

Asia Pacific Projects Update

EPC CONTRACTS IN THE POWER SECTOR

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 projects¹. 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 specified level. Failure to comply with any requirements will usually result in the contractor incurring monetary liabilities.

It is timely to examine EPC contracts and their use on infrastructure projects given the bad publicity they have received, particularly in contracting circles. A number of contractors have suffered heavy losses and, as a result, a number of contractors now refuse to enter into EPC contracts in certain jurisdictions. This problem has been exacerbated by a substantial tightening in the insurance market. Construction insurance has become more expensive due both to significant losses suffered on many projects and the impact of September 11 on the insurance market.

However, because of their flexibility, the value and the certainty sponsors and lenders derive from EPC contracts, and the growing popularity of PFI² projects, the authors believe EPC contracts will continue to be the predominant

form of construction contract used on large-scale infrastructure projects in most jurisdictions.³

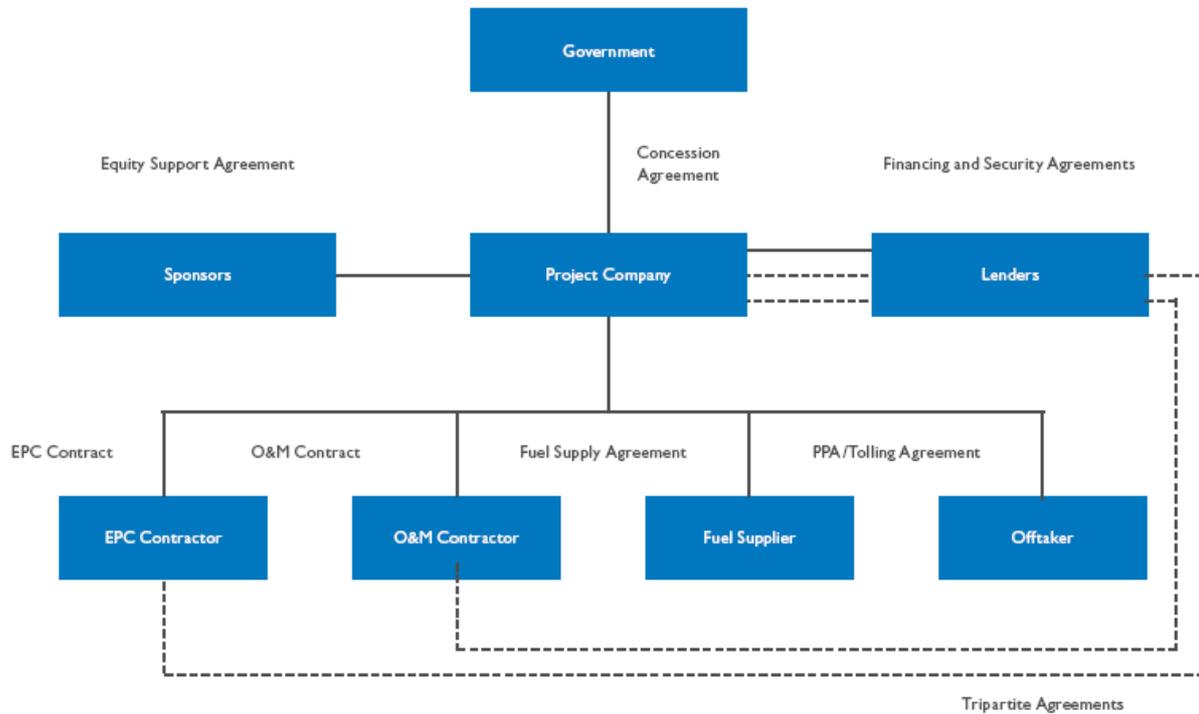
This paper will only focus on the use of EPC contracts in the power sector. However, the majority of the issues raised are applicable to EPC contracts used in all sectors.

Prior to examining power project EPC contracts in detail, it is useful to explore the basic features of a power project.

BASIC FEATURES OF A POWER PROJECT

The contractual structure

The diagram below illustrates the basic contractual structure of a project-financed power project using an EPC contract.



The detailed contractual structure will vary from project to project. However, most projects will have the basic structure illustrated above. As can be seen from the diagram, the project company⁴ will usually enter into agreements which cover the following elements:

- An agreement which gives the project company the right to construct and operate the power station and sell electricity generated by the power station. 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 power station 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) projects⁵.

However, following the deregulation of electricity industries in many countries, merchant power stations are now being 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 to 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 purchase agreement (PPA) between the project company and the local government authority, where the local government authority undertakes to pay for a set amount of electricity every year of the concession, subject to availability, regardless of whether it actually takes that amount of electricity (referred to as a take or pay obligation). Sometimes a tolling agreement is used instead of a PPA. A tolling agreement is an agreement under which the power purchaser directs how the plant is to be operated and despatched. In addition, the power purchaser is responsible for the provision of fuel. This eliminates one risk variable (for the project company) but also limits its operational flexibility.

In the absence of a PPA, project companies developing a merchant power plant, and lenders, do not have the same certainty of cashflow as they would if there was a PPA.

Therefore, merchant power projects are generally considered higher risk than non-merchant projects.⁶ This risk can be mitigated by entering into hedge agreements.

Project companies developing merchant power projects often enter into synthetic PPAs or hedge agreements to provide some certainty of revenue. These agreements are financial hedges as opposed to physical sales contracts. Their impact on the EPC contract is discussed in more detail below.

- A construction contract governing the construction of the power station. There are a number of contractual approaches that can be taken to construct a power station. An EPC contract is one approach. Another option is to have a supply contract, 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 ie 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, power projects use an EPC contract.

- An agreement governing the operation and maintenance of the power station. This is usually a long-term operating and maintenance agreement (O & M agreement) with an operator for the operation and maintenance of the power station. 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 independent power producer (IPP) or utility company whose main business is operating power stations. Therefore, the term of the O & M agreement will likely match the term of the concession agreement. In some financing structures the lenders will require the project company itself to operate the facility. In those circumstances the O & M agreement 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.

- An agreement governing the supply of fuel to the power station. This is usually a fuel supply agreement, often with the local government authority that regulates the supply of the fuel used to run the power station (eg coal, fuel oil, gas etc). Obviously, if there is a tolling agreement there is no separate fuel supply agreement. In addition, in some markets and for particular types of projects the project company may decide not to enter into a long-term fuel supply agreement but instead elect to purchase fuel in the spot market. This will usually only be feasible for peaking plants and in locations with ample supplies of the necessary fuel. For hydro and wind projects there is also no need for a fuel supply agreement. However, this paper focuses on thermal plants. Many of the issues discussed will be applicable to hydro and wind projects, however, those projects have additional risks and issues that need to be taken into account.
- 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 on a power project. 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 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 power station) 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 and 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 agencies⁷ or trans- or multi-national organisations like the World Bank, the Asian Development Bank and European Bank for Reconstruction. In addition, as well as bank borrowings sponsors are also using more sophisticated products like credit wrapped bonds, securitisation of future cashflows 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 date
- A fixed completion price
- 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)
- 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.

