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Evolution of contract structures in water supply and sanitation

Didier Carron, Jan G. Janssens and Vivian Castro-Wooldridge

ABSTRACT

Today, public-private partnerships (PPPs) in the water supply and sanitation sector, including the *affermage*, are increasingly hybrid, performance-based models. These include evolved, more sophisticated *affermage* models – such as what we refer to as the performance-based *affermage* (PBA). This model is based on an incentive-driven and more equitable distribution of the efficiency gains between the operator and the contracting authority (CA). The operator's expenses are reduced through efficiency improvements; the operator's fee reduces and the payment to the CA increases. The operational surplus increases and its eventual distribution depends on whether or not the operator meets its financial and technical contractual targets. Hence the PBA model may be more politically attractive to public authorities whose bargaining power to demand improved service delivery from the operator is strengthened. Key preconditions for the successful implementation of a PBA include: (i) an incentive mechanism based on an audited and validated baseline, and (ii) a capable CA, leading to a balance of power and mutual respect between partners. This output-based *affermage* (PBA) option is structured with appropriate investment obligations and allocation of risks between the operator and the CA. These are based on each entity's ability to manage risks – and both are rewarded on their performance and the respective levels of risk assumed.

Key words | *affermage*, delegated management, lease contract, private sector, public-private partnerships (PPPs), sanitation, water supply

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INTRODUCTION

Delegated management contracts today have more of a mixed, hybrid nature than in the past. They borrow select elements from different models to create a new, tailored model. The result is that many delegated management contracts can no longer be easily classified into a single category on the public-private partnership (PPP) spectrum.

One innovative version of the *affermage* contract gaining in popularity is designed for greater transparency and a more equitable distribution of profits between public and private partners. In this paper we explore the recent trends of the *affermage* model through the case study of the *Syndicat des Eaux d'Ile de France* (SEDIF) in the Parisian suburbs. We first describe the characteristics of the traditional *affermage*, more popular in civil law contexts, and then analyze the characteristics and benefits of the

performance-based *affermage* (PBA), which includes a more equitable model of revenue distribution between partners and open book practices for sharing data. We conclude with a discussion on the evolution of new contract structures and its relevance for the sector.

CHARACTERISTICS OF THE AFFERMAGE MODEL

An *affermage* is one type of delegated management contract in the PPP spectrum. Under this type of contract, the operator is responsible for operations and maintenance (O&M). The operator collects the tariff directly from consumers on behalf of the contracting authority (CA), which may be either an asset holding company (AHC) or the government,

depending on the sector's institutional framework. The CA is typically responsible for major rehabilitation and new capital works. However, the exact terms and responsibilities for financing and implementing maintenance, rehabilitation and new works are defined in the contract. Table 1 summarizes the characteristic roles and responsibilities of the main players in an affermage model.

The operator earns an *operator's price* based on an agreed-upon share of the water tariff (per m³) that is produced and sold. The difference between the tariff and the *operator's price* is paid to the CA. The CA's share is used to fund its expenses, including debt service on capital investments.

The *affermage* may be particularly attractive in contexts where private equity and commercial debt for the water supply and sanitation sector are not readily available because the average water tariff is below full cost recovery. CAs may also prefer an *affermage* to a management contract because an *affermage* transfers the commercial risk to the operator. The design is inherently incentive-driven since the operator's remuneration is linked to its commercial performance.

Within the PPP spectrum

Within the family of delegated management contracts, the *affermage* is a variant of the concession. The basic legal principles governing the *affermage* are the same as the *concession*. They both define how infrastructure is to be used in the public interest. In both the *affermage* and the *concession*, the operator is responsible for operations, maintenance and renewal of certain categories of assets, such as non-fixed assets, meters, and domestic connections. The main difference between the two models is that in the *concession* the operator is also responsible for capital investments.

Other similarities also exist between the *affermage* and *lease* models. The terms are often used interchangeably although they are technically different. In the *affermage* contract, typically applied in civil law contexts, the operator has an intangible personal right to the infrastructure similar to a patent or a copyright but not the real property right of a leasehold. The lease model is typically applied in common law contexts. Other similarities and differences between the two are listed in Table 2.

