InfraRead

ISSUE 13: JUNE 2019

PORTS AND WORLD TRADE: BULK PORTS (EXPORT AND IMPORT) AND PORT-LOCATED FACILITIES

Coal, iron ore and LNG ports

BY MICHAEL HARRISON, RICHARD GUIT, AND DANIEL REINBOTT

ALSO IN THIS ISSUE:

ashurst

An overview of this issue

I am delighted to introduce this thirteenth issue of **Infra**Read, our biannual publication covering a range of legal and transactional issues relevant to the global transport and infrastructure space.

Mark Elsey

Partner, London
T +44 (0)20 7859 1721
mark.elsey@ashurst.com

Contents

In this issue we look at:

This publication is not intended to be a comprehensive review of all developments in the law and practice, or to cover all aspects of those referred to. Readers should take legal advice before applying the information contained in this publication to specific issues or transactions. If you have any comments about this edition or suggestions for future editions, please contact us at infraread@ashurst.com. If you would like to contact Ashurst please visit Ashurst.com/contactus and one of our team will be happy to help you.

Ashurst Australia (ABN 75 304 286 095) is a general partnership constituted under the laws of the Australian Capital Territory and is part of the Ashurst Group.

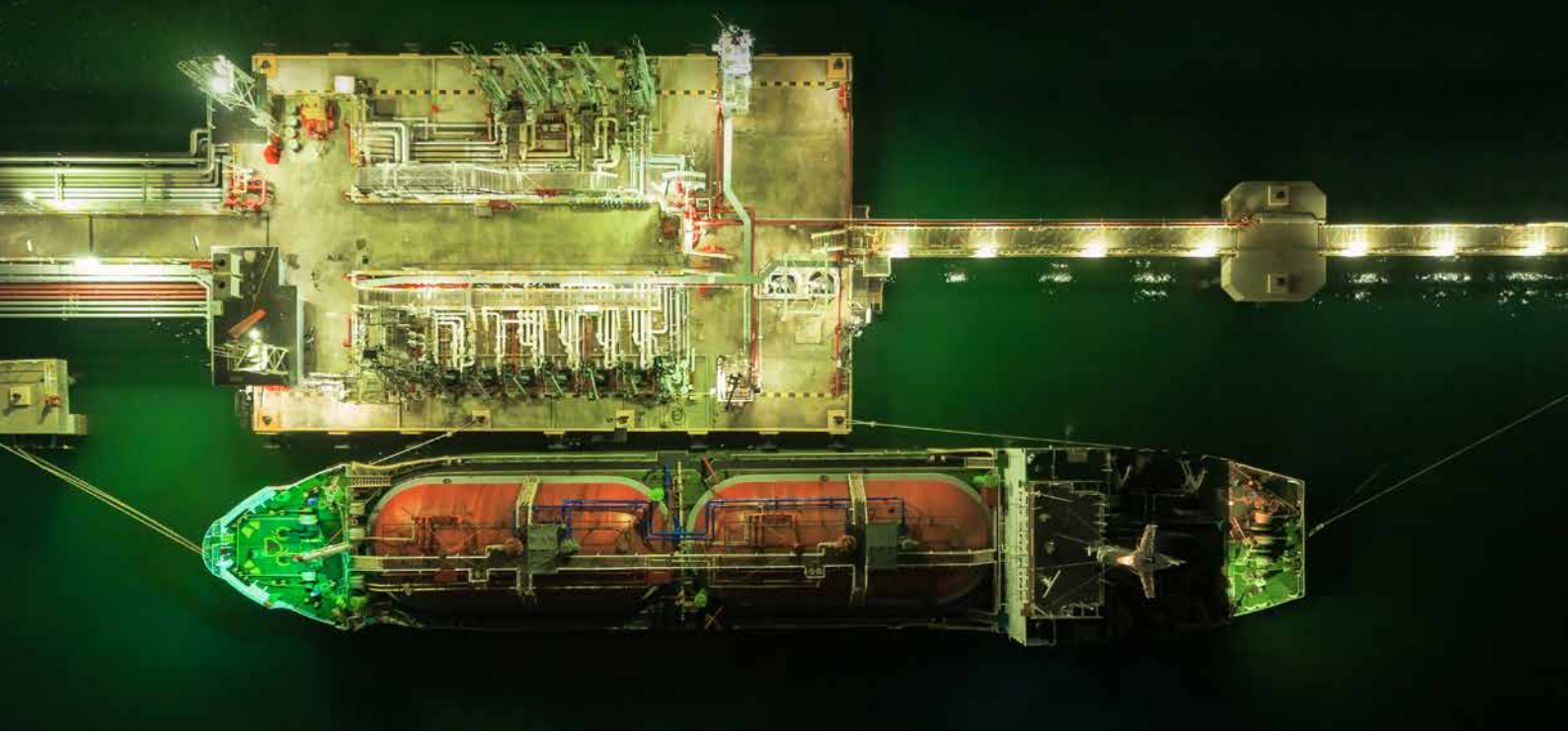
Ashurst LLP is a limited liability partnership registered in England and Wales under number OC330252 and is part of the Ashurst Group. It is a law firm authorised and regulated by the Solicitors Regulation Authority of England and Wales under number 468653. The term "partner" is used to refer to a member of Ashurst LLP or to an employee or consultant with equivalent standing and qualifications or to an individual with equivalent status in one of Ashurst LLP's affiliates. Further details about Ashurst can be found at ashurst.com.

© Ashurst 2019. No part of this publication may be reproduced by any process without prior written permission from Ashurst.

PORTS AND WORLD TRADE: BULK PORTS (EXPORT AND IMPORT) AND PORT-LOCATED FACILITIES

Coal, iron ore and LNG ports

By Michael Harrison, Richard Guit, and Daniel Reinbott



In a previous InfraRead article titled "Port Developments in AsiaPac: A platform for regional growth and global trade", we provided an overview of the various approaches to procuring port infrastructure and port services in the Asia Pacific (for both government-owned and private ports). In this context, we considered both whole-of-port and specific infrastructure development (both land side and marine side).

In this second article in a series of InfraRead articles on ports, we consider various kinds of bulk ports (Ports) and port infrastructure broadly at ports. The purpose of this article is to provide an overview of the arrangements that exist upstream and downstream of Ports, that affect the arrangements at Ports for the use of those Ports and the use of facilities and infrastructure (Port Terminals) for bulk. To provide context, we consider three bulk resource commodities that are highly dependent on Ports and Port Terminals: Coal (thermal and metallurgical); iron ore; and liquefied natural gas (LNG). In future InfraRead articles, we will consider other commodities.

Background

As a general statement, ports and port terminals around the world may be categorised as follows (by reference to category of cargo):[1]

- Bulk Ports and Ports Terminals, comprising dry bulk terminals and liquid bulk terminals – the subject of this article covers dry bulk terminals for coal and iron ore, and liquid bulk terminals for LNG;
- Container Ports and Container Terminals;
- General Cargo and Multipurpose Ports and Terminals; and
- Ro-Ro[2] Terminals.

In addition, there are fishery ports and inland ports and terminals. Some ports are dedicated to one cargo or category of cargo. For example, Port Hedland in Western Australia's Pilbara Region is a dedicated iron ore port, and the Port Terminals within Port Hedland are each dedicated to iron ore.

As a general statement, each Port Terminal is made up of dry and wet infrastructure (critically the jetties and berths and the berthing pockets) and the superstructure of, or on which the Port Terminals are located, the equipment used at the Port Terminal, critically for loading (at the Port of loading) and unloading equipment (at the Port of unloading) and those operating the Port Terminal.

The *configuration* of Ports and Port Terminals is a function of the capital applied to develop them. The *efficiency* of the Ports and Port Terminals is a function of the turnaround times for loading and unloading: at its most simple, Ports and Port Terminals want to have sufficient capacity to avoid bottlenecks in capacity availability such that efficient loading and unloading is achieved to optimise the use of the Port and the Port Terminal. As might be expected, there is a direct link between capital and operating expenditure. These are not static dynamics, they are relevant to both new and existing Ports and Port Terminals. We will consider these matters in future InfraRead articles.

Coal, iron ore and LNG

In the context of world trade

In terms of the number of tonnes transported, maritime transportation moves the greatest number of tonnes globally, and as such may be regarded as the most important mode of transport.[3]

Iron ore may be regarded as the most important dry bulk commodity for the purposes of world trade, accounting for approximately 20 per cent to 22 per cent by mass of world dry bulk maritime trade. Coal remains key to world trade,[4] although the mass of thermal coal (used for power generation) transported may reduce over time. However, the use of metallurgical coal (used in steel making) will not follow the same trend. The quantities of LNG produced and transported have increased remarkably over the last 20 years or so as the number of LNG projects has increased around the world. While the rate of increase may slow, the upward trend in LNG production and export will continue.[5] These three commodities are, and will likely remain, key to world trade for the foreseeable future – iron ore and LNG in particular.

In this context, Ports and Port Terminals, and their capacity, are key to world trade. Port Terminals for coal, iron ore and LNG are at the end of a production and haulage/transportation chain in the country of export. The transport chain comprises capital-intensive infrastructure, whether owned by the Producers of the commodities or accessed by them. The transportation chain delivers the commodities to the Port and the Port Terminal for loading onto a carrier.[6]

Once that carrier arrives at the country of import, the commodity needs to be unloaded at Port at a Port Terminal (using port facilities and infrastructure), and then delivered to the point of ultimate use within the country of import. As with the country of export, the Port and the Port Terminal at the Port of unloading comprise capital intensive infrastructure, and delivery to the point of ultimate use is likely to require rail (for coal and iron ore) and pipeline (for regasified LNG) infrastructure.

Demand for Ports and Port Terminals as a function of commodity prices

The development of bulk Ports and Port Terminals is a function of the world market for commodities being stockpiled and loaded and unloaded (and stockpiled and stored and loaded and unloaded (in the case of coal and iron ore) and stored and used for the production and regasification (in the case of LNG)). Critical to the development of Ports and Port Terminals is the demand for each commodity and how demand is reflected in the prices realisable for on sale.

In coal, iron ore and LNG, there is no long-term price certainty. To a greater or lesser extent, the length of, and the basis for, pricing under sale and purchase agreements for each of these commodities is not certain (Sales Contracts). The prices for all three will fluctuate over time. As such, if a Producer of any of these commodities contracts for Port use or Port facilities or infrastructure use or to develop a Port or facilities and infrastructure at a Port, the Producer will have reached a conclusion as to where it sits on the cost curve for production, the market for its production and as such, the project revenue stream from the sale of the commodity.

Ports

Port activities and functions

The activities undertaken on the land side and marine side within a Port can generally be categorised as: Governance, Infrastructure and Operations. In the context of bulk Ports, the

1 In broad terms, the following are the main categories of cargo: (a) agricultural products and livestock; (b) other food products and fodder; (c) solid fuels, including coal; (d) petroleum products, including LNG; (e) metal and ore for use as feedstock, including scrap metal and iron ore; (f) finished metal products, including iron, steel and non-ferrous metals; (g) raw materials, including for construction; (h) chemical products, including fertilisers; and (i) equipment and machinery, including vehicles.

2 Roll-on-Roll-off terminals.

3 The other modes of transport are inland water, rail, road, air and pipeline.

4 Global sales of exported coal were estimated to be US$120 billion in 2018.

5 Global LNG trade increased by 24 MT (8.3%) in 2018 with 313.8 MT of LNG being imported globally. This is more than three times the level of Global LNG trade in 2000. On the production/supply side, global liquefaction capacity increased by 41 MTPA in 2018, with total liquefaction (nameplate) capacity now standing at 406 MTPA globally. Around 25 MTPA of new liquefaction capacity is expected to come on line in 2019 ("The LNG Industry", GIINGL Annual Report 2019).

6 Each Port Terminal has different requirements for facilities and infrastructure and equipment because the physical and chemical characteristics of each commodity are different: for example, iron ore density limits the height of stockpiling of iron ore, because of the load-bearing capacity of the superstructure, blending activity may be required at Port, requiring space to stockpile and blend; the volatility of coal will tend to limit the height of stockpiling (to manage the risk of spontaneous combustion arising as coal absorbs oxygen) and dust management will be important within the Port and at the Port Terminal; and LNG is a cryogenic cargo (with a temperature of around minus 160 degrees Celsius) requiring specific technology and materials able to handle the LNG.

Governance functions are activities that tend to be undertaken by the government authorities rather than users of the Port. Infrastructure (development and maintenance) activities may be undertaken by the ultimate owner of the Port, but tend to be undertaken by users or by contractors with which they contract. Finally, Operational Functions, tend to be undertaken by owners and operators of infrastructure on land side, and on marine side tend to be supplied by contractors operating within the Port, including providers of pilotage and towage services.

Port activities are made up of:

- **Governance functions:** including Customs, Quarantine and Immigration, Harbour Master – vessel traffic management within the Port, including to manage any collision; and Policing and Security Management;
- **Infrastructure (development and operation and maintenance) functions:** including Breakwaters, harbour walls and shore protection and bridges; Port Channels and Dredging – capital dredging and maintenance dredging – channels and berth boxes/pockets; jetties, piers, quays and wharfs, and berths; Terminals – container terminals, Ro-Ro, passenger terminals; and Ship Loading Facilities – dry bulk commodity storage and conveyors and loaders and liquid storage and loading; and
- **Operational functions:** land side – storage and warehousing and transport (likely road and rail, within the port precinct) and transport and logistics (to and from the port precinct); Stevedoring – loading and unloading, and handling, of cargo services; Marine and side – pilotage, towage, mooring and unmooring and services; Infrastructure developed under Design, Build, Finance, Operate and Maintain (or DBFOM) procurement structures.

Port models:

In general terms, there are four port models:

1. **Private service model:** the whole port is owned and operated entirely by the private sector;[7]
2. **Public service model (public service port):** the port is owned and operated entirely by the host government or a government entity;[8]
3. **Service port model or labour model (tool port):** the port (equipment and land) is owned by the host government or a government entity, and is either operated by government, or the government contracts with the private sector to operate all or part of the port; and
4. **Landlord model:** the port (whether publicly or privately owned) leases land within the precincts of the port to the private sector to undertake activities within the port, and the private sector invests capital to allow it to undertake those activities (effectively each private sector entity is granted a concession, which may or may not be exclusive).`

In the context of bulk Ports, the private service model or the landlord model is the most likely model to be used, and either of them is appropriate. That said, there are examples of the other models being used.

Location of ports and infrastructure ports and port terminal

Bulk Ports are generally located as near as possible to the source of the resource commodity, subject to the characteristics of the Port itself (and the vicinity of the Port, including considerations of climate (for example, if the Port is subject to weather conditions

7 A private service model places market risk of port patronage and use (and actually or prospectively market power because of barriers to entry for competitors) with the private sector, but the host government will want to be assured that it is able to achieve the benefits of the multiplier effect within the broader economy. It is reasonable to assume that the private sector will be concerned to achieve improved efficiency across all activities, and that it is likely to contract to achieve this, including to develop port capacity.

8 It is fair to say that even in public service ports and service ports some activities will be undertaken by the private sector, not necessarily under term contracts, but as contractors of the host government. The public service ports and service port models do not preclude the government from involving the private sector in the development of some infrastructure on a piecemeal basis, but may not allow the host government to achieve efficiency levels that in the case of transhipment ports will attract increased trades.

that will affect land side or marine side operations), silting of the Port (and its vicinity), tidal range at the Port, draught of the channels within Port leading to the berth and the depth at the berthing pocket itself). These characteristics are relevant to carriers used to load, to transport and to unload, and to operations at the Port of loading and Port of unloading. The carriers used for coal, iron ore and LNG carriage are specialised, in particular the carriers need to be compatible with both the Port of loading and the Port of unloading and the Port Terminals at each of them.

In addition to addressing compatibility for coal and iron ore, stockpiling is likely to be required at the Port of loading. To allow stockpiling, land must be available on land side at the Port. Coal and iron ore in stockpile needs to be handled into, and out from, stockpile, and this will require handling equipment and infrastructure (stockpiling and reclamation), either separate from or integrated with the infrastructure for loading, and are likely to comprise conveyor systems. Coal and iron ore may be blended at Port, and this is likely to take place using designated stockpiling and reclamation plans to achieve the required specification of blended coal. (Note that coal and iron ore, or other similar dry bulk such as bauxite, are not processed at Port, although some producers regard blending as processing.)

In the more congested coal and iron Ports around the world, congestion is managed at least to some extent by provisions that manage delivery of coal and iron ore into unloading facilities from trains and into stockpile. For this reason, coal and iron ore Port Terminals comprise rail sidings and unloading facilities, at which coal and iron ore delivered from mines is unloaded. At the Port of unloading, equipment and infrastructure to unload, stockpile, reclaim, and to load trains will be required, unless the coal is delivered to the ultimate user at Port (power station for thermal coal, steel mill for metallurgical coal, or steel mill for iron ore).

For LNG production and loading, natural gas processing, liquefaction, storage and loading facilities are required. These facilities are located within the precincts of the Port of loading. Upstream of LNG production and loading facilities are connection points to which natural gas is delivered from wells and gathering systems. LNG facilities can be shore-based or floating. Unlike coal and iron ore Port Terminals (which allow products to be stored in stockpile), LNG facilities have comparatively limited storage capacity: once produced LNG is stored and handled using cryogenic steel, which is expensive. As a consequence of the cost of storage facilities, the scheduling of LNG carriers and their timely arrival and loading are key both to Port operations and LNG facilities' operation: if LNG is not taken by a carrier and storage is utilised fully, the production of LNG will have to be turned down. For this reason, the arrangements for LNG carriers are prescriptive and regimented in detail in LNG sale and purchase agreements. While the underlying agreements for the sale and purchase of LNG contain provisions addressing liability for delay in loading (caused by the LNG facilities and the LNG carrier), the amounts payable under these provisions tend to provide for liquidated damages based on demurrage, rather than allowing recovery of the consequences of delay.[9]

At the Port of unloading, facilities for unloading of LNG, storage of LNG and regasification and send-out (of regasified LNG), and delivery to the ultimate user or into the transmission system for natural gas is required. Regasification and storage facilities at the Port of unloading can be shore-based or floating. Increasingly, floating storage and regasification units (FSRUs) are being used.

In a future InfraRead article, **Michael Harrison, Dan Reinbott, Peter Vaughan** and **Matt Wood** will provide an overview of shore-based and floating regasification.

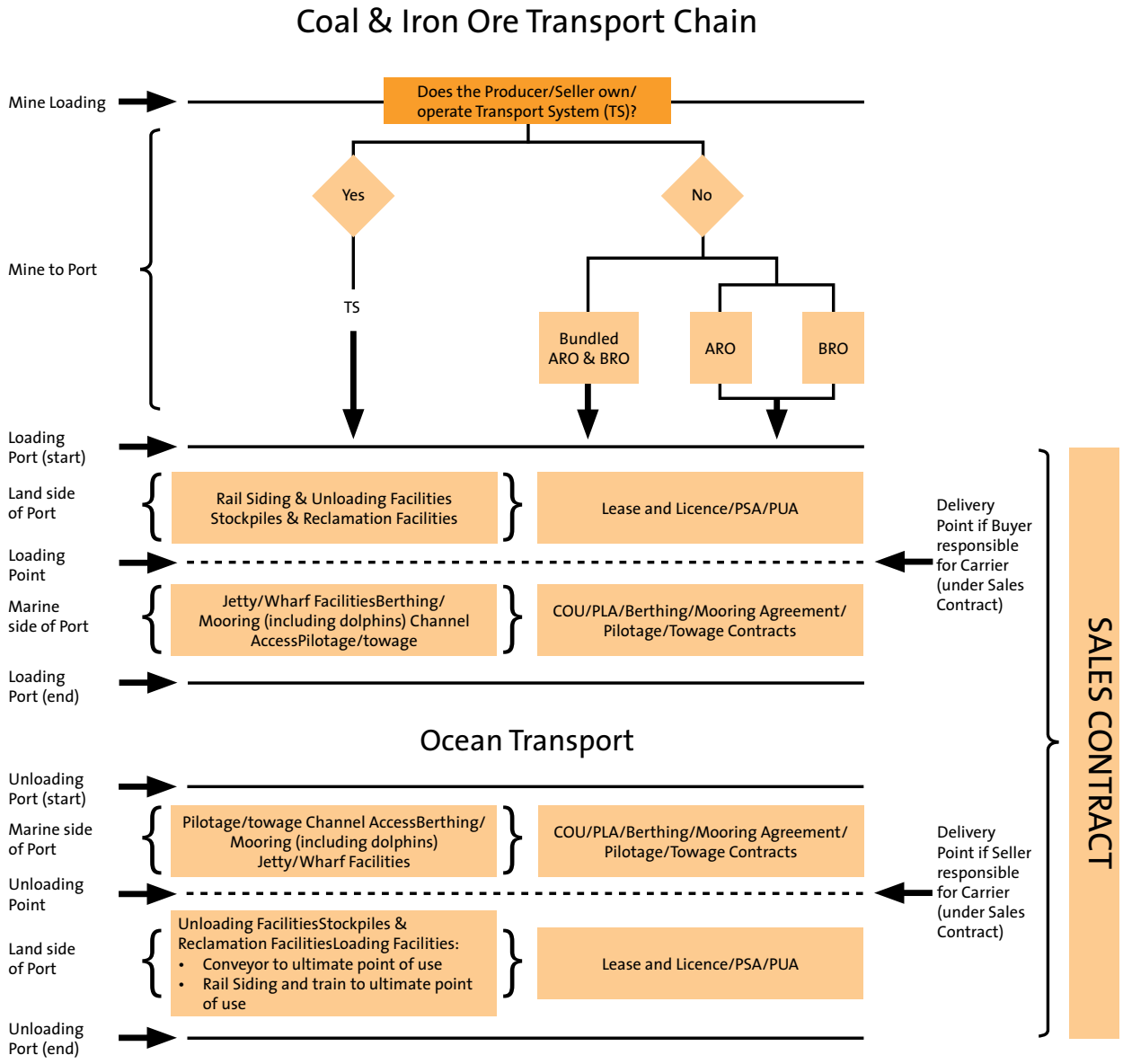
At each loading and unloading Port, operators of the Port and the Port Terminal will retain the right to refuse to allow a carrier to come to berth to load (or to unload) if it is not on time, and to move away from berth if the carrier is not able to load (or unload) in a timely manner.

9 Liquidated damage provisions in contracts provide for the payment of a stated amount by one party to another party if a stated event occurs or does not occur, for example if there is a delay in loading or unloading LNG. Although, note that in the case of prolonged delay (eg 48 or 72 hours after the end of the scheduled loading/unloading window), the Buyer/Seller will typically have the right to treat the delay as a failure to deliver/take, which will result in liability, sometimes of a liquidated amount. In this case, damages may be based on demurrage to compensate for opportunity cost of charterer vessel and/or compensation may be payable by the Port to other users whose vessels might be delayed as a result.

Summary of infrastructure at Port

Coal – key infrastructure	Iron ore – key infrastructure	LNG – key infrastructure
Above and below rail assets and infrastructure from mine to Port	Above and below rail assets and infrastructure from mine to Port	Upstream feed-gas production and delivery system to floating or shore-based processing and production
Train unloading facility	Train unloading facility	Production of LNG at liquefaction train
Conveyor into stockpile and stock reclamation equipment and conveyor to coal loader	Conveyor into stockpile and stock reclamation equipment and conveyor to iron ore loader	Storage of LNG in cryogenic storage tanks before loading
Coal loader	Iron ore loader	Loading of LNG using cryogenic facilities
Coal unloader	Iron ore unloader	Unloading of LNG using cryogenic facilities
Conveyor into stockpile and stock reclamation equipment and conveyor onto rail or into ultimate point of use	Conveyor into stockpile and stock reclamation equipment and conveyor onto rail or into ultimate point of use	Storage and regasification of LNG facilities, floating or shore-based, before send-out to pipeline to ultimate point of use or to trunkline
If onto rail, above and below rail assets and infrastructure to the point of delivery	If onto rail, above and below rail assets and infrastructure to the point of delivery	If transport through trunkline, transport until off-taken by the ultimate user

UNDERLYING CONTRACTS:



Legend:

Producer/Seller: the producer of, and seller of, coal or iron ore or, if producer itself is not the seller, a marketing entity that sells coal or iron ore

Buyer: the buyer of coal or iron ore under a Sales Contract

Sales Contract: a contract under which the Producer/Seller sells coal or iron ore to a Buyer

ARO: above rail asset and infrastructure owner operator

BRO: below rail asset and infrastructure owner operator

Dedicated Facility: a facility or infrastructure on land side of a Port that is dedicated to the use of one Producer/Seller

PSA/PUA: a port services or port use agreement under which the Port contracts with a Producer/Seller for the use facilities at a Port Terminal owner by the Port

COU/PLA: conditions of use or port liability agreement under which a user of a Port (the Producer/Seller, the Buyer and Carrier) are permitted to access marine side of the Port, including the terms of liability for any incident within the Port

Ex Ship: the terms of carriage stated in a Sales Contract under which the Producer/Seller is required to deliver coal or iron ore to a Port of unloading, and as such contract with a Carrier for this purpose

FOB: the terms of carriage stated in a Sales Contract under which the Buyer is required to take delivery of coal or iron ore at the Port of loading, and as such contract with a Carrier for this purpose

Transportation System: delivery system transporting the iron ore or coal to the Port

Producers and provision of delivery services[10]

In the case of:

(a) coal and iron ore, some Producers own and operate the delivery systems from the mine to the Port, others use existing delivery systems owned and operated by others;

(b) LNG, most Producers own and operate the delivery systems from the field (whether reservoir or coal seam methane) to the Port, others use existing delivery systems owned and operated by third parties (for example, in the United States of America) to deliver feed gas to LNG production and storage facilities (in each case a Transportation System).

