INTRODUCTION

Engineering, Procurement and Construction ("EPC") Contracts are the most common form of contract used to undertake construction works by the private sector on large scale and complex infrastructure projects. Under an EPC Contract, a contractor is obliged to deliver a complete Facility to a developer who need only ‘turn a key’ to start operating the Facility; hence EPC Contracts are sometimes called turnkey construction contracts. In addition to delivering a complete Facility, the contractor must deliver that Facility for a guaranteed price by a guaranteed date and it must perform to the guaranteed level. Failure to comply with any requirements will usually result in the contractor incurring monetary liabilities.

Due to the flexibility, the value and the certainty derived to sponsors and lenders, EPC Contracts are being used as the main form of construction contract by project sponsors bidding for projects under South Africa's Renewable Energy Independent Power Producer ("RE IPP") Procurement Programme.

This paper is set out in two parts. Part 1 outlines the current context of renewable energy policy and legislation in South Africa, the basic features of the renewable energy technologies, lessons learned from the lenders' bankability requirements and other key issues arising in relation to EPC Contracts in the context of the RE IPP Programme. Part 2 sets out the key features of EPC Contracts in the context of renewable energy projects more broadly.

PART 1 - RENEWABLE ENERGY IN SOUTH AFRICA AND THE RE IPP PROGRAMME

Policy context

On 17 March 2011, the South African Government approved the Integrated Resource Plan 2010 ("IRP") for electricity. The IRP outlines the Government's plan to increase South Africa's total installed electricity capacity from 260 TWh in 2010 to 454 TWh in 2030, an increase of more than 170% over the 20 years. Of this amount,
42% of the new installed capacity is planned to be sourced from renewable energy. The Government’s key policy mechanism for achieving the targeted amount of installed capacity of renewable energy is the RE IPP Programme.

**RE IPP Programme - overview**

Under the RE IPP Programme, Bidders submit Bid responses to construct and operate renewable energy projects and sell power to Eskom.

The renewable energy technologies comprising the RE IPP Programme, and their envisaged split, are set out below:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Proposed amount</th>
<th>Percentage allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore wind</td>
<td>1850MW</td>
<td>49.7%</td>
</tr>
<tr>
<td>Concentrated Solar Power</td>
<td>200MW</td>
<td>5.3%</td>
</tr>
<tr>
<td>Solar Photovoltaic</td>
<td>1450MW</td>
<td>38.9%</td>
</tr>
<tr>
<td>Biomass</td>
<td>12.5MW</td>
<td>0.3%</td>
</tr>
<tr>
<td>Biogas</td>
<td>12.5MW</td>
<td>0.3%</td>
</tr>
<tr>
<td>Landfill gas</td>
<td>25MW</td>
<td>0.7%</td>
</tr>
<tr>
<td>Small hydro (&lt;10MW)</td>
<td>75MW</td>
<td>2%</td>
</tr>
<tr>
<td>Small Projects IPP (max MAW)</td>
<td>Total threshold of 100MW</td>
<td>2.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3725MW</strong></td>
<td></td>
</tr>
</tbody>
</table>

Each of the renewable energy technologies comprising the RE IPP Programme have a set minimum capacity and maximum installed capacity.

The RE IPP Programme is comprised of five phases, pending subscription by Bidders of the total allocation of MW for each technology. All allocations for each form of technology are made available during the each Bid submission phase. Where an allocation is undersubscribed, the remaining MW will be made available to Bidders in the following phase.

The First Bid Submission Date was 4 November 2011 and the first selection of 28 Preferred Bidders was announced at COP 17 in Durban on 7 December 2011. Preferred Bidders were initially required to finalise all of their contractual arrangements by 22 May 2012 and to reach financial close by 19 June 2012. However, the date for financial close has subsequently been extended and remains outstanding, with Preferred Bidders requested to extend their Bid validity period until the end of October 2012.

The Second Bid Submission Date was 5 March 2012, and 19 Preferred Bidders were announced on 21 May 2012. Preferred Bidders were initially required to reach financial close by December 2012, but this date has been extended to 18 - 28 March 2013. The Third Bid Submission Date has also been extended from 1 October 2012 to 7 May 2013.

**RE IPP Programme - proposed update**

It has been recently reported that the DOE is proposing to procure an additional 3200 MW of renewable energy capacity by 2020, over and above the 3725 MW being procured currently under the RE IPP Programme.

On 9 October 2012, Engineering News reported:

*Addressing a South Africa-Spain Business Summit in Johannesburg, Department of Energy (DoE) acting chief director Thabang Audat said the proposal had been sent to the National Energy Regulator of South Africa (Nersa) for its concurrence on the additional allocation.*

*He was unable to provide details as to how the new allocation would be divided between the various renewables technologies, but said this breakdown would be provided in a Ministerial determination, which would be published in Government Gazette within seven working days of Nersa’s concurrence.*

*The new renewables allocation meant that there would now be more than 4 360 MW of capacity available for future bidding rounds, with the next round scheduled to close in May, 2013.*

*Prior to this extension only 1 165.6 MW of capacity remained unallocated under the REIPPP, following two bidding rounds during which a total of 47 projects were named as preferred bidders.*

**Technologies utilised under the RE IPP Programme**

**Wind Farm Projects**

A wind farm typically comprises a series of wind turbines, a substation, cabling (to connect the wind turbines and substation to the electricity grid), wind monitoring equipment and temporary and permanent access tracks. The wind turbines used in commercial wind farms are generally large slowly rotating, 3 bladed machines that typically produce between 1.5 MW and 3 MW of output. Each wind turbine is comprised of a rotor, nacelle, tower and footings. The height of a tower varies with the size of the generator but can be as high as 100m. The number of turbines depends on the location of the wind farm and capacity of the turbines.
The amount of power a wind generator can produce is dependent on wind availability and speed. The term “capacity factor” is used to describe the actual output of a wind energy Facility as the percentage of time it would be operating at maximum power output.

Wind farms need to be located on sites that have strong, steady winds throughout the year, good road access and proximity to the electricity grid.

**Solar Projects**

Solar energy projects can be divided into two broad categories, solar photovoltaic ("PV") and concentrated solar power ("CSP").

Solar PV projects utilise power PV cells which are assembled to form solar PV panels or modules that are then lined up in solar arrays. PV cells convert sunlight into electric current using the photoelectric effect. Most solar arrays use an inverter to convert the DC power produced by the solar panels into AC power that can power lights, motors and other loads.

Solar PV plants can use either fixed-mount solar arrays, or automated tracking systems that allow the solar arrays to follow the sun’s daily path across the sky to generate more electricity. A solar PV plant typically comprises a series of solar arrays and inverters, a substation, cabling (to connect the solar arrays and substation to the electricity grid), monitoring equipment and temporary and permanent access tracks.

CSP projects use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. There are four common concentration technologies, namely:

- parabolic troughs;
- dish Sterlings;
- concentrating linear Fresnel reflectors; and
- solar power towers.

The concentrated heat provided by the beam is then used to heat a working fluid (commonly molten salt), which is then used for power generation or energy storage.

The amount of power a solar project can produce is dependent on the availability and intensity of sunshine. Most areas in South Africa average more than 2 500 hours of sunshine per year, and average solar-radiation levels range between 4.5 and 6.5kWh/m² per day. The annual 24-hour global solar radiation average is approximately 220 W/m² for South Africa, compared with approximately 150 W/m² for parts of the USA, and approximately 100 W/m² for Europe and the United Kingdom. This makes South Africa’s solar resources among the best in the world.

**Biomass, biogas and landfill gas**

Biomass is biological material derived from living organisms, and, in the context of power production, can take the form of forestry residues and wood, agricultural and livestock residues (including straw and animal slurries), sewage wastes, sugar, grains, oils, seeds, and black liquor from paper manufacture.

Energy from biomass is produced through conversion technologies that release energy directly (as heat or electricity), or convert it into another form such as liquid biofuel or biogas. Conversion of biomass may occur through thermal (using heat), chemical, or biochemical processes (using microorganisms). For example, biogas can be produced from an anaerobic digester plant using an air-tight tank containing microorganisms which digest slurry biomass and produce gaseous fuel.

Landfill gas utilisation is the process of processing landfill gas (produced by the degradation of municipal solid waste) into electricity, heat or other fuels. Methane gas produced by landfills must be collected and treated before it can be used for electricity production. Collecting the landfill gas involves extraction through vertical extraction wells or horizontal trenches, from which the gas is then piped to a main collection header before being treated. Treatment of landfill gas occurs via primary and secondary processing systems that remove moisture, particulates and other constituents. Landfill gas can be used for electricity production using an internal combustion engine, gas turbine, microturbine or fuel cell.

**Small hydro**

Hydro facilities are projects that generate electric power from the movement of water. To generate electricity from water, there must be a dependable flow and sufficient distance over which the water can fall ("head"). In a hydro plant, water feeds from a reservoir through a channel or pipe into a turbine, and the turbine shaft will rotate as pressure from the water builds. The motion of the shaft is converted into electricity via a generator.

A Facility is considered to be ‘small hydro’ if its generation capacity is relatively low (typically 10MW or less). Small hydro projects may utilise existing dams and abandoned hydro sites. ‘Run-of-the-river’ hydro projects, whereby a river’s flow is diverted through a pipe or tunnel leading to electricity-generating turbines and then returned back to the river downstream, may also be used.

**Contractual structure for projects under the RE IPP Programme**

An overview of the typical contractual structure for a project financed renewable energy project is set out in
Part 2. The outline below relates specifically to the contractual structure used under the RE IPP Programme. Under the RE IPP Programme, Bidders are also required to submit as part of their Bid the detailed heads of terms of the contracts that they would enter into with their contractors, equipment suppliers and other subcontractors if selected as a Preferred Bidder. In most cases this will be comprised of a detailed heads of terms for an EPC Contract and an Operating and Maintenance ("O&M") Contract.

If a Bidder is selected as a Preferred Bidder, it will negotiate and prepare fully termed EPC and O&M Contracts based on the detailed heads of terms submitted as part of their Bid.

Preferred Bidders will be required to enter, as project company, into the following non-negotiable agreements with the relevant counterparties in order to reach financial close and develop the Facility:

- Power Purchase Agreement ("PPA") with Eskom;
- Implementation Agreement ("IA") with the Department of Energy ("DoE");
- Transmission Agreement or Distribution Agreement (as relevant, depending on which network the Facility will connect to); and
- Direct Agreement,

(together "the Project Documents").

Key issues and 'lessons learned' under the RE IPP Programme to date

Overview

We have set out below some of the key requirements that Preferred Bidders will be required to meet as the project company under the Project Documents, including our experience of the lenders’ bankability requirements from Phase 1 and Phase 2 of the RE IPP Programme, and consider the effect of these requirements and how they may be flowed through to the relevant contractors. The terms "Buyer" and "Seller" are used below in relation to obligations set out in the Project Documents, referring to Eskom and the project company respectively. The capitalised terms used in this section relate to defined terms from the Project Documents.

Overriding pass-through of obligations from the Project Documents

To limit gaps in liability and minimise the need for additional sponsor support, project companies will seek to ensure that the EPC Contracts used in respect of RE IPP Programme projects are bankable, in particular the obligations, risks and liabilities under the PPA and other Project Documents must be passed through to the contractor to the fullest extent that is possible and commercially feasible. The overriding "pass through" principle is that the contractor must take account of the PPA and other Project Documents in performing the EPC Contract and must not put the project company in breach of those documents. The EPC Contract should provide for an acknowledgement of pass through and assumption of risks by the EPC Contractor. We recommend that the following clause be included:

"The Contractor has reviewed the terms of the Power Purchase Agreement, Implementation Agreement, [Distribution Agreement or Transmission Agreement] and Direct Agreement (Project Documents) and, subject to specific limitations agreed in this Contract; assumes those risks relevant to the Works which are assumed by the Owner under the Project Documents; will perform its obligations under the Contract in such manner as to allow the Owner to comply with its obligations under the Project Documents regarding completion of the Facility; and must not do anything to prevent or interfere with the Owner's performance of its corresponding obligations under the Project Documents."

There are three categories of obligations, risks and liabilities that should be passed through to the contractor:

- explicit obligations;
- risks or potential liabilities, but no specific obligations; and
- requirements to take certain action to allow the project and the project company to comply with the requirements of the Project Documents.

If a particular risk cannot be passed through to the contractor, the risk will need to be mitigated by some other means, such as through insurance and/or by the provision of some additional form of sponsor support.

'Pass through' and linked entitlements

Where any entitlements of the contractor arise as a result of the project company being entitled to relief under the Project Documents, including in relation to events of Force Majeure, as well as for Compensation Events, System Events or Unforeseeable Conduct, to avoid gaps in liability under the Project Documents and the need to provide additional sponsor support, the contractor's entitlement under the EPC Contract should be linked to, and limited by, reference to what the project company (as the Seller) receives under the Project Documents, rather than what the project company is or may be entitled to. We recommend that the following clause be included, subject to the project company being required to comply with the process for claiming relief under the Project Documents:
"the Contractor agrees to accept in full and final satisfaction of any Pass Through Claim, the amount agreed or determined as payable under the Project Documents."

**Force Majeure**

The definition of 'Force Majeure' under the PPA is an exclusive and relatively restrictive definition. For further discussion about force majeure clauses generally, please refer to the force majeure section in this paper below.

To minimise the risk of the project company being required to grant an extension of time to the contractor when the project company is not able to obtain relief under the PPA, the definition of force majeure in the EPC Contract should be back to back with the definition in the PPA.

In addition, given that the PPA does not provide a right to terminate for an extended force majeure, lenders will generally require that no such right to terminate is provided in the EPC Contract or, if such right is provided, that additional sponsor support is also provided.

If an event of Force Majeure occurs prior to the Scheduled COD, the PPA allows for an extension of time by postponing the Scheduled COD for 'such time as shall be reasonable for such a Force Majeure event, taking into account the likely effect of the delay' (clause 16.5).

The Seller will also be entitled to relief if, during any 12 month period, the cumulative duration of Force Majeure events or their consequences (each of which event must last 24 hours or longer) exceeds 60 or more days and the Seller is not entitled to bring a claim under any insurance policy is required to hold under the PPA in respect of those Force Majeure events. In such circumstances, clause 16.9 of the PPA provides the Seller with an entitlement to an extension of the Term and/or other relief from the Buyer to 'place the Seller in the same overall economic position as it would have been in but for such Force Majeure event', provided that any compensation must not be in monetary form and the total extension of the Term must not exceed ten years.

To avoid any gaps in liability arising, the project company should ensure as far as possible that the relief available under the EPC Contract for a Force Majeure event is back to back with the provisions of the PPA.

We recognise that this may be difficult to achieve in practice given the relatively narrow definition of Force Majeure in the PPA and the Self Build Agreement (to be discussed later in this paper).

**Compensation Event**

The definition of 'Compensation Event' under the PPA includes material breaches by the Buyer of obligations under the PPA, including failure to make payments at the relevant time.

Under clause 15.3 of the PPA, the Seller will be entitled to both an extension of time and additional costs (either additional cost incurred by the Seller before the Commercial Operation Date or capital expenditure at any time) for a Compensation Event. Relief under the EPC Contract for a Compensation Event should be back to back with this.

Under clause 15.3.2 of the PPA, the Buyer has the option to make payments for additional costs in respect of a Compensation Event in either a lump sum or by instalments. If the Buyer chooses to pay the amount in instalments, lenders will need to consider how the increased costs during construction or the additional capital costs after the Commercial Operation Date will be financed. To address this issue, we recommend that the following clause be included:

"Subject to the Contractor complying with the notice and other requirements under this Contract, to the extent that the Owner is entitled to claim relief under the Project Documents for any System Event, Compensation Event, Force Majeure and Unforeseeable Conduct, the Contractor is entitled to claim corresponding relief under the Contract mutatis mutandis, irrespective of whether or not the Owner actually claims such relief under the Project Documents, provided that where a payment must be made by the Owner to the Contractor similar to the payment contemplated in clause 15.3.2 or 17.6 of the PPA, the Owner will make payment in the manner contemplated in clause 15.3.2.2.1 or 17.6.1 of the PPA (as the case may be), and not in the manner contemplated in clause 15.3.2.2.2 or 17.6.2 of the PPA (as the case may be). Accordingly, the Owner will not be relieved from its obligations due to its failure to comply with the notice and other requirements under the Project Documents, or its failure to claim relief under the Project Documents."

**System Event**

Under clause 14.1 of the PPA, the Seller will be entitled to relief for a 'System Event', defined as delays in connecting the Facility to the grid and the unavailability of the grid. The definition of 'System Event' specifically excludes circumstances 'caused by any natural force or event'. However, the PPA does not provide any definition of the term 'natural force or event'. In addition, under clause 14.1 of the PPA, the Seller is not entitled to bring a claim in relation to a System Event unless the time that the System Event(s) have endured is greater than the Allowed Grid Unavailability Period for a Contract Year or the period...
that the Commercial Operation Date is delayed beyond the Scheduled COD.

Given that the duration of the 'Allowed Grid Unavailability Period' is not insignificant, representing 2% of the total hours available in a year, this may be a material issue and may not be able to be fully passed through to the contractor. If the contractor will not accept a full pass through of risks relating to the Allowed Grid Unavailability Period and the exemption for a 'natural force or event', the project company may be required to provide some form of sponsor support.

Under clause 14.1 of the PPA, the Seller will be entitled to both postponement of the Last COD and/or a Deemed Energy Payment for a System Event. 'Deemed Energy Payments' are defined under the PPA as an amount payable by the Buyer to the Seller in respect of Energy Output that would otherwise be available to the Buyer, but for a System Event or a Compensation Event, calculated in accordance with Schedule 6 of the PPA with reference to the Commercial Energy Rate and dependant on the period in respect of which such payment is due and payable.

The method by which the amount of the Deemed Energy Payment is determined is set out in Schedule 6 of the PPA. To the extent that this amount will not cover the contractor's delay costs during a System Event, this will become a risk to the project company which would require appropriate sponsor support.

**Unforeseeable Conduct**

The term 'Unforeseeable Conduct' under the PPA is broadly equivalent to change in law risk. Like Force Majeure, the matters included in the definition of Unforeseeable Conduct are narrower than would generally be expected and, for example, do not extend to changes in law or tax that are not discriminatory to the project. The EPC Contract should be back to back with this definition.

Under clause 17.5 of the PPA, the Seller will be entitled to compensation or relief from the Buyer to restore the general economic position of the Seller but for the Unforeseeable Conduct. This may take the form of monetary compensation or an extension of time. Note also that if the Seller benefits as a result of the Unforeseeable Conduct, the Seller will be required to pay the value of any such benefit to the Buyer.

As with a Compensation Event, the PPA provides the Buyer with the option under clause 17.6 to pay monetary compensation for Unforeseeable Conduct as either a lump sum payment or in equal monthly instalments for the remainder of the Term. Please refer to our suggested clause above in the context of Compensation Events that addresses this issue.

**Scheduled COD**

Under clause 4.6 of the PPA, for every day that the Commercial Operation Date is delayed beyond the Scheduled COD (unless the delay is due to an event of Force Majeure, System Event, Compensation Event or Unforeseeable Conduct), the Operating Period will be reduced by an additional day and the Expiry Date will be brought forward by one day. As a result, the Seller will effectively lose 2 days for each day that the Commercial Operation Date is delayed beyond the Scheduled COD.

The quantum of delay liquidated damages in the EPC Contract must factor in the total loss or revenue to the project due to the reduced number of days, and should also be reviewed by the project technical advisors.

**Achieved Capacity and Contracted Capacity**

Under clause 4.8 of the PPA (save for the Landfill Gas PPA which is discussed in more detail below), if the Achieved Capacity of the Facility on the Commercial Operation Date is less than the Contracted Capacity for the Facility (being the anticipated capacity of the Facility), the Contracted Capacity will be permanently reduced to the Achieved Capacity of the Facility reached as at the Commercial Operation Date. Regardless of any further testing performed, the Seller will not be entitled to increase the installed capacity of the Facility above the new Contracted Capacity at any time in the future for any reason, and accordingly this restriction poses a substantial risk to a project's bankability.

To mitigate this risk, the schedule of the project and the timing of testing should be aligned with the Scheduled COD and Last COD dates under the PPA to ensure that adequate time is allowed for the Facility to achieve the Contracted Capacity by the Last COD under the PPA.