Table 1 | Summary of roles and responsibilities – affermage model

	Role	Functions
Government	Define the water sector's policy and strategy	<ul style="list-style-type: none"> • Define the sector's policy • Define the institutional framework • Manage water resources • Establish the regulatory framework • Review and approve tariffs and subsidies
Asset Holding Company	Manage resources (<i>on behalf of the government</i>)	<ul style="list-style-type: none"> • Manage assets (<i>development, amortization, debt service</i>) • Develop and implement master plan and investment plan • Secure finance • Act as the CA for new works • Liaise with the public/implement awareness campaigns • Monitor and audit O&M quality • Monitor/supervise the operator's performance based on contractual targets
Operator	Deliver services (<i>technical operations and commercial management</i>)	<ul style="list-style-type: none"> • Operate and maintain infrastructure (<i>fixed assets and operations materials</i>) • Renew operations materials • Purchase meters and materials for customer connections • Renew and extend the distribution network (<i>based on contractual obligations</i>) • Project management of extension works of distribution network with external financing. Justify necessity of renewal and extension works through studies • Billing and revenue collection • Develop and sustain relationship with customers

Table 2 | Key features of the affermage and lease models

Features	Affermage	Lease
Operator's price	Based on €/m ³ produced and sold (<i>volumetric</i>)	Annual monetary, non-volumetric, based on cost-plus
Competitive bidding process	Lowest bid (operator's price) wins <i>The operator's price covers O&M costs, including some renewal costs</i>	Highest bid (lease fee) wins <i>The lease fee is paid by the operator to the CA</i>
Performance incentives	Linked to water production (m ³)	Linked to water sales
Bulk metering	Mandatory	Optional
Domestic metering	Mandatory	Optional
Regulation	By contract (contract compliance in achieving target performance)	Cost-plus or price-cap

Although the affermage and lease may seem quite similar, the subtleties between the two models differ substantially. The *affermage* incentivizes operational efficiency by awarding the contract to the lowest bidder – versus the *lease* in which the highest bidder (or highest payment to the CA) is awarded the contract. The affermage's performance incentives are typically structured according to water production in order to encourage water use efficiency. Lease incentives are typically based on water sales. Finally, an affermage is typically regulated by contract with regulation focusing on issues of contract compliance and achievement of targets. A lease is typically regulated through a cost-plus or price-cap regime and requires the close monitoring of O&M expenditures.

The contractual framework

The contractual framework of delegated management arrangement, including the *affermage*, typically includes the following five types of contracts: (i) a *delegated management* (or *affermage*) contract in parallel with (ii) a *performance* contract; (iii) the *concession* contract in parallel with (iv) the *development* contract; and (v) the *end-user* or consumer contract.

There may also be a *technical assistance* (TA) contract between the operator and its majority professional shareholder (see Figures 1 and 2). The six types of contracts are described further below.

- (i) *Delegated management contract (affermage)*: The contractual framework of the *affermage* is

underpinned by a delegation of management contract between a public CA (the '*signatory*') and an operator. The operator's legal status may be either public or private. This contract defines each party's responsibilities for O&M of fixed assets and the provision of water and sanitation services. The contract is typically based on a performance-incentive structure and defines the terms for reporting on performance to the CA.

- (ii) *Concession and development contracts*: In contexts where a separate AHC has been established, a concession and development contract usually exists between the government and the AHC, in addition to the performance contract between the AHC and the operator (discussed separately below). The concession contract between the AHC and the Government defines each party's precise roles and responsibilities as well as the Government's terms and conditions for supervising the AHC. The AHC (a) develops and manages water supply facilities and public works; (b) implements the investment program; and (c) has the exclusive right to acquire and construct works and facilities for production, transport, storage and distribution in the service area.
- (iii) *Performance contract*: This contract typically defines the indicators and targets for measuring the operator's performance as well as the incentives for achieving these targets. The performance contract is annexed to the delegated management/affermage contract in contexts where the AHC is the signatory – and a

