

Monetising utility solutions at master planned community projects



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1 Options for a Developer to participate and monetise

1.1 Executive Summary

There are a number of options available to a Developer of master planned community projects in terms of the development and operation and corresponding monetisation of a district cooling utility and other utilities. These are set out in detail in this Section 1 and also in Sections 2, 3, 4 and 5 of this briefing paper. Note we have also benchmarked the corporate, financial and contractual structuring of district cooling on master planned community projects on an international basis. The options available include:

- a concession fee, which could be structured as a lease payment for use of the land or in other ways and factored into end-user payments
- a structure that allows a Developer to realise the spread between the cost of production and the market rate for various products and services
- developer equity participation in the concession company itself, through which it could receive dividend payments and other forms of return on equity including subsequent divestments
- not having a concession at all and proceeding on a more traditional basis with a DBO or a split EPC and operating arrangement.

In particular, the third option could be considered given the increasing appetite of international and domestic superannuation/pension and infrastructure funds to invest in infrastructure assets (on a greenfield or a brownfield basis) which meet their following investment criteria:

- monopoly asset
- guaranteed revenue stream
- low technology risk.

The above criteria also applies to the banks providing project financing if the district cooling utility is developed on a concession basis and requires off-balance sheet financing and has strong counterparties.

In addition, industry participants particularly in the operation phase (which includes billing and collection) actively seek opportunities to participate in Developer equity in the concession company.

Discussion Point: The above depends on key commercial considerations including:

- level of control required over the construction and operation of the asset/willingness to transfer risk to another party (including ensuring quality control and avoiding reputational damage)
- use of capital and the applicability of off-balance sheet financing
- potential divestment or partial divestment of the asset or combined assets in the medium to long term
- impact on rates payable by end-users.

1.2 Introduction

There are a variety of ways in which a Developer can participate in, and monetise for its own benefit, the revenue of utilities that it is developing.

Any utility being developed by a Developer provides an opportunity for monetisation, including:

- district cooling
- wastewater and polished water from treated sewerage effluent
- municipal solid waste disposal and conversion to electricity
- municipal solid waste collection
- potable water
- gas
- telephone, internet and other telecommunications
- electricity generation
- roads and other transport.

albeit in Australia (and in other countries) the specific regulatory regime for each utility must be taken into account (refer to Section 5 “Regulatory Issues”).

Developers usually choose to develop their utilities on a concession model in order better to shift risk to private utility companies and to utilise off balance sheet project financing to avoid its own capital expenditure, ie on-balance sheet financing (refer to Section 3 “Benchmarking and International Best Practice”). However, a Developer may participate in the revenues of its utilities whether they are developed on a concession model or a more traditional design, build and operate (DBO) direct funding model, or in some other way (refer to Section 2 “Concession vs DBO vs EPC/O&M contracting models” for a more detailed discussion of these models).

The primary options available to a Developer include:

- a concession fee, which could be structured as a lease payment for use of the land or in other ways and factored into end-user payments
- a structure that allows a Developer to realise the spread between the cost of production and the market rate for various products and services
- developer equity participation in the concession company itself, through which it could receive dividend payments and other forms of return on equity including subsequent divestments (note that the current forms of PwC Standard Concession Agreements allow for this)
- not having a concession at all and proceeding on a more traditional basis with a DBO or a split EPC and operating arrangement (note that this structure places more risk on the Developer and generally involves on-balance sheet financing).

Regardless of the specific means selected by a Developer to realise some of the value of its utilities projects, Developers usually set up a separate special purpose company (SPV) which can capture the benefit of its share of project revenue or other value.

The utilities SPV can then be utilised in a variety of additional structures to further enhance value. For example, in order to allow a Developer to realise the present value of the future earnings of the SPV, the Developer could sell shares of one or more of the utilities SPVs into an investment fund, or they could be offered publicly in an initial public offering.

Discussion Point: Given potential stamp duty and other implications, consider the best time to formulate and complete the corporate structure and corresponding project structure.

Discussion Point: There are a number of infrastructure asset sales coming to the market in 2015, 2016 and beyond there are a large number of domestic and international superannuation/pension and infrastructure funds actively seeking infrastructure assets which meet the following criteria

- monopoly asset
- guaranteed revenue stream
- low technology risk.

Given the Queensland asset sales are currently off the agenda following the election result, the above funds will increasingly look at alternative or private asset sales.

Further discussion point on the identity of those domestic and international superannuation/pension and infrastructure funds and the likely participants from that group will depend on the size of the equity involvement eg IFM, QIC, Australian Super, Future Fund, REST and the Canadian Pension Funds such as CPP, PSPF and OTPP will generally require a minimum investment of upwards of \$250 million and a controlling share. Others, such as ICG or Palisade, have a lower investment threshold. Accordingly, aggregating utilities and/or developments may provide the size the larger superannuation/pension funds require.

The utilities SPV or SPVs could be initially structured as a joint venture with a financial institution, an industry participant or other investor in order to reduce the amount of upfront capital provided by a Developer and to otherwise spread the risk of the projects. A variety of structures for doing this are available.

Discussion Point: Comment on the identity of those domestic and international industry participants that bring complementary expertise and have international experience in the construction and operation phases of utilities, eg Veolia, GDF Suez (Cofely Ineo) and others.

These options are discussed in more detail below.

One point worth noting is that any monetisation by a Developer of value from its utilities (whether through revenue sharing or otherwise) will inevitably be reflected to some extent in end-user tariffs and charges and may thereby reduce the value and attractiveness of the Developer's properties to potential purchasers. However, in some cases, there could be an increase in value. The extent of this impact should be quantified through financial analysis and considered by the Developer. Similarly, the financial characteristics and profitability of individual concessions must also be considered in determining whether any of the following monetisation alternatives is viable in a specific context. Accordingly, until appropriate financial analysis is made, note that none of the following monetisation options constitutes a specific recommended course of action.

Discussion Point: The impact on the end-user tariff may be positive or negative.

1.3 Sharing of utilities revenue

Revenue sharing arrangements in which the Developer participates in the revenues of utilities that are in a concession model, a DBO model or any similar or hybrid model could be structured in many ways. For example:

- **Regular Payments:** One way is to require the concession company to make regular payments, either as a percentage of revenue earned or as a fixed fee, to the Developer over the term of the concession, commencing from commercial operations of the facilities. A variation of this option is to require the concession company to make "regular lease" payments for use of the site or to require a "rental charge" for use of the development networks by the concession company. A combination of the above options is also possible. Ultimately, any option chosen by the Developer will have some impact on the tariff charged to end users.
- **Spread between Production and Market Prices:** The Developer may also purchase the relevant output from the utilities plants based on minimum purchase requirements or a percentage of installed capacity of the plant and based on the price required by the concession company, and then sell the output at a higher price to the end users.

Note that in the alternatives mentioned above, the Developer would be expected to take some demand risk which is a key issue in district cooling arrangements, especially when developments are scaled down, postponed or cancelled.

1.4 Equity interest in the utilities

An alternative option involves the Developer either:

- obtaining shares in the concession company at a zero cost (that is, fully carried) or a discounted price, in return for the grant of the concession rights
- setting up a subsidiary to own the utilities assets and develop them on a traditional DBO or split EPC Contract/operating contract model, or on a similar basis.

Shareholders agreement

The relationship between shareholders (such as equity contribution, profit and loss sharing) will be governed by a shareholders agreement between the Developer and the other shareholders of the company. The Developer's rights to transfer, assign or resell its equity interest will be governed by that agreement and the agreement should be drafted to give the Developer as much flexibility as possible to transfer its equity interest.

For example, the Developer should not be required to hold its interest for a minimum period of time, or to limit the transfer to another party of equivalent financial standing. If the Developer's involvement is purely as a passive investor, it is likely that the other shareholders would be open to a relaxation of the Developer's transfer rights.

Equity benefits and risk mitigation approaches

The advantage of taking an equity interest in the concession company or owning the utilities assets directly is that the Developer will be able to share in all the profits of the concession company, and to be involved in the construction and operation of the facilities, in a way that perhaps it otherwise would not have as a Developer. On the other hand, the disadvantage of this option is that it dilutes the risk transfer under the concession.

Since one of the objectives of the concession is to transfer certain risk from the Developer to the private sector, taking an equity interest in the company would mean that a portion of the risk transferred to the company will ultimately be retained by the Developer. One way to manage the risk transfer is to structure the "buy in" into the company at a time when a portion of the risk has been eliminated, for example when construction is completed. With regard to total Ownership by a Developer, the risk of construction and operations is only transferred to the private sector to the extent provided in the DBO or the split EPC Contract and the operating contract. The Developer is insulated financially from project risks only if the Contractor is creditworthy and the contracts are properly structured.

In order to further reduce immediate equity risk exposure, rather than taking a direct equity stake at the commencement of the project, the Developer may wish to obtain an option to purchase shares in the company at a later time for a discounted price. The option could be structured so it is available to be exercised anytime during the concession term (ie from the commercial operation date) or some other time period. Once construction risks are eliminated, and commercial operation is achieved, it is likely there will be a significant increase in the value of the company. The Developer will have the right to buy shares at a price which may be significantly lower than its market value. At this point in time, the Developer may wish to exercise the option and either retain its interest in the company and receive dividends, or sell its shares and gain the increase in value. The Developer may also be able to sell the options, but this may not result in the same amount of gain.

1.5 Developer SPV

The Developer could establish an SPV as the vehicle to hold the shareholding interest it acquires in concession companies or its direct ownership interest in the utilities (in those cases where a more traditional DBO or split EPC/operating contract and the Developer direct funding approach is taken).

Special considerations where the SPV is a concession company shareholder

If the Developer seeks to acquire an interest in a concession company, the entitlement of the Developer (through the SPV) to acquire a shareholding interest (presumably, fully carried) in concession companies will not be dealt with in the concession agreement itself. Instead, it will be addressed in a separate share subscription and shareholders agreement between the Developer (or the SPV as its nominee), the concession company and each of the other shareholders of concession company. This agreement will set out the terms and conditions attaching to SPV's shareholding, anti-dilution rights and so on.

The SPV's ongoing interests in the utilities, whether taking the form of a shareholding interest in the concession companies themselves, direct ownership of the utilities assets, ongoing revenue sharing entitlements to income derived by concession companies from end consumers or state utilities, or a combination of the above, are assets of material value that would fit into an infrastructure fund or could be the subject of an initial public offering.

Allocation of utilities assets

The utilities assets could be held by an SPV on:

- an individual concession basis (such as a district cooling concession)
- a project or territory basis (such as all the concessions for a master development together)
- an asset type basis (such as all the wastewater treatment plant concession)
- some combination of the above.

The best asset combination will depend upon a cash flow and valuation analysis and the maximisation of value to the Developer. Depending on the analysis the Developer could have several separate SPVs or something that is more like an SPV holding company. A financial analysis should be conducted to determine the optimal asset combination. In addition the regulatory aspects of each utility will also need to be considered (again, refer to Section 5 "Regulatory Issues").

1.6 Developer SPV as a joint venture

A financial institution, an industry participant or other investor could also partner with the Developer in the establishment of the SPV which has been the case on a range of international district cooling projects (refer to Section 3 "Benchmarking and International Best Practice").

Discussion Point: Refer to previous discussions on financial institutions including superannuation/pension and infrastructure funds. Also, note international industry participants operating in Australia (and internationally) such as Veolia, GDF Suez (Cofley Ineo) and others.

Some of the primary steps that would be involved in this are as follows:

- **Term Sheet/MOU:** The parties agree and execute a detailed term sheet (heads of agreement, MOU or similar) setting out the terms of their commercial arrangement for the SPV. Careful consideration to be given to the obligations assumed by the investor in relation to financing of the SPV and the nature of the SPV's entitlements and obligations within concession company. We expect that the arrangements within the concession company will vary from utilities project to utilities project. It will also be necessary to consider the specific nature of the SPV, ie whether a simple company, a unit trust or other structure that enables the investor must make an additional lump sum payment to the Developer each time the SPV is granted an interest in another concession holder or utilities project. Consideration must also be given to the jurisdiction of incorporation of the SPV along with the tax and other considerations that will also arise from the nature and jurisdiction of the concession companies.
- **Investor Due Diligence:** The investor will conduct due diligence in relation to each concession to be granted for evaluation and valuation purposes. The investor's financial modelling of the SPV's shareholding in each concession company will be of obvious interest to the Developer. That model will likely provide the basis for calculating each purchase price that the SPV must pay the Developer to gain the right to receive the allotment of shares in a concession company. At the time that shares in the additional concession company

are allotted to the SPV, the investor will subscribe for new shares (or units) in the SPV (possibly with a different class being issued for each new concession company shareholding) at the predetermined price. The SPV will then pay total purchase price for the concession company shares by (a) a cash payment of the amount received from the investor, plus (b) an allotment of the new shares (or units) in the SPV to the Developer of the same class as allotted to the investor.

The proportionate interests of the Developer and the investor at the initial and ongoing stages will be as contained in the final transaction documentation between those parties.

