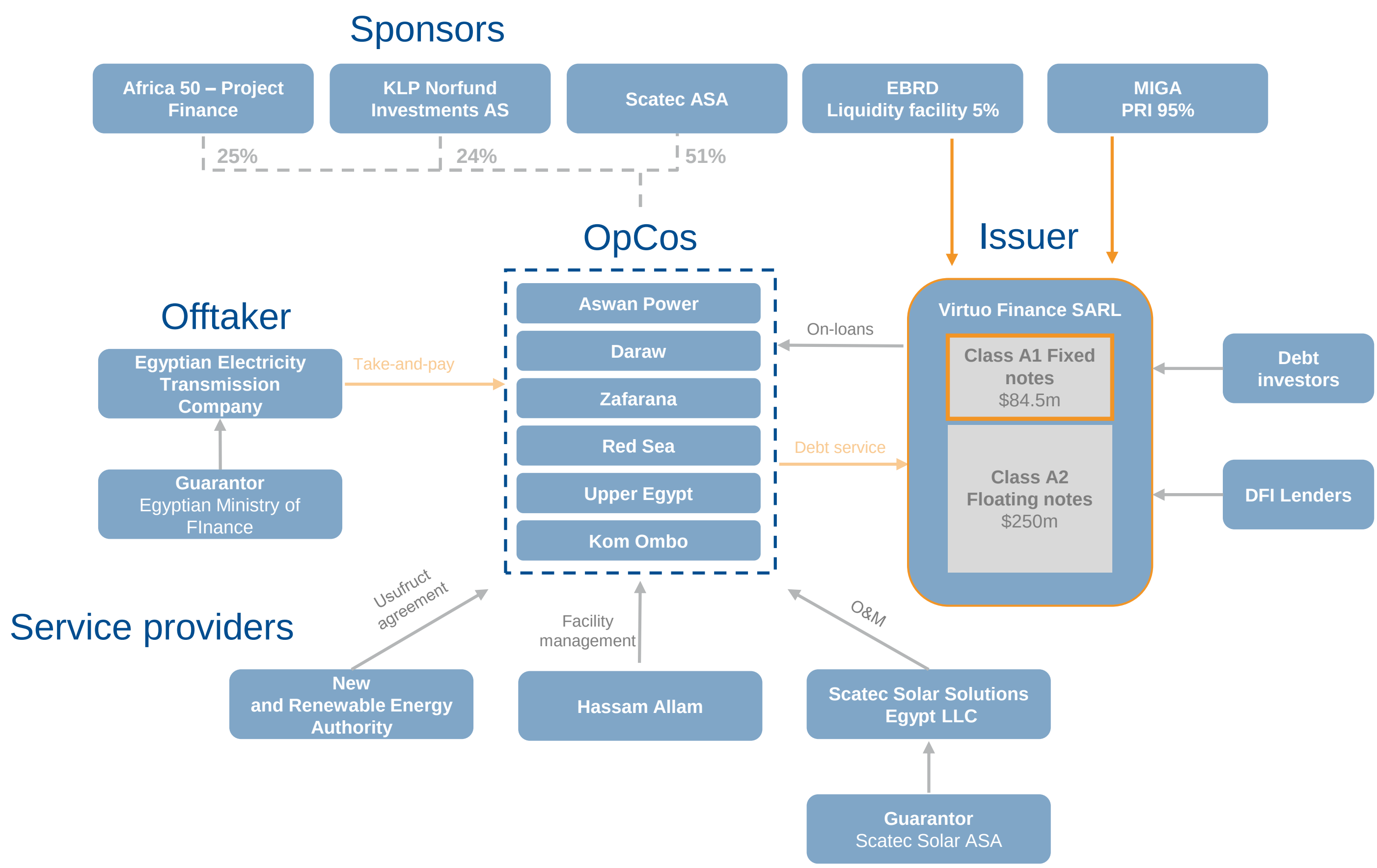
Credit impairment events (summary)



Source: Scope.

1. Transaction summary

Figure 1: Simplified representation of the transaction structure



Source: Transaction documents and Scope.

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The rated bonds support the refinancing of six operational photovoltaic power plants with a total capacity of 300MW$_{AC}$ located near Benban city, Egypt (together the project). The plants are part of the 1.8GW Benban solar cluster. The project has been operating since 2019.

The rated Class A1 bonds benefit from political risk insurance (PRI) of the Multilateral Investment Guarantee Agency (MIGA, part of the World Bank group) and a credit enhancement facility (CEF) of EBRD. Only Class A1 benefits from these instruments. Class A2 will be funded by DFI lenders, some of which were part of the original financing.

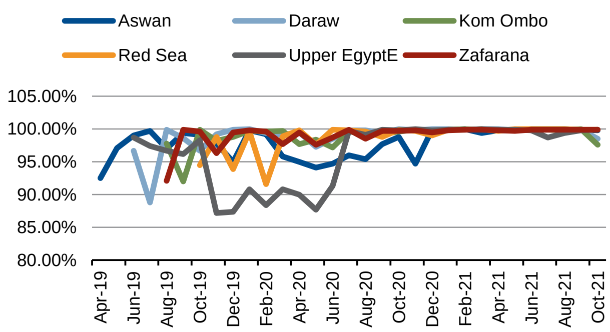
The issuer is a Luxembourg compartment which will on-lend the bond proceeds to each individual opco. Each opco has an identical long-term power purchase agreement (PPA) with the Egyptian Electricity Transmission Company (EETC). The Egyptian Ministry of Finance (MoF) guarantees EETC’s obligations. Scope has assigned a private rating to the Republic of Egypt.

Figure 2: Benban solar park

Source: RINA.

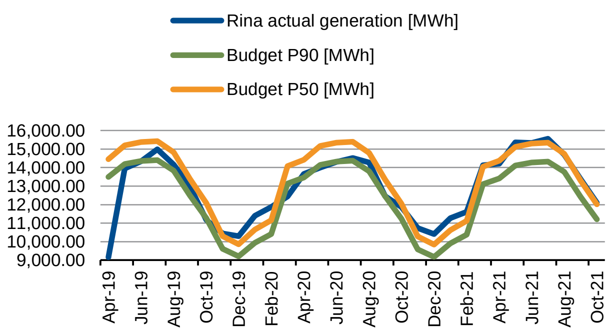
All PV plants have formally achieved taking-over in 2019. Operational performance in 2021 was satisfactory after some teething issues in 2019/20. RINA, the lenders' technical adviser, confirmed that performance ratios were above the level guaranteed under the PPAs and production exceeded both P50 and P90 levels in the period of Nov 2020 – Oct 2021.

Figure 3: Availability



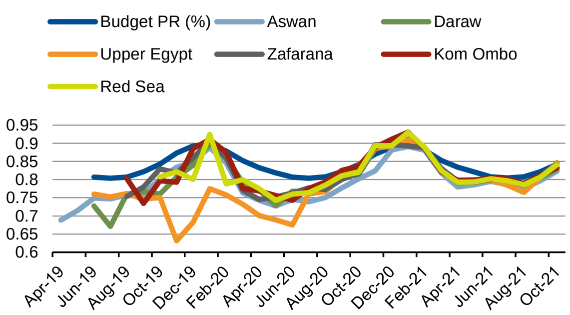
Source: RINA.

Figure 4: Generation



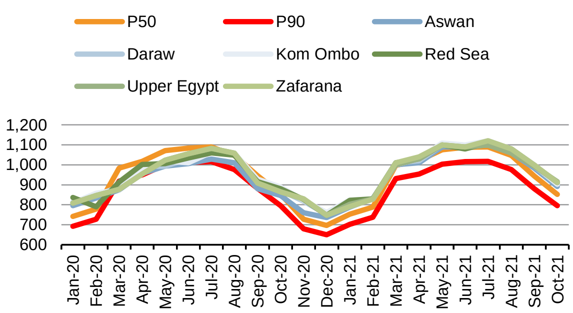
Source: RINA.

Figure 5: Performance ratio



Source: RINA.

Figure 6: Revenues



Source: RINA.

2. Rating and project risk

EL and PD strengths

We use EL strength (ELS) and probability of default strength (PD strength or PDS) to indicate the relative robustness of the different credit risk dimensions of a project.

The ELS and PDS indicate what the rating of the project would be if all other credit dimensions were as risky as the dimension under analysis. This is expressed with a symbol from our rating scale but written in lowercase to denote that the strength indication is not a rating.

