



EPC and EPCM  
delivery models

# 16 Engineering, Procurement and Construction Management (EPCM) contracts

Investing in Energy Transition Projects  
March 2023



# Introduction

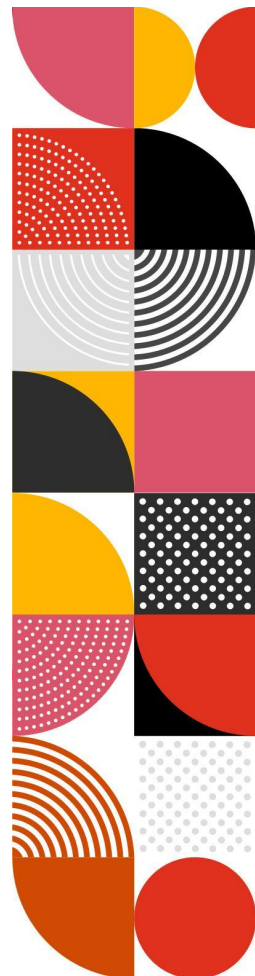
Lump sum Engineering, Procurement and Construction (**EPC**) style contracts which fully allocate risk to a head Contractor for project delivery are often not a suitable delivery method. The reasons include:

- extreme risk of cost rises in a high inflation economy
- supply difficulties
- the use of high risk technologies
- the imperative to start projects before pricing and programming can be finalised to minimise delays caused by supply chain issues
- high demand in the global construction and engineering sectors
- the significant size, complexity and profile of so-called 'mega projects'
- the shortage of Contractors with the experience and resources needed to deliver such mega projects
- the shortage of experienced labour and quality materials and resultant fluctuations in associated costs.

Increasingly, Principals and Contractors are looking for alternatives to the traditional fixed price and time project delivery methods. While the traditional delivery methods remain (such as design and build; EPC; and construct only), the risk allocation and payment arrangements vary significantly.

This paper provides a brief review on the traditional fixed time and cost arrangements and, in the Engineering, Procurement and Construction Management (**EPCM**) context:

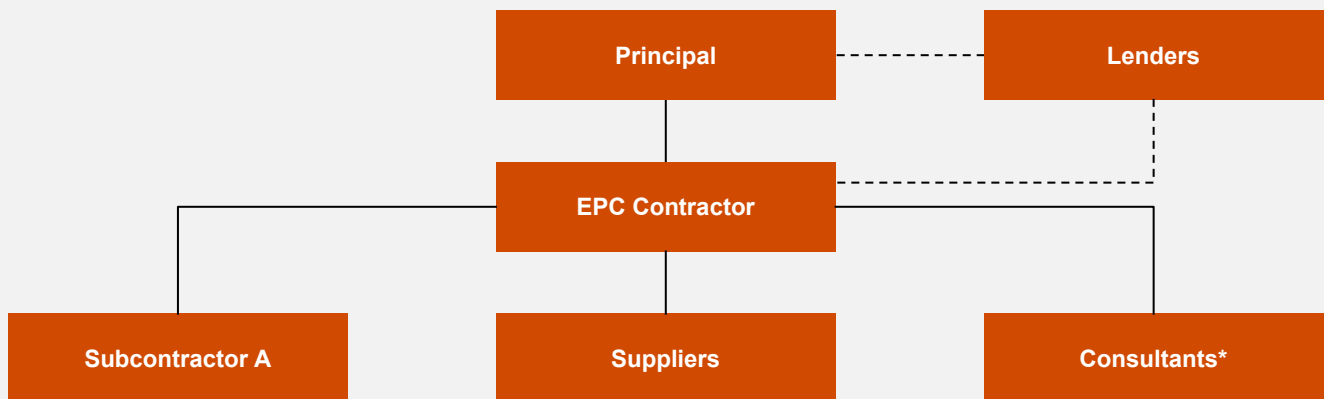
- provides an overview of the main features
- examines each phase of the EPCM delivery method
- discusses other issues, including bankability and Key Performance Indicator (**KPI**) arrangements.



# Delivery by traditional fixed time and cost arrangements

Over the past 10-15 years, project delivery methods have generally incorporated some form of fixed time and cost arrangement – whether by construct only, design and build or EPC. These delivery methods were, and remain, popular with Principals and Financiers as the fixed time and cost arrangement provides certainty and, for EPC Contracts, a single source of responsibility. Delay liquidated damages may be levied against the Contractor so as to incentivise them to complete the works on time and the circumstances where the Contractor can claim relief for increases in the cost are carefully limited. Naturally, Contractors seek to price a risk premium into their remuneration to deal with such risk allocation.

Where projects are delivered on a limited or non-recourse financing basis, the need for time and price certainty is magnified. While the recent forces of demand and supply in the construction industry have also impacted the risk allocation on the 'turnkey' EPC Contracts used for such projects, and bank credit committees have relaxed requirements slightly (credit crunch aside), the change in risk allocation has been far more limited.



\* including designers, engineers and construction managers – where limited or non-recourse financing is in place

# Overview of EPCM arrangements

Under an EPCM Contractor, the Contractor manages the activities required to engineer, procure and construct the project, but does not itself undertake to deliver that project:

- by a set time
- for a fixed price
- to be fit for purpose.

The concept of delivering projects by way of an EPCM Contract is not new. It has wavered in popularity for a number of decades and has, for some time, been used extensively throughout the oil, gas, petrochemical and resources industries, where Principals and Contractors are large, experienced and have ongoing relationships. In the current market, sophisticated Principals are often not prepared to pay large risk premiums and profits to Contractors under traditional fixed time and cost contracts. Add to this, the current boom in the number of projects to be delivered across the globe, increased pressure to fast-track delivery, limitations on Principal's resources, rising prices of materials and labour, and we are witnessing a redefining of the way projects are being delivered. EPCM Contracting is just one of a number of alternative models becoming more widespread.

The form and structure of an EPCM Contract will vary depending on a variety of factors such as the:

- particular industry and project
- sophistication and expertise of the project parties
- Principal's requirements as to level of involvement
- Principal's internal project delivery resources and skill set
- history and level of trust between the Principal and the Contractor
- level of integration between the project parties' respective teams
- level of risk on the project (i.e., technical and commercial/financial).

In its simplest form, an EPCM Contract is a consultancy agreement for the provision of professional or technical services. At one end of the spectrum, an EPCM could be considered to be a pure consultancy-type arrangement and, at the other end, an integrated EPCM Contract could look more akin to an integrated alliance style contract.

The EPCM Contractor is typically responsible for:

- basic and detailed design and engineering
- establishing, implementing and managing tendering processes for procurement of all equipment and materials and awarding and managing works package contracts
- overall project management and administration of work package contracts, including during warranty periods.