The risk of the project company may also be mitigated by ensuring:

- that the performance testing and performance guarantee framework aligns with the Contracted Capacity and the output capacity in the financial model; and
- that the quantum of the Performance Liquidated Damages is sufficient to compensate the project company for the additional costs and lost revenue resulting from the under-performance of the Facility, and should be reviewed by the project technical advisers.

It is important to note that the PPA in respect of Landfill Gas ("LFG PPA") does not contain the same restrictive provisions (as set out in clause 4.8 of the PPAs for the other renewable energy technologies) in respect of the Achieved Capacity and the Contracted Capacity. Under
the LFG PPA, the Contracted Capacity is the anticipated peak capacity of the Facility as a whole (including all Facilities in the Portfolio) achieved during the term of the PPA, and is not limited to the Achieved Capacity. This reflects the fact that LFG technology has a generation capacity that follows a bell curve ("P50 gas curve") rather than a linear generation capacity i.e. in reality LFG technology cannot attain the Contracted Capacity by the Last COD in the PPA as a landfill site’s generation potential grows over time.

Performance Testing and Performance Guarantees
As a consequence of the PPA providing for the Achieved Capacity to be fixed at the Commercial Operation Date for all Facilities other than landfill gas Facilities (as discussed above), it is necessary to test (among other things) the Achieved Capacity of the Facility at Commercial Operation.

However, a number of types of performance tests, including performance ratio tests for solar PV Facilities and power curve tests for wind Facilities, are only able to be performed after the relevant Facility has been operating for a specified period of time (often 1-2 years).

To accommodate this split, it is common under the RE IPP Programme to have a pre-COD and post-COD two-stage performance testing process, with corresponding pre-COD and post-COD performance guarantees. There is also a split arrangement in terms of the remedies available if the contractor fails to achieve the pre-COD or post-COD performance guarantees.

The pre-COD performance guarantees are usually comprised of a Contracted Capacity guarantee. As discussed above, the restrictions under the PPA mean that if the Achieved Capacity of the Facility on the Commercial Operation Date is less than the Contracted Capacity for the Facility, the Contracted Capacity will be permanently reduced to the Achieved Capacity of the Facility reached as at the Commercial Operation Date. If the Contracted Capacity of the Facility is reduced, the Facility will not be able to generate energy at the rate that has been included the financial model for the project. To avoid creating a revenue shortfall, an appropriate remedy for a failure to meet the pre-COD performance guarantees is a reduction in the contract price paid to the contractor that is proportional to the amount by which the Contracted Capacity has been reduced.

As with other types of performance guarantees, performance liquidated damages are an appropriate remedy for a failure of the contractor to achieve the post-COD performance guarantees.

We have included sample testing, performance guarantee and liquidated damages schedules in Appendix 2 that indicate this split between pre-COD and post-COD testing, performance guarantees, reduction in contract price and performance liquidated damages.

Site risk
Under clause 3.2 of the PPA, all risk in relation to the project site (including hydrological, geotechnical and other risks) rests with the Seller.

Lenders will expect that this risk is fully passed through to the contractor under the EPC Contract. However, depending on the specific conditions or circumstances relating to a particular project site, the lenders may be able to obtain some comfort from appropriate site investigations being carried out before and after the Preferred Bidder selection process. If the contractor does not accept the full pass through of pre-existing site risk, the project company may need to provide some form of additional sponsor support.

Application of insurance proceeds
Under clause 19.2 of the PPA, the proceeds of any insurance claim (other than claims under any loss of revenue policies) must be applied by the Seller towards the reinstatement or repair of the Facility unless the Buyer otherwise agrees.

The main issue that arises is that lenders will want to control the application of insurance proceeds, particularly if those proceeds are of a certain threshold and if repairing the Facility is not economically viable. Steps that could be taken to mitigate this risk are to ensure that the lender is identified as a loss payee under the all risks insurance policy in relation to the project, and to provide the lender with a priority security interest over all assets of the project company including insurance proceeds.

Economic Development Obligations
The Seller must meet all Economic Development Obligations placed on it in relation to the project. These are set out in schedule 2 of the IA, and relate to job creation, local content, ownership element obligations, social development, preferential procurement and management control obligations.

If the Seller does not comply with the Economic Development Obligations, the Seller may have to pay an amount (set out in schedule 2 of the IA) to the DOE or accrue Termination Points. If the Seller accrues more than 9 Termination Points in a consecutive 12 month period, DOE may terminate the IA, which will also allow the PPA to be terminated.

Again, to avoid any gaps in liability arising the project company should seek to ensure that all relevant Economic Development Obligations are passed through to the contractor under the EPC Contract to the extent relevant.
including exclusions from the cap on liability and from the exclusion of consequential loss in respect of liability arising out of any failure of the contractor to comply with the Economic Development Obligations that results in the project company being in breach of a Project Document.

In addition, the lenders will generally require a buffer period under the EPC Contract whereby a process will be triggered if the Owner accrues a certain number of Termination Points (for example, six Termination Points in a 12 month period) as a result of the Contractor failing to comply with the Economic Development Obligations. This threshold number should be set lower than the number of Termination Points that provide the DOE a right to terminate the IA, in order to provide a step in or cure period for the project company and/or the lenders to ensure that the relevant Economic Development Obligations are met.

**Corrupt Acts**

Under the IA, the Seller is required to warrant that, in entering into the Project Documents, that it has not committed any 'Corrupt Act', defined as any offence in respect of corruption or corrupt activities contemplated in the *Prevention and Combating of Corrupt Activities Act, 2004*. The consequence of the Seller (or any shareholder, contractor or affiliate of the Seller) admitting to or being convicted of a Corrupt Act is very serious, with the DoE having an immediate right to terminate the IA, which will have the effect of simultaneously terminating the PPA. As a result, the project company should require the EPC Contract to contain back to back termination rights and, given that the lenders will generally expect to be kept whole, exclusions from the cap on liability and from the exclusion of consequential loss in respect of liability arising out of Corrupt Acts.

**Liability**

Contractors will generally require a 'cap' or limit to be placed on their aggregate liability under the EPC Contract and for liability in respect of consequential or indirect loss to be excluded.

In our experience under the RE IPP Programme, such caps have generally been subject to number of exceptions, including where the liability arises as a result of (among other things):

- a breach of any Project Document by the project company as a direct result of a breach by the contractor of its obligations under the EPC Contract (including in relation to a failure to meet the Economic Development Obligations or committing a Corrupt Act);
- death, personal injury or cases of third party property damage, unless attributable to any negligence, wilful act or breach of the EPC Contract by the project company;
- a breach of various indemnities provided by the contractor to the project company, including a breach of the requirement to obtain and maintain all necessary consents or of any of the warranties provided in respect of intellectual property;
- a breach of the confidentiality provisions of the EPC Contract; and
- the fraud or wilful misconduct of the contractor, its personnel or its subcontractors.

**Exclusion of special or consequential loss**

Clause 28.1.2 of the PPA provides that neither party shall be liable to the other party for any Special Loss suffered as a result of any act or omission of the first party. ‘Special Loss’ is defined as any loss or damage which does not constitute a direct loss, including indirect losses, consequential or special losses and wasted or increased overheads.

In some instances, contractors may seek a broader exclusion of special or consequential loss than that provided under the PPA. To minimise the risk of gaps in liability arising, the project company should ensure that any exclusion provided is back to back with what is provided under the PPA.

As mentioned above in relation to caps on liability, typical exceptions to the broad exclusion of consequential loss provided under the RE IPP Programme include:

- liability which arises from a breach of any project document by the project company as a direct result of a breach by the contractor of its obligations under the EPC Contract (other than liability for Special Loss as defined under the PPA);
- wilful misconduct;
- delay liquidated damages;
- performance liquidated damages;
- recovery of insurance proceeds;
- a breach of various indemnities provided by the contractor to the project company, including a breach of the requirement to obtain and maintain all necessary consents or of any of the warranties provided in respect of intellectual property; and
- a breach of the confidentiality provisions of the EPC Contract.

**Grid connection and Self-Build**

A key issue for the consideration of project companies is the extent to which additional works may be required to enable a Facilities to obtain adequate access to the
Transmission System or the Distribution System, as relevant. These additional works may be comprised of connection works to be performed by Eskom and/or connection works to be performed by the project company (known as ‘self-build’ works). Some project companies in the RE IPP Programme have elected to pursue the self-build option due to a need to accelerate project works in line with the schedule.

The connection works are governed by a set of standard form documents. For example, the key documents for the connection of a Facility to the Distribution System are:

- the Budget Quote (containing the terms and conditions for the connection works to be performed by Eskom to connect the Facility to the Distribution System);
- the Distribution Connection Use of System Agreement (containing the terms and conditions of the connection of the Facility to the Distribution System, the access and use of the Distribution System and the delivery of electrical energy from the Facility); and
- if applicable, the Self-Build Agreement (containing the terms and conditions for the self-build of Eskom Distribution Connection Assets by customers).

In selecting the self-build option, project companies need to consider the additional risks that may arise, including:

- additional delays and costs incurred in procuring access land required to complete the self-build works;
- delays in completing the self-build works that may delay other elements of the project works and potentially impact on the project company's right to receive compensation in respect of System Events under the PPA; and
- other risks that may arise under the Self-Build Agreement itself.

Project companies also need to be aware that under the Self-Build Agreement there is a requirement that all ‘Contract Works’ (as defined in that agreement) are performed only by an Eskom Accredited Contractor.

Project companies should also be aware that the definition of Force Majeure provided under the Self-Build Agreement is broader than the definition of Force Majeure under the PPA, which creates a potential gap in liability.

**Early Operation and Staged Completion**

The PPA provides a process for the ‘early operation’ of one or more units of the Facility under the ‘Early Operation’ provisions of the PPA, it is not permitted to have phased or staged completion or commissioning of the Facility. Although this is not specifically stated in the Project Documents, it has since been clarified by the DoE in Briefing Note 4.

Accordingly, the project company will not be entitled to apply for certification or to achieve Commercial Operation in respect of the Facility before the Scheduled COD. These limitations need to be taken into account in preparing the financial model and in considering any early completion bonuses that may be payable to the contractor.

**Dispute resolution**

Clauses 26 and 27 of the PPA set out the dispute resolution process to be followed in respect of any dispute arising in relation to or in connection with the PPA. It provides an escalating process from internal referral to litigation in the High Courts. It also provides for a ‘fast track’ dispute resolution process for disputes to be determined by an independent expert.

Given that many of the parties involved in the RE IPP Programme projects are international, in our experience there has been a strong preference for the use of arbitration (rather than litigation) as the preferred dispute resolution mechanism under EPC Contracts. In these circumstances, the project parties need to consider the implications of this potential mismatch and the extent to which the EPC Contract can be aligned with the PPA to allow the joinder of disputes where required. These issues should be considered on a case by case basis, depending on the identity of the relevant parties.

**Other issues**

In addition to the issues set out in this section that are specific to the RE IPP Programme, many of the issues set out in Part 2 are also relevant in the context of the RE IPP Programme.
The contractual structure will vary from project to project. However, most projects will have the basic structure illustrated above.

We note that in some renewable energy projects, particularly wind farms or hydro plants, the EPC Contract may be split into an Equipment Supply Contract (such as a Wind Turbine Generator Supply Contract) and a Balance of Plant (“BOP”) Contract, where the performance guarantee element is dealt with in a Warranty Operating and Maintenance Agreement (“WOM”). The principles are essentially the same as set out below and we will discuss specific components later in this paper.

As can be seen from the diagram, the project company will usually enter into agreements which cover the following elements:

- An agreement which gives the project company the right to construct and operate the Facility and sell electricity generated by the Facility. Traditionally this was a Concession Agreement (or Project Agreement) with a relevant government entity granting the project company a concession to build and operate the Facility for a fixed period of time (usually between 15 and 25 years), after which it was handed back to the government. This is why these projects are sometimes referred to as Build Operate Transfer (“BOT”) or Build Own Operate Transfer (“BOOT”) Projects. However, following the deregulation of electricity industries in many countries, merchant facilities are now being planned and constructed. A merchant power project is a project which sells electricity into an electricity market and takes the market price for that electricity. Merchant power projects do not normally require an agreement between the project company and a government entity to be constructed. Instead, they need simply obtain the necessary planning, environmental and building approvals. The nature and extent of these approvals will vary from place to place. In addition, the project company will need to obtain the necessary approvals and licences to sell electricity into the market.

- In traditional project financed power projects (as opposed to merchant power projects) there is a Power
Lessons learned from Phases 1 and 2

- **Equipment such as wind turbines, solar panels or above**, is to have a supply contract for key items of the facility comprising civil and electrical assembly of the key equipment to construction of the Facility, from manufacture and supplier of the major equipment supplied, for example, in the case of a wind farm, the wind turbine generators, during which the appointed operator will train the staff of the project company. The project company will take over operation of the Facility on expiry of the O&M Agreement and will perform all functions of the operation and maintenance of the technical services Agreement.

- **A Connection Agreement for connection of the Facility generation equipment into the relevant electricity distribution network (“Network”) between the project company and the owner of the Network, who will be either a transmission company, a distribution company, an electrical utility or a small grid owner/operator.** The Connection Agreement will broadly cover the construction and installation of connection facilities by the owner of the Network and the terms and conditions by which electricity is to be delivered to the generation equipment at the Facility from the Network (“import electricity”) and delivered into the Network once generated by the Facility (“export electricity”).

- **A construction contract governing various elements of the construction of the Facility, from manufacture and assembly of the key equipment to construction of the balance of the plant comprising civil and electrical works.** There are a number of contractual approaches that can be taken to construct a Facility. An EPC Contract is one approach. Another option, as outlined above, is to have a supply contract for key items of equipment such as wind turbines, solar panels or hydro turbines, a design agreement and construction contract with or without a project management agreement. The choice of contracting approach will depend on a number of factors including the time available, the lenders’ requirements, and the identity of the contractor(s). The major advantage of the EPC Contract over the other possible approaches is that it provides for a single point of responsibility. This is discussed in more detail below.

Interestingly, on large project financed projects the contractor is increasingly becoming one of the sponsors - i.e. an equity participant in the project company. Contractors will ordinarily sell down their interest after financial close because, generally speaking, contractors will not wish to tie up their capital in operating projects. In addition, once construction is complete the rationale for having the contractor included in the ownership consortium no longer exists. Similarly, once construction is complete a project will normally be reviewed as lower risk than a project in construction; therefore, all other things being equal, the contractor should achieve a good return on its investments.

In our experience most projects and almost all large, private sector, facilities use an EPC Contract.

- **An agreement governing the operation and maintenance of the facilities.** This is usually a long-term Operating and Maintenance Agreement (“O&M Agreement”) with an operator for the operation and maintenance of the Facility. The term of the O&M Agreement will vary from project to project. The operator will usually be a sponsor, especially if one of the sponsors is an RE IPP or utility company whose main business is operating facilities. Therefore, the term of the O&M Agreement will likely match the term of the Concession Agreement or the PPA. In some financing contexts the lenders will require the project company itself to operate the Facility. In those circumstances the O&M Contract will be replaced with a Technical Services Agreement under which the project company is supplied with the know how necessary for its own employees to operate the Facility. In other circumstances the project company will enter into a fixed short term O&M Agreement with the manufacturer and supplier of the major equipment supplied. For example, in the case of a wind farm, the wind turbine generators, during which the appointed operator will train the staff of the project company. The project company will take over operation of the Facility on expiry of the O&M Agreement and will perform all functions of the operation and maintenance of the technical services Agreement.
operator save for some support functions being retained by the manufacturer.

- Financing and security agreements with the lenders to finance the development of the project.

Accordingly, the construction contract is only one of a suite of documents relating to a Facility. Importantly, the project company operates the project and earns revenues under contracts other than the construction contract. Therefore, the construction contract must, where practical, be tailored so as to be consistent with the requirements of the other project documents. As a result, it is vital to properly manage the interfaces between the various types of agreements. These interface issues are discussed in more detail later.

**BANKABILITY**

A bankable contract is a contract with a risk allocation between the contractor and the project company that satisfies the lenders. Lenders focus on the ability (or more particularly the lack thereof) of the contractor to claim additional costs and/or extensions of time as well as the security provided by the contractor for its performance. The less comfortable the lenders are with these provisions the greater amount of equity support the sponsors will have to provide. In addition, lenders will have to be satisfied as to the technical risk. Obviously price is also a consideration but that is usually considered separately to the bankability of the contract because the contract price (or more accurately the capital cost of the Facility) goes more directly to the bankability of the project as a whole.

Before examining the requirements for bankability it is worth briefly considering the appropriate financing structures and lending institutions. The most common form of financing for infrastructure projects is project financing. Project financing is a generic term that refers to financing secured only by the assets of the project itself. Therefore, the revenue generated by the project must be sufficient to support the financing. Project financing is also often referred to as either “non-recourse” financing or “limited recourse” financing.

The terms “non-recourse” and “limited recourse” are often used interchangeably, however, they mean different things. “Non-recourse” means there is no recourse to the project sponsors at all, whereas “limited recourse” means, as the name suggests, there is limited recourse to the sponsors. The recourse is limited both in terms of when it can occur and how much the sponsors are forced to contribute. In practice, true non-recourse financing is rare. In most projects the sponsors will be obliged to contribute additional equity in certain defined situations.

Traditionally project financing was provided by commercial lenders. However, as projects became more complex and financial markets more sophisticated, project finance also developed. Whilst commercial lenders still provide finance, governments now also provide financing either through export credit agencies or trans or multinational organisations like the World Bank, the Asian Development Bank and European Bank for Reconstruction and Development.

Development finance institutions (DFIs) such as DBSA and IDC are involved many projects under the RE IPP Programme as lenders or, in some cases, as financial advisers or equity investors. More broadly, DFIs have a general mandate to provide finance to the private sector for investments that promote development, such as in the form of higher risk loans, equity positions and risk guarantee instruments to private sector investments in developing countries.

In addition, as well as bank borrowings sponsors are also using more sophisticated products like credit wrapped bonds, securitisation of future cash flows and political risk insurance to provide a portion of the necessary finance.

In assessing bankability lenders will look at a range of factors and assess a contract as a whole. Therefore, in isolation it is difficult to state whether one approach is or is not bankable. However, generally speaking the lenders will require the following:

- a fixed completion price;
- a fixed completion date;
- no or limited technology risk;
- output guarantees;
- liquidated damages for both delay and performance;
- security from the contractor and/or its parent;
- large caps on liability (ideally, there would be no caps on liability, however, given the nature of EPC contracting and the risks to the contractors involved there are almost always caps on liability); and
- restrictions on the ability of the contractor to claim extensions of time and additional costs.

An EPC Contract delivers all of the requirements listed above in one integrated package. This is one of the major reasons why they are the predominant form of construction contract used on large scale project financed infrastructure projects.

**Sponsor support**

In certain cases, it may be necessary to provide sponsor support to strengthen the capacity of the project company to satisfy its obligations to the banks and to have a "bankable" project. Forms of sponsor support may include
equity subscription agreements (base and standby equity), completion guarantees of whole or part of the debt until the project commences commercial operation, bank guarantees to support completion guarantee, and cost overrun guarantees. Completion guarantees, for example, ensure that the lenders will be paid back a set amount if the Facility does not reach completion or the repayment of scheduled debt service, of principal plus interest, if completion is delayed. Other forms of support may be incorporated where the sponsor is a party to a key project contract (such as a construction contract, operating and maintenance agreement, or offtake agreement by requiring the sponsor to provide additional guarantee letters of credit or corporate support to underpin the project.

**BASIC FEATURES OF AN EPC CONTRACT**

The key clauses in any construction contract are those which impact on:

- time;
- cost; and
- quality.

The same is true of EPC Contracts. However, EPC Contracts tend to deal with issues with greater sophistication than other types of construction contracts. This is because, as mentioned above, an EPC Contract is designed to satisfy the lenders’ requirements for bankability.

EPC Contracts provide for:

**A single point of responsibility.** The contractor is responsible for all design, engineering, procurement, construction, commissioning and testing activities. Therefore, if any problems occur the project company need only look to one party – the contractor – to both fix the problem and provide compensation. As a result, if the contractor is a consortium comprising several entities the EPC Contract must state that those entities are jointly and severally liable to the project company.