In the case of coal and iron ore, if there is an existing Transportation System in the form of a rail network, the Producer will seek to use that existing Transportation System. For these purposes, the Producer will seek to contract with the third party owner operator of the existing Transportation System for the provision of transportation services using above rail and below rail assets to deliver coal or iron ore to the Port.

In the case of LNG, in the last ten years or so more Producers, particularly in the case of newly developed projects, have used existing pipeline systems to deliver feed gas to processing and liquefaction and storage facilities (frequently tolling that feed gas through those facilities in the case of the United States of America) or from new fields to use existing processing and liquefaction facilities in which there is spare capacity, as the fields from which natural gas was originally derived deplete over time and new fields are developed to make use of the spare capacity.

In a future InfraRead article **Michael Harrison, Dan Reinbott, Peter Vaughan** and **Matt Wood** will outline the basis of LNG tolling projects and financing the development of processing and liquefaction facilities.

The coal industry in Australia provides a good example of third party owner operator of above rail and below rail assets and infrastructure providing delivery services to coal Producers to deliver coal from mine to Port. One third-party owner may own and operate the above rail assets, and another third party may own and operate the below rail assets, or a third party may own and operate both the above and below rail assets and infrastructure. If the above and below rail assets and infrastructure are owned by different third parties, it may be that the coal Producer can contract separately with the owner operator of each of the above rail assets and below rail assets and infrastructure, or that it will contract with the owner operator of the above rail asserts for the provision of a bundled service, in which case the above rail owner operator will contract with the below rail owner operator for access to the below rail assets and infrastructure so as to be able to provide the above rail services. If a Producer has a choice, it tends to prefer to contract separately (with the above rail and below rail owner operators) rather than for a bundled service.

Third Party Access

Background

Given the nature of below rail assets and infrastructure, the terms of access (and pricing) may be regulated to ensure that monopoly rents cannot be charged by the owner operator. In contrast, the terms of contracts for above rail services using below rail assets and infrastructure are unlikely to be regulated. If a third party owns and operates both the above and below rail assets, there is an argument for regulation of the bundled service.

The iron ore industry in Australia provides good examples of Transportation Systems owned and operated by iron ore Producers or infrastructure owning and operating companies that they have set up. The Big Three iron ore Producers in Australia (BHP Ltd, Rio Tinto Ltd and Fortescue Metals), each own and operate (or control) above rail and below rail assets and infrastructure delivering iron ore from mine site to Port. Each of the Big Three controls the delivery of its iron ore to Port, and Rio Tinto owns the Port into which it makes delivery. In seeking to maintain the integrity of an integrated mining, blending and port production process, BHP and Rio Tinto each sought to avoid its below rail assets being subject to a third party access regime.[11] The ability of third parties to seek a declaration that privately owned infrastructure should be subject to negotiated access continues to be a contentious issue, even though now long established.

Other than in the United States of America, LNG production projects tend to follow norms globally, with wells, gathering, collection and delivery systems operated on an integrated basis with processing and specialised purpose-built liquefaction facilities (typically in remote locations not comprising part of the broader port scheme).[12] In this context, the production of LNG may be regarded as part of an integrated process. There are examples of regulatory regimes globally that contemplate access to Transportation Systems (and in some circumstances processing facilities), but not liquefaction facilities. As noted above, tolling projects have become increasingly prevalent over the last ten years, but this is on the basis of a negotiated tolling agreement for liquefaction rather than a regulated third party access regime. While liquefaction is not subject to a third party access regime the use of the existing gas pipeline transportation system across the United States is regulated to allow third party access.

In contrast to liquefaction facilities, the application of third party access regimes to LNG regasification facilities is far more developed and widely implemented. This is particularly the case in Europe and also in some Asia Pacific nations, where mature competition regulations, deregulated gas markets and multiple downstream gas utilities seek to access "natural monopoly" infrastructure. In contrast to liquefaction projects, tolling models have become the norm for regasification facilities in recent years.

Third Party Access regimes

If infrastructure upstream of the applicable Port (ie before delivery to that Port) is subject to a third party access regime, the issue for any Producer that is not an owner operator of that infrastructure will be the terms upon which access to the infrastructure may be obtained, including timely delivery to the Port. The terms of access can be regulated under an open access regime (under which a Producer can access the infrastructure on the same terms as the

10 We have chosen a suitably generic term to refer to transportation by rail to the rail siding at the Port at which the coal or iron ore is unloaded for stockpiling and to refer to the feed-gas system used to deliver feed gas to the LNG facilities.

11 The third party access regimes applicable around the world will be considered in a subsequent InfraRead article.

12 While there may be different ownership of different elements of a LNG production project, there will be commonality of operatorship in the ordinary course. In relation to purpose-built new liquefaction facilities, the Port infrastructure will be funded by a greenfield development project.

rest of the industry) or under a negotiated access regime where the terms have to be negotiated and, if the person seeking access is not able to reach agreement with the owner operator of the infrastructure, the person seeking access may refer the terms of access for determination by an arbitrator. As third party access regimes become more mature, with many jurisdictions regulating open access, reference to arbitration becomes less frequent.

In a future InfraRead article **Michael Harrison, Richard Guit, Dan Reinbott** and **Justin Jones** will provide an overview of third party access regimes applicable to rail and to port infrastructure (including marine side, critically access to channels and the cost of that access).

Producers and provision of Port services and Port Terminal services

As noted above, coal and iron ore are likely to require stockpiling and reclamation at Port. Each Producer will have (in the case of iron ore) and is likely have (in the case of coal) dedicated facilities at Port for this purpose. It may be that a Producer will undertake these activities with its own personnel and equipment and facilities (most likely) or retain contractors to provide these services (possibly contractors procured by the Port). In the case of Producers at dedicated Ports or having dedicated facilities at Port, they have integrated systems for stockpiling and reclamation and loading. In the case of producers that have to share infrastructure with other Producers, typically, coal loading infrastructure (from stockpile and reclamation on to carrier), the Producer may contract with a third party to provide services to it and to other Producers (more likely with coal than with iron ore).

In relation to coal loading infrastructure, at some Ports Producers combine to develop infrastructure companies (typically, in which each Producer owns shares) to own and to operate infrastructure to coal loading services to each Producer so as to enable coal to be loaded on to carriers. This approach avoids unnecessary duplication of coal loading infrastructure, allows the Producers together to achieve economies of scale and as such lower unit cost, along with increased operational efficiency (while preserving operational integrity) of the Port. Project finance can be used to develop coal loading infrastructure because each Producer will contract over the longer term for the provision to it of coal loading services.

The basis upon which Producers combine is likely to require consideration and in some cases authorisation from an anti-trust law perspective because of the impact on competition of supply side competitors combining. In the context of the major Australian coal ports, the arrangements in respect of the coal loading infrastructure and the basis upon which each Producer contracts for coal loading services have the authorisation of the competition authority.

In a future InfraRead Ports article **Michael Harrison** and **Richard Guit** will consider these arrangements in detail, with the integrated arrangements to ensure effective management of capacity of infrastructure from mine to port, the structures used and the financing arrangements. In relation to iron ore, most Producers have dedicated infrastructure connecting to dedicated loading facilities at Port.[13]

The ability to project finance Port assets and infrastructure at Port (rather than the Transportation System to Port) will depend, in

13 Some Producers have developed above and below rail and port infrastructure assets in companies owned or controlled by them, typically to allow project financing of the infrastructure assets, and to allow possible sale of that company to a third party.

part, on the tenure of the Producer at the Port: if the Producer or its infrastructure company owns the Port or has a long-term lease at Port, project financing will be more straightforward. Note also that if dedicated facilities are to be developed, the Port may require a works agreement between the Port and Producer/Seller to govern the basis of development.

In LNG projects, key LNG infrastructure facilities:

(i) at the loading port are the connections from the upstream, the processing, liquefaction facilities and storage tanks, and the jetty and berthing facilities to allow loading of the LNG;

(ii) at the unloading port are the jetty and berthing facilities, the unloading facilities, the LNG storage tanks and regasification facilities (which may be land-based or floating), and the natural gas send-out (including any pipeline) to the ultimate user or to the main trunk-line gas transmission system.[14]

There are some circumstances in which coal or iron ore may not be loaded directly onto carriers, rather the product is transshipped (typically using barges) from the Port of loading to the carrier at a loading point within or outside the Port. This is done in circumstances in which the depth of the Port is not sufficient to allow carriers to enter and to leave the Port or a particular part of the Port.

There are some (although few) circumstances in which LNG is loaded at a Port of loading, unloaded at a transshipment point at an intermediate Port and then reloaded to be transported to its final destination. This has not been common historically, however as the liquidity of global LNG trade increases and new markets for LNG emerge, some regasification terminals are starting to offer storage and reload services, effectively "break bulk". LNG trucking services have also emerged as an alternative to transport LNG to end users "off-grid", as opposed to transportation of regasified LNG by pipeline.

The Producer/Seller may have use of a Dedicated Facility, and in the case of iron ore is likely to do so. The Dedicated Facility may have been developed by the Port (in which case the terms of use will be governed by a Port Services or Port Use Agreement) or more likely the Port will have leased land at Port to allow the Producer/Seller to develop the Dedicated Facility. The terms of any lease of land at Port for this purpose is likely to be on standard form with limited or no ability to negotiate with the Port: the expectation of the Port will be that the Producer/Seller will take all risks, and that the Port will not have any liability other than in limited circumstances. The lease will provide for exclusive possession of the land at Port leased to the Producer/Seller. Also, the lease will provide for the payment of rent. The amount of the rent will be a function of a number of things, including demand for the land at Port and that other port charges payable by the Producer/Seller, in particular the cargo/wharfage charges (harbour or Port dues).

In the ordinary course, "Port Charges" is a term used to describe all charges, fees and imposts for access to, and use of, a Port and the provision of port and marine services provided by the Port and the Port Terminal, on land side and marine side. If a Producer/Seller has exclusive use of port infrastructure, it is likely that the Port will seek to impose a minimum through-put cargo/wharfage charging regime on the Producer/Seller so that Producer/Seller (in the case of the Port of loading) or the Buyer (in the case of the Port of unloading) as that the user of the Port takes risk of demand for the commodity to be moved through the Port. In the ordinary course, Port Charges are paid in advance.[15]

Buyers and Sellers of Products

It will be clear from what is stated above that Producers (as Sellers) are selling coal, iron ore or LNG (directly or indirectly[16]) to Buyers of those products. Those Buyers may be the ultimate consumers of those products or they may trade those products. Those Sales Contracts may be under term contracts[17] or spot contracts.[18] Irrespective of whether a Sales Contract is term or spot, among other things, the Sales Contract will deal with the party responsible for arranging transportation of the product from the loading port to the unloading port, compatibility of the carrier used to transport the product with the applicable Port and the Port Terminal at that Port, the schedule of the carrier (critically, arrival and loading days or unloading days), and liability of each of Seller and Buyer under the Sale Contract, including the responsibilities of each party for incidents within the Port and at the Port Terminal.[19]

If the Seller is responsible for arranging transportation under a Sales Contract (to deliver the product to unloading port), the Seller will contract with a transportation company for the charter of a carrier (unless the Seller owns its own carrier(s)) to transport the product. In addition, the Seller will have to contract with the Port and Port Terminal at the loading port for access and use of the Port and the Port Terminal, and with the Port at the unloading port to allow it access to the Port. (If the Seller owns and operates the Port of loading or the Port Terminal at the Port of loading, it will not have to contract with that Port or that Port Terminal.)

If the Buyer is responsible for arranging transportation (to take delivery of the product at the loading port to allow it to deliver the product to an unloading port), the Buyer will have to contract with a transportation company for the charter of a carrier (unless the Buyer owns its own carriers) to transport the product. In addition, the Buyer will have to contract with the Port of loading and at the Port of unloading for access and use of the Port and with the Port Terminal at the Port of unloading to allow use of the Port Terminal. (If the Buyer owns and operates the Port of unloading or the Port Terminal at the Port of unloading, it will not have to contract with that Port or that Port Terminal.)

14 In addition to the traditional LNG regasification facilities described, other facilities and services may include LNG trucking (at loading or unloading port), break-bulk and LNG bunkering.

15 Depending on the Port, the Port charges may include customs, immigration and quarantine clearance charges (normally payable to a government agency or an agent of it), navigation aid charges (recognising the capital and operational cost of any navigation aid), security charges (recognising the need of the Port and Port Terminal to comply with duties and obligations in respect of the security at the Port and Port Terminal), berthing and jetty services (recognising the capital and operating costs of providing access to and use of berthing and jetty facilities), stevedoring services (recognising the capital and operating cost of the provision of loading and unloading services by any stevedore), stockpiling (and storage and warehousing) and reclamation services (recognising the capital and operating costs of the stockpiling and reclamation services), cargo/wharfage charges, sometimes referred to as harbour or port dues, levied by a Port in respect of products moved through that Port on a per unit basis.

16 Coal, iron ore and LNG are often marketed and sold by related companies of Producers, often through centres of marketing excellence such as Singapore.

17 A term contract is a contract for a stated period of time. The length of the term will depend on a number of factors, but each of coal, iron ore and LNG industries have reasonably standard form contracts.

18 A spot contract is a contract for a stated cargo or for a stated number of cargoes of the applicable product. Again, the spot contracts are standard form contracts.

19 These are not the only important terms under Sales Contracts, but from the perspective of the issues that arise at Port they are key.

All Sales Contracts will address specification and sampling by reference to that which may be rejected by the Buyer and by reference to which price will be determined. It is important for these provisions to be understood and reflected in the contractual arrangements with the transportation company providing the carrier, and the contractual arrangements with the Port Terminal owner operator at the Port of loading and the Port of unloading.

Sellers and Port and Port Terminals

As will be clear from the above, Sellers of products will contract with the Port and the Port Terminal (unless the Seller owns and operates the Port or the Port Terminal, or both of them). The contractual arrangements with the Port are likely to be standard form with no basis (or very little basis) for negotiation. Among other things,[20] these contractual arrangements will specify the Port charges and fees and wharfage charges[21] to be paid by the Seller in respect of the export of the product, and, often, the responsibility of the Seller for acts and omissions of any agent or contractor of the Seller, which includes its carrier if Seller is arranging transportation from the Port of loading to the Port of unloading, and which includes Buyer (and, possibly, its carrier) if the Buyer is arranging transportation from the Port of loading.

Under these contractual arrangements, in any event, the Seller will be responsible for the payment of the land side charges and fees at the Port of loading.

If the delivery point (for the coal, iron or LNG) under the Sales Contract is:

(i) at the Port of loading, the Buyer will be responsible for the marine side port charges and fees at both the Port of loading and Port of unloading, and for procuring terminal access and services at the Port Terminal and land side charges and fees at the Port of unloading; and

(ii) at the Port of unloading, the Seller will be responsible also for marine side port charges and fees at both the Port of loading port and the Port of unloading, but the Buyer will responsible at its cost to procure terminal access and services at the Port Terminal at the Port of unloading and for landside charges and fees at the Port of unloading.

Carriers and Ports

It is usual for carriers accessing and using any Port to have to comply with the conditions of use (COU) of that Port. COUs tend to deal with similar subject matter.[22] One of the matters that any COU should address is liability of the carrier (and entities with interests in the carrier) for incidents[23] within the Port and at the Port Terminal.

In a future InfraRead Ports article **Michael Harrison, Richard Guit** and **Dan Reinbott** will provide more detail on COUs from around the world, and the spread of structures that are used to address liability, including structures that are used to ensure that users of a Port have direct obligations to, and direct rights and remedies against, other Port users.

It is likely that to the extent permitted by law, each Port will seek to exclude and to limit liability for acts and omissions of that Port, including arising from acts and omissions of those for whom the Port is vicariously liable. It is likely that Ports will seek to back-to-back any prospective liability with its insurances.

It is important to understand the law of the jurisdiction in which a Port is located, in particular whether a cap on liability may arise as a matter of law in that jurisdiction.

In a future InfraRead Ports article **Michael Harrison** and **Richard Guit** will consider the liabilities that may arise within a Port and at Port Facilities, and how law of the applicable jurisdiction and the expectations of insurers interplay. This basis of liability will be of concern to those with interests in the carrier and the insurers of the carrier, in particular Protection & Indemnity Clubs in respect of the insured for liability to third parties.

Each carrier will have to contract with the provider of pilotage and towage services within the Port of loading and unloading. The cost incurred by the carrier for the provision of these services will be reflected in the underlying contract of carriage and Sales Contract as a pass through.

Buyer and Port and Port Terminals

If a Buyer is responsible for arranging transportation, the Buyer will have to contract for access to and use of the Port at which the product is to be loaded, and with the Port of unloading and the Port Terminal at the Port of unloading.

In the case of coal, the Port Terminal at the Port of unloading will comprise a berthing jetty and pocket, a shore-based unloading facility, critically coal unloading facilities.

In the case of iron ore, the Port Terminal at the Port of unloading will comprise a berthing jetty and pocket, a shore-based unloading facility, critically iron ore unloading facilities, and likely stockpiling and reclamation facilities. In addition, the unloaded iron ore will have to be transported to deliver to the point of use.

In the case of LNG, the Port Terminal at the unloading port will comprise a berthing jetty and pocket, a shore-based or floating regasification and storage facility (including send-out facilities). In addition, the regasified LNG will have to be transported from the send-out facilities by gas pipeline (or truck) to deliver to the point of use.

If the Buyer does not own and operate the regasification and storage facility, it will have to contract for regasification, storage and send-out services under contractual arrangements with the owner and operator of that facility (and possibly other users of it). Under these contractual arrangements (often called terminal use agreements) the Buyer will contract for capacity in the facility, and services to be provided, by the owner operator. As with other facilities and infrastructure, Buyers sometimes combine to develop the facility using a company in which the Buyers hold shares, with the company owning and operating the facility, and providing services. Under the terminal use agreement it is likely that other services will be provided to the Buyer, including for imbalance and

20 These are not the only important terms under contracts with Ports, but from the perspective of the issues that arise at Port they are key.

21 The amount of port fees and wharfage can be regulated.

22 The subject matter is capable of being characterised as: (1) operational matters – business as usual, including health and safety, and the environment;(2) operational matters business not as usual (including specific incident response and detention of carriers); and (3) liability (including obligations to insure).

23 Incidents will be defined on a port-by-port basis, but as a general statement, they will tend to include among other things: allision and collision, grounding, wreck removal, and contamination and pollution.

for treatment of regasified LNG, in the ordinary course, blending,[24] inerting[25] or spiking services.[26]

If the regasification and storage facility is floating (eg FSRU) it is likely that the Buyer will charter the FSRU under a long-term charterparty with the owner operator of the FSRU. Under the charterparty the Buyer will contract for exclusive use (and quiet enjoyment of the FSRU), reserving the capacity in it, and paying for the availability of the capacity in the FSRU, and the provision of receipt, regasification, storage and send-out services.

In a future InfraRead Ports article Michael Harrison, Dan Reinbott, Peter Vaughan and Richard Shi will provide an overview of the contracts particular to the LNG industry at Ports.

Conclusion

As world trade in bulk commodities continues to grow, countries exporting bulk commodities are likely to achieve ever higher levels of utilisation from existing infrastructure at, and in the vicinity of, Ports, and from transportation systems from mine or field to Ports and from existing production facilities at Ports. In some areas of the world this has already occurred. The benefits are clear.

In the case of coal and iron ore, rail infrastructure and dedicated facilities at Port will continue to be augmented and developed, with greater quantities of commodities projected to pass over existing (and augmented) transportation systems and through existing Ports (including innovative operations as port, land and marine side).[27] While the demand for thermal coal may decline over time, the demand for metallurgical coal and the demand for iron ore will continue to increase.

In the case of LNG, new projects (production and regasification) continue to be developed, sometimes sharing existing Ports and infrastructure. This continued development is driven by projected demand for LNG, with Producers seeking to monetise reserves in line with that projected demand. This is a key driver for both new and existing projects. In respect of existing projects, where upstream reserves are depleted, or depleting and coming off plateau production levels, existing liquefaction facilities (located at existing Ports) are seeking to toll feed gas to produce LNG, and fields are moving into production as a result (including some fields that might not be viable if they had to develop new liquefaction and port facilities).

In this context, it is contemplated that third party access both regulated and unregulated will continue to be used to allow efficient use of existing Ports and infrastructure to, and at, Port. Governments (and their regulators) increasingly are seeing the economic benefits of access to existing infrastructure, subject to preservation of the integrity of the operations of existing users and the owner operators charging for access such that the person to whom access is provided does not get subsidised, and as such pays appropriate charges.

Consistent with these dynamics, the next two InfraRead publications relating to Ports will consider third party access regimes and tolling projects.

Michael Harrison
Partner, Perth and Sydney
T +61 2 9258 6837
michael.harrison@ashurst.com

Richard Guit
Partner, Perth
T +61 8 9366 8052
richard.guit@ashurst.com

Daniel Reinbott
Partner, Singapore
T +65 6416 9529
daniel.reinbott@ashurst.com

24 Blending involves mixing lower heating value natural gas with higher heating value natural gas.

25 Inerting involves the use of nitrogen to reduce the heating value or the Wobbe index of natural gas to allow the gas to be accepted into the mainline trunk gas transmission system within the country in which the LNG is unloaded.

26 Spiking involves increasing the heating value of natural gas by using propane or butane.

27 The largest export bulk ports in the world are coal and iron ore ports. For example, on Australia's East Coast, the major coal producing states of New South Wales and Queensland export approximately 200 million tonnes of coal, and 250 million tonnes of coal respectively from key Ports at Kembla and Newcastle (in NSW) and Abbott Point, Hay Point, Dalrymple Bay and Gladstone (in Queensland). On Australia's West Coast, Port Hedland in Western Australia, from which BHP Billiton Ltd, Fortescue Metals Group Ltd and Roy Hill Holdings Pty Ltd export iron ore, close to 500 million tonnes of iron ore a year is exported. Again in Western Australia, Rio Tinto Ltd exports iron ore from four dedicated Port Terminals at two Ports (Dampier and Cape Lambert) with a total capacity of approximately 350 million tonnes a year. In all, from Australia's bulk ports close to 900 million tonnes of iron ore a year is exported. Together iron ore and coal are Australia's first and second largest exports in quantity and value.

PAVING THE ROAD FOR PRIVATISATION:

Saudi Arabia's Draft Private Sector Participation Law

By Bilal Rana and Iman Linjawi

In July 2018, Saudi Arabia published a draft of the much anticipated Private Sector Participation Law. It was hoped that the law would address some of the key issues affecting the growth of the PSP sector in the Kingdom. The draft law holds significant promise.

Paving the road for privatisation: Saudi Arabia's Draft Private Sector Participation Law

In April 2016, Saudi Arabia announced its Saudi Arabian Vision 2030, a comprehensive economic reform plan that aims to reshape and diversify the Kingdom's economy away from dependence on oil. Private sector participation (PSP) is a cornerstone of Vision 2030, having the dual aim of reducing government spending and improving the quality of public services for citizens as well as strengthening the private sector in the process.

Even before the importance accorded to it under Vision 2030, PSP has been on the government agenda for some time. Although there have been some notable privatisations over the last two decades (through corporatisations and the initial public offerings of Saudi Telecom Company and the Saudi Electricity Company), the process has been unable to gain momentum in a manner that it was hoped it would. There are several reasons for this besides soaring oil prices. For example, the absence of an overarching regulatory framework to facilitate the PSP process; the directional and structural ambivalence of the relevant government ministries and authorities in pursuing PSP for their respective assets; lack of alignment among government authorities whose cooperation would be vital in implementing a PSP project (leading to delays in issuing permits or supplying utilities).

These issues are being addressed in earnest by the government under Vision 2030 through a multi-pronged approach. On the one hand, the government is setting up new bodies and empowering existing ones to oversee and resolve any hurdles to swift action on PSP projects. On the other, it is putting in place a multi-faceted legislative framework to facilitate the smooth implementation of the PSP projects, of which the PSP law will be a key pillar, the bankruptcy law and the commercial pledge law being two of the other legal pillars.

A draft PSP law was published in July 2018 for public consultation (the Draft PSP Law). The draft law goes a long way towards addressing a number of points that may have had the effect of stymying PSP growth in the past. If the enacted law is in fact along the lines of the draft, it will augur well for PSP projects in Saudi Arabia.

Key Implementers

To fully appreciate the application of the PSP law, familiarity with the key players who will be implementing the various aspects of the privatisation process will be useful.

Council of Ministers: This is the cabinet, Saudi Arabia's main legislative body after the King, consisting of key ministers and headed by the Prime Minister, who is the King himself.

Council of Economic and Development Affairs (CEDA): This is the main sub-cabinet overseeing all the economic and developmental affairs of Saudi Arabia, and is headed by the Crown Prince.

National Centre for Privatization & PPP (NCP): The NCP's role is to be an "enabler" of the PSP programme, by educating the ministries/authorities in the key target sectors, formulating regulations, creating frameworks and preparing government assets and services identified for PSP. The draft PSP Law was prepared and issued by the NCP.