BASIC FEATURES OF AN EPC CONTRACT

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

- Time
- Cost
- 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 this date is not met 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 power station. 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 power station 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 power station. Therefore, it is vital that the power station performs as required in terms of output, efficiency 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.

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 power station 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 five 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 five MW.

PLDs and the performance guarantee regime and its interface with the DLDs and the delay regime are 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 percent 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 percent of the contract price with an overall cap on both types of liquidated damages of 30 percent 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 ie, 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 ie 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))

- Advance payment guarantee, if an advance payment is made

- A parent company guarantee – this is a guarantee from the ultimate parent (or other suitably 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 power station and a second, extended period, for more critical items.
- **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 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.

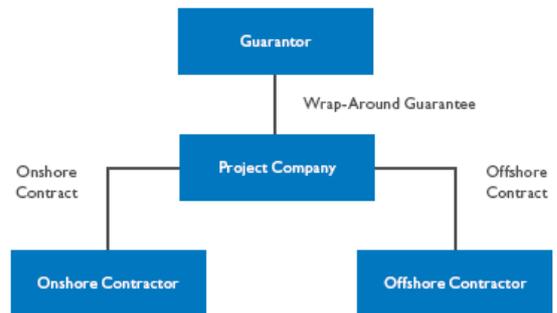
Obviously, ensuring the project is completed satisfactorily is usually more important than protecting the integrity of the contractual structure. However, if a project company interferes with the execution of the works they will, in most circumstances, have the worst of both worlds. They will have a 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 will be able to argue that it is not liable for either delayed or defective performance.

As a result, 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

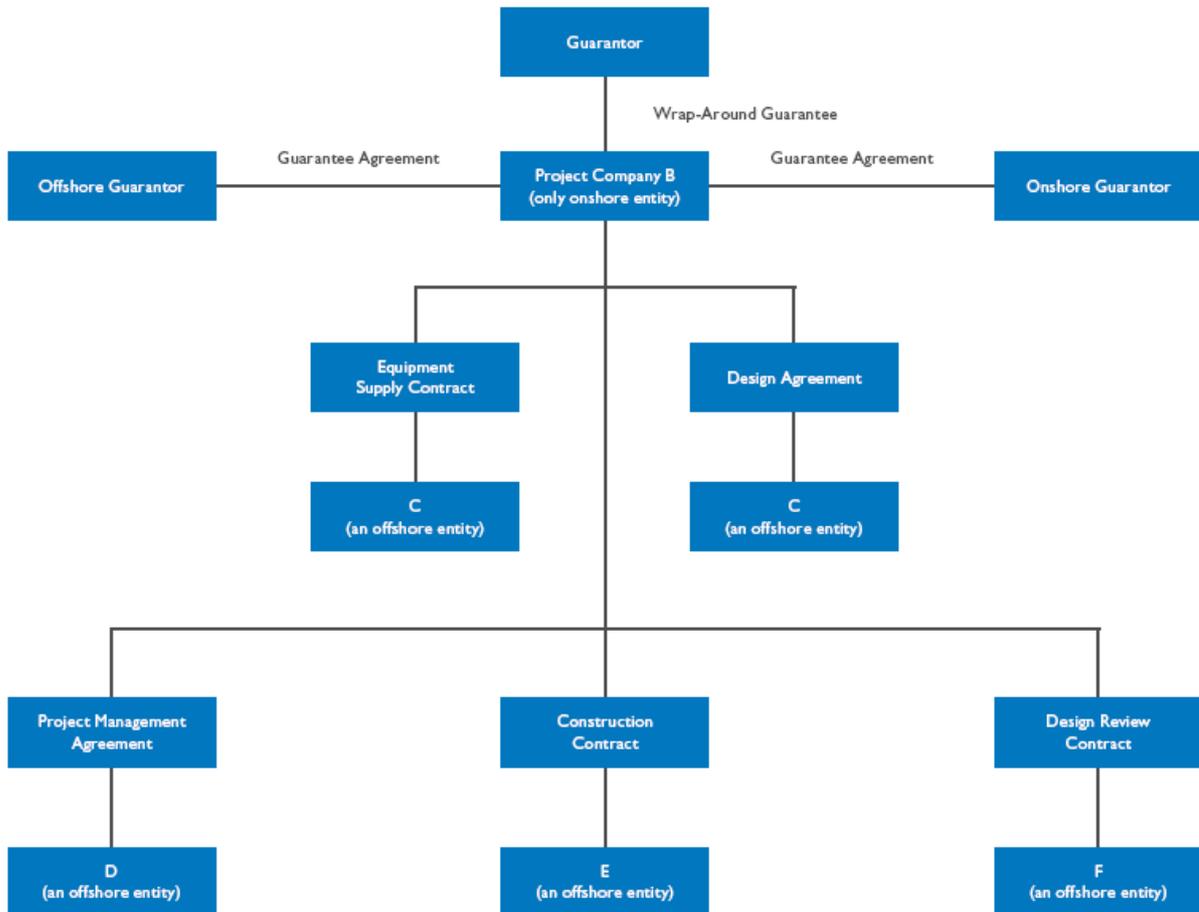
One common variation, particularly in Asia, on the basic EPC structure illustrated above is a split EPC contract. Under a split EPC contract, the EPC contract is, as the name implies, split into two or more separate contracts.

The basic split structure (illustrated below) involves splitting the EPC contract into an onshore construction contract and an offshore supply contract.⁹



There are two main reasons for using a split contract. The first is because it can result in a lower contract price as 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 because 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. Below is a diagram illustrating a more complex split EPC structure we have used previously that dealt with both tax and licensing issues.

EXAMPLE SPLIT EPC STRUCTURE



Whilst a split EPC contract can result in costs savings, there are risks to the project company in using such a 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 wrap-around guarantee,¹⁰ is 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. The contracting entities will then enter into a separate agreement to determine how, as between themselves, liability is to be apportioned. However, that agreement is not relevant for the purposes of this paper.

In addition, the wrap-around guarantee will, if properly drafted, prevent the various contractors from relying on the defaults of the other parties to avoid performing their

contractual obligations – a tactic known as a horizontal defence. The wrap-around guarantee should also prevent a contractor from relying on the project company's default where the project company's default was a result, either directly or indirectly, of the non-performance, under-performance or delay in performance of any of the other contractors under their respective contracts.