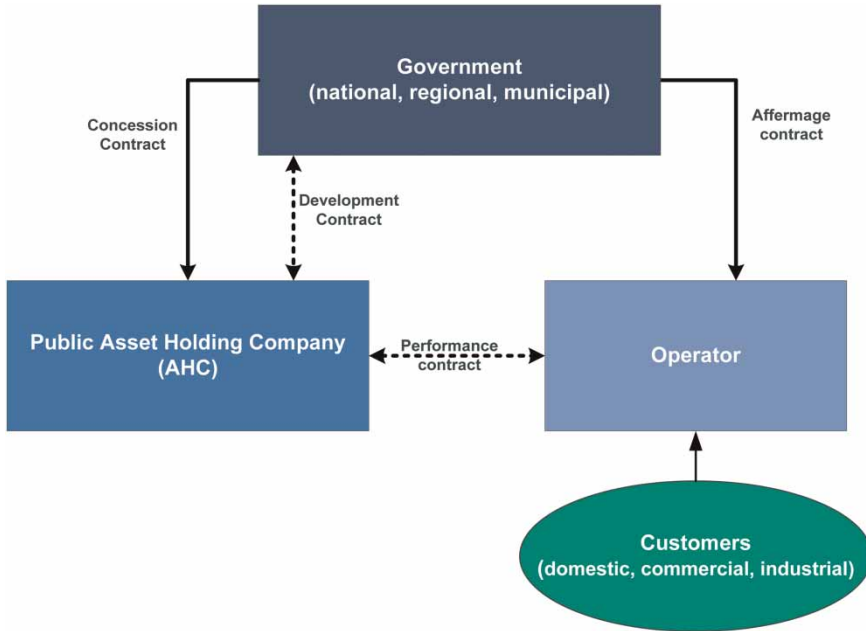


Figure 1 | Affermage contractual framework – Government is signatory.

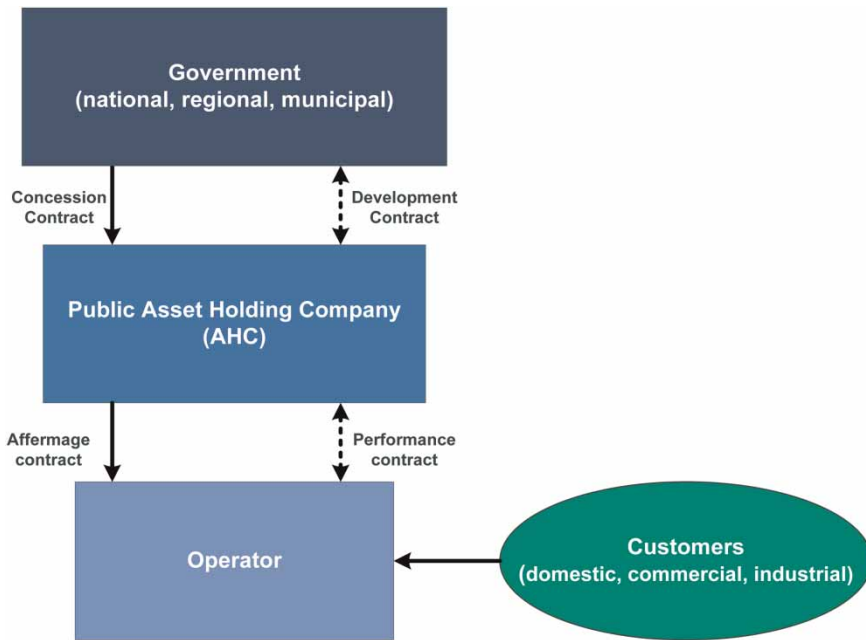


Figure 2 | Affermage contractual framework – Asset Holding Company is signatory.

stand-alone contract where the government is the signatory.

- (iv) *TA contract*: It is common for delegated management arrangements to include a TA contract for services

and assistance. This TA is often provided to the operator by its majority shareholder on a sole source basis. The implication is that there are strong incentives for the operator to siphon its revenues through

contracts awarded on a sole source basis to companies affiliated to the majority shareholder. The relations between the operator and its majority shareholder should therefore be closely monitored.