Key features of the draft PSP law

Scope

The Draft PSP Law applies to public institutions and bodies with independent juristic personality, all ministries and departments, and any company with more than 51 per cent of its capital being owned by the Government and already set up for implementation of PSP projects. For example, Saudi Aviation Holding Company has been set up to own Saudi airport assets and facilitate the PSP projects in the aviation sector.

The Draft PSP Law applies to PSP projects, and defines a PSP as any infrastructure-related contractual arrangement that results in sale of assets (SOA) (any transfer of ownership of assets, shares, or rights from a governmental entity through a contract or grant) or a public private partnership (PPP). PPP is defined as a contractual arrangement relating to infrastructure between a governmental entity (including government-owned companies) and a private party that contains the following elements (among others):

(a) the arrangement is for five years or more;

(b) the private party provides a public service which includes the construction, management, operation or maintenance of assets;

(c) there is a qualitative distribution of risks between the government entity and the private party (the implementing regulations specify the cases in which the qualitative distribution of risks is achieved); and

(d) the monetary amounts owed by or to the private party under this arrangement shall principally be calculated on the basis of and adjusted for the performance of its obligations.

A PPP contract may not have a term longer than 30 years without CEDA's approval.

The Draft PSP Law defines public service to mean any service provided, directly or indirectly, by a government entity through a contract or grant; and that such services may be internal (ie to support government operations), or external (ie to provide goods or services to the public), or both.

The Draft PSP Law contemplates a Joint Committee of PSP Projects (consisting of the NCP and two other governmental bodies to be determined by the Council of Ministers) (the Joint Committee), which shall have the power to review any project or contractual arrangement and include it within the scope of the PSP law, even if such project or contractual arrangement did not fall within the definition of the PSP projects to which the PSP law applies. However, the Joint Committee may not review projects or arrangements that were signed prior to the formation of the committee. At the same time, the Draft PSP Law grants NCP's board of directors the power to exclude any project or arrangement that would otherwise constitute a PSP project. In addition, NCP's board of directors shall have the power to set a minimum value for projects that may be considered PSP projects.

Key issues resolved

The Draft PSP Law aims to resolve a number of issues that could be viewed as impeding the implementation of PSP projects in the past.

Issue	Description	Proposed resolution
Government Tender and Procurement Law	Historically, there has been some ambiguity as to whether PSP-type projects were subject to the Government Tender and Procurement Law. The law was intended for direct government procurement arrangements, but was actually stated to apply to all contracts with the government. However, due to the incompatibility of the requirements of that law with the workings of PSP projects approved by the relevant authorities, a view was taken in the legal community that the Government Tender and Procurement Law did not apply to PSP and privatisation transactions. Nonetheless, the ambiguity persisted owing to the expansive text of the law itself, and did pose a risk for the procuring authority and the investors if the matter was brought before a court of law.	The Draft PSP Law makes it clear that Government Tender and Procurement law shall not apply to PSP contracts. In fact, in recognition of the persisting ambiguity, a recent Royal Decree M/101 dated 4 July 2018 has confirmed that the Government Tender and Procurement Law does not apply to contracts that are necessary to execute privatisation transactions.
Tender process	Other than under the Government Tender and Procurement Law, there are no uniform legal rules governing the tender process. In practice, individual procurement authorities have been devising their own rules based on market practice. This led to variations and inconsistencies in which the different tender processes relating to PSP projects were run, leaving more risk for disputes and challenges on account of grounds of fairness and transparency.	The Draft PSP Law provides that the implementing regulations of the law (the Saudi equivalent of secondary legislation) will contain detailed rules that will govern tender processes in PSP projects. In addition, the law also contemplates establishing a PSP Appeals Committee, with jurisdiction to hear complaints and objections to the PSP selection process.
Government support	As with the tender process, there are no uniform rules governing credit support from the government. For example, what forms of government support would be available, in which sectors, on what kind of projects. As expected, credit support is a hotly debated subject in Saudi PSP projects from a bankability perspective.	The Draft PSP Law provides that the implementing regulations will include provisions specifying types of support, procedures, principles and conditions of such support.
Real Estate	Previously, non-Saudi entities (including any Saudi entities with an element of direct or indirect foreign shareholding) were only able to own real estate in very limited circumstances. This hampered the SOA-type PSPs in the past. Furthermore, non-Saudis could not lease (let alone own) any real estate within the boundaries of the cities of Makkah and Madinah. This obviously stymied growth of real estate-related PSPs in the two cities.	Subject to the Council of Ministers approval, non-Saudi private parties may take ownership of real estate for the purpose of PSP projects, except within the boundaries of the cities of Makkah and Madinah. In Makkah and Madinah, non-Saudi private parties may lease property for a period equal to the term of any PPP contract for the purpose of implementing the PPP contract.
Healthcare and schools	The existing laws restrict non-Saudis from owning healthcare institutions and private schools.	These restrictions will be waived for a PPP contract for the duration of such contract.
Permits	Naturally, a PSP project entails obtaining permits and support from multiple government authorities. For example, the Ministry of Labour's permit for recruiting employees, the Ministry of Transport building the necessary road infrastructure linking the PSP project, Saudi Arabian General Investment Authority's licence to allow non-GCC investors to make any investment in the Kingdom. Historically, often the relevant authorities were not fully aligned, causing protracted delays and cost burdens on projects.	The Draft PSP Law also gives CEDA the powers to grant any licences, permits or approvals required for implementation of the PSP projects, including those that are normally granted by other governmental bodies.
Saudisation	The Ministry of Labour imposes minimum Saudisation requirements for workforces in most businesses in Saudi Arabia (requiring workforces to be filled with Saudi nationals up to a certain level). Consequently, some businesses requiring specialist expertise can find that a challenge.	The Draft PSP Law empowers the NCP to coordinate with the Ministry of Labour for exemptions from the Labour Law, including Saudisation thresholds.

Issue	Description	Proposed resolution
Competition law	Historically, it has been unclear how the Saudi General Competition Authority, in the absence of a comprehensive competition regime, would view a private party taking over a government asset pursuant to a PSP contract, particularly for pilot projects where no other private party was providing competition.	Subject to approval from CEDA or the Council of Ministers, PPP contracts may be exempted from the application of the competition law.
Contracts Assignment	Given the Saudi law requirement for an express consent by a contract counterparty to be able to assign that contract, counterparties often see a request for consenting to an assignment as an opportunity to renegotiate the contract terms.	Existing contracts entered into by the public sector may be transferred to the private party undertaking the PSP project by operation of law, without the counterparty's consent.
Nationalisation/ Change in Law	Historically in PSP projects, the right of the investor to recover compensation for the nationalisation of assets and losses arising from a change in law was largely contractual.	The Draft PSP Law expressly affords protection to the investor's property from nationalisation and other similar measures. Furthermore, it expressly enshrines the investor's right to be compensated for losses arising from changes in law, unlawful action or failure of public authorities, subject to the terms of the PSP contract.
Dispute resolution	The default position under Saudi law is that most legal proceedings involving government departments and entities fall within the exclusive jurisdiction of the Board of Grievances, the Saudi administrative court. The Board of Grievances is generally known to take a more conservative view when applying sharia principles (the overarching principles of Islamic law governing all laws), including on commercial matters. Furthermore, government ministries, departments and wholly owned government entities are not allowed to submit to any arbitration proceedings (international or local) without the approval of the Prime Minister (being the King himself), which was rarely sought. This meant that the international and local investors in PSP projects have been left without the option to arbitrate disputes relating to complex PSP contracts, and instead have had to accept the possibility of arguing these complex contracts before the Board of Grievances.	The Draft PSP Law provides that PSP contracts will not fall within the jurisdiction of the Board of Grievances. In addition, the Draft PSP Law provides that CEDA may allow contracting parties to agree arbitration as a dispute resolution mechanism, except for contracts relating to real estate in the Kingdom. It is worth mentioning that the Council of Ministers Resolution No. 28004 and dated 28/01/2019 has approved that any government department or state-owned company may, subject to their internal approvals, in contracts involving foreign investors, agree arbitration in Saudi Arabia or in any international tribunal approved by the Council as a dispute resolution mechanism. Currently, it is possible to have arbitration in Saudi Arabia conducted under international rules such as ICC or UNCITRAL. This should come as a welcome development for foreign investors looking to participate in PSP projects in Saudi Arabia, who would be more familiar with these rules than with the Board of Grievances or local courts. However, we note that this resolution does not apply to PSP contracts between a government authority and local investors. This means that if they were unable to obtain CEDA approval for arbitration, the local investors' primary dispute resolution mechanism would be to bring proceedings before the Commercial Courts in Saudi Arabia. The Draft PSP Law is silent on whether the parties to a PSP contract can choose a non-Saudi governing law.

As discussed above, the Draft PSP Law goes a long way towards addressing some of the key issues that have been of concern to prospective local and international investors looking at PSP opportunities in Saudi Arabia. A law enacted on these lines will provide significant support to the PSP sector in the country.

Bilal Rana
Partner, Riyadh
T +966 11 261 1580
bilal.rana@ashurst.com

Iman Linjawi
Associate, Riyadh
T +966 11 261 1583
iman.linjawi@ashurst.com

Is free-flow the future of French motorway tolling?

By Jacques Dabreteau

France looks set to introduce free-flow technology to its motorway networks. This presents an opportunity for the technology providers to enter the French market.

Unlike several other countries where the motorway networks are highly developed, the French system has yet to introduce free-flow tolling technology to its traffic lanes, ie lanes without physical barriers. Technical progress over the past two decades has made the shift to free-flow a realistic prospect for French authorities and their concessionaires. Thanks to coming changes to the French and European legal frameworks, the stars seem to be aligned for the development of this innovative and modern fee-collection system on French motorways.

Free-flow tolling, also known as cashless tolling, refers in substance to the collection of tolls from road users and users of other transportation facilities such as bridges, tunnels, etc that can aid cruising without the presence of toll gates.

The free-flow market is characterised by a diversity of systems – AET (All Electronic Tolling), ORT (Open Road Tolling), MLFF (Multi Lane Free Flow), etc, all of which aim to eliminate toll plazas and booths from tolled transportation facilities. Among those systems, a wide range of technologies may be used to identify the vehicle and/or the user subject to the payment of toll, such as the automatic number plate recognition system, the DSRC (Dedicated Short-Range Communications)[1] toll badges (*badges de télépéage*) or the use of an on-board unit (OBU) such as the RFID (Radio Frequency Identification)[2] sticker, to mention the most common tools.

Beyond the diversity of systems and technologies, free-flow tolling consists of various roadside devices (gantries, cameras,

1 DSRC technology is based on bidirectional radio communication between fixed roadside equipment and an OBU. It is by means of such communication that vehicles are identified by the roadside infrastructure, which triggers the payment due. Depending on the technical complexity, the OBU can be represented by a simple identification tag for the storing of more information supporting the vehicle classification and the identification of the travelled path.

2 RFID technology uses radio waves to automatically identify on-board devices very similar to the DSRC technology. But operating on a different frequency bandwidth (in the range of 915 MHz) RFID-based tolling systems still make use of a tag installed in the vehicle, which is detected and identified by means of a reader antenna installed over the carriageways.

sensors, laser, etc) which can detect and categorise the vehicles using the road. In cases where the vehicle is equipped with a toll badge or an OBU, the relevant transit information for the payment of the toll is automatically transferred to and processed by the electronic system. Otherwise, vehicles without badges or OBUs can be automatically recognised by their number plate via cameras and sensors installed on overhead gantries. Thanks to vehicle registration databases, the owner can be identified and the payment completed either when the vehicle passes through the gantry or afterwards, depending on the system and technology used.

Free-flow tolling is a key driver for the modernisation of tolling systems and equipment allowing for both the identification of vehicles and automatic payment without stopping or even slowing down. It is an efficient system to reduce congestion at the plazas by allowing more vehicles per hour or per lane. Rapid throughput and decreased congestion also reduce the emission of pollutants and the proliferation of greenhouse gases. By reducing the number of stops along toll roads, the free-flow system also reduces the environmental impact of vehicle traffic.

Conversely, the disadvantage of free-flow consists primarily in the high risk of fraud or leakage, as the non-payment of tolls due by certain road users is facilitated in the absence of motorway toll gates with barriers. The risk of toll evasion is even greater as regards foreign road users, ie those who are not domiciled or whose vehicle is not registered in the country where the toll collection system is performed.

France is lagging behind

Free-flow tolling systems, largely developed in North America, are also being used in various other countries. The first free-flow tolls considered as really innovative were established in California on State Route 91 in 1995 (AET system), followed by Melbourne in 1996 and Canada in 1997. Many other systems have since been implemented on other road facilities (bridges, tunnels) and extended motorway networks, in certain cases for specific types of vehicles only, eg heavy goods vehicles.

In Europe, free-flow tolling systems while not widespread have already been implemented in several countries. Portugal was one of the first countries to introduce a free-flow system for imposing tolls on all vehicles. On the former SCUT roads (Sem Custos para o Utilizadors) the user is charged in a MLFF environment using either OBUs or video tolling mechanisms based on post-pay mode (allowing the road user to pay the toll after the transaction has been registered) and, as the case may be, pre-pay mode (whereas the user account is charged with an amount that is then decreased over time as long as the user is travelling across the network). In the Czech Republic, the electronic tolling system is based on DSRC technology, also applied in MLFF tolling. Another example of a MLFF tolling system is the M50 motorway to the west of Dublin in Ireland: since 2008, on the so-called West-Link, tolling has been by means of number plate recognition via overhead gantries.

In France, the motorway toll system is mainly based on the distance travelled and depends on the type of vehicle. Tolls can be paid (i) with automatic equipment by cash, credit card, or (ii) with electronic toll collection equipment handling toll badges and OBUs without the need to stop but with reduced speed limit at toll plazas equipped with physical barriers. Until very recently, no free-flow tolling system was in operation. Only a few projects had emerged including a technical experiment in 2009 on the A8 motorway in order to test the reliability of licence number plate recognition equipment.

Wind of change

However, things are moving fast. There are clear signals that the free-flow market is going to take off. Certain free-flow pilot projects are in place and others are about to be launched. Since February 2019, users of the A10 motorway operated by Vinci can pay the toll using new lanes equipped with portals and cameras without any physical barriers. Those dedicated lanes may in principle be used solely by the vehicles equipped with a toll badge, failing which the cameras installed on the overhead gantries can identify the vehicles by reading their licence plate number. Given the right of the motorway concessionaire to access the national vehicle registration system (see below), the owner of the corresponding vehicle will be invoiced afterwards. At this experimental stage, the vehicle's speed is limited to 30 mph below the gantries for safety reasons. However, the installed cameras can still read the licence plate number of the vehicles exceeding such speed limit.

In addition, in the course of March 2019, the A4 motorway operated by Sanef will also be equipped with a free-flow tolling system in order to ease traffic flow and facilitate travel. Vehicles that are equipped with a toll badge will be detected and identified by the motorway equipment that collects all the information required to calculate the tariff, charge the account and then produce a bill. As the toll badge is not mandatory, motorway users may be charged in two different ways: (i) through a RFID sticker affixed on the windscreen; this sticker may be obtained freely from the concessionaire but its use will be limited to this specific motorway section (unlike the toll badge); and (ii) a post-payment through the licence plate number recognition system.

It is also expected that a motorway junction on the A837 operated by Vinci will be equipped before the summer of 2019 with an overhead gantry including smart cameras and laser caption systems.

The impetus for change has not only come from French motorway concessionaires. The ministry of transport is also now fostering the development of free-flow tolling on motorways. In the context of the ongoing tendering process for the award of a major motorway concession contract known as the RCEA (*Route Centre-Europe Atlantique*) project, the bidders were requested to submit two offers, one based on a classic toll-collection system with barriers and the other involving a free-flow tolling solution.

At the same time, it appears that there is clear political support to amend and improve the regulatory framework in favour of the development of free-flow in France. This is reflected in particular in the draft bill providing guidelines for internal transport (*projet de loi d'orientation des mobilités*), which is currently under discussion before the French Parliament.

Coming change of the French regulatory framework

The current regulatory framework does not prohibit the use of a free-flow tolling system on motorways, as demonstrated by past experience and recent pilot projects.

Based on decisions of the National Commission for Data Protection and Freedoms (*Commission nationale de l'informatique et des libertés* or CNIL) and pursuant to the provisions of a decree dated 3 January 2013, the sworn officers of motorway concessionaires have been entitled to use video protection systems to detect and record traffic offences such as toll evasion. Since the use of such devices involves the processing of personal data (ie identification of individuals through the licence number plate of their vehicles), their implementation was subject to the issuance of an authorisation from the CNIL.

Given the risk of toll evasion resulting from the removal of physical barriers in a free-flow environment, it is necessary to take appropriate measures to discourage road users from avoiding toll payment even if they had no intention to do so. Indeed the loss of revenue is expected to increase with a toll evasion recovery rate estimated to be around 5 per cent in the context of a free-flow tolling system comparing to 0.02 per cent in the current context.

The measures provided in the draft bill will primarily aim at completing and consolidating certain legal provisions adopted several years ago in favour of the development of free-flow tolling systems.

In the so-called Grenelle II law (*loi n°2010-788 du 12 juillet 2010 portant engagement national pour l'environnement*), the sworn officers of motorway concessionaires have been authorised to access the national vehicle registration system to help them identify the holders of the vehicle registration certificates to then improve the prosecution of offenders. This law also created an amicable procedure (*procédure transactionnelle*) pursuant to which, in case of default of toll payment, an amicable settlement may be proposed by the sworn officers of motorway concessionaires to the holder of the vehicle registration certificate (deemed as the offender). This settlement takes the form of a payment notice of an amount equal to at least the amount of the unpaid toll plus fixed compensation (EUR 20). The offender benefits from a two-month period to accept settlement and pay the amount due to the motorway concessionaire. Absent any payment within two months, the holder of the vehicle registration certificate becomes automatically liable to an increased fixed fine (EUR 75) to be recovered by the French Treasury. In practice, the entry into force of this amicable procedure has had a strong impact on the toll evasion rate which has significantly decreased, up to 80/90 per cent.

The efficiency of this mechanism probably explains that the upcoming regulatory framework relies on an adaptation of the existing amicable procedure to a free-flow environment: in case of traffic offence evidenced by free-flow technological tools, and provided that the driver has not used any of the payment modes proposed to road users before or after the travel, the offender will have a 15-day period to pay the toll due as well as a reduced fixed fine (approx EUR 5). The rationale behind this procedure is to allow the regularisation of the toll payment, considering in particular the risk of unintentional toll evasion during the implementation of new free-flow systems.

In addition, the draft bill provides for a new criminal offence which aims at punishing severely the "usual" offenders, namely those drivers who evade toll payments on a regular basis. According to the draft bill, a driver will be deemed a "usual" offender in the case where he has been subject to more than five fines for having eluded the toll payment on a period equal to or less than 12 months. In such a case, the "usual" offender shall be liable to a fine of up to EUR 7,500. A powerful tool to encourage compliance with the scheme rules is indeed to set the penalties for non-compliance in such a way that it deters opportunist drivers from evading the toll.

Those measures will certainly have an effect on road users whose vehicles are registered in France, as the sworn officers of motorway concessionaires may easily identify the offenders given the right they have to access the national vehicle registration system. However, the question remains open for violators who are not domiciled in France, and more specifically for those whose vehicles are not registered in France. This issue being not specific to France, a proposed directive is currently under discussion at European level to facilitate cross-border exchange of information on the failure to pay road fees in the EU.

Improvement of the European regulatory framework

Prosecution of foreign offenders is a key challenge in the context of a free-flow environment. The absence of a legal basis to access foreign vehicle registration systems appears as a loophole that is masterfully exploited in France. According to French motorway concessionaires, 37 per cent of toll gates being forced in 2016 were forced by foreign vehicles (whose part in the total traffic is however only 15 to 20 per cent).

Under applicable regulations, there is not currently any efficient procedure allowing French motorway concessionaires, nor even French public enforcement authorities, to obtain the relevant information on foreign road users in the case of toll evasion by the latter.

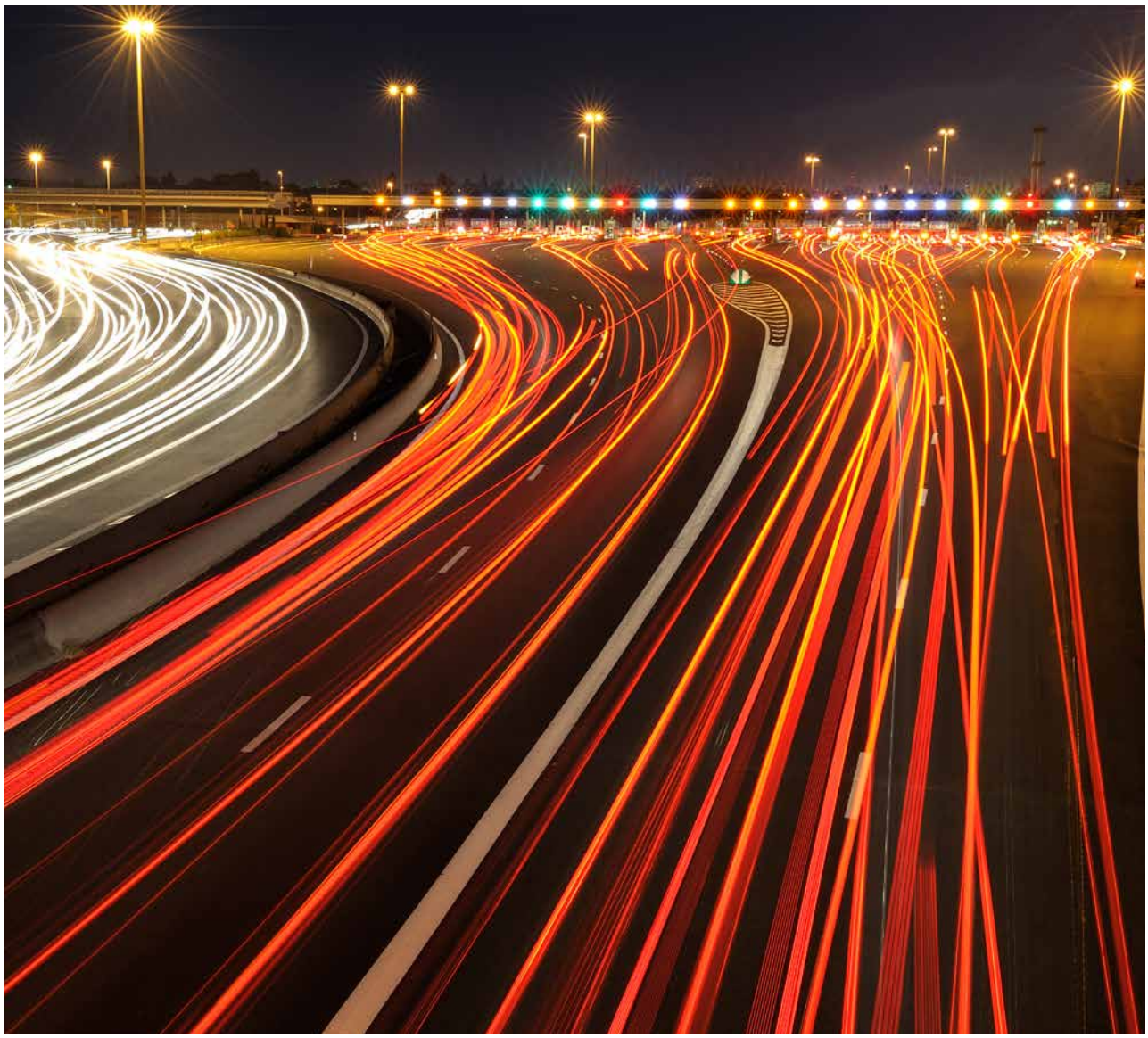
The Vienna convention on road traffic of 8 November 1968 which aims to facilitate international road traffic and improve road safety certainly provides for cross-border exchanges of information in case of serious road traffic offences but toll evasion does not fall within the scope of the definition of such offences.

Equally, the EU directive 2004/52 of 29 April 2004 on the interoperability of electronic road toll systems in the Community does not provide any mechanism to ease the exchange of information between Member States. In addition, the EU directive 2015/413 of 11 March 2015 facilitating cross-border exchange of information on road safety-related traffic offences is not applicable in the case of toll evasion.

This explains why a proposed directive 2017/0128 repealing the directive 2004/52 is currently under discussion to facilitate cross-border exchange of information on the failure to pay road fees in the EU. According to its provisions, in case of toll evasion, the Member State shall grant other Member States' national contact points access to the following national vehicle registration data, with the power to conduct automated searches thereon: data relating to vehicles and data relating to the owners or holders of the vehicle.

This new regulatory framework, once adopted by EU institutions and implemented into French law, should improve the prosecution of foreign offenders by French public authorities in the absence of a common and harmonised vehicle register at European level.

This can be considered a first step though, as it is not clear that it will be sufficient to eliminate the risk of toll evasion from a motorway concessionaire's perspective. Indeed, even if the fraud



is confirmed and the violator is identified then the motorway concessionaires have to find a solution to effectively recover the due toll and penalties, which is at this stage rendered difficult once the violator has left the country.