In addition to horizontal defences, the wrap-around guarantee should deal with the following matters:

- Guarantees and indemnities – the guarantor must guarantee the performance of the totality of the works and the ability of the separate parts to work seamlessly
- Liquidated damages – this is linked to the issue of horizontal defences discussed above. The wrap-around guarantee must ensure that liquidated damages are paid regardless of which contractor is late and which contractor fails to perform. Similarly, the aggregate cap of liability in the wrap-around guarantee must override any caps on liability in the split contracts themselves
- Provision of a performance bond by the guarantor or its parent – it is usually prudent to have the guarantor provide security for their obligations under the wrap-

around guarantee. This may be in addition to or in replacement of the security provided under the EPC contracts themselves. It will depend on the particular requirements of each project

- Liability (and limitation of liability) of the guarantor – the guarantor’s liability should be equal to the aggregate liability of the contracting entities under the split EPC contracts
- Duration of the wrap-around guarantee – the wrap-around guarantee should remain in force for as long as possible to offer the project company additional protection in the event latent defects occur. In any event, it should remain in force until the expiry of the defects liability period or the resolution of any dispute arising out of or in connection with the construction of the facility, whichever is the later
- Dispute resolution – the procedures should be identical to those in the project documents and allow the project company to consolidate claims
- Termination – termination of an EPC contract should automatically terminate the other EPC contract(s) and the wrap-around guarantee (except in respect of accrued liability)
- Tax indemnity – ideally the contractor(s) should indemnify the project company for any taxes or penalties payable as a result of the split.

In addition, the wrap-around guarantee should contain provisions dealing with the practical consequences of splitting the contract and how the contracts and the project should be administered. For example, there should also be clauses dealing with more mundane issues like notices. Notices issued under one contract should be deemed to be notices under the other contracts.

Whenever an EPC contract is split the primary driver both of the general structure of the split and the particular drafting approach must be achieving a tax effective structure. Therefore, tax advice from experts in the relevant jurisdiction must be obtained and those experts must review the split contracts and the wrap-around guarantee.

KEY POWER SPECIFIC CLAUSES IN POWER EPC CONTRACTS

General interface issues

As noted earlier, an EPC contract is one of a suite of agreements necessary to develop a power project. 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*
- Intellectual property.

Obviously, not all these issues will be relevant for all agreements. In addition to these general interface issues that apply to most types of projects, there are also power project issues that must be considered. These issues are mainly concerned with the need to burn fuel and export power. They are discussed in more detail below.¹¹

Those major power-specific interface issues are:

- Access for the contractor to the transmission grid to allow timely completion of construction, commissioning and testing (grid access).
- Consistency of commissioning and testing regimes
- Fuel specification requirements
- Interface issues between the relevant government agencies and system operator and the contractor. In particular, whilst the project company must maintain a long-term or comfortable relationship with either the government or the system operator the contractor does not.

Grid access

Clearly, EPC contracts will not provide for the handover of the power station to the project company and the PPA will not become effective until 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:

- The obligation to ensure that the infrastructure is in place
- 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 itself or has it provided through the relevant concession agreement. Issues that must be considered include:

- 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, concession agreement or any other construction agreement? If so, are the rights and obligations of the project company dealt with in a consistent manner?
- 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:

- 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?
- 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?
- 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?
- Is the relevant grid robust enough to allow for full testing by the contractor – for example, the performance of full-load rejection testing?
- What is the impact of relevant national grid codes or legislation and their interaction with both the EPC contract and the PPA?

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 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 on in Asia, particularly in China and the Philippines, have incurred

significant amounts of time and costs in determining the grid access obligations under the EPC contract. This experience has taught us that it is a matter which must be resolved at the contract formation stage. Therefore, we recommend inserting the clauses in part 3 of appendix 1.¹²

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. Relevant testing issues which must be considered include:

- Are differing tests/trialling required under the EPC contract and the PPA? 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' engineer 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 power station.
- Is the basis of the testing to be undertaken mirrored under both the EPC contract and the PPA? For example, on what basis are various environmental tests to be undertaken? Are they to be undertaken on a per unit basis or a station output basis?
- What measurement methodology is being used? Are the correction factors to be applied under the relevant documents uniform? Are 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 World Bank environmental guidelines, 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 legislative/guidelines have changed as regards environmental concerns. 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 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.

Fuel specification issues

The nature of the fuel to be supplied to the contractor under the EPC contract is also another important issue. Where there is a tolling agreement, as opposed to a PPA, it is vitally important that adequate review is done at the EPC contract level to ensure that the fuel being provided under the tolling agreement meets the requirements of the EPC contract. Similar consideration will need to be given to any project company where there is a PPA structure.

Differing fuel specification requirements can only result in delay, cost claims and extension of time claims at the EPC contract level. Fuel specification issues will be hidden away in the schedules. Again, watch out for those schedules.

In addition, where certain tests require specific types or quality of fuel the review should check that there are arrangements in place for that type of quality of fuel to be provided eg high sulphur fuel may be required to properly test the flue gas desulphurisation equipment.

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 or system operator during construction on issues such as the provision of transmission facilities, fuel requirements, 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 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.

KEY PERFORMANCE CLAUSES IN POWER 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 power station 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 and unenforceable. 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 to being unenforceable as a penalty, 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, ie 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 (ie 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 they are properly drafted to ensure contractors cannot avoid their liquidated damages liability on a legal technicality.

Therefore, it is important, from a legal perspective, to ensure DLDs and PLDs are dealt with separately. If a combined liquidated damages amount is levied for late completion of the works, it risks being struck out as a penalty because it will overcompensate the project company. However, a combined liquidated damages amount levied for underperformance may under-compensate the project company.

Our experience shows that there is a greater likelihood of delayed completion than there is of permanent underperformance. One of the reasons why projects are not completed on time is contractors are often faced with remedying performance problems. This means, from a legal perspective, if there is a combination of DLDs and PLDs, the liquidated damages rate should include more of the characteristics of DLDs to protect against the risk of the liquidated damages being found to be a penalty.

If a combined liquidated damages amount includes an NPV or performance element the contractor will be able to argue that the liquidated damages are not a genuine pre-estimate of loss when liquidated damages are levied for late completion only. However, if the combined liquidated damages calculation takes on more of the characteristics of DLDs the project company will not be properly compensated if there is permanent underperformance.

It is also important to differentiate between the different types of PLDs to protect the project company against arguments by the contractor that the PLDs constitute a penalty. For example, if a single PLDs rate is only focused on output and not efficiency, problems and uncertainties will arise if the output guarantee is met but one or more of the efficiency guarantees are not. In these circumstances, the contractor will argue that the PLDs constitute a penalty because the loss the project company suffers if the efficiency guarantees are not met are usually smaller than if the output guarantees are not met. As a result, power

project EPC contracts normally impose two types of PLDs, one for output (ie how many megawatts the power station produces) and one for heat rate (ie how much fuel the power station burns to generate the required output of electricity).

Drafting of the performance guarantee regime

Now that it is clear that DLDs and PLDs must be dealt with separately it is worth considering, in more detail, how the performance guarantee regime should operate. A properly drafted performance testing and guarantee regime is important because the success or failure of the project depends, all other things being equal, on the performance of the power station.

The major elements of the performance regime are:

- Testing
- Guarantees
- Liquidated damages.