- (v) *End-user contract*: The contract between the operator and each of its customers defines the terms and conditions of service, including the level of service; the expected payment frequency and amount; and policies and penalties in case of non-payment.

Flow of funds

In a simple *affermage*, the operator collects tariffs directly from its customers and deposits this revenue into its own account – the ‘tariff account’. The volume of water billed, multiplied by the tariff, is collected by the operator and deposited into this tariff account. The operator retains part of the total revenue at a set fee per cubic meter. This fee or ‘operator price’ is the main bid criterion in the tender process. The CA (either the government or the AHC) is paid the balance between total revenue and the operator’s fee, which includes O&M expenditures. The CA typically uses its share to pay for investments and debt service. The AHC subsidizes any operational deficit and may also decide to increase the tariffs (subject to prevailing tariff review regulations).

In cases where the CA holds the tariff account, the CA reimburses the operator’s O&M costs from the tariff revenue. However, operators will have a tendency to inflate costs. There is therefore a clear need for the AHC (or sector regulator) to closely monitor the operator’s O&M costs. This may be done through the application of price cap regulation.

Remuneration structure and performance incentives

The operator’s price in both the *affermage* and lease models covers the following four elements:

- O&M expenses for production and distribution facilities, including all operator charges stipulated in the contract;
- general operations expenditures and profits;
- cost of renewing the distribution system, as specified in both the main contract and the performance agreement; and

- cost of assisting the CA to procure and supervise rehabilitation works for the distribution system, as stipulated in the *affermage* agreement.

The operator’s price (P_e) is its bid price. It is generally adjusted for inflation and other economic fluctuations on an annual basis. The operator’s revenue is calculated by multiplying its price (P_e [€/m³]) by the volume of water produced (V_p [m³/yr]).

$$\text{operator's income} = P_e * V_p$$

The operator’s income may also be structured according to its performance based on contractual targets in a number of key areas. This type of a remuneration structure is used to incentivize and reward high performance in specific areas, for example, non-revenue water (NRW) reduction ($E_{t,c}$) or revenue collection efficiency ($E_{c,c}$). Using the definitions in the box, the operator’s annual total revenue from water sales would be calculated as follows to incentivize NRW reduction and revenue collection:

V_p [m³/yr]: volume of water produced
 V_b [m³/yr]: volume of water billed
 V_c [m³/yr]: volume of water paid for
 $E_{t,a} = [V_b/V_p]_a = [1 - \text{NRW}]_a$: actual technical (distribution) efficiency
 $E_{t,c} = [V_b/V_p]_c = [1 - \text{NRW}]_c$: contractual technical (distribution) efficiency
 $E_{c,a} = [V_c/V_b]_a$: actual bill collection efficiency
 $E_{c,c} = [V_c/V_b]_c$: contractual bill collection efficiency
 T_{avg} = average water tariff per m³ billed: total annual billed revenue from water sales/volume billed for (V_b) (net of taxes) (weighted average of all tariffs)

$$T_{\text{avg}} * V_r = T_{\text{avg}} * V_p * E_{t,a} * E_{c,a} \quad (1)$$

The amount to be paid to the CA for each year of the *affermage* agreement would be calculated as follows:

$$[T_{\text{avg}} - P_e] * V_p * E_{t,c} * E_{c,c} \quad (2)$$

Thus, the operator's fee according to the basic structure is [(1) – (2)] or:

$$(P_e * V_p * E_{t,c} * E_{c,c}) + [T_{avg} * V_p * (E_{t,a} * E_{c,a} - E_{t,c} * E_{c,c})]$$

Accordingly, the operator's income is based largely on:

- The bid price [P_e] applied to the contractual target volume to be both sold and collected $\{P_e * V_p * E_{t,c} * E_{c,c}\}$; and
- The full value of the average tariff applied to the difference between the operator's actual performance and the contractual target performance $\{T_{avg} * V_p * [E_{t,a} * E_{c,a} - E_{t,c} * E_{c,c}]\}$.