Traditionally, the Principal entered into the construction and procurement agreements for the project. However, depending on the project structure, the Principal and the industry, the EPCM Contractor may enter into contracts directly with Contractors and suppliers, as agent for the Principal, (with the EPCM Contractor assuming no or limited liability under such contracts). Where this is the case, there are generally clear procedures and limitations on the EPCM Contractor's ability to execute such contracts.

EPCM Contractors usually do not take full responsibility for:

- delivery of the project by certain key milestone dates
- care and custody of the works (with certain exceptions for arranging security and management of safety etc.)
- the project being delivered in accordance with the project budget.
- The EPCM Contractor is usually heavily incentivised to bring the project to commercial operation on time and under budget, but is not required to indemnify the Principal for failing to do so.

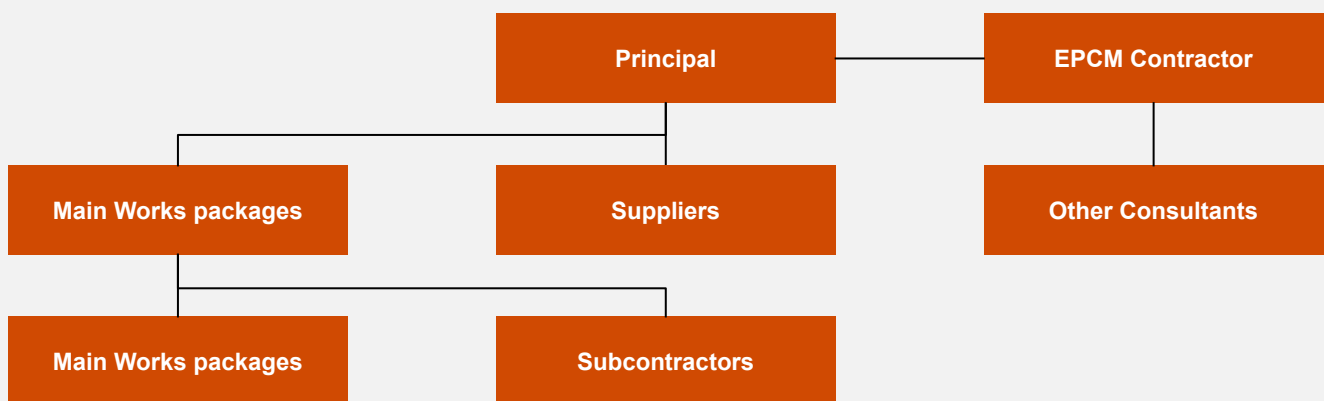
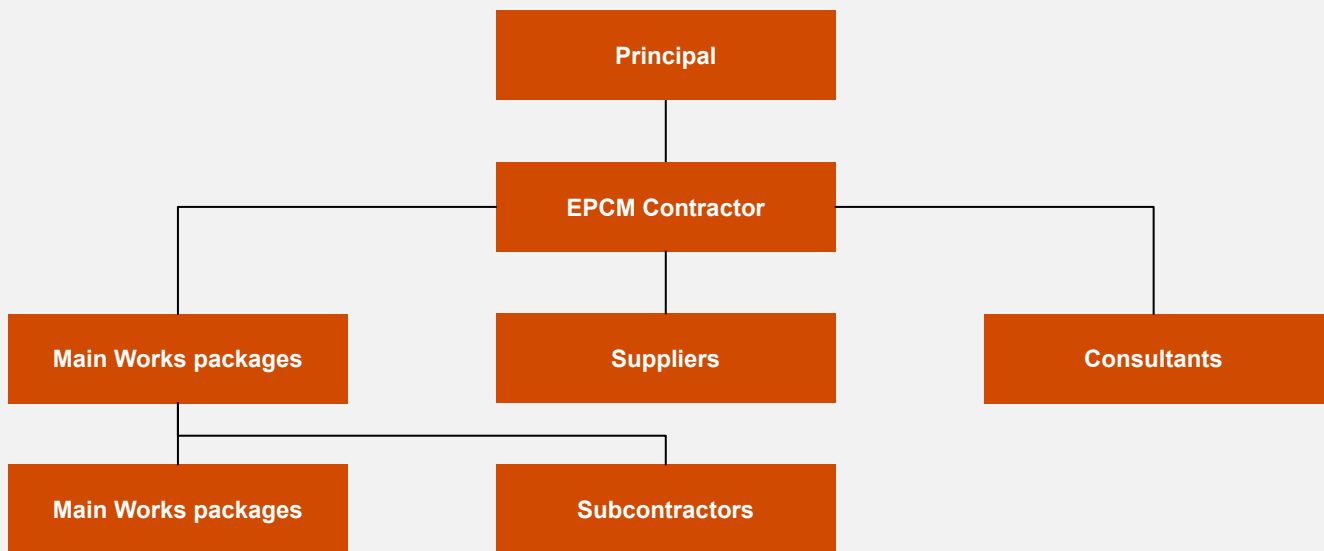
Depending on the scope of services to be provided by the EPCM Contractor, potential liabilities may relate to wilful default, fraudulent behaviour and, after some form of negligence or recklessness, in respect of matters such as:

- performance of the design and engineering
- preparation of the project budget and project schedule
- management of procurement, including a failure to implement an objective and competitive tender process
- management, administration and supervision of the work packages
- coordination of the design and construction works between works package Contractors.

Ordinarily, the maximum liability of the EPCM Contractor is much lower than is usually the case under fixed time and cost arrangements. It is often limited to the re-performance of defective services and capped out at between 5-20% of the total EPCM remuneration (or, more recently, to the value of the profit and sometimes the overhead component as well). There are generally a number of carve-outs from such a limitation, including for losses resulting from fraud or wilful misconduct. Obviously, these arrangements depend on a number of factors and vary widely from project to project.

**Model 1:** EPCM Contractor has direct contractual relationship with works package Contractors and suppliers.

**Model 2:** EPCM Contractor procures the entry by the Principal into a direct contractual relationship for the main works package.



Appendix 1 to this paper contains a table summary of some key issues for the appointment of an EPCM Contractor to be considered by Principals when preparing the EPCM Contract.

# Typical phases of an EPCM

## Design and engineering

It is not unusual to have the engineering arrangements split into a number of components. The EPCM Contractor's engagement may start as early as the feasibility stage of the project. That is, it may be engaged to analyse high level technical aspects and prepare a report on the likely timing and cost, proposed procurement arrangements for long-lead items, local project considerations and other aspects of the proposed project (usually on a straight cost-plus basis).