- **Developer Due Diligence:** The Developer will conduct due diligence in relation to the investor's investment structure, including its fund. Relevant considerations will include the size and underlying ability of the investor fund to perform and ensuring that the Developer does not have any competitive or other concerns with any investors in the fund.
- **Preparation of Documentation:** Concurrently with the above steps, formal transaction documentation will be prepared for review. The suite of documents is likely to include a master agreement that details the total transaction and annexes a subscription agreement, shareholder (or unit holder) agreement and, potentially, put and call option arrangements.
- **Other Steps:** Additional issues and steps will need to be addressed as matters progress further with utilities projects and tenderers and with any the investor, such as:
 - Whether the Developer prefers to contract with an the investor on an individual concession basis, a project or territory basis, or an asset type basis, as described above; and
 - Whether the Developer expects to also share in any additional revenue streams that the investor identifies for itself in relation to the concessions and concession companies (eg as a financial adviser or financier to the concession company itself).

Discussion Point: The banks providing the financing will have similar criteria to that of the superannuation/pension and infrastructure funds ie:

- monopoly asset
- guaranteed revenue stream
- low technology risk
- strong counterparties.

Further discussion point on the identity of those domestic and international banks and also the increasing involvement of ECAs (primarily from Asia, eg K-Exim, K-Sure, JBIC and China Exim) in infrastructure project financings in Australia.

2 Concession vs DBO vs EPC/O&M contracting models

2.1 Introduction

This Section 2 supplements Section 1 above. It examines in more detail whether the provision of utilities by the Developer at its master planned community project should be on a concession or a DBO basis.

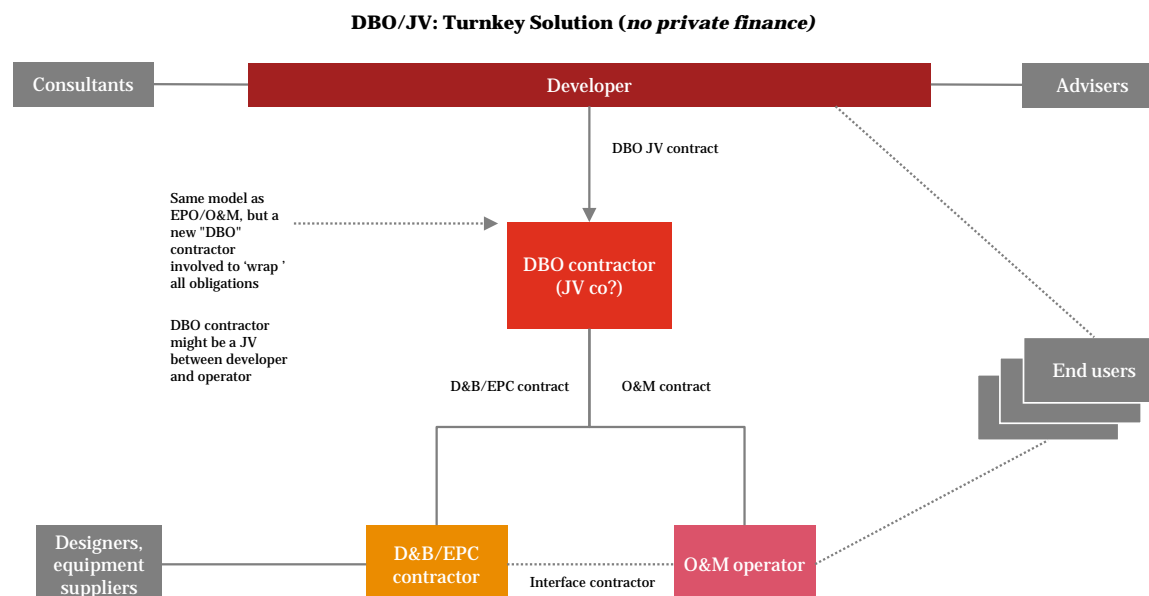
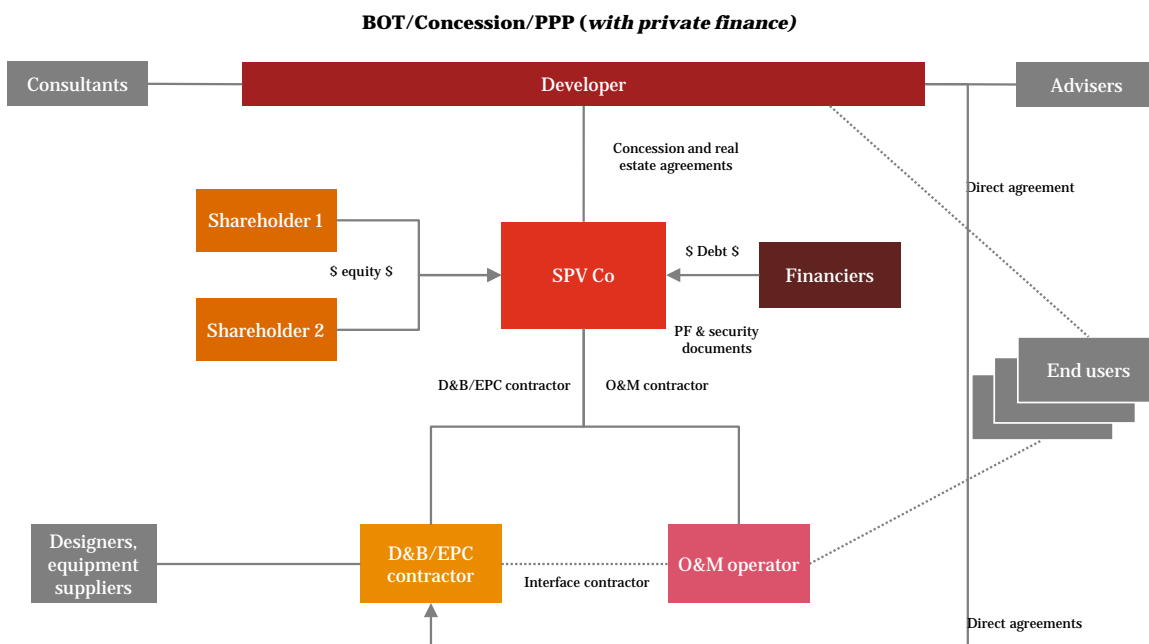
The options for provision of these utilities for a Developer are to provide them on either a:

- concession basis (where, in its traditional form, a third party designs, build, operates, owns and finances the utility) (see Diagram 1).
- DBO basis (where, in its traditional form, a third party designs, builds and operates the utility, but does not finance the utility or own it) (see Diagram 2).
- engineering, procurement and construction (EPC) and operation and maintenance (O&M) basis again where, in its traditional form, a third party designs and builds the utility and the same or a separate third party operates the facility, but does not finance the utility or own it (see Diagram 3).

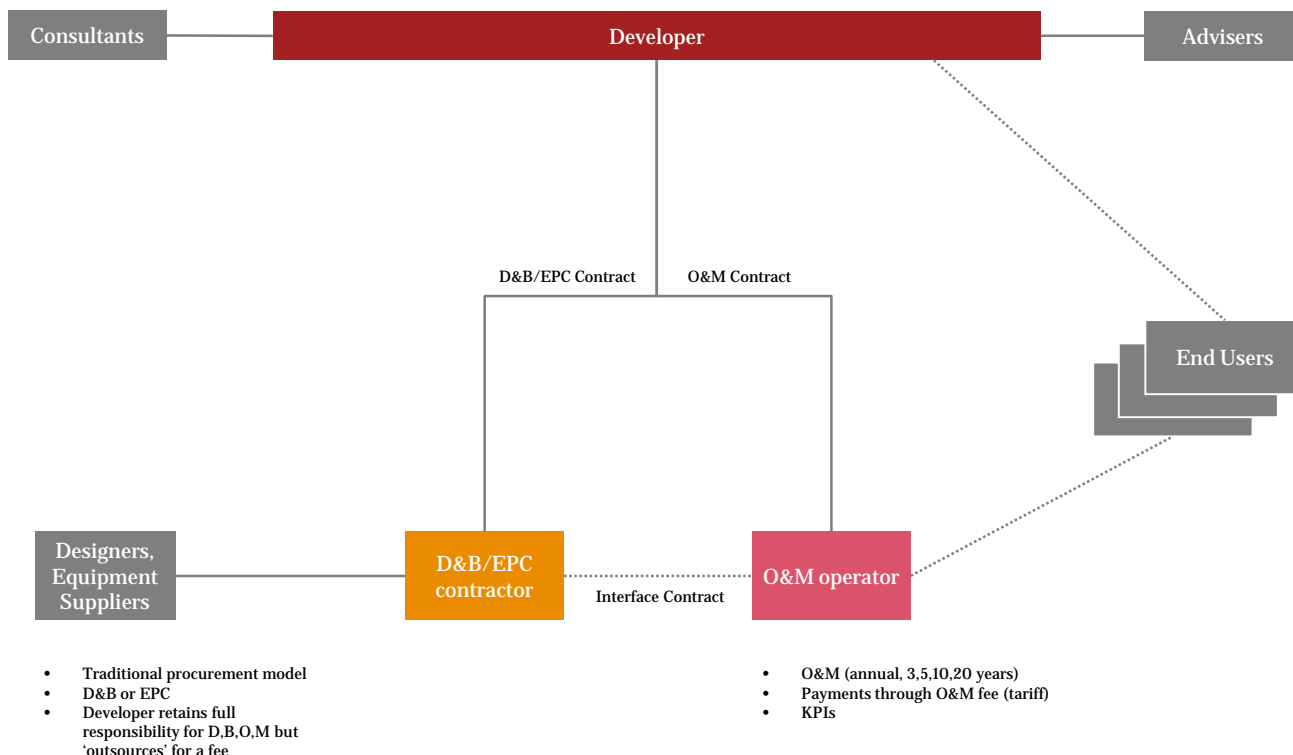
A further option is to combine both approaches. The Developer would incorporate a SPV, and grant a simple form of concession to this SPV; the SPV would then contract for the provision of the utilities on a DBO basis. This option is useful in that it shields the Developer from a direct contractual relationship with the DBO Contractor (although a DBO Contractor may require guarantees from the Developer) (see Diagram 3). Other variations of the DBO and concession approaches may also be implemented based upon the result of negotiations on various contract issues.

The significant differences between these options are:

- the source of finance for delivery of the utilities
- the equity interest in the utilities
- the ability of the Owner to influence and control end-user rates
- the flexibility and expenses of the Owner in terminating the arrangement.



EPC & O&M: Build, Separate Operator



A further option is to combine the concession and DBO approaches, by granting a simple form of concession to a SPV, which would then contract for the provision of the utilities on a DBO basis.

2.2 Differences in approach

Concession agreements and DBO agreements have very similar risk profiles. In both cases, a SPV is formed by the party delivering the project, and that SPV is given the overall responsibility for designing, constructing and operating the utility. Both approaches give incentive for innovation and good design as the party building the facility is the party operating the facility.

The fundamental difference in approach is that when a DBO is used, no private sector funding is necessary, as the DBO Contractor is paid for the asset on completion, or as progress payments through construction, and is then paid an indexed service charge for the operation of the facility.

When utilities are financed at the SPV level through the use of a concession, Financiers will not finance 100% of the required capital. Therefore, the SPV must provide the shortfall in the form of equity typically in the region of 20 – 30%. This shortfall gives the SPV an equity stake in the utility, on which a concessionaire will expect a return. The presence of SPV equity and finance leads to a difference in how an SPV recovers its costs, and how an SPV makes a profit.

In the case of a concession, the SPV is given the right to charge a tariff, and the tariff is the only compensation the SPV receives. The tariff is calculated by reference to a financial model. The inputs into the financial model are the costs associated with constructing the utility, operating and maintaining the utility, and the required return on investment on the invested equity in the project. Use of a tariff therefore spreads the cost of the initial capital expenditure across the entire concession period, for example, 20 years, meaning that the SPV needs to recover not only the capital costs, but also the finance charges associated with being indebted for a long period of time.

In the case of a DBO, the SPV is paid for its capital expenditure on completion of the asset, or as progress payments throughout construction, and then paid a service charge to operate and maintain the facility. As there is no debt involved, these amounts can be on a fixed fee or a cost plus basis. This results in a lower cost

(however, in comparing costs between the two, the source of, and costs associated with, the finance used at the grantor level in the DBO scenario must be taken into account).

In the case of a combined approach, the Developer maintains an equity stake in the utilities through its Ownership of the SPV. The SPV then passes on its obligations to the DBO Contractor (with the financing in place). This results in a situation where the profile is very similar to that of the DBO scenario outlined above.

2.3 Advantages of a DBO approach

If minimising end-user utility rates is an objective, and the Owner that is letting the DBO contract has access to cheaper finance than would be available through project financing (such as sovereign rates of finance) or has access to financial reserves to pay on-balance sheet for the capital cost of the utility, then an on-balance sheet DBO approach is preferable. This is due to the fact that the lower finance cost means that the Owner can pass through its lower financing costs to end-users in the form of lower rates and can also discount the rate of return on its equity contribution to further reduce end-user rates. Financiers would incorporate a risk premium into the interest payable by an SPV in a concession model. Also, the SPV in a concession would charge a higher rate of return on contributed equity.