French free-flow market expected on semi-urban motorways first

Given the remaining high risk of toll evasion even after implementation of the above-mentioned regulatory changes, we can expect that motorway operators will first install free-flow tolling equipment on semi-urban motorway sections where the evasion rate is lower, as they are being used by regular users whose identity is easily traceable (home to work travel). It is not by chance that the pilot projects that have been selected by French motorway concessionaires are located in semi-urban environments which appear as less risky areas. The French motorway network is primarily operated under long-term concession contracts by the subsidiaries of three major concession groups (Abertis, Eiffage Vinci); the development of a free-flow collection system will then be a matter for those concessionaires in the coming months and years.

It is only in a second stage that those concessionaires might deploy the new toll collection system to the wider motorway network including transit areas used by foreign drivers. However, in the meantime, as is the case for the RCEA project, the next greenfield motorway concession contracts to be tendered by the French State (such as the Rouen bypass or the Toulouse-Castres motorway) are likely to include the provision by the bidders of free-flow tolling solutions or, at least, should not prevent them from proposing offers based on such tolling system. These projects will be an opportunity for European free-flow operators to promote their experience and enter the French motorway concession market.

Jacques Dabreteau
Partner, Paris
T: +33 1 53 53 53 69
E: jacques.dabreteau@ashurst.com

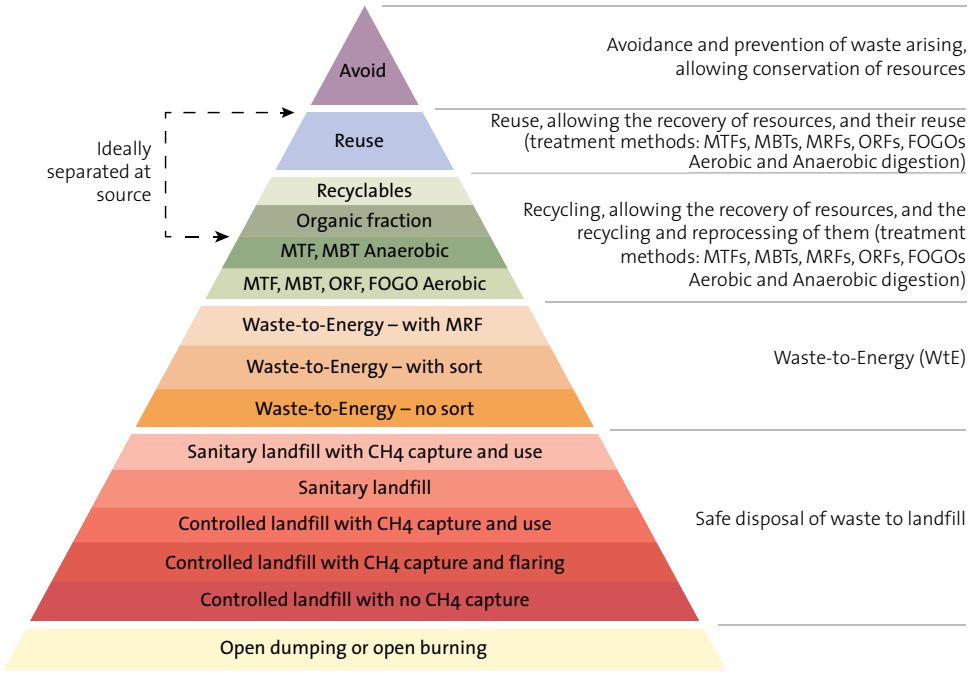
WASTE-TO-WEALTH INITIATIVES:

Aerobic and Anaerobic digestion waste projects

by Michael Harrison, Richard Guit, Mark Disney, Ratha Nabanidham, Cameron Smith and Nick Stalbow

In our previous articles on waste projects, we considered: (i) the nature of waste projects; (ii) the key commercial, legal and policy issues arising in the context of Waste-to-Energy (WtE) projects (including using anaerobic digestion); (iii) the key policy settings for waste projects in some of the key Asia Pacific jurisdictions; and (iv) the size and shape of waste projects (other than WtE projects) generally. While we considered feedstock and its interface with waste projects in passing, we did not consider feedstock in detail. The quality of feedstock is critical to all waste projects, particularly those using aerobic and anaerobic digestion technologies.

Therefore, in this article we consider feedstock in detail, in particular in the context of aerobic digestion and anaerobic digestion technologies. This reflects the prevalence of the use of these technologies for waste projects, particularly in areas that are not heavily urbanised, and in areas that are urbanised or urbanising and seeking to reuse organic waste more effectively, in particular agricultural and farming and food waste. In this context, we consider the interface between councils and municipalities and policy development and implementation, and the broader role of policy across the entire waste industry. The purpose in doing so is to assist councils and municipalities (and other procuring entities) in framing assessment and consideration of aerobic digestion and anaerobic digestion technologies as possible options for waste projects, and, if viable as waste projects, to achieve the policy outcomes sought. In considering aerobic and anaerobic digestion technologies, councils and municipalities are looking to achieve outcomes higher up the Waste Management Hierarchy than are achieved using other waste projects.



It is often the case that councils and municipalities have to implement more challenging policy outcomes without access to the scale offered by the waste industry as a whole; typically, this is the case for councils and municipalities in jurisdictions with more developed waste collection systems that have duties that include the collection or disposal of waste, or both, and in particular the collection and disposal of household waste or municipal solid waste (MSW). Because of these duties (and the ability to raise local rates and taxes), these councils and municipalities provide key support of the policy outcome of diverting MSW from landfill which may be promoted by a landfill or waste levy. MSW contains a number of fractions, including a reusable fraction[1] and a recyclable fraction,[2] and within each fraction there is organic and inorganic material which is non-digestible. For the reuseable and recyclable fractions in MSW to be reused or recycled it is necessary to separate the organic material from the inorganic and other non-digestible fractions. Separating at source, or between source and ultimate processing and treatment at a waste project, can be costly and may not achieve the required level of effectiveness to allow the digestion technology to achieve the performance contemplated and often provided for contractually.

There are opportunities for the private sector to work with councils and municipalities (and other entities procuring waste facilities or services) to achieve the necessary scale in terms of quantities of waste processing and treatment and, in so doing, increase the derivation of reuseable and recyclable fractions, and the production of reuseable and renewable resources from a diverse range of waste streams. In many jurisdictions, councils and municipalities are combining to achieve scale across their council and municipal areas. In the United States of America, these technologies have been used to achieve scale and, as a result, significant levels of reuse, recycling and diversion from landfill.

In the fourth article in the Waste-to-Wealth Initiatives series, Waste-to-Wealth: Have we reached a tipping point?, it was stated that, in the context of all waste projects, the "Four Cs" – Compatibility, Contamination, Composition (and Characteristics) and Capacity – needed to be considered and addressed. This may be said to be particularly the case in the context of waste projects using aerobic and anaerobic technologies. In many ways, this article expands in detail on the Four Cs described in the fourth article, providing a more detailed and nuanced explanation of the importance of the Four Cs.

In this article, we provide an overview of: (i) aerobic and anaerobic digestion technologies; (ii) the waste that may be used (and may not be used) in each process and treatment technology (feedstock); (iii) the key commercial and legal issues for councils and municipalities (and other entities) procuring, or procuring services from, waste projects using aerobic and anaerobic digestion technologies; and (iv) the opportunities from a policy perspective to maximise the use of waste streams to divert waste from landfill.

In the context of heat and energy production, the process of the putrefaction (or decomposition) of organic matter (biomass) produces gas from the putrefaction of organic material disposed of to landfill, which may be collected/gathered from landfill as landfill gas (LFG). Alternatively, if the biomass is subject to an anaerobic digestion technology designed to produce biogas, biogas will be produced.[3] Both LFG and biogas contain methane (CH_4).

1 As a general statement, reuse includes use or reuse of any material in the waste stream including as a result of processing or treatment, and as such the production and use of compost amounts to reuse from aerobic digestion, as does the production and use of fertiliser (most prevalently phosphorus (P) is recovered and reused, but also nitrogen (N) and potassium (K)) or compost from further processing to pasteurise the organic material in the sludge (which will contain NPK too). Anaerobic digestion is also able to produce reusable material from animal slaughter (and associated animal by-product production), principally stomach contents, bio-degradable organs and tissue, and waste water treatment, and food preparation, processing and treatment (most prevalently from waste water arising from preparation, processing and treatment).

2 As a general statement, recyclables include aluminium, glass, high density polyethylene (HDPE), liquid paper board (LBP), mixed plastics, polyethylene terephthalate (PET) and steel, and often paper and cardboard. Even if source separation is used, it is likely that material derived from MSW as feedstock for aerobic or anaerobic digestion will be contaminated with recyclables and other non-digestible materials.

3 Aerobic digestion technologies do not allow for the collection of biogas.

As a result, LFG and biogas may be used as feedstock that is burned to produce heat or energy, or both. In addition, biogas may be used as a feedstock for biofuel production. LFG and biogas are each a renewable energy source.[4] As noted below, the production of biogas using anaerobic technology is preferred because of its better environmental and public health outcomes. However, this preference is only likely to be realised if the policy framework provides disincentive to send waste to landfill in the form of a landfill or waste levy and an incentive to produce biogas in the form of favourable renewable energy pricing and the requirement that retailers and large users of energy source energy from renewable resources.

This article has been authored by legal practitioners who have worked on waste projects using aerobic and anaerobic technologies around the world. The observations made are derived from the authors' general experience of the issues that need to be considered and, ideally, addressed in procuring a successful aerobic or anaerobic waste project, alone or as part of a waste project using different technologies (for example, a Mechanical and Biological Treatment (MBT) waste project). The authors have experience in respect of a broad range of aerobic and anaerobic digestion technologies processing a variety of feedstock, including sewage, green waste,[5] agricultural and farming waste (including animal litter/manure/slurry[6] biomass from crop harvesting and early stage crop processing), by-products of animal slaughter, preparation and processing (including carcasses and intestines),[7] Food Waste[8] and MSW.[9] This article does not, however, describe in detail how specific aerobic and anaerobic digestion technologies work (including, for example, dry and wet digesters), or the particular issues of which the council or municipality (or other procuring entity) needs to be aware in respect of particular technologies. Rather, we identify matters of which councils and municipalities (and other procuring entities) need to be aware.

4 In many jurisdictions, the production of renewable energy entitles the owner of the waste project to some form of green certificate or right.

5 Green Waste is organic material from domestic "green" bins, which typically includes Garden Waste from domestic gardening activities and Green and Botanical Waste from activities of councils and municipalities, typically maintaining parks and gardens and lopping and topping of trees. Green Waste may be used as feedstock for FOGOs (Food Organics and Garden Organics Facilities) and ORFs (Organic Recovery Facilities), including those using aerobic digestion technologies. If to be used as feedstock for anaerobic digestion or in the context of co-digestion, the Green Waste is best mulched before processing and treatment.

6 The capture of biogas from animal litter/manure/slurry uses well-established anaerobic digestion technology. It is possible further to process the sludge derived after digestion.

7 Animal slaughter, processing and preparation produces animal by-products and waste, while the waste water produces a feedstock for anaerobic digestion to produce biogas.

8 Food Waste includes organic material-derived agricultural and farming production (including all forms of agricultural and farming activities, including dairy, cereal crops, fruit, vegetables, etc), food processing and preparation, and sale and consumption.

9 MSW is municipal solid waste (as distinct from sewage or waste water).

Feedstock for aerobic and anaerobic digestion technologies

The following table details in general terms the categories of waste that may be used as feedstock for aerobic and anaerobic digestion:

Aerobic	Anaerobic
Agricultural/Farming Waste: • While waste from arable cropping/harvesting (including from cereal and sugar cane) may be used, it is more prevalent as feedstock for anaerobic digestion and in some instances WtE;[10] and • Cotton growing remains/residue/waste.	**Agricultural/Farming Waste:** • Animal litter/Manure/Slurry from cattle, poultry and pigs; • Animal slaughter and preparation; • Cultivated crop waste, including rice husk/stream waste;[11] • Silage; • Dairy farming and milk production; • Fruit and vegetable production; and • Hay and straw and animal litter/manure.
Food Waste: Some forms of Food Waste are capable of use as feedstock for aerobic digestion (typically uncooked organic material from food preparation and tea bags or grounds), but not fish or meat (cooked or uncooked). Wetter forms of Food Waste are not suitable for aerobic digestion, unless mixed with other organic material with structure.	**Food Waste** from processing, sale and consumption: • Food and drink production; • Food consumed at point of sale; • Food consumed other than at point of sale, including following preparation at home; and • Food, drink and dairy products past use-by dates.
Green Waste: Green waste is the predominant feedstock for aerobic digestion technologies, sourced from domestic gardening/horticultural activities, civic and municipal parks and gardens.	**Green Waste:** If the lignin[12] content is manageable, (including through shredding and mulching) some organic material may be digested.
Industrial Waste: Some commercial and industrial waste may be capable of use but the waste must be untreated, and is likely to require blending/mixing.	**Industrial Waste** including: • Paper production, including waste water; and • Chemical and pharmaceutical production.
MSW: If effective separation at source or other separation, organic material may be derived for use as feedstock.	**MSW:** If effective separation at source or other separation, organic material may be derived for use as feedstock.

As will be apparent from the table, the Food Cycle comprises production,[13] harvesting, processing, sale and consumption of food. At each stage of the Food Cycle, waste is produced. It is important to understand the Food Cycle, and each point in the Food Cycle at which Food Waste arises.

It is noted that some crops are grown and harvested for the purposes of the production of heat and energy, but for the purpose of this article these crops are not considered to be waste.

In the context of possible co-digestion (considered below), it is worth considering which feedstock may be mixed with other feedstock, including use of existing anaerobic digestion facilities.

While in most circumstances it is necessary (or recommended) to pre-sort MSW, most feedstock benefits from some form of pre-sorting (and some feedstock also benefits from the addition of water, including that derived from effluent) including – in the case of aerobic digestion recyclables and inorganic organic material and in the case of aerobic digestion – pre-sorting to remove grit and sand, and non-digestible material (organic and inorganic). The effect of the pre-sort on the composition (and characteristics) of the feedstock needs to be considered. The authors have worked on waste projects with complex and virtually exhaustive pre-sort processes, which have – despite separation at source or pre-sorting prior to processing – resulted in a concentration of base metals (critically lead), which meant that the compost produced did not comply with the required standards for use and sale.

Overview

Key issues

If a council or municipality (or other procuring entity) is considering (or a number of councils or municipalities are

10 Sugar cane production produces biomass (called bagasse), which is and has been used as feedstock for heat and energy facilities around the world for many years using thermal technologies, but which may be used as feedstock for aerobic digestion composting. For decades sugar cane growing regions (for example Queensland) have used bagasse and cane trash to satisfy heat and energy requirements. While beyond the scope of this article, it is estimated that roughly 50 per cent of all bagasse and cane trash is collected. Bagasse and cane trash are capable of being used to produce ethanol.

11 Rice husk/straw waste can be used in anaerobic digestion, including co-digestion. Anaerobic digestion technologies in rice-growing regions of the world are increasingly being considered.

12 Lignin is an organic material that is non-digestible through anaerobic digestion.

13 Agriculture/Farming and food production generally produce methane – in some crops more than others, and in some livestock more than others.

considering collectively)[14] using an aerobic or anaerobic digestion technology for a waste project or as part of a waste project, it is important for the council or municipality (or for each of them, or any other procuring entity) to consider the context in which it is (or they are) procuring the waste project. Therefore this article considers in detail the vital importance of understanding feedstock that is under the control of councils and municipalities (and any other procuring entity), being Controlled Waste Streams. Also, it is important to understand the waste streams arising within the area of the council or municipality (or councils or municipalities) which are not under the control of such council or municipality (or councils and municipalities), and which may be consolidated with Controlled Waste Streams to allow increased scale and thereby lower unit processing and treatment costs. For example, agricultural and farming waste (if any) and other Food Waste arising within the area. In this context, we consider the key feedstock that may arise and may offer opportunities for increased processing and treatment, and as such reuse.

Feedstock is only one element of decision-making for the purposes of procurement. Feedstock is inextricably linked to the size of the council or municipality (or councils or municipalities); the existing waste collection system; the existing population and projected population growth (including in each instance, its distribution and degree of urbanisation); existing infrastructure (including existing waste projects and, in certain circumstances, existing wastewater treatment facilities) and existing landfill capacity, and the remaining life (both design and regulatory) of that infrastructure and existing landfill; and other planned waste projects (including waste projects that may compete for feedstock, typically feedstock is not included within Controlled Waste Streams). Depending on the feedstock, it is important to understand the willingness of the population to separate fractions of the waste stream at source, including the Food Waste fraction[15] from MSW, and the cost and effectiveness of doing so.

In addition, it is important to consider the extent of markets for compost (including their scale and geographical locations) in the case of an aerobic digestion waste project and other organic products, and the market for biogas and biofuels (in the case of an anaerobic digestion waste project), including any potential off-takers for heat and energy (in the case of biogas) and biofuel, including the councils or municipalities themselves (or any other procuring entity including the private sector).[16] In this context, councils and municipalities (and any other procuring entity) should consider alternative energy and fuel supplies from a net cost/revenue perspective: this will involve considering the projected short, medium and long term net cost/revenue position, including the net present value of avoided and deferred costs of new landfill, and, in jurisdictions in which landfill is being or has been phased out (as in the European Union), other means of disposal.

These matters speak to the cost and revenue profiles of a waste project, and as such its affordability and sustainability (ie whether it is viable). In the context of the cost profile, experience shows that it is important to understand how to monitor and avoid contamination or, if it is not possible to avoid contamination, then to manage it (effectively, the system cost of avoiding or managing contamination, and how to decontaminate or pre-treat feedstock if required). The starting point for avoiding contamination of certain waste streams is likely to be the education of the residents/constituents of the council or municipality, and the provision of bins for separation at source of fractions within the waste stream. Education and the provision of bins have a cost. If the feedstock for a waste project is to include Food Waste separated at source from MSW, the assessment of the cost and effectiveness of separation at source is particularly important and that education regarded as a starting point only. There is a need for ongoing assessment of the collection system and the effectiveness of separation at source. Any documentation under which any council or municipality agrees to take waste services from a waste project must not restrict the ability of the council or municipality to change any aspect of its collection system. This is a commercial and technical issue (including to respond to change in law) and is necessary to enable councils and municipalities to respond to social licence as it changes over time.

In all contexts, "social licence" must be understood, ie whether the activity enjoys the acceptance and trust of those affected. We do not offer any specific comments on social licence, other than to note that it is a function of the constituency of each council or municipality, and in some situations the wider community, and that social licence changes over time. As we noted in our fourth article in the Waste-to-Wealth Initiatives: Examining policy settings in Asia Pacific, culture is critical as it relates to implementation of any policy, including the development of any waste project: to obtain and to maintain social licence awareness of the cultural setting is key.

Aerobic and anaerobic digestion

(a) **Aerobic digestion** involves biological digestion of organic matter (in the presence of oxygen) to derive compost[17] (and associated storage of carbon and nitrogen in the compost) and the "production" of heat, water (including by evaporation)[18] and carbon dioxide (CO_2). The use of aerobic digestion technologies allows pasteurisation of the organic matter processed and treated into compost, with the process of pasteurisation removing pathogens and ammonia. As noted below, to produce compost effectively aerobic digestion requires organic matter of a consistent form and type, and consistent aeration of the organic matter. The production of compost reduces the mass and volume of organic matter that might otherwise go to landfill (including as a result of the evaporation of water). In the context of councils and municipalities (and other procuring entities), being aware of this reduction in mass and volume

14 There are many examples of councils and municipalities procuring waste projects collectively, with well-understood and "tried-and-tested" governance structures and compliance procedures (including any necessary competition clearances or exemptions). Equally important is ensuring that private sector equity investors and debt providers understand the credit risk of contracting with councils and municipalities without the provision of state guarantees.

15 Food Waste extracted from households or businesses may include waste from the preparation of food, leftovers or food that has passed its best-by date, sell-by date or use-by date.

16 For example, in the case of a waste project producing a product that can be used as a fertiliser (rather than as compost), the ability of farms to take the product will be key, as will the proximity of a sufficient number of farms to take the product (including from a regulatory perspective).

17 The production of compost requires taking the organic fraction (or more accurately part of the organic fraction) from the waste stream and processing it to produce organic matter in the (more) stable form of compost. The compost is derived from the process breaking down at a slower rate than the organic matter in the waste stream from which it is derived, and which may otherwise have been disposed of to landfill.

18 The production and loss of water vapour reduces the mass of the organic matter, thereby diverting it from landfill through natural processes.

allows an informed assessment (and measurement) of the real level of diversion from landfill.

(b) **Anaerobic digestion** involves biological digestion (in the absence of oxygen) to process and treat organic matter to derive energy (using anaerobic digestion). As noted below (and as noted in our Waste-to-Wealth Initiatives: Waste-to-energy projects article), anaerobic digestion requires a consistent form and type of organic matter (such as animal litter, manure or sewage, Food Waste or crop residue from harvesting and processing) held in a controlled environment to produce biogas (primarily, methane (CH_4) and carbon dioxide (CO_2)) and residue. As we explain below, while biogas can be used for some purposes without further processing, it tends to be processed further to remove CO_2, hydrogen sulphide (H_2S) and water vapour. This process, and critically the net cost/revenue consequence of removal of H_2S, is considered in further detail below.

(c) **Comparison of aerobic and anaerobic digestion:** Both aerobic and anaerobic digestion technologies differ from other waste technologies. Aerobic digestion technologies may be regarded as the most straightforward of technologies, and are often combined with other technologies, such as mechanical treatment in a composting hall to pasteurise the organic material. Anaerobic digestion technologies contrast in particular with thermal or thermochemical treatment of organic and inorganic matter[19] in that the non-gaseous residue from an anaerobic digestion technology is bio-solids and sludge, bottom ash or bio-char in the case of thermal or thermochemical treatments.

In the context of waste projects generally, this contrast is critical. We have worked on a number of waste projects using aerobic (and anaerobic) digestion technologies that have used contaminated feedstock, with resulting contamination of compost that cannot be marketed and must be disposed of to landfill; or anaerobic digestion projects that have not achieved consistent use of feedstock, with resulting congestion and negative diversion rates (on a mass basis), because the processed and treated feedstock using a wet anaerobic digestion technology is heavier than the feedstock introduced. These dynamics will be the subject of a later article in the Waste-to-Wealth Initiatives series.

As a general statement, aerobic digestion takes place at a faster rate, and the capital costs of an aerobic digestion waste project are lower than an anaerobic digestion waste project. Depending on the technology used, as a general statement, the operating costs of some aerobic technologies are higher. We say "as a general statement", because the feedstock used for many anaerobic digestion technologies needs to be well understood and well regulated operationally, particularly the composition and the characteristics of the biomass used as feedstock: the effectiveness of certain anaerobic technologies is affected by certain parts of the organic fraction. For example, grass (and wood) is a lignin with abrasive characteristics that is unlikely to be suitable as a feedstock for anaerobic digestion (unless its characteristics are overcome by mulching and pulping), and experience indicates that this may have an impact on effective operation and the cost of operation (including higher than anticipated wear affecting equipment and part life cycles, and higher personnel costs). Conversely, aerobic digestion technologies require "structured" feedstock, rather than "sloppy"/wet feedstock.

MSW as a feedstock

In a similar vein, it will be important to assess whether the nutrients in animal litter/manure/slurry-based feedstock may result in operational congestion or increased levels of wear on components or equipment (thereby reducing design life). For example, the mineral struvite can be derived from anaerobic digestion, but in our experience its presence can cause operational problems within the piping systems of some anaerobic digestion technologies. In addition, the use of MSW without any separation at source or other pre-sorting is unlikely to provide an appropriate feedstock. Separation at source or pre-sorting of the organic fraction in MSW may provide a feedstock appropriate for an anaerobic digestion technology. There are examples of separation at source of the organic fraction (typically, the Food Waste fraction) working effectively, as is the case in the United Kingdom and other European countries. MSW is not suitable as a feedstock for aerobic digestion.

Given that the organic fraction of MSW can be a relatively high percentage of its mass, effective separation at source is a key part of any waste collection system seeking to deliver the Food Waste fraction of MSW from households to waste projects. In the United Kingdom, while councils and municipalities continue to develop anaerobic digestion facilities for source-separated Food Waste, this is losing momentum because the collection costs and levels of contamination mean that, overall, operational costs are such that, in the circumstances, other technologies offer better value for money. Because there are no hard Food Waste recycling targets in the United Kingdom (although there are overall MSW recycling targets), it is often cheaper to send Food Waste retained within (rather than separated at source from within) MSW to WtE plants. This is informing an industry view held by some players in the United Kingdom waste sector that the calorific value of MSW will drop over the next ten years as more Food Waste is retained within MSW, and as the plastics fraction within MSW reduces.