Following the feasibility study, the Contractor may be appointed to undertake the Front-End Engineering and Design (**FEED**) for the project. Broadly, the FEED phase covers the basic engineering and design for the project and also the development of preliminary project schedules, budgets and work packages. This process allows the Principal to go to the market with sufficient scope definition to ensure that it receives bids which are competitive and realistic – ideally on a lump sum basis although this may only be for the procurement of long-lead critical path items (e.g., key equipment or foundation work/site and access preparation). As with the feasibility stage, this component usually proceeds on a cost-plus basis.

Following the FEED stage, the EPCM Contractor will work the basic engineering and design into the complete detailed engineering package. In many cases, the EPCM Contractor will ultimately be responsible for ensuring that the engineering and design will meet the relevant performance parameters for the project. To this end, it must coordinate these works with the other parties involved to ensure that the engineering and design complies with the overall project specification and other specific requirements.

The EPCM Contract may also be structured in such a way so as to permit the Principal, in its absolute discretion, to instruct the EPCM Contractor to proceed to the next stage. For example, at the conclusion of the feasibility stage, the Principal can elect to dismiss the EPCM Contractor and engage another Contractor to undertake the FEED services regardless of whether the Contractor has properly performed the services. Also, the contract may be structured in such a way so as to have the EPCM Contractor roll into a lump sum EPC after conclusion of the FEED services and therefore taking the turnkey risk on the entire project. This process can provide the Principal with greater flexibility but will obviously depend on the needs and other constraints of each particular project.

## Procurement

In addition to undertaking the design and engineering for the project, the EPCM Contractor is usually required to procure, on behalf of the Principal, all of the materials, equipment and construction works necessary for the proper completion of the project. To this end, the EPCM Contractor is required to establish a system or follow procedures for implementing such procurement arrangements. This may be a significant task if the project is broken down into many components and involves the EPCM Contractor preparing a suite of standard form procurement and construction contracts for the project (most EPCM Contractors will have these already), establishing a tender process suitable for the project and works to be approved by the Principal, responding to tender clarification issues, negotiating the commercial terms of all construction works packages and supply contracts and finalising each of the agreements for execution by the Principal or approved by the Principal for execution by the EPCM Contractor.

## Construction management

Once the works have started, the EPCM Contractor assumes the role of the Principal's 'engineer' or 'Employer's representative' under the various work package and supply contracts. It manages and supervises each of these contracts. A key role for the EPCM Contractor is coordinating each of the works packages to ensure that all of the works interface as required and that delays and variation claims are minimised where possible. Usually the EPCM Contract will set out the limits on the EPCM Contractor's authority. These limitations generally relate to instructing or agreeing variations, settling of claims, waiving any breach or default and certification of final payments.

Depending on the scope of the EPCM services which, in some cases, evolves as the project proceeds, the EPCM Contractor is usually required to play an active role in monitoring and reporting during the testing and commissioning phase of the works packages. Further, they are generally required to oversee the notification and rectification arrangements during the defects liability period and also to deal with any other warranty issues. In certain cases, the EPCM Contractor is required to take an active role in the management of claims or disputes from work package Contractors. Alternatively, this role may be limited to the provision of advice regarding any disputes that arise during the course of the projects.

# Other issues

## Bankability and completion guarantees

As mentioned earlier, where the project is financed through limited or non-recourse project financing, Lenders will demand a great deal of outcome certainty in terms of time and cost because their security is heavily reliant on sufficient and timely revenue from the operation phase. The borrower is usually the entity newly established to own the project and this usually precludes the use of EPCM Contracting even though the outcome may be cheaper and faster.

The only circumstances (with some exceptions where there is government support or very strong client-Lender relationships or influence) where EPCM Contracting will be bankable where the Sponsor(s) provide the Lenders with a completion guarantee. That is, it offers the Lenders some form of parent company guarantee until commercial operation or a commitment to cover cost overruns and debt service obligations during a period of delay. Such a guarantee is usually for the total amount of the debt and falls away upon commercial operation.

Depending on the Lenders, the project and the Principal/Contractor's track record for delivering similar projects, the completion guarantee may be more limited and step down prior to commercial operation or as various stages of the project are completed. Conversely, they sometimes linger beyond commercial operation to cover market pricing risk depending on the type of project and output.

## Incentivising the EPCM Contractor

KPI and incentive arrangements are very much project-specific. As such, it is difficult to meaningfully suggest project-specific KPI arrangements without first understanding the key commercial considerations driving any particular project. These are usually a combination of time, cost, quality, safety, environment and community. To a certain extent, the corporate philosophy of the Contractor is also important.

Appendix 2 to this paper contains a table summary of various KPIs and related incentive arrangements that may be relevant to the appointment of an EPCM Contractor. Whilst this table is not an exhaustive list, it includes key issues which a Principal should consider in order to encourage the behaviour it requires the EPCM Contractor to display so as to achieve the Principal's objective for its project.

Given the cost-reimbursable nature of most EPCM Contracts, an alignment of interests is obviously extremely desirable from the Principal's perspective to encourage productive behaviour and positive outcomes. However market forces and an environment of rising costs and scarce technical resources have been driving some Contractors' lack of enthusiasm to place too much at risk.

At the early stages of a project, lack of project-definition also complicates the setting of meaningful and precise targets against which performance can be measured and appropriate behaviour encouraged. Setting the framework and principles at an early stage, while there is a competitive environment and balanced bargaining position, is generally the best way for the Principal to lock in KPI arrangements.

As noted earlier, there has been a significant shift in the construction market over the last few years particularly regarding traditional risk allocation. This has also impacted the form of EPCM Contracts being used. Interestingly, some Contractors are preferring to move away from, or limit the extent and impact of, KPIs. This is largely because they believe these arrangements can:

- create uncertainty (and therefore increased risk and are more difficult to achieve in a rising cost market)
- cause additional friction between the parties which does not foster a sense of cooperation or trust or help develop a long-term multi-project relationship
- waste time and resources on trying to monitor, document and agree on whether KPIs have been met (which detracts from the main objective of successfully completing the project).

Some Principals prefer an integrated approach toward administering and managing the project akin to assuming part of, and sharing, the EPCM responsibilities. Given the magnitude, complexity and duration of the 'mega projects', some Contractors may be unwilling to commit a material percentage of their remuneration to an incentive regime structured on a 'whole of project' basis as opposed to one that corresponds with discrete phases of work.

Many projects are almost completely 'schedule' driven. Consequently, and despite both parties' best efforts, an incentive arrangement that predominantly focuses on time may inevitably create inefficiencies which results in increased cost, double handling and/or re-work which also puts pressure on costs. Any KPI arrangement adopted for a particular project must encourage the kind of behaviour the Principal wants the Contractor to display so as to achieve the project's objectives. Above all, any KPI arrangement should focus on maximising productivity and delivering timely and innovative results while striking a balance between time and budget without sacrificing quality or safety or creating inefficiencies. Obviously this is easier said than done.