For example, an ELS of aa+ for the 'Supply interruptions' credit impairment event indicates that the project would be rated AA+ if all dimensions of risk were as safe as the availability of inputs for the project.

The rating on the instrument reflects the financial and legal structure of the transaction; the value of the security package; the competitive position of the borrower; the experience and alignment of interests of the sponsors; and the counterparty exposures to key partners in construction (if applicable) and operation.

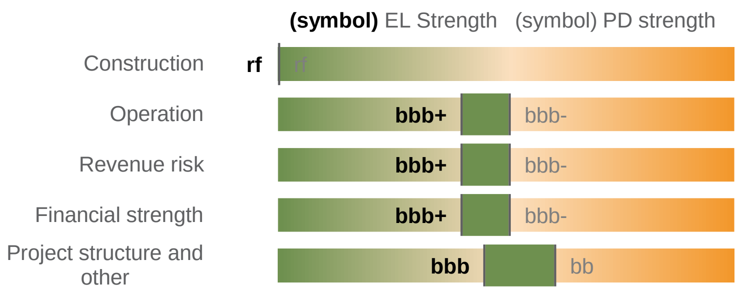
The total EL on the rated instrument is commensurate with a BBB+ rating. We calculated an EL of 1.20% over the lifetime of the instrument (equivalent to a constant exposure expected risk horizon of 8.76 years) under our rating case scenario (Scope's rating case), which is more conservative than the sponsor's base case scenario.

The EL reflects: i) the likelihood of several idealised credit impairment events with the potential to reduce payments originally promised to the investor; and ii) the severity of such credit impairment events. Credit impairment events represent default-like situations that could impair the project's credit performance in relation to the rated instrument.

Our analysis focuses on 16 credit impairment events grouped in five areas of risk: i) Construction; ii) Operation; iii) Revenue risk; iv) Financial strength, and v) Project structure and event risk.

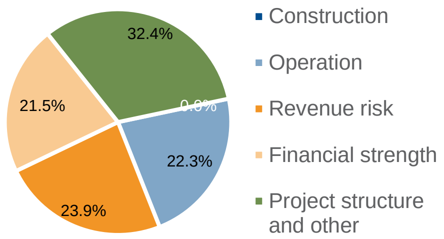
Figure 7 shows the probability of default (PD) and EL strengths of the instrument in relation to the five risk areas considered in our analysis. Figure 8 shows the relative contribution of each risk area to the total expected loss for the investor in the instrument.

Figure 7: PD and EL strengths by risk area



Source: Scope.

Figure 8: Share total EL contributions by risk area



Source: Scope.

Figure 9 shows the idealised credit impairment events that we consider when estimating the EL for the investor, expressed as a probability tree. The tree illustrates the expected likelihood of each impairment, as well its expected severity for the investor – taking into account the leverage of the project. The three most relevant credit impairment events for this transaction are highlighted in green. The most relevant events as regards the impairment likelihood and contribution to total EL are highlighted in light blue.

Figure 9: Visual summary of the project's risks, impairment likelihoods and EL contributions

Virtuo Finance SARL - Compartment 2022-3 (PRE)

Risk horizon 8.8 years
Total EL 1.20%
EL rating symbol BBB+
Total PD 6.9%
PD strength bb+

Construction – Likelihood = 0.00% – PDS rf / ELS rf

No construction issues – Likelihood = 100.00%

Operation – Conditional likelihood = 1.11% – PDS bbb- / ELS bbb+

Revenue risk – Conditional likelihood = 1.21% – PDS bbb- / ELS bbb+

Financial strength – Conditional likelihood = 1.09% – PDS bbb- / ELS bbb+

Project structure and other – Conditional likelihood = 3.47% – PDS bb / ELS bbb

No default – Conditional likelihood = 93.11%

	PD strength	Likelihood	Severity	Expected loss	EL strength
Construction delay Conditional likelihood = 0.00%	rf	0.0000%	61%	0.00%	rf
Cost overrun Conditional likelihood = 0.00%	rf	0.0000%	64%	0.00%	rf
Other issues (e.g. technology, counterparty) Conditional likelihood = 0.00%	rf	0.0000%	61%	0.00%	rf
Sponsor equity contribution or credit risk Conditional likelihood = 0.00%	rf	0.0000%	54%	0.00%	rf
Operational performance, budget and schedule issues Conditional likelihood = 28.93%	bbb	0.3224%	23%	0.08%	a-
Lifecycle issues Conditional likelihood = 23.36%	bbb	0.2603%	24%	0.06%	a-
O&M counterparty issues Conditional likelihood = 47.72%	bbb-	0.5318%	24%	0.13%	bbb
Revenue counterparty issues (financial or technical performance) Conditional likelihood = 54.73%	bb+	0.6637%	26%	0.18%	bbb-
Revenue deterioration Conditional likelihood = 34.20%	bbb-	0.4147%	18%	0.08%	a-
Supply interruptions or reserve issues Conditional likelihood = 11.08%	a-	0.1343%	25%	0.03%	a+
Inflation, interest or currency issues Conditional likelihood = 43.48%	bbb-	0.4751%	22%	0.11%	bbb+
Refinancing issues Conditional likelihood = 21.87%	bbb	0.2390%	25%	0.06%	a-
Debt repayment or cash flow liquidity issues Conditional likelihood = 34.64%	bbb-	0.3785%	24%	0.09%	bbb+
Country or political issues Conditional likelihood = 73.44%	b	2.5502%	5%	0.13%	bbb
Force majeure or events issues Conditional likelihood = 19.32%	bb+	0.6709%	28%	0.19%	bbb-
Legal, environmental or compliance issues Conditional likelihood = 7.24%	bbb	0.2514%	29%	0.07%	a-
No credit impairments Conditional likelihood = 100.00%		93.1077%	0%	0.00%	
Total	0.0%	100.0%	17.3%	1.1952%	

PDS: probability of default strength
ELS: expected loss strength
Most likely / most severe events
Scope selected events

Source: Scope.

3. Likelihood of credit impairment events

We calculated an expected impairment likelihood of 6.89% for this project, commensurate with a PD strength of bb+ when expressed using the levels of our idealised PD curves, as per our methodology. The project's PD strength and EL results from the aggregated risk of the construction and operational phases. Figure 7 shows the PD strengths of the different risk areas of this project. PD strengths determine the likelihood of credit impairments under the scenarios linked to the risk area.

We considered 23 risk factors that contribute to the project's total credit risk and drive the likelihood of credit impairment events. These risk factors are categorised in the same five risk areas that we use to group credit impairment events, with the risk contribution from sponsors impacting all five areas of risk. We assessed the risk contribution of each risk factor using a scoring model, in the context of the instrument. The likelihood of a given risk area triggering a credit impairment event (PD strength of risk area) is derived from the scores of the different risk factors (see Figure 7).

Figure 10 summarises the scores assigned to each of the risk factors defined in our methodology.

Figure 10: Summary of the project's risk factor scores

Risk area	Risk factor	Score	Comment
Sponsors	Sponsor's experience, track record and importance of the project	**Average**	Scatec Solar (51%) is an experienced independent solar power producer listed on the Oslo stock exchange. The company develops, builds, owns, operates and maintains solar power plants. Scatec Solar currently has c. 3.4GW of installed capacity in operation. Benban represents Scatec Solar's third-largest operating asset and African projects represent c. two thirds of the company's project backlog. With Benban, Scatec Solar is the largest solar developer in Egypt and the country is a strategic market, with hydrogen and desalination projects in the pipeline in addition to solar PV. The other sponsors are Africa50 (25%, pan-African infrastructure fund), Norfund (12%, Norwegian development fund), and KLP (12%, Norwegian pension fund).
Construction PDS rf	Construction complexity, permits, design and technology	**n/a**	No construction risk. All six PV plants have been operating since 2019.
	Construction contracts, budget and schedule	**n/a**	No construction risk. All six PV plants have been operating since 2019.
	Construction funding and liquidity package	**n/a**	No construction risk. All six PV plants have been operating since 2019.
	Counterparty risk	**n/a**	No construction risk. All six PV plants have been operating since 2019.
	Equity contribution risk	**n/a**	No construction risk. All six PV plants have been operating since 2019.
Operation PDS bbb-	Operational complexity, technology and standing	**Low**	The TA regards the technology used suitable with some elements of complexity including single-axis trackers and bifacial PV modules. Key equipment suppliers are reputable companies and include LONGi (PV modules), Gamesa (inverter stations), and PVHardware (single-axis trackers). LONGi is fairly new to the market, although with rapidly rising market share. Bifacial modules still have a limited, albeit growing track record with c. 10GW of LONGi bifacial modules shipped by 2020. The project's historical performance was characterised by some teething issues in 2019-20. However, performance ratios were above the guaranteed performance ratio of 81.8% and production levels were above P50 in 2021 after most of issues were resolved. The overall higher-than-budgeted irradiation and bifacial gains further contributed to the reassuring recent performance. Remaining concerns are plant clipping due to high irradiation, tracker downtime at all plants due to high wind speeds, partial shading during twilight hours due to backtracking issues, and a long-term solution for a dust ingress issue into the inverter transformer station at Aswan.
	O&M contracts, budget and planning	**Low**	The O&M contract term is 25 years, which matches the PPA term and exceeds the bond tenor by six years. The O&M contractor guarantees a performance ratio of 81.8%. The O&M fee is at the lower end of the TA's expectations yet in line with market standards. The O&M contract is comprehensive and covers all scheduled and unscheduled maintenance, monitoring, site management and security for the six plants. However, the contract does not cover spare parts. The TA is satisfied with the budget allocated in the financial model to cover spare parts that are not covered by a supplier's warranty. Inverters in particular are covered by a five-year warranty followed by an inverter maintenance contract.