Liquidated damages were discussed above. Testing and guarantees are discussed below.

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 power station. For example, pumps, conveyers, pressure vessels etc. They are usually discrete tests which do not test the power station as a whole. Liquidated damages do not normally attach to these tests. Instead, they are absolute obligations that must be complied with. If not, the power station will not reach the next stage of completion (for example, mechanical completion or provisional acceptance).
- Emissions tests – these test compliance against environmental requirements. Again, these are normally absolute obligations because the consequences of failure can be as severe as being forced to shut down the power station. These tests should ensure the most stringent obligations imposed on the project company, whether by government regulations or by lenders, are met. Emissions tests occur at various times, including during and after guarantee tests. Liquidated damages are sometimes levied if the contractor fails the emissions tests. However, given emissions tests are usually related to environmental approvals, it is likely that the power station will not be able to operate if the emissions tests are failed. Therefore, passing the emissions tests is usually an absolute obligation not linked to liquidated damages.
- Guarantee tests – these test the ability of the power station to meet the performance criteria specified in the contract. There are often minimum and guaranteed

levels of performance specified and, as discussed above, providing the minimum levels are met the consequence of failure is normally the payment of PLDs. Satisfaction of the minimum performance guarantees is normally an absolute obligation. The minimum performance guarantees should be set at a level of performance at which it is economic to accept the power station. 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 power station 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 power station 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 power station operates at the guaranteed level or the contractor pays PLDs where the power station does not operate at the guaranteed level. Obviously, DLDs will be capped (usually at 20 percent 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 power station. If the project company does not have this right the problem mentioned above will arise, namely, the project company will not have received its power station and will not be receiving any DLDs as compensation.

It is common for the contractor to be given an opportunity to modify the power station if it 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 over-engineer the power station and will build a contingency for paying PLDs into the contract price. The second reason is because in most circumstances the project company will prefer to receive a power station that operates at 100 percent capacity. 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 who bears the costs of the additional fuel and consumables required to undertake the retesting. The cost of the fuel 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 programme 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' engineer. 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 American Society of Mechanical Engineers 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?
- **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 power stations with multi-units the testing procedures must state those tests to be carried out on a per unit basis and those on an entire plant basis.

Provision of consumables and fuel

The responsibility for the provision of consumables and fuel required to carry out the performance tests must be clearly set out in the EPC contract. In general, the project company will be responsible for the provision of both consumables and fuel.

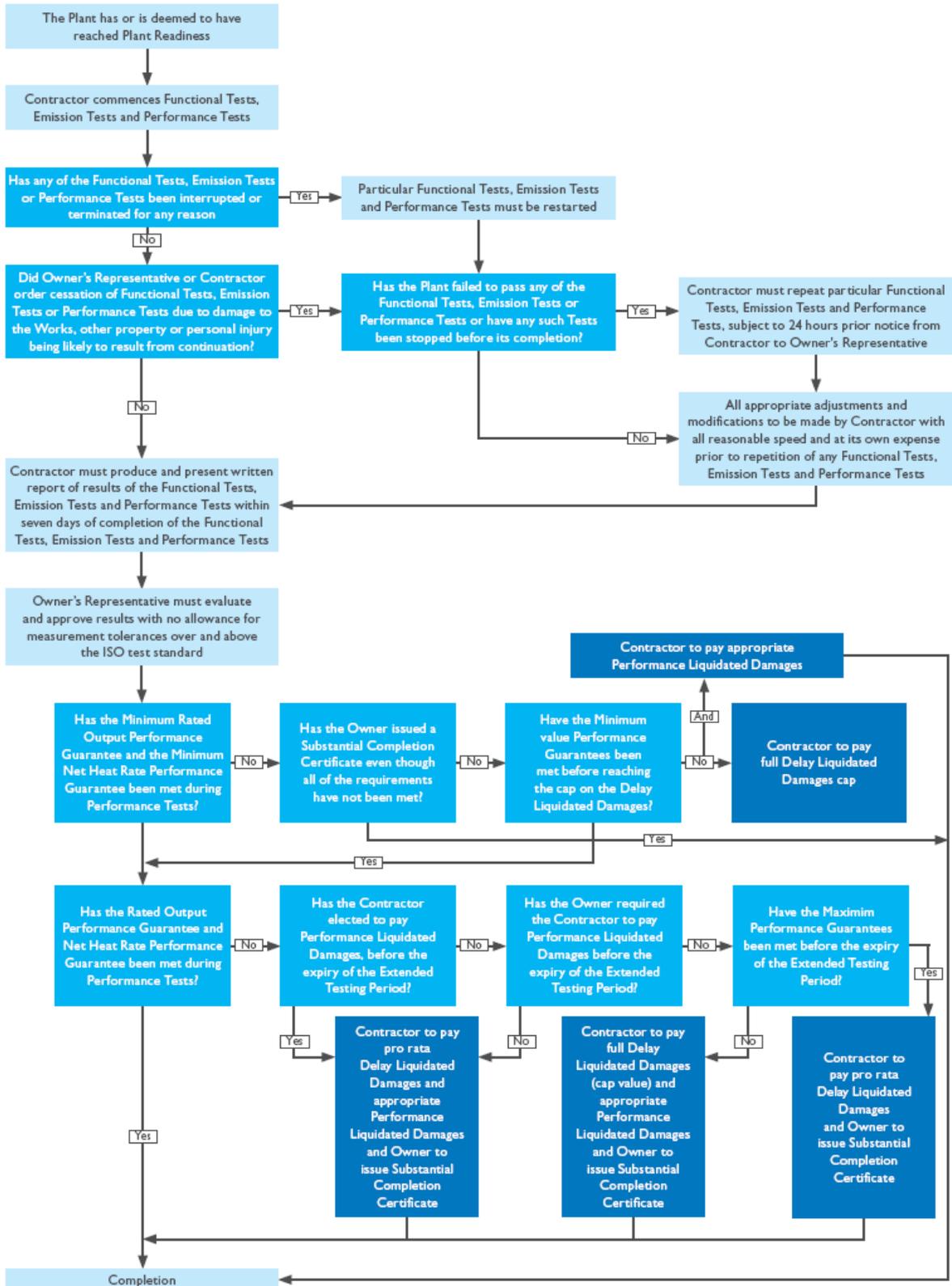
As the proper interpretation of the project company's obligation to supply consumables is often a matter of dispute between the project company and contractor, it is important for the EPC contract to precisely identify the quality and quantity of consumables to be provided as well as the time for provision of those consumables (which should be linked to the progress of the works rather than a specific date). The responsibility for the cost of providing consumables and fuel must also be clearly identified. This is discussed in more detail in the preceding section above.

An example of the performance testing and guarantee regime we have used on a number of projects is included in appendix 1 to this paper.

These example clauses are only extracts from a complete contract and ideally should be read as part of that entire contract and, in particular, with the clauses that deal with DLDs, PLDs, liability, the scope of the contractor's obligations, including any fitness for purpose warranties and termination. Nonetheless, they do provide an example of the way a performance testing and liquidated damages regime can operate.