**A fixed contract price.** Risk of cost overruns and the benefit of any cost savings are to the contractor’s account. The contractor usually has a limited ability to claim additional money which is limited to circumstances where the project company has delayed the contractor or has ordered variations to the works.

**A fixed completion date.** EPC Contracts include a guaranteed completion date that is either a fixed date or a fixed period after the commencement of the EPC Contract. If completion does not occur before this date the contractor is liable for delay liquidated damages (“DLDs”). DLDs are designed to compensate the project company for loss and damage suffered as a result of late completion of the Facility. To be enforceable in common law jurisdictions, DLDs must be a genuine pre-estimate of the loss or damage that the project company will suffer if the Facility is not completed by the target completion date. The genuine pre-estimate is determined by reference to the time the contract was entered into.

DLDs are usually expressed as a rate per day which represents the estimated extra costs incurred (such as extra insurance, supervision fees and financing charges) and losses suffered (revenue forgone) for each day of delay.

In addition, the EPC Contract must provide for the contractor to be granted an extension of time when it is delayed by the acts or omissions of the project company. The extension of time mechanism and reasons why it must be included are discussed later.

**Performance guarantees.** The project company’s revenue will be earned by operating the Facility. Therefore, it is vital that the Facility performs as required in terms of output and reliability. Therefore, EPC Contracts contain performance guarantees backed by performance liquidated damages (“PLDs”) payable by the contractor if it fails to meet the performance guarantees. By way of example, for a wind farm project the performance guarantees will usually comprise a guaranteed power curve and an availability guarantee guaranteeing the level of generation of electricity.

PLDs must also be a genuine pre-estimate of the loss and damage that the project company will suffer over the life of the project if the Facility does not achieve the specified performance guarantees. As with DLDs, the genuine pre-estimate is determined by reference to the time the contract was signed. PLDs are usually a net present value (NPV) (less expenses) calculation of the revenue forgone over the life of the project.

For example, if the output of the plant is 5 MW less than the specification the PLDs are designed to compensate the project company for the revenue forgone over the life of the project by being unable to sell that 5 MW.

PLDs and the performance guarantee regime and its interface with the DLDs and the delay regime is discussed in more detail below.

**Caps on liability.** As mentioned above most EPC contractors will not, as a matter of company policy, enter into contracts with unlimited liability. Therefore, EPC Contracts for power projects cap the contractor’s liability at a percentage of the contract price. This varies from project to project, however, an overall liability cap of 100% of the contract price is common. In addition, there are normally sub-caps on the contractor’s liquidated damages liability. For example, DLDs and PLDs might each be capped at 20% of the contract price with an
overall cap on both types of liquidated damages of 30% of the contract price.

There will also likely be a prohibition on the claiming of consequential damages. Put simply consequential damages are those damages which do not flow directly from a breach of contract but which were in the reasonable contemplation of the parties at the time the contract was entered into. This used to mean heads of damage like loss of profit. However, loss of profit is now usually recognised as a direct loss on project financed projects and, therefore, would be recoverable under a contract containing a standard exclusion of consequential loss clause. Nonetheless, care should be taken to state explicitly that liquidated damages can include elements of consequential damages. Given the rate of liquidated damages is pre-agreed most contractors will not object to this exception.

In relation to both caps on liability and exclusion of liability it is common for there to be some exceptions. The exceptions may apply to either or both the cap on liability and the prohibition on claiming consequential losses. The exceptions themselves are often project specific, however, some common examples include in cases of fraud or wilful misconduct, in situations where the minimum performance guarantees have not been met and the cap on delay liquidated damages has been reached and breaches of the intellectual property warranties.

Security. It is standard for the contractor to provide performance security to protect the project company if the contractor does not comply with its obligations under the EPC Contract. The security takes a number of forms including:

■ a bank guarantee for a percentage, normally in the range of 5–15%, of the contract price. The actual percentage will depend on a number of factors including the other security available to the project company, the payment schedule (because the greater the percentage of the contract price unpaid by the project company at the time it is most likely to draw on security i.e., to satisfy DLD and PLD obligations the smaller the bank guarantee can be), the identity of the contractor and the risk of it not properly performing its obligations, the price of the bank guarantee and the extent of the technology risk;

■ retention i.e., withholding a percentage (usually 5%–10%) of each payment. Provision is often made to replace retention monies with a bank guarantee (sometimes referred to as a retention guarantee (bond)) or to make the security package simpler the above bank guarantee is generally used as a standalone security for a value of 15% of the contract price;

■ advance payment guarantee, if an advance payment is made; and

■ a parent company guarantee - this is a guarantee from the ultimate parent (or other suitable related entity) of the contractor which provides that it will perform the contractor’s obligations if, for whatever reason, the contractor does not perform.

Variations. The project company has the right to order variations and agree to variations suggested by the contractor. If the project company wants the right to omit works either in their entirety or to be able to engage a different contractor this must be stated specifically. In addition, a properly drafted variations clause should make provision for how the price of a variation is to be determined. In the event the parties do not reach agreement on the price of a variation the project company or its representative should be able to determine the price. This determination is subject to the dispute resolution provisions. In addition, the variations clause should detail how the impact, if any, on the performance guarantees is to be treated. For some larger variations the project company may also wish to receive additional security. If so, this must also be dealt with in the variations clause.

Defects liability. The contractor is usually obliged to repair defects that occur in the 12 to 24 months following completion of the performance testing. Defects liability clauses can be tiered. That is the clause can provide for one period for the entire Facility and a second, extended period, for more critical items, such as the wind turbine blades or the solar panels. Refer also to the discussion regarding serial defects in this paper above.

Intellectual property. The contractor warrants that it has rights to all the intellectual property used in the execution of the works and indemnifies the project company if any third parties’ intellectual property rights are infringed.

Force majeure. The parties are excused from performing their obligations if a force majeure event occurs. This is discussed in more detail below

Suspension. The project company usually has the right to suspend the works.

Termination. This sets out the contractual termination rights of both parties. The contractor usually has very limited contractual termination rights. These rights are limited to the right to terminate for non-payment or for prolonged suspension or prolonged force majeure and will be further limited by the tripartite or direct agreement between the project company, the lenders and the contractor. The project company will have more extensive contractual termination rights. They will usually include the ability to terminate immediately for certain major breaches or if the contractor becomes insolvent and the
right to terminate after a cure period for other breaches. In addition, the project company may have a right to terminate for convenience. It is likely the project company’s ability to exercise its termination rights will also be limited by the terms of the financing agreements.

Performance specification. Unlike a traditional construction contract, an EPC Contract usually contains a performance specification. The performance specification details the performance criteria that the contractor must meet. However, it does not dictate how they must be met. This is left to the contractor to determine. A delicate balance must be maintained. The specification must be detailed enough to ensure the project company knows what it is contracting to receive but not so detailed that if problems arise the contractor can argue they are not its responsibility.

Whilst there are, as described above, numerous advantages to using an EPC Contract, there are some disadvantages. These include the fact that it can result in a higher contract price than alternative contractual structures. This higher price is a result of a number of factors not least of which is the allocation of almost all the construction risk to the contractor. This has a number of consequences, one of which is that the contractor will have to factor into its price the cost of absorbing those risks. This will result in the contractor building contingencies into the contract price for events that are unforeseeable and/or unlikely to occur. If those contingencies were not included the contract price would be lower. However, the project company would bear more of the risk of those unlikely or unforeseeable events. Sponsors have to determine, in the context of their particular project, whether the increased price is worth paying.

As a result, sponsors and their advisers must critically examine the risk allocation on every project. Risk allocation should not be an automatic process. Instead, the project company should allocate risk in a sophisticated way that delivers the most efficient result. For example, if a project is being undertaken in an area with unknown geology and without the time to undertake a proper geotechnical survey, the project company may be best served by bearing the site condition risk itself as it will mean the contractor does not have to price a contingency it has no way of quantifying. This approach can lower the risk premium paid by the project company. Alternatively, the opposite may be true. The project company may wish to pay for the contingency in return for passing off the risk which quantifies and caps its exposure. This type of analysis must be undertaken on all major risks prior to going out to tender.

Another consequence of the risk allocation is the fact that there are relatively few construction companies that can and are willing to enter into EPC Contracts. As mentioned in the Introduction some bad publicity and a tightening insurance market have further reduced the pool of potential EPC Contractors. The scarcity of EPC Contractors can also result in relatively high contract prices.

Another major disadvantage of an EPC Contract becomes evident when problems occur during construction. In return for receiving a guaranteed price and a guaranteed completion date, the project company cedes most of the day-to-day control over the construction. Therefore, project companies have limited ability to intervene when problems occur during construction. The more a project company interferes the greater the likelihood of the contractor claiming additional time and costs. In addition, interference by the project company will make it substantially easier for contractors to defeat claims for liquidated damages and defective works.

Obviously, ensuring the project is completed satisfactorily is usually more important than protecting the integrity of the contractual structure. However, if a project company interferes with the execution of the works they will, in most circumstances, have the worst of both worlds. They will have a contract that exposes them to liability for time and costs incurred as a result of their interference without any corresponding ability to hold the contractor liable for delays in completion or defective performance. The same problems occur even where the EPC Contract is drafted to give the project company the ability to intervene. In many circumstances, regardless of the actual drafting, if the project company becomes involved in determining how the contractor executes the works then the contractor executes the works then the contractor will be able to argue that it is not liable for either delayed or defective performance.

It is vitally important that great care is taken in selecting the contractor and in ensuring the contractor has sufficient knowledge and expertise to execute the works. Given the significant monetary value of EPC Contracts, and the potential adverse consequences if problems occur during construction, the lowest price should not be the only factor used when selecting contractors.

SPLIT EPC CONTRACTS

One common variation on the basic EPC structure illustrated above is a split EPC Contract. Under a split EPC Contract, the EPC Contract is, as the name implies, split into two or more separate contracts.
The basic split structure involves splitting the EPC Contract into an Onshore Construction Contract and an Offshore Supply Contract.

There are two main reasons for using a split contract. The first is that it can result in a lower contract price since it allows the contractor to make savings in relation to onshore taxes - in particular, on indirect and corporate taxes in the onshore jurisdiction. The second is that it may reduce the cost of complying with local licensing regulations by having more of the works, particularly the design works, undertaken offshore. In addition, in some countries which impose restrictions on who can carry out certain activities like engineering and design services, splitting the EPC Contract can also be advantageous because it can make it easier to repatriate profits.

However, a split EPC contractual structure can arise in another context in renewable energy projects. For example, in the case of wind farms, the manufacturers of the wind turbines have successfully avoided taking the turnkey responsibility by entering into a supply contract and a balance of plant contract (i.e., the foundation works, civils and erection etc.) instead of an EPC Contract.

There are risks to the project company in this structure. This mainly arises because of the derogation from the principle of single point of responsibility.

Unlike a standard EPC Contract, the project company cannot look only to a single contractor to satisfy all the contractual obligations (in particular, design, construction and performance). Under a split structure, there are at least two entities with those obligations. Therefore, a third agreement, a coordination and interface agreement or wrap-around guarantee, is often used to deliver a single point of responsibility despite the split.

Under a wrap-around guarantee, an entity, usually either the offshore supplier or the parent company of the contracting entities, guarantees the obligations of both contractors. This delivers a single point of responsibility to the project company and the lenders. Where the manufacturer of the turbines, panels etc and the balance of plant contractor are separate entities, in many circumstances neither company will be prepared to take the single point of responsibility for the performance of the obligations of both contractors under the wrap-around guarantee. Accordingly, the lenders will want to be satisfied that the interface issues are dealt with in the absence of a single point of responsibility.

To provide assurance to lenders that the risk of interface and coordination issues arising between the two contracts will be minimised, the contractors and the project company should enter into a coordination and interface agreement. In addition to setting out the general coordination and interface arrangements relating to the performance of the works, to minimise interface risk the lenders will generally seek to ensure that the contractors are jointly and severally liable in respect of the performance of the ‘coordination obligations’ relating to the project, which may include activities such as the coordination of programmes, site access, document provision, work handover and defect rectification.

**KEY RENEWABLE ENERGY SPECIFIC CLAUSES IN EPC CONTRACTS**

**General interface issues**

As noted in the earlier section above, an EPC Contract is one of a suite of agreements necessary to develop a renewable energy Facility. Therefore, it is vital that the EPC Contract properly interfaces with those other agreements. In particular, care should be taken to ensure the following issues interface properly:

- commencement and completion dates;
- liquidated damages amounts and trigger points;
- caps on liability;
- indemnities;
- entitlements to extensions of time;
- insurance;
- force majeure; and
- intellectual property.

**Interfacing of Commissioning and Testing Regimes**

It is also important to ensure the commissioning and testing regimes in the EPC Contract mirror the requirements for commercial operation under the PPA. Mismatches only result in delays, lost revenue and liability for damages under the PPA or concession agreement, all of which have the potential to cause disputes.

Testing/trialling requirements under both contracts must provide the necessary project company satisfaction under the EPC Contract and system operator/offtaker satisfaction under the PPA or Connection Agreement. Relevant testing issues which must be considered include:

- Are differing tests/triallling required under the EPC Contract and the PPA and/or the Connection Agreement? If so, are the differences manageable for the project company or likely to cause significant disruption?
- Is there consistency between obtaining handover from the Contractor under the EPC Contract and commercial operation? It is imperative to prescribe back to back testing under the relevant PPA and the
EPC Contract which will result in a smoother progress of the testing and commissioning and better facilitate all necessary supervision and certification. It must not be forgotten that various certifications will be required at the lender level. The last thing the lenders will want is the process to be held up by their own requirements for certification. To avoid delays and disruption it is important that the lenders’ technical adviser is acquainted with the details of the project and, in particular, any potential difficulties with the testing regime. Therefore, any potential problems can be identified early and resolved without impacting on the commercial operation of the Facility.

- Is the basis of the testing to be undertaken mirrored under both the EPC Contract and the PPA? For example, in the context of wind, what basis are various noise tests to be undertaken?
- What measurement methodology is being used? Are there references to international standards or guidelines to a particular edition or version?
- Are all tests necessary for the contractor to complete under the EPC Contract able to be performed as a matter of practice?

Significantly, if the relevant specifications are linked to guidelines such as the relevant IEC standard, consideration must be given to changes which may occur in these guidelines. The EPC Contract reflects a snapshot of the standards existing at a time when that contract was signed. It may be a number of years post that date in which the actual construction of the project is undertaken thus allowing for possible mismatches should the relevant standards guidelines have changed. It is important that there is certainty as to which standard applies for both the PPA and the EPC Contract. Is it the standard at the time of entering the EPC Contract or is it the standard which applies at the time of testing?

Consideration must therefore be given to the appropriate mechanism to deal with potential mismatches between the ongoing obligation of complying with laws, and the contractor’s obligation to build to a specification agreed at a previous time. Consideration must be given to requiring the satisfaction of guidelines “as amended from time to time”. The breadth of any change of law provision will be at the forefront of any review.

The above issues raise the importance of the testing schedules to the EPC Contract and the PPA. The size and importance of the various projects to be undertaken must mean that the days where schedules are attached at the last minute without being subject to review are gone.

Discrepancies between the relevant testing and commissioning requirements will only serve to delay and distract all parties from the successful completion of testing and reliability trials.

These are all areas where lawyers can add value to the successful completion of projects by being alert to and dealing with such issues at the contract formation stage.

We have included a sample testing schedule in Appendix 2, which relates to solar PV projects under the RE IPP Programme. Although the testing regime for a particular project will be dependent on a range of factors, such as the specific technology used, and will be heavily scrutinised by the lenders’ technical advisers, the sample testing schedule illustrates the key matters and considerations outlined above.

**Interface issues - split contract structure**

In some circumstances, a split contract structure may be used to achieve a lower overall contract price than would be achieved under an EPC Contract. For example, a structure with a BOP Contract and an Equipment Supply Contract may be used. However, if a split structure is used, it is critical that a single point of responsibility is provided. If not, the project company will be left with interface risk which will impact on bankability.

Matters that are critical to providing a single point of responsibility are:

- providing that no claim is available by the contractor against the project company arising out of an act or omission of any other contractor; and
- preventing split contractors from having the ability to make a claim on the project company due to the default of one of the other contracting entities (e.g. equipment supply contractor claiming against the project company for a default caused by the balance of plant contractor).

If a split contract structure is used, we recommend that the following clauses be inserted to provide this mechanism:

**No relief**

\[ \text{Neither contractor 1 nor contractor 2 will be entitled to payment of any sum from the project company or to relief from any obligation to make payment of any sum to the project company or be entitled to relief from or reduction of any other liability, obligation or duty arising out of or in connection with the contracts including (without limitation):} \]

\[ \text{\{\text{1 any extension of time;}} \]

\[ \text{\{\text{2 any relief from liability for liquidated damages;}} \]

\[ \text{\{\text{3 any relief from liability for any other damages;}} \]
Lessons learned from Phases 1 and 2

18

likely, lend company. This is because, while it may ultimately be
whether the parties are controlled by the same parent
company or not. This is due to the fact that, in some cases, the contractor and operator may seek to
manipulate their obligations under the contract.

For example, consider the situation where the contractor and the operator for a project are related entities. The
contractor has been delayed in achieving commercial operation under the EPC Contract and delay liquidated
damages are accruing. The parent company of the contractor and the operator may determine that the net
loss to the parent company in respect of the project will be minimised if the delay is instead shifted to be the
responsibility of the operator under the O&M Contract, for example, by the operator failing to provide staff to be
trained by the contractor in respect of the operation of the Facility. The monetary amount of the liability of the
operator for failing to provide staff for training purposes will in most cases be substantially lower than the rate of
delay liquidated damages being levied on the contractor, due to the lower value of and lower caps on liability etc.
provided under the O&M Contract.

To avoid this potential manipulation and shifting of risks under the EPC and O&M Contracts, we recommend
including the horizontal defences and no relief clauses set out above.

**Interface issues - contractor and operator are the same or related entities**

Similarly, as is the case in many projects under the RE IPP Programme, where the contractor and the operator
under the O&M Contract are the same or related entities ultimately controlled by the same parent company, rather
than a true ‘arms-length’ relationship, the EPC Contract should include a mechanism that prevents the contractor
and operator from (i) relying on the delay or underperformance of the other to obtain relief from the project
company under their respective contracts and (ii) seeking to rely on the actions of the other as a defence to a
claim by the project company for delay or non-performance. If not, this may impact on bankability.

These provisions can be included in the EPC Contract itself (in which case back to back clauses should be
included in the O&M Contract) or otherwise in a separate coordination and interface agreement that sets out the
coordination and interface obligations of the parties in relation to the project.

In some cases, the contractor and the operator may seek to argue that interface issues are minimal because, although
controlled by the same parent company, different entities have been formed (including for the purpose of fulfilling
local ownership and participation requirements) to perform the works and services under the two contracts.

The key issue for project companies and lenders is whether the parties are controlled by the same parent
company. This is because, while it may ultimately be unlikely, lenders may be concerned about the risk that
entities within the same corporate group may seek to manipulate their obligations under the contract.

**Horizontal defences**

Contractor 1 and contractor 2 each waive any and all rights, under contract, delict or otherwise at law, to assert any and all defences which either of the contractor 1 or contractor 2 may have to a claim by the project company for the non-performance, inadequate performance or delay in performance under their respective contract due to any non-performance or inadequate performance or delay in performance by the other party under its contract.

**Interface issues between the Offtaker and the EPC contractor**

At a fundamental level, it is imperative that the appropriate party corresponds with the relevant offtaker/system operator during construction on issues such as the provision of transmission or distribution facilities and the relevant testing requirements and timing.

The project company must ensure the EPC Contract states clearly that it is the appropriate party to correspond with the offtaker and the system operator. Any uncertainty in the EPC Contract may unfortunately see the EPC contractor dealing with the offtaker and/or the system operator thus possibly risking the relationship of the project company with its customer. Significantly, it is the project company which must develop and nurture an ongoing and long term relationship with the offtaker. On the other hand, it is the contractor’s prime objective to complete the project on time or earlier at a cost which provides it with significant profit. The clash of these conflicting objectives in many cases does not allow for such a smooth process. Again, the resolution of these issues at the EPC Contract formation stage is imperative.