19 Anaerobic, thermal and thermochemical technologies being technologies that can produce renewable energy.

Quantities of feedstock required to produce heat and energy

As a general statement, the following quantities of feedstock are required to produce the following heat and energy:

Feedstock (methane percentage) (1 tonne – wet tonnes)	**Methane Yield (cubic metres) per tonne**	**Energy** (kWh – the energy will depend on percentage of methane compared to carbon dioxide)
Animal litter/manure/slurry:		
• Cattle/cows (60-65)	14-20	6-8.5 ^
• Pigs (62-67)	18-20	6.5-8.2
• Chicken (Note: Chicken litter is also a viable feedstock for WtE projects)	18-22	8.5-9.0
Animal slaughter/processing:		
• stomach contents (60-65)	45-48	6-8.5
• waste water (60-65)	54-56	6-8.5
• organs and soft tissue (65-67)	190-195	6.5-8.5
Food Waste – separated at source:		
• Food Waste fraction in MSW (60-65)	130	6-8.5
• food preparation (cafes and restaurants) (63-70)	110	6-9.0
• wholesale and retail (57-63)	64	5.5-8.5

As a general statement, the calorific/gross heating value of natural gas (comprising predominantly methane or entirely methane) is in the range of 38.5 to 40 MJ/Kg, and will produce approximately 11 kWh of kinetic energy (power).

In comparison, the heating value of biogas (comprising methane and carbon dioxide, and as such heavier than natural gas) will produce approximately 5 kWh (50 per cent methane) to 9.67 kWh (97 per cent methane) depending on the proportion of methane and carbon dioxide.

As noted in the first column above, it is appropriate to assume that somewhere between 60 and 70 per cent of biogas produced from anaerobic digestion of the various feedstock will comprise methane, with the balance comprising carbon dioxide. In practice, the percentage of methane may be less, perhaps as low as 50 per cent.

^ The higher the methane content of the biogas, the greater the energy that can be derived from it, likewise the higher the methane content the higher the calorific/heating value of the feedstock. Pure methane has a calorific/higher heating value of approximately 55 MJ/kg.

Regulatory context

While this article focuses on practical commercial and legal matters (including in the context of any policy to encourage diversion from landfill, reuse of renewable resources, and the production of renewable energy) from a regulatory perspective, it is important to understand the nature of the feedstock that may be delivered to and used at any waste project, and the approvals required (and the likely terms of those approvals) in respect of each type of feedstock delivered. In jurisdictions with developed waste collection systems and industries, it is likely that specified kinds of waste may be processed and treated using particular technologies. For example, in the context of aerobic digestion for composting, green waste and organic waste are likely to be defined as feedstock that may be used, while food waste, general waste and regulated waste are likely to be defined as waste that may not be used. In contrast, in the context of anaerobic technologies Food Waste, green waste, organic waste and regulated waste are likely to be defined as waste that may be used for anaerobic digestion. In other jurisdictions, household waste or MSW is defined for the purposes of laws promoting the use of advanced thermal technologies.

In the context of any procurement, it is important to recognise the likely approvals required, and the time it is likely to take to obtain them, to orientate the private sector (and in some jurisdictions the public sector) in this way. In addition, considering the regulatory frame of reference at the procurement stage is critical in assessing the broader environmental and public health benefits which differing waste projects may achieve, and in this context compliance with obligations imposed on councils or municipalities. Furthermore, in some jurisdictions, there is often a strategic dimension to seeking approvals, and this is best assessed as part of the procurement stage (if not before).

In the context of a waste project using an anaerobic digestion technology to produce biogas to be burned to produce heat or energy, or both, or with further processing, biofuel, it is important to understand the extent to which the viability of the waste project is dependent on being able to realise revenue from the sale of renewable energy or biofuel as a direct or indirect result of policies, being policies that may be subject to change. In addition, in the context of the use of any compost derived from mixed organic waste, biogas produced from animal litter/manure/slurry or Food Waste (critically animal by-products or meat), it is likely that there will be particular regulatory oversight and requirements, including in respect of use of the residual sludge.

Interface between the Four Cs and feedstock: feedstock is fundamental to the design, life and health of any waste project [20]

Feedstock is key for any waste project

Understanding the available feedstock is the starting point for the procurement of any waste project. The type of feedstock determines the technology used and the design of that technology, and the composition and characteristics of the feedstock determine the outputs from the waste project (products and residuals) and, as such, the economic sustainability of the waste project.

Feedstock is even more important for aerobic and anaerobic digestion waste projects

(a) In the context of any procurement of, or the provision of services from, a waste project using an aerobic or anaerobic digestion technology, understanding the composition of the organic matter available as feedstock (and the associated characteristics of that organic matter) is key, in many ways more so than for other waste projects using other technologies.

Also key in assessing the outputs (products and residuals) and, as such, costs and revenue, is understanding the mass of the organic waste arising and available within the applicable area (or areas) or the quantity of organic matter which the procuring council and municipality (or other procuring entity) is/are prepared to commit to delivering, if any. Understanding these matters will allow the council or municipality to make a decision on whether to contract on a waste-arising basis (as is increasingly the case) or on a quantity basis.

(b) The **Composition** of the organic matter in the waste stream is critical to:

(i) the **Compatibility** of each technology being considered to process and treat the organic matter available as feedstock for that technology. Is the composition of the organic material available as feedstock capable of being processed and treated by that technology? Are there any restrictions on the ability of, or impacts on the efficiency of, that technology to process and to treat the contemplated organic material?

(ii) the **Contamination** levels within the organic matter available as feedstock for each technology being considered. Is the anticipated contamination of the organic matter available as feedstock such that it will affect the efficiency of the technology, and, if so, how, and what can be done and at whose cost to avoid or to remove contamination, or to mitigate the effect of the contamination? In addition, is the contamination such that it may affect the ability to market any product produced?

Providing information about the Composition of the available organic matter as feedstock, and the required Capacity for each waste project, provides each proponent with a clear basis on which to respond to the procurement process being undertaken. In addition, requiring each proponent to provide details as to the requirements of, and the sensitivities of, the technology in respect of composition and contamination will improve the ability of the procurement team to make an informed decision as to the most appropriate technology, including the risk of choosing one technology over another.

In addition, if the procurement process being undertaken is to procure services, providing details of the likely waste arising over the period of time during which the services are to be provided (Term) and other sources of organic matter that may comprise compatible feedstock (within the applicable area or areas) will enable the proponent to provide pricing reflecting the size and scale of the waste project that may be developed, the capacity of that waste project, and the use to which the capacity may be put during the Term to maximise the use of that project and to minimise the cost of the service to the applicable council or municipality (or other procuring entity). From the point of view of the council or municipality (or other entity) procuring the provision of services from a waste project, it is for the service provider to take the risk in the composition of the feedstock, and to manage that risk. This is particularly the case in respect of aerobic and anaerobic digestion waste projects.

The importance of information

(a) **Avoiding the mistakes of others:** There are examples of waste projects in Australia and around the world in which councils and municipalities assumed a technology could process and treat certain waste streams without any need for consistency of feedstock or separation at source of the required organic fraction from the waste stream or the pre-processing or pre-sorting of feedstock, rather than requiring the procurement process to "prove up" and to demonstrate that the assumption was indeed correct. The subsequent issues presented by each of these examples could have been avoided by more rigorous procurement processes, including the provision of information by proponents demonstrating the ability of the waste project to source, accept, process and treat feedstock to achieve the outcomes sought from the procurement.

Taken together, this information (and other associated information) will provide a clear basis for making a fully-informed procurement decision as to the technology, including any mitigation that may be required.

(b) **What information needs to be available and understood?** In the context of waste projects generally, feedstock is fundamental. However, in the context of aerobic and anaerobic waste project facilities it is the most important factor of all. It is difficult to overstate the importance of understanding:

(i) the impact of the means of the collection of feedstock, including the effectiveness of any separation at source;

(ii) the compositional range of organic matter that each waste project facility is able to process and to treat;

(iii) the composition of organic matter available for use as feedstock in the applicable area or areas from which the organic matter will be sourced; and

(iv) in respect of the material which the facility is able to process and to treat (as determined by paragraphs (ii) and (iii)), the possible circumstances that may affect its composition and, as a result, may impact on the performance of the waste project facility, and the consequences for the council or

20 The Four Cs are four key risks that must be considered in developing a waste project and which project sponsors will be concerned with, being: Compatibility, Contamination, Composition (and Characteristics) and Capacity.

municipality and the waste project itself of differing levels of performance.

(c) **Biogas from anaerobic digestion:** While the proposition is that all organic matter can be processed and treated by anaerobic digestion, this proposition needs to be treated with the utmost caution. The proposition is not wrong of itself, but experience shows that efficient, and indeed optimal, operation of anaerobic facilities is achieved using feedstock that is consistent (e.g. animal litter/manure and sewage, macerated fruit and vegetables or other Food Waste) in its composition (and its characteristics). A number of examples exist of waste projects that have not recognised this. It is important to be aware that, if certain organic matter is to be processed and treated, it will require pre-treatment (including mulching and pulping) to avoid abrasion and congestion of the vessels used as anaerobic digesters.

On average, depending on the circumstances and the technology used, biogas contains:

- 50-80 per cent methane (CH_4);
- 20-50 per cent carbon dioxide (CO_2); and
- traces of other gases, including hydrogen sulphide (H_2S, which is toxic) and nitrous oxide (which is a fundamental measure of air quality).

(d) **Methane from biogas:** Methane gas (CH_4) has high energy potential, and, as such, can be used to produce energy. Equally important is the fact that CH_4 has 21 times the global warming potential of carbon dioxide (CO_2). In other words, one tonne of CH_4 emitted to the atmosphere causes 21 times as much impact as one tonne of CO_2 emitted to the atmosphere: on a per tonne basis, CH_4 contributes 21 times as much to climate change as CO_2. Rather than allowing CH_4 emitted from the natural putrefaction process of organic matter in landfill to escape into the atmosphere, from an environmental and public health perspective it makes sense to capture CH_4 in a controlled environment and to burn it. Combustion of CH_4 transforms it into heat (and CO_2). In burning CH_4, councils and municipalities (and other procuring entities) may be said to be harvesting the energy potential of waste and, in so doing, reducing emissions to the atmosphere, and lessening the impact of waste (produced by human activity) on climate change.

(e) **Feedstock and Residue:** The feedstock for aerobic and anaerobic digestion is also known as biomass. While biomass may be regarded as an all-encompassing term, which includes organic matter derived from farming (including from harvesting) and gardening, food production and processing, and animal litter/manure/slurry and sewage, different types of organic matter have different composition and characteristics, and different technologies are suited (or better suited) to certain organic matter, while others are not. For regulatory (and likely social licence) reasons, some biomass cannot be used as feedstock for some technologies.

In the United Kingdom and other European Union countries, some waste project developers specialise in Food Waste (sourcing from councils and municipalities, shopping centres, supermarkets and educational and correctional institutions) while others have chosen to specialise in the agricultural waste sector. As outlined below, Food Waste offers great potential as feedstock in jurisdictions generating Food Waste capable of being processed and treated, and may be regarded as a feedstock that remains the most prospective across many jurisdictions.

(f) **Aerobic digestion:** If an effective aerobic technology is used, the biomass, which the waste project facility is licensed to use as feedstock, will be pasteurised and stabilised to produce compost (containing carbon and nitrogen,[21] and phosphates and sulphates).[22] Composting has value, both in itself and in the products derived from it. Composting reduces the mass and volume of the biomass processed and treated by 50 per cent and 80 per cent respectively, thereby avoiding use of airspace/void space at landfill. The compost produced has value in the nutrients contained within it (nitrogen, phosphorous, potassium and calcium), and as humus (given its humic fraction)[23] for use in agriculture or horticulture or organic matter for use in rehabilitation. However, there is a cost associated with the logistics of getting compost to market or to its point of use and in its use itself (including the cost of spreading large volumes of compost compared to relatively smaller volumes of its market substitute, fertiliser).

In addition, the value of compost varies depending on the final uses to which it can be put, which in turn may be dependent on a policy. Aerobic digestion results in the production of carbon dioxide (CO_2) and water. The chemical characteristics of the organic matter at the start of the aerobic digestion will tend to be the same as at the end (including nitrates, phosphates and sulphates), less CO_2 and water. Also it is likely there will be contamination and residue arising from the processing and treatment of organic matter including, depending on the source of the feedstock, a form of run-off that will need to be contained and possibly treated.

If a council or municipality (or other procuring entity) contracts for the processing and treatment of biomass supplied by it, its expectation will be that the waste project[24] will take the risk of the level of contamination in the biomass delivered (possibly not completely, but certainly to a specified percentage level) and that the waste project will take the risk in the market (critically, the market price) for compost produced and the cost of getting it to market, and the cost of diverting any organic material produced by the waste project that is not compost that can be sold in a market.

Aerobic digestion facilities can be stand-alone facilities (for example, open window composting, but this takes up space, and may result (or some may say, (always results) in odour issues) or form part of Mechanical Treatment (MT) and Mechanical and Biological Treatment (MBT) waste facilities (these facilities often have aerobic maturation halls at the back-end).[25]

(g) **Anaerobic digestion:** Assuming an effective anaerobic technology is used, biogas[26] and bio-solids[27] (if the feedstock is animal litter/manure/slurry or sewage) and sludge (if another feedstock is used) will be produced. While the biogas produced by an anaerobic digestion facility may be used for cooking and for heating without further processing, the removal of carbon dioxide (CO_2)[28] and hydrogen sulphide (H_2S) (and water and water vapour) from the biogas allows that gas to be marketed as natural gas,[29] or what is sometimes referred to as bio-

methane. In addition, the removal of H_2S avoids corrosion of boilers and engines and ancillary systems[30] and will enable the use of biogas for heating and as biofuel (including using gas-fired engines, including Combined Heat and Power Plant engines). The cost of removal, and the effectiveness of the means of removal (usually scrubbing to make a liquid chemical residue for disposal or to make sulphur cake),[31] will need to be demonstrated. Given that CO_2, H_2S and water vapour can be (and H_2S and water will be) removed from biogas, procuring councils and municipalities (and other procuring entities) will want to understand the cost of removal and the revenue benefit of doing so, as will the waste project. If it is necessary to remove CO_2 in order to market the biogas or to market biofuel, waste projects will have to demonstrate that this can be done, and the cost and effectiveness of doing so.[32]

In order to determine the quantity of biogas that will be produced from a particular feedstock (and, therefore, the likely revenue from the sale of biogas or biofuel, or savings from the use of biogas or biofuel), the composition and characteristics of that feedstock will need to be understood, and the biochemical methane potential (BMP) of the biogas determined. The enhanced processing of biogas is likely to increase its value, and in turn the revenue that the waste project is able to earn, if it performs as contemplated. The net income position of the waste project will depend on realising greater revenue modelled on the basis of the increased capital costs of the enhanced processing of biogas.

While anaerobic digestion has been used to process animal litter/manure/slurry and sewage, anaerobic digestion technology is also used to process and treat other feedstock, including in some cases the organic fraction separated from MSW and green waste. In the United Kingdom, the use of anaerobic digestion may be split into three broad, but distinct, sub-sectors depending on the feedstock: (i) sewage anaerobic digestion undertaken by water companies; (ii) Food Waste anaerobic digestion undertaken by councils and municipalities; and (iii) agricultural, diary and abattoir anaerobic digestion undertaken by merchant waste projects.[33] In the context of some jurisdictions, it is possible that councils and municipalities[34] may take a role in each of these sub-sectors, possibly working with the private sector.

(h) **Contamination of feedstock:** Depending on the nature of the feedstock and the technology, it is likely that contamination will be less critical for the purposes of processing and treating organic matter in an anaerobic environment, except for the risk of chemical contamination which might kill the micro-organisms[35] present in the anaerobic environment to digest the organic matter to produce biogas, ie to produce CH_4 (and CO_2). In addition to managing contamination of this kind, the waste project will be concerned to ensure that the composition (and characteristics) of the organic matter used as feedstock are compatible with the anaerobic technology, both to optimise biogas production and to minimise operational and capital cost issues that may arise from feedstock with certain chemical and physical characteristics.

If a council or municipality (or other procuring entity) contracts for the processing and treatment of biomass supplied by it, its expectation will be that the waste project will take the

21 Composting converts nitrogen in its unstable form as ammonia into a stable organic form: chemically, nitrogen in compost is stable and as such is released slowly.

22 Composting is undertaken in an aerobic environment in which the presence of oxygen (through aeration) allows microbial processes (involving actinomycetes, bacteria and fungi) to break down the less complex organic matter (including fats, proteins, starch, and sugar) and, at higher temperatures, to kill pathogens, leaving organic matter that will decompose in the environment in which it is located over time. From a technology perspective, it is important that the microbial stability is understood, given that it is fundamental to composting.

23 Humus is the principal organic matter component of soil, constituting approximately 65 to 75 per cent of the total organic matter in soil. Humus has the key role in the fertility of soils. As such the humic fraction of compost has value for both horticultural and agricultural use, and in some jurisdictions for restoration of native vegetation and forestry plantations, and road verges and central reservations on roads and highways, particularly for councils and municipalities with responsibility for roads and highways.

24 A waste project being the entity owning and operating the waste facility at which the organic matter is to be processed and treated.

25 In the United Kingdom aerobic digestion remains incomplete, but is less prevalent, and in some MT and MBT waste projects it is regarded as no longer economically sustainable, in particular because WtE plants provide a cheaper option.

26 By way of background, biogas is a term that is used to refer to gas that is produced by the biological breakdown of organic (bio-genic) matter in an oxygen-free environment. Biogas is produced from the anaerobic digestion of organic matter. It is derived from biomass, animal litter/manure/slurry and sewage/wastewater for the most part. Biogas comprises primarily methane (CH_4) and carbon dioxide (CO_2) (likely to be approximately 70 per cent CH_4 and 30 per cent CO_2). As LFG contains biogas, ammonia and sulphides, including H_2S, will be present. Both CH_4 and CO_2 are greenhouse gases, CH_4 contributing around 25 per cent to global warming, and CO_2 around 70 per cent, although (and as noted in the body of this article) the global warming potential of CH_4 is 21 times that of CO_2.

27 Bio-solids and sludge will remain after anaerobic processing and treatment of animal litter/manure/slurry and sewage (and wastewater generally). It is necessary to dispose of bio-solids/sludge, and the cost of this disposal (transport and final disposal) needs to be considered in the choice of any anaerobic technology. It is possible to process bio-solids/sludge further to produce compost in a controlled environment using thermophilic digestion (typically, at a temperature of around 55 degrees Celsius in an aerobic environment) or vermicomposting (using earthworms in an aerobic environment). As with anaerobic co-digestion (considered below) there appears to be increased interest in combining feedstock comprising bio-solids with other organics (with a higher carbon content) to produce a higher quality compost product within a shorter period of time using a combination of thermophilic digestion and vermicomposting.

28 The removal of CO_2 increases the energy context of the biogas because there is more methane. CO_2 may be removed in a number of ways, including water scrubbing, polyethylene glycol scrubbing, carbon molecular sieves, and membrane separation.

29 The calorific value of biogas and natural gas is unlikely to be the same. The calorific value of biogas and natural gas is a function of the percentage of methane. The percentage of methane is a function of the reservoir or seam from which it was taken in the case of natural gas or the organic material and its characteristics in the case of biogas. The calorific value of natural gas from a reservoir or a seam will be higher than that of biogas derived from waste: this is because the percentage of the natural gas that is methane is rarely less than 85 per cent by volume and is likely to contain heavier hydrocarbons.

30 H_2S may be removed in a number of ways, including water scrubbing, NaOH scrubbing, activated carbon (converting H_2S into sulphur and water), iron chloride dosing (to create iron sulphide salt), iron oxide (needs water) and air/oxygen dosing of biogas.

31 Sulphur cake is produced from the oxidation of hydrogen sulphide. Sulphur cake can be used in agricultural preparation.

32 In addition to the removal of CO_2 and H_2S it may be necessary to remove halogenated hydrocarbons to comply with the recommendations of engine manufacturers (typically, using activated carbon, through which CH_4 is able to pass, as is N).

33 Merchant waste projects being projects that take risk in the quantity of waste delivered.

34 Given the role of councils and municipalities in respect of road, water, sewage/wastewater and waste.

35 The micro-organisms are able to survive in this anaerobic environment by sourcing oxygen from the organic material itself and from inorganic oxides present in the organic matter.

risk in the level of contamination in the biomass delivered, and the project will take the risk in the market for biogas produced, and the cost of diverting any bio-solids or sludge[36] produced by the waste project. Effectively, the council or municipality (or other procuring entity) will not want to take performance risk in the waste project; rather it will want to make a procurement decision based on demonstrated performance in the circumstances in which the waste project is going to operate (including in its proposed location, recognising that ambient temperature in a location can influence the decisions taken).

However, the more certainty a council or municipality is able to provide, and the more risk it is able to take in respect of feedstock specification or biogas and biofuel specification, or both, the lower the overall costs of the waste project for the council or the municipality (or other procuring entity).

(i) **Co-digestion projects:** Given that anaerobic digestion is a proven technology for biogas production (as demonstrated by existing facilities and infrastructure), there appears to be an increasing interest in the use of existing facilities to maximise capacity of those facilities and that infrastructure so as to increase biogas production through increased throughput of feedstock and through the use of what has been termed anaerobic co-digestion, being the use of different types of feedstock.

The effective use of anaerobic co-digestion offers councils and municipalities with existing facilities the ability to increase biogas production by using existing facilities and infrastructure, and in so doing provide for the more effective processing and treatment of feedstock which might otherwise have to be disposed of to landfill (or possibly by other means). In addition, anaerobic co-digestion offers councils and municipalities (and other procuring entities) the opportunity to consider technologies that are able to co-digest and, as such, achieve greater size and scale than a technology that is not able to co-digest. In this context, in addition to the issue of consistency of the characteristics of the feedstock, the complementarity and compatibility of different feedstock needs to be understood in any procurement process.

The use of animal litter/manure/slurry and other organic material may be regarded as offering reasonably prospective opportunities for co-digestion. If a council or municipality (or other procuring entity) contracts for provision services from a co-digestion project, it should expect that the waste project will take risk in each feedstock and the performance of the project, including the production of biogas and sludge or fertiliser (or if further processing is undertaken, compost).[37]

(j) **Key parameters:** In the context of co-digestion projects it is particularly important to understand the parameters for each technology. The key parameters for effective aerobic composting include the porosity of the organic matter and as such the aeration and oxygenation (the level of oxygen),[38] the moisture level,[39] the relative proportion of carbon to nitrogen (C:N) in the feedstock, the pH value of the feedstock and the temperature. From this it is clear that aerobic digestion requires feedstock with "structure" (ie physical structure).

Most aerobic and anaerobic technologies require consistent parameters, critically the heat, moisture and carbon to nitrogen (C:N) ratios,[40] with variations affecting the digestion process. The key parameters for aerobic digestion vary depending on the phase of composting.[41] There are certain materials that are not suitable for composting, including bio-char or coal ash, fish, meat, cooked food waste, roots and seeds, nappies, and most Recyclables (including glass, metals and plastics), although some papers may be used. Therefore, if MSW is being contemplated as a feedstock it is important to recognise the need for effective separation at source or other pre-sort elsewhere.

The key parameters for effective anaerobic digestion will very much depend on the feedstock available and the technology chosen, but as a general statement the total solid content, temperature and retention times (tied to whether the anaerobic digestion takes place in mesophilic or thermophilic conditions) and pH values (which values will vary depending on the stage of digestion). Critically, anaerobic digestion involves a micro-biotic process by which organic material is converted into methane in an oxygen-free (ie anaerobic) digester.[42] To convert organic material into methane (CH_4) takes time. The bacteria must have contact with the organic material being digested (digestate): the better the contact, the greater and more effective the digestion. Because the digestate comprises bacteria, contamination of the organic matter in the feedstock or too high a pH value can affect the operation of the digester. The operating parameters of each anaerobic digestion technology is different, but consistency of feedstock (quality and quantity) are critical to the consistent production of biogas: to achieve consistency and to achieve optimal carbon to nitrogen (C:N) ratios[43] mixing of feedstock is often undertaken.

Finally, the operating parameters of each anaerobic digestion technology will need to be understood in terms of the speed at which feedstock can be fed into the digester. Overloading a digester affects costs and revenue and can give rise to liability under contracts into which the waste project enters. Organic loading rate (OLR) is expressed in Chemical Oxygen Demand (COD)[44] or Volatile Solids (VS)[45] are means of measuring OLR.

Jurisdiction-by-jurisdiction

The powers and duties of councils and municipalities in particular jurisdictions varies: in some jurisdictions the powers and duties of councils and municipalities may be limited to the collection and disposal of waste, in others the powers and duties may extend to roads, water, wastewater (including sewage) and waste. In addition, policy makers and councils and municipalities in some jurisdictions have the advantage of having seen what has worked in other parts of their counties and other jurisdictions around the world.

The introduction of landfill levies/waste disposal levies may send pricing signals to councils/municipalities or waste producers required to pay them. Likewise, phasing out or scarcity of landfill. The introduction of container deposit/refund schemes is likely to reduce the volume of certain recyclable materials because it encourages effective pre-sort of those recyclables which are covered by the scheme.

The implications of continuing as is...

As noted above, in the absence of waste projects, both the organic and inorganic fractions in the waste stream will go to landfill. If organic matter goes to landfill, LFG is released from landfill as the organic matter, as putrescible waste,[46] decomposes over time.

As a general statement, if organic matter is left to decompose over time, the LFG released will typically comprise 50 per cent methane (CH_4) and 50 per cent carbon dioxide (CO_2) (with traces of nitrogen, oxygen, hydrogen and carbon monoxide (CO)), and organics such as ammonia (NH_3) and sulphides. Some organics released are harmful to both the environment and to public health (and some are odorous and toxic, some both).