Risk area	Risk factor	Score	Comment
	Lifecycle risk	**Low**	Lifecycle risk is predictable and well covered. Repairs and replacements of inverters are covered under the O&M contract, including labour for scheduled and unscheduled labour. The opex assumptions incorporated in the financial model cover other spare parts and include a general contingency. In addition, an MRA of USD 100k represents an additional contingency.
	Counterparty risk	**Average**	Scatec Solar Solutions Egypt LLC provides operations & maintenance services to the project, backed by a parent company guarantee of Scatec Solar SAS. The right to set off claims from O&M fees partially compensates for the lack of a performance bond. The O&M provider is incentivised to improving the performance ratio thanks to the presence of an acceptable bonus/malus regime. The O&M provider's liabilities are capped at 200% of its annual fee, which the TA considers satisfactory. Scatec Solar further benefits from high performance ratios in its role as sponsor. We consider the O&M provider could be replaced, taking into account the presence of multiple other O&M providers within the Benban cluster.
Revenue risk PDS bbb-	Revenue contract	**Low**	Revenue risk is low because each of the six power plants sells its power under a 25-year power purchase agreement on a take-and-pay basis, respectively. The offtaker purchases all power delivered (or deemed delivered) at a feed-in tariff equal to USD 8.40ct/kWh. The feed-in tariff is payable in EGP and is 70% adjusted to the EGP/USD exchange rate prevailing during the respective billing cycle. The remaining 30% is pegged to the exchange rate applicable on the Ministerial Decree issuance date of 0.11 EGP/USD. The revenues received in EGP will be applied to operating expenditures denominated in EGP or, within one week, converted to USD and transferred to the offshore operating account. The project benefits from a revenue tail of three years by which the PPA terms exceed the bond tenor. The TA confirmed that revenues were above P50 for all plants from Nov 2020 until Oct 2021. Even though the PPA does not provide for full offshore arbitration, arbitration in the event of a dispute will be in accordance with the rules of the Cairo Regional Centre for International Commercial Arbitration (CRCICA), and held at a venue in Cairo (Egypt), but the courts of Paris will be the exclusively competent courts in case of any action for annulment of the arbitration award
	Economic fundamentals	**Average**	The project benefits from exceptionally strong solar irradiance year-round thanks to its location in the Aswan region in the Eastern Sahara desert. The project is part of the 1.8GW Benban solar PV cluster, which is one of the largest in the world. The project contributes to Egypt's long-term energy strategy of meeting increasing demand, diversifying its national energy mix from its historically high reliance fossil fuels, and improve the environmental and climate footprint of the power sector (ESG factor). The project's high reliance on the feed-in tariff granted under the power purchase agreement with EETC constrains its economic fundamentals.
	Supply / Reserve risk	**Very low**	Resource risk is very low due to the excellent quality and low variability solar resource.
	Supplier risk	**Very low**	There is no counterparty risk to any key input supplier because the project's key input is solar irradiation.

Risk area	Risk factor	Score	Comment
	Offtaker risk	**Average**	The credit quality of the offtaker EETC and its guarantor the Egyptian Ministry of Finance is weak (Scope has assigned a private rating to the Republic of Egypt). However, the subordinated, revolving liquidity facility of USD 30m by EBRD (rated AAA by Scope) partially mitigates offtaker default risk because the facility can be drawn to cover debt service and prevent a payment default if the offtaker or the MoF fail to make payments under the PPAs. The liquidity facility is sized to cover up to three years of debt service and can also be drawn if the bonds are accelerated. Termination provisions of the PPAs are satisfactory: termination compensation fully covers all outstanding senior debt in all circumstances in which the project has to be transferred to EETC, including an EETC default on its obligations and prolonged force majeure events. The project's strategic importance as part of the Benban solar cluster in Egypt's energy strategy as well as the explicit guarantee of the Ministry of Finance strongly incentivise EETC to perform its obligations under the power purchase agreement. While the MIGA political risk insurance does not prevent a potential default as it can only be triggered upon a breach of contract, it substantially reduces the severity and hence the expected loss contribution of such events.
Financial strength PDS bbb-	Debt repayment	**Low**	Debt repayment risk is low because of low expected cashflow volatility in combination with solid minimum DSCR of 1.29x (2025) and average DSCR of 1.44x in Scope's rating case. The PLCR of 1.31x and LLCR of 1.27x are acceptable, reflecting a modest revenue tail of three years following the debt maturity. A six-months debt service reserve account and the EBRD liquidity facility provide substantial liquidity support, allowing debt service to continue for up to three years in the event of a payment disruption under the PPAs. Our rating case assumes P90 energy yield, 98% availability, 0.40% p.a. module degradation, a -2.4% compound annual growth rate in the EGP/USD exchange rate (i.e. a depreciation of the Egyptian pound against the US dollar), an average US CPI inflation of 2.8%, and operational expenditures of USD 8.05ct/MWp.
	Sensitivity to cash flow stress scenarios	**Average**	The project could sustain tariff or availability losses of 22% (break-even point). Scenario analysis demonstrates the project's resilience against inflation and FX risk: a 5% p.a. depreciation of EGP/USD in combination with a 5% p.a. increase in US CPI would have a moderate impact on the project's credit metrics (minimum DSCR of 1.27x in 2041). The project's resilience to operational expenditure volatility is satisfactory: opex (fixed, variable and insurance) could increase 100% before triggering a payment default.
	Inflation, interest rate and FX risk	**Average**	The project has modest direct exposure to inflation risk in Egypt because most opex are denominated in US dollars. However, some risk exposure to foreign exchange rate fluctuations and EGP depreciation in particular is present because 30% of PPA revenues are pegged to the historical EGP/USD exchange rate effective on the signing date of the PPAs. Interest rate risk is low because of the fixed rate loans and the required hedge ratio of 70-100% of the floating rate loans.
	Refinancing risk	**Very low**	Refinancing risk is negligible because the bonds are fully amortising until maturity.
	Counterparty risk	**Low**	Financial counterparty exposure is immaterial. The onshore security trustee is Banque Misr (rated B+/B by reputable CRAs). The offshore security trustee is BNY Mellon (rated AA-/A/A1 by reputable CRAs). The DSRA and MRA accounts are with BNY Mellon. Cash that is not needed by the opcos to pay EGP-denominated opex will be converted to USD and transferred to BNY Mellon periodically.