## Cost definition

Where the cost-plus model is used, there needs to be a detailed assessment of what costs are in and which are not. Some EPCM models also separate the direct costs from project and head office overheads and either treat them differently or agree a lump sum or fixed percentage for some or all of the overhead or profit component. Doing so can also tie into the incentivisation regime. If fixed, then the Contractor's margin diminishes the longer the delivery period and/or the greater the reimbursable component becomes.

## Alliancing comparisons

The integrated team approach of EPCM Contracting is verging on an alliancing style contract without taking the final step of openly creating a 'no blame' environment. The reality is however, that it becomes increasingly difficult to apportion blame and pursue a Contractor for breach of contract in an integrated team approach where representatives of the Principal and the Contractor work together and make decisions jointly. Conversely, many EPCM Contracts are more similar in style to consultancy contracts and cannot be compared to alliancing.

# Conclusion

Current projections indicate that the international construction boom is likely to continue into the foreseeable future. Consequently, more Principals and Contractors will seek to redefine traditional project delivery methods, particularly in response to a variety of economic and market-driven changes. In such an environment, it is likely that rigid fixed time and cost arrangements will become less common and we will see more of cost-plus, alliancing and EPCM arrangements.

As the complexity of so called 'mega projects' increases and labour, materials and professional resources become more difficult or expensive to source, Principals will need to choose between paying an increasing EPC profit/risk premium or placing greater reliance on the expertise and skill of reputable and experienced Contractors to manage the delivery of their projects.

If the latter is the preferred option, a carefully planned EPCM Contract, with appropriate incentivisation arrangements, will go some way to ensuring that the Principal's commercial and other project objectives are achieved.





# How to contact us



If you have any questions about this paper, please contact the editor, Damian McNair, Partner, Energy Transition.

PwC Australia has a dedicated Energy Transition business, consisting of a hub of 132 multidisciplinary and highly-skilled experts helping to facilitate Australia's successful transition to a decarbonised economy by 2050. We are helping accelerate our clients through the energy transition and their related ESG priorities as Australia moves to a net zero economy.

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# Appendix 1

Issue	Comment
<b>Form</b>	<p>In its simplest form, an EPCM Contract is a consultancy agreement for the provision of professional and/or technical services. At one end of the spectrum, an EPCM Contract could be considered to be a pure consultancy-type arrangement and, at the other end, it could look more akin to an integrated alliance style contract where the parties' interests' are aligned through the KPI incentive regime.</p> <p>There are many important factors arising out of a project and the current market which will influence the form of the EPCM Contract. They include:</p> <ul style="list-style-type: none"> <li>• the surge in demand in the engineering/project management sector across Australia and internationally</li> <li>• the size, complexity and profile of the project</li> <li>• whether the project is to be delivered on a fast-track schedule</li> <li>• the requirements and approach to allocation of risk of the project Sponsor(s)/Principal's parent company(s)</li> <li>• the requirements of the Lenders where the project is to be financed on a limited or non-recourse basis</li> <li>• the requirements of other stakeholders including governments</li> <li>• the extent of engineering and design already undertaken by the Principal under separate contracts (if any).</li> </ul>
<b>Scope of services</b>	<p>The EPCM Contractor's scope of services typically includes:</p> <ul style="list-style-type: none"> <li>• engineering and design</li> <li>• procurement</li> <li>• construction management and administration</li> <li>• the provision of systems and computer software.</li> </ul> <p><b>Design and Engineering</b></p> <p>It is not unusual to have the engineering arrangements split into a number of components. The EPCM Contractor's engagement may start as early as the feasibility stage of the project. That is, it may be engaged to analyse high level technical aspects and prepare a report on the likely timing and cost, proposed procurement arrangements for long-lead items, local project considerations and other aspects of the proposed project (usually on a straight cost-plus basis).</p> <p>Following the feasibility study, the Contractor may be appointed to undertake the FEED for the project. Broadly, the FEED phase covers the basic engineering and design for the project and also the development of preliminary project schedules, budgets and work packages. This process allows the Principal to go to the market with sufficient scope definition to ensure that it receives bids which are competitive and realistic – ideally on a lump sum basis, although this may only be for the procurement of long-lead critical path items (e.g., key equipment or foundation work/site and access preparation). As with the feasibility stage, this component usually proceeds on a cost-plus basis.</p> <p>Following the FEED stage, the EPCM Contractor will work the basic engineering and design into the complete detailed engineering package. In many cases, the EPCM Contractor will ultimately be responsible for ensuring that the engineering and design will meet the relevant performance parameters for the project. To this end, it must coordinate these works with the other parties involved to ensure that the engineering and design complies with the overall project specification and other specific requirements of the Principal.</p> <p>As discussed below, the EPCM Contract may also be structured in such a way so as to permit the Principal, in its absolute discretion, to instruct the EPCM Contractor to proceed to the next stage.</p> <p><b>Procurement</b></p> <p>In addition to undertaking the design and engineering for the project, the EPCM Contractor is usually required to procure, on behalf of the Principal, all of the materials, equipment and construction works Contractors necessary for the proper completion of the project. To this end, the EPCM Contractor is required to establish a system or follow procedures for implementing such procurement arrangements. This may be a significant task if the project is broken down into many components and involves the EPCM Contractor preparing a suite of standard form procurement and construction contracts for the project (in conjunction with the Principal's legal advisors), establishing a tender process suitable for the project and works to be approved by the Principal, responding to tender clarification issues, negotiating the commercial terms of all construction work packages and supply contracts and finalising each of the agreements for execution by the Principal or approved by the Principal for execution by the EPCM Contractor.</p>