LFG may be captured, and flared, or captured and fired, to produce energy. The capture and firing of LFG is regarded as a better solution, and more environmentally friendly, than slow release given the global warming potential of methane (CH_4). While capture is better than non-capture, avoiding production of LFG is a better outcome still because it captures a greater quantity of CH_4 and does so in an environment that avoids (or minimises) the odour associated with the slow release of LFG. To achieve this, putrescible waste is diverted from landfill to a waste project.

Achieving increased diversion from landfill is not just a council and municipality issue, however. It is a broader policy issue in which all putrescible waste should be viewed as waste to be avoided. If however waste is not avoided, the waste that arises should be regarded as potential feedstock for waste projects and aerobic and anaerobic digestion technology solutions.

Also, in some jurisdictions and in some council and municipal areas, the use of land for landfill may have lost, or be in the process of losing, its social license, or be preventing the use of surrounding land for higher and better uses. This is often the case in jurisdictions and council and municipality areas with increasing populations and urbanisation.

Increased diversion of organic matter as putrescible waste from landfill

Balancing ideals and practicalities

As noted above, to increase the diversion of putrescible waste from landfill there needs to be a reduction in organic matter going to landfill. For this to be achieved, policy needs to encourage avoidance of organic matter waste. To the extent that organic matter waste is not avoided, and waste arises, policy needs to allow (and, in some cases, to facilitate) the development of waste projects to process and to treat such organic matter waste to achieve improved environmental and public health outcomes.

As we have noted in other articles in the Waste-to-Wealth Initiatives series, waste projects comprise WtE (mass burn; gasification; pyrolysis and plasma, and anaerobic digestion to derive biogas); FOGOs[47] (the technology used depending on the food organic content); ORFs[48] (tending to use aerobic digestion); MBTs (some using aerobic and anaerobic digestion), MTs and anaerobic digestion.

Given the wide range of waste projects, the Waste Management Hierarchy can be used as a frame of reference. However, it needs to be seen as a frame of reference for all in the community, not just councils and municipalities. In this context, having collected data to understand the feedstock, it is necessary for all stakeholders to be pragmatic, balancing the ideals with that which is achievable practically. Affordability and value for money are fundamental to achievability, including by reference to other technologies and the outcomes that they can achieve. For example, FOGO projects represent an ideal outcome, but because their effectiveness depends on the composition of the waste that is placed in collection bins going to FOGO waste projects, they often work most effectively in communities receptive to education, and locations that do not experience higher temperatures.

FOGO projects may be said to go beyond the need for social license; rather they require a social contract with the community such that food and garden organics in the waste stream are separated at source effectively by the community before they are delivered to the FOGO project. This social contract has been achieved in smaller communities and, over time, in larger ones.

Leaving to one side the fundamental concepts of affordability and value for money, if councils and municipalities look to develop waste projects by reference to the Waste Management Hierarchy, the outcome sought is to maximise reuse. The key practical overlay to the application of the Waste Management Hierarchy is the level of contamination in the waste stream, and the ability to avoid

36 Bio-solids/sludge have to be processed and treated further and will need to be disposed of lawfully, with the key costs of disposal being the actual cost of disposal and the cost of transportation to the ultimate point of disposal.

37 Further processing will require the pasteurisation of the organic matter within the sludge and fixing the organic material or the mixing of the resulting organic material to create an organic material that is humic.

38 Aeration of the digestate is required, whether forced or passive.

39 With aeration the moisture level is critical for effective microbial digestion.

40 In many aerobic processes, wood (and possibly paper) provides carbon content and nitrogen content from Food Waste (and in a closed processing and treatment environment, possibly animal litter/manure/slurry, and less likely sewage).

41 There are four key phases of composting: (i) mesophilic; (ii) thermophilic; (iii) cooling; and (iv) maturing.

42 There are four stages of anaerobic digestion: (i) hydrolysis (involving hydrolytic bacteria); (ii) acidogenesis (or fermentation) (involving acidoengic bacteria); (iii) actogenesis (involving acetogenic bacteria); and (iv) methanogensis (involving methanobacterium and methananosarina): some authors refer to three main stages (hydrolysis, acidogenesis and methanogenesis), but our preference is to refer to four stages. At a high level and in broad terms, the first stage (hydrolysis) breaks down complex organic material (including cellulose) into soluble molecules, including amino and fatty acids and sugar (hydrolysis is of critical importance in digestate with a high organic content), and during this stage chemicals may be used to reduce digestion, the second stage decomposes carbohydrates in the absence of oxygen, converting the acids from hydrolysis into ammonia, and simple organic acids, carbon dioxide (CO_2) and hydrogen (mimicking the way in which milk sours if left to sour), the third stage converts the organic acids into acetic (from amino acids), butyric and propionic acids, and ethanol, and the fourth stage converts acetate (through methanosarcina) and hydrogen and CO_2 to methane (CH_4) (through methanobacterium).

43 Optimal C:N ratios in anaerobic digesters are said to be between 20:1 and 30:1: a high C:N indicates an increased consumption of nitrogen and lower biogas production, whereas a low C:N indicates ammonia accumulation with higher pH values and, as such, the digestate can kill methanogenic bacteria.

44 COD is measured by mass: is a simple measure of water and waste water quality, critically the level of organic content of the water. Anaerobic digestion technologies alone cannot reach the required levels of COD to allow discharge.

45 VS is measured by volume: is a simple measure of volume before and after complete combustion of a cubic metre of feedstock. Essentially, how much of each cubic metre of feedstock is biodegradable (BVS) and how much is not is a refractory VS (RVS). A high VS with a low RVS means that the feedstock is suitable for anaerobic digestion. The level of volatile solid degradation indicates the level of biogas production.

46 Organic matter that decays as a result of putrefaction.

47 Food and Garden Organics facilities.

48 Organic Recovery Facilities.

or to mitigate the levels of contamination, before delivery to the waste project or, alternatively, leaving this for the waste project to manage. There is no "one-size-fits-all" approach to the management of feedstock separation and avoidance or management of contamination.

Understanding the feedstock available (composition and mass) and its source, and the cost of separating feedstock at source or at transfer stations, will inform decision-making, as will the level of contamination avoidance and management that needs to take place before the feedstock is delivered to the waste project.

If feedstock with manageable levels of contamination is delivered to waste projects using aerobic and anaerobic digestion technologies, this will allow reuse of organic matter through the production of compost and the production of biogas and with further processing of residue compost, in each case reducing putrescible waste going to landfill.

In the context of achieving higher levels of diversion from landfill and higher levels of reuse using aerobic and anaerobic digestion technologies, there are at present a number of waste streams that are not being accessed systematically to maximise diversion from landfill, and to maximise biogas production. In addition, as noted above, there are opportunities to use feedstock and technologies to maximise levels of biogas production. By achieving maximisation of diversion from landfill, councils and municipalities with landfills achieve longer lifecycle opportunities for those landfills, and possibly lower unit costs by utilising existing assets and infrastructure, and net income benefits from the production of biogas, through processing to produce natural gas or biofuels.

In addition, cooperation between councils and municipalities (and other procuring entities) may allow greater diversion from landfill and greater reuse by virtue of scaling up waste projects to process and treat organic matter and, in other instances, inorganic matter, which would otherwise go to landfill. Cooperation between councils and municipalities (and other procuring entities) offers a real opportunity to extend concepts of achievability by extending the concepts of affordability and, as such, value for money by scaling up waste projects to take more waste and to take a greater variety of waste streams.

Accessing feedstock

(a) **Other sources of feedstock:** The Food Cycle comprises production, harvesting, processing, sale and consumption of food. At each stage of the Food Cycle, waste is produced. It is important to understand the Food Cycle, and each point in the Food Cycle at which waste arises (Food Waste). The greatest quantity of waste arises in the first four phases (production to sale) of the Food Cycle. Depending on the area of the world (and areas of each country), consumers are responsible for between 1.25 per cent and 38 per cent of the Food Waste from the Food Cycle.

For the balance of this article, we focus on Food Waste, but in a future article we will analyse other possible feedstock for each waste project technology, including organic matter that may be processed and treated using aerobic and anaerobic digestion technologies, such as animal by-products (including carcasses and intestines) and biomass from harvesting of crops (including arable crops, such as maize and wheat).

Consistent with the Waste Management Hierarchy, food waste is to be avoided (either not produced or consumed, either by humans or animals). If it is not possible to avoid food waste, the Waste Management Hierarchy contemplates the reuse of Food Waste. The use of Food Waste to produce heat or energy, or both, and possibly compost represents reuse. If councils and municipalities and other procuring entities work together to use technologies (and existing facilities in some instances) to process and to treat Food Waste with other feedstock, benefits of scale will be realisable if there is sufficient Food Waste available as feedstock.

Certain organic matter in Food Waste provides better feedstock than other organic matter. For example, pre-processed fruit solid waste and vegetable solid waste provide optimal feedstock for anaerobic digestion. Post-processed, but pre-consumed, fruit solid waste and vegetable solid waste is less suitable because of possible packaging contamination, but may still be capable of use if contamination is managed effectively. Post-consumed Food Waste is less suitable still because of possible contamination with paper, metal cans, glass, plastics, containers and utensils, but does not mean that post-consumed food cannot be used as feedstock. It is fair to say that, if the composition and characteristics of the Food Waste are known, waste projects should be able to configure designs to allow processing and treatment. For example, the United Kingdom has anaerobic digestion facilities that accept and treat out-of-date packaged Food Waste comprising food and dairy products, with all packaging stripped mechanically before the Food Waste is treated anaerobically.

Organic matter in Food Waste derived from source-separated organics (green bins or other source-separated organics (SSO)) is likely to be contaminated to some extent. The issue is to what extent and whether the contamination can be removed and, if so, the likely cost of doing so. In the absence of an effective separation at source system, organic matter in Food Waste that is derived from MSW will have levels of contamination that make it unsuitable as feedstock for anaerobic digestion. To derive the organic fraction from MSW requires a pre-sort and screening of the feedstock on delivery.

For these purposes, the origin of Food Waste needs to be understood both in terms of consistency of composition and consistency of mass arising. As stated above, waste arises from production through to point-of-sale (essentially undertaken at a commercial level) and after the point-of-sale (essentially at a domestic production or domestic purchasing level). From a policy perspective and a commercial perspective, it is easier to send policy signals to (and to effect policy enforcement in respect of) producers, processors and retailers than it is to consumers. Effective separation at source of various waste streams, critically the organic fraction (and possibly Food Waste from garden waste green bins) from the inorganic fraction, and the recyclable fraction from each other fraction, means that the fractions separated as SSOs may be processed and treated so as to divert waste from landfill (or other Waste Management Hierarchy outcomes).

In terms of the sources of Food Waste, hospitals, prisons, schools and universities, cafes, shopping centres, malls

and supermarkets, food centres and restaurants, and food production facilities, are all likely to generate highly putrescible feedstock with a high BMP.

(b) **The importance of information, in particular about MSW:** Given that councils and municipalities have a duty (and the power and revenue-raising ability) to collect MSW, and to dispose of it (for well-established and well-understood environmental and public health reasons) and given the likely level of the organic fraction within it, including Food Waste, thought and resources need to be applied to determine how to separate the fractions within MSW at source or elsewhere.

In addition, the organic fraction (and Food Waste in particular) makes up a significant proportion of the mass of MSW arising within each council and municipal area, and, as such, its diversion from landfill will be of benefit. The issue for councils and municipalities is to assess the MSW arising within their areas and its composition, and in so doing to assess, realistically, how much of the organic fraction in that MSW may be separated at source, separated at a transfer station or separated at the ultimate processing and treatment destination, and at what cost. As noted above, in the United Kingdom, some councils and municipalities have found that the operational cost of separation at source and the levels of contamination of MSW have resulted in leaving the Food Waste organic fraction within MSW.

Having this information available allows councils and municipalities to make decisions about the means by which MSW may be processed and treated, assuming for present purposes separation at source or elsewhere. In this context, it is important to understand the waste arising that may be collected and consolidated to provide further feedstock for each use identified, and that policy makers consider whether to incentivise or to dis-incentivise those generating waste to use one technology or not to use another technology so as to achieve the scale to support the preferred (and ideally optimal) technological outcome. In addition, while a wet anaerobic digestion technology may not be suited to the processing and treatment of MSW, there are however smaller scale dry technology plants that may be used.

Conclusion

As noted in our recent article Waste-to-Wealth Initiatives: Have we reached a tipping point?, the changes introduced by the People's Republic of China at the end of 2017 have jolted the waste industry around the world. This jolt has prompted policy makers, councils and municipalities, producers of waste and the waste industry more generally to consider policy afresh, including funding and implementation decisions for waste avoidance and waste processing and treatment. In some jurisdictions this is an opportunity: given the maturity of industry participants who have developed and applied technologies around the world, and mature bases for decision-making, jurisdictions have a broad range of technologies to assess and to choose from. In jurisdictions with well-developed waste collection systems, there is an opportunity to develop waste processing and treatment facilities in a coordinated way, each project or coordinated collection of projects maximising the objectives of the Waste Management Hierarchy in a way that recognises local conditions and practicalities, with only waste that cannot be processed by a waste project at a higher level in the Hierarchy permitted to be processed by a project at a lower level in the Hierarchy.

Michael Harrison
Partner, Perth and Sydney
T +61 2 9258 6837
michael.harrison@ashurst.com

Richard Guit
Partner, Perth
T +61 8 9366 8052
richard.guit@ashurst.com

Mark Disney
Partner, Brisbane
T +61 7 3259 7399
mark.disney@ashurst.com

Ratha Nabanidham
Partner, Brisbane
T +61 7 3259 7096
ratha.nabanidham@ashurst.com

Cameron Smith
Partner, London
T +44 20 7859 1125
cameron.smith@ashurst.com

Nick Stalbow
Partner, London
T +44 20 7859 1802
nick.stalbow@ashurst.com

DEVELOPMENTS IN TWO-STAGE CONTRACTING AND EARLY CONTRACTOR INVOLVEMENT:

A UK perspective

By Michael J Smith

Is the UK construction industry now ready to embrace a procurement model based on two-stage contracting and early contractor involvement, on the basis that it gives the parties the best chance to properly investigate, assess and manage construction risk on the most complex of infrastructure projects?

Recent experience within the UK construction industry has led project stakeholders, including the UK Government, to question whether the previously widespread use of a single, lump-sum, turnkey contract to procure complex infrastructure assets, via a limited recourse project financing, is in everyone's best, long-term interests.

Those funding or sponsoring such projects have tended to adopt the default position that the use of a single turnkey contract (pursuant to which the contractor accepts global responsibility for the engineering, design, construction, testing and commissioning of the asset) was the only appropriate procurement choice, unless they were unable to find a contractor willing to wrap that risk. Looked at from a purely legal perspective and standing in the shoes of a risk-adverse project sponsor or lender, it was difficult to counsel against such a conclusion.

However, just as it seems that the rest of the world is beginning to embrace the limited recourse project financing models developed in the UK over the last 20 years, the UK is changing direction. While it may not be unusual for the UK to start heading off in a different direction to everyone else, there is perhaps good reason for that change in direction.

There is a perception that significant recent events in the UK (ie the demise of Carillion last year and the difficulties which have led Interserve to exit the energy from waste sector) have demonstrated the potentially disastrous consequences of a single entity wrapping the entire project delivery risk without properly understanding the nature of that risk and making appropriate allowance for it.

As a consequence of this perception, there appears to be a developing consensus within the UK that the client side of the industry needs to engage earlier and better with the whole of its supply chain in order to properly understand and manage the particular construction risks on any given project. Stepping down the whole of that risk to a single contractor who has priced that risk in a highly competitive environment, may no longer be seen as representing value for money (and may be considered unwise in certain technologically challenging sectors).

We believe that this consensus will lead to the more widespread use of a delivery model which has been promoted by the UK Government for some years now. It is based on a standard form contract (the NEC/4 Engineering & Construction Contract) and it entitles the contractor to reimbursement on a "cost plus (fee)" basis. A two-stage tender process (which provides for early contractor

involvement (or ECI) during the initial design stage) and an attendant outturn construction cost incentive scheme are then used in order to:

- interrogate, understand and manage out construction risk before the parties commit to a lump sum or a target price for the second, construction stage; and
- manage the cost escalation risk that is inherent in any "cost plus" contract.

This procurement model has been used and refined by those involved in the structuring of some of the largest and most complex infrastructure projects within the UK over the last ten years, where there was no market appetite for a single, turnkey wrap (eg Crossrail, Thames Tideway Tunnel, Hinckley Point C and High Speed 2).

Structuring a two-stage tender process

Lump sum and/or cost reimbursable?

One of the first procurement decisions to be made on any project is how many principal Works packages there will be and which of the following pricing structures is most likely to deliver value for money for the client:

- fixed price, lump sum, under which the fixed price is only adjusted in respect of agreed compensation events; or
- cost plus, under which the contractor will be reimbursed those costs which it reasonably incurs in carrying out and completing the Works, plus an additional fee to cover its overheads and its profit entitlement, calculated as a percentage of those allowable costs.

Fixed price/lump sum contracts

If the client's basic engineering design solution and technical requirements for the Works can be sufficiently developed prior to contract, so that the contractor can properly define and price the consequent Scope of Work without an undue risk margin allowance, then a lump sum, fixed-price contract may still deliver costs certainty and value for money for the client. In those circumstances either the FIDIC Silver Book or the NEC/4 Engineering & Construction Contract (Option A) would be the most commonly used standard form contracts within the UK.

Cost reimbursable contracts

However, if:

- programme constraints dictate that a significant element of the client's technical requirements for the Works package can only be developed post contract; or
- there is little or no market appetite to accept (or sensibly price):
  - o the risk of an uncertain or technically challenging design; or
  - o the interface risk on a multi-contract construction management procurement,

then a cost reimbursable contract is likely to represent better value for money for the client. It may also be the only available procurement option, if there is a lack of competitive tension within the relevant market (something that we are currently seeing within certain sectors of the UK market for the reasons referred to above).

Choosing the correct contract conditions

So, if the client does decide to adopt a cost reimbursable approach for its project, how will it best manage the risk of significant costs escalation to which it will then be exposed? Within the UK, the current consensus is that the NEC/4 (Option C) Engineering & Construction Contract will give the client the best means of doing so. It contains all of the project management tools that are most commonly used to manage the risk of unnecessary costs escalation. While the recently updated FIDIC Red, Yellow and Silver Books do now include some of these project management tools, they do not provide for:

- a two-stage ECI tender process; and/or
- a Target Price pain/gain share incentive regime,

both of which are included as standard Optional Clauses within NEC/4.

Facilitating proactive construction management

It is also commonly said that effective costs management, particularly where the project is to be procured on a construction management basis (ie where the client retains responsibility for managing the interface risk between several different Works packages), will depend upon strong and proactive construction management. So the client will need to give itself the project management tools which it needs in order to properly manage that risk. The NEC/4 conditions of contract do this by:

- only allowing for the reimbursement of "Defined Costs" and not "Disallowed Costs" (thereby encouraging the contractor to be efficient in the management of its supply chain);
- obliging the contractor to comply with a key dates regime, an information release schedule and a site access protocol (thereby assisting the client in its management of interface risk);
- promoting transparency between the parties through the use of a risk register, disclosure of the contractor's pricing contingency allowance and agreement between the parties on float allowance and ownership; and
- facilitating good project management via the use of early warning notices, risk reduction meetings and programme updates.

Some (but not all) of these project management tools have also now been adopted within the 2018 Edition of the FIDIC contracts.

Control of costs escalation under a cost reimbursable contract

Target price incentive schemes

In order to ensure that the contractor is incentivised to work efficiently, in the best interests of the project, those tendering for a "cost plus" contract will usually be asked to bid a target price for the Works. The successful tenderer will then share an agreed percentage of any resultant "pain" or "gain", ie the amount by which the actual outturn construction cost is more or less than the target price bid by the contractor.

Where this type of incentive scheme is adopted, most of the negotiation between the parties will usually concern:

- the list of compensation events that will entitle the contractor to an adjustment to the Target Price;
- the percentages at which and the bands within which any pain and gain is shared between the parties;
- the circumstances in which the fee (ie the contractor's overheads and profit) is not applied to any cost (and is therefore not payable to the contractor); and
- the extent (if any) to which the contractor's pain share counts towards any limit on its aggregate liability under the contract.

The two-stage tender/ECI process

However, a properly constructed, two-stage ECI tender process is likely to represent the parties' best opportunity to (a) reduce their exposure to "pain" risk on a Target Price contract or (b) achieve value for money on a lump sum, turnkey contract (on the basis that asking the contractor to price an uncertain design solution is unlikely to represent value for money).

Pursuant to the Secondary Option Clause X22 (ECI), which is designed for use with the NEC/4 Main Option C Target Contract, the client initially only appoints the contractor for a specified period of time, to undertake a limited scope of design development (Stage One). Thereafter the client will have the option of appointing the contractor to finish the detailed design development and execute the Works (Stage Two).

If properly constructed, this process should enable the client to:

- manage out some of the potential pain share risk by investigating and developing the contractor's proposed design solution during Stage One:
- retain some control over the process by which the design solution is developed and adopted for the project (thereby avoiding the danger of significant reputational damage that could occur if an inadequate design solution is adopted by a package contractor with no interest in the operational performance of the project);
- maximise the opportunities for value, engineering and innovation, thereby minimising both capex and opex costs for the project; and
- integrate design development with construction planning at the earliest possible stage of the project, thereby allowing more time for the parties to plan for critical events and prepare a fully detailed construction programme.

However, the client should also safeguard against the risk of programme slippage and a gradual erosion of its bargaining power as Stage One progresses by:

- including clear programme and Scope of Work requirements for Stage One within the Invitation to Tender;
- providing clearly for the client's right to withdraw from the process without penalty at the end of Stage One (and to proceed with the next best bid);
- requiring agreement on the Stage Two conditions of contract as a condition precedent to the Stage One appointment; and
- maintaining competitive tension within the tender procedure by:
    - evaluating change to the Stage 2 Target Price using the competitive pricing information included within the contractor's original bid submission; and

- allowing the contractor to share in any saving between (a) the Initial Target Price included within the contractor's original bid submission and (b) the sum of the revised Target Price fixed at the end of the Stage One process and the amounts paid to the contractor during Stage One (with payment of any such saving held over until completion of the Works and the assessment of any outturn pain share payable by the contractor at that stage).

It should be noted that amendment to the NEC/4 Secondary Option Clause X22 will be required in order to reflect any of the above arrangements. (Most significantly, it appears that the intention of the NEC/4 Secondary Option Clause X22 is to incentivise the contractor to interface effectively with any other package contractors, by entitling the contractor to share in any saving between the outturn costs paid for the whole project and the budget cost for the whole project.)

Alliancing schemes on multi-contract procurements

We find the drafting of the NEC/4 Secondary Option Clause X22 (ECI) strange, given that the NEC/4 Secondary Option Clause X12 (Multiparty Collaboration) is also clearly designed to promote collaboration across different Works packages in order to facilitate the achievement of a common set of objectives set by the client, ie a Project Target Price, a Planned Date for Project Completion and/or the achievement of other Key Performance Indicators.

The scheme is based on three fundamental principles:

- a successful incentive regime depends upon a successful alliance;
- an alliance can only exist where there is consensus; and
- the alliance parties can only be incentivised to achieve an outcome if they are able to influence that outcome by their own performance.

Accordingly, it should be noted that:

- there is no contractor exposure to any Project Target Cost pain or any Project Programme overrun;
- the client has the right to add new incentives to the scheme (or revise existing ones if their achievement can no longer be influenced);
- the alliance is managed by consensus, ie by a Core Group within which each partner is equally represented and decisions are made on a unanimous basis; and
- if any participant wishes to withdraw it may do so without penalty (provided it has acted in good faith).

Clearly, the effectiveness of such an alliance scheme will depend upon a continuing consensus between all of the participants, driven by the collective gain share. It should be noted that, from a legal perspective, the Owner has very little power if the incentive for collaboration no longer exists and consensus breaks down. In such circumstances the client will have no claim against the individual participants (unless they have acted in bad faith).

The NEC Alliance Agreement

The NEC has also published an Alliance Agreement. The intention is that all of the parties to the alliance enter into the Agreement, instead of several package contracts, thereby removing the individual Target Price pain/gain share incentive schemes referred to above.

We are not aware of any project which has used the NEC Alliance Agreement and we have reservations about the dispute avoidance and termination provisions within it; in particular how they will actually work in the event that the incentive scheme breaks down.

However, most significantly, we do not see why the time and expense of negotiating an Alliance Agreement between several different package contractors, who have never been party to such an agreement before, could justify the replacement of a two-tier incentive regime based on:

- an NEC/4 Secondary Option Clause X12 (Multiparty Collaboration) target price gain-share incentive, applied across the whole project; and
- an NEC/4 Option C target price pain/gain share incentive within each Works package contract (which would survive any termination of the project-wide incentive regime).

EPC Feed Agreements

Similar to a contract which provides for a two-stage ECI process, a "front-end engineering and design agreement" or "FEED Agreement" will usually provide for the development of front-end engineering and design proposals, to the extent sufficient to facilitate the obtaining of necessary project approvals by the client and the establishment of an indicative investment cost for the project. The FEED design process will also focus the technical requirements which will comprise the Employer's Requirements for the purposes of an EPC Contract.