Risk area	Risk factor	Score	Comment
Project structure and other PDS bb	Financing and legal framework, compliance	**Low**	The financial and legal framework conforms to international project finance standards. The security package is comprehensive, covers all material project assets, and includes direct agreements with all major project parties. All opcos as well as the holdco will cross-guarantee each other's obligations and cross-default provisions will apply for each of the opco loans. Further to the security documents, MIGA insures 95% of the fixed rate bonds for political risks including transfer & convertibility, expropriation, war & civil disturbance, and breach of contract. A USD 30m credit enhancement facility by EBRD protects additional protection in an event of default or termination of the PPAs. The PPA's termination provisions include a change in law clause, which triggers a purchase obligation by EETC if a specific change in law targets the project to its detriment. Creditors benefit from strong financial covenants including a consolidated lock-up DSCR of 1.20x and default DSCR of 1.10x (backward- and forward-looking, respectively), which is higher than usual. The financing and offshore security documents are governed by English law, whereas the onshore security documents are subject to Egyptian law.
	Country risk	**High**	The Egyptian sovereign has weak credit quality, which is mainly due to wide fiscal and current account deficits, low per-capita income, and weak governance indicators, geopolitical risks and uncertainty over the country's political transition. While particularly transfer & convertibility risks and the risk of expropriation are concerns in Egypt which could lead to short-term disruption, the political risk insurance cover by MIGA substantially reduces the expected severity of such events for fixed rate bondholders.
	Events and force majeure risk	**Average**	Egypt is in seismic zone A2, which was taken into consideration in the structural design of the plants. The risks of flooding, sand dune movement, and archaeological findings are minimal according to the TA. Governmental force majeure events (including war, change in law, expropriation) allow the project to terminate the PPA and require EETC to purchase the facilities or compensate the project for lost sales. If a force majeure event other than governmental prevents EETC from physically taking delivery of power, electricity will be calculated and paid for on a "deemed delivered" basis. Marsh, the lenders' insurance adviser, has confirmed the general suitability of the insurance package. However, Marsh recommended certain improvements to ensure compliance with lenders' requirements. In particular, the property damage & business interruption insurances include a "special deductable" of 30% the indemnity otherwise payable if the safety regulations have not been observed. Marsh considers this unusual, onerous and recommends its removal at the earliest opportunity. The opcos and the insurer have initiated the process for this removal.

Source: Scope.

3.1. Probability of hard default

This instrument faces a lifetime 2.25% probability of hard default, equivalent to a one-year probability of hard default of 0.09%. We derived the lifetime probability of hard default considering the likelihood of credit impairment events combined with the probability of incomplete recoveries after restructuring events (i.e. 32.63%).

4. Severity of credit impairment events

We calculated a total expected recovery rate of 82.6584% on credit impairments for the project. The total expected recovery rate is the probability-weighted average recovery rate of all 16 credit impairment events considered under our project finance rating methodology (see Figure 9).

Top three credit impairment events

We performed a detailed estimation of the expected severity of the three credit impairment events that are most relevant for investors. These are: i) Revenue deterioration; ii) Inflation, interest or currency issues; and iii) Country or political issues (see Figure 11). These three credit impairment events together contribute 25.9% of the EL for investors.

We analysed all other credit impairment events using standard recovery assumptions and applied adjustments to reflect the project's specific characteristics. These adjustments are based on the instrument' seniority, coupon, repayment profile, and project-specific recovery risk factors, which are further detailed in section 4.2.

4.1. Severity analysis of most relevant credit impairment events

We performed a fundamental analysis of the expected recovery rate for the most relevant credit impairment events by stressing cash flows to investors using the project's financial model.

We stressed the key inputs to the project's financial model based on the conditions implied by the respective credit impairment event. We derived the expected recovery rate by calculating the net present value of all cash flows available for debt service under the assumptions of the respective most relevant credit impairment event.

Figure 11: Most relevant credit impairment events

	Name	Driver	E{RR}
Top event 1	**Revenue deterioration**	Lower availability or higher power generation losses could decrease the project's revenues and lead to a credit-impairment event.	81.8%
Top event 2	**Inflation, interest or currency issues**	A substantial depreciation of the Egyptian pound and/or a rise in US CPI could lead to a credit-impairment event.	77.6%
Top event 3	**Country or political issues**	The Egyptian government could decide to change relevant laws, expropriate, or restrict the expatriation of funds of the project, leading to a credit-impairment event.	95.0%

Source: Scope.

4.1.1 Revenue deterioration

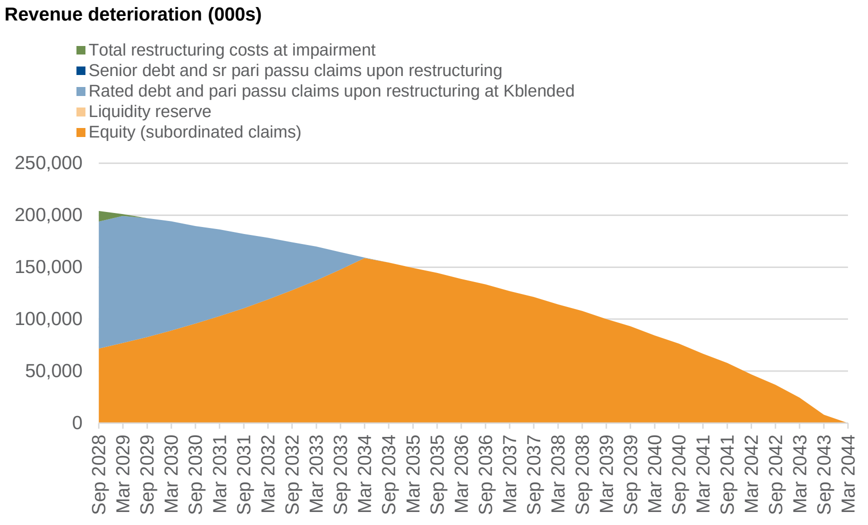
Revenue deterioration accounts for 6.3% of the total EL…

We expect a recovery rate of 81.8% on the instrument upon impairment owing to Revenue deterioration events. The EL contribution from such events is 0.08% (EL strength: a-) over the senior instrument's 8.76-year expected risk horizon. This represents 6.3% of the senior instrument's total EL of 1.20%.

We derived the recovery rate under stress from cash flow analysis. The analysis yields a recovery rate of 81.6% and based on a Project sale scenario with a stressed capital structure upon restructuring of 63.06% and cost of debt and equity of 7.89% and 15.00%, respectively. The recovery analysis assumes the repayment of claims via Sweeps. We assumed P99 production and 78% availability in 2028, 81% in 2029, 84% in 2030, 87% in 2031, 90% in 2032, and 99% from 2033 onwards.

Figure 12 shows how the claims on the stressed project value are distributed.

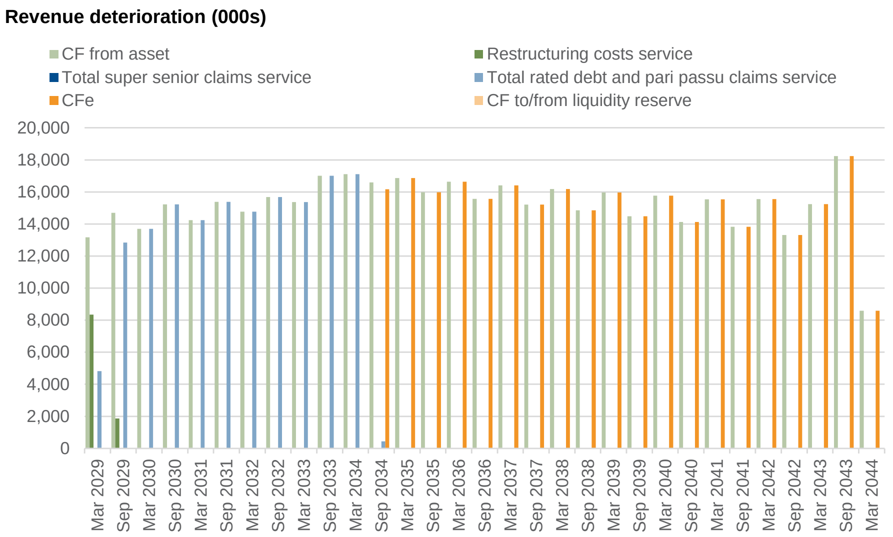
Figure 12: Evolution of restructuring claims on stressed project value



Source: Scope.

Figure 13 shows the cash flows allocated to the stakeholders of the project after restructuring.

Figure 13: Cash flows from restructuring claims to stressed project value



Source: Scope.