**Interface issues on site access**

Access to land for the siting of a Facility involves negotiations with the landowner or the appropriate land
authority. More often than not, the co-existence of components of the Facility such as wind turbines or PV
solar arrays with rural holdings will result in the project
company entering into access agreements with the landowners. The more common arrangements will be land leases providing possession and site access for the duration of the construction and operation of the Facility. While the leasing of land to renewable energy companies provides long term income that complements farming income, the substance of the land lease agreements with landowners is the subject of much discussion and negotiation, principally to ensure that the environmental and development impact of the Facility is considered and managed properly. Securing land rights for good development sites may be difficult if there is community opposition to these developments. Principal responsibility for obtaining access to the site and negotiating the terms of the lease agreements will lie with the project company. However, in order for the project company to comply with the terms of the land lease or other access agreements, the project company will have to ensure that the contractor under the EPC Contract complies with all the terms and conditions of the land lease agreements. The contractor must also accept some degree of responsibility for the ongoing liaison and coordination with landowners during the construction and operation of the Facility. Given that considerations and concerns will often differ between landowners, the specific requirements of the landowners should be taken into account at an early stage in the negotiation of the terms of the EPC Contract. Such concerns will vary from prohibitions on the depth of excavation to allow farming activity, to access agreements for grazing and stock transportation.

The project company should only be required to provide possession and access as permitted under the negotiated land lease or site agreements, and the obligations of the project company under the land lease or site agreements should be flowed down into the EPC Contract. The contractor should be appraised of the specific conditions and requirements of the landowners to ensure that the contractor is aware of the limits on access to the site on which the Facility is to be constructed and operated. The contractor must formally acknowledge the project company’s obligation to comply with the terms of the land lease or site agreements and must accept responsibility for compliance with the terms of the land lease or site agreements which are affected by the contractor’s design and construction obligations under the EPC Contract.

**Grid Access**

EPC Contracts will generally only provide for the handover of the Facility to the project company and the effectiveness of the PPA once all commissioning and reliability trialling has been successfully completed. This raises the important issue of the contractor’s Grid Access and the need for the EPC Contract to clearly define the obligations of the project company in providing Grid Access.

Lenders need to be able to avoid the situation where the project company’s obligation to ensure Grid Access is uncertain. This will result in protracted disputes with the contractor concerning the contractor’s ability to place load onto the grid system and to obtain extensions of time in situations where delay has been caused as a result of the failure or otherwise of the project company to provide grid access.

Grid Access issues arise at two differing levels, namely:

(a) the obligation to ensure that the infrastructure is in place; and

(b) the obligation to ensure that the contractor is permitted to export power.

With respect to the obligation to ensure that the infrastructure is in place, the project company is the most appropriate party to bear this risk vis-à-vis the contractor, since the project company usually either builds the infrastructure. Issues that must be considered include:

(a) what are the facilities that are to be constructed and how will these facilities interface with the contractor’s works? Is the construction of these facilities covered by the PPA, connection agreement, concession agreement or any other construction agreement? If so, are the rights and obligations of the project company dealt with in a consistent manner?

(b) what is the timing for completion of the infrastructure – will it fit in with the timing under the EPC Contract?

With respect to the contractor’s ability to export power, the EPC Contract must adequately deal with this risk and satisfactorily answer the following questions to ensure the smooth testing, commissioning and entering of commercial operation:

(a) what is the extent of the Grid Access obligation? Is it merely an obligation to ensure that the infrastructure necessary for the export of power is in place or does it involve a guarantee that the Grid will take all power which the contractor wishes to produce?

(b) what is the timing for the commencement of this obligation? Does the obligation cease at the relevant target date of completion? If not, does its nature change after the date has passed?

(c) what is the obligation of the project company to provide grid access in cases where the Contractor’s commissioning/plant is unreliable – is it merely a reasonableness obligation?
Lessons learned from Phases 1 and 2

For example, in relation to solar PV Facilities, a defect can be defined as substantially the same defect having the same root cause. A ‘serial defect’ occurs where there is a repeated failure of the same component or repeated failure from the same root cause in a predetermined percentage of commissioned equipment. The concept of serial defects is particularly relevant to EPC Contracts where a large number of units of the same piece of equipment are to be supplied (such as wind turbine generators or PV modules).

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Serial defects

Warranted component parts

For some specialised parts such as, in the context of solar PV, modules and inverters, the EPC Contractor will remain liable for defects in those parts during the warranted components part period. However, the EPC Contractor's liability will be limited to providing collateral warranties in favour of the project company from the manufacturers of the warranted components parts, warranting against defects in those parts for the warranted components part period.

Though a warranted components part period of 10 years or more, depending on the nature of the part, may provide some certainty, it also introduces risk relating to the long term financial stability of the manufacturer providing the collateral warranty.

Input from technical advisers should be obtained in relation to the duration of the warranted component parts period and the party providing collateral warranties.

Development and environmental considerations

The responsibility for the environmental issues surrounding the construction and operation of the Facility must be set out clearly in the EPC Contract. Renewable energy projects have a range of environmental impacts which need to be considered and managed properly. The sponsor or project company will have to investigate if any aspects of the project are likely to be subject to scrutiny under the National Environmental Management Act 1998 (No. 107 of 1998) ("NEMA") or other relevant legislation and policy.

The type of environmental and other development impacts that a renewable energy project may have will depend on a number of factors, including the technology being used, the size of the project and where the project is sited. Environmental and related impacts associated with renewable energy projects generally include:

- noise from the operation of the plant and/or mechanical noise associated with noise from the generator;
- the impact on threatened species that inhabit the nearby area, whose habitat or surrounding ecological community may be impacted by the development;
- effects on areas of high conservation and landscape values, such as national and state parks and World Heritage properties, which may limit or prevent development;
- effects on particular locations of high amenity or tourist value, which may limit or prevent development;
- the required clearance of native vegetation and revegetation during construction;
- construction issues such as the impact of construction traffic and the construction of access road; and

Many EPC Contracts are silent on these matters or raise far more questions than they actually answer. Given that the project company’s failure will stem from restrictions imposed on it under either or both the PPA or the concession agreement, the best answer is to back to back the project company’s obligations under the EPC Contract (usually to provide an extension of time and / or costs) with the PPA. This approach will not eliminate the risk associated with Grid Access issues but will make it more manageable.

A variety of projects we have worked have incurred significant amounts of time and costs in determining the Grid Access obligations under the EPC Contract. This suggests that it is a matter which must be resolved at the contract formation stage. Therefore, we recommend inserting the clauses in Part III of Appendix 1. Warranted component parts

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Serial defects

A 'serial defect' occurs where there is a repeated failure of the same component or repeated failure from the same root cause in a predetermined percentage of commissioned equipment. The concept of serial defects is particularly relevant to EPC Contracts where a large number of units of the same piece of equipment are to be supplied (such as wind turbine generators or PV modules).

For example, in relation to solar PV Facilities, a serial defect can be defined as substantially the same defect having the same root cause.
archaeological and heritage issues including the impact on cultural heritage values and sites of significance to indigenous peoples.

There are also particular impacts associated with specific technologies. Impacts particularly associated with wind farms include:

- concern for the visual impact of wind energy development, which is usually a concern prior to development;
- the effect of shadow flicker and blade glint which must be avoided or mitigated by design and siting;
- noise from the swishing of the blades;
- the impact on migratory species that may fly or move through the wind farm area, even if they do not inhabit the area, through collisions with turbines; and
- potential electromagnetic interference with microwave, television and radio signals.

Impacts particularly associated with solar PV and CSP plants include:

- the effect of reflective glare from solar panels, which again may be avoided or mitigated by design and siting; and
- in the case of CSP solar facilities, the disposal of waste and storage of supplementary fuel.

Impacts associated with hydro facilities include changes to local ecosystems that cause habitat disturbance for fish, wildlife and riparian vegetation. These impacts may be due to the localised effects of construction activities (including roads and power lines), or to longer term changes in water quality and flow. Impacts from smaller hydro facilities tend to be less than larger facilities, particularly those without storage reservoirs, but the nature of impacts will largely depend on the individual Facility and its local environment.

Impacts associated with landfill gas, biomass and biogas facilities will depend on the nature of the Facility and the source of fuel of the Facility, but include odour and issues with stockpiling the fuel source and the disposal of waste, including the potential for run-off and spills. In addition, landfill gas can be dangerous to human and environmental health, and as a result facilities must be appropriately designed and sited to minimise these risks.

Many of these issues will be most relevant at the stage of seeking approval for the development of a Facility and will be the responsibility of the sponsor or project company. The list of development permits, approvals and licences which must be obtained by the project company should be clearly identified in the EPC Contract, with the balance of construction permits and approvals being the responsibility of the contractor. However, responsibility for adherence to the conditions attached to the development approvals, permits and the risks identified in the environmental impact assessment, must be passed on to the contractor. For instance, in the case of wind energy, planning approvals for wind farms are generally subject to permit conditions about noise limits. The contractor must adhere to the required noise specifications and provide warranties that the wind farm will comply with the noise curves required by the specifications.

If the environmental assessment has identified areas of ecological or archaeological importance, then these pre-construction site conditions must be documented in the EPC Contract and accepted by the contractor.

The contractor must also develop an environmental management plan to identify risks, mitigation and monitoring processes during construction of the Facility. This should take into account factors such as erosion, dust and sediment control, storage of hazardous materials, weed control and waste management.

**Independent certification of key equipment**

The provision of design certificates or a statement of compliance from an independent certifying body is essential for the project company to ensure that critical items of equipment (such as wind or hydro turbines or solar PV panels) provided by the contractor have been designed in accordance with industry standards and will fulfil the required design parameters. Although the discussion below relates to wind turbines, similar standards and certification requirements also apply in relation to other items of equipment such as hydro turbines or solar PV panels.

Certification of wind turbines has a history of almost 25 years. In recent years, other countries, as well as financiers, have realised the necessity of a thorough evaluation and certification of wind turbines and their proposed installation. The certifications are commonly divided into type certification and wind turbine certification. The certification is usually required to be carried out by an independent certifying body, such as Germanischer Lloyd Industrial Services GmbH (an international operating certification body for renewable energy equipment, including wind turbines), and is performed in accordance with that body’s rules or regulations. Where possible, the certification should encompass confirmation on the design life of the wind turbines.

Wind turbine certification involves a complete third party assessment and certification of specific wind turbines from design assessment to commissioning, witnessing, site assessment and periodic monitoring. Wind turbine
Lessons learned from Phases 1 and 2

The issue of a Taking Over Certificate for individual accordance with the number of components taken over. Security to be provided by the operator can be increased in the obligations of an operator of the Facility commences on the project company. If the operation and maintenance is reasonable to reduce the performance security held by and the generation of electricity by each individual component does not affect the contractor’s performance security held by the project company when contemplating staged taking over as and when it is completed at different times. As each wind turbine generator on a wind farm or solar array for a PV solar plant, is usually constructed sequentially, each wind turbine generator or solar array may be taken over by the project company as it passes the required tests on completion. While the taking over of each wind turbine or solar array and associated equipment as and when it is installed and commissioned is not unusual, it is important to ensure that the issue of a Taking Over Certificate for each individual component does not affect the contractor’s obligations under the EPC Contract. Issues such as the management of staggered defects liability periods, the method of calculation of the availability guarantees and the point at which performance security held by the project company should be released are among the important issues that must be considered carefully by the project company when contemplating staged taking over of components of the Facility.

Despite taking over individual wind turbine generators or solar arrays, the performance security held by the project company should only be reduced or released when the relevant Facility has passed all tests required for commercial operation of the entire Facility. Factors such as the time period between taking over of each component and the generation of electricity by components taken over by the project company will influence the point at which it is reasonable to reduce the performance security held by the project company. If the operation and maintenance obligations of an operator of the Facility commences on the taking over of each component, the performance security to be provided by the operator can be increased in accordance with the number of components taken over.

The issue of a Taking Over Certificate for individual components will also trigger commencement of the defects liability period for that component. For example, if a wind farm has between 20 and 25 wind turbines, this could mean that the project company will have to administer defects liability periods equivalent to the number of wind turbines on the wind farm. If there is a substantial gap between taking over of the first wind turbine and the last wind turbine, this could also result in the defects liability period for the first wind turbine expiring substantially earlier than the last wind turbine taken over and could affect the contractor’s defects rectification or warranty obligations for defects affecting the entire wind farm. The ideal position would be to require the defects liability period to commence on taking over of each wind turbine but to expire only from a set time from taking over of the entire wind farm. If this proves too onerous for the contractor, the wind turbine generators could be divided into circuits of wind turbines, for instance, 2 or 3 circuits of wind turbines each comprising a separable portion. A taking over certificate will therefore only be issued in relation to each circuit, making it easier to administer the defects liability periods or to manage other issues such as the reduction of security.

The availability guarantee provided by the contractor in each operating year of the Facility should ideally commence from commercial operation of the entire Facility and not from the time revenue is generated from commercial operation of each component of the Facility. However, as with the defects liability period, whether or not this is acceptable to the contractor will depend on the length of time during which the project company has commenced generation of electricity from individual components taken over prior to commercial operation of the entire Facility. In some contracts, the availability guarantee in the first operating year has been calculated from the average date of completion of the individual components.

Another important consideration is to ensure that the delay liquidated damages imposed for failure to complete the entire Facility by the required date for practical completion takes into account any revenue that may be generated by the project company from individual components that are taken over and operated prior to commercial operation of the entire Facility. This is to ensure that the delay liquidated damages represent a genuine pre-estimate of the project company’s loss.

As discussed in this paper above (under the heading 'Early Operation and Staged Completion'), staged completion is not available under the RE IPP Programme.
KEY PERFORMANCE CLAUSES IN RENEWABLE ENERGY EPC CONTRACTS

Rationale for imposing liquidated damages

Almost every construction contract will impose liquidated damages for delay and impose standards in relation to the quality of construction. Most, however, do not impose PLDs. EPC Contracts impose PLDs because the achievement of the performance guarantees has a significant impact on the ultimate success of a project. Similarly, it is important that the Facility commences operation on time because of the impact on the success of the project and because of the liability the project company will have under other agreements. This is why DLDs are imposed. DLDs and PLDs are both ‘sticks’ used to motivate the contractor to fulfil its contractual obligations.

The law of liquidated damages

As discussed above, liquidated damages must be a genuine pre-estimate of the project company’s loss. If liquidated damages are more than a genuine pre-estimate they will be a penalty under South African law. This penalty is capable of being enforced, but may be reduced by a court at its discretion where it considers that clause to be out of proportion to the prejudice suffered by the project company. The court can reduce the penalty to such extent as it deems equitable in the circumstances. There is no legal sanction for setting a liquidated damages rate below that of a genuine pre-estimate, however, there are the obvious financial consequences.

In addition, liquidated damages can also be void for uncertainty or unenforceable because they breach the prevention principle. Void for uncertainty means, as the term suggests, that it is not possible to determine how the liquidated damages provisions work. In those circumstances, a court will void the liquidated damages provisions.

The prevention principle was developed by the courts to prevent employers i.e. project companies from delaying contractors and then claiming DLDs. It is discussed in more detail below in the context of extensions of time.

Prior to discussing the correct drafting of liquidated damages clauses to ensure they are not void or unenforceable it is worth considering the consequences of an invalid liquidated damages regime. If the EPC Contract contains an exclusive remedies clause the result is simple – the contractor will have escaped liability unless the contract contains an explicit right to claim damages at law if the liquidated damages regime fails. This is discussed in more detail below.

If, however, the EPC Contract does not contain an exclusive remedies clause the non-challenging party should be able to claim at law for damages they have suffered as a result of the challenging party’s non or defective performance. What then is the impact of the caps in the now invalidated liquidated damages clauses?

Unfortunately, the position is unclear in common law jurisdictions, and a definitive answer cannot be provided based upon the current state of authority. It appears the answer varies depending upon whether the clause is invalidated due to its character as a penalty, or because of uncertainty or unenforceability. Our view of the current position is set out below. We note that whilst the legal position is not settled the position presented below does appear logical.

Clause invalidated as a penalty

When liquidated damages are invalidated because they are a penalty (i.e., they do not represent a genuine pre-estimate of loss), the liquidated damages or its cap will not act as a cap on damages claims at general law.

We note that it is rare for a court to find liquidated damages are penalties in contracts between two sophisticated, well advised parties.

Clause invalidated due to acts of prevention by the principal

A liquidated damages clause will cap the contractor’s liability where a liquidated damages regime breaches the prevention principle because this gives effect to the commercial bargain struck by the parties.

Clause void for uncertainty

A liquidated damages clause which is uncertain is severed from the EPC Contract in its entirety, and will not act as a cap on the damages recoverable by the principal from the contractor. Upon severance, the clause is, for the purposes of contractual interpretation, ignored.

However, it should be noted that the threshold test for rendering a clause void for uncertainty is high, and courts are reluctant to hold that the terms of a contract, in particular a commercial contract where performance is well advanced, are uncertain.

Drafting of liquidated damages clauses

Given the role liquidated damages play in ensuring EPC Contracts are bankable, and the consequences detailed above of the regime not being effective, it is vital to ensure that liquidated damages clauses are properly drafted to ensure contractors cannot avoid their liquidated damages liability on a legal technicality.
Lessons learned from Phases 1 and 2

The major elements of the performance regime are:

- testing;
- guarantees; and
- liquidated damages.

Liquidated damages were discussed above. Testing and guarantees are discussed below. In addition, a sample testing, guarantee and liquidated damages framework in respect of a solar PV Facility in the context of the RE IPP Programme is set out in Appendix 2 of this paper.

**Testing**

Performance tests may cover a range of areas. Three of the most common are:

**Functional tests** – these test the functionality of certain parts of the key components of a Facility, such as, in the case of wind facilities, wind turbine generators, SCADA systems, power collection systems and meteorological masts. These are usually discrete tests which do not test the Facility as a whole. Liquidated damages do not normally attach to these tests. Instead, they are absolute obligations that must be complied with. If they are not complied with, the Facility will not reach the next stage of completion (for example, mechanical completion or provisional acceptance).

**Guarantee tests** – these test the ability of the Facility to meet the performance criteria specified in the contract. Given that the performance guarantees will differ by technology, so will the relevant guarantee tests. For example, in the case of wind technology, a power curve test will generally be conducted, in addition to an acoustic emissions test. A sample testing framework for a solar PV Facility in the context of the RE IPP Programme is set out in Appendix 2 of this paper.

The consequence of failure to meet these performance guarantees is normally the payment of PLDs. If minimum performance guarantees are provided, satisfaction of these minimum guarantees is generally an absolute obligation. In some cases, if minimum performance guarantees are not met the project company will have a right to terminate the EPC Contract and to reject the Facility and (in some circumstances) require the contractor to repay all amounts paid to it in respect of the Facility and dismantle and remove the Facility at its own cost and restore the site to its original condition.

The performance guarantees should be set at a level of performance at which it is economic to accept the Facility. Lender’s input will be vital in determining what this level is. However, it must be remembered that lenders have different interests to the sponsors. Lenders will, generally speaking, be prepared to accept a Facility that provides sufficient income to service the debt. However, in addition to covering the debt service obligations, sponsors will also want to receive a return on their equity investment. If that will not be provided via the sale of electricity because the contractor has not met the performance guarantees, the sponsors will have to rely on the PLDs to earn their return.
In some projects, the guarantee tests occur after handover of the Facility to the project company. This means the contractor no longer has any liability for DLDs during performance testing.

In our view, it is preferable, especially in project financed projects, for handover to occur after completion of performance testing. This means the contractor continues to be liable for DLDs until either the Facility achieves the guaranteed level or the contractor pays PLDs where the Facility does not operate at the guaranteed level. Obviously, DLDs will be capped (usually at 20% of the Contract Price) therefore, the EPC Contract should give the project company the right to call for the payment of the PLDs and accept the Facility. If the project company does not have this right the problem mentioned above will arise, namely, the project company will not have received its Facility and will not be receiving any DLDs as compensation.

It is often the case in renewable energy projects that the contractor or operator of a Facility will not accept liability for availability PLDs beyond a limited period. In a power plant, the PLDs are calculated to enable the project company to recover the amount it will lose over the life of the power plant in the event the guarantees are not satisfied. The PLDs on a power plant are usually calculated using the NPV of the project company's loss based on the life of the plant. For example, on wind farm projects, the contractor will pay power curve PLDs but will often not accept responsibility for availability PLDs beyond the warranty period or in the case of the operator, the term of the operating and maintenance agreement. The contractor or operator, as the case may be, will simply pay the yearly availability PLDs for failing to meet the stipulated availability guarantee over the warranty period specified in the contract or for the period during which the operator has control over the operation and maintenance of the Facility.