The perceived advantages of a properly constructed FEED process are very similar to those of a two-stage ECI tender process. It should:

- enable risks to be properly identified, assessed, priced and mitigated;
- reduce the costs of tendering, as only one design process is undertaken;
- facilitate the achievement of value for money through early contractor involvement in the design and pricing of the Works, on a transparent basis; and
- optimise construction efficiencies and reducing operating costs.

However, to deliver these benefits, a FEED process will usually need to recognise and embrace the following key principles:

- it should facilitate outturn capex savings by an up-front, initial investment in value engineering.
- it should recognise the need for relevant designer technical expertise;
- it should require and facilitate early O&M contractor and other stakeholder involvement;
  - the services Scope of Work and deliverables will vary, depending upon the nature of the Works package and/or project; and
  - it should recognise the need to provide for whole life project and systems changes/requirements.

Michael J Smith
Senior Consultant, London
T +44 (0)20 7859 1004
michael.j.smith@ashurst.com

INVESTING IN INFRASTRUCTURE?

Managing risk and treaty protection in an uncertain world

By Tom Cummins and Emma Johnson

Global investment in the infrastructure sector is on the rise, increasing at an average annual growth rate of 2.9 per cent, and with the global need for infrastructure investment reported to be likely to reach $94 trillion by 2040.[1] However, we live in an uncertain world, where the risk landscape for international investors, including in the infrastructure sector, has seldom been as challenging. Political and economic risk factors such as Brexit, import restrictions in the Middle East, the US-China "trade war" and the high profile use of financial sanctions are the daily fodder of the financial press.

It is perhaps because of the volatile political landscape that the number of investment treaty claims against states relating to construction and infrastructure projects is on the rise – the International Centre for Settlement of Investment Disputes (ICSID) reported earlier this year that construction and infrastructure disputes represented 41 per cent[2] of the 55 new cases registered with it in 2018.

International investors are well advised to know about the protection offered by investment treaties, no matter whether the location of their investment is in a traditionally stable jurisdiction such as the UK or a country with a track record of political instability. However, this need to ensure investment protection comes at a time when investor-state dispute settlement (ISDS) is subject to increasing public criticism, giving rise to a shifting landscape in the nature and extent of the investment protection available. So, investors also need to know the potential limitations of the protection available.

This article considers some of the key global developments which have the potential to impact foreign investors, and the extent to which investors can mitigate against such risks by restructuring their investments to take advantage of investor protection rights and guarantees available under existing bilateral and multilateral investment treaties.

1 *Global Infrastructure Outlook: Infrastructure investment needs 50 countries, 7 sectors to 2040,* Oxford Economics, 2017; accessible at https://www.oxfordeconomics.com/recent-releases/Global-Infrastructure-Outlook.

2 Comprising construction (14%), Water, Sanitation & Flood Protection (2%), Electric Power & Other Energy (20%) and Transportation (5%). See: The ICSID Caseload – Statistics (Issue 2019-1), accessible at https://icsid.worldbank.org/en/Documents/resources/ICSID%20Web%20Stats%202019-1(English).pdf.

Traditional investor protection

Foreign investors have long sought to structure their investments so as to take advantage of the investor protection provisions included in bilateral and multilateral investment treaties.

Bilateral investment treaties (BITs), are public international law agreements whereby two states agree to provide reciprocal guarantees and protection for investments made by foreign investors within their jurisdiction. States typically agree that foreign investors and their investments will be afforded fair and equitable treatment, freedom from discrimination (judged against the treatment that the host state provides to both domestic investors and investors from third states), and protection against expropriation without adequate compensation. Multilateral investment treaties (MITs) often provide similar guarantees, but have three or more state signatories.

BITs and MITs typically provide investors with a direct means of enforcing their rights by allowing them to commence arbitration proceedings against the host state. This is particularly valuable as it dispenses with the requirement for a separate arbitration agreement between the investor and the state.

The type of arbitration provided for in BITs and MITs varies, but arbitration under the rules of the International Centre for the Settlement of Investment Disputes (ICSID, a World Bank entity), the Stockholm Chamber of Commerce (SCC), or the United Nations Commission on International Trade Law, (UNCITRAL) is common. Those rules typically provide for hearings to be held in private, and there is little public disclosure of details about the case, the parties' respective positions, and any awards rendered, although there have been a number of steps in recent years to promote transparent arbitration of investment disputes. There is also little scope for the parties to challenge or appeal unsatisfactory awards, which are enforceable globally under either the New York Convention or the Washington Convention (in the case of ICSID awards).

Importance for infrastructure investment

Infrastructure projects, which are typically long-term investments, will inevitably be exposed to a risk of policy changes over the life of their development. Those risks can be difficult to foresee at the time of initial investment. Brexit is a good example of such risks – even now there is no certainty as to what form Brexit might take.

Structuring (or restructuring) investments in the infrastructure sector so as to ensure treaty protection can be an effective way to manage the risks that can arise during the life of a project for several reasons, including the fact that:

(a) in case of expropriation, investment treaties typically require the payment of prompt, adequate and effective compensation. The purpose of compensation under international law is to "*wipe out all the consequences of the illegal act and re-establish the situation which would, in all probability, have existed if that act had not been committed.*"[3] This is a standard that is frequently applied by investment arbitration tribunals and may be higher than the compensation that would be available to an investor under national law;

(b) investment treaties also offer other protection that may not be available under national law (such as fair and equitable treatment and protection against measures that have an effect that is tantamount to expropriation). This means that the host state will not be able, without potentially attracting liability, to introduce measures (such as fiscal measures) which would destroy the value of an investment but would not be considered as expropriation as the investment has not been confiscated;

(c) investment treaties exist outside of national legal systems, which means that a new government (which may not share the policy objectives of its predecessor) will be unable unilaterally to alter the terms of the treaty, although it may be able to terminate it; and

(d) however, treaties normally contain "sunset clauses" that operate to continue to extend treaty protection for a period of time after termination, typically for 10 to 15 years.

In addition to providing recourse to international arbitration (should disputes arise), investment treaties can also be used as a means of lobbying host states against adopting adverse policy changes. The threat of potentially public arbitration proceedings (with the added risk of a significant damages claim) can be a significant deterrent.

The changing landscape

Over the past decade, there has been a significant increase in the number of claims brought by foreign investors against the states hosting their investments. Many of those claims have been against emerging economies with stretched budgets, and in respect of politically controversial projects. They have frequently resulted in states being ordered to pay hundreds of millions, if not billions, of dollars in compensation to multinational corporations. Many of those claims have arisen in the oil and gas, power and renewables industries.

Much has been written both in the press and in academic journals condemning ISDS. Critics have derided ISDS for amounting to "hotel room justice", where arbitration hearings in politically charged cases take place in private, away from public scrutiny, in the conference rooms of luxury hotels. Having once justified such treaties as a means of encouraging foreign direct investment, a number of states are finding it difficult to quantify the economic benefits realised and to justify to their own citizens the benefits of remaining a party to BITs and MITs in their current form.

This fresh look at BITs and MITs is leading to policy decisions and legal, regulatory and political reform which could, in turn, adversely impact foreign investors. In May 2018, the United Nations Conference on Trade and Development issued a report noting that investment treaty making had reached a "turning point". It noted that the number of new investment treaties concluded in 2017 was the lowest since 1983 and that, for the first time, the number of effective treaty terminations outpaced the number of new treaties.

Changes in Europe

In Europe, it is perhaps in part because of such growing public scrutiny that the European Commission has taken steps itself to condemn bilateral investment treaties. In June 2015, the European Commission commenced infringement proceedings against Austria, the Netherlands, Romania, Slovakia and Sweden, asking them formally to denounce their intra-EU BITs (BITs concluded

3 Case concerning the *Factory at Chorzów (Germany -v- Poland),* Jurisdiction, Judgment, 26 July 1927, P.C.I.J., Series A, No. 9.

between EU member states) on the basis they were incompatible with EU law.

In March 2018, the European Court of Justice (ECJ) handed down its decision in the *Achmea case*.[4] That case concerned a Slovak-Dutch BIT, which had been invoked by the Dutch investor against the Slovak Republic in response to the Slovak Government's decision to change its health insurance legislation. The ECJ held that the BIT violated EU law because it infringed the ECJ's role as the final arbiter of EU law (as it permitted the investor to commence international arbitration proceedings in respect of disputes arising under the treaty, which would in turn involve an international tribunal determining matters of EU law).

Following that decision, in January 2019, all 28 EU Member States agreed to terminate their intra EU BITs. 21 Member States also declared that they would inform investment arbitration tribunals (whether constituted under BITs or under the Energy Charter Treaty – a MIT to which the EU itself is a contracting party) of the decision in *Achmea* and would request courts to set aside or refuse to enforce investment arbitration awards arising from an intra EU BIT. There have already been instances of EU courts refusing to enforce intra-EU investment treaty awards.

Treaty termination

The problem is not confined to Europe. A number of states have sought to amend their BIT and MIT obligations in recent years. Following up on his campaign promises, the current US President has succeeded in having signed the United States–Mexico–Canada Agreement (which is yet to be ratified by all 3 countries), which will eventually replace the North American Free Trade Agreement (NAFTA), the MIT that has regulated trade between Canada, Mexico and the US for around 14 years.

NAFTA is only one of the MITs to fall foul of Mr Trump's protectionist policies. The US withdrew from the Trans-Pacific Partnership (a MIT which would otherwise have involved countries responsible for 40 per cent of the world's economic output) in January 2017, with the remaining state parties continuing with the agreement but narrowing the ISDS provisions.

The US is not the only state looking to reduce the scope for investors' claims against it. A number of Latin American states, as well as India and South Africa, have terminated their BITs in recent years, many as a result of substantial arbitral awards obtained by investors against them. Some states, including Bolivia, Ecuador and Venezuela, have gone a step further and withdrawn from ICSID altogether.[5] The Netherlands has also published a new model investment treaty, which significantly restricts the protections afforded to investors under Dutch BITs. The Dutch Government intends to use the draft treaty to renegotiate its existing BITs with non-EU states.

Protectionist policies

Even in those states where treaties remain in place, the position remains uncertain for foreign investors. States are displaying increased reluctance to enter new treaties and to renew treaties that are due to lapse. Some have sought to amend their model treaties to "water down" the investor protection obligations they will take on in the future. India, for example, now requires investors to exhaust all local remedies before commencing arbitration proceedings (meaning that any foreign investment dispute will need to originate in the Indian courts, and thus that investors will be significantly delayed in getting their dispute before an international tribunal).

All of this presents a significant degree of uncertainty and unforeseeability for investors. Despite this, infrastructure projects will continue to attract investment as they offer the possibility of significant and stable returns (China's Belt and Road Initiative, for example, is expected to result in investments of more than £760 billion across three continents and over 60 countries). But the uncertain climate does raise important questions such as will investments currently benefiting from investor protection guarantees continue to do so in the future? Will the standards and level of protection currently offered remain the same? Is the level of protection likely to change in the future?

None of these questions can be answered with any degree of confidence. It simply is not yet clear exactly how the landscape will change and what the impacts of such change will be. What is clear is that we have entered a new period fraught with uncertainty. Investors are best advised to find out whether they are currently covered by investor protection and, if not, to consider whether they may be able to restructure their investments to ensure protection.

Investor protection – is restructuring an option?

One issue for consideration by foreign investors who do not currently have the benefit of treaty coverage (or who have treaty coverage that is likely to be eradicated or "watered down" in the near future) is whether the investment can be restructured so as to ensure appropriate treaty coverage in the future. For example, with the termination of intra-EU BITs, how can foreign investors revisit the nationality of their investment vehicle in order to secure the nationality of a state that retains appropriate treaty coverage with the host state?

Whether restructuring is necessary and appropriate will depend upon the foreign investor's current rights and how they are likely to change in the future. Most BITs do not expressly prohibit the restructuring of investments to gain treaty protection. Indeed, it has been held that the restructuring of investments through a holding company in a third country in order to gain treaty protection against a breach of rights by the host state authorities is a "*perfectly legitimate goal as far as it concern*[s] *future disputes*"[6] and that "*corporate groups are routinely restructured for a variety of reasons*"[7].

The key point is that treaty protection will be secured only where the restructuring was motivated by an aim to obtain such protection in respect of "future disputes". Arbitral tribunals have used the "abuse of rights" doctrine to decline to consider investment treaty claims where the restructuring has been motivated wholly or partly by a desire to gain access to investment protection in circumstances where a specific dispute exists or is foreseeable.

Most notably, in the *Philip Morris* case,[8] the Australian Government succeeded in arguing in its defence that the *Philip Morris* tobacco company had restructured its investment (so as to

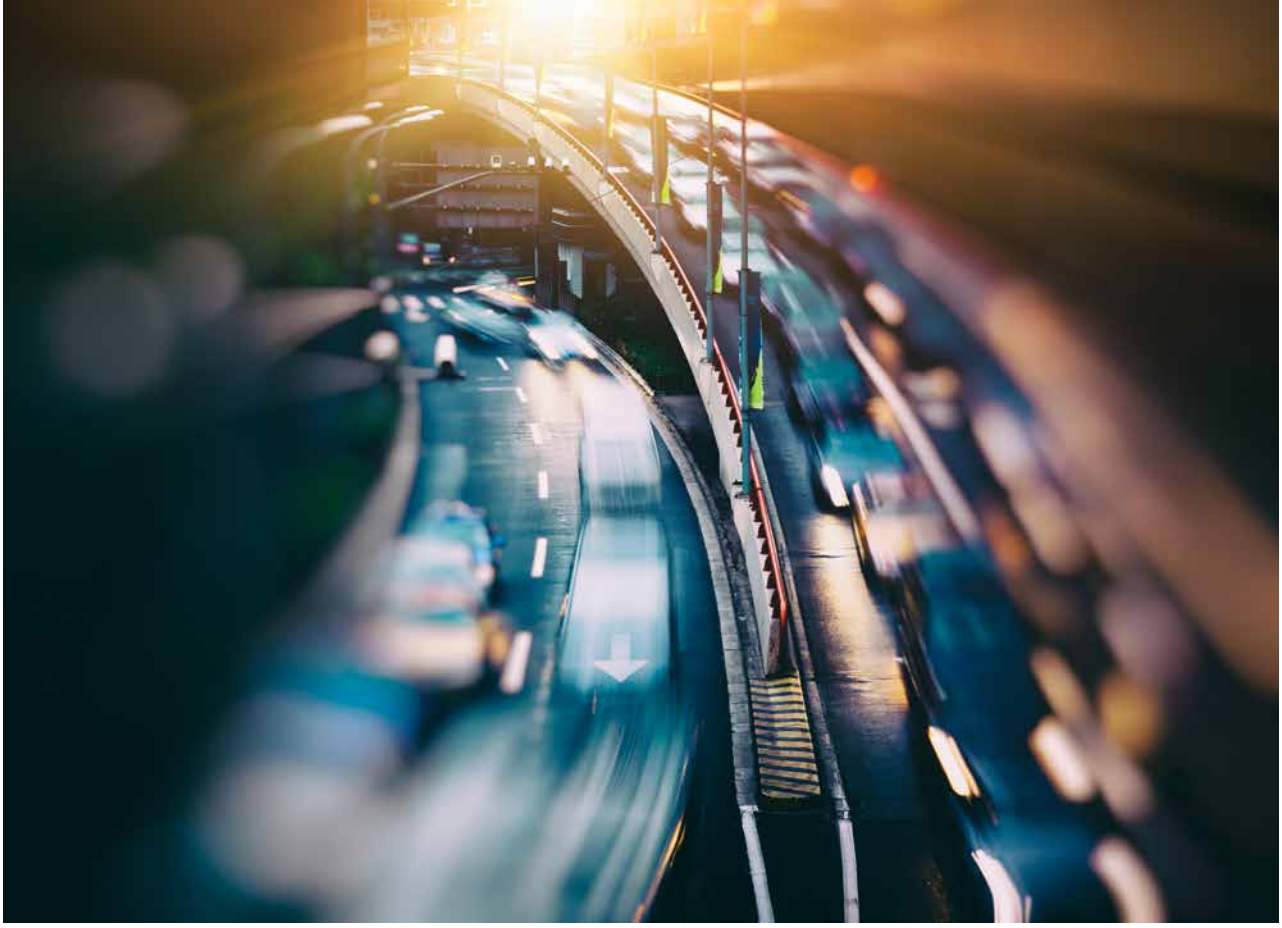
4 Case C-284/16, *Slovak Republic -v- Achmea BV*, Judgment of the court on 6 March 2018.

5 For more on the implication of states terminating their investment treaties, see previous article "Is the sun setting on BITs", published in our International Arbitration Newsletter in December 2017: https://www.ashurst.com/en/news-and-insights/legal-updates/is-the-sun-setting-on-bits/.

6 *Mobil -v- Venezuela* (ICSID Case No. ARB/07/27) (Decision on Jurisdiction).

7 *Philip Morris Asia Limited -v- The Commonwealth of Australia (PCA Case No. 2012-12) (Award on Jurisdiction and Admissibility).*

8 *Ibid.*



route it through Hong Kong) primarily for the purpose of gaining access to the ISDS provisions in the Hong Kong-Australia BIT once it became likely that tobacco plain packaging laws would be introduced, which it would want to dispute. As a result, the Tribunal held that Philip Morris was not entitled to rely upon the investment protection standards set out in the Hong Kong-Australia BIT.

Philip Morris is not the only case on the topic. Other tribunals have also provided guidance on the extent to which a restructured investment will be subject to investment treaty protection. The key question is whether the dispute was in existence or foreseeable at the time of the restructuring. If there was a very high probability of a specific future dispute, and not a mere possible future controversy, the restructuring to take advantage of a specific treaty will likely be held to constitute an abuse of rights.

While there is no system of binding precedent in public international law, publicly available investment treaty awards are often considered persuasive, if not *de facto* precedent. Together with the increased public scrutiny to which ISDS is subject, it is likely that arbitral tribunals faced with claims by companies that have restructured their investments will give careful consideration to the reasons underpinning any such restructuring and the abuse of rights doctrine.

What next?

Foreign investors should think carefully about their existing investments in infrastructure projects as well as any new commitments under consideration now or in the future. They should consider whether those investments are at risk. Do they currently benefit from treaty protection? Is legislative change likely in the future which will impact the investment? Is the investor reliant upon protective measures set out in a treaty that may now be considered unenforceable, or which may be terminated, in the future?

Restructuring may allow investors to position their investment under the protective umbrella of a different BIT or MIT, but they may fail in subsequent attempts to seek redress from the state hosting their investment if they restructure for the sole or dominant purpose of securing rights against the host state to pursue a foreseeable dispute. Early consideration of the factors likely to impact a foreign direct investment, and a careful approach to any restructuring, will be crucial if investor protection rights are to be preserved. Therefore, if restructuring is considered necessary, it should be conducted in a timely manner, long before any specific dispute arises or becomes likely. Properly documenting the reasons for the restructuring will also be key.

Being aware of the protection that exists under international investment treaties may also provide investors with a means of seeking assurances from the state, and/or of lobbying host state governments to reconsider intended policy. Either way, early legal advice should be sought to ensure that the steps taken do not undermine the investment and to ensure that the investor is properly able to seek redress against the state should it need to do so.

Tom Cummins
Partner, London
T +44 20 7859 1051
tom.cummins@ashurst.com

Emma Johnson
Partner, London
T +44 20 7859 1356
emma.johnson@ashurst.com

INFRASTRUCTURE PROJECTS IN LATIN AMERICA:

Fraud and Corruption – World Bank Sanctions

By Andrés Alfonso and Rafael Fernández

Due to the negative consequences that fraudulent and corrupt practices have on infrastructure projects in Latin America, the World Bank has implemented an exhaustive procedure to combat these undesirable practices.

LatAm infrastructure environment

The Latin American region (LatAm) has become one of the largest recipients of foreign investment for infrastructure in recent decades. For example, China has loaned more than USD 140 billion to Chile, Peru and Brazil for infrastructure projects in the past decade alone. However, foreign direct investment (FDI) in infrastructure projects has been stalled for the last six years in LatAm.

There are several factors that have contributed to this situation: decline in commodity prices; Brazil's economic downturn; deterioration of inter and intraregional trade; emerging market turmoil; and fraud and corruption scandals.

Corruption and fraud can occur in different ways. Perhaps the most common is in the form of bribes in order to achieve benefits or obtain influence in a specific area. Other forms include theft and the misuse of public assets, falsification of accounts, abuse of official discretion or the disclosure of privileged information.

One of the consequences of such corruption and fraud are the sanctions imposed by international finance institutions (IFIs). Once made public, these sanctions have a negative and global impact on the whole economy of a country in terms of foreign investment: IFIs play an important role in the investment community by providing financial support, professional advice and international economic cooperation and stability; IFIs are the largest source of development finance in the world, providing USD 30-40 billion to low and middle-income countries per year. As such, fraud and corruption and its consequences can adversely affect FDI and international support provided by IFIs to the projects financed by them.

IFIs' involvement is key for lenders, sponsors and governments in project finance transactions and IFIs may be essential to unlock a transaction given their commitment to development; attitude to risk; ability to provide longer tenors for loans or bear the risk of local currency lending.

The role of the World Bank

The World Bank is, together with the International Monetary Fund, the most significant IFI in terms of promoting international investment in infrastructure projects in the world, and has been no stranger to imposing sanctions for fraud and corruption.

Before entering into a transaction, the World Bank conducts

exhaustive due diligence and implements a range of measures in order to prevent fraudulent and corrupt practices in the projects in which its institutions[1] participate, but unfortunately these activities cannot be prevented in their entirely.

Some of the most significant actions taken by the World Bank in order to prevent fraudulent and corrupt activities include (i) imposing compulsory contractual commitments and provisions on the borrower under a loan agreement, (ii) cancellation of a portion of a loan if corrupt or fraudulent practices are determined, (iii) declaration that a firm is ineligible, either indefinitely or for a period of time, (iv) the retention of the right to inspect and audit financial statements, by an auditor appointed by the World Bank, related to the performance of a contract, (v) a review of procurement laws, regulations and practices, and (vi) supervision and inspection of project sites.

Identifying damaging practices in a project cycle

Given that corruption and fraud can occur at any stage of the project cycle, the World Bank has flagged a number of practices to be aware of:

(a) During the period when the project is being created, assessed and set up, corruption and fraud can occur in the following areas: when the project design is manipulated for the benefit of third parties (such as suppliers, consultants or contractors); allowing borrower discretion in allocating project resources or management arrangements that entitle managers to divert funds for unauthorised purposes; weak oversights and supervision mechanisms; or unjustified alteration of project timing.

(b) During the procurement stage, when the risk of corruption and fraud increases, the following could be symptoms of corruption and fraud: insufficiency of advertising; an excessively short time for bidding; misuse of legal and administrative requirements; inappropriate bidding procedures; unjustified complaints; collusion schemes; and misleading bids.

(c) Lastly, during the implementation phase, fraudulent and corrupt practices can be related to suspicious contract amendments, unjustified complaints, overbilling or overpayment, lower than specified quality, unjustified delays, theft and the manipulation of the dispute resolution procedure.

From a financial point of view, standard fraudulent behaviour can be seen in the duplication of payments, alteration of invoices, adulteration or duplication of accounting records, lack of supporting records, ineligible payments, misuse of funds, unauthorised advance payments without guarantee, unauthorised use of project property, excessively high operational expenditure and unreported discounts. This financial misconduct affects all stages.

In addition to the above, the World Bank has designed and implemented the Anti-Corruption Guidelines[2] in order to prevent and combat fraud and corruption.

Sanctionable practices

The independent unit that investigates and pursues sanctions related to allegations of fraud and corruption in projects financed by the World Bank Group is the Integrity Vice Presidency (IVP). The sanctionable practices targeted by the IVP are fraud, corruption, coercion, collusion and obstructive conduct.

According to the World Bank Group policies, such practices can be defined as follows:

(a) Corrupt practice: a corrupt practice is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party. Both active and passive bribery are prohibited.

(b) Fraudulent practice: a fraudulent practice is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation. The action must be done knowingly or recklessly, in the case of being a negligent or innocent misrepresentation or omission does not constitute a violation.

(c) Collusive practice: a collusive practice is an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party.

(d) Coercive practice: a coercive practice is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party.

(e) Obstructive practice: an obstructive practice is (i) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice and threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (ii) acts intended to materially impede the exercise of the Bank's contractual rights of audit or access to information.

In all cases, mere intention is enough to be considered punishable conduct regardless of its result.

Sanctions process

The World Bank's investigation and process for establishing sanctions is divided into two steps. The first step begins with an investigation by the IVP of the potentially punishable practice.

1 The World Bank Group achieve its purposes through the following international institutions: (i) the International Bank for Reconstruction and Development (IBRD), that lends to governments of middle-income and creditworthy low-income countries; (ii) the International Development Association (IDA), that provides interest-free loans, or credits, and grants to governments of the poorest countries; (iii) the International Finance Corporation (IFC), that provides loans, equity, and advisory services to stimulate private sector investment in developing countries; (iv) the Multilateral Investment Guarantee Agency, that provides political risk insurance and credit enhancement to investors and lenders to facilitate foreign direct investment in emerging economies; and (v) the International Centre for Settlement of Investment Disputes, that provides international facilities for conciliation and arbitration of investment disputes.

2 The anticorruption policy in relation to procurement under World Bank projects is described in (i) the Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants; and (ii) Guidelines: Selection and Employment of Consultants by the World Bank Borrowers.

If the IVP finds enough grounds or evidence to continue the investigation, the case is elevated to the Evaluation and Suspension Officer (ESO).