Having no Financiers (other than on-balance sheet Lenders) involved means that project negotiation is relatively quicker.

In a DBO approach the Owner is also in a better position to achieve lower end-user rates by avoiding the monetisation of the particular utility service (refer to Section 1 “Options for a Developer to Participate and Monetise”). Since it is generally taking more risk than a DBO Contractor, a concession company will want to monetise any opportunities to achieve a higher rate of return on its contributed equity. Monetising utilities opportunities often results in higher end-user rates since some (but not all) monetisation techniques involve setting higher end-user rates. In a DBO approach, the DBO Contractor generally has less risk and is not contributing equity, and so has less leverage to implement such monetisation. As a result, in a DBO contract situation, whether to monetise or not should be entirely decision of the Developer.

A DBO contract should offer the Owner more flexibility in connection with contract termination. For example, since the DBO Contractor is not contributing equity, termination by the Owner (perhaps to implement a cheaper utility approach) should be less expensive and simpler.

2.4 Advantages of a concession approach

Concessions have an almost identical risk profile to DBOs, with all of the risk passed down to the SPV level. Concessions are preferable when the party granting the concession does not have access to cheap finance, or prefers to allocate the capital required to build the utility to another use.

A concession approach generally involves a more complete transfer of risk than a DBO approach (in which there is no equity at risk and the limits of liability may be lower to reflect what is frequently a fixed fee payment structure).

2.5 Advantages of a combined approach

A combined approach has the same advantages as using a DBO; however, due to the use of the SPV, it has the following further advantages:

- access to non-recourse project finance at the SPV level
- insulating the Developer from a direct contractual relationship with the DBO Contractor.

2.6 Integrated solution

There are often synergies between different utilities that can result in lower costs and greater efficiencies if the utilities are combined. An example of this would be an integrated solution between sewerage treatment, potable water and district cooling. The utilities deal primarily with water, and the sewerage treatment facility can be used to produce polished water for use by the district cooling facilities.

When utilities are combined, staffing costs, and other operating costs, can be shared between the utilities resulting in lower overall costs. Integration of utilities also serves to lower the interface risk between the utilities.

2.7 Expansion

One of the critical risks in developing utilities (including district cooling) for master planned communities is managing the take up and potential expansion of the project facilities and related distribution networks. This is particularly the case where a community is being developed in phases and/or the rate of take up of certain building lots is uncertain.

To ensure that capital expenditure is limited to building to a capacity that meets the actual needs of the master planned community at a point in time, the Developer will look to defer the construction of any permanent additional capacity to the project facilities, and capital costs associated with such permanent additional capacity. Typically, a demand curve will be created at the beginning of the project to estimate the initial (or base) capacity and the timing for the need for any additional capacity based on the expected rate of development and population growth. Depending on the size and rate of growth of the development, this demand curve is usually on an annual basis taking into account growth and sales trends. This may result in adjustments to the timing and capacity requirements for each phase (including resulting changes to the tariff).

If possible, one of the first options is to require the utility provider to utilise temporary facilities to the extent possible. This limits unnecessary capital expenditure but the parties must ensure that the services are capable of being provided efficiently and safely. Where the Developer determines that projected demand is expected to result in consistent utilisation of such additional capacity, it has the option of requiring the utility provider to provide details for any required expansion including capital expenditure, contracting arrangements (such as the preferred D&C and O&M Contractors who would typically be the same as those for the base project facilities, subject to benchmarking or otherwise a competitive tender process) and related financing arrangements. If the parties agree on the new arrangements, the Developer may instruct the utility provider to proceed with the design and construction of the additional project facilities (including the network) to meet the agreed additional capacity.

Depending on the tariff structure, the Developer may bear capacity risk in relation to base and additional capacity (ie in the form of an availability payment). However, hybrid models may be adopted where the risk is shared, or otherwise wholly borne by the utility provider. This will depend on the nature of the market, the reputation of the Developer and the related capacity of the utility provider to obtain finance at reasonable rates.

The project expansion works are usually provided under the key terms of the existing concession agreement, in the form of a concession agreement supplement (including any additional direct agreements with Financiers and Contractors in the same form as those executed for the base project facilities).

The Developer may always elect not to proceed with the expansion of a project facility, however this may result in relief from certain KPIs to the extent demand exceeds the design capacity. The obligation of the utility provider to provide services from existing or temporary facilities under these circumstances is limited to its ability to provide the services in accordance with laws (eg environmental requirements etc.) and good utility practice.

An example of a phased expansion clause for a district cooling project under a concession agreement (with an underlying DBO Contractor) is attached at Appendix 1.

2.8 Conclusion

If the Developer has access to the capital required to pay for the utilities itself, or alternatively, has access to cheaper finance than available in the project finance market generally, and has made the business decision to allocate its capital to constructing the utilities, then the Developer should consider applying a DBO approach to the utilities solution. This may:

- offer a cheaper cost, resulting in either a lower price to end-users, or a profit to the Developer, or a combination of the two, however, this should be examined on a case by case basis

- result in a shorter negotiation time in tendering the utilities as the input of the Financiers is removed, however, this benefit is lessened once one or two projects have been banked, ie received credit committee approval and reached financial close
- provide the Developer with more flexibility to terminate the arrangement at a future time for a lower cost and to control alternatives such as monetisation, which if implemented, could increase end-user rates.

By comparison, a concession approach would likely shift more project risk and cost (including financing cost) off balance of the Developer and onto the concession company.

The chosen approach for the development of utilities should be examined on a company-wide basis and not just a project-wide basis.

3 Benchmarking and international best practice

We have benchmarked district cooling projects internationally and, in summary, international best practice can predominantly be seen in the Middle East, with ~3.4 million Refrigeration Tons (RT) of existing district cooling capacity and hundreds of individual cooling plant facilities (predominantly managed by dedicated utilities). There is a strong tendency to use concession BOO/BOOT/contracting models.

Note: We have also examined district cooling projects in Asia (particularly Malaysia, with ~200,000 RT of installed capacity), and to a lesser extent Europe (which primarily operates publically-owned district heating utilities). The results are set out below.

3.1 Middle East

(a) District cooling market landscape

The extreme climate conditions in the Middle East necessitate a significant level of air conditioning, accounting for ~50.0% of annual electricity consumption in 2012, and ~70.0% of peak demand. Furthermore, peak cooling demand in the GCC is expected to nearly triple from 2010 to 2030, rising to ~100.0 million RTs.

The UAE, in particular, has successfully developed a substantial volume of district cooling (~2.4 million RT) (see below). According to Strategy&, the potential market for district cooling through to 2030 in the Middle East is ~32.5 million RT.

The predominant form of contracting model for district cooling facilities is through commission/BOO/BOOT agreements, with specialised district cooling utilities assuming operational responsibility for upwards of 20 years. Examples include:

- **Empower:** Emirates Central Cooling Systems Corporation (Empower) was established in 2003 as a joint venture between the Dubai Electricity and Water Authority and TECOM Investments (a member of Dubai Holdings and a Government Backed Entity). Following the acquisition of Palm Utilities and Palm District Cooling (the Owner and Operator of district cooling systems/concessions such as Palm Jumeirah, Ibn Battuta Mall) in January 2014 at a cost of US\$500 million, Empower holds approximately 70.0% of the UAE's district cooling market, with over 45,000 customers. Empower is the largest district cooling utility in the world, with upwards of 1.0 million RT of cooling capacity.
- **Emicool:** Emirates District Cooling (Emicool) was formed as a joint venture between Dubai Investments and Union Properties, and currently operates upwards of 8 plants through a predominantly BOO business model.
- **Tabreed:** The National Central Cooling Company PSJC (Tabreed) was established in 1998 as a publically listed entity. Tabreed has interests in a total of 67 district cooling plants in the UAE, 52 of which are wholly owned and operated, and 8 of which are operated through affiliates established as Joint Ventures. An additional 6 plants are owned and operated through regional affiliates (in particular Qatar Cool and Saudi Tabreed).

(b) Examples of district cooling contracting models

Location	Development	Contracting model
Dubai	<p>BOO: Numerous projects including Investments Park; Dubai Design District; Palazzo Versace Dubai Hotel, Condominiums, and D1 Tower; Dubai Sports City; Dubai Motor City, Zayed Military City</p> <p>BOOT/Concession: Numerous projects including Dubai Metro; Dubai International Finance Centre; Discovery Gardens; Jumeriah Group Properties, Al Maryah Island, Saadiyat Island</p>	
	Dubai Parks and Resorts, Jebel Ali	<p>Concession: Tabreed signed a long term concession agreement with Meeras Leisure and Entertainment to provide 45,600 RT of cooling. The contract for design, procurement, construction and commissioning services for facility was awarded to SNC-Lavalin Gulf Contractors, at a value of C\$37.0 million.</p>
	Dubai Design District	<p>BOO: Empower, a subsidiary of the Developer (TECOM Investments) secured a contract to provide up to 120,000 RT of capacity to the project, boosting the company’s portfolio by ~12.0%. The facility is to be funded from Empower’s own balance sheet.</p>
Qatar	Lusail city Marina District DCP ^{1,2}	<p>EPC (turnkey) contract: Marafeq Qatar, a subsidiary of Qatari Diar, designed, managed and supervised the project.</p> <p>The BUTEC/ADC Joint Venture was selected for the design, procurement, construction and plant commissioning of the project. Drake & Scull Engineering won a \$29.9m contract for the design and build of the plant.</p>
Kingdom of Saudi Arabia	Jabal Omar development (Holy City of Mecca) ³	<p>BOOT: Central District Cooling Company (CDCC), a special purpose vehicle owned by Saudi Tabreed (60%) and the Jabal Omar Development Company (40%), entered into a 20 year BOOT agreement for the construction of a 55,000 RT project in 2011. The expected cost of the project was SAR 500 million.</p> <p>SNC-Lavalin was contracted by CDCC for the design, procurement, construction and commissioning of the facility.⁴</p>

1 <http://www.snclavalin.com/en/snc-lavalin-awarded-district-cooling-contract-in-dubai>

2 <http://www.qatarconstructionguide.com/index/index.php?id=3&art=208&lang=en>

3 <https://www.tabreed.ae/en-GB/press-releases/12/2/2013/tabreeds-affiliate-to-develop-aed-549-million-district-cooling-project-in-saudi-arabia.aspx>

4 <http://www.constructionweekonline.com/article-17973-snc-lavalin-wins-makkah-district-cooling-contract/>

Location	Development	Contracting model
	Saudi Aramco office complex development, Dhahran	BOOT/Concession: Saudi Tabreed was contracted to design, construct, finance, own, operate and maintain the District Cooling Network with 27,000 RT cooling capacity (expandable to 32,000 RT). The project was the first of its kind in Saudi Arabia, structured as a 25 year concession agreement on a limited recourse project-finance basis. Banque Saudi Fransi was the financier
Bahrain	Bahrain Bay, Manama	BOT: Bahrain Bay Development (a JV between Delkia Utilities and Arcapita) entered into a 50 year Build-Operate-Transfer agreement with Bahrain Bay Development for the delivery of a 45,000 RT seawater cooling facility.

Case study 1 – District cooling developed on a concession basis: Saadiyat Island, United Arab Emirates

Saadiyat Island is a mixed-use development with a total built-up area of over 1.6 million m². The precinct is being developed as a cultural and touristic destination for the Abu Dhabi emirate, including a cultural district, numerous luxury hotels, and a large range of residential and hospitality centric developments. The overall capacity of the district cooling facility is 47,500 TR.

The master Developer of the project is the Tourism Development & Investment Company (TDIC), an entity of the Abu Dhabi Government. District cooling of the development is governed by a 29 year concession agreement between the TDIC and a Joint Venture led by Dalkia Utilities (a subsidiary of EDF & Veolia) as operating company and minority equity investor. Arcapita, an alternative asset manager, is the majority equity investor.