It is common for the contractor to be given an opportunity to modify the Facility if the Facility does not meet the performance guarantees on the first attempt. This is because the PLD amounts are normally very large and most contractors would prefer to spend the time and the money necessary to remedy performance instead of paying PLDs. Not giving contractors this opportunity will likely lead to an increased contract price both because contractors will build a contingency for paying PLDs into the contract price and because in most circumstances the project company will prefer to receive a Facility that achieves the required performance guarantees. The right to modify and retest is another reason why DLDs should be payable up to the time the performance guarantees are satisfied.

If the contractor is to be given an opportunity to modify and retest the EPC Contract must deal with the question of who bears the costs required to undertake the retesting. The cost of the performance of a power curve test in particular can be significant and should, in normal circumstances, be to the contractor’s account because the retesting only occurs if the performance guarantees are not met at the first attempt.

**Technical issues**

Ideally, the technical testing procedures should be set out in the EPC Contract. However, for a number of reasons, including the fact that it is often not possible to fully scope the testing program until the detailed design is complete, the testing procedures are usually left to be agreed during construction by the contractor, the project company’s representative or engineer and, if relevant, the lenders’ technical adviser. However, a properly drafted EPC Contract should include the guidelines for testing. The complete testing procedures must, as a minimum, set out details of:

- **Testing methodology** – reference is often made to standard methodologies, for example, the IEC 61-400 methodology.
- **Testing equipment** – who is to provide it, where it is to be located, how sensitive must it be.
- **Tolerances** – what is the margin of error. For instance excluding wind conditions in excess of specified speeds or excluding solar radiation in excess of certain levels.
- **Ambient conditions** – what atmospheric conditions are assumed to be the base case (testing results will need to be adjusted to take into account any variance from these ambient conditions).

In addition, for renewable energy facilities with a number of components, such as wind farms with multiple wind turbine generators or PV solar plants with multiple solar arrays, the testing procedures must state those tests to be carried out on a per turbine or per solar array basis and those to be carried out on an average basis.

An example of the way a performance testing and liquidated damages regime can operate is best illustrated diagrammatically. Refer to the flowchart in Appendix 3 for an example of how the various parts of the performance testing regime should interface in the context of wind farms.

**Long term performance guarantees**

The project company should be aware that guarantee tests are only a snapshot of the Facility's capacity and reliability, and the long-term capabilities of the Facility under varying conditions remain unproven.
The project company may wish to incorporate long-term performance guarantees from the Contractor into the EPC Contract to cover this. These performance guarantees may operate past the hand-over of the Facility to the project company or operator and up to the expiry of the defects liability period. Such guarantees can include guaranteed generated output in MWh per year. In general, contractors will not wish to enter into such long-term performance guarantees. As an inducement, the project company may offer performance bonuses for where guaranteed generated output is exceeded.

**KEY GENERAL CLAUSES IN EPC CONTRACTS**

**Delay and Extensions of Time**

**The Prevention Principle**

As noted previously, one of the advantages of an EPC Contract is that it provides the project company with a fixed completion date. If the contractor fails to complete the works by the required date they are liable for DLDs. However, in some circumstances the contractor is entitled to an extension of the date for completion. Failure to grant an extension for a project company caused delay can void the liquidated damages regime and ‘set time at large’. This means the contractor is only obliged to complete the works within a reasonable time.

This is the situation under common law governed contracts due to the prevention principle. The prevention principle was developed by the courts to prevent employers i.e.: project companies from delaying contractors and then claiming DLDs.

The legal basis of the prevention principle is unclear and it is uncertain whether you can contract out of the prevention principle. Logically, given most commentators believe the prevention principle is an equitable principle, explicit words in a contract should be able to override the principle. However, the courts have tended to apply the prevention principle even in circumstances where it would not, on the face of it, appear to apply. Therefore, there is a certain amount of risk involved in trying to contract out of the prevention principle. The more prudent and common approach is to accept the existence of the prevention principle and provide for it in the EPC Contract.

The contractor’s entitlement to an extension of time is not absolute. It is possible to limit the contractor’s rights and impose pre-conditions on the ability of the contractor to claim an extension of time. A relatively standard extension of time (“EOT”) clause would entitle the contractor to an EOT for:

- an act, omission, breach or default of the project company;
- suspension of the works by the project company (except where the suspension is due to an act or omission of the contractor);
- a variation (except where the variation is due to an act or omission of the contractor); and
- force majeure, which cause a delay on the critical path and about which the contractor has given notice within the period specified in the contract. It is permissible (and advisable) from the project company’s perspective to make both the necessity for the delay to impact the critical path and the obligation to give notice of a claim for an extension of time conditions precedent to the contractor’s entitlement to receive an EOT. In addition, it is usually good practice to include a general right for the project company to grant an EOT at any time. However, this type of provision must be carefully drafted because some judges have held (especially when the project company’s representative is an independent third party) the inclusion of this clause imposes a mandatory obligation on the project company to grant an extension of time whenever it is fair and reasonable to do so, regardless of the strict contractual requirements. Accordingly, from the project company’s perspective it must be made clear that the project company has complete and absolute discretion to grant an EOT, and that it is not required to exercise its discretion for the benefit of the Contractor.

Similarly, following some recent common law decisions, the contractor should warrant that it will comply with the notice provisions that are conditions precedent to its right to be granted an EOT.

We recommend using the relevant clauses provided in Appendix 1.

**Concurrent Delay**

You will note that in the suggested EOT clause, one of the subclauses refers to concurrent delays. This is relatively unusual because most EPC Contracts are silent on this issue. For the reasons explained below we do not agree with that approach.

A concurrent delay occurs when two or more causes of delay overlap. It is important to note that it is the overlapping of the causes of the delays not the overlapping of the delays themselves. In our experience, this distinction is often not made. This leads to confusion and sometimes disputes. More problematic is when the contract is silent on the issue of concurrent delay and the parties assume the silence operates to their benefit. As a result of conflicting case law it is difficult to determine who, in a particular fact scenario, is correct. This can also lead to protracted disputes and outcomes contrary to the intention of the parties.
There are a number of different causes of delay which may overlap with delay caused by the contractor. The most obvious causes are the acts or omissions of a project company.

A project company often has obligations to provide certain materials or infrastructure to enable the contractor to complete the works. The timing for the provision of that material or infrastructure (and the consequences for failing to provide it) can be affected by a concurrent delay.

For example, the project company is usually obliged, as between the project company and the contractor, to provide a transmission line to connect to the Facility by the time the contractor is ready to commission the Facility. Given the construction of the transmission line can be expensive, the project company is likely to want to incur that expense as close as possible to the date commissioning is due to commence. For this reason, if the contractor is in delay the project company is likely to further delay incurring the expense of building the transmission line. In the absence of a concurrent delay clause, this action by the project company, in response to the contractor’s delay, could entitle the contractor to an extension of time.

Concurrent delay is dealt with differently in the various international standard forms of contract. Accordingly, it is not possible to argue that one approach is definitely right and one is definitely wrong. In fact, the ‘right’ approach will depend on which side of the table you are sitting.

In general, there are three main approaches for dealing with the issue of concurrent delay. These are:

- **Option One** – the contractor has no entitlement to an extension of time if a concurrent delay occurs.
- **Option Two** – the contractor has an entitlement to an extension of time if a concurrent delay occurs.
- **Option Three** – the causes of delay are apportioned between the parties and the contractor receives an extension of time equal to the apportionment. For example, if the causes of a 10-day delay are apportioned 60:40 project company : contractor, the contractor would receive a 6-day extension of time.

Each of these approaches is discussed in more detail below.

(i) **Option One: Contractor not entitled to an extension of time for concurrent delays.**

A common, project company friendly, concurrent delay clause for this option one is:

"If more than one event causes concurrent delays and the cause of at least one of those events, but not all of them, is a cause of delay which would not entitle the Contractor to an extension of time under [EOT Clause], then to the extent of the concurrency, the Contractor will not be entitled to an extension of time."

The most relevant words are bolded.

Nothing in the clause prevents the contractor from claiming an extension of time under the general extension of time clause. What the clause does do is to remove the contractor’s entitlement to an extension of time when there are two or more causes of delay and at least one of those causes would not entitle the contractor to an extension of time under the general extension of time clause.

For example, if the contractor’s personnel were on strike and during that strike the project company failed to approve drawings, in accordance with the contractual procedures, the contractor would not be entitled to an extension of time for the delay caused by the project company’s failure to approve the drawings.

The operation of this clause is best illustrated diagrammatically.

**Example 1: Contractor not entitled to an extension of time for project company caused delay**

<table>
<thead>
<tr>
<th>Contractor Delay 1</th>
<th>Project Company Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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</tbody>
</table>

In this example, the contractor would not be entitled to any extension of time because the Contractor Delay 2 overlaps entirely with the Project Company Delay. Therefore, using the example clause above, the contractor is not entitled to an extension of time to the extent of the concurrency. As a result, at the end of the Contractor Delay 2 the contractor would be in 8 weeks delay (assuming the contractor has not, at its own cost and expense accelerated the Works).

**Example 2: Contractor entitled to an extension of time for project company caused delay**

<table>
<thead>
<tr>
<th>Contractor Delay Event</th>
<th>Project Company Delay Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay</td>
<td>6 Weeks</td>
</tr>
<tr>
<td></td>
<td>2 Weeks</td>
</tr>
</tbody>
</table>

In this example, there is no overlap between the contractor and Project Company Delay Events. The contractor would be entitled to a two week extension of time for the project company delay. Therefore, at the end of the Project Company Delay the contractor...
will remain in six weeks delay, assuming no acceleration.

Example 3: Contractor entitled to an extension of time for a portion of the project company caused delay

<table>
<thead>
<tr>
<th>Contractor Delay 1</th>
<th>Contractor Delay 2</th>
<th>Project Company Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 weeks</td>
<td>2 weeks</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

In this example, the contractor would be entitled to a one week extension of time because the delays overlap for one week. Therefore, the contractor is entitled to an extension of time for the period when they do not overlap i.e., when the extent of the concurrency is zero. As a result, after receiving the one week extension of time, the contractor would be in seven weeks delay, assuming no acceleration.

From a project company’s perspective, we believe, this option is both logical and fair. For example, if, in example 2 the Project Company Delay was a delay in the approval of drawings and the Contractor Delay was the entire workforce being on strike, what logic is there in the contractor receiving an extension of time? The delay in approving drawings does not actually delay the works because the contractor could not have used the drawings given its workforce was on strike. In this example, the contractor would suffer no detriment from not receiving an extension of time. However, if the contractor did receive an extension of time it would effectively receive a windfall gain.

The greater number of obligations the project company has the more reluctant the contractor will likely be to accept option one. Therefore, it may not be appropriate for all projects.

(ii) Option Two: Contractor entitled to an extension of time for concurrent delays

Option two is the opposite of option one and is the position in many of the contractor friendly standard forms of contract. These contracts also commonly include extension of time provisions to the effect that the contractor is entitled to an extension of time for any cause beyond its reasonable control which, in effect, means there is no need for a concurrent delay clause.

The suitability of this option will obviously depend on which side of the table you are sitting. This option is less common than option one but is nonetheless sometimes adopted. It is especially common when the contractor has a superior bargaining position.

(iii) Option Three: Responsibility for concurrent delays is apportioned between the parties

Option three is a middle ground position that has been adopted in some of the standard form contracts. For example, some standard construction contracts adopt the apportionment approach. For example:

"Assessment

When both non qualifying and qualifying causes of delay overlap, the Superintendent shall apportion the resulting delay to WUC according to the respective causes’ contribution.

In assessing each EOT the Superintendent shall disregard questions of whether:

a) WUC can nevertheless reach practical completion without an EOT; or

b) the Contractor can accelerate, but shall have regard to what prevention and mitigation of the delay has not been effected by the Contractor."

We appreciate the intention behind the example clause and the desire for both parties to share responsibility for the delays they cause. However, we have some concerns about this clause and the practicality of the apportionment approach in general. It is easiest to demonstrate our concerns with an extreme example. For example, what if the qualifying cause of delay was the project company’s inability to provide access to the site and the non-qualifying cause of delay was the contractor’s inability to commence the works because it had been black banned by trade unions. How should the causes be apportioned? In this example, the two causes are both 100% responsible for the delay.

In our view, an example like the above where both parties are at fault has two possible outcomes. Either:

- the delay is split down the middle and the contractor receives 50% of the delay as an extension of time; or
- the delay is apportioned 100% to the project company and therefore the contractor receives 100% of the time claimed. The delay is unlikely to be apportioned 100% to the contractor because a judge or arbitrator will likely feel that that is ‘unfair’, especially if there is a potential for significant liquidated damages liability.

In addition, option three is only likely to be suitable if the party undertaking the apportionment is independent from both the project company and the contractor.

Exclusive remedies and fail safe clauses

It is common for contractors to request the inclusion of an exclusive remedies clause in an EPC Contract. However, from the perspective of a project company, the danger of an exclusive remedies clause is that it prevents the project
company from recovering any type of damages not specifically provided for in the EPC Contract.

An EPC Contract is conclusive evidence of the agreement between the parties to that contract. If a party clearly and unambiguously agrees that their only remedies are those within the EPC Contract, they will be bound by those terms. However, the courts have been reluctant to come to this conclusion without clear evidence of an intention of the parties to the EPC Contract to contract out of their legal rights. This means if the common law right to sue for breach of EPC Contract is to be contractually removed, it must be done by very clear words.

**Contractor’s perspective**

The main reason for a contractor insisting on a project company being subject to an exclusive remedies clause is to have certainty about its potential liabilities. The preferred position for a contractor will be to confine its liabilities to what is specified in the EPC Contract. For example, an agreed rate of liquidated damages for delay and, where relevant, underperformance of the Facility. A contractor will also generally require the amount of liquidated damages to be subject to a cap and for the EPC Contract to include an overall cap on its liability.

**Project company’s perspective**

The preferred position for a project company is for it not to be subject to an exclusive remedies clause. An exclusive remedies clause limits the project company’s right to recover for any failure of the contractor to fulfil its contractual obligations to those remedies specified in the EPC Contract. For this reason, an exclusive remedies clause is an illogical clause to include in an EPC Contract from the perspective of a project company because it means that the project company has to draft a remedy or exception for each obligation - this represents an absurd drafting position. For example, take the situation where the EPC Contract does not have any provision for the recovery of damages other than liquidated damages. In this case, if the contractor has either paid the maximum amount of liquidated damages or delivered the Facility in a manner that does not require the payment of liquidated damages (i.e., it is delivered on time and performs to specification) but subsequent to that delivery the project company is found to have a claim, say for defective design which manifests itself after completion, the project company will have no entitlement to recover any form of damages as any remedy for latent defects has been excluded.

The problem is exacerbated because most claims made by a project company will in some way relate to performance of the Facility and PLDs were expressed to be the exclusive remedy for any failure of the Facility to perform in the required manner. For example, any determination as to whether the Facility is fit for purpose will necessarily depend on the level and standard of the performance of the Facility. In addition to claims relating to fitness for purpose, a project company may also wish to make claims for, amongst other things, breach of contract, breach of warranty or negligence. The most significant risk for a project company in an EPC Contract is where there is an exclusive remedies clause and the only remedies for delay and underperformance are liquidated damages. If, for whatever reason, the liquidated damages regimes are held to be invalid, the project company would have no recourse against the contractor as it would be prevented from recovering general damages at law, and the contractor would escape liability for late delivery and underperformance of the Facility.

**Fail Safe Clauses**

In contracts containing an exclusive remedies clause, the project company must ensure all necessary exceptions are expressly included in the EPC Contract. In addition, drafting must be included to allow the project company to recover general damages at law for delay and underperformance if the liquidated damages regimes in the EPC Contract are held to be invalid. To protect the position of a project company (if liquidated damages are found for any reason to be unenforceable and there is an exclusive remedies clause), we recommend the following clauses be included in the EPC Contract:

```
[ ] 1 If clause [delay liquidated damages] is found for any reason to be void, invalid or otherwise inoperative so as to disentitle the Project company from claiming Delay Liquidated Damages, the Project company is entitled to claim against the Contractor damages at law for the Contractor’s failure to complete the Works by the Date for Practical Completion.

[ ] 2 If [ ] 1 applies, the damages claimed by the Project company must not exceed the amount specified in Item [ ] of Appendix [ ] for any one day of delay and in aggregate must not exceed the percentage of the EPC Contract Price specified in Item [ ] of Appendix [ ].
```

These clauses (which would also apply to PLDs) mean that if liquidated damages are held to be unenforceable for any reason the project company will not be prevented from recovering general damages at law. However, the amount of damages recoverable at law may be limited to the amount of liquidated damages that would have been recoverable by the project company under the EPC Contract if the liquidated damages regime had not been held to be invalid (see discussion above). For this reason,
the suggested drafting should be commercially acceptable to a contractor as its liability for delay and underperformance will be the same as originally contemplated by the parties at the time of entering into the EPC Contract.

In addition, if the EPC Contract excludes the parties rights to claim their consequential or indirect losses, these clauses should be an exception to that exclusion. The rationale being that the rates of liquidated damages are likely to include an element of consequential or indirect losses.

**Force Majeure**

**What is force majeure?**

Force majeure clauses are almost always included in EPC Contracts. However, they are rarely given much thought unless and until one or more parties seek to rely on them. Generally, the assumption appears to be that “the risk will not affect us” or “the force majeure clause is a legal necessity and does not impact on our risk allocation under the contract”. Both of these assumptions are inherently dangerous, and, particularly in the second case, incorrect. Therefore, especially in the current global environment, it is appropriate to examine their application.

Force majeure is a civil law concept that has no real meaning under the common law. However, force majeure clauses are used in contracts because the only similar common law concept – the doctrine of frustration -is of limited application. For that doctrine to apply the performance of a contract must be radically different from what was intended by the parties. In addition, even if the doctrine does apply, the consequences are unlikely to be those contemplated by the parties.

Given force majeure clauses are creatures of contract their interpretation will be governed by the normal rules of contractual construction. Force majeure provisions will be construed strictly and in the event of any ambiguity the contra proferentem rule will apply. Contra proferentem literally means “against the party putting forward”. In this context, it means that the clause will be interpreted against the interests of the party that drafted it and is seeking to rely on it. The parties may contract out of this rule.

The rule of ejusdem generis which literally means “of the same class” may also be relevant. In other words, when general wording follows a specific list of events, the general wording will be interpreted in light of the specific list of events. In this context it means that when a broad ‘catch-all’ phrase, such as ‘anything beyond the reasonable control of the parties’, follows a list of more specific force majeure events the catch all phrase will be limited to events analogous to the listed events.

Importantly, parties cannot invoke a force majeure clause if they are relying on their own acts or omissions.

The underlying test in relation to most force majeure provisions is whether a particular event was within the contemplation of the parties when they made the contract. The event must also have been outside the control of the contracting party. There are generally three essential elements to force majeure:

- it can occur with or without human intervention;
- it cannot have reasonably been foreseen by the parties; and
- it was completely beyond the parties’ control and they could not have prevented its consequences.

Given the relative uncertainty surrounding the meaning of force majeure we favour explicitly defining what the parties mean. This takes the matter out of the hands of the courts and gives control back to the parties. Therefore, it is appropriate to consider how force majeure risk should be allocated.

**Drafting force majeure clauses**

The appropriate allocation of risk in project agreements is fundamental to negotiations between the project company and its contractors. Risks generally fall into the following categories:

- risks within the control of the project company;
- risks within the control of the contractor; and
- risks outside the control of both parties.

The negotiation of the allocation of many of the risks beyond the control of the parties, for example, latent site conditions and change of law, is usually very detailed so that it is clear which risks are borne by the contractor. The same approach should be adopted in relation to the risks arising from events of force majeure.

There are 2 aspects to the operation of force majeure clauses:

- the definition of force majeure events; and
- the operative clause that sets out the effect on the parties’ rights and obligations if a force majeure event occurs.