The remuneration structure is designed so that the operator bears the risk for failing to attain its targets but is also fully rewarded for outperforming. In the example presented above, the operator is provided with strong financial incentives to both decrease NRW and improve collection efficiency.

The CA's income is then calculated as follows:

$$V_p * [T_{avg} - P_e] * E_{t,c} * E_{c,c}$$

The CA does however have a certain degree of influence over its income. The CA may prioritize investments that increase overall water production capacity, thereby increasing V_p . In some contexts the CA may also be able to influence the regulator or line Ministry to adjust the average tariff.

Recent trends in the *affermage* model include a greater combination of both operational and financial targets to calculate remuneration and incentivize overall higher performance. Another innovation in contract structure is the two-part operator tariff discussed below.

Two-part operator tariff

In most *affermages*, the operator's compensation is based on a flat rate per cubic meter. A more innovative approach for incentivizing performance is to apply a *two-part operator tariff*, currently applied in Senegal and Cameroon. The contractual terms of this tariff are as follows:

1. For a given volume of water produced, the CA shall pay the operator at two rates: (i) the bid price up to a set target of volume of water for which revenue has been collected; and (ii) the full consumer tariff if the operator's performance exceeds the target. The operator is also penalized at the full consumer tariff rate if performance falls below the set targets.
2. For a given level of combined technical and billing efficiency, if the operator produces more water than the set target, the operator is paid at the bid price adjusted for the difference between the target and actual efficiency. For example, if the operator's efficiency is equal to the set target, then the operator is compensated at the bid price. If the operator's efficiency exceeds the target, the operator is compensated at a higher amount than the bid price. If efficiency falls short of the target, the operator will be paid less than the bid price.

The *two-part operator tariff* sends a strong signal to the operator and the public that the CA cares a great deal about improving technical and billing collection efficiency and is willing to reward high performance with a substantial bonus. The operator is likely to invest in measures that help to ensure that the targets are exceeded. The *two-part operator tariff* may be an important determinant of success and sustainability since the operator is motivated to meet and exceed its targets – and because underperforming is quite costly.

Payments to the contracting authority

The precise amount the operator pays the CA for each contract year is determined at the end of each year in question. However, the *affermage* contract typically requires monthly payments to the CA. The end year payment is then adjusted at the end of the 12-month period depending on the operator's actual performance and revenue. At the end of the contract year the operator may owe the CA an additional sum. It is also possible that the operator overpaid the CA. In the latter, the CA must reimburse the difference to the operator.

Although the annual dues to the CA are based on the volumetric amount of water produced or sold, the monthly payments to the CA are based on the operator's revenue collections for the previous month. The implication is that

non-payment or late payment of water bills, including those by government institutions, results in a lower monthly payment to the CA. However, the operator's incentive to increase billing collection efficiency remains intact. It is the volume of water produced that is taken into account at the end of the contract year when the exact amount due to the CA for the previous 12-month period is calculated – and not the amount of revenue collected from customers.

A provisional agreement for payment to the CA for the first year of the *affermage* contract is common. This agreement is then reviewed and revised (*if necessary*) at the end of Year 1. This review process allows for any first-year teething issues and decisions, such as the installation of bulk meters or development of a strategy for recovering the backlog of payments owed by government authorities. The review process also helps to ensure that all parties have a common understanding of all contract clauses.

AN EMERGING HYBRID – THE PERFORMANCE-BASED AFFERMAGE

Emerging delegated management contracts are increasingly based on hybrid models, such as the improved *affermage* (or *affermage amélioré*) currently found in both Senegal and Cameroon. In this type of *affermage* the operator may not be given the immediate responsibility for implementing capital investments, but is responsible for financing and implementing certain renewal investments.

A *subsidized concession* is a second example of a hybrid contract (Brocklehurst & Janssens 2004). In this case the operator is responsible for contributing financially to capital investments that are subsidized by the Government.

Another innovative model is an even more sophisticated *affermage* than the *affermage amélioré* – what we call the PBA. The PBA builds on the incentive system of the *affermage amélioré* but includes a more equitable distribution of the surplus between the operator and the CA. The PBA is also innovative in the water sector for its combination of both operational and financial parameters for calculating the operator's revenue and bonus – and for its open book practices for sharing data.