Issue	Comment
<b>Scope of services (Cont'd)</b>	<p><b>Construction Management</b></p> <p>Once the works have started, the EPCM Contractor assumes the role of the Principal's 'engineer' or 'Principal's representative' under the various work package and supply contracts. It manages and supervises each of these contracts within pre-agreed limits of authority. A key role for the EPCM Contractor is coordinating each of the work packages to ensure that all of the works interface as required and that delays and variation claims are minimised where possible. Usually the EPCM Contract will set out the limits on the EPCM Contractor's authority. These limitations generally relate to instructing or agreeing variations, settling of claims, waiving any breach or default and certification of final payments.</p> <p>Depending on the scope of the EPCM services which, in some cases, evolves as the project proceeds, the EPCM Contractor is usually required to play an active role in monitoring and reporting during the testing and commissioning phase of the work packages. Further, they are generally required to oversee the notification and rectification arrangements during the defects liability period and deal with any other warranty issues. In certain cases, the EPCM Contractor is required to take an active role with the Principal's legal advisors in the management of claims or disputes with work package Contractors. Alternatively, this role may be limited to the provision of advice regarding any disputes that arise during the course of the project.</p> <p>EPCM Contractors usually do not take responsibility for:</p> <ul style="list-style-type: none"> <li>• delivery of the project by certain key milestone dates</li> <li>• care and custody of the works (with certain exceptions for arranging security and management of safety etc.)</li> <li>• the project being delivered in accordance with the project budget.</li> </ul> <p>These obligations would be included in the infrastructure contracts and supply agreements.</p>
<b>Remuneration</b>	<p>EPCM Contractors are typically remunerated on an cost-reimbursable basis, including the following components:</p> <ul style="list-style-type: none"> <li>• <b>Fixed Fee:</b> Pre-agreed fixed fee or % of the value for each phase of the project to cover margin and overheads</li> <li>• <b>Actual Personnel Costs:</b> Reimbursement for directly and reasonably incurred personnel costs at pre-agreed rates (fixed for the duration of the EPCM Contract where possible), with typical carve-outs for duplication of work undertaken due to defects in the services or otherwise for the EPCM Contractor's default</li> <li>• <b>Reimbursable Expenses:</b> Reimbursement for a discrete list of reimbursable expenses, subject to the Principal's approval prior to the expense being incurred (i.e., pre-approved work related travel).</li> </ul> <p>The EPCM Contractor may also be entitled to bonuses (or subject to a reduction in payment) under an agreed KPI incentive regime.</p>
<b>Bankability</b>	<p>Where the project is to be financed through limited or non-recourse project financing, Lenders will demand a great deal of outcome certainty in terms of time and cost because their security is heavily reliant on sufficient and timely revenue from the operation phase.</p> <p>In these circumstances, to provide cost certainty for the EPCM Contract, the Principal should consider capping individual incentive arrangements (or the aggregate of all) at a certain percentage of the fee or the estimated target costs. The Principal should also consider incorporating a guaranteed maximum or 'ceiling price' cap on the EPCM Contractor's remuneration (i.e., if the target man-hour budget is exceeded, the payments otherwise due to the EPCM Contractor could be deemed not reimbursable). This could apply to price caps for each phase of the project. Obviously this approach would require a certain level of project definition to enable the development of realistic target man-hour budgets during negotiations with the successful Contractor. However, the extent to which the Principal can impose a cap on the EPCM Contractor's remuneration will depend on market conditions at the time of going to tender. In the current market we are seeing this approach rejected by many Contractors because there are opportunities to procure work on a pure cost reimbursable basis, particularly on projects that are not subject to Lender requirements/restrictions.</p> <p>Also, where the borrower is an entity newly established to deliver, own and operate the project, this usually restricts the use of EPCM Contracting even though the outcome may be cheaper and faster (with some exceptions where there is government support or very strong client-Lender relationships or influence). Where EPCM Contracting is used, it is not uncommon for Lenders to require the Sponsor(s) to provide them with a completion guarantee. That is, the Sponsor(s) offers the Lenders some form of parent company guarantee until practical completion/commercial operation or a commitment to cover cost overruns and debt service obligations during a period of delay. Such a guarantee is usually for the total amount of the debt and falls away upon practical completion/commercial operation. Depending on the Lenders, the project and the Principal /Contractor's track record for delivering similar projects, the completion guarantee may be more limited and step down prior to practical/commercial operation or as various stages of the project are completed. Conversely, they sometimes linger beyond commercial operation to cover market pricing risk depending on the type of project and output.</p>
<b>Novation of existing design</b>	<p>Where a major proportion of the engineering and design for the project has already been undertaken under separate design/consultancy packages let by the Principal (i.e., FEED during the project feasibility phase), the Principal must avoid potential gaps in liability by creating a single point of responsibility for the performance of the design of the project through the novation of the existing design to the EPCM Contractor. The Principal must allow sufficient time in the project schedule for the EPCM Contractor to verify and accept responsibility for the existing design.</p>

Issue	Comment
<b>Optional Phases</b>	<p>In most instances the EPCM Contract should be structured in such a way so as to permit the Principal, in its absolute discretion, to instruct the EPCM Contractor to proceed to the next stage.</p> <p>For example, at the conclusion of the feasibility stage, the Principal can elect to dismiss the EPCM Contractor and engage another Contractor to undertake the FEED services regardless of whether the Contractor has properly performed the services. Similarly, where the project is to be financed through limited or non-recourse project financing, the Principal must be entitled to terminate the EPCM Contractor in its absolute discretion if the Lenders do not give finance approval or the Principals cannot raise the required capital.</p> <p>Terms establishing the process, consequences (including payment on termination outlined above) and risk in the services undertaken during a particular phase will need to be clearly articulated in the EPCM Contract.</p> <p>Also, for certain types of projects (i.e., the construction of a facility such as a power station or a process plant) the EPCM Contract may be structured in such a way so as to have the EPCM Contractor roll into a lump sum EPC after conclusion of the FEED services, therefore taking the turnkey risk on the entire project. This process can provide the Principal with a single point of responsibility for design and construction and greater flexibility but will obviously depend on the needs and other constraints of each particular project, including market considerations. For example, rolling an EPCM into a single EPC is unlikely to be suitable on major projects such as integrated mine, port and rail projects where the size, complexity and varying nature of the project components cannot be delivered in its entirety by one EPC Contractor or without significant risk premiums that increase costs to a level that impact on the overall viability of the project.</p>
<b>Insurance</b>	<p>Obviously the whole of project insurance strategy is a critical issue for all projects. It will also impact on the EPCM Contract and extent of insurances to be procured and maintained by the EPCM Contractor. For example, a project wide PI policy may be required to supplement the PI insurance provided by the EPCM Contractor, to avoid gaps in design liability in circumstances where the limit of indemnity provided under the EPCM Contractor's PI insurance is not sufficient to cover the potential loss.</p>
<b>Liability Caps</b>	<p>In the current market, any sophisticated Contractor will require an overall cap on liability and exclusion of liability for consequential loss.</p> <p>The overall limitation could be managed in a number of ways – for example, the EPCM Contractor's exposure could be limited to:</p> <ul style="list-style-type: none"> <li>• 100% of any incentive payment or the component of the price representing the Contractor's profit and/or overhead (or part thereof)</li> <li>• a percentage of the contract price – ideally, this would be the higher of the 'total estimated contract price' or the actual amount of payments made to the EPCM Contractor (to overcome the issue where the EPCM Contract is terminated for breach in the early stages of the project and payments made to the Contractor are insignificant in comparison to the loss suffered by the Principal).</li> </ul> <p>Ordinarily, the maximum liability of the EPCM Contractor is much lower than is usually the case under fixed time and cost arrangements. In the current market, and for similar services, overall caps are reported to be typically in the range of 5% – 20% of the total EPCM remuneration (or, more recently, to the value of the profit and sometimes the overhead component as well). This is in addition to proceeds available from project insurance policies.</p> <p>Obviously it is desirable for the Principal to set the cap at the 'high water mark' to satisfy requirements of the Sponsors and Lenders in seeking to minimise gaps in liability and then by transferring liability to Contractors, suppliers and the insurers.</p> <p>These overall caps and exclusion of consequential loss usually do not apply to certain exempt liabilities such as the cost of re-performing defective works, infringement of IP/confidentiality obligations, third party claims, fraud, gross negligence (this is often controversial), wilful misconduct, unlawful acts and liabilities which the EPCM Contractor cannot lawfully contract out of (generally contracts are silent on this – the main one being section 52 of the Trade Practices Act). Having said that, there may be some significant push back by EPCM Contractors on these carve-outs and even limiting consequences of breach largely to re-performance of defective work (more so in an integrated team environment and after considerable debate over what is, or is not, 'defective' work).</p>
<b>Variations</b>	<p>Principals need to develop mechanisms for determining what amounts to a variation (i.e., a major change to the services not contemplated by the parties) and the corresponding cost consequences (i.e., adjustment to fixed fee and overhead component or payment of direct costs only). This area becomes more important in relation to the achievement of KPIs and whether the target costs and time frames are to be adjusted. Pre-award workshops are often conducted with Contractors to define the limited nature of events giving rise to a variation.</p>
<b>Termination Payments</b>	<p>In the current market, where the EPCM Contract is terminated for the Principal's convenience or default during one of the optional phases, the EPCM Contractor is likely to expect to be paid a portion of loss of profit for the balance of that phase and for its reasonable demobilisation expenses which have not been recovered through payment up to the date of termination.</p> <p>Where this is the case, to the extent possible, it is desirable to have pre-agreed fixed amounts. Where this is not possible, the method of calculation should be clearly defined, including what's in and what's out, particularly in respect of any demobilisation entitlement (on other projects we have seen the Principal paying significant sums for staff wages and relocation as part of demobilisation payments).</p> <p>Where the EPCM Contract is terminated for the EPCM Contractor's default any payment should be limited to the services performed up to the date of termination and subject to the Principal's right to set off.</p>