The events which trigger the operative clause must be clearly defined. As noted above, it is in the interests of both parties to ensure that the term force majeure is clearly defined. Please refer above in this paper for discussion of the concept and definition of events of force majeure in the context of the RE IPP Programme.

The preferred approach for a project company is to define force majeure events as being any of the events in an exhaustive list set out in the contract. In this manner, both
parties are aware of which events are force majeure events and which are not. Clearly, defining force majeure events makes the administration of the contract and, in particular, the mechanism within the contract for dealing with force majeure events simpler and more effective.

An example exhaustive definition is:

“An Event of Force Majeure is an event or circumstance which is beyond the control and without the fault or negligence of the party affected and which by the exercise of reasonable diligence the party affected was unable to prevent provided that event or circumstance is limited to the following:

a. riot, war, invasion, act of foreign enemies, hostilities (whether war be declared or not) acts of terrorism, civil war, rebellion, revolution, insurrection of military or usurped power, requisition or compulsory acquisition by any governmental or competent authority;

b. ionising radiation or contamination, radio activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive assembly or nuclear component;

c. pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds;

d. earthquakes, flood, fire or other physical natural disaster, but excluding weather conditions regardless of severity; and

e. strikes at national level or industrial disputes at a national level, or strike or industrial disputes by labour not employed by the affected party, its subcontractors or its suppliers and which affect an essential portion of the Works but excluding any industrial dispute which is specific to the performance of the Works or this Contract.”

An operative clause will act as a shield for the party affected by the event of force majeure so that a party can rely on that clause as a defence to a claim that it has failed to fulfil its obligations under the contract.

An operative clause should also specifically deal with the rights and obligations of the parties if a force majeure event occurs and affects the project. This means the parties must consider each of the events it intends to include in the definition of force majeure events and then deal with what the parties will do if one of those events occurs.

An example of an operative clause is:

“[ ] 1 Neither party is responsible for any failure to perform its obligations under this Contract, if it is prevented or delayed in performing those obligations by an Event of Force Majeure.

[ ] 2 Where there is an Event of Force Majeure, the party prevented from or delayed in performing its obligations under this Contract must immediately notify the other party giving full particulars of the Event of Force Majeure and the reasons for the Event of Force Majeure preventing that party from, or delaying that party in performing its obligations under this Contract and that party must use its reasonable efforts to mitigate the effect of the Event of Force Majeure upon its or their performance of the Contract and to fulfil its or their obligations under the Contract.

[ ] 3 Upon completion of the Event of Force Majeure the party affected must as soon as reasonably practicable recommence the performance of its obligations under this Contract. Where the party affected is the Contractor, the Contractor must provide a revised Program rescheduling the Works to minimise the effects of the prevention or delay caused by the Event of Force Majeure

[ ] 4 An Event of Force Majeure does not relieve a party from liability for an obligation which arose before the occurrence of that event, nor does that event affect the obligation to pay money in a timely manner which matured prior to the occurrence of that event.

[ ] 5 The Contractor has no entitlement and the Project Company has no liability for:

(a) any costs, losses, expenses, damages or the payment of any part of the Contract Price during an Event of Force Majeure; and

(b) any delay costs in any way incurred by the Contractor due to an Event of Force Majeure.”

In addition to the above clause, it is important to appropriately deal with other issues that will arise if a force majeure event occurs. For example, as noted above, it is common practice for a contractor to be entitled to an extension of time if a force majeure event impacts on its ability to perform the works. Contractors also often request costs if a force majeure event occurs. In our view, this should be resisted. Force majeure is a neutral risk in that it cannot be controlled by either party. Therefore, the parties should bear their own costs.

Another key clause that relates to force majeure type events is the contractor’s responsibility for care of the...
works and the obligation to reinstate any damage to the works prior to completion. A common example clause is:

“[ ].1 The Contractor is responsible for the care of the Site and the Works from when the Project Company makes the Site available to the Contractor until 5.00 pm on the Date of Commercial Operation.

[ ].2 The Contractor must promptly make good loss from, or damage to, any part of the Site and the Works while it is responsible for their care.

[ ].3 If the loss or damage is caused by an Event of Force Majeure, the Project Company may direct the Contractor to reinstate the Works or change the Works. The cost of the reinstatement work or any change to the Works arising from a direction by the Project Company under this clause will be dealt with as a Variation except to the extent that the loss or damage has been caused or exacerbated by the failure of the Contractor to fulfil its obligations under this Contract.

[ ].4 Except as contemplated in clause [ ].3, the cost of all reinstatement Works will be borne by the Contractor.”

This clause is useful because it enables the project company to, at its option, have the damaged section of the project rebuilt as a variation to the existing EPC Contract. This will usually be cheaper than recontracting for construction of the damaged sections of the works.

**Operation and Maintenance**

**Operating and Maintenance Manuals**

The contractor is usually required to prepare a detailed Operating and Maintenance Manual. The EPC Contract should require the contractor to prepare a draft of the O&M Manual within a reasonable time to enable the project company, the operator and possibly the lenders to provide comments, which can be incorporated into a final draft at least 6 months before the start of commissioning.

The draft should include all information which may be required for start-up, all modes of operation during normal and emergency conditions and maintenance of all systems of the Facility.

**Operating and Maintenance Personnel**

It is standard for the contractor to be obliged to train the operations and maintenance staff supplied by the project company. The cost of this training will be built into the contract price. It is important to ensure the training is sufficient to enable such staff to be able to efficiently, prudently, safely and professionally operate the Facility upon commercial operation. Therefore, the framework for the training should be described in the appendix dealing with the scope of work (in as much detail as possible). This should include the standards of training and the timing for training.

The project company’s personnel trained by the contractor will also usually assist in the commissioning and testing of the Facility. They will do this under the direction and supervision of the contractor. Therefore, absent specific drafting to the contrary, if problems arise during commissioning and/or testing the contractor can argue they are entitled to an extension of time etc. We recommend inserting the following clause:

“[ ].1 The Project Company must provide a sufficient number of competent and qualified operating and maintenance personnel to assist the Contractor to properly carry out Commissioning and the Commercial Operation Performance Tests.

[ ].2 Prior to the Date of Commercial Operation, any act or omission of any personnel provided by the Project Company pursuant to GC [ ].1 is, provided those personnel are acting in accordance with the Contractor’s instructions, directions, procedures or manuals, deemed to be an act or omission of the Contractor and the Contractor is not relieved of its obligations under this Contract or have any claim against the Project Company by reason of any act or omission.”

**Spare Parts**

The contractor is usually required to provide, as part of its scope of works, a full complement of spare parts (usually specified in the appendices (the scope of work or the specification)) to be available as at the commencement of commercial operation.

Further, the contractor should be required to replace any spare parts used in rectifying defects during the defects liability period, at its sole cost. There should also be a time limit imposed on when these spare parts must be back in the store. It is normally unreasonable to require the spare parts to have been replaced by the expiry of the defects liability period because that may, for some long lead time items, lead to an extension of the defects liability period.

The project company also may wish to have the option to purchase spares parts from the contractor on favourable terms and conditions (including price) during the remainder of the concession period. In that case it would be prudent to include a term which deals with the situation where the contractor is unable to continue to manufacture...
or procure the necessary spare parts. This provision should cover the following points:

- written notification from the contractor to the project company of the relevant facts, with sufficient time to enable the project company to order a final batch of spare parts from the contractor;
- the contractor should deliver to, or procure for the project company (at no charge to the project company), all drawings, patterns and other technical information relating to the spare parts; and
- the contractor must sell to the project company (at the project company’s request) at cost price (less a reasonable allowance for depreciation) all tools, equipment and moulds used in manufacturing the spare parts, to extent they are available to the contractor provided it has used its reasonable endeavours to procure them.

The contractor should warrant that the spare parts are fit for their intended purpose, and that they are of merchantable quality. At worst, this warranty should expire on the later of:

- the manufacturer’s warranty period on the applicable spare part; and
- the expiry of the defects liability period.

The project company should be aware that the contractor may be purchasing the spare parts from the Original Equipment Manufacturer (“OEM”). The OEM will have typically imposed non-negotiable warranties on the spare parts that the contractor will try to pass-through to the project company. This should be resisted on the part of the project company. However, the project company should be prepared to pay higher prices for those spare parts to reflect the greater risk the contractor will be accepting in place of the pass-through of the OEM warranties.

**DISPUTE RESOLUTION**

Dispute resolution provisions for EPC Contracts could fill another entire paper. There are numerous approaches that can be adopted depending on the nature and location of the project and the particular preferences of the parties involved.

However, there are some general principles which should be adopted. They include:

- having a staged dispute resolution process that provides for internal discussions and meetings aimed at resolving the dispute prior to commencing action (either litigation or arbitration);
- obliging the contractor to continue to execute the works pending resolution of the dispute;

- not permitting commencement of litigation or arbitration, as the case may be, until after commercial operation of the Facility. This provision must make exception for the parties to seek urgent interlocutory relief i.e. injunctions and to commence proceedings prior to the expiry of any limitations period. If the provision does not include these exceptions it risks being unenforceable; and
- providing for consolidation of any dispute with other disputes which arise out of or in relation to the construction of the Facility. The power to consolidate should be at the project company’s discretion.
APPENDIX 1 EXAMPLE CLAUSES

Part I - Performance Testing and Guarantee Regime - Solar PV Projects - RE IPP Programme

I COMMERCIAL OPERATION PERFORMANCE TESTS, COMMERCIAL OPERATION, POST COD PERFORMANCE TESTS AND FINAL COMPLETION

Early Operation

1.1 The Contractor may notify the Owner at least 21 Days before a Unit or Units will, in the reasonable opinion of the Contractor be ready for the issue of the Notice of Commencement of Unit by the Owner under the Power Purchase Agreement. The Contractor must not provide a notice under this clause more than 180 Days before the Scheduled COD.

1.2 As soon as the Unit or Units are, in the reasonable opinion of the Contractor, ready for the issue of the Notice of Commencement of Unit by the Owner under the Power Purchase Agreement, the Contractor must give a notice to that effect to the Owner.

1.3 Not later than 7 Days after receipt of the Contractor's notice under clause 1.1, the Owner must either:

1.3.1 issue the Notice of Commencement of Unit to the Buyer under the Power Purchase Agreement (with a copy to the Contractor and the Lenders); or

1.3.2 notify the Contractor that the Unit or Units are not ready for the issue of the Notice of Commencement of Unit under the Power Purchase Agreement and indicate any defects.

1.4 If the Owner notifies the Contractor of any defects in accordance with clause 1.3.2 the Contractor must promptly correct those defects and the procedures described in clauses 1.1-1.3 must be repeated until the Owner issues the Notice of Commencement of Unit to the Buyer under the Power Purchase Agreement.

1.5 During the Early Operating Period, the Contractor is responsible for the Operation and Maintenance of the Unit or Units and all related parts of the Works and the Facility, including providing and training all staff and personnel required to Operate and Maintain the Unit or Units and all related parts of the Works and the Facility.

1.6 Despite the issue of the Notice of Commencement of Unit to the Buyer under the Power Purchase Agreement and any other provisions of this Contract to the contrary, the Contractor remains responsible for care, custody and control of the Unit or Units and all other parts of the Works and the Facility until the Commercial Operation Date.

1.7 In consideration for the Contractor Operating and Maintaining the Unit or Units and all related parts of the Works and the Facility during the Early Operating Period and for complying with its other obligations under clauses 1.2-1.6, the Owner must pay the Contractor 50% of the net profit (after tax and the Owner's costs arising out of the operation of such Unit or Units and the generation of the Early Operating Energy have been deducted) derived from the Early Operating Energy Payments received by the Owner under the Power Purchase Agreement in respect of the Early Operating Energy generated from such Unit or Units. Following receipt of the Early Operating Energy Payments, the Owner must provide the Contractor with a statement setting out the relevant Early Operating Energy Payments received together with a detailed calculation of the Owner's net profit derived therefrom and the Contractor's share of such net profit. The Contractor's share of such profit will be held by the Owner in an interest bearing account until the Contractor becomes entitled to receive such payment in accordance with clause 1.8.

[Drafting note: the drafting of this clause will depend on the incentive/reward structure proposed for each contract, and should be reviewed on a project-by-project basis.]

1.8 The Owner must pay the amounts due to the Contractor under clause 1.7, plus the interest accrued on such amounts, on the date which is (i) 6 Months after the Commercial Operation Date, provided that the Post COD Performance Guarantees up to that date have been met or Performance Liquidated Damages payable have been paid, or (ii) such earlier date on which this Contract is terminated, and following receipt by the Owner of a Tax Invoice for those amounts from the Contractor.

1.9 The issue of a Notice of Commencement of Unit to the Buyer under clause 1.3.1 does not:
1.9.1 operate as an admission that all the requirements of Commercial Operation in respect of the Unit or Units have been met;

1.9.2 prejudice any of the Owner's rights, including the right to require the Contractor to satisfy all these requirements;

1.9.3 guarantee that the Unit or Units will be connected to the System or that Commercial Operation will be achieved; or

1.9.4 entitle the Contractor to any payment under clause 1.8 unless and until the Owner receives corresponding payments under the Power Purchase Agreement.

Performance Tests

1.10 After completion of Commissioning, the Contractor must give the Owner at least 7 Days prior written notice that the Equipment, Works and Facility (or any component part of the Works and Facility) are ready for the Commercial Operation Performance Tests.

1.11 As soon as reasonably practicable after receipt of a notice under clause 1.10, the Owner must issue a notice to the Contractor specifying the date for commencement of the Commercial Operation Performance Tests if such date is not identified in the Program and/or Schedule 8 (Tests).

Commercial Operation

1.12 The Contractor must notify the Owner at least 70 Days before the whole of the Works will, in the opinion of the Contractor:

1.12.1 reach the stage of Commercial Operation; and

1.12.2 be suitable for the issue of the Facility Completion Form by the Independent Engineer under the Power Purchase Agreement.

[Note: Clause 4.5.1 of the Power Purchase Agreement requires at least 60 Days' notice of the Owner's intention to issue the Notice of Commencement of Facility. This has been lengthened to 70 Days in this Contract to provide the Owner with time to assess this written notice and then pass it onto the Buyer]

1.13 As soon as the whole of the Works have, in the opinion of the Contractor, satisfied each of the preconditions for achieving Commercial Operation, including that the Facility Completion Form has been issued to the Owner by the Independent Engineer, the Contractor must give a notice to that effect to the Owner.

[Note: The Owner requires the Facility Completion Form as a precondition for issue of the Notice of Commencement of Facility to the Buyer under clause 4.5.3 of the Power Purchase Agreement]

1.14 Not later than 10 Days after receipt of the Contractor's notice under clause 1.13, the Owner must either:

1.14.1 issue a Certificate of Commercial Operation stating that the Facility has reached Commercial Operation and the date on which the Facility reached Commercial Operation; or

1.14.2 notify the Contractor that the Facility has not achieved Commercial Operation and indicate any defects and/or deficiencies.

1.15 If the Owner notifies the Contractor of any defects and/or deficiencies in accordance with clause 1.14.2, the Contractor must promptly correct those defects and/or deficiencies before the Last COD and the procedures described in clauses 1.13 and 1.14 must be repeated until the Owner issues a Certificate of Commercial Operation.

1.16 No payment and no partial or entire use or occupancy of the Project Site, the Works or the Facility by the Owner (whether during the Commercial Operation Performance Tests or otherwise) in any way constitutes an acknowledgment by the Owner that Commercial Operation has occurred, nor does it operate to release the Contractor from or otherwise affect any of the Contractor's warranties, obligations or liabilities under or in connection with this Contract.

1.17 Upon the issue of the Certificate of Commercial Operation, the Contractor must handover care, custody and control of the Facility to the Owner.

1.18 Notwithstanding that all the requirements for the issuing of a Certificate of Commercial Operation have not been met, the Owner may at any time, in its absolute discretion, issue a Certificate of
Commercial Operation. The issue of a Certificate of Commercial Operation under clause 1.14.1 will not operate as an admission that all the requirements of Commercial Operation have been met, and does not prejudice any of the Owner's rights, including the right to require the Contractor to satisfy all these requirements.

Post COD Performance Tests

1.19 The Contractor must give the Owner prior written notice of when it intends to carry any of the Post COD Performance Tests at the times and in accordance with the requirements set out in Schedule 8 (Tests).

1.20 As soon as reasonably practicable after receipt of a notice under clause 1.19, the Owner must issue a notice to the Contractor specifying the date for commencement of the Post COD Performance Tests at the times and in accordance with Schedule 8 (Tests).

Final Completion

1.21 The Contractor must notify the Owner at least 10 Days before whole of the Works and Facility will, in the opinion of the Contractor, reach the stage of Final Completion.

1.22 As soon as the whole of the Works and Facility have, in the opinion of the Contractor, satisfied each of the preconditions for achieving Final Completion the Contractor must notify the Owner.

1.23 Not later than 10 Days after receipt of the Contractor's notice under clause 1.21, the Owner must either:

1.23.1 issue a Certificate of Final Completion stating that the Facility has reached Final Completion and the date on which the Facility reached of Final Completion; or

1.23.2 notify the Contractor that the Facility has not achieved of Final Completion and indicate any defects and/or deficiencies.

1.24 If the Owner notifies the Contractor of any defects and/or deficiencies, the Contractor must then correct those defects and/or deficiencies and the procedures described in clauses 1.21 to 1.23 must be repeated until the Owner issues a Certificate of Final Completion.

1.25 The Certificate of Final Completion will be evidence of accord and satisfaction, and in discharge of each Party's obligations in connection with this Contract except for obligations in relation to Spare Parts, Warranted Component Parts, indemnities or unresolved issues the subject of any Dispute of which notice has been given prior to the issue of the Certificate of Final Completion.

1.26 Despite any other provision of this Contract, no partial or entire use or occupancy of the Project Site, the Works or the Facility by the Owner after the Commercial Operation Date, whether during the Post COD Performance Tests or otherwise, in any way constitutes an acknowledgment by the Owner that Final Completion has occurred, nor does it operate to release the Contractor from any of its warranties, obligations or liabilities under or in connection with this Contract including the satisfactory performance of its obligations during the Defects Liability Period, the carrying out of the Post COD Performance Tests and meeting the Post COD Performance Guarantees.

2 PERFORMANCE GUARANTEES

Contractor's guarantee

2.1 The Contractor guarantees that the Facility and all component parts will meet all of the Performance Guarantees as specified in the Performance Guarantees Schedule, including the Commercial Operation Performance Guarantees and the Post COD Performance Guarantees.

Minimum Acceptance Capacity not achieved

2.2 Following the completion of the Commercial Operation Performance Tests, if the Capacity of the Facility is not greater than the Minimum Acceptance Capacity, the Contractor must at its cost and expense make changes, modifications or additions to the Facility, or any part of the Facility, as may be necessary for the Facility to reach a Capacity greater than the Minimum Acceptance Capacity. The Contractor must notify the Owner upon completion of the necessary changes, modifications or additions and must, subject to the Owner's rights under clause 2.3, continue to repeat the Commercial Operation Performance Tests until the Capacity of the Facility is greater than the Minimum Acceptance Capacity.

[Drafting Note: this is a pass through of clause 4.5.6 of the PPA.]
Owner's rights

2.3 If, for reasons not attributable to the Owner, the Capacity is not greater than the Minimum Acceptance Capacity by the Last COD, the Owner may terminate this Contract. If, for reasons not attributable to the Owner, the Capacity is not greater than the Minimum Acceptance Capacity by the Last COD, and any of the Project Documents is terminated, in addition to having the right to terminate this Contract, the Owner may also reject the Facility.

Commercial Operation Performance Guarantees not achieved

2.4 If, after carrying out the Commercial Operation Performance Tests, any of the Commercial Operation Performance Guarantees have not been met, the Owner may direct the Contractor to make changes, modifications or additions to the Facility or any part of the Facility as may be necessary to meet the Commercial Operation Performance Guarantees. Without limiting the Owner's rights in this clause, the Contractor may within 7 Days of the performance of any Commercial Operation Performance Test which revealed that any of the Commercial Operation Performance Guarantees have not been met, notify the Owner that it wishes to make changes, modifications or additions to the Facility or any part of the Facility as may be necessary to meet the Commercial Operation Performance Guarantees, provided such notice is given at least 3 Months prior to the Last COD.