These emerging hybrids for PPP contracts in the water sector provide greater options for transferring commercial

risks to the operator and for attracting private finance (Carron *et al.* 2011). They do, however, work best in contexts where a certain level of reform has already taken place and a strong and capable CA is present.

We have found that there are cases, in France for example, of the use of the PBA in order to increase transparency and incentivize performance while also strengthening the role of the CA and sharing a greater share of the surplus with the CA. SEDIF, a CA in France, has recently signed a contract with a private operator that is based on the elements of the PBA described above. The need for a more transparent and accountable contract structure in this case arose from general public dissent with PPPs and the need for a more publicly acceptable model.

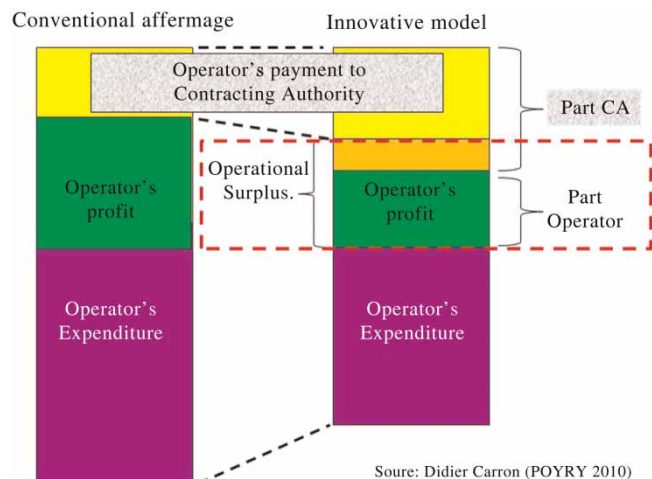
Innovation in surplus distribution

In a conventional *affermage* contract, the operator (i) pays for O&M costs, and (ii) remits the difference between average tariff and operator's price to the CA; but (iii) retains the entire operational profit. In a PBA, the operational profit is shared between contracting parties. The proportion allocated to each party is based on an incentive structure that combines both operational and financial performance targets. The indicators and target are explicitly defined in the contractual agreement.

In situations where the operator's profit can be clearly quantified through a dedicated accounting system, the performance incentive mechanism may be applied on the total operational surplus, or only on a given proportion (e.g. 50%). In cases where the operator's operational profit cannot be easily quantified or ring-fenced due to combined accounting for many interrelated activities or any other reasons, the incentive mechanism can instead be applied on a predetermined, fixed part of the operator's revenue.

Figure 3 below illustrates the differences in the distribution of revenue between the conventional *affermage* and the PBA. The most obvious advantages of the PBA include:

- Greater efficiency gains – reduced operational expenditure.
- More equitable distribution of operational profit – a reduced operator's income.



Source: Didier Carron (POYRY 2010)

Figure 3 | Revenue distribution – conventional affermage vs. PBA.

- More equitable revenue distribution – an increase in the operator's payment to the CA.
- Greater incentives for financial performance – a bonus based on the operator's financial performance as well as technical performance.

The operator's surplus may be transferred to an escrow account in order to create comfort for the operator. The operator only accesses these funds after achieving the performance targets based on both technical and financial indicators.

In case of poor performance vis-à-vis the contractual targets, the operator only receives a reduced proportion of the surplus, or even no surplus. In case of high performance vis-à-vis the contractual targets, the operator may earn a large share of the surplus (*even up to 100%*) depending on the contractually agreed equation for calculating the distribution of surplus between parties.

For the PBA contract starting in 2010, SEDIF used the following structure to calculate the private operator's surplus as a function of both technical and financial performance:

No. 1 Operational performance

- 25% on water quality, wastewater and asset management.
- 25% on quality of customer service.

No. 2 Financial performance

- 25% on profitability.
- 25% on cost controls (i.e. productivity efficiency).

The contract defined both target and minimum values for each financial and operational indicator. SEDIF required reliable baseline data in order to be able to set targets and apply the operational and financial indicators above to later calculate the operator's earnings. The baseline data was audited and validated by an accredited independent third party prior to the tendering process.