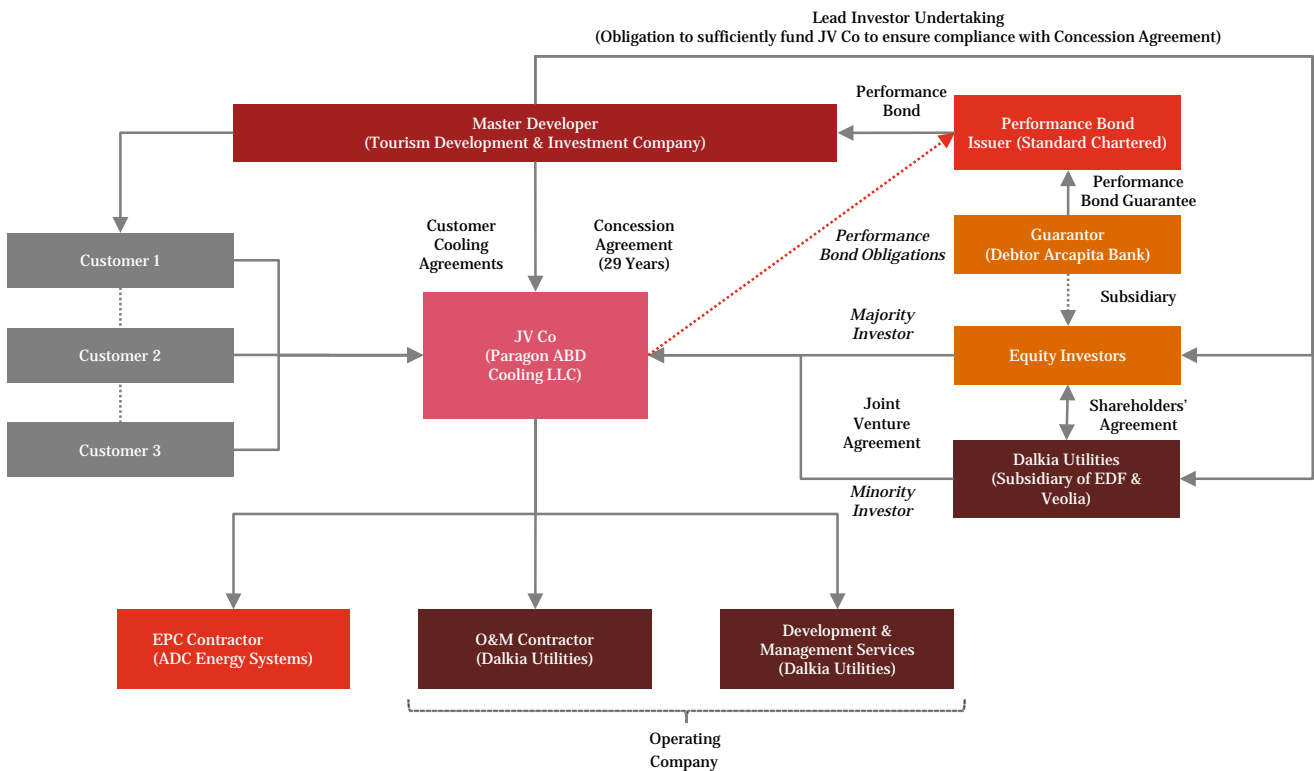
Additionally, TDIC required protection in the form of a \$10.0 million performance bond, guaranteed by Arcapita and issued by Standard Chartered. This bond assured the performance of the obligations of the JV during the period of the concession agreement.

As the operating company, Dalkia directly assumed responsibility for the appointment of the EPC Contractor, ADC Energy Systems (ADC), following a competitive tender.

According to their external publications, the *“Use of the BOOT structure created key synergies through the project:*

- *Project risk was effectively transferred downstream from TDIC to expert district cooling providers. This single point of contact substantially reduced the complexity from the master Developer’s perspective. Furthermore, as customers directly contract for services with the JV, price risk was fully shifted (allowing for more precise budgeting by TDIC).*
- *Furthermore, appropriate mechanisms were put in place to correctly incentivise the District Cooling Provider through equity and long-term concessions, and properly protect the Developer against defaults in financing arrangements and performance.*
- *As operating company with both a contractual and equity interest in the effective operation of the plant, Dalkia was encouraged to collaborate closely with ADC in the construction of the project. This was achieved by continuous and dynamic coordination, and allowed for a smoother transition from the construction phase to the operation phase.”*

Contract Structure – Saadiyat Islands District Cooling Plants (BOOT Structure)



Case study 2 – The acquisition of a district cooling concession by an infrastructure/state owned fund and an industry participant (in this case an Operator): Tabreed and Mubadala Infrastructure Partners, United Arab Emirates

A consortium comprising National Central Cooling Company PJSC (“Tabreed”), the leading Abu Dhabi-based district cooling utility company, and Mubadala Infrastructure Partners (“MIP”), an infrastructure focused fund investing in the Middle East, North Africa and Turkey, with institutional investors from the GCC region and Asia, announced in June 2014 that it has acquired a 30-year concession to be the exclusive provider of district cooling services to the developments on the southern part of Al Maryah Island, Abu Dhabi.

The transaction, which is valued at approximately US\$285 million, involves the acquisition of the existing district cooling provider to Al Maryah Island (Al Wajeez Development Company PJSC) and will be funded through a combination of equity and a 20-year long-term non-recourse senior loan provided by First Gulf Bank.

The 30-year concession represents an installed capacity of up to 80,000 refrigerated tons (RT) for Abu Dhabi’s new Central Business District and luxury lifestyle destination on Al Maryah Island. Al Maryah Island Phase I developments encompass 450,000m² of office, retail and hotel developments designed to form the commercial and financial hub of the Emirate of Abu Dhabi. Key developments on the Island include Cleveland Clinic Abu Dhabi, Four Seasons Hotel, Rosewood Hotel, Sowwah Square Towers, Galleria Mall, Al Hilal bank and Abu Dhabi Exchange Building. The acquisition of the Al Maryah Island plant brings the total number of district cooling plants owned and operated by Tabreed in the GCC to 67, and increases its connected capacity to over 900,000 RT.

Note also the abovementioned recent acquisition by Empower of Palm Utilities for US\$500 million.

3.2 Asia

(a) Capacity for more development

There has been an array of new end-users like airports, religious site, sports complexes and religious facilities deploying district cooling technology. It is estimated that US\$11bn of investment in end-use efficiency is needed by South-East Asian countries by 2020 to meet their national targets for energy efficiency and greenhouse gas emission reductions.

For example, according to a recent report by Asia Development Bank (2013) based on the technical structures, Malaysia has the potential to triple the scale of its district cooling industry to a built-up capacity of 575,000 tonnes of refrigerants from the current approximates of about 200,000-tonne capacity. The Asian Development Bank currently invests more than US\$2.3bil (RM7.29bil) per year in clean energy projects across Asia. However, the awareness of district cooling technology is still low level in most of the urbanised Asian countries.⁵

Examples of district cooling contracting models

Location	Development	Contracting model
Malaysia	Various options are used for procuring district cooling in Malaysia, but the predominant form is the conventional EPC and O&M model. However new approaches such as BOT and BOOT contracts are also used. ⁶	<p>EPC/O&M: UKM Loop 1; Kompleks Kerajaan; UNITEN Putrajaya; Putrajaya Development; MMU Cyberjaya; Nuklear Malaysia Dengkil; S&T Complex UiTM; Mutiara Damansara; Hospital Serdang; MBSA Shah Alam</p> <p>BOT: KLIA Sepang; IJN</p> <p>BOO: Megajana DCS Cyberjaya; Pantai DCS Bangsar; KLCC Development; Putrajaya Development; KL Sentral</p>
Hong Kong	Kai Tak airport site redevelopment ⁷	<p>DBO: awarded by Hong Kong government, to a joint venture comprising Dalkia Asia Pte Ltd, Hip Hing Engineering Co Ltd and Young's Engineering Co Ltd.</p> <p>Note: BOT was initially considered but rejected due to the global economic climate and uncertainty in DCP development – The development was the first of its kind in Hong Kong. The project was Sponsored by the Hong Kong government.</p>
Singapore	Marina Bay	<p>Concession: Singapore Power and Dalkia conducted feasibility studies and advocated the implementation of a district cooling system for the new business district. They were granted the concession of a pilot district cooling system. Singapore District Cooling (SDC) was incorporated as a joint-venture in 2000 to implement the pilot system.</p> <p>Funding: commercial JV without public funding. Initial plant funded by shareholder equities. Subsequent expansion funded by bank loans secured through project financing scheme from a leading Singapore bank.</p> <p>Regulation: <i>District Cooling Act</i> mandates subscription for new commercial developments, in order to mitigate start-up</p>

5 <http://adb-seaee.com/wp-content/uploads/2013/10/Malaysia-District-Cooling-Seminar-Concept-Note-and-Agenda-4oct13.pdf>

6 http://www.academia.edu/4167047/A_Review_Of_Value_Creation_From_Procurement_Contracts_And_Business_Models_For_District_Cooling_Systems_In_Malaysia

7 <http://www.cospp.com/articles/print/volume-12/issue-4/features/district-cooling-reaches-hong-kong.html>

Location	Development	Contracting model
		demand risk. Framework administered by Energy Market Authority of Singapore. Over time the district cooling Operator is allowed to earn a baseline return based on its invested assets. When the Operator has recovered start-up losses, any efficiency gain above baseline returns is shared between Operator and customers.
Singapore	JTC Multi-Utility Hub at Mediapolis ⁸	DBOO: Keppel DHCS, an indirect wholly-owned subsidiary of Keppel Infrastructure Holdings Pte Ltd, was awarded the tender by JTC Corporation to design, build, own and operate a new DCS plant at JTC's Multi-Utility Hub at Mediapolis, and secured a contract to provide DCS services to MediaCorp's new campus at Mediapolis@one-north.

3.3 Europe

Developments in the district heating and cooling sector are driven to a large extent by European legislation.

Europe is less relevant, since it mainly uses district heating and most district cooling plants are public-owned.

Location	Development	Contracting model
France	Paris	Concession: CLIMESPACE is a concession company for the City of Paris since 1991, and produces and distributes district cooling.
UK (London)	OLYMPIC PARK	Concession: Elyo UK won a 40-year contract for the building, financing and operation of urban heating and air conditioning networks (€1,500 M).
UK	Bazainville	EPC/O&M: Tractebel Engineering was chosen as Owner's engineer on the turnkey contract for the new interconnection station in Bazainville.

4 Billing and collection regime

4.1 Introduction

As discussed in section 5 below, district cooling is currently not specifically regulated in Australia. This means that providers are free to determine their own billing and collections model through contracts with their suppliers and with building Owners/end users.

Discussion Point: The billing and collections model for district cooling may be impacted by other regulatory frameworks (eg water, gas and electricity) if a multi-utility embedded network model is chosen. Refer to Section 5 (Regulatory Issues).

Typically a billing and collections model will be made up of the following elements – Metering and data services, pricing and billing/collection.

Despite the advent of modular plant and equipment, district cooling networks are particularly front loaded investments. Therefore, the success of any billing and collections regime requires co-ordinated development,

⁸ http://www.keppeldhcs.com/news_item.aspx?sid=3970

accurate estimation of cost (both capital costs and operating costs) and accurate estimation of network load over the life of the development.

4.2 Metering and data services

Many early providers of district cooling (particularly in the Middle East) relied on bulk metering only. Providers would meter multi-dwelling usage at a building level only and then it would be up to building Owner to develop its own allocation model across residential, retail and commercial tenancies. This has led to inequitable cost allocation and significant customer dissatisfaction.

More recent developments provide a combination of bulk metering, tenancy metering and more granular sub-metering which provide much richer information. This together with more sophisticated data collection systems which often include integration to back-end billing and customer management systems has improved allocation models significantly.

The EU, United Kingdom and Hong Kong are all in the process of introducing regulation which mandates tenancy level metering for district cooling at new developments and at substantial renovations (where technically possible and cost-effective in the long term).⁹

Providers commonly subcontract their metering and data services to one or more metering services provider. The scope of these arrangements involve meter supply, meter installation, meter operation and maintenance and data services.

4.3 Pricing models

Although district cooling is rarely regulated, pricing models typically consist of the following elements:

- (a) **A connection charge:** For connection to the network (this typically covers meter supply, installation and connection services)
- (b) **A capacity charge:** For the estimated maximum cooling capacity of the building (this typically covers an allocation of the providers capital costs of the district cooling network)
- (c) **Consumption charges:** For the actual consumption of district cooling services used by occupiers/tenants district.

There is also sometimes a specific capacity overrun charge if the actual consumption exceeds the estimated building capacity.

Given the length of district cooling concessions or DBO arrangements, it is critical that whatever pricing model is chosen, that pricing model is subject to clear periodic adjustment mechanisms which allow the provider to vary the charges to take account of changes to input costs such as water, power, labour, inflation and finance costs and the consequences of changes to law.

4.4 Billing and collection risk

Collection risk is a key issue in district cooling projects. Therefore even with the advent of tenancy level metering, typically district cooling providers will not wish to invoice end-users/tenants directly but will prefer to invoice the Developer or building Owner who will pass the costs through the end-users through a service charge or management fee.

In considering whether to accept payment by the Developer/building Owner, the district cooling provider will need to satisfy itself as to the ability of the Developer/building Owner to pay the district cooling charges and, if necessary, seek some form of security such as a parent company guarantee or letter of credit.

⁹ Section 4 of The Heat Network (Metering and Billing) Regulations 2014 (UK); Articles 9-11 of the European Energy Directive (EU); and District Cooling Services Bill 2014 (Hong Kong SAR)

If the district cooling provider takes the risk of collecting charges from the end-users, it will need to build in safeguards to ensure that it is able to do so. This may involve appointing a facilities manager to assist with collection, in which case the latter may be incentivised to collect the payments by having all or a portion of its payment being dependent on the collection of the district cooling charges from end-users.

The district cooling provider will also want to ensure that the end-user agreements contain rigorous succession obligations so that subsequent purchasers are required to enter into an agreement with the district cooling provider for district cooling and/or to take an assignment of the original end-user agreement. The district cooling provider may also, if it is permitted by local laws, look to include rights to cut off the supply of district cooling for non-payment.