Owner directs changes to Facility

2.5 If the Owner directs the Contractor in accordance with clause 2.4 or the Contractor notifies the Owner in accordance with clause 2.4, the Contractor must:

2.5.1 at the Contractor's cost and expense, make the changes, modifications or additions to the Facility or any part of the Facility as may be necessary to meet the Commercial Operation Performance Guarantees;

2.5.2 notify the Owner upon completion of the necessary changes, modifications or additions; and

2.5.3 continue to repeat the Commercial Operation Performance Tests until the Commercial Operation Performance Guarantees have been met or until the Last COD, whichever is earlier.

2.6 Notwithstanding that any of the Commercial Operation Performance Guarantees have not been met, but provided that all of the other requirements for Commercial Operation have been met, or waived in writing by the Owner, and the Contractor has not given a notice contemplated in, and within the 7 Day period contemplated in, clause 2.4, the Owner may at any time prior to the Last COD issue a Certificate of Commercial Operation, in which case the process set out in clauses 2.23 to 2.26 must be followed.

[Drafting Note: this is a pass through of clauses 4.5.5.1 and 4.5.5.2 of the PPA.]

Owner issues Certificate of Commercial Operation

2.7 If the Owner issues a Certificate of Commercial Operation under clause 2.6, the Contractor must do all things reasonably necessary to assist the Owner to ensure that the requirements for the issue of a Certificate of Commercial Operation in relation to the Facility are met.

Reduction in Contract Price for failure to achieve the Commercial Operation Performance Guarantees

2.8 Despite any provision of this Contract, if any of the Commercial Operation Performance Guarantees have not been met at the earliest of:

2.8.1 the Last COD;

2.8.2 when the Contractor is liable for Delay Liquidated Damages up to the aggregate liability; or

2.8.3 when the Owner issues a notice deeming Commercial Operation to have been achieved (notwithstanding that any of the other Commercial Operation Performance Guarantees have not been met) under clause 2.6,

the Owner will be entitled to a reduction in the Contract Price determined in accordance with the Liquidated Damages Schedule and the Contract Price will be reduced accordingly.

Performance Liquidated Damages for failure to achieve the Post COD Performance Guarantees

2.9 Despite any provision of this Contract, if the Contractor does not meet the Post-COD Performance Guarantees in accordance with the Performance Guarantees Schedule after the Commercial Operation Date, the Contractor must pay to the Owner the Performance Liquidated
Damages in the amounts specified in the Liquidated Damages Schedule and at the times specified in clause 2.11.

**Satisfaction of Performance Guarantees**

2.10 The Owner's entitlement to a reduction in the Contract Price under clause 2.8 and the payment of Performance Liquidated Damages under clause 2.9 will be in satisfaction of the relevant Performance Guarantees.

**Due and payable**

2.11 Performance Liquidated Damages must be invoiced in accordance with clause 2.8 by the Owner and payment will be due within 30 Days of issue of such invoice. At the expiration of 30 Days the amount invoiced will be a debt due and payable to the Owner on demand and may be deducted from any payments otherwise due from the Owner to the Contractor and the Owner may also have recourse to the security provided under this Contract.

**Aggregate liability**

2.12 The aggregate liability of the Contractor for Performance Liquidated Damages for breach of Post-COD Performance Guarantees under clause 2.9 (but excluding any reduction in the Contract Price pursuant to clause 2.8 or any other amounts expressly excluded in the Liquidated Damages Schedule from the cap on Performance Liquidated Damages under this clause 2.12) will not exceed the amount specified in the Liquidated Damages Schedule.

**Duplicate damages**

2.13 Nothing in this clause 2 entitles the Owner to claim duplicate damages under this Contract and under law regarding the failure of the Contractor to meet the Performance Guarantees.

**Part II – Extension of Time Regime**

**Notice**

2.1 The Contractor must give notice to the Owner of all incidents, circumstances or events (Events) of any nature affecting or likely to affect the progress of the Works which might be reasonably expected to result in a delay to the Works achieving Commercial Operation by the Scheduled COD as soon as reasonably possible after the Contractor has become aware that such Event has arisen.

**Further notice**

2.2 Within 21 Days after the Contractor becomes aware that an Event has first arisen, the Contractor must give a further notice to the Owner which must include:

2.2.1 the material circumstances of the Event including the cause or causes;

2.2.2 the nature and extent of any delay caused by the Event;

2.2.3 the corrective action already undertaken or to be undertaken;

2.2.4 the effect on the critical path noted on the Program;

2.2.5 whether in its opinion, the Event qualifies as one which entitles the Contractor to an extension of time to the Scheduled COD;

2.2.6 the period, if any, by which in its opinion the Scheduled COD should be extended; and

2.2.7 a statement that it is a notice under this clause.

**Continuing Events**

2.3 Where an Event has a continuing effect or where the Contractor is unable to determine whether the effect of an Event will actually cause delay to the progress of the Works so that it is not practicable for the Contractor to give notice under clause 3.2, a statement to that effect with reasons together with interim written particulars (including details of the likely consequences of the Event on progress of the Works and an estimate of the likelihood or likely extent of the delay) must be submitted by the Contractor in place of the notice required under clause 3.2. The Contractor must then submit to the Owner, at intervals of 14 Days or less, further interim written particulars until the actual delay caused (if any) is ascertainable, at which time the Contractor must as soon as practicable but in any event within 42 Days give a final notice to the Owner including the particulars specified in clause 3.2.

**Determination by Owner**

2.4 Within 42 Days after receipt of the notice in clause 3.2 or the final notice in clause 3.3, the Owner must issue a notice notifying the Contractor's Representative of its determination as to whether the relevant Event qualifies as one
which entitles the Contractor to an extension to the Scheduled COD, and if it does, the period, if any, by which the Scheduled COD is to be extended.

2.5 Any extension of time given in relation to a delay caused by an event of Force Majeure, Compensation Event or System Event must not exceed the duration of any extension to the Scheduled COD under the Power Purchase Agreement which the Owner receives in relation to the same events provided that the Contractor's right to receive an extension of time will apply irrespective of whether or not the Owner actually claims an extension of time under the Power Purchase Agreement (where it is entitled to claim an extension of time under the Power Purchase Agreement).

Causes of delay

2.6 Subject to the provisions of this clause, the Contractor is entitled to an extension of time to the Scheduled COD as the Owner assesses where a delay to the achievement of Commercial Operation is caused by any of the following events, whether occurring before, on or after the Scheduled COD:

2.6.1 any act, omission, breach or default by the Owner or its Personnel;
2.6.2 a Variation, except where that Variation is caused by an act, omission or default of the Contractor, its Personnel or its Subcontractors;
2.6.3 a suspension of the Works under this Contract, except where that suspension is caused by an act, omission or default of the Contractor, its Personnel or its Subcontractors;
2.6.4 a Compensation Event;
2.6.5 a System Event;
2.6.6 Unforeseeable Conduct;
2.6.7 an event of Force Majeure; or
2.6.8 such other events specified in this Contract which entitle the Contractor to an extension of time.

Extension of time

2.7 Despite any other provisions of this clause, and notwithstanding that the Contractor is not entitled to or has not claimed an extension of time to the Scheduled COD, the Owner may, in its absolute sole and unfettered discretion, at any time grant an extension of the Scheduled COD. The Owner has no obligation to grant, or to consider whether it should grant an extension of time and is not required to exercise this discretion for the benefit of the Contractor.

Conditions precedent

2.8 If the Contractor fails to submit the notices required under this clause within the times required, or fails to comply with any other notice requirement under this Contract regarding the event then:

2.8.1 the Contractor has no entitlement to an extension of time; and
2.8.2 the Contractor must comply with the requirements to perform the Works by the Scheduled COD.

Must impact on critical path

2.9 It is a further condition precedent of the Contractor's entitlement to an extension of time that:

2.9.1 the Contractor is or actually will be prevented from achieving Commercial Operation by the Scheduled COD by an Event, and the Event qualifies as one which entitles the Contractor to an extension of time to the Scheduled COD under this clause; and
2.9.2 the relevant delay is demonstrable on an assessment of the actual and then current critical path to achieving Commercial Operation by the Scheduled COD.

Acceleration

2.10 The Owner may direct the Contractor's Representative to accelerate the Works for any reason.

2.11 The Contractor must submit within 5 Days after an acceleration direction under clause 3.10, a revised Program for the approval of the Owner. The Contractor must set out any likely effects the direction has on the Works and the Scheduled COD.

Contractor entitled to additional costs

2.12 The Contractor will be entitled to all extra costs necessarily incurred (which do not include off-Site overheads, profit or loss of profit), by the
Concurrent causes of delay

2.13 If there are 2 or more Events which constitute concurrent causes of delay and at least one of those concurrent causes is a cause of delay which would not entitle the Contractor to an extension of time under this Contract, the Contractor is not entitled to an extension of time for the period of that concurrency.

Part III - Grid Access Regime

3 | GRID ACCESS

[Note: This GC is an either/or choice of the Distribution System and the Transmission System depending upon which System the Owner wishes to connect with. The difference between the 2 systems is that the Distribution System is a distribution network of any Distributor which operates at a nominal voltage of 132 kV or less, as described in the Codes. The Transmission System is the national transmission system of the NTC, consisting of all lines and substation equipment which operate at a nominal voltage of above 132 kV. Item 14 of Part A (General Requirements, Rules and Provisions) of the RFP sets out that the Owner will need to either connect to the Transmission System via the Transmission Agreement or the Distribution System by either the Distribution Agreement or a Pro-forma Municipal Distribution Agreement. As a result, the Owner and Contractor will need to select and modify the below provisions based upon the choice of system]

Managing Connection to the System

3.1 The Contractor must undertake and co-ordinate the Connection Works with the NTC, Independent Engineer and Distributor, and provide termination facilities specified in the Specification.

3.2 The Contractor must liaise with NERSA, the NTC, Distributor, DOE, Buyer, Responsible Authorities, Independent Engineer, the Owner and other Parties to avoid delays in undertaking the Connection Works and connecting the Facility to the Transmission System and/or Distribution System.

Transmission and Connection System

3.3 On the Date for First Synchronisation the Owner must ensure that there is in place a Transmission System and/or Distribution System which is capable of receiving the generated net output the Facility is physically capable of producing at any given time.

Owner's obligation

3.4 The Owner's obligation to ensure that the Transmission System and/or Distribution System is in place is subject to the Facility being able to be connected to the Transmission System and/or Distribution System and the Contractor being able to import and/or export power.

First Synchronisation before Date for First Synchronisation

3.5 If the Contractor notifies the Owner that First Synchronisation is likely to take place before the Date for First Synchronisation, the Owner must use its reasonable endeavours to ensure that the Transmission System and/or Distribution System is in place to enable First Synchronisation to take place in accordance with the Contractor's revised estimate of First Synchronisation. The Contractor is not entitled to claim any additional cost or expense or any adjustment to the Contract Price or to claim any extension to the Scheduled COD or to make any claim under any applicable Law, at law, in equity or otherwise, if the Distribution System is not in place to enable First Synchronisation to take place in accordance with the Contractor's revised estimate of First Synchronisation.

Export of power

3.6 At the time of and following First Synchronisation the Owner will ensure that the Contractor is permitted to export to the Transmission System and/or Distribution System power which the Facility is physically capable of exporting, provided that:

3.6.1 it is necessary for the Contractor to export that amount of power if the Contractor is to obtain Commercial Operation;

3.6.2 the Contractor has complied in all respects with its obligations under the 'Code Requirements'; and

3.6.3 in the reasonable opinion of the Owner and/or the NTC, Distributor or NERSA
the export of power by the Facility will not pose a threat to the safety of persons and/or property (including the Transmission System and/or Distribution System).

No breach

3.7 The Owner will not be in breach of any obligation under this Contract by reason only of the Contractor being denied permission to export power to the Transmission System and/or Distribution System in accordance with the Codes for reasons attributable directly or indirectly to the Contractor and/or the performance of the Facility as a whole.

No deemed Commercial Operation

3.8 The Contractor acknowledges that there will not be any deemed Commercial Operation as a result of the connection of the Facility to the Transmission System or the sale of any electricity.

Code requirements

3.9 The Contractor must perform the Works (including the Connection Works) to ensure that the Owner and Contractor [its Personnel and Subcontractors] each comply with the requirements of any Responsible Authorities and each Party's obligations under the:

3.9.1 Codes;
3.9.2 applicable Laws; and
3.9.3 Project Documents.

Avoidance of Damage or Interference to Transmission System

3.10 The Contractor must perform the Works (including the Connection Works) to ensure that:

3.10.1 any interference to the Transmission System and/or Distribution System is minimised; and
3.10.2 damage to the Transmission System and/or Distribution System is avoided.

Reporting of interference

3.11 The Contractor must immediately report to the Owner's Representative any interference with and damage to the Transmission System and/or Distribution System which connects with the Facility of which it is aware.

Additional obligations

3.12 In performing any test which requires the Contractor to supply electricity to the Transmission System and/or Distribution System, the Contractor must:

3.12.1 on behalf of the Owner, comply with the Owner's obligations under clause 2 of the Transmission Agreement and/or clause 12 of the Distribution Agreement as they relate connection and synchronisation of the Facility with the Transmission System and/or Distribution System;

3.12.2 issue a notice to the Owner's Representative at least 48 hours prior to the time at which it wishes to so supply, detailing the testing or commissioning and including the Contractor's best estimate of the total period and quantity (in MWh per half-hour) of that supply;

3.12.3 promptly notify the Owner's Representative if there is any material change in the information contained in such notice; and

3.12.4 do all things reasonably necessary to assist the Owner (including co-operating with the NTC and complying with its 'Code Requirements' obligations).
APPENDIX 2
Sample schedules - solar PV projects - RE IPP Programme

TESTING

[Drafting Note: The testing structure proposed below follows the distinction between the period prior to the Commercial Operating Date (the "Pre-COD Period") and the period after the Commercial Operating Date (the "Post-COD Period"), with the Commercial Operating Date being the date so defined in the Power Purchase Agreement.

The Pre-COD Period testing will involve Precommissioning Tests, Commissioning Tests and Performance Tests. The Post-COD Period testing will involve Performance Testing.

A complete testing of a photovoltaic facility requires the facility to be grid-connected. It is therefore important to continue the testing following the Commercial Operating Date.]

1 PRE-COD PERIOD TESTING

1.1 Precommissioning Tests

[List details of tests to be passed prior to commissioning in the table below or incorporate by reference tests set out in Specification (Schedule 1) if applicable.

Please note that all tests conducted as Precommissioning Tests will have to be conducted without grid connection.

The below headings are an indication of the nature of the tests that you ought to include. This is not a complete list.

Please confirm with your technical advisor whether any specific testing activity requires grid connection to be in place.

The Precommissioning Tests ought to include any requirements under the applicable grid code or other legal requirement prior to the grid connection.]

1.1.1 General Testing Activities

The Works have been performed in a workmanlike manner and are in compliance with all requirements stipulated or referred to in GC 5.1.

1.1.2 Mechanical Testing Activities

The proper mechanical construction and functioning of the Facility shall be tested, including but not limited to the testing of the:

(a) Correct supply and positioning of all civil infrastructure with reference to the Specification (including but not limited to the CCTV, security system and telecom system).

(b) Proper mounting of the modules, the verification of their quantity and consistency with the Specification (including but not limited to the type of technology, shading effects, absence of damages and the proper application of the mismatching procedure).

(c) Absence of major visual defects in the Works or the component parts.

(d) Absence of fractures, irregularity, or damage on external surface of the component parts.

(e) Absence of fractures, irregularity, or damage within the component parts, including but not limited to the cells composing the modules.

(f) Absence of loss of mechanical integrity of any of the component parts, including but not limited to the modules.

(g) If required, obtaining any static approval for the structure and foundations, to be performed by a properly qualified and independent engineer to be chosen by the Owner.

1.1.3 Electrical Testing Activities

The proper electrical construction and functioning of the Facility shall be tested, to the extent possible without the Facility being connected to the Distribution System or Transmission System, including but not limited to the testing of the:

(a) Correct supply and positioning of all electrical infrastructure with reference to the Specification.

(b) Proper connection of the cables, including but not limited to the proper clamping of terminal blocks.

(c) Insulation resistance of conductors on DC side (test voltage = [●]).
(d) Insulation resistance of conductors on low voltage AC side (test voltage = [●]).

(e) Insulation resistance and applied voltage tests of conductors on medium voltage AC side.

(f) Off-line test and electrical test on transformer, including:
   - **Off-line Testing Procedure - General Verification**
     - (i) Verifying mechanical works completion.
     - (ii) Verifying proper positioning and clamping of transformer, according to technical documentation.
     - (iii) Verifying terminal connection on MV and LV side and cabling of cables.
     - (iv) Verifying transformer ground connection.
     - (v) Verifying data on nameplate.
     - (vi) Verifying absence of condensation and oxidation on terminal strips.
     - (vii) Verifying screw tightness.
     - (viii) Verifying proper functioning of accessories.
     - (ix) Verifying proper positioning and cabling of temperature probes.
     - (x) Verifying and setting temperature tripping thresholds.
   - **In case of oil insulated transformer, the following verifications shall be undertaken:**
     - (A) Oil dielectric measurement and gas analysis.
     - (xi) Check of tank grounding connection.
     - (xii) Oil level check (oil conservator).
     - (xiii) Check of thermometer pocket oil level.
   - **(B) Electrical test (factory testing in presence of the Owner)**
     - (xiv) Measurement of winding insulation resistance to ground:
     - (xv) Measurement of voltage ratio.
   - (g) Electrical grounding of Surge Protection Devices (SPD).
   - (h) Electrical grounding of electrical boxes.

(i) Proper functioning of mechanical interlocks in MV boxes.

(j) Correct labelling of all electrical infrastructure, including but not limited to the inverters, probes and electrical boxes, in relation to the Specification and as-built drawings.

(k) Electrical continuity between the parts of the electrical infrastructure where electrical continuity is required, including but not limited to: between modules, between the modules and the inverters, and between the inverters and the transformers.

(l) The proper electrical characteristics of the Facility, including but not limited to string open circuit voltage, string short circuit current, and the direct current, each in accordance with given testing conditions, a target measurement uncertainty and in accordance with applicable international standards.

1.1.4 Monitoring & Security System Testing Activities

Correct supply and positioning of all the monitoring systems and security systems (including but not limited to any microwave detectors and the CCTV) with reference to the Specification.

(a) Proper connections of the cables in the monitoring systems and security systems, including but not limited to the proper clamping of terminal blocks.

(b) Electrical continuity of the appropriate parts of the monitoring and security system components.

(c) Proper functioning of all aspects of the monitoring system and security system, including but not limited to proper functioning of the alarms and proper off-site data transmission.

[List details of tests to be passed prior to commissioning in the table below or incorporate by reference tests set out in Specification (Schedule 1) if applicable]

<table>
<thead>
<tr>
<th>Description of Precommission tests</th>
<th>Required result</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the presence of our representative, you must carry out the tests set out in [insert reference to relevant specification or applicable industry]</td>
<td>100% of the [insert description of relevant part of the Works or the Facility] must achieve 100% compliance with [insert reference to</td>
</tr>
</tbody>
</table>
1.2 Commissioning Tests

[List details of tests to be passed in the table below or incorporate by reference tests set out in Specification (Schedule 1) if applicable.

The below headings are an indication of the nature of the tests that you ought to include. This is not a complete list.

Please confirm with your technical advisor whether any specific testing activity does not require grid connection to be in place and could, accordingly, be conducted as part of the Precommissioning Tests.

The Commissioning Tests typically include a range of tests required by the grid operator under the relevant grid code and are therefore highly country-specific.

The Commissioning Tests will include all those tests required to be conducted while the Facility is connected to the Distribution Network or the Transmission Network and that will be necessary prior to the Performance Tests being carried out.

The Commissioning Tests ought to include any requirements under the applicable grid code or other legal requirement prior to achieving operating grid connection.

1.2.1 On-Line Tests

The following tests could be included in the Commissioning Tests:

(a) The proper operation of the inverters, with reference to the maintenance manual and the data sheet, and the verification of the correct operation of the maximum power point tracking device (MPPT).

(b) The proper “stop and start” functionality of inverters.

(c) That the protection devices trip when the appropriate thresholds are met.

(d) The proper operation of the data monitoring system.