PBA advantages

There are a number of advantages to the PBA model. First, the financial gains of operations (the operational surplus or profit) are shared between contracting parties in an equitable way on the basis of an incentive structure combining operational and financial performance indicators. This is common in other sectors such as roads and energy but has not been widely applied in the water and sanitation sector to date. The contractual arrangement may be more politically attractive to public authorities, especially where officials and civil society may feel that private operators tend to disproportionately benefit from PPP arrangements. The contractual design hence strengthens the bargaining power of the public authority (SEDIF) to demand improved service delivery from the operator.

SEDIF's PBA was also designed with an open book policy and shared data platform. The contract stipulates public ownership of the data, including most of the information system developed during the contract period. The vision behind the open book policy is to better position SEDIF, two or three years prior to the contract's termination date, to freely explore and choose another, perhaps different PPP contractual option, or to even operate the services itself.

Key preconditions for the successful implementation of this type of affermage include: (i) an incentive mechanism based on an audited and validated baseline, and (ii) a capable CA, leading to a balance of power and greater mutual respect between partners.

Experience shows that in low and middle income countries, a sequential approach is most often the preferred way forward, starting with a TA or an input-based, professional support partnership and moving towards a deeper partnership, such as the present PBA. The section below explores how a PBA may perhaps be applied in the future to increase the incentives for serving low-income consumers.

Incentives to serve the poor

A Universal Service Obligation (USO) imposes a general obligation on the operator to provide service to all people living within the operator's jurisdiction. A USO is part of some countries' legal framework. However, in some developing countries the situation is less clear. For example, whether or not the operator has the mandate to serve the informal settlements or slums within its service area may be ambiguous.

Under an *affermage* contract the operator's price is based either on the volume of water produced, such as in Senegal, or on the amount of water sold, such as in Cameroon. The operator's price does not differ by geographical area (e.g. high-income versus low-income areas) – or by consumer type (e.g. domestic, commercial, institutional or industrial). The operator's price does not fluctuate based on whether the water was sold at full cost or a subsidized, lifeline tariff. This means that the remuneration structure itself does not disincentivize the operator from serving low-tariff paying customers.

Under the *lease model*, there is little to no incentive to serve low-income consumers and a clear disincentive to serve customers billed at below-cost rates – unless the operator has an explicit mandate to do so, either through a USO or contractual coverage targets (e.g. targets related to overall coverage or access).

Under the *affermage* model, financial losses incurred as a result of applying a subsidized, lifeline tariff for low-income households are meant to be absorbed by the CA and not the operator. A problem may arise, however, if the average tariff becomes lower than the operator's price and the operator is uncertain about the CA's commitment and capacity to absorb the deficit. In this type of scenario, the operator may actually have an incentive to minimize the expected shortfall by focusing its services on high-revenue segments of the market to the exclusion of low-income consumers. Efforts should be made to carefully design the *affermage* contract so that this type of scenario is avoided as much as possible. Including specific targets in the contract for serving low-income areas may help to ensure that the operator focuses its efforts in both high and low-income areas.

The traditional *affermage* does not inherently disincentivize serving the poor (Brocklehurst and Janssens 2004). However, there is room to incorporate indicators into the overall remuneration structure based on serving low-income areas. This may help to ensure that service providers focus their efforts on serving the poor as well as middle-to-high income areas.

CONCLUSION

Delegated management contract structures are evolving in the water supply and sanitation sector to incentivize efficiency gains and equitably distribute revenue gains amongst partners. The *PBA* is a performance-based contract, with the operator's profit varying as a function of both its technical and financial performance.

The *PBA* borrows certain principles from other sectors and the lessons are not limited to the *affermage* model. The use of both operational and financial indicators; two-part operator tariffs; profit-sharing; and open book practices may be applied to other PPP models with the overall objective to increase transparency and accountability, strengthen the role of the CA, and improve services for end users.

ACKNOWLEDGEMENTS

The views expressed in this article do not reflect the views of the Asian Development Bank.

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