5 Regulatory issues

Unlike some other jurisdictions, where district energy comprises a sizeable portion of the total energy load, there is no direct regulation of district cooling/heating plant or commercial arrangements in Australia. At most, these arrangements are governed by local or State planning and environmental requirements and other relevant general legislation, such as the Competition Consumer Act (particularly relevant if commercial structures involve vertical constraints on retail pricing) and Australian Consumer Law.

However, to the extent that any district cooling solution forms part of an integrated utility offering, there are a range of regulatory considerations and challenges that are both complex and differ by State. While a comprehensive overview is beyond the scope of this paper, some of the relevant Australian regulatory considerations across energy (electricity and gas), water (potable and waste) and telecommunications infrastructure/services are set out below.

5.1 Energy – Electricity and gas

Any integrated utility proposal needs to address energy regulatory requirements across each of the following:

Issue	Description
Metering and billing	<ul style="list-style-type: none"> • Metering is addressed in the National Electricity Market (in those jurisdictions with contestability) through a Metrology Procedure. Complex rules, but require gate meter to be registered as parent in the market settlement system by the retailer. • In those jurisdictions where contestability is available (Victoria, New South Wales and South Australia) – Where a network service provider exemption is in place, metering requirements will typically be covered by a condition to the relevant NSP exemption (see below). • Note – Pro rata or shadow pricing of DUOS and NUOS charges is permitted, but network charges for private infrastructure need to be recovered through lease or other payments (eg fit out charges) – Not explicitly through energy pricing.
Retailing	<ul style="list-style-type: none"> • Retailing of energy in Australia is principally governed by the National Energy Retail Law and National Energy Retail Rules. The NER prohibits the retail sale of energy unless the seller is authorised, or has obtained a relevant exemption. Exemptions are granted on both an individual and class basis by the regulator, the Australian Energy Regulator (AER) • Obligations apply both to selling and on-selling of energy • Where contestability has been introduced individual tenants need to retain an ability to acquire supply directly from retailers.

Issue	Description
<p>Network infrastructure ownership/embedded networks</p>	<ul style="list-style-type: none"> • Under this model, the Developer owns the embedded network after it becomes operational and takes supply from the relevant distribution network Operator through a gate meter and pays a cost reflective network tariff • The Developer may be able to obtain an exemption from the obligation to be registered as a network service provider. Any exemption is subject to conditions, typically relating to pricing, metering and distribution loss factors • Pricing and tariff structures for DNSPs vary (and can be subject to jurisdictional specific pricing obligations) and so while the overarching regulatory framework is common, the price structures and regulatory arrangements can differ markedly between States • There are currently a number of DNSP tariff resets underway.

5.2 Water – Potable and wastewater

Australia currently suffers from a patchwork of State-based regimes for water regulation, and generally has an under-developed model for contestability in the supply of private water infrastructure. The draft report of the current Harper Review has flagged reform of the water sectors as an area of ‘unfinished business’ in terms of Australian competition policy reform.

As a consequence, the key regulatory issues vary substantially by State, for example:

- **New South Wales:** The most advanced of the jurisdictions, there is scope to obtain both a retailer and network services licence (note: amendments are currently being considered to the legislative regime that will mean entities, rather than individual schemes, become subject to licensing).
- **Queensland:** There is some scope in Queensland for private entities to be licensed as water service providers – For both potable and sewerage services. However, to date, the provision of these services has been by government-owned entities. Pricing is set by the State competition authority (Queensland Competition Authority). Registration obligations are also less onerous in relation to recycled water suppliers.
- **Victoria:** Private involvement in the water sector has been limited by law to the supply of services to government-owned utilities (this is enshrined in the Victorian Constitution). There is some scope for involvement of the private sector through sub-contracting structures. Melbourne metropolitan services are supplied by 3 government-owned utilities.
- **South Australia:** A licensing regime has been recently introduced (2013) for licensing of “water retail services” (covering both water and sewerage), overseen by the State competition authority (ESCOSA).

Australia’s approach to regulation of private participation in the water sector contrasts with a number of other jurisdictions, internationally, which have successfully privatised or otherwise facilitated private involvement, including France (which has a long history of private sector involvement) and the United Kingdom.

5.3 Telecommunications

The regulatory environment for the development of telecommunications infrastructure in new developments remains in a state of flux, caused by an overhaul of regulatory requirements as part of the Commonwealth National Broadband Network (NBN) deployment.

There are a number of private Operators that compete for the provision of (mostly fibre) infrastructure in new residential estates.

The Coalition Government has published for consultation a modified “new developments policy” aimed at improving the contestability of fibre deployment to new developments – And ensuring competitive neutrality with NBN Co (based principally on a set of published connection and development charges). Minimum network standards will be imposed via licence condition, and will broadly match NBN Co’s requirements. Where a carrier does not provide NBN-comparable services, there is a risk of overbuild by NBN Co. Currently, any new Operator of a “superfast” network that supplies services predominantly to residential or small business customers, must do so on an open access and non-discriminatory basis.

As the above summary demonstrates, a single or “boilerplate” approach to regulatory approvals across integrated utility projects is unlikely to be feasible, at this time, with regulatory issues needing to be differently addressed in each case. Each project regulatory strategy will need to take into account the features of the project and individual State differences and requirements – With the supply of water infrastructure services (in most States) and any proposed supply of bundled retail fibre-based telecommunications services to residential developments raising particular challenges.

Discussion Point: To be considered on a case by case basis but also on a whole of project and business unit basis when considering an integrated utility solution.

Appendix 1 Glossary

- 1 **BOO/BOOT:** Build, Own, Operate or Build, Own, Operate and Transfer. These terms and concessions and DBOO can be used interchangeably.
- 2 **Concession:** An agreement whereby a concession to design, build, own and operate a facility is granted by a concessionaire to the concession company (commonly referred to as an SPV or a Project Company)
- 3 **DBO:** Design, Build, Operate. This model does not include Ownership or the corresponding off – balance sheet project financing.
- 4 **DBOO:** Design, Build, Own and Operate. Note above comment on BOO/BOOT and concessions.
- 5 **ECA:** Export Credit Agency
- 6 **EPC:** Engineering, Procurement and Construction. A construction contract which then links into the O&M Contract. If they were combined they would be a DBO contract.
- 7 **PwC:** PricewaterhouseCoopers
- 8 **O&M:** Operation and Maintenance. An operating and maintenance contract which links into back to the EPC Contract. If they were combined they would be a DBO contract.
- 9 **SPV:** Special Purpose Vehicle. Alternatively known as the Project Company in a project financing.

Appendix 2 Example expansion/project phasing clause

Refer to Section 2.7 for an analysis of potential expansion of the district cooling facility through increased take-up. This clause is an extract from the PwC Standard Concession Agreement illustrating how a Developer could deal with this critical risk.

8 Project phasing

8.1 Implementation of Project Phases

The Concession Company acknowledges and agrees that:

- (a) *the Development is being implemented by the Owner in stages*
- (b) *it is a primary objective of the Owner to defer the construction of permanent additional capacity to the Project Facilities, and capital costs associated with such permanent additional capacity, to the extent reasonably practicable consistent with Good Utility Practice. Accordingly, in connection with the consideration of the Demand Curve and expansion of the capacity of each of the Project Facilities, the Concession Company must, unless it is otherwise directed in writing by the Owner, utilise Temporary Facilities to the maximum extent reasonably practicable consistent with Good Utility Practice in order to defer the construction of additional permanent capacity and the capital costs associated with such permanent additional capacity until such time that projected demand is expected to result in consistent utilisation of such additional capacity*
- (c) *subject to clause 7.7 and execution of the relevant Concession Agreement Supplement, the Concession Company must provide the Design and Construction Works for each Project Facility Phase in accordance with the requirements of this agreement and any Concession Agreement Supplement*
- (d) *with respect to each Project Facility Phase, the Owner shall have the same substantive and procedural rights it has with respect to the Design and Construction Works for the Base Project Facilities, as set out in clause 9.*

8.2 Adjustments to demand curve

- (a) *On each anniversary of the Signing Date until the date that the ultimate Guaranteed Capacity of each Project Facility has been reached, and at such other times as may be agreed by the parties, the Owner must provide the Concession Company the Demand Curve as revised by the Owner based on information reasonably available to the Owner regarding population trends and other matters that affect the assumptions upon which the Demand Curve is calculated, including information provided by the Concession Company in Monthly Performance Reports regarding utilization of the Project Facilities (the "Demand Curve Notice").*
- (b) *The Owner and the Concession Company must meet promptly following the receipt by the Concession Company of the Demand Curve Notice to discuss the Demand Curve Notice. The Owner must provide the Concession Company such additional information regarding the Demand Curve Notice and the Demand Curve as the Concession Company reasonably requests.*
- (c) *As soon as reasonably practicable following receipt by the Concession Company of the Demand Curve Notice and any additional information referred to in clause 1.2 (b), the Concession Company must notify the Owner regarding:*
 - (i) *the then current capacity of the Wastewater Treatment Plant and the Polishing Plant*

- (ii) *the additional capacity which will reasonably be required by the Wastewater Treatment Plant and the Polishing Plant as a result of the Demand Curve*
- (iii) *any required changes to Schedule 7 to provide such additional capacity*
- (iv) *any changes necessary to the Development Network as a result of the Demand Curve and such additional capacity*
- (v) *the estimated Capital Requirements for providing such additional capacity, and any changes to the Prevailing Financial Model to reflect such requirement*
- (vi) *whether the additional capacity provided by each Project Facility Phase, as the case may be, of each Project Facility should be increased or decreased as a result of the Demand Curve*
- (vii) *whether the Scheduled Commercial Operations Date for each Project Facility Phase should be postponed or brought forward as a result of the Demand Curve, and, if so, by how much*
- (viii) *the estimated increase in operating costs of the Project Facilities as a result of such additional capacity, and any changes to the Prevailing Financial Model to reflect such increase*
- (ix) *the estimated effect on the Tariff calculated in accordance with Schedule 27, and any changes to the Prevailing Financial Model to reflect such effect*
- (x) *the estimated schedule for expanding the capacity of the Wastewater Treatment Plant and the Polishing Plant, as applicable, and any changes to the Prevailing Financial Model to reflect such expansion*
- (xi) *the plan of the Concession Company for designing, constructing and financing such additional capacity, including the plan for issuing Concession Company Debt and contributing Equity*
- (xii) *the estimated cost and schedule for providing a commitment from one or more financial institutions for financing the amount of the Capital Requirements for the applicable Project Facility Phase*
- (xiii) *the information described in items (v), (viii), (ix) and (xi), assuming that the required additional capacity identified in such notice from the Concession Company is provided through Temporary Facilities.*

(the Demand Curve Notice Response).

- (d) *The Concession Company must provide to the Owner as soon as reasonably practicable such additional information regarding the Demand Curve Notice Response as the Owner reasonably requests and meet with the Owner at its request to discuss the Demand Curve Notice Response. Estimated and other information provided by the Concession Company in the Demand Curve Notice Response must be based on information reasonably available to the Concession Company, but the Concession Company is not obliged to undertake any formal solicitation of bids from potential SubContractors or any similar process in order to obtain such information.*
- (e) *Within the later of 60 Days of receipt of the Demand Curve Notice Response and 10 Days after provision of any additional information reasonably requested by the Owner pursuant to clause 1.2(d), the Owner must notify the Concession Company that the Owner has made one of the following determinations, or a combination of them, as applicable:*
 - (i) *proceed with the Project Facility Phase and the additional capacity it requires for the Project Facility Phase*
 - (ii) *not proceed with the Project Facility Phase at such time and directs the Concession Company to use Temporary Facilities*

- (iii) *not proceed with the Project Facility Phase at such time and directs the Concession Company to use existing capacity of the applicable Project Facility.*
- (f) *If the Owner elects not to proceed with the Project Facility Phase at such time*
 - (i) *directs the Concession Company to use Temporary Facilities, then the Concession Company must subject to clause 7.7(g)(iii) provide Temporary Facilities as set out in clause 12.19, and the Concession Payment must be adjusted as provided in Schedule 13 and Schedule 27*
 - (ii) *directs the Concession Company to use the existing capacity of the applicable Project Facility, then the Concession Company must maximise the usage of the capacity of the applicable Project Facility to Treat Wastewater and Septage and to Polish TSE, as the case may be, in excess of the Guaranteed Capacity of the then-existing Project Facilities to the extent that such usage is consistent with applicable Law and Good Utility Practice, and the Concession Payment must be adjusted as provided in Schedule 13 and Schedule 27; provided, however, that at such time that the Concession Company reasonably determines that usage of the capacity of the applicable Project Facility in excess of the Guaranteed Capacity is not consistent with applicable Law or Good Utility Practice, the Concession Company must notify the Owner in writing as to the basis for such determination in reasonable detail, and provide the Owner with information it reasonably requests relating to such determination. If the parties are unable to resolve any dispute regarding such determination, either party may refer the matter to the Independent Expert pursuant to clause 39. If the parties agree or it is determined by the Independent Expert that the usage of the capacity of the applicable Project Facility in excess of the Guaranteed Capacity is not consistent with applicable Law or Good Utility Practice, then the Owner must, subject to clause 39, direct the Concession Company (A) to implement a Project Phase; or (B) subject to clause 7.58(g)(iii), to install Temporary Facilities; or (C) to utilise such other methods consistent with Good Utility Practice and applicable Law as are approved by the Owner, including applicable methods described in clause 7.8(g)(ii)*
- (g) *If the Owner elects to proceed with the Project Facility Phase, then the Phase Contractor for the applicable Project Facility Phase will be selected, the Project Facility Phase will be implemented and the Concession Payment will be adjusted as provided in this clause 8 and Schedule 27.*