The process is best illustrated diagrammatically. Refer to the flowcharts below to see how the various parts of the performance testing regime should interface.

PERFORMANCE GUARANTEES AND TESTING



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 it is 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 contracts¹³ due to the prevention principle. The prevention principle was developed by the courts to prevent employers ie 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 preconditions 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)
- *Force majeure*,

Which cause a delay on the critical path¹⁴ 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 clause in part 2 of 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 power station

by the time the contractor is ready to commission the power station. 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 six-day extension of time.

Each of these approaches is discussed in more detail below.

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:

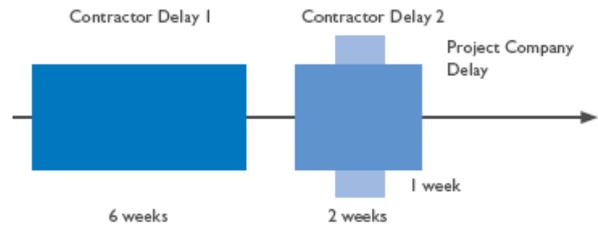
"If more than one event causes concurrent delays and the cause of at least one of those events, but not all of them, is a cause of delay which would not entitle the contractor to an extension of time under [EOT clause], then to the extent of the concurrency, the contractor will not be entitled to an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

Nothing in the clause prevents the contractor from claiming an extension of time under the general extension of time clause. What the clause does 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.

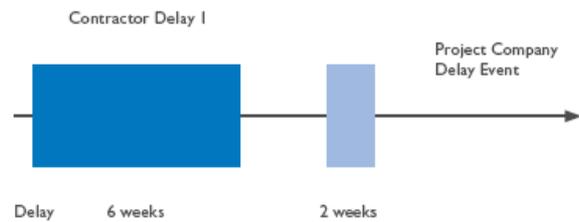
The operation of this clause is best illustrated diagrammatically.

Example 1: contractor not entitled to an extension of time for project company-caused delay



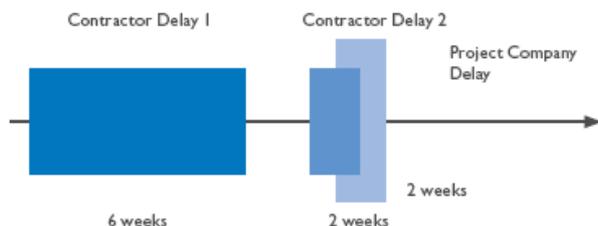
In this example, the contractor would not be entitled to any extension of time because the Contractor Delay 2 overlap entirely the project company delay. Therefore, using the example clause above, the contractor is not entitled to an extension of time to the extent of the concurrency. As a result, at the end of the Contractor Delay 2 the contractor would be in eight 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



In this example, where 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



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 ie 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.

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.

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, the Australian Standards construction contract AS4000 adopts the apportionment approach. The AS4000 clause states:

"34.4 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:

- *WUC can nevertheless reach practical completion without an EOT; or*
- *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 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 the unions. How should the causes be apportioned? In this example, the two causes are both 100 percent 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. We appreciate the above is not particularly rigorous legal reasoning, however, the clause does not lend itself to rigorous analysis.

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 power station. 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 power station in a manner that does not require the payment of liquidated damages (ie 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 power station and PLDs were expressed to be the exclusive remedy for any failure of the power station to perform in the required manner. For example, any determination as to whether the power station is fit for purpose will necessarily depend on the level and standard of the performance of the power station. 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 power station.

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. An example of how difficult it is to show frustration is that many of the leading cases relate to the abdication of King Edward VIII before his coronation and the impact that had on contracts entered into in anticipation of the coronation ceremony.

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 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
- 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
- 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 two aspects to the operation of *force majeure* clauses:

- The definition of *force majeure* events
- 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.

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:

- *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*
- *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*
- *Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds*
- *Earthquakes, flood, fire or other physical natural disaster, but excluding weather conditions regardless of severity*
- *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 programme 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:

- *Any costs, losses, expenses, damages or the payment of any part of the contract price during an event for force majeure.*
- *Any delay costs in any way incurred by the contractor due to an event for 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 5.00pm 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 (O & M 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 six 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 power station.

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 power station 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 power station. 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 spare 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
- 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 the 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
- The expiry of the defects liability period.

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 power station. This provision must make exception for the parties to seek urgent interlocutory relief ie 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
- Providing for consolidation of any dispute with other disputes which arise out of or in relation to the construction of the power station. The power to consolidate should be at the project company's discretion.

We have prepared a paper which details the preferred approach to be taken in respect of dispute resolution regimes in various Asian jurisdictions including the PRC, Philippines, Thailand, Vietnam and Taiwan. You should consult this paper, or ask us for a copy, if you want more information on this topic.

APPENDIX I – EXAMPLE CLAUSE: PART I – PERFORMANCE TESTING AND GUARANTEE REGIME

I COMMISSIONING TESTS AND POWER STATION READINESS

1.1 After the contractor has provided the owner's representative with the marked-up drawings of the piping and instrumentation diagrams, logic diagrams and electrical single-line diagrams and control schematics for them, the contractor must carry out the commissioning tests for the relevant system.

1.2 The commissioning tests:

For each system must:

- Be performed on a system-by-system basis.
- Include the inspection and checking of equipment and supporting subsystems, trial operation of supporting equipment, initial operation of the system, operation of the system to obtain data, perform system calibration and corrective works, and shutdown inspection and correction of defects and non-conforming works identified during the commissioning tests.

Must demonstrate:

- The capability of major sections of the works to operate in all modes of start-up, steady state, transients, plant changeovers, shutdowns, trips and the like.
- The technical suitability of the works and its control equipment and the capability of the operational procedures recommended by the contractor.

[Clause 1.2 is optional. The commissioning testing regime can be included in the general testing regime in clause 1.3. The reference to a system is a reference to a discrete part of the works that contains several elements but which can be tested independently of the entire works. Examples include the fire safety system, a coal conveyor and crusher system etc.]

1.3 In carrying out any test which requires the contractor to supply electricity to the transmission network, the contractor must:

- Issue a notice to the owner's representative at least 24 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
- Promptly notify the owner's representative if there is any change in the information contained in such notice.

- Do all things necessary to assist the owner (including but not limited to cooperating with the network service provider), so that the owner can comply with its obligations under the grid code.

Power station readiness

1.4 As soon as the power station has, in the opinion of the contractor, reached the stage of power station readiness, the contractor must give notice to the owner's representative.

1.5 The owner's representative must, promptly, and no later than three days after receipt of the contractor's notice under GC 1.4, either issue a power station readiness certificate in the form specified in appendix X stating that the power station has reached power station readiness or notify the contractor of any defects and/or deficiencies.