Issue	Comment
<b>Contractor's Security</b>	At the risk of stating the obvious, given the duration of the EPCM services, the likely low caps on liability and the cost of maintaining the performance security (which will ultimately be borne by the Principal), consideration should be given to the value of the security required, rather than simply allocating an arbitrary X% of the estimated contract price.
<b>Project and Services Budgets</b>	The concept of whole of project and/or EPCM services budgets could be incorporated into the EPCM Contract terms to deal with limitations on the cost of certain services or implementation contracts etc. As outlined above, any incentive or KPI arrangement incorporated could be limited where the Principal incurs cost overruns above budgeted amounts of greater than [ ]%.
<b>Contractor's Key Personnel</b>	The traditional provisions regarding personnel (i.e., the EPCM Contractor cannot remove Key Personnel without the Principal's prior approval) may be too inflexible. Given the market squeeze on suitably qualified personnel and resourcing, consideration could be given to alternate arrangements regarding Key Personnel – such as payment of a liquidated amount where senior personnel leave or are taken off the project within a certain period (i.e., within 2 years – we have seen amounts up to USD\$300k for the project director). Possible exceptions to such payment could include illness, incapacitation, and resignation or if the personnel are temporarily absent on annual, sick, long service or compassionate leave etc. If liquidated damages are not suitable, Key Personnel turnover could also be a consideration in any KPI incentive payments (as outlined in Table 1).
<b>Project Control Group</b>	Generally the Principal will establish a form of 'Project Directorate' or management team ( <b>Project Control Group</b> ) comprising personnel from the Principal, Sponsor(s) and the EPCM Contractor. Terms must be included dealing with the composition, role and powers of the Project Control Group (and various other administrative matters, such as meeting protocols and reporting). These arrangements could also deal with the Principal's 'reserve powers', the flexibility to add other equity participants to the Project Control Group and procedures for determining KPI performance as discussed above.
<b>Health and Safety</b>	The Principal must consider that it will have primary responsibility for implementing the workplace, health and safety obligations for the project. We often see the EPCM Contractor (to the extent permitted by law) assuming primary responsibility for implementing the workplace, health and safety obligations for the services and the overall project (including any and all implementation Contractors and the Principal's personnel at the site).
<b>Disputes</b>	<p>Given the likely duration of the EPCM Contract, the fact that small disputes are likely to occur and a good working relationship must be maintained at the senior project level, it may be beneficial (in terms of certainty and time) for the EPCM Contract to establish a dispute resolution procedure in advance of any arbitration or litigation. For example, negotiation between the parties' representatives; escalation to negotiation by senior representatives not heavily involved in the project (or the Project Control Group); referral to expert determination (or other form of resolution); and then to arbitration or the courts.</p> <p>From an enforceability perspective, arbitration is preferred if contracting with foreign parties (i.e., to be able to rely on the New York Convention).</p>
<b>Reserve Powers</b>	Terms should be added to clarify the 'reserve powers' held by the Principal to manage and direct the project, including approval of systems and procedures governing the project, urgent protection of people and property, issuing bid documents, awarding implementation contracts, approving variations and extensions of time or any event likely to have a major impact on the operation or viability of the project etc.
<b>Lender requirements</b>	Where the project is to be financed through limited or non-recourse project financing, terms must be added to the EPCM Contract regarding the usual Lender requirements (such as step-in rights, cooperation (including providing access to Financiers' engineer), execution of a tripartite deed, the Principal's right to assign its interest in the EPCM Contract etc).