8.3 Selection of phase Contractor

- (a) *If the Concession Company proposes to have the Initial DBO Contractor undertake the Design and Construction Works for the Project Facility Phase, then, within 60 Days of receipt of the notice from the Owner pursuant to clause 1.2(e), the Concession Company must provide the Owner with a proposal which includes:*
 - (i) *the notice provided in clause 41(b) and (d), such notice to include current information with regard to the Initial DBO Contractor*
 - (ii) *the design specification, scheduling and other relevant information for the Design and Construction Works for the applicable Project Facility Phase*
 - (iii) *a binding guaranteed maximum price from the Initial DBO Contractor for the Design and Construction Works together with a certificate from the Independent Engineer certifying that such price is fair and reasonable and consistent with applicable market conditions (which shall be final and binding on the parties)*
 - (iv) *the DBO Contract for the Base Project Facilities marked to show any changes necessary for the Design and Construction Works for the applicable Project Facility Phase*
 - (v) *the terms of the Concession Company Debt or Equity to be issued or provided by the Concession Company to pay for the Capital Requirements of the Design and Construction Works for the applicable Project Facility Phase pursuant to the obligations of the Concession Company under clause 7.8*

- (b) *The Concession Company must provide the Owner such additional information regarding such proposal as the Owner reasonably requests and meet with the Owner at its request to discuss such proposal, including providing the Owner with the detailed breakdown on an "open book" basis of the costs of the Initial DBO Contractor for undertaking the Design and Construction Works.*
- (c) *If the terms of such proposal for such Design and Construction Works are fair and reasonable and consistent with applicable market conditions for similar projects, the Project Facilities Phase utilises the technology described in Schedule 7 and is otherwise consistent with Schedule 7 or otherwise approved by the Owner, and does not impose obligations on the Owner that are different or greater than the obligations in this agreement (unless such obligations are approved by the Owner acting reasonably), then the Concession Company may have the Initial DBO Contractor undertake the Design and Construction Works for the applicable Project Phase.*
- (d) *If the parties cannot agree regarding the matters identified in clause 1.3(c) within 30 Days after receiving such proposal and the additional information referred to in clause 1.3(b), then either party may refer the matter to the Independent Expert. The determination of the Independent Expert shall be final and binding on the parties.*
- (e) *If the Independent Expert determines that the terms of the Initial DBO Contractor's proposal for such Design and Construction Works is not fair and reasonable or is not consistent with applicable market conditions for similar projects, the Project Facilities Phase does not utilise the technology described in Schedule 7 or is not otherwise consistent with Schedule 7 or imposes obligations on the Owner that are different or greater than the obligations in this agreement, then the competitive tender process described below must be used to procure an EPC Contractor for the Design and Construction Works.*
- (f) *The parties acknowledge their preference for continuing the Initial O&M Contractor with respect to the provision of Operation and Maintenance Services for each Project Facilities Phase but that there may be circumstances in which retendering the provision of all Operation and Maintenance Services may be advantageous. Accordingly, and subject to clause 1.3(h), the Concession Company may implement the competitive tender process described in the following provisions of this clause 8.3 for the provision of both Design and Construction Works with respect to a Project Facilities Phase and all Operation and Maintenance Services for all Project Facilities where it is able to demonstrate to the Owner's satisfaction (acting reasonably) that the Owner will not be materially and adversely affected by the retendering of those services.*
- (g) *In no event may the procurement of a new DBO Contractor in connection with the implementation of a Project Facility Phase:*
 - (i) *relieve, affect or diminish any obligation of the Concession Company under this agreement*
 - (ii) *adversely affect the provision of the Operation and Maintenance Services under this agreement*
 - (iii) *increase the Owner's payment obligations for the Operation and Maintenance Services beyond those provided at the time of the proposed procurement of a new DBO Contractor (as included in the Fixed Operating Costs Charge and the Variable Operating Costs Charge components of the Concession Payment in effect at such time) by an amount greater than the amount determined in accordance with section (A)4 of the Adjustment Principles. For the avoidance of doubt, the Concession Company may not engage a new DBO Contractor in connection with the implementation of a Project Facility Phase if the Fixed Operating Costs Charge plus the Variable Operating Costs Charge will as a result be greater than the sum of the then-existing Fixed Operating Costs Charge and Variable Operation Costs Charge plus any increased operating costs relating to the applicable Project Facilities Phase as determined in accordance with section (A)4 of the Adjustment Principles, without the prior written consent of the Owner.*
- (h) *Except as otherwise agreed by the Owner in its sole discretion, the Initial O&M Contractor must be used by the Concession Company for the provision of the Operation and Maintenance Services for the Residual Waste Treatment Plant for a period of at least 5 Years from the Commercial Operation Date of the Residual Waste Treatment Plant.*

- (i) *If a competitive tender process is used, the Concession Company must prepare bid documents for prospective Phase Contractors, including a Phase Contract and other necessary Project Agreements.*
- (j) *If a competitive tender process is used, the Concession Company must obtain bids as follows:*
 - (i) *unless a lesser number is agreed by the Owner, the Concession Company must send to no fewer than 3 prospective Phase Contractors, a request for proposals from the prospective Phase Contractor for the Project Phase (the "RFP"). Following approval by the Owner of the financial condition of such Phase Contractors to design and construct the Project Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operate the Project, and based on the criteria set out below and such other criteria as may be set out in such RFPs (the "Selection Criteria"), the Concession Company will select one or more of such prospective Phase Contractors for negotiation of the price, and the other terms and conditions, for designing and constructing the Project Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operating the Project*
 - (ii) *the criteria for selecting the Phase Contractor include:*
 - (A) *the Selection Criteria*
 - (B) *the price of designing and constructing the Project Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operating the Project*
 - (C) *the terms and conditions of the Phase Contract for designing and constructing the Project Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operating the Project*
 - (iii) *the Selection Criteria must include the following criteria and any other criteria set out in the RFPs:*
 - (A) *ability to perform the specified design, construction and operation services in accordance with a demonstrated high-level quality of service and performance*
 - (B) *ability to provide the specified design and construction services in connection with the timetable set out by the Concession Company and the Owner, and in accordance with the Design and Technical Specifications for the Project Facility Phase*
 - (C) *ability to perform the specified design, construction and operation services in accordance with a price competitive with other bidders*
 - (D) *experience in designing and constructing other similar projects*
 - (E) *experience in operating other similar projects*
 - (F) *financial condition and ability to provide required performance and payment bonds for the Project Phase*
 - (G) *take account of the matters referred to in clause 1.3(a)*
 - (iv) *the Concession Company must provide the Owner with the RFPs no less than 10 Days before it is sent to prospective Phase Contractors for review and comment by the Owner. The RFPs must be reasonably acceptable to the Owner prior to issue. Following receipt of responses to the RFPs, the Concession Company must prepare a report which analyses and ranks such responses, and lists not less than 2 prospective Phase Contractors with which the Concession Company will negotiate a price, and other terms and conditions, for the Project Phase. The Concession Company must provide the Owner with a copy of that report for the Owner's review and comment before any of the prospective Phase Contractors is notified of a determination by the Concession Company. The report must be reasonably acceptable to the Owner; provided, however, that it is recognised and agreed by the Owner that, subject to clause 8.3(g) selection of prospective Phase Contractors for negotiation of price will be made by the Concession Company*

- (v) *the Concession Company must, at the request of the Owner, provide the Owner with a copy of all information received by the Concession Company from the prospective Phase Contractors submitting responses to the RFPs, including information regarding price proposals. The Concession Company must answer questions from the Owner relating to the process of selecting the Phase Contractor and its status and must, at the Owner's request, meet the Owner to brief the Owner on matters relating to such selection process, including negotiations regarding price and other terms and conditions for designing and constructing the Project Facility Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operating the Project.*
- (k) *As soon as practicable after the Concession Company has received indicative offers for the Phase Contract for the Project Phase, it must provide the Owner with:*

 - (i) *all relevant information in relation to those offers including copies of the draft documents on which those offers are based*
 - (ii) *a draft Concession Agreement Supplement setting out the proposed amendments to this agreement to address each of the following matters with respect to the facilities covered by the Concession Agreement Supplement*

 - (A) *Design and Construction Works*
 - (B) *Design and Technical Specifications*
 - (C) *Completion Tests*
 - (D) *Scheduled Commercial Operation Date*
 - (E) *Milestone Schedule and Milestones*
 - (F) *Guaranteed Availability and Guaranteed Capacity*
 - (G) *Operation and Maintenance Services (if applicable)*
 - (iii) *a Model Variation Event Report in accordance with Schedule 27, including a calculation of the Concession Payment showing the financing of the Capital Requirements for the Project Phase and the change of the operating costs of the Concession Company pursuant to sections (A) 5 and (A) 6 of the Adjustment Principles.*
- (l) *Unless the parties agree otherwise:*

 - (i) *the draft Concession Agreement Supplement must not propose any amendments to this agreement other than those which are necessary in order to address each of the matters referred to in clause 1.3(k); and*
 - (ii) *the Design and Technical Specifications for the facilities covered by the draft Concession Agreement Supplement must be the same (other than with respect to capacity) as those for similar facilities making up the existing Project Facilities.*
- (m) *If the parties cannot agree on the terms and conditions on which to proceed with the Project Phase within 30 Days of the Owner receiving the information, documents and the draft Concession Agreement supplement referred to in clause 8.3(k), then either party may refer the matter to the Independent Expert; provided, however, that the Independent Expert may not make any determination related to any matter set out in clause 8.3(g), all of which matters are to be determined by the Owner in its reasonable discretion. The Independent Expert must take into account whether the draft Concession Agreement Supplement complies with clause 8.3(k)*
- (n) *Notwithstanding anything in this agreement to the contrary, the Concession Company must not enter into a Phase Contract until and unless the Concession Company has provided the Owner for its review and comment a copy of each draft Phase Contract no less than 15 Days prior to delivery of the draft Phase Contract to the prospective Phase Contractor with which the Concession Company is negotiating,*

including a copy of the substantially final draft of the Phase Contract. The Phase Contract must be reasonably acceptable to the Owner and must provide, among other things, that the Phase Contractor must perform all the obligations of the Concession Company set out in this agreement relating to the design and construction of the Project Phase and if applicable (and subject to clause 8.3(g) and 1.3(h)) operation of the Project. The Phase Contract submitted by the Concession Company to the Owner will be deemed approved by the Owner if the Owner has not provided notice to the contrary in writing to the Concession Company within 15 Days of submission by the Concession Company. The Concession Company is solely responsible for the obligations of the Phase Contractor set out in the Phase Contract and the Owner will have no responsibility or liability therefore. Each Phase Contract is deemed to constitute a Subcontract and must comply with all requirements for a Subcontract.