4.1.2 Inflation, interest or currency issues

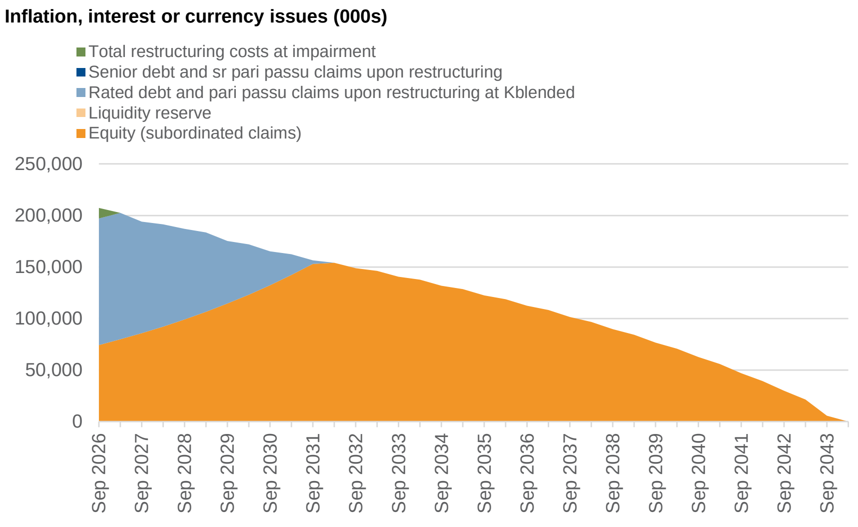
Inflation, interest or currency issues contribute 8.9% of the total EL…

We expect a recovery rate of 77.6% on the instrument upon impairment owing to Inflation, interest or currency issues events. The EL contribution from these events is 0.11% (EL strength: bbb+) over the senior instrument's 8.76-year expected risk horizon. This represents 8.9% of the senior instrument's total EL of 1.20%.

We derived the recovery rate under stress from cash flow analysis. The analysis yields a recovery rate of 77.3% and assumes a Project sale scenario with a stressed capital structure upon restructuring of 62.33% and cost of debt and equity of 7.89% and 15.00%, respectively. The recovery analysis assumes the repayment of claims via Sweeps. We assumed P99 production; a 90% EGP depreciation in 2025, and a US CPI of 5% p.a. from 2025 onwards.

Figure 14 shows how the claims over the stressed project value are distributed.

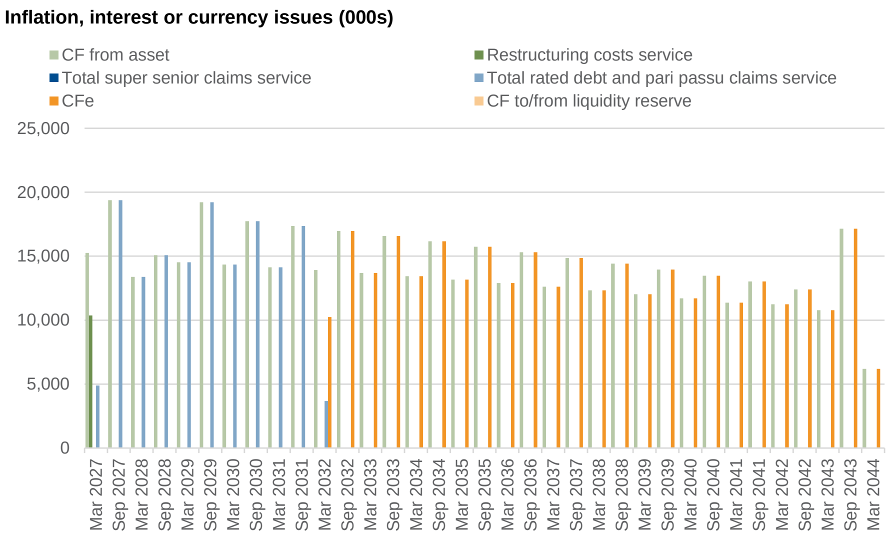
Figure 14: Evolution of restructuring claims on stressed project value



Source: Scope.

Figure 15 shows the cash flows allocated to the stakeholders of the project after restructuring.

Figure 15: Cash flows from restructuring claims to stressed project value



Source: Scope.

4.1.3 Country or political issues

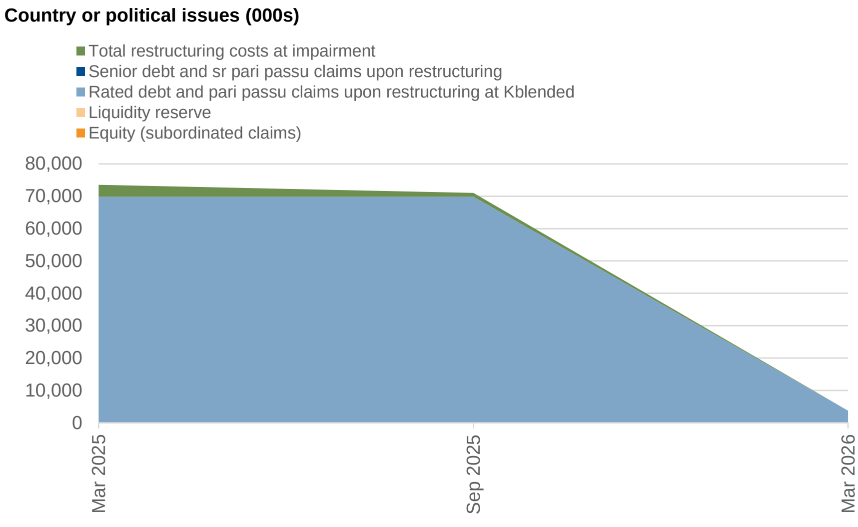
Country or political issues account for 10.7% of the total EL…

We expect a recovery rate of 95.0% on the instrument upon impairment owing to Country or political issues events. The EL contribution from these events is 0.13% (EL strength: bbb) over the senior instrument's 8.76-year expected risk horizon. This represents 10.7% of the senior instrument's total EL of 1.20%.

We derived the recovery rate under stress from cash flow analysis. The analysis yields a recovery rate of 79.3% and assumes a Project sale scenario with a stressed capital structure upon restructuring of 100.00% and cost of debt and equity of 5.26% and 5.26%, respectively. The recovery analysis assumes the repayment of claims via Sweeps. We have assumed an expropriation event triggering a termination of the PPAs in 2025. The compensation payment is covered by MIGA political risk insurance with a pay-out in 2026. We also assumed the coverage of two debt service payments between the PPA termination and the MIGA pay-out by drawdowns under the EBRD credit enhancement facility. The maximum recovery is capped at 95% according to our methodology.

Figure 16 shows how the claims over the stressed project value are distributed.

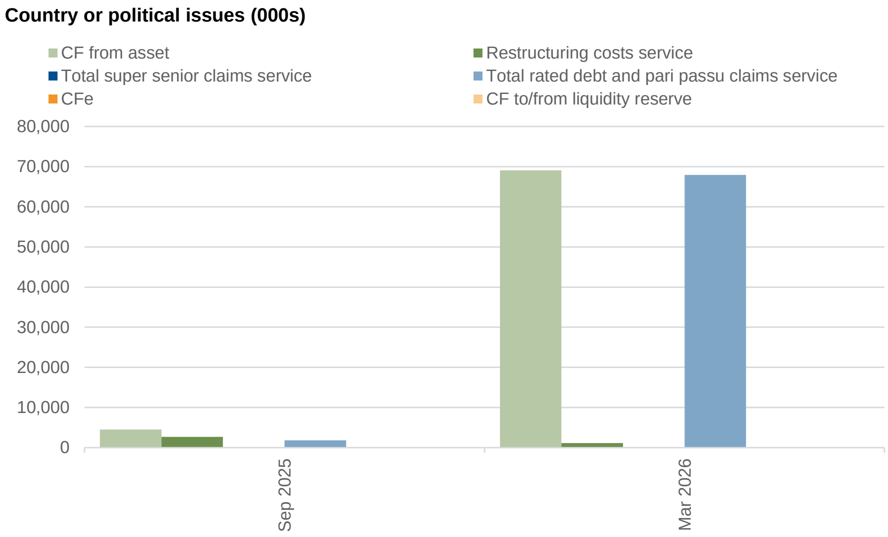
Figure 16: Evolution of restructuring claims on stressed project value



Source: Scope.

Figure 17 shows the cash flows allocated to the stakeholders of the project after restructuring.

Figure 17: Cash flows from restructuring claims to stressed project value



Source: Scope.

4.2. Severity analysis of standard credit-impairment events

We analysed all other credit impairment events using our standard recovery distribution assumption for each type of event. We assigned the project our 'Higher-asset-value resilience' assumptions as defined in our General Project Finance Methodology. The project's stable and predictable cash flows, underpinned by the high reliability of the solar resource and the absence of price risks, support its high asset-value resilience under stress. Political risk insurance by the Multilateral Investment Guarantee Agency (MIGA) protects the project from a termination of the power purchase agreement leaving the asset stranded.