1.6 If the owner's representative notifies the contractor of any defects and/or deficiencies, the contractor must then correct such defects and/or deficiencies and must repeat the procedure described in GC 1.4.

1.7 If the owner's representative is satisfied that the power station has reached power station readiness, the owner's representative must promptly, and no later than three days after receipt of the contractor's repeated notice, issue a power station readiness certificate stating that the power station has reached power station readiness as at the date stated in that certificate.

1.8 If the owner's representative is not so satisfied, then it must notify the contractor of any defects and/or deficiencies within three days after receipt of the contractor's repeated notice and the above procedure must be repeated.

1.9 If the owner's representative fails to issue the power station readiness certificate and fails to inform the contractor of any defects and/or deficiencies within six days after receipt of the contractor's notice under GC

1.4 or within three days after receipt of the contractor's repeated notice under GC 1.6, then the power station is deemed to have reached power station readiness as at the date of the contractor's notice or repeated notice, as the case may be.

2 FUNCTIONAL TESTS, EMISSION TESTS, PERFORMANCE TESTS AND SUBSTANTIAL COMPLETION

Tests

2.1 Upon receipt of the power station readiness certificate, or when the power station is deemed to have reached power station readiness under GC 1.9, the contractor must carry out the functional tests, emission tests and performance tests, provided the contractor gives at least

48 hours' notification to the owner's representative prior to commencing such tests.

2.2 The contractor must not commence any of the functional tests, emission tests or performance tests prior to power station readiness.

2.3 For the avoidance of doubt, it is a condition precedent to the achievement of substantial completion that the emission tests must be passed.

Procedure

2.4

- If a functional test, emission test or performance test is interrupted or terminated, for any reason, such test must be re-started from the beginning, unless otherwise approved by the owner's representative.
- The owner's representative or the contractor is entitled to order the cessation of any functional test, emission test or performance test if damage to the works, or other property or personal injury are likely to result from continuation.
- If the power station being tested fails to pass any of the functional tests, emission tests or performance tests (or any repetition thereof in the event of prior failure) or if any functional test, emission test or performance test is stopped before its completion, such functional test, emission test or performance test must, subject to 48 hours' prior notice having been given by the contractor to the owner's representative, be repeated as soon as practicable thereafter. All appropriate adjustments and modifications are to be made by the contractor with all reasonable speed and at its own expense before the repetition of any functional test, emission test or performance test.
- The results of the functional tests, emission tests and performance tests must be presented in a written report produced by the contractor and delivered to the owner's representative within seven days of the completion of the functional tests, emission tests or performance tests. Such results will be evaluated and approved by the owner's representative. In evaluation of such results, no additional allowance will be made for measurement tolerances over and above those specified in the applicable ISO test standard.

Substantial completion

2.5 As soon as the power station has, in the opinion of the contractor, reached the stage of substantial completion, the contractor must give notice to the owner's representative.

2.6 The owner's representative must, promptly, and no later than three days after receipt of the contractor's notice under GC 2.5, either issue a substantial completion

certificate in the form specified in appendix 13 stating that the power station has reached substantial completion or notify the contractor of any defects and/or deficiencies.

2.7 If the owner's representative notifies the contractor of any defects and/or deficiencies, the contractor must then correct such defects and/or deficiencies and must repeat the procedure described in GC 2.5.

2.8 If the owner's representative is satisfied that the power station has reached substantial completion, the owner must, promptly, and no later than three days after receipt of the contractor's repeated notice, issue a substantial completion certificate stating that the power station has reached substantial completion as at the date stated in that certificate.

2.9 If the owner's representative is not so satisfied, then it must notify the contractor of any defects and/or deficiencies within three days after receipt of the contractor's repeated notice and the above procedure must be repeated.

2.10 Notwithstanding that all the requirements for the issuing of a substantial completion certificate have not been met, the owner's representative may at any time, in its absolute discretion, issue a substantial completion certificate. The issue of a substantial completion certificate in accordance with this GC 2.10 will not operate as an admission that all the requirements of substantial completion 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.

3 RELIABILITY TEST AND COMMERCIAL OPERATION

Reliability test

3.1 Upon receipt of the substantial completion certificate the contractor must carry out the reliability test.

3.2 It is a condition precedent to the commencement of the reliability test that the substantial completion certificate has been issued.

3.3 If the reliability test is interrupted or terminated by the owner or the owner's representative, other than for reason of default by the contractor, such test must be restarted from the point of interruption or termination. In the case of default by the contractor, it must be restarted from the beginning or otherwise in accordance with appendix 1. If the actual rated output specified in the substantial completion certificate is less than the rated output performance guarantee the guaranteed availability in MWh will be recalculated.

Commercial operation

3.4 As soon as the power station has, in the opinion of the contractor, reached the stage of commercial operation, the contractor must give notice to the owner's representative.

3.5 The owner's representative must, promptly, and no later than three days after receipt of the contractor's notice under GC 3.4, either issue a commercial operation certificate in the form specified in appendix 14 stating that the power station has reached commercial operation or notify the contractor of any defects and/or deficiencies.

3.6 If the owner's representative notifies the contractor of any defects and/or deficiencies, the contractor must then correct such defects and/or deficiencies and must repeat the procedure described in GC 3.4.

3.7 If the owner's representative is satisfied that the power station has reached commercial operation, the owner must, promptly, and no later than three days after receipt of the contractor's repeated notice, issue a commercial operation certificate stating that the power station has reached commercial operation as at the date stated in that certificate.

3.8 If the owner's representative is not so satisfied, then it must notify the contractor of any defects and/or deficiencies within three days after receipt of the contractor's repeated notice and the above procedure must be repeated.

4 PERFORMANCE GUARANTEES

Net heat rate and rated output performance guarantees

4.1 The contractor guarantees that, during the same performance tests, the power station and all parts will meet the rated output performance guarantee and the net heat rate performance guarantee.

Minimum performance guarantees not met

4.2 If, for reasons not attributable to the owner, either or both of the minimum performance guarantees are not met, the contractor must at its cost and expense make such changes, modifications and/or additions to the power station or any part as may be necessary so as to meet at least the minimum rated output performance guarantee and the minimum net heat rate performance guarantee respectively. The contractor must notify the owner upon completion of the necessary changes, modifications and/or additions and must repeat, subject to the owner's rights under GCs 4.3 and 46.2(a)(iii) [Termination], the relevant performance tests until the minimum rated output performance guarantee and the minimum net heat rate performance guarantee respectively have been met. Nothing in this GC 4.2 derogates from the contractor's

obligation to meet the rated output performance guarantee and the net heat rate performance guarantee.