# Appendix 2

Incentive Arrangement	Comment
<p><b>General</b></p>	<p>Given the cost reimbursable nature of EPCM Contracts, without KPI incentive mechanisms, it is difficult, if not impossible, to instil the same sense of urgency and efficiency in the EPCM Contractor and its personnel over a long period as compared to a fixed price model. Therefore, the KPIs will be critical in incentivising the EPCM Contractor to perform in a safe, productive, efficient and timely manner in order to ensure the Principal's key commercial objectives for the project are realised – usually time, cost, quality, safety, environment and community or some combination of these.</p> <p>It is critical to the success of the KPI incentive regime that, when formulating the targets and methods of measuring performance, there is sufficient clarity of project scope and the Principal's requirements. Whenever possible, the Principal must allow sufficient time and resources to agree and clearly articulate quantifiable KPI targets and corresponding methods of measuring performance in the EPCM Contract. Obviously, formulating incentive arrangements is problematic where they need to be agreed through the execution phase. This approach is not recommended as the parties often fail to reach agreement, in which case the incentive regime has little or no value.</p> <p>The KPI incentive regime should focus on maximising productivity and timely delivery whilst striking a balance between time and budget, and without sacrificing quality or safety. We have seen very detailed and sophisticated KPI incentive regimes, particularly in an alliancing or relationship contracting context and where project deliverables are to be measured over long time frames.</p> <p>Conversely, some EPCM Contractors prefer to move away from (or limit the extent and impact of) KPI incentive regimes, largely because they believe these arrangements can create uncertainty (and therefore some risks in a rising cost market) and additional friction between the parties, which does not foster a sense of co-operation or trust. Where this is the case, we see Principals often opting for an integrated approach toward administering and managing the project (akin to assuming part of, and sharing, the EPCM responsibilities). In the current market we are also seeing that some EPCM Contractors are unwilling to put a material percentage of their remuneration at risk based on a KPI incentive regime.</p> <p>However, if the KPI incentive regime is structured with proper recognition of the current market conditions and the issues below are addressed then successful outcomes are achievable.</p>
<p><b>KPI – Cost</b></p>	<p>The cost incentive arrangements can be structured on a 'whole of project basis' or a 'phase by phase' basis with an underlying 'whole of project' component (which directs the EPCM Contractor to also focus on the integration of the phases into the overarching project). For the 'whole of project' component there needs to be a meaningful target reimbursable cost – something that might not be available with any degree of accuracy at the time the Principal elects to go to the market.</p> <p>The Principal should consider whether it has sufficient detail to develop realistic target man-hour budgets. If the target man-hour budget is exceeded, certain components of the payments otherwise due to the EPCM Contractor could be deemed not reimbursable (unlikely to be acceptable in this market), or there could be some reduction in the incentive payment (likely to be more acceptable).</p> <p>Another alternative is to set a fixed profit and off-site overhead component as part of the EPCM Contractor's remuneration. If the project takes longer than anticipated or more man-hours are required, the profit and overhead component does not change. It diminishes as a percentage of the overall project value (unless there is a very significant/fundamental change in scope).</p>
<p><b>KPI – Schedule</b></p>	<p>The traditional schedule disincentive arrangements of liquidated damages for delays are not generally applicable in the EPCM context. This is because the EPCM Contractor does not have complete control over the delivery of the works and achieving project milestones.</p> <p>On projects where time is of critical importance, the 'carrot' rather than the 'stick' approach seems more commonly used. This can be done by agreeing fixed bonuses up front (typically where the additional revenue/cost savings to the Principal resulting from early completion can be assessed at the outset), or by including schedule KPIs as part of an overall weighted performance measurement calculation used to determine bonuses or abatements. As noted above, schedule incentive can also be dealt with indirectly, by setting a fixed profit and off-site overhead component (i.e., if the project takes longer than anticipated, the profit and overhead component diminishes as a percentage of the overall project value).</p>

Incentive Arrangement	Comment
<b>KPI – Schedule (Cont'd)</b>	<p>Many projects are almost completely 'schedule driven'. Despite both parties' best efforts, any arrangement that predominantly focuses on time may inevitably create inefficiencies (resulting in increased cost, double handling and/or re-work which ultimately puts pressure on costs and impacts on quality and safety). Therefore, it is important to try, if possible, to ensure that the KPI incentive regime is not solely 'schedule' driven to eliminate those inefficiencies. Obviously, too great an emphasis on schedule incentive arrangements can jeopardise or undermine other objectives of the project – ie cost, safety, quality, environmental performance, community relations and minimising operational expenditure.</p>
<b>KPI – Performance</b>	<p>There are many other ways in which to incentivise Contractors regarding performance. It is not unusual to see performance incentive arrangements where performance by the EPCM Contractor which:</p> <ul style="list-style-type: none"> <li>• exceeds pre-agreed fixed targets will lead to better than normal returns for the EPCM Contractor</li> <li>• falls short of the pre-agreed fixed targets will lead to poorer than normal returns for the EPCM Contractor.</li> </ul> <p>It is important to set targets that can be effectively measured to collect demonstrable performance information. This is easier said than done and requires specific project management expertise. If this is not possible, or it is difficult, there is a real prospect of dispute and the incentive arrangement will be of little value. Regular meetings of a Project Control Group where performance issues are raised and areas for improvement are identified are important (as are outcomes and objectives reached during any pre-contract workshops to set targets).</p> <p>It is also common to see KPI incentive mechanisms whereby the Contractor's overall bonus (or reduction in fee) is determined using weighted performance measurement across several pre-agreed targets (i.e., time, cost, safety, environment and community). The weightings and formula are agreed and recorded in the EPCM Contract from the outset. The weightings reflect the importance placed on each target in achieving the Principal's commercial and other objectives for the project (it is common to see safety with the greatest weighting).</p> <p>Often it is the role of a Project Control Group to analyse performance against targets and determine the inputs to the formulae used to determine the adjustment to the Contractor's fee (if any). To avoid disputes over performance it is important that the measurement of performance is based on quantifiable targets and not open to subjective interpretation. However, in circumstances where the Project Control Group is unable to reach agreement on performance, the determination is typically made by the Principal's representative or an independent expert (the latter generally considered the fairer option, while recognising that appointment of the expert will be an additional cost to the parties).</p> <p>Under a weighted performance mechanism, the Contractor may be entitled to a bonus, despite failing to achieve one of the KPI targets. Alternatively, the EPCM Contractor's bonus or the fee payable may be reduced where the EPCM Contractor achieves some but not all of the targets.</p>
<b>KPI – Safety</b>	<p>Generally, KPI arrangements for safety are largely based on the corporate policy of the Principal or the project Sponsors (i.e., zero deaths and/or lost time injuries (LTIs)), many of which are absolute.</p> <p>Other factors that may be relevant include:</p> <ul style="list-style-type: none"> <li>• compliance with safety management plans, procedures and policies (and diligence in reporting and/or ensuring other parties comply with these)</li> <li>• number of accidents, near misses or project-related injuries</li> <li>• Contractor's management and administration of accidents, near misses and project-related injuries (i.e., reporting, preparation of hazard assessments etc).</li> </ul> <p>It is likely that many of the safety incentive arrangements for the EPCM Contract will also take into account the performance of the other Contractors appointed by the Principal on the project. This is typically the case where the Principal wants the EPCM Contractor to drive safety KPIs and culture across the whole project.</p> <p>Also, it is not uncommon to see the achievement of certain safety KPIs as a mandatory requirement to the EPCM Contractor receiving any incentive bonus. In these circumstances, where the Contractor fails to achieve these KPIs, they often forfeit the entire project incentive arrangement (not just for safety) that would have otherwise been available to them. For example where there is a major personal injury suffered by a person involved with the project, which results in permanent disability or death.</p> <p>However, the mandatory requirement to the incentive bonus may not be appropriate in the context of a single or several LTIs, particularly where the EPCM services are to be performed over one to three years. This is because it is likely that the EPCM Contractor (or one of the Principal's other Contractors) will suffer an LTI at some stage during this period, which would render the whole incentive regime void.</p> <p>Obviously, the Principal should also consider the corporate policy of the Sponsor(s)/Principal's parent company(s) in setting safety KPIs for the EPCM Contract.</p>
<b>KPI – Quality</b>	<p>Quality incentive arrangements are not always afforded a great deal of attention in many KPI arrangements (generally at the expense of time and cost issues).</p> <p>It is important to ensure that the end product is of the specified quality to minimise impact on the long term operational expenditure and profitability of the project. Generally, it will be the EPCM Contractor's responsibility to identify and instruct the Principal's other Contractors when certain performance or quality guarantees are not being met under the various work packages.</p>