To calculate expected recovery rates specific to the rated instrument (i.e. tranche-specific recovery rates), we adjusted the standard recovery rate distribution for each event to capture the project's capital structure (section 4.2.1) and assessed the project's specific recovery strength (section 4.2.2).

4.2.1 Seniority and leverage of rated exposure

We adjusted each recovery rate distribution to incorporate the protection to investors resulting from the seniority and leverage of the rated instrument at the expected impairment times. We estimate a protection by subordination of 19.45% during construction, with a detachment point of 100.00%. We estimate a protection by subordination of 31.99%, and a detachment point of 100.00%, at the expected time of impairment during operation and have used these values to calculate the expected recovery rates. We calculate the first-loss protection buffer using the financial balance sheet (i.e. based on the present value of future cash flows) rather than the accounting balance sheet.

4.2.2 Recovery risk factors

We then adjusted the standard recovery assumptions to the specific characteristics of the rated instrument. The analysis of the recovery risk factors resulted in a haircut of 4.6% to the expected tranche-level recovery rates derived from the previous steps.

We assessed the project's specific recovery strength by applying the recovery risk factors shown in Figure 18.

Figure 18: Recovery risk factors

Recovery risk factor	Recovery score	Assessment
Project security	**Average**	The underlying loans' security package is comprehensive and includes share pledges, bank accounts, pledges of movable and immovable assets, direct agreements in relation to the PPAs and usufruct agreements, and step-in rights with respect to all major project contracts. Bondholders further benefit from MIGA political risk insurance, which covers 95% of the bonds' outstanding balances in respect of transfer & convertibility restrictions, expropriation, war & civil disturbance, and breach of contract with respect to the PPAs. The subordinated EBRD credit enhancement facility provides further support if the bonds are accelerated in a PPA termination event.
Collateral enforceability	**Average**	Arbitration in the event of a PPA termination dispute will be in accordance with the rules of the Cairo Regional Centre for International Commercial Arbitration at a venue in Cairo, Egypt. However, the courts of Paris will be the exclusively competent courts in case of any action for annulment of an arbitration award. The EBRD credit enhancement facility is sized to cover service debt for up to three years, partially mitigating the risk of prolonged arbitration proceedings hampering timely enforcement. Furthermore, MIGA could decide to make provisional payments ahead of an arbitration award in its sole discretion. The financing and security documents are governed by English law, whereas the PPAs and local security interests such as pledges are governed by Egyptian law.
Recovery enhancements	**Low**	The PPA provides that if there is a termination for EETC default or prolonged governmental force majeure the borrower may require EETC to purchase the power plant for a purchase price that covers the senior debt in full. The same price will apply if EETC were to terminate the PPA for prolonged other force majeure. The purchase price must be paid in US dollars. The MIGA political risk insurance and the EBRD credit enhancement facility

		mitigate the risk of EETC and the Egyptian Ministry of Finance failing to pay the purchase price.
Fundamental economic value of the project	**High**	The project's fundamental economic value implies moderate excess value over debt to enhance expected recovery prospects on a standalone basis (i.e. before considering recovery enhancements including political risk insurance), as reflected in the relatively modest PLCR of 1.31x in our rating case.

Source: Scope

4.3. Recovery rate on hard defaults

The expected recovery upon a hard default of the rated instrument is 46.85%. This hard recovery rate is linked to the probability of hard defaults reported in section 3.1 (i.e. 2.25%). We derived this value by considering that the EL to the investor in the rated instrument (i.e. 1.20%) is constant, irrespective of the definition of the event of default considered in the analysis.

5. Rating stability

The rating is resilient to sizeable changes in assumptions

This section shows the sensitivity of the rating to changes in the input assessments as considered by the analysts. This analysis has the sole purpose of illustrating the sensitivity of the rating to input assumptions and is not indicative of expected or likely scenarios. Figure 19 shows how the model-implied rating changes for each rating-sensitivity scenario.

Figure 19: Sensitivity results

Analytical assumption tested	Shifts considered to inputs	Result
Rating case	No shifts	BBB+
General stress to all risk factors in all areas	Scores reduced by one level	BB+
Shock stress to the risk area with the most relevant credit impairment event	Scores driving risk area of most-relevant credit impairment event (i.e. Revenue deterioration) reduced by two levels	BB+
Haircut to recovery	25% haircut to recovery assumptions	BBB-

Source: Scope

6. ESG grid

We analysed ESG risks by examining risk factors (section 3) and recovery risk factors (section 4) of the project. The relationship between credit risk and ESG factors is not direct because ESG factors only impact the performance of a project indirectly and in ways that can be opposite for two given projects. Investors should consider ESG as a different and separate dimension with respect to which a project should be analysed.

The ESG grid in Figure 20 highlights how ESG themes within the three ESG pillars (environmental, social and governance) influence the credit risk of this project and whether they do so in a positive (i.e. less credit risk for the project) or negative way (i.e. more credit risk for the project). Our ESG grid promotes transparency in credit analysis and shows how credit risk relates to relevant ESG themes.

Figure 20: Project ESG grid

Environmental	Social	Governance
Air pollution and GHG emissions	Employment and labour management	Management, supervision and anti-corruption
Energy efficiency	HSE management	Governance system
Hazardous substances and waste	Social value, affordability, local community relations, human rights	Financial structure complexity
Material sourcing and resource management	Customer stewardship and personal data privacy	Reporting and transparency
Physical risks	Regulatory, reputational and social resistance risks	Political risks, lobbying and public relationships

Source: Scope.

With regards to the environmental pillar: Considerations regarding the Air pollution and GHG emissions ESG theme are a credit positive for the project. The rated bond is a green bond that meets the criteria defined by the Climate Bonds Standard Board on behalf of the Climate Bonds Initiative, certified by DNV. In its annual Environmental and Social Monitoring Report 2021, the issuer confirmed that the projects have avoided 486k tonnes of actual GHG emissions. The projects support Egypt's strategic objectives to diversify and decarbonise its energy generation mix. Considerations regarding the Energy ESG theme are a credit positive for the project. The project is important for Egypt's strategic commitment to decrease its dependence on fossil fuels by 42% by 2050. The project contributes to Egypt's aim to increase the share of renewable energy in its generation mix as part of the Benban solar cluster, the largest solar park in the country and one of the largest in the world. Considerations regarding the Hazardous substances and waste ESG theme are neutral for the project; Considerations regarding the Material sourcing and resource management ESG theme are neutral for the project; Considerations regarding the Physical risks ESG theme are neutral for the project;

With regards to the social ESG pillar: Considerations regarding the Employment and labour management ESG theme are neutral for the project; Considerations regarding the HSE management ESG theme are neutral for the project; Considerations regarding the Social value, affordability, local community relations, human rights ESG theme are neutral for the project; Considerations regarding the Customer stewardship and personal data privacy ESG theme are neutral for the project; Considerations regarding the Regulatory, reputational and social resistance risks ESG theme are neutral for the project;

With regards to the governance pillar: Considerations regarding the Management, supervision and anti-corruption ESG theme are neutral for the project; Considerations regarding the Governance system ESG theme are neutral for the project; Considerations regarding the Financial structure complexity ESG theme are neutral for the project; Considerations regarding the Reporting and transparency ESG theme are neutral for the project; Considerations regarding the Political risks, lobbying and public relationships ESG theme are neutral for the project;

7. Legal framework

We believe that these agreements will be legal, valid, binding and enforceable. Scope expects that this will also be supported by the opinion of the legal counsel of the investors, a reputable multinational legal firm. Scope further assumes that the transaction will conform to international standards and supports our general legal analytical assumptions (see Legal Risks in Project Finance – Analytical Considerations, dated April 2020 and available in www.scoperatings.com).

8. Monitoring

Scope analysts are available to discuss the rating analysis

We will monitor the rating over the life of the rated instrument. Our monitoring analysis will be based on the construction reports produced during the construction phase; the payment and performance reports to be provided periodically by the management company during the operational phase; and any other available information such as financial accounts and compliance certificates. The rating will be monitored continuously and will be reviewed on an annual basis, or upon occurrence of any events affecting the project's creditworthiness.