(e) The proper operation of the Facility in various operating condition, including but not limited to Power ON, Power OFF, and Grid disconnected.

(f) The proper functioning of the MV/LV transformers.

1.2.2 Tests pursuant to regulatory requirements and grid code

[Any tests that might be required under regulatory regimes or the grid code.]

<table>
<thead>
<tr>
<th>Description of Commissioning Tests</th>
<th>Required result</th>
</tr>
</thead>
<tbody>
<tr>
<td>[insert] test</td>
<td>[insert]</td>
</tr>
</tbody>
</table>

1.3 Performance Test

[Drafting Note: Please note that the Owner might choose to trigger an Early Operating Period pursuant to clause 4.4 of the Power Purchase Agreement.]

1.3.1 Achieved Capacity Test

[As a pre-condition to the Facility achieving the Commercial Operating Date under the Power Purchase Agreement, the Independent Engineer will need to certify the Achieved Capacity. If the Achieved Capacity falls short of the Contracted Capacity, such Achieved Capacity might substitute the Contracted Capacity. The Achieved Capacity is also not allowed to exceed the Contracted Capacity.

The Power Purchase Agreement does not stipulate the methodology by which the Achieved Capacity is measured and Briefing Note 13 of the DoE has only partially shed light on this issue. We would therefore expect the Independent Engineer Agreement to stipulate a detailed methodology for determining the Achieved Capacity.

In line with other projects already banked, we are proposing that the Achieved Capacity will be confirmed as part of the Tests, but that no specific guarantee in Schedule 9 attaches to the Contracted Capacity not being met. The consequences would therefore be the same as for any other incident of not meeting the Specification.]

1.3.2 Commercial Operation Performance Test

The Contractor shall measure and calculate the Actual PR in accordance with Attachment A of Schedule 8 under the following testing conditions:

(a) Subject to an extension pursuant to paragraph (d), the Evaluation Period shall be [5] days.
Subject to paragraph (c), the results of all Measurement Periods in a day are admissible, if during that day there were at least 12 Measurement Periods during which the average unshaded insolation in the plane of array was at least 400 W/m² ("Admissible Measurements").

The results of a Measurement Period shall be inadmissible if the Facility is not fully available.

If there are not at least 12 Admissible Measurements for a day, the given day shall be disregarded and the Evaluation Period shall be extended by a day. Such extension of time shall be limited to a maximum of 5 days.

If despite this extension, there are not at least 12 Admissible Measurements met, then at the Owner’s sole discretion:

(i) the Commercial Operation Performance Test shall be deemed completed despite the lower number of admissible Measurement Periods and the Actual PR shall be calculated on the basis of the Admissible Measurements; or

(ii) the threshold of the average unshaded insolation in the plane of array shall be reduced to 300 W/m² so as to increase the number of Admissible Measurements. If, despite such reduction, the increased number of Admissible Measurements does not reach or exceed the minimum of 12 Admissible Measurements, then the Commercial Operation Performance Test shall be deemed completed and the Actual PR shall be calculated on the basis of, at the Owner’s sole discretion (x) on the Admissible Measurements (as defined originally) or (y) on the Admissible Measurements following the reduction of the required insolation pursuant to the present paragraph.

For the avoidance of doubt:

- the extension to the Commercial Operation Performance Test due to unavailability of the Facility is uncapped; and

- if low insolation conditions coincide with incidents of unavailability of the Facility, the relevant measurements shall be deemed inadmissible entirely and solely due to the unavailability of the Facility.

### 1.3.3 DC Capacity Test

The Contractor shall calculate the sum total of the nameplate values of the rated power of the PV modules actually installed (the "Installed DC Capacity").

The "Guaranteed DC Capacity" shall be [XXX] MW_peak.

### 2 POST-COD PERFORMANCE TESTING

#### 2.1 Operation Performance Test

The Contractor shall measure and calculate the Actual PR in accordance with Attachment A of Schedule 8 for the following Evaluation Periods:

- 2.1.1 the first Evaluation Period running from the day after the Commercial Operation Date to the first anniversary of the Commercial Operation Date;
- 2.1.2 the second Evaluation Period running from the day after the first anniversary of the Commercial Operation Date to the second anniversary of the Commercial Operation Date; and
- 2.1.3 the third Evaluation Period running from the day after the second anniversary of the Commercial Operation Date to the end of the Defects Liability Period.

The "Guaranteed PR" shall be [81.00 %].

#### Attachment A to Testing Schedule - Measurement of Actual Performance Ratio

### 1 Actual performance ratio

#### 1.1 Calculation of the Actual Performance Ratio

The Actual Performance Ratio (the "Actual PR") for the relevant Evaluation Period ("EP") shall be calculated as the insolation-weighted average of each Measured PRMP for each Measurement Period falling with the Evaluation Period as follows:

$$ Actual\ PR_{EP} = \frac{1}{n} \sum_{i=1}^{n} \left( \frac{Measured\ PR_{MP} \times F_{PDA, MP}^{\text{insolation,} PDA}}{\sum F_{PDA, MP}^{\text{insolation,} PDA}} \right) $$

whereby:

- Actual \(PR_{EP}\) is the insolation-weighted average (dimensionless) of Measured PR_{MP} for all relevant Measurement Periods in the Evaluation Period;
$EP$ is the relevant Evaluation Period stated elsewhere in this Contract;

$i$ is the sequential number of each Measurement Period in the Evaluation Period;

$MP$ is the relevant Measurement Period of [15 minutes] each;

$E_{MP} \text{insolation,POA}$ is the unshaded insolation (kWh/m²) in the plane of array measured in accordance with paragraph 2.7 below during the relevant Measurement Period.

## 2 MEASURED PR$_{MP}$

### 2.1 Determination of Measured PR$_{MP}$

Measured PR$_{MP}$ shall be determined and calculated as follows:

\[
\text{Measured PR}_{MP} = \frac{E_{AC}}{E_{\text{insolation,POA}}} \times \eta_{\text{plant,STC}} \times A_{\text{array}} \times TC \times D
\]

whereby:

- $\text{Measured PR}_{MP}$ is the Measured PR (dimensionless) for the relevant Measurement Period;
- $MP$ is the relevant Measurement Period;
- $E_{AC}$ is the energy actually metered (kWh) by the HV meter at Delivery Point during the Measurement Period; [Drafting note: If energy generated by the Facility is used to provide auxiliary power (rather than drawing auxiliary power from the grid), it would be appropriate to add the auxiliary power to EAC. However, in such case there should be a separate guarantee of the maximum requirements for auxiliary power.]
- $E_{\text{insolation,POA}}$ is determined in accordance with the formula in paragraph 2.2 below.
- $\eta_{\text{plant,STC}}$ is determined in accordance with the formula in paragraph 2.4 below; [Drafting note: If only one type of module is installed in the Facility, reference can be had to $\eta_{\text{STC}}$, being the module efficiency at Standard Testing Conditions as stipulated in the module datasheet.]
- $A_{\text{array}}$ is the gross collector area of all modules (m²), which (for the avoidance of doubt) shall be the dimensions provided on the module datasheet and shall not be restricted to the cell surface;
- $TC$ is the temperature correction factor (dimensionless) determined in accordance with the formula in paragraph 2.5 below; and
- $D$ is the degradation correction factor (dimensionless) determined in accordance with the formula in paragraph 2.6 below.

### 2.2 Determination of $E_{\text{adjusted \, \text{insolation,POA}}}$

\[
E_{\text{adjusted \, \text{insolation,POA}}} = E_{\text{insolation,POA}} - \sum_{e=1}^{f}E_{\text{insolation,POA}}^{\text{external \, event}}
\]

whereby:

- $E_{\text{insolation,POA}}$ is the unshaded insolation (kWh/m²) in the plane of array measured in accordance with paragraph 2.7 below during the relevant Measurement Period;
- $e$ is each External Event as defined in paragraph 2.3 below;
- $f$ is the total number of External Events in the relevant Evaluation Period; and
- $E_{\text{insolation,POA}}^{\text{external \, event}}$ is the unshaded specific irradiation (kWh/m²) in the plane of modules received during an External Event persisting during the relevant Measurement Period measured in accordance with paragraph 2.7 below.

### 2.3 External Events

Each of the following events shall be an "External Events":

(a) the complete or partial unavailability of the grid for the purpose of exporting energy to the grid (but only to the extent of such unavailability);
the complete or partial unavailability of the Facility for the purpose of producing energy (but only to the extent of such unavailability) caused by the action of a third party, unless the prevention of action from third parties was within the scope of the services to be provided by the Contractor or the Operator; [Drafting Note: The exclusion will only be justified if the Contractor or the Operator is responsible for site security and if the Operator is an Affiliate of the Contractor.]

(c) a weather event exceeding the design parameters of the Facility, but only to the extent the Contractor can show that such weather event has reduced the ability of the Facility to produce energy; [Drafting note: Please check that the design parameters have included permissible weather conditions and that such design parameters are reflected in the specification and the datasheets.]

(d) the inability of the Owner to export energy to the grid due to the termination of the Power Purchase Agreement or the revocation, annulment or termination of any relevant Authorisation; and

(e) an event of Force Majeure, but only to the extent the Contractor can show that such event of Force Majeure has reduced the ability of the Facility to produce energy, provided always that for the duration of the relevant External Event:

(i) if the Contractor and the Operator are Affiliates, neither the Contractor nor the Operator; or

(ii) if the Contractor and the Operator are not Affiliates, the Contractor has not caused or contributed to the External Event and has not aggravated the effects of the External Event on the ability of the Facility to generate and export energy.

2.4 Determination of $\eta_{\text{Plant,STC}}$

$\eta_{\text{Plant,STC}}$ is determined as follows:

$$\eta_{\text{Plant,STC}} = \frac{\sum_{m=1}^{n} P_{\text{module}}}{\sum_{m=1}^{n} A_{\text{module}} \times 1.000 \frac{W}{m^2}}$$

whereby:

$P_{\text{module}}$ is the nominal capacity (W) of each module $m$, which (for the avoidance of doubt) shall be the capacity provided on the module datasheet;

$n$ is the total number of modules installed in the Facility; and

$A_{\text{module}}$ is the gross collector area (m²) of each module $m$, which (for the avoidance of doubt) shall be the dimensions provided on the module datasheet and shall not be restricted to the cell surface.

[Drafting note: Paragraph 2.4 is not required if reference is to $\eta_{\text{STC}}$ only.]

2.5 Determination of $T_C$

The temperature correction factor $T_C$ shall be determined as follows:

$$T_C = 1 - T_C(P_{\text{max}}) \times (T_{\text{ref}} - T_{\text{real}})$$

whereby:

$T_C$ is the applicable temperature correction factor (dimensionless);

$T_C(P_{\text{max}})$ is the negative temperature coefficient (%/°C) for maximum power $P_{\text{max}}$ provided on the module datasheet;

$T_{\text{ref}}$ is [reference temperature in °C]; [Drafting Note: Determining the reference temperature as benchmark has a crucial impact on the temperature correction factor. Three approaches seem to be followed in the industry: (1) Benchmarking against 25°C, being the temperature component of STC, in which case $T_{\text{real}}$ should be measured as the ambient temperature. (2) Benchmarking against Normal Operating Cell Temperature NOCT (usually around 48°C, but in the range of about 33 to 58°C, in which case $T_{\text{real}}$ should be measured on the back of the module such as to pick up the cell temperature). (3) Benchmarking against the reference cell temperature used by the calculation software - PVSYST at 40 °C. The methodology for temperature correction should be reviewed by the technical advisors and taken into account for the purpose of stipulating the Guaranteed PR.]

$T_{\text{real}}$ is the measured average temperature (°C), measured [by the temperature sensor of the weather station][by temperature sensors on the reverse side of the modules] during the relevant Measurement Period; [Drafting Note: See previous drafting note.]
2.6 Determination of D

The degradation correction factor $D$ shall be determined as follows:

$$D_{MP} = (1 + DF)^n \times DF_{final}$$

whereby:

- $D_{MP}$ is the degradation factor applying to the Measurement Period $MP$;
- $DF$ is [specify, typically -0.3 to -0.4] %/a;
- $n$ is the year following the Commercial Operation Date into which the Measurement Period falls (but excluding the final year if the final year is not a full year);
- $DF_{final}$ is 1.00 for every full year following the Commercial Operation Date and the factor calculated in accordance with the formula below if the final year is not a full year:

$$DF_{final} = \frac{1}{1 + \frac{nd}{365}}$$

whereby:

- $nd$ is the number of days in the final year that fall within the Evaluation Period;
- $DF$ has the same meaning as above.

2.7 Measurement of $E_{insolation,POA}$

$E_{insolation,POA}$ shall be measured and calculated as follows: [Drafting note: Detail measurement and calculation methodology in light of pyranometers and reference cells actually available.]
PERFORMANCE GUARANTEES

[Drafting Note: This Performance Guarantee Schedule must be finalised based on the agreed performance criteria following review of the proposed detailed design and specification referred to in the Specification and the relevant Power Purchase Agreement.]

1 COMMERCIAL OPERATION PERFORMANCE GUARANTEES

Performance Guarantees to be met prior to the Commercial Operation Date are:

1.1 Performance Ratio Guarantee

The Contractor guarantees that during the Commercial Operation PR Test the Actual PR is no less than [95%] of the Guaranteed PR.

[A guarantee that a certain level of performance will be achieved, measured during a certain testing period under standardised conditions. The achievement will be measured by means of a performance test (see Testing Schedule).]

1.2 DC Capacity Guarantee

The Contractor guarantees that the Installed DC Capacity is no less than [99.5%] of the Guaranteed DC Capacity.

[A guarantee that the component most critical for the capacity of the Facility will be installed, despite potential uncertainties in the supply chain.]

2 POST-COD GUARANTEES

Guarantees to be met after the Commercial Operation Date are:

2.1 Performance Ratio Guarantee

The Contractor guarantees that during each Evaluation Period during the Defects Liability Period the Actual PR is no less than the Guaranteed PR.

[A guarantee that a certain level of performance will be achieved, measured on an ongoing basis. The achievement will be measured by means of a performance test (see Testing Schedule).]

2.2 [Parasitic Load/Auto-consumption Guarantee]

[Drafting Note: if the Facility will auto-consume some of the energy produced and such energy is added back on to the $E_{AC}$ for the purpose of the calculation of the Measure PR (see our comment there), the Operator should guarantee that such auto-consumption (parasitic load) does not exceed a stated level].
LIQUIDATED DAMAGES AND REDUCTIONS IN THE CONTRACT PRICE

1 DELAY LIQUIDATED DAMAGES

[Drafting Note: The following structure is an example of the delay liquidated damages that may be listed in this Schedule.]

1.1 The Delay Liquidated Damages are:  

1.1.1 [insert]

[Drafting note: under clause 4.6 of the PPA is that for each day that Commercial Operation is delayed beyond the Scheduled COD, the Operating Period will be reduced by one day and the Expiry Date will be brought forward by one day. The effect of this is that the term of the PPA will effectively be reduced by 2 days for each day of delay beyond the Scheduled COD. This 2 day reduction should be factored in when determining the rate of Delay Liquidated Damages.]

1.2 The aggregate liability for Delay Liquidated Damages is limited to 15.00 % of the Contract Price.

1.3 Delay Liquidated Damages must be invoiced weekly by the Owner and payment will be due within 30 Days of issue of such invoice.

1.4 At the expiration of 30 Days the amount invoiced will be a debt due and payable to the Owner on demand and may be deducted from any payments otherwise due from the Owner to the Contractor and the Owner may also have recourse to the security provided under the Contract.

2 REDUCTIONS IN THE CONTRACT PRICE

Reductions in the Contract Price for breach of the Commercial Operation Performance Guarantees are:

2.1 DC Capacity Guarantee

If the Contractor is in breach of the DC Capacity Guarantee, the Contract Price shall be reduced by an amount of [X.XX %] for each 1.00 % (pro-rated for part thereof) by which the Installed DC Capacity falls short of the Guaranteed DC Capacity.

The remedy for a breach of the DC Capacity Guarantee will be a reduction in the Contract Price, taking into account the Installed DC Capacity. The reduction in the Contract Price should be somewhat larger than 1.0 % for every 1.0 % shortfall, taking into account the higher over-head costs per unit of Installed DC Capacity and loss of profit on DC capacity not installed.

3 PERFORMANCE LIQUIDATED DAMAGES

Performance Liquidated Damages for breach of the Post-COD Guarantees are:

3.1 Liquidated Damages for Loss during Defects Liability Period

If the Contractor is in breach of the Performance Guarantee of the Post-COD Guarantees for any Evaluation Period during the Defects Liability Period, the Contractor shall pay the Owner in respect of losses suffered during such Evaluation Period liquidated damages calculated as follows:

\[ LD_{EP} = \frac{LD_{PR}}{Guaranteed PR - Actual PR_{EP}} \times \frac{Guaranteed PR}{Actual PR_{EP}} \times \frac{Energy_{EP}}{CER} \]

Where:

-\( LD_{EP} \) means the liquidated damages payable in respect of the relevant Evaluation Period.

-\( EP \) means the relevant Evaluation Period and has the same meaning as in Schedule 9.

-\( Guaranteed PR \) has the same meaning as in Schedule 9.

-\( Actual PR_{EP} \) means the Actual PR in the relevant Guarantee Period and Actual PR has the same meaning as in Schedule 9.

-\( Energy_{EP} \) means the energy that would have been delivered at the Delivery Point in the relevant Evaluation Period had the Actual PREP been at the level of the Guaranteed PR for that Evaluation Period.

-\( CER \) means the applicable Commercial Energy Rate as stipulated in, and indexed pursuant to, part 3 of schedule 1 of the Power Purchase Agreement.

3.1.1 The aggregate liability for Performance Liquidated Damages for breach of the...
3.1.2 Performance Liquidated Damages pursuant to paragraph 3.1.1 must be invoiced by the Owner by reference to each Evaluation Period and payment will be due within 30 Days of issue of such invoice.

3.1.3 At the expiration of 30 Days the amount invoiced will be a debt due and payable to the Owner on demand and may be deducted from any payments otherwise due from the Owner to the Contractor and the Owner may also have recourse to the security provided under the Contract.

3.2 Liquidated Damages for Future Loss

3.2.1 If the Contractor is in breach of the Performance Guarantee of the Post-COD Guarantee calculated in respect of the entire Defects Liability Period, the Contractor shall pay the Owner in respect of future losses expected to be suffered by the Owner after the Defects Liability Period liquidated damages in an amount of \[ X.XX \% \] for each 1.00 % (pro-rated for part thereof) by the Actual PR for the Defects Liability Period falls short of the Guaranteed PR. [The liquidated damages for future losses are similar to an adjustment of the Contract Price and should be larger than 1.0 % for every 1.0 % shortfall, taking into account the higher over-head costs if there is a permanent performance shortfall as well as loss of profit on energy not produced. Please also note that a 1.00 % shortfall of the Actual PR automatically translates into a loss greater than 1.00 % (the loss factor is 1/Guaranteed PR) by virtue of 100

3.2.2 The aggregate liability for Performance Liquidated Damages for breach of the Performance Guarantee of Post-COD Guarantees for future losses is limited to \[ [X.XX \%] \] of the Contract Price.

[We would recommend that the limit for this type of loss is the Contract Price, but do recognise that this is commercially difficult to achieve. We have seen lower caps (effectively in the region of 10 to 15 % of the Contract Price).]

3.2.3 Performance Liquidated Damages for Future Loss must be invoiced by the Owner by reference to the Defects Liability Period and payment will be due within 30 Days of issue of such invoice.

3.2.4 At the expiration of 30 Days the amount invoiced will be a debt due and payable to the Owner on demand and may be deducted from any payments otherwise due from the Owner to the Contractor and the Owner may also have recourse to the security provided under the Contract.

3.3 [Parasitic Load/Auto-consumption Guarantee]

[Drafting Note: Please see our comment in the Testing Schedule.]

4 OVERALL AGGREGATE LIABILITY

4.1 The overall aggregate liability for Delay Liquidated Damages and Performance Liquidated Damages is limited to \[ 25 \% \] of the Contract Price.
EPC Contracts in the Renewable Energy Sector - South African RE IPP Programme

Lessons learned from Phases 1 and 2

(October 2012)

APPENDIX 3

Sample flowchart - interfaces in the performance testing regime for wind farms