4.3 Notwithstanding this GC 4 or any other provision of this contract, if for reasons not attributable to the owner at any time after the contractor has repeated the performance tests the contractor does not meet either or both minimum performance guarantees, the owner may require the contractor to pay

- In relation to the minimum performance guarantee(s) that has/have been met performance liquidated damages calculated in accordance with section 2.1(a) or section 2.2(a) of appendix Y.
- If the minimum rated output performance guarantee has not been met:
 - An amount equal to the amount the contractor would have been liable for if the actual rated output of the power station was equal to 95 percent of the rated output performance guarantee as specified in section 2.1(a) of appendix Y.
 - Performance liquidated damages calculated in accordance with section 2.1(b) of appendix Y.
- If the minimum net heat rate performance guarantee has not been met:
 - An amount equal to the amount the contractor would have been liable for if the actual net heat rate of the power station was equal to 105 percent of the net heat rate performance guarantee as specified in section 2.2(a) of appendix Y.
 - Performance liquidated damages calculated in accordance with section 2.2(b) of appendix Y.

4.4 The payment of performance liquidated damages under GC 4.3 will be in complete satisfaction of the contractor's guarantees under GC 4.1.

Minimum performance guarantees met, but not performance guarantees

4.5 Subject to GC 4.3, 4.6 and 4.7, if, for reasons not attributable to the owner, both of the rated output performance guarantee and the net heat rate performance guarantee are not met but both the minimum performance guarantees are met during the same performance test, the contractor must, prior to the expiration of the extended testing period:

- At its cost and expense make such changes, modifications and/or additions to the power station or any part as may be necessary so as to meet the rated output performance guarantee and the net heat rate performance guarantee respectively.
- Notify the owner upon completion of the necessary changes, modifications and/or additions.

- Repeat the performance tests until the rated output performance guarantee and the net heat rate performance guarantee respectively have been met during the same performance test.

4.6 If, during the same performance test, the contractor has met both the minimum performance guarantees, but not both the net heat rate performance guarantee and the rated output performance guarantee by the expiration of the extended testing period, the contractor must pay the respective performance liquidated damages to the owner.

4.7

- Notwithstanding GC 4.5 and 4.6, the contractor may at any time during the extended testing period elect to pay performance liquidated damages to the owner in respect of the failure to meet either or both of the net heat rate performance guarantee and the rated output performance guarantee provided the minimum performance guarantees are met.
- Notwithstanding GCs 4.5 and 4.6, and subject to GC 4.3, the owner may, provided that the date for commercial operation has passed, require the contractor to pay performance liquidated damages to the owner in respect of the failure to meet either or both of the net heat rate performance guarantee and the rated output performance guarantee.

4.8 The payment of performance liquidated damages under GC 4.6 or GC 4.7 will be in complete satisfaction of the contractor's guarantees under GC 4.1, provided that the power station meets both the minimum rated output performance guarantee and the minimum net heat rate performance guarantee as at the date of payment of such performance liquidated damages.

Guaranteed availability

4.9 The contractor guarantees that the power station either in whole or in part will operate at the guaranteed availability for a period of 12 months from not later than two months after the date of commercial operation.

4.10 If the actual availability period actual energy measured is less than the guaranteed availability, the contractor will pay performance liquidated damages to the owner as specified in appendix Y.

4.11 The aggregate liability of the contractor for performance liquidated damages under GC 4.10 will not exceed the amount calculated in accordance with appendix 15.

General

4.12 Performance liquidated damages will be invoiced by the owner and payment will be due within 21 days of issue of such invoice. At the expiration of 21 days the amount invoiced is 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.

4.13 The parties agree that the performance liquidated damages in appendix Y are a fair and reasonable pre-estimate of the damages likely to be sustained by the owner as a result of the contractor's failure to meet the performance guarantees.

4.14 The payment of performance liquidated damages under this GC 4 is in addition to any liability of the contractor for delay liquidated damages under GC [].

4.15 The aggregate liability of the contractor for delay liquidated damages and performance liquidated damages (provided the contractor has met both minimum performance guarantees) will not exceed the amount calculated in accordance with section 3 of appendix Y. The aggregate liability of the contractor under this GC 4.15 will not apply if the owner requires the contractor to pay performance liquidated damages pursuant to GC 4.3.

4.16 If this GC 4 (or any part thereof) is found for any reason to be void, invalid or otherwise inoperative so as to disentitle the owner from claiming performance liquidated damages, the owner is entitled to claim against the contractor damages at law for the contractor's failure to meet any or all of the performance guarantees. Such damages must not exceed:

- \$[] for each megawatt (and pro rata for part of a megawatt) by which the actual output of the power station or part (whichever is applicable) is less than the rated output performance guarantee, unless the actual output of the power station is less than 95 percent of the rated output performance guarantee, in which case such damages will not exceed \$[] for each megawatt (and pro rata for part of a megawatt) by which the actual output of the power station or part (whichever is applicable) is less than the minimum rated output performance guarantee.
- \$[] for each kilojoule/kilowatt hour (and pro rata for part of a kilojoule/kilowatt hour) by which the actual net heat rate of the power station or part (whichever is applicable) exceeds the net heat rate performance guarantee, unless the actual net heat rate of the power station is more than 105 percent of the net heat rate performance guarantee, in which case such damages will not exceed \$[] for each kilojoule/kilowatt hour (and pro rata for part of a kilojoule/kilowatt hour) by which the actual net heat rate of the power station or part (whichever is applicable) is less than the minimum net heat rate performance guarantee.
- \$[] for each megawatt hour (and a proportionate part thereof for each part of a megawatt hour) that the

availability period actual energy measured is less than the guaranteed availability.

4.17 The contractor is not entitled to the benefit of the exclusion in GC [] [prohibition on claiming consequential loss] in any claim for damages at law by the owner against the contractor pursuant to GC 4.16 for the contractor's failure to meet any or all of the performance guarantees.

APPENDIX I – EXAMPLE CLAUSE: PART 2 – EXTENSION OF TIME REGIME

[].1 The contractor must immediately give notice to the project company of all incidents and/or events of whatsoever nature affecting or likely to affect the progress of the works.

[].2 Within 15 days after an event has first arisen the contractor must give a further notice to the project company which must include:

- The material circumstances of the event including the cause or causes
- The nature and extent of any delay
- The corrective action already undertaken or to be undertaken
- The effect on the critical path noted on the programme
- The period, if any, by which in its opinion the date for commercial operation should be extended
- A statement that it is a notice pursuant to this GC [].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 in accordance with GC [].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 in place of the notice required under GC [].2. The contractor must then submit to the project company, at intervals of 30 days, further interim written particulars until the actual delay caused (if any) is ascertainable, whereupon the contractor must as soon as practicable but in any event within 30 days give a final notice to the project company including the particulars set out in GC [].2.

[].4 The project company must, within 30 days of receipt of the notice in GC [].2 or the final notice in GC [].3 (as the case may be), issue a notice notifying the contractor's representative of its determination as to the period, if any,

by which the date for commercial operation is to be extended.