Concession agreement supplement

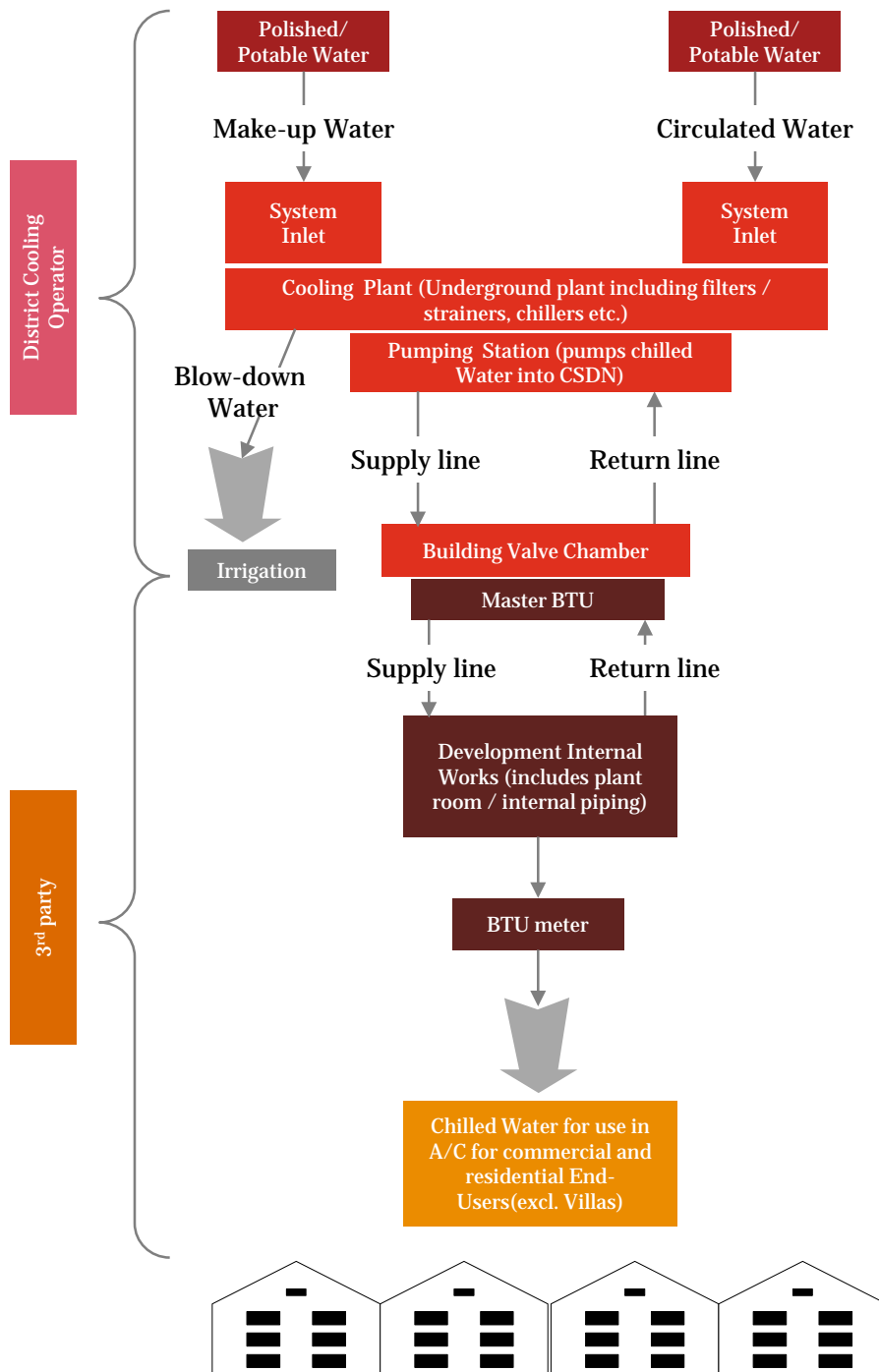
- (a) *Simultaneously with the execution of the Phase Contract, the Concession Company and the Owner will execute the Concession Agreement Supplement agreed or determined in accordance with this clause 8.3.*
- (b) *Without limiting the generality of the provisions of clauses 7.4 and 7.5, the Concession Company must, on or before the date of execution of the Concession Agreement Supplement:*
 - (i) *enter into the relevant Project Agreements and any other agreements necessary to be entered into by the Concession Company to enable it to undertake the Project Phase and to otherwise exercise its rights and fulfil its obligations under this agreement, and provide the Owner with certified copies of these agreements as soon as practicable after their execution; and*
 - (ii) *obtain all Authorisations necessary for it to undertake the Project Phase and to otherwise exercise its rights and perform its obligations under this agreement and the other Project Agreements.*

Direct agreements

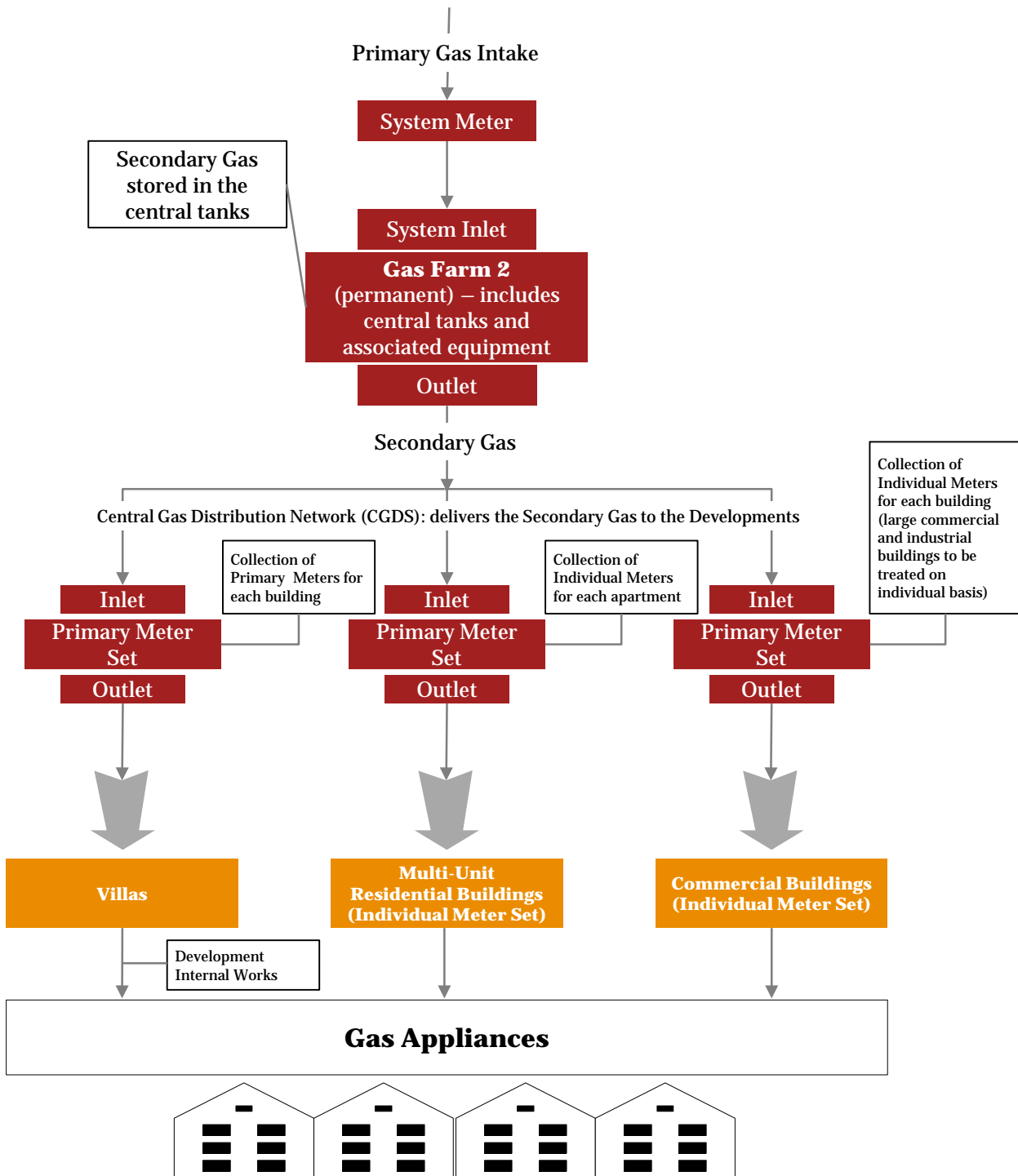
If any Financing Documents are entered into after the Signing Date in accordance with this agreement, the Owner agrees, at the Concession Company's request, to enter into any direct agreements in substantially the same form as Schedule 19.

Appendix 3 Example stand alone and integrated utility solutions from international projects

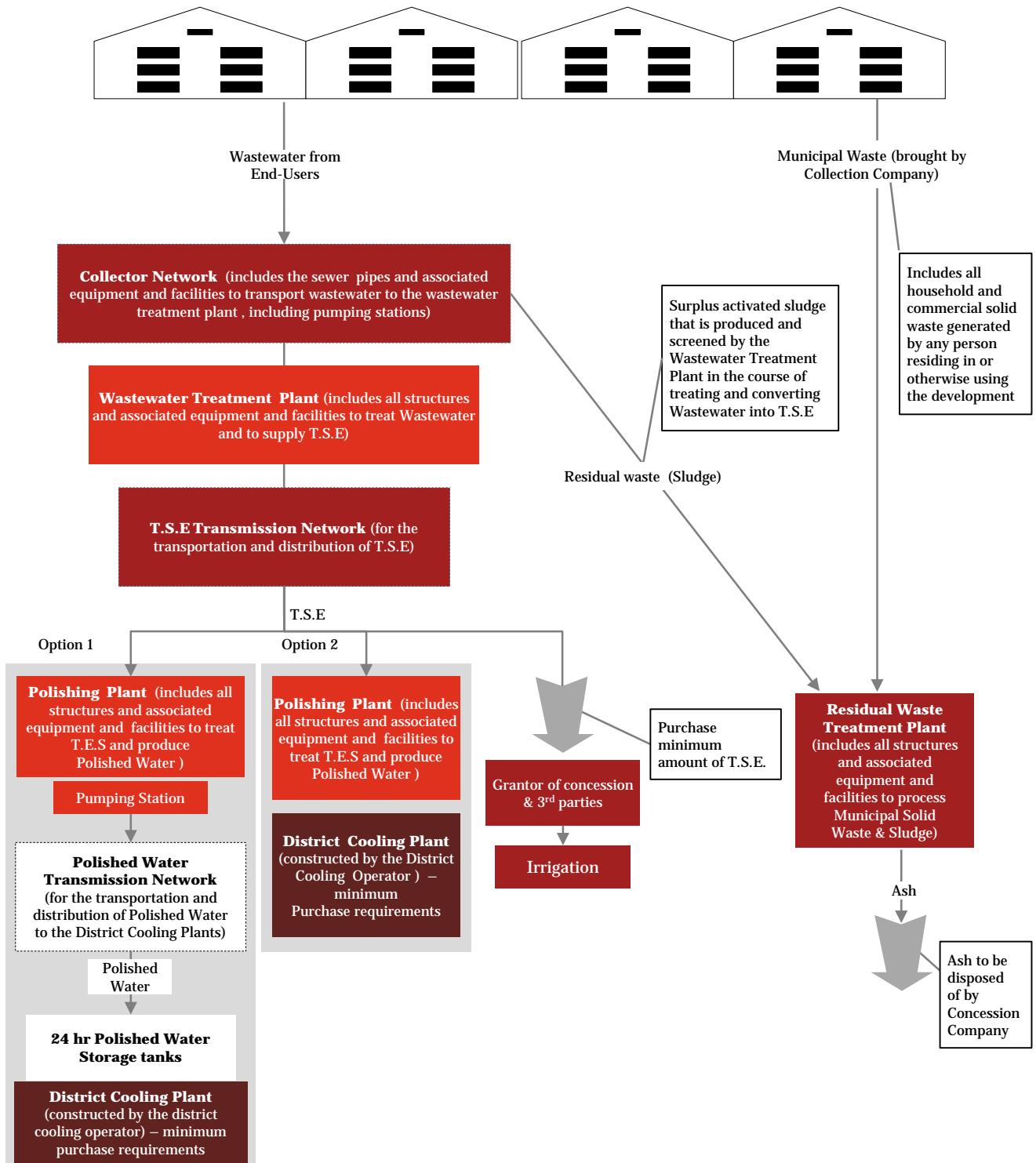
District Cooling Concession Agreement – Project Facilities



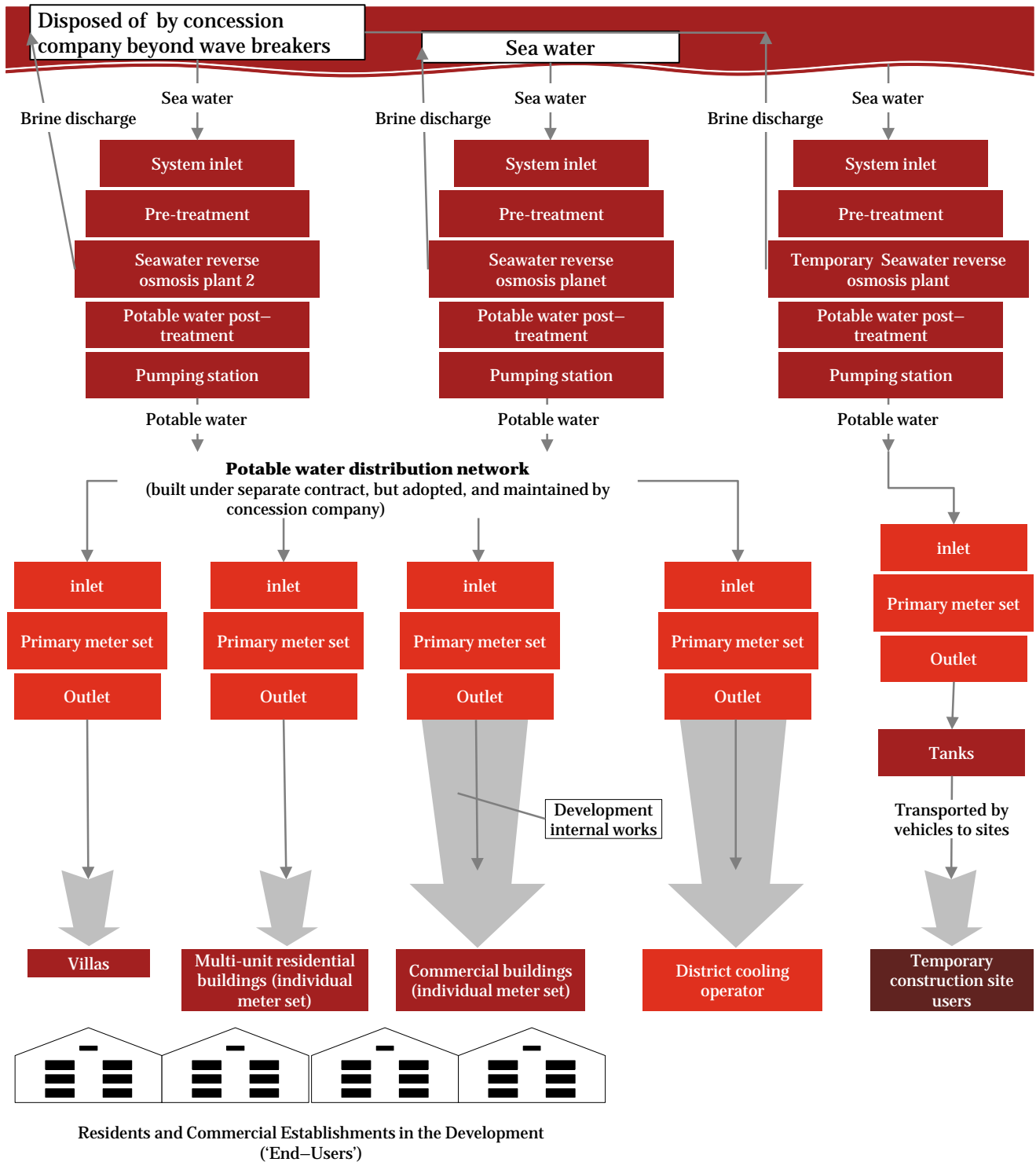
Gas System Concession Agreement – Project Facilities