Scope analysts are available to discuss all the details surrounding the rating analysis and are available to discuss the ongoing monitoring of the transaction.

9. Applied methodology and data

We applied the analytical framework described in our General Project Finance Rating Methodology, dated November 2021, downloadable from www.scoperatings.com.

The information supporting our rating analysis was adequate. We used internal and external data sources for the rating of this transaction. We received from MUFG Securities EMEA plc information about the project, including the borrower's financial accounts, incorporation documents, material project contracts; as well as due diligence reports; financial and security documents; legal opinions; and the transaction's financial model.

Appendix I Likelihood and expected recovery of credit impairment events

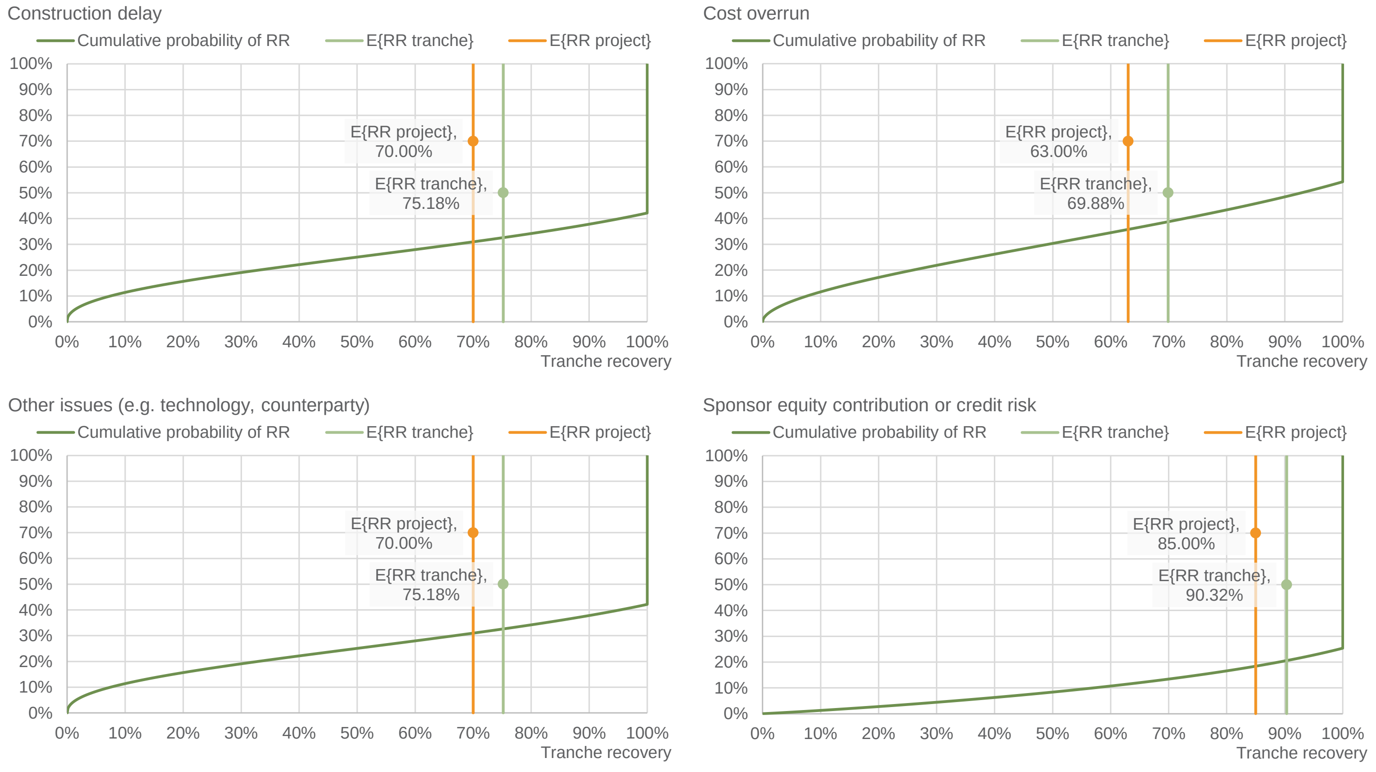
Event	Probability	Expected recovery	EL contribution
Construction delay	0.00%	38.70%	0.0000%
Cost overrun	0.00%	35.97%	0.0000%
Other issues (e.g. technology, counterparty)	0.00%	38.70%	0.0000%
Sponsor equity contribution or credit risk	0.00%	46.49%	0.0000%
Operational performance, budget and schedule issues	0.32%	76.55%	0.0756%
Lifecycle issues	0.26%	75.52%	0.0637%
O&M counterparty issues	0.53%	75.99%	0.1277%
Revenue counterparty issues (fin. or tech. performance)	0.66%	73.51%	0.1758%
Revenue deterioration	0.41%	81.82%	0.0754%
Supply interruptions or reserve issues	0.13%	74.75%	0.0339%
Inflation, interest or currency issues	0.48%	77.59%	0.1065%
Refinancing issues	0.24%	75.19%	0.0593%
Debt repayment or cash flow liquidity issues	0.38%	76.04%	0.0907%
Country or political issues	2.55%	95.00%	0.1275%
Force majeure or events issues	0.67%	72.15%	0.1868%
Legal or environmental or compliance issues	0.25%	71.23%	0.0723%
No credit impairment events	93.11%	100%	0%
TOTAL FOR RATED EXPOSURE	6.89%	82.66%	1.20%

Source: Scope.

Appendix II Recovery distributions under all impairment events

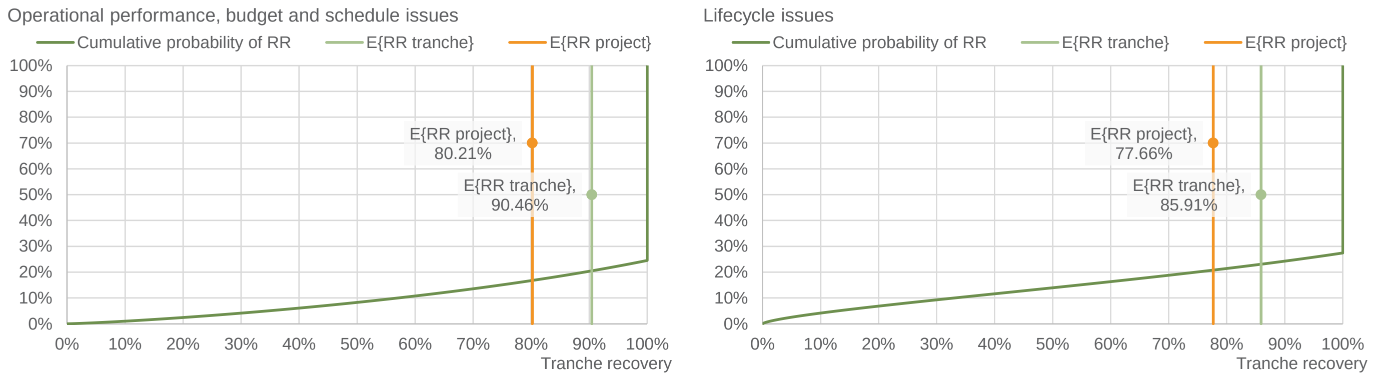
The following charts show the recovery distributions we assumed for the analysis of the expected recovery of the rated instrument under the different credit impairment events considered in our methodology. The charts also show the expected recovery at the project level and rated-tranche level to illustrate how the capital structure influences recovery. The recoveries shown in these charts are before adjustments to consider the recovery characteristics of this project, and before adjustments for time-value of money and credit for amortisation.