[].5 Subject to the provisions of this GC [], the contractor is entitled to an extension of time to the date for commercial operation as the project company assesses, where a delay to the progress of the works is caused by any of the following events, whether occurring before, on or after the date for commercial operation:

- Any act, omission, breach or default by the project company, the project company's representative and their agents, employees and contractors
- A variation, except where that variation is caused by an act, omission or default of the contractor or its Subcontractors, agents or employees
- A suspension of the works pursuant to GC [], except where that suspension is caused by an act, omission or default of the contractor or its subcontractors, agents or employees
- An event of force majeure
- A change of law

[].6 Despite any other provisions of this GC [], the project company may at any time make a fair and reasonable extension of the date for commercial operation.

[].7 The contractor must constantly use its best endeavours to avoid delay in the progress of the works.

[].8 If the contractor fails to submit the notices required under GCs [].1, [].2 and [].3 within the times required then:

- The contractor has no entitlement to an extension of time
- The contractor must comply with the requirements to perform the works by the date for commercial operation
- Any principle of law or equity (including those which might otherwise entitle the contractor to relief and the prevention principle) which might otherwise render the date for commercial operation immeasurable and liquidated damages unenforceable, will not apply

[].9 It is a further condition precedent of the contractor's entitlement to an extension of time that the critical path noted on the programme is affected in a manner which might reasonably be expected to result in a delay to the works reaching commercial operation by the date for commercial operation.

[].10 If there are two or more concurrent causes of delay and at least one of those delays would not entitle the contractor to an extension of time under this GC [] then, to the extent of that concurrency, the contractor is not entitled to an extension of time.

[].11 The project company may direct the contractor's representative to accelerate the works for any reason including as an alternative to granting an extension of time to the date for commercial operation.

[].12 The contractor will be entitled to all extra costs necessarily incurred, by the contractor in complying with an acceleration direction under GC [].11, except where the direction was issued as a consequence of the failure of the contractor to fulfil its obligations under this contract. The project company must assess and decide as soon as reasonably practical, the extra costs necessarily incurred by the contractor.

APPENDIX I – EXAMPLE CLAUSE: PART 3 – GRID ACCESS REGIME

[].1 The contractor must coordinate the connection of the facility to the transmission line and provide, in a timely manner, suitable termination facilities in accordance with appendix 1. The contractor must liaise with the network service provider, government authorities and other parties to avoid delays in connecting the facility to the transmission line.

[].2 On the date for first synchronisation the project company must ensure that there is in place a transmission network which is capable of receiving the generated output the facility is physically capable of producing at any given time.

[].3 The project company's obligation to ensure that the transmission network is in place is subject to the contractor being able (physically and legally) to connect the facility to the transmission line and import and/or export power to the transmission network.

[].4 If the contractor notifies the project company that first synchronisation is likely to take place before the date for first synchronisation, the project company must endeavour, but is under no obligation to ensure that the transmission network is in place, to enable first synchronisation to take place in accordance with the contractor's revised estimate of first synchronisation.

[].5 At the time of and following first synchronisation the project company will ensure that the contractor is permitted to export to the transmission network power which the facility is physically capable of exporting, provided that:

- It is necessary for the contractor to export that amount of power if the contractor is to obtain commercial operation
- The contractor has complied in all respects with its obligations under GC [].7

- In the reasonable opinion of the project company and/or the network service provider the export of power by the facility will not pose a threat to the safety of persons and/or property (including the transmission network).

[].6 For the avoidance of doubt, the project company 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 network in accordance with the grid code.

[].7 The contractor must carry out the testing of the works, in particular in relation to the connection of the facility to the transmission network so as to ensure that the project company and the contractor as a Participant (as defined in the electricity code) comply with their obligations under the electricity code in respect of the testing of the works.

[].8 The contractor must carry out the testing of the works, in particular in relation to the connection of the facility to the transmission network, so as to ensure that:

- Any interference to the transmission network is minimised
- Damage to the transmission network is avoided.

[].9 The contractor must promptly report to the project company's representative any interference with and damage to the transmission network which connects with the facility.

[].10 Without derogating from the contractor's obligations under this contract, in carrying out any test which requires the contractor to supply electricity to the transmission network, the contractor must:

- Issue a notice to the project company's representative at least 24 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
- Promptly notify the project company's representative if there is any change in the information contained in such notice
- Do all things necessary to assist the project company (including but not limited to cooperating with the network service provider and complying with its obligations under GC 20.15), so that the project company can comply with its obligations under the national electricity code

FOOTNOTES

1 By this we mean industry sectors including power, oil and gas, transport, water and telecommunications.

2 The terms private finance initiatives (PFI) and public private partnerships (PPP) are used interchangeably. Sectors which undertake PFI projects include prisons, schools, hospitals, universities and defence.

3 Some jurisdictions, such as the USA, use alternative structures which separate the work into various components.

4 Given this paper focuses on project-financed infrastructure projects we refer to the employer as the project company. Whilst project companies are usually limited liability companies incorporated in the same jurisdiction as the project is being developed in the actual structure of the project company will vary from project to project and jurisdiction to jurisdiction.

5 Power projects undertaken by the private sector and, more particularly, by non-utility companies are also referred to as independent power projects (IPPs). They are undertaken by independent power producers (IPPs).

6 However, because merchant power projects are generally undertaken in more sophisticated and mature markets there is usually a lower level of country or political risk. Conversely, given the move towards privatisation of electricity markets in various countries, this may no longer be the case.

7 Export credit agencies are bodies that provide finance on the condition that the funds are used to purchase equipment manufactured in the country of the export credit agency.

8 For the purposes of this paper, we have assumed the EPC contract will be governed by the law of a common law jurisdiction. Where there are differences between jurisdictions we have adopted the English law approach. Therefore, if an EPC contract is governed by a law other than English law you will need to seek advice from local counsel to ensure the contract is enforceable in the relevant jurisdiction. For further information on liability in EPC contracts under English law refer to our paper outlined "Position Paper on Liability".

9 We have prepared a paper that deals with the variations and complications in split EPC contracts. You should consult that paper, or ask us for a copy, if you want more information on this topic.

10 This is also called a coordination agreement, an administration agreement or an umbrella deed.

11 This discussion assumes the project company will be entering into either a PPA or a tolling agreement. However, some of these issues will also be relevant if the project company is entering into hedging agreements for a merchant project. For example, those hedge agreements will likely mandate a date by which the power station must be capable of commercial operation. Failure to comply with this requirement will incur monetary liability. Similarly there may be availability requirements and certain performance guarantees imposed by the hedge. These requirements must be flowed through to the EPC contract.

12 These clauses will have to be modified to ensure compliance with the relevant regulatory regime.

13 It can arise in civil law countries as well, it will depend on the relevant provisions of the code in those countries. For example, the PRC contract law contains articles that entitle a contractor to an extension of time for employer-caused delays.

14 The critical path is the path on the construction programme that shows the dates when certain activities must be completed by in order to achieve completion by the specified date.

KEY CONTACTS

Damian McNair

Partner, Head of Finance & Projects Australia

T +61 3 9274 5379

damian.mcnaair@dlapiper.com

www.dlapiper.com

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