The second step focuses on the evaluation of facts and evidence by the ESO in order to determine if the facts and evidence are sufficient to impose the sanction. If that is the case, the ESO issues a "Notice of Sanctions Proceedings" which immediately suspends the individual or entity and imposes a sixty-day summons period in which to hear allegations.

Once allegations have been heard, sanctions will be made final or the procedure will be closed. Notwithstanding this, IVP retains the right to reopen the procedure in case of new evidence or relevant information. In any event, if the malpractice occurred more than ten years ago, the sanctions process is closed.

Sanctions are determined by a special board established by the World Bank's sanctions board. Potential sanctions include the following:

(a) Debarment with conditional release: The individual or entity will not be able to participate in any more projects financed by the World Bank until certain conditions are fulfilled (such as creating or implementing a compliance programme or taking action against the responsible person).
(b) Debarment: The individual or entity will not be able to participate in any more projects financed by the World Bank for a fixed period of time. A variety of this practice is the "Conditional non-debarment", in which the prohibition applies unless certain conditions are met.
(c) Letter of reprimand: a letter usually sent due to a failure to supervise an affiliate company – this is published on World Bank's website for a period of time.
(d) Permanent debarment: The individual or entity is debarred indefinitely from participating in projects financed by the World Bank.
(e) Restitution and other remedies: The individual or entity pays back a quantifiable amount to the client country or project.

After the sanctions procedure has been completed, the World Bank publishes the names of the individuals or entities sanctioned on the World Bank's website, provided that the publication of the information does not endanger someone's life, health or safety.

Recent cases

As previously noted, these sanctions can have a negative impact on the reputation of the individuals and entities involved, and on FDI in the region. Since 1999, the World Bank has sanctioned more than 330 entities and individuals for fraud and corruption in World Bank financed projects. A telling example in LatAm is Brazil's Odebrecht S.A. (Odebrecht) corruption scandal.

Odebrecht was considered the biggest construction and engineering company in LatAm and a global leader in terms of infrastructure. Their work included roads in Mexico, a water-purification plant in Argentina, a hydroelectric plant in Peru and railways in Colombia among other projects. So, when the corruption scandal erupted, its consequences adversely affected the activity and foreign investment in infrastructure projects in LatAm at all levels.

Colloquially known as Operation Car Wash (*Operação Lava Jato*), the Odebrecht fraud scandal was initially a money-laundering investigation involving Brazilian state-controlled oil company (Petróleo Brasileiro S.A., known as Petrobras) which became a fraud and corruption investigation into certain executives that allegedly were paid bribes in return for being awarded overpriced contracts

with construction firms. The corruption investigations involved nine of the major Brazilian construction firms, in more than eleven countries (mainly in LatAm), bribes to a value higher than USD 800 million and more than one hundred contracts that have possible earnings of more than USD 3 billion. To date, it represents the largest corruption scandal in the history of LatAm.

In this context, one of projects affected by the Odebrecht scandal was the Rio Bogotá Environmental Recuperation and Flood Control Project in Colombia. In this project, the Brazilian-based entity and subsidiary of Odebrecht, Constructora Norberto Odebrecht S.A. (CNO), received funding from the World Bank in order to assist the government of Colombia in mitigating certain environmental risks, including water quality and flooding near the Bogotá river.

However, after corresponding investigations, the World Bank alleged that CNO failed to disclose fees paid to commercial agents during the tender prequalification and bidding processes and that certain agents helped the CNO to obtain confidential information related to tender prequalification and bidding. Also, the World Bank considered that CNO, along with an agent to whom CNO had paid undisclosed fees, tried to obtain improper influence in the tendering project package. This behaviour was understood as collusive practice according to World Bank's procurement guidelines.

Following an anti-corruption and fraud procedure, the World Bank and CNO announced a settlement on 29 January 2019. A few days later, on 1 February 2019, the World Bank made a public announcement debarring CNO from participating in projects financed by the World Bank for three years as part of the settlement. In its public announcement, the World Bank noted that the debarment was reduced due to CNO's cooperation.

Another recent case refers to three construction companies in Argentina (Gavinor S.R.L., J.C. Segura Construcciones S.A. and a joint venture) in relation to the advancement of the Second Provincial Agricultural Development Project in Argentina. This project was also financed by the World Bank for the purpose of supporting the government in its aim to increase the productivity and profitability of small and medium-size producers in the agriculture sector, and contributing to the improvement of competitiveness.

The parties agreed to enter into a negotiated resolution agreement, under which the companies acknowledged responsibility for undertaking prohibited practices, agreed to meet certain corporate compliance conditions and a three-year debarment which would make the three companies ineligible to participate in projects financed by the World Bank for a period of 18 months[3].

Conclusion

As we have seen, fraud and corruption can have serious consequences and the sanctions imposed by IFIs, such as the World Bank, can have a major impact on the activity and development of infrastructure projects including in the LatAm region. For this reason, the entire international community should be conscious of how damaging fraud and corruption can be and strive to implement corresponding preventive and corrective measures in order to prevent these types of activities, to contribute to a more reliable and stable environment that will allow sponsors, lenders and IFIs to continue in their role as the promoters of prosperity for infrastructure in LatAm.

3 The parties agreed to enter into a negotiated resolution agreement, under which the companies acknowledged responsibility for undertaking prohibited practices, agreed to meet certain corporate compliance conditions and a debarment which would make the three companies ineligible to participate in projects financed by the World bank for a period of 18 months.

Andrés de Alfonso
Partner
T 913649873
andres.alfonso@ashurst.com

Rafael Fernández
Associate
T 913649445
rafael.fernandez@ashurst.com

DETOXIFYING THE PLANNING PROCESS

Revoking hazardous substances consents

By Charlie Reid

When redeveloping former hazardous installations the need to remediate the land itself is apparent but what is often overlooked is the need to clean up the consenting position. Sites that once housed hazardous substances will have needed hazardous substances consents (HSCs) and these can remain a barrier to development even if they are in effect redundant. This article considers the practicalities of revoking HSCs within the context of the planning system's drive to increase housing supply.

Background

The hazardous substances regime ensures that necessary measures are taken to prevent major accidents and limit their consequences to people and the environment. The regime originates from a number of major incidents in Europe in the 1970s, the most significant of which took place in Seveso, Italy, in 1976, where the accidental production and release of a dioxin as an unwanted by-product from a runaway chemical reaction led to widespread contamination. Such incidents, and an acknowledgement of the need to reconcile different standards of control over industrial activities within the EU, led the European Commission to propose a Directive on the control of major industrial accident hazards. The original Seveso Directive was adopted in 1982; it has been amended over time and the current iteration, Seveso III, was adopted in 2012.

The objectives of the Directive are achieved through two main areas: (1) land use planning requirements and (2) health and safety measures. In England, the former is implemented through the Planning (Hazardous Substances) Act 1990 and the Planning (Hazardous Substances) Regulations 2015 and the latter is delivered principally through the Control of Major Hazards Regulations 2015 (COMAH). This article focuses only on the land use planning aspects in England.

The process established by the Planning (Hazardous Substances) Act 1990 (the Act) regulates the storage and use of hazardous substances by making a HSC a prerequisite to storing hazardous substances on sites in controlled quantities. HSCs therefore provide control over the presence of hazardous substances whether or not

an associated planning permission is required for the development of a hazardous installation. The authority responsible for granting HSCs, the Hazardous Substances Authority, is usually the relevant local council and often this is the same entity as the Local Planning Authority. Where this is the case, it needs to be remembered that the authority's planning and hazardous substances functions are related but separate.

Why is this relevant?

When a HSC application is considered, an assessment is made as to the risks and likely effects of major accidents occurring at the installation. The decision as to whether the level of risk is tolerable for the surrounding community and environment is made by the Hazardous Substances Authority. However, the HSE[1], as the COMAH competent authority and statutory consultee on HSC applications, will advise the Hazardous Substances Authority as to the nature and severity of risk. The HSE sets a consultation distance (CD) around major hazard sites following the risk assessment, being the area which the HSE considers at risk from either the activities being carried out or from the substances present on the site. A CD is divided into three zones (inner, middle and outer) which define the levels of likely risk or harm to individuals (including businesses) within each zone with risks and consequences decreasing from inner to outer zones.

When a HSC is granted, the CD associated with it is also fixed. This then interfaces with the land-use planning regime both at plan-making and decision-taking levels. Local Planning Authorities should know the location of hazardous installations as they will have been notified of any relevant CDs by the COMAH competent authority. When taking public safety into account in planning decisions and formulating local plans, the Local Planning Authority will need to take account of the total number of people that will be present in the CDs as a result of development coming forward.

So, for example, if a planning application is submitted which falls within a CD (for the redevelopment of the major hazard site itself or within its vicinity) the Local Planning Authority must consult with the HSE and take its advice into account when determining the application. The HSE will present its advice in one of two ways; it will either "advise against" or "not advise against" the grant of planning permission, taking into account the nature, size and characteristics of the proposed development and its location within the CD and proximity to the hazardous installation. Although the HSE's role is advisory only, it is unusual for Local Planning Authorities to go against HSE advice; where they do, the HSE has the power to request that the Secretary of State (SoS) calls in the planning application. The HSE will also advise the Local Planning Authority on conditions which may be imposed on any planning permission.

Why is it an issue?

Although the restrictions on developing around hazardous installations are understandable and necessary, the potential for conflict between the existence of an HSC and a local authority's planning priorities is clear. The housing crisis currently facing the UK exacerbates this problem. In the drive to increase land supply for new homes, the spotlight is increasingly falling on brownfield and former industrial land in our cities; even sites that once housed hazardous installations now provide opportunities for residential, employment and community uses to be developed. Indeed, the Government's Housing White Paper (February 2017) and subsequent NPPF (February 2019), alongside the Mayor of London's Housing Strategy (May 2018) and emerging draft London Plan, all seek to encourage the productive re-use of brownfield land; so much so that the NPPF now requires planning policies and decisions to "*give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs*" [2].

While the policy paper trail is clear to see, it won't by itself override the paper trail left over from a site's industrial past. The problem is particularly acute where a HSC legally subsists but is redundant in practice (disused urban gas holder sites where natural gas is no longer stored in controlled quantities are a good example). This is because until an HSC is formally revoked, the CDs remain in place and are likely to still apply. This can lead to an out of date "paper trail" that acts as a barrier to development, a political lever and commercial bargaining chip even when the absence of hazardous substances and benefits of redevelopment are plain to see. The following problems can arise:

(a) An unrevoked HSC may contribute to a site not being released from an industrial planning policy designation and/or not allocated for housing and other development. This can result in substantial cost and delay for developers who may have to wait for a local plan review to lobby for a change in policy or, alternatively, prepare and consult on a planning brief, masterplan or similar to win support from the Local Planning Authority. It can also result in planning applications for redevelopment being advertised as departures from the local plan which increases call-in risk and is another hook for objectors. This issue could also become increasingly tactical given the direction that planning policy is taking. Policy H5 of Sadiq Khan's draft London Plan makes plain that the Mayor expects residential proposals on industrial land to deliver at least 50 per cent affordable housing where the scheme would result in a net loss of industrial capacity. A situation where a local authority supports redevelopment in principal but tactically seeks to retain an industrial allocation in order to secure greater upfront affordable housing and/or more stringent reviews of financial viability is not unforeseeable.

(b) The HSE "advises against" the grant of planning permission even where the Local Planning Authority is supportive. This is a fairly regular occurrence on the basis that unless the relevant HSC is revoked, hazardous substances could in theory be reintroduced to the site. The solution is usually the imposition of a planning condition restricting occupation of the whole or part of the development unless and until the HSC concerned is formally revoked. This can be a pragmatic approach to securing the grant of planning permission, especially in circumstances where the developer has a contractual relationship with the HSC holder. However, it can store up problems where the HSC holder is a third party or adjoining landowner. In either case, it still requires the revocation of the HSC for the development to

1 The COMAH competent authority for most cases is the Health and Safety Executive and Environment Agency, acting jointly and for nuclear sites the Office of Nuclear Regulation and the Environment Agency, acting jointly.

2 NPPF 2018 paragraph 118(c).

be de-risked and resource and effort on the developer's part to achieve this.

(c) The more extreme outcome is a request by the HSE for the SoS to call-in a planning application following the Local Planning Authority's resolution to grant planning permission. Although not a frequent occurrence, the situation is not unheard of. This precise situation arose at the former Ram Brewery in Wandsworth Town Centre in 2010, where the density of part of the proposed development (two residential towers) within the inner and middle zones of the CD of a neighbouring gasholder resulted in the calling-in and subsequent refusal of the application by the SoS notwithstanding a resolution to grant planning permission being made by the local planning authority. One of the reasons for refusal was the possibility of a major explosion at the gasholder; although the risk of a major explosion was considered low it was not insignificant. A revised scheme with recalibrated bulk and massing was subsequently granted planning permission at a local level but was subject to a condition preventing occupation of various blocks until the relevant HSC had been fully revoked. The condition was imposed notwithstanding written assurances from the HSC holder that it intended to decommission the gasholder and relinquish the HSC in the near future.

(d) As the Ram Brewery example demonstrates, out of date HSC's can restrict development both on site and more widely. This can lead to a concentration of power in hands of HSC holder who can frustrate the ambitions of neighbouring landowners and developers as well as Local Planning Authorities.

(e) Often the HSC is simply forgotten or assumed to be irrelevant. This can result in sites not being properly assessed in Environmental Impact Assessments, the HSE not being properly engaged at the pre-application stage and restrictive conditions subsequently coming as a surprise and development programmes overlooking the time and steps required to revoke an HSC. In a worst case, it can also result in missed contractual opportunities.

What can be done?

The Government's guidance acknowledges the risk that redundant HSCs pose to development:

"Hazardous substances authorities should be proactive about revoking consents that are no longer required. Operators are required to inform the COMAH competent authority in advance of permanently closing or decommissioning a COMAH site. The competent authority will then notify the hazardous substances authority to allow for the revocation of the hazardous substances consent."

However, in reality, there is little evidence of this proactivity, even where a site is de-notified under COMAH. Although revocation powers sit with the Hazardous Substances Authority it will often not invoke them without first receiving a request to do so from the HSC holder.

This can be addressed where a developer is proposing to develop the hazardous installation itself by dealing with it contractually to oblige the holder of the HSC to revoke it.

The issue is less straightforward where the HSC benefits third party land. Where a deal cannot be struck with the HSC holder it may be necessary to see if the Hazardous Substances Authority can apply leverage. Where this is not possible a design scheme design may need to be explored which minimises the impact of any potential occupation restrictions that could be imposed.

How do you revoke a HSC?

In simple terms the Hazardous Substances Authority makes a revocation order and the Secretary of State confirms it, following procedures similar to those used to stop up highways.

The powers for Hazardous Substances Authorities to "make" revocation orders are contained in sections 14(1) and 14(2) of the Act:

(a) section 14(1) contains a general power and permits a revocation order to be made if the Hazardous Substances Authority considers it expedient to do so having regard to material considerations; and

(b) section 14(2), enables a Hazardous Substances Authority to make a revocation order if it appears to them that a prescribed scenario has arisen, namely:

- there has been a material change of use of land to which the HSC relates;
- planning permission has been granted for development which would involve a material change of use of the land affected by the HSC and the development to which the permission or development consent related has been commenced; or
- the hazardous substance (or substances) consented has not been present on, over or under the land to which the HSC relates for at least five years.

Section 14(4) requires that a revocation order must specify the grounds on which it is made.

Section 15 of the Act then provides that a revocation order shall not take effect unless it is confirmed by the Secretary of State. The confirmation process is handled by National Planning Casework Unit (NPCU) in Birmingham on behalf of the Secretary of State.

The Act provides very little detail as to the procedural requirements for making and confirming a revocation order. In truth, the process is not complicated and the key steps can be summarised as follows:

(a) The Hazardous Substances Authority "makes" the revocation order, which means that they seal and date the relevant document.

(b) The authority sends the made order to the SoS for confirmation and simultaneously serves notice on landowners (and people in control of the land) and affected parties (this is a very limited list and does not comprise the general public and neighbours or other consultees). The notice should advise recipients to direct objections to the NPCU. The NCPU recommends avoiding any wider consultation as it is not strictly required and can cause confusion and delay as an authority will need to respond to any representations it receives.

(c) The people on whom notice is served then have 28 days to serve objections on the SoS at the NPCU.

(d) If there are objections, a local inquiry would need to be held but in practice, there would probably be some time to try and negotiate away the objections.

(e) After expiry of the 28 day period, if no objections are made, the SoS can confirm the order with or without modifications.
(f) Confirmation of the order involves a physical endorsement by the SoS on the order (i.e. a stamp is applied verifying that the order has been confirmed and the date plus any modifications required).
(g) The order and any modifications take effect on the date of confirmation.
(h) The authority then serves a second notice enclosing a copy of the confirmed order on the same parties originally served.

What do you need to be aware of in the revocation process?

Revocation orders made under section 14(1) attract a right to compensation by anyone suffering damage in consequence of the order by way of (a) depreciation in value of a land interest or (b) disturbance of his enjoyment of land. Authorities can therefore require assurances that no claims for compensation will be made or that they are suitably indemnified against such claims before using their powers. No such rights arise in relation to the use of section 14(2) powers, however, the authority may require evidence which demonstrates that a prescribed scenario has arisen and this can be hard to collate without input from the HSC holder.

Although making and confirming a revocation order is not a complex process, the reality is that many authorities are more used to wearing their Local Planning Authority hats than their Hazardous Substances Authority ones. So while the process of getting a revocation order confirmed by the Secretary of State is relatively straightforward there is typically some uncertainty as to the steps the Hazardous Substances Authority will take at the beginning of the process to actually make the order. Different authorities take different routes to make the revocation order depending on their internal processes. Given the general unfamiliarity of authorities with their powers/functions under the Act, this can lead to delay and confusion. Errors by a Hazardous Substances Authority at the front-end can cause unnecessary delays at the confirmation stage with the Secretary of State. Much also depends on the HSC holder who may need to provide written assurances to the authority to help the process along.

Having assisted on a number of revocation orders, our suggested practical points for anyone involved in obtaining a revocation order are:

(a) seek to agree an action plan with the Hazardous Substances Authority early on to clearly establish what powers it will be using, what steps it will be taking to make the order and what information it requires from the HSC Holder;
(b) encourage the HSC Holder to provide sufficient information that enables the authority to use s14(2) powers if possible. Where s14(1) powers are to be used the HSC Holder will need to confirm that it does not intend to pursue a compensation claim;
(c) there is no need for public consultation (the Act only requires notice to be served on a very limited group, namely landowners and those affected by the revocation);
(d) it may be prudent to avoid determination by committee and to stick within a Hazardous Substances Authority's delegated powers;
(e) engage early with NPCU to establish what they require to be submitted to them and relay this information to the Hazardous Substances Authority;
(f) establish a good working relationship and with legal officers at the Hazardous Substances Authority if they will be assisting with the order making process and be on hand to assist them as necessary.

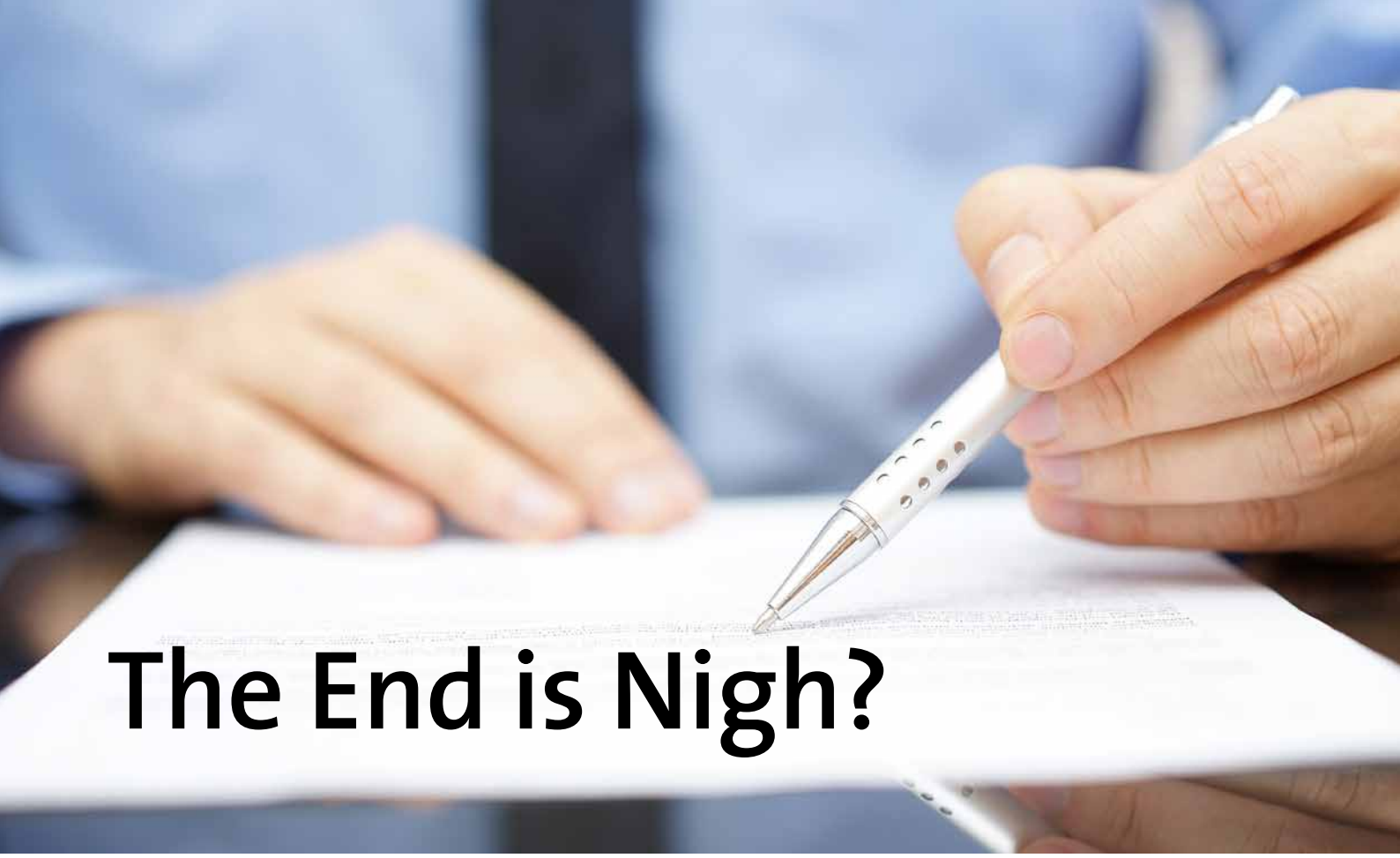
Conclusion

The pressure to increase housing land supply in our cities means that we are increasingly going to see HSCs needing to be revoked in order for development to be de-risked and brought into beneficial use.

Policy may keep moving forwards but it will be necessary to address redundant HSCs if the housing and economic growth our politicians want to see is to be achieved. Hazardous Substances Authorities will need to become more confident in their powers and more proactive in revoking old consents.

Meanwhile, the more familiar developers are with the revocation process the better able they will be include appropriate conditionality into land contracts, navigate the planning process and to assist Hazardous Substances Authorities in driving forwards revocation orders when needed.

Charlie Reid
Senior Associate, London
T +44 207 859 2254
charlie.reid@ashurst.com



The End is Nigh?

Mark Elsey writes...

I was reminded recently that one of the first PFI concession contracts that I negotiated (and drafted at a time when standard form was but a twinkle in the eye of Partnerships UK) was due to expire in less than two years. Leaving aside the inevitable discomfort of having fresh pairs of eager eyes crawling over handback provisions drafted near the dawn of PFI time, I realised that this was the mere tip of the handback iceberg.

The UK has been a global leader in the implementation of over 800 PFI/PPP projects since the early 1990s. This means that we are already seeing the first PFI/PPP (typically with 25 year operating periods) reaching handback stage and there is a substantial wave following.

While not underestimating the complexities and issues likely to arise from the handback process itself, the more interesting question is what happens next? Obvious questions include:

- is the public sector prepared and resourced to take over responsibility for running all these projects?
- what will be the impact on the private sector investment in UK infrastructure if all these assets revert to public ownership?
- will it be attractive for the public sector to "relet" some of these concessions/service contracts?
- will any relets be on a plain outsourcing basis or will there be appetite to maintain some form of risk-bearing capital in the delivery of these projects?

Or will someone somewhere dare to think bigger? I have a hunch that bundling up batches of mature projects with a proven track record and no construction risk represents a proposition that would attract strong investor interest at very competitive long-term funding rates. If these relet projects were structured by the public sector to support sensible capital investment to bear long-term lifecycle and sub-contractor performance risk, it would be possible to raise significant amounts of fresh capital for the public sector to invest in new projects at a relatively low cost (a variant on the Australian recycling model). Inevitably, balance sheet treatment will be key – but what is inherently wrong with the cost of public infrastructure being spread over the generations of tax payers benefitting from its delivery?

In any event, let's hope that the end is seen as an opportunity to refresh and renew the partnerships between the public and private sectors as opposed to a politically expedient death knell for a methodology that (despite the public rhetoric) has, in the view of many, delivered real value and benefits across a wide range of public services.

Mark Elsey
Partner
T +44 (0)20 7859 1721
mark.elsey@ashurst.com

ashurst