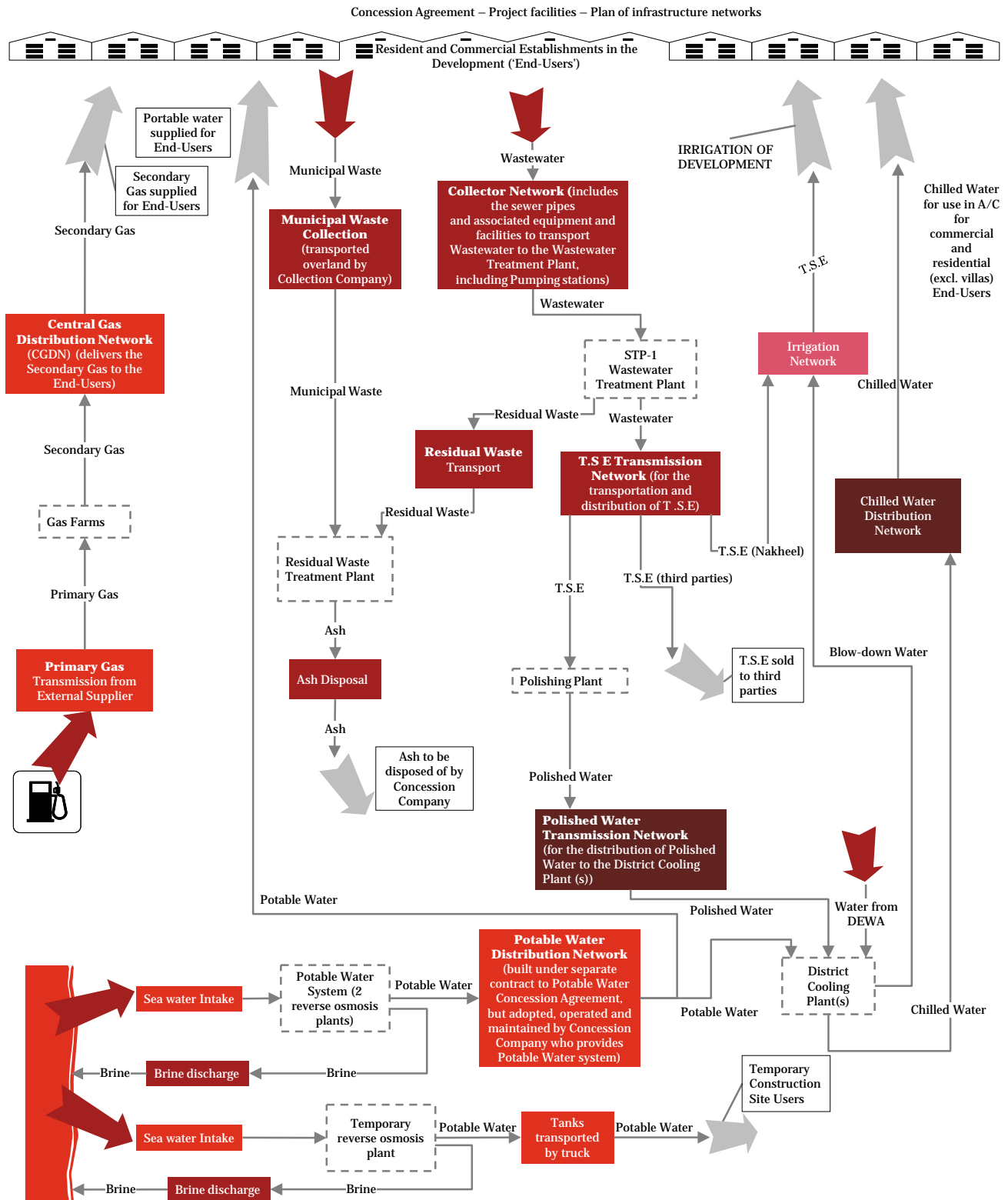
Wastewater Treatment Concession Agreement – Project Facilities

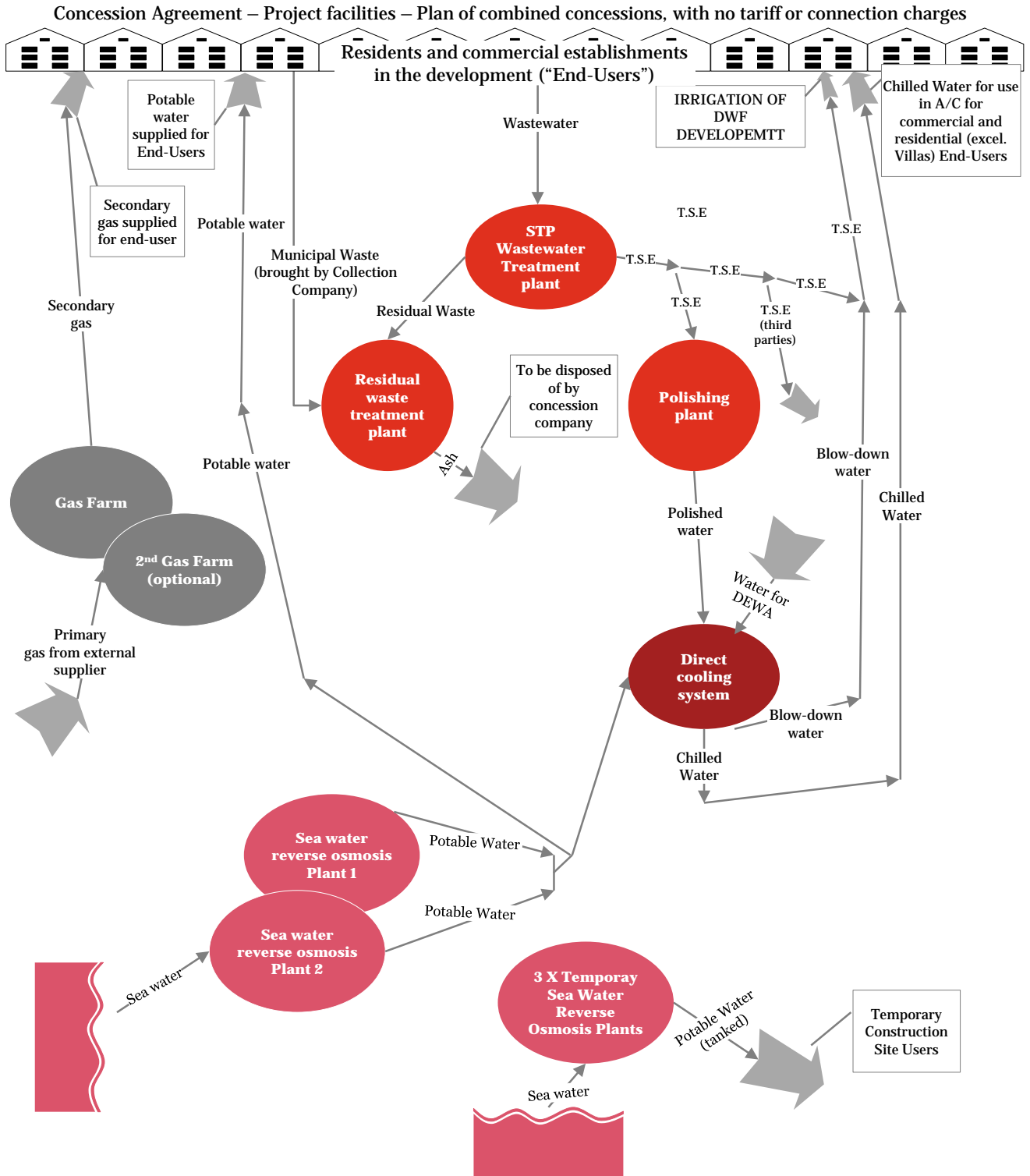


Potable water concession agreement – Project facilities

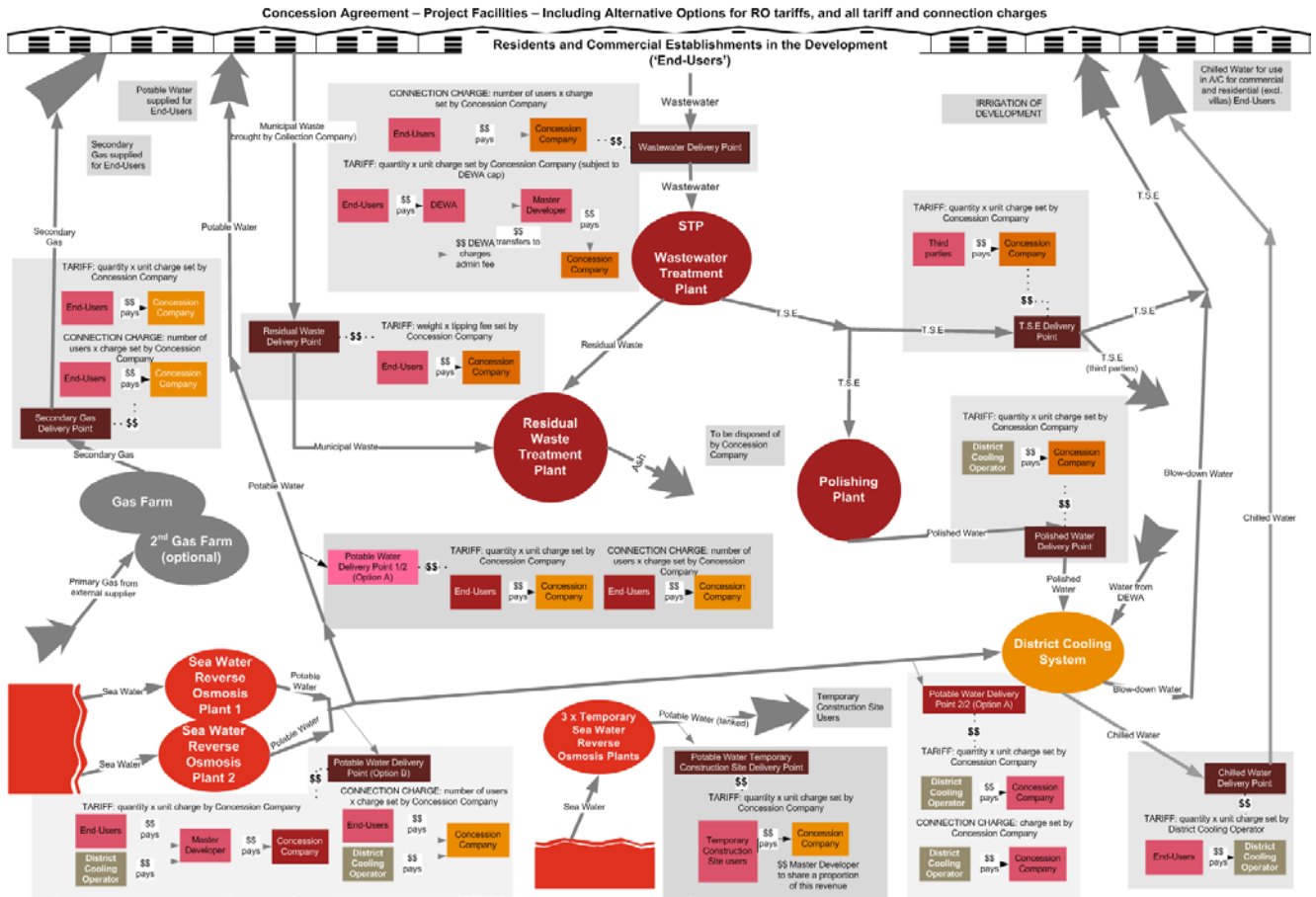


Example stand alone and integrated utility solutions from international projects





Example stand alone and integrated utility solutions from international projects



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