Figure 21: Recovery distributions under construction credit impairment events

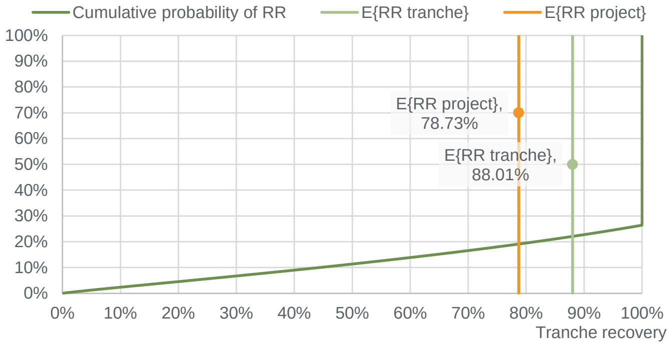


Source: Scope

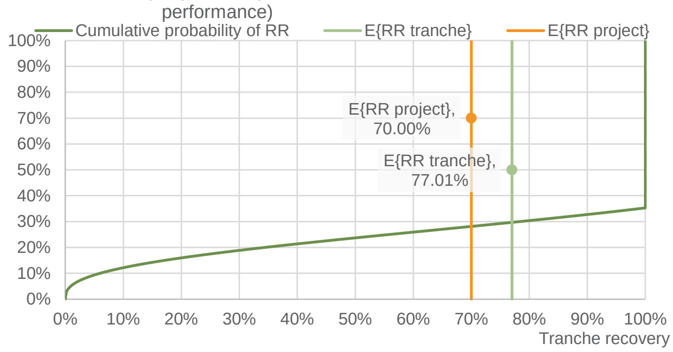
Figure 22: Recovery distributions under operational credit impairment events



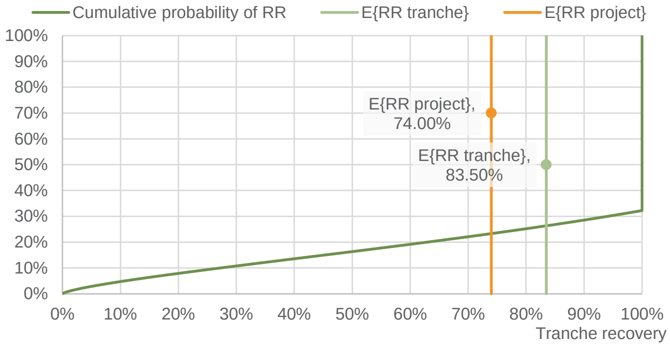
O&M counterparty issues



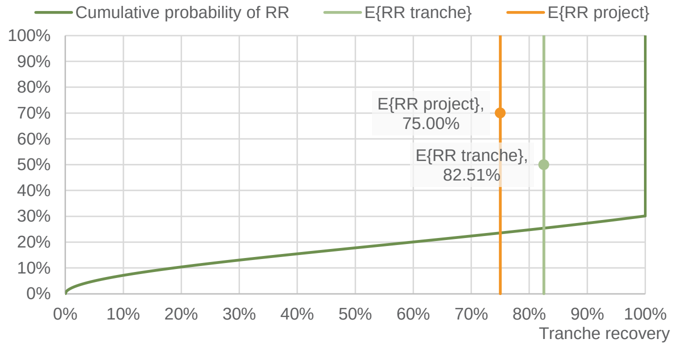
Revenue counterparty issues (financial or technical performance)



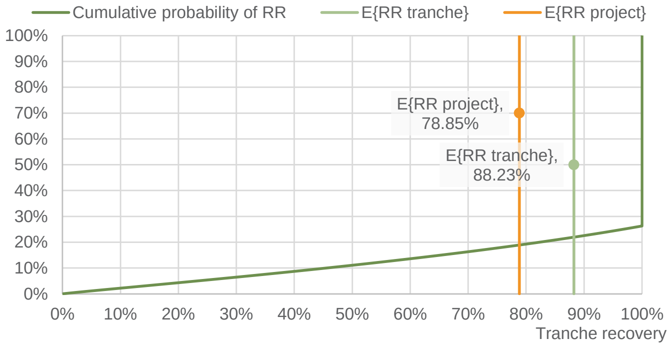
Revenue deterioration



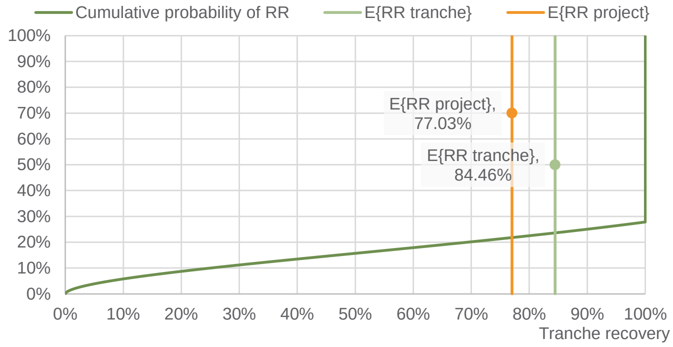
Supply interruptions or reserve issues



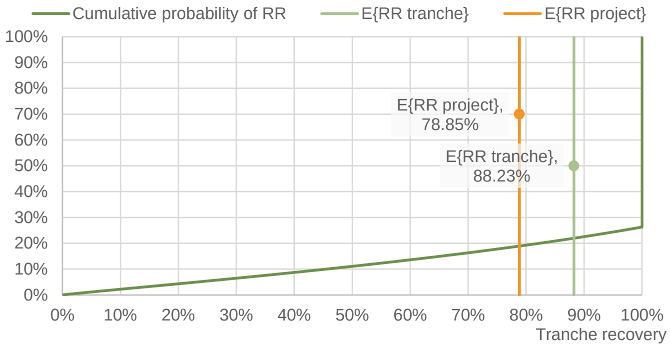
Inflation, interest or currency issues



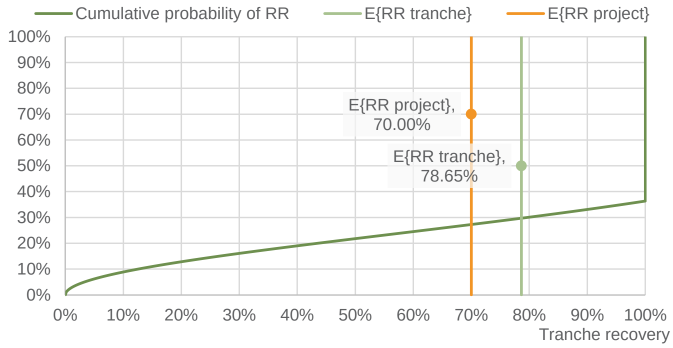
Refinancing issues



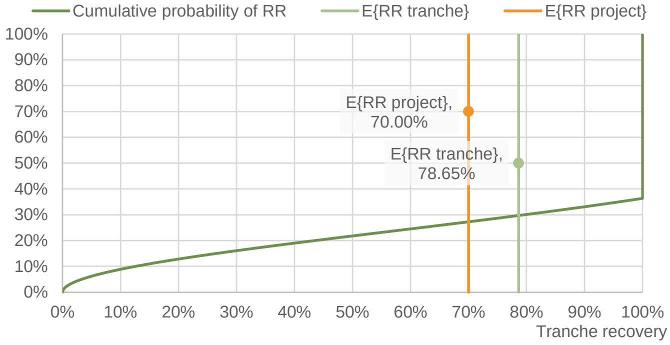
Debt repayment or cash flow liquidity issues



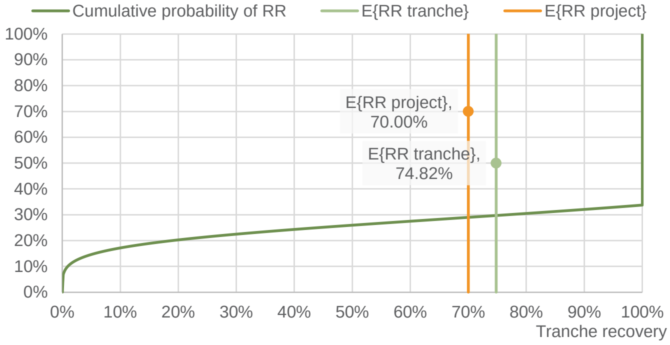
Country or political issues



Force majeure or events issues



Legal, environmental or compliance issues



Source: Scope

Scope Ratings GmbH

Headquarters Berlin
Lennéstraße 5
D-10785 Berlin

Phone +49 30 27891 0

Frankfurt am Main
Neue Mainzer Straße 66-68
D-60311 Frankfurt am Main

Phone +49 69 66 77 389-0

Paris
23 Boulevard des Capucines
F-75002 Paris

Phone +33 6 62 89 35 12

Oslo
Karenslyst allé 53
N-0279 Oslo

Phone +47 21 62 31 42

Madrid
Paseo de la Castellana 141
E-28046 Madrid

Phone +34 91 572 67 11

Milan
Via Nino Bixio, 31
20129 Milano MI

Phone +39 02 30315 814

Scope Ratings UK Limited
52 Grosvenor Gardens
London SW1W 0AU

Phone +44 20 7824 5180

info@scoperatings.com
www.scoperatings.com

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