Incentive Arrangement	Comment
<b>KPI – Quality (Cont'd)</b>	<p>Factors that may be integral in any assessment of the EPCM Contractor's quality performance include:</p> <ul style="list-style-type: none"> <li>instances of defective services, equipment, systems or re-work by the EPCM Contractor</li> <li>failure to meet the Principal's performance and other design requirements on, and after, commissioning</li> <li>failure to identify defective work, equipment or plant of other Contractors and suppliers</li> <li>functionality, throughput, availability and reliability of the supply chain; compliance with quality management plans, including conduct of audits and inspections (and diligence in ensuring other parties comply with these)</li> <li>failure to meet reporting obligations</li> <li>failure to properly administer contracts on behalf of the Principal</li> <li>poor communications or responsiveness</li> <li>failure to comply with relevant project approvals, regulations and standards.</li> </ul> <p>Back to back obligations would also be included in the implementation phase infrastructure contracts and supply agreements.</p>
<b>KPI – Environmental and Community Impacts</b>	<p>A project's impact on the environment and community are often of key concern to the Principal and other stakeholders.</p> <p>Certain KPIs can encourage the EPCM Contractor to ensure it, and the Principal's other Contractors, diligently comply with their environmental obligations and meet the project's environmental objectives.</p> <p>Factors we have seen that may influence any environmental and community incentives include:</p> <ul style="list-style-type: none"> <li>quality and timing of responses to environmental and other complaints from the community and stakeholders</li> <li>where relevant, management of community (including Indigenous) consultation and education</li> <li>number of incidents of environmental harm and the timing and quality of the corresponding response to such incidents</li> <li>compliance with environmental management plans (and diligence in ensuring other parties comply with same)</li> <li>compliance with the conditions and reporting requirements under any statutory approval</li> <li>establishment of effective administrative procedures to deal with notifications under any implementation phase infrastructure contract or supply agreement.</li> </ul>
<b>KPI – Key Personnel</b>	<p>Given the current pressure in the market on retaining skilled and appropriately experienced personnel, securing and retaining quality personnel for any project will be critical.</p> <p>Retention of sufficient numbers and Key Personnel has been an issue that commonly arises (especially where the project spans many years) and often results in negative cost and time outcomes due to a lack of resources and continuity of key people.</p> <p>Approaches to Key Personnel KPIs that may be considered include a reduction in the EPCM Contractor's fee:</p> <ul style="list-style-type: none"> <li>for high turnover rate of personnel (outside of pre-agreed parameters)</li> <li>for replacement of personnel during a 'project introduction phase' (based on discounted rates)</li> <li>for the number of personnel removed as a result of incompetence, negligence etc.</li> </ul> <p>The Principal may also consider some form of direct bonus for the retention of individual Key Personnel over certain timeframes or the life of the project or the reimbursement of recruitment costs.</p> <p>Some EPCM Contracts also include payment of liquidated damages by the EPCM Contractor where senior personnel leave or are taken off the project within a certain period.</p>
<b>Assessment</b>	<p>There are many ways that KPIs can be assessed including:</p> <ul style="list-style-type: none"> <li>through the use of a formula or other mutually agreed procedure whereby the Contractor's performance is evaluated against set criteria. This is often a detailed schedule to the EPCM Contract that sets out where the risk and reward lies</li> <li>through a procedure to be agreed by the parties after the EPCM Contract is signed (although as outlined above we do not recommend that you adopt this approach)</li> <li>use of a committee to agree the measurement of KPIs with a dead lock or dispute resolution mechanism.</li> </ul> <p>As discussed above, it is important that the assessment of performance is based on quantifiable targets and not open to subjective interpretation.</p>
<b>Structure</b>	<p>The Principal should consider how KPIs are going to be structured, such as:</p> <ul style="list-style-type: none"> <li>a percentage of the EPCM Contractor's profit</li> <li>a percentage of other amounts payable under the EPCM Contract (for example, profit and overhead but not direct costs)</li> <li>a bonus pool or discrete cash amount set up only for the calculation of KPIs and independent of the payment provisions under the EPCM Contract.</li> </ul>



Incentive Arrangement	Comment
<b>Timing</b>	<p>There are a number of alternatives regarding the timing of any incentive payment:</p> <ul style="list-style-type: none"> <li>• a one off 'bullet' payment at the end of the project</li> <li>• payments to be made at the end of each discrete phase with an additional 'whole of project' payment or fee reduction made at the end of the project</li> <li>• payments offered on a calendar or financial year basis (to coincide with the Principal's reporting or other project obligations)</li> <li>• certain incentive payments could be contingent upon the happening of a set event (i.e., timely delivery of key materials, return of performance security etc)</li> <li>• a combination of the above.</li> </ul>
<b>Other Considerations</b>	<p>The Principal may also want to consider the following:</p> <ul style="list-style-type: none"> <li>• whether each incentive arrangement (or the aggregate or all) will be capped (for example, at a certain % of the fee or the target costs), particularly where the project is financed through limited or non-recourse project financing because Lenders will demand a great deal of outcome certainty in terms of time. This can be for both individual and overall KPIs</li> <li>• how often the incentive arrangements will be assessed and the relevant processes that must be followed</li> <li>• how often the incentive arrangements will be paid or deducted. This is particularly important as some KPIs can only be assessed after completion of the project</li> <li>• whether the incentive arrangements can be challenged and, if so, how this is done. For example, the parties could agree to establish a Senior Management Group made up of senior executives of the Principal and the EPCM Contractor to review and attempt to agree upon any disputed decisions in relation to incentive payments prior to litigation or arbitration. Alternatively the EPCM Contract could provide for independent determinations of such disputes</li> <li>• whether there is a mechanism to vary any of the incentive arrangements to account for the changing emphasis and priorities of the project and drive preferred Contractor behaviour. Such a mechanism could also be used to address incentive arrangements that are not working as anticipated or those that have become less relevant. It could also address the timing of payment, amount of payment, method of calculation, criteria, addition of other incentive arrangements etc.</li> </ul>



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