Global Green Growth Institute

Comparative Analysis of Bus Public Transport Concession Models

Synthesis

.

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01 Introduction

Public transport in many cities of emerging economies is characterized by inefficient, polluting and unsafe buses, in many cases owned and operated by individuals and not by formal companies. This situation is the result of several factors, including weak regulation, access to capital, and the technical and administrative capabilities of both operators and authorities. In this context, concession contracts are critical tools to ensure that operators deliver efficient, clean and high-quality service, in line with user expectations and the requirements of the authorities.

There are many examples of cities around the world that have significantly improved their public transport systems by implementing virtuous concession models that incentivize the professionalization of the service providers and the authorities, resulting in better service for the users. Often, the nuances of these models are lost to transport city planners elsewhere, and suboptimal concessions are designed and procured.

GGGI developed the report *Comparative Analysis of Bus Public Transport Concession Models* to help decision makers understand what makes concession models successful, and present guidelines and best practices for the desired transformation. The need for change is based on the multiple limitations of existing models, where often, there is no government control over revenue, quality of service is subpar, concession clauses are not enforced strongly, and vehicles are unsafe and polluting.

The report analyzes and compares the concession models of 7 cities in Europe and Latin America, varying in size and level of development. Two European cities were selected based on good performance that has been sustained over time, and provide an aspirational goal for cities in emerging economies. Five Latin American cities were included to show what has worked in practice in emerging economies, and to understand what political, economic and social barriers exist for the transformation.

All the cities included in the report have implemented - to varying degrees - integrated transport systems. The report includes a dedicated section for each of these cities. For 5 of the cities, namely London (UK), Bogota (Colombia), Mexico City (Mexico), Stockholm (Sweden) and Uberlandia (Brazil), the focus of discussion is on how their current concession models operate, while the discussion for the remaining 2 cities centers around the process they undertook to transition from an owner-operator model to an organized system comprised of formal enterprises.

The present synthesis gathers main insights and examples from the case studies and attempts to provide decision makers with tools to define the type of concession model best suited for their city. Chapter 2 of this document discusses the main elements that need to be considered to design an effective concession model, while chapter 3 discusses the conclusions.

02 Concession models

This chapter describes 8 key elements that should be considered for the successful design and implementation of a concession model; it draws from the experience of the cases studied. Thee elements are: i) stakeholder's needs; ii) allocation of the service contracts; iii) roles and responsibilities of the authority and operators; iv) risk allocation; v) contract duration; vi) remuneration scheme; vii) quality clauses, incentives and penalties, and viii) procurement process. As decision makers, it is important to consider these elements per the local political, economic, social and technological context.

The planning process of a concession model is cyclical and non-linear, requiring the definition and revision of the elements enunciated above. An example of how this process can take place is shown in Error! Reference source not found.. T his process usually starts by 1) identifying stakeholder's needs, followed by defining 2) how the concession contracts will be allocated in terms of routes and/or service areas, and 3) the roles and responsibilities that key parties will assume. Subsequently, technical components such as quality clauses (with associated incentives and penalties), duration of contract, remuneration model, and allocation of risks can be designed considering the envisioned system structure and stakeholder's needs. Finally, a procurement process is selected considering the best options to implement the concession model.

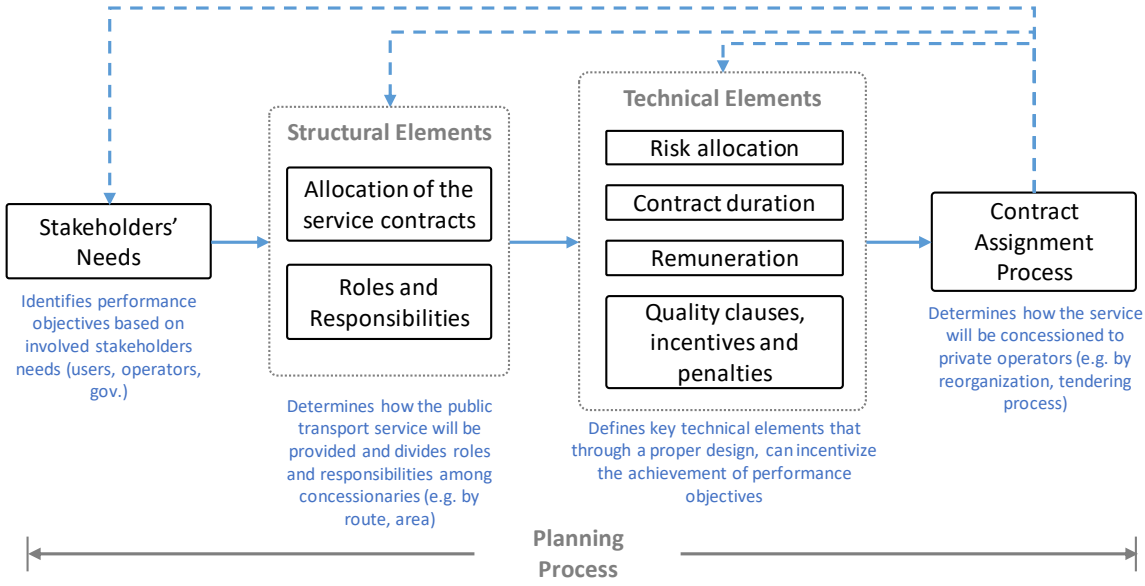

FIGURE 1 EXAMPLE PROCESS FOR THE DESIGN OF A CONCESSION MODEL

Stakeholders' Needs

A key aspect of the planning process is the identification of needs, motivations and capacities of the major stakeholders, namely users, operators and the authority. This is a critical step that – when performed carefully – provides planners with useful information to help them set clear objectives and define the specific elements that comprise concession contracts. This will help ensure that the needs of the various stakeholders are met and the sustainability of the system is enhanced.

The authority must seek to understand the different needs of stakeholders and enhance those where they align (i.e. efficient operation), while providing a framework to seek agreement when they are opposed (e.g. low fares demanded by users vs. high revenues sought by operators). Ultimately these needs would be reflected directly in quality clauses, incentives and penalties, but also influence concession elements such as contract duration and the chosen remuneration model.

Users' needs are the main drivers of a city's policies. Certain cities are better at meeting user needs than others. For example, London strongly considers user needs and has implemented an official "watchdog" organization, London Travel Watch (LTW) that represents their interests and works to promote higher standards of quality, performance, and accessibility, which has resulted in achievements like having low-floors and wheelchair accessibility in all buses.

The Quality Service Cycle shown in Figure 2, and explored in more detail in the report, provides a useful framework to examine the service quality from different points of view and is a powerful methodology for continuous improvement. It takes into account not only the expressed needs of users, but also how they translate into performance objectives, and ultimately, to the provision of service quality that will be perceived by users through their own personal perspective.

Eventually, the use of this framework will lead to a clearer picture of what the quality service cycle for the city will look like and provide a basis to measure the success of both authorities and operators on meeting these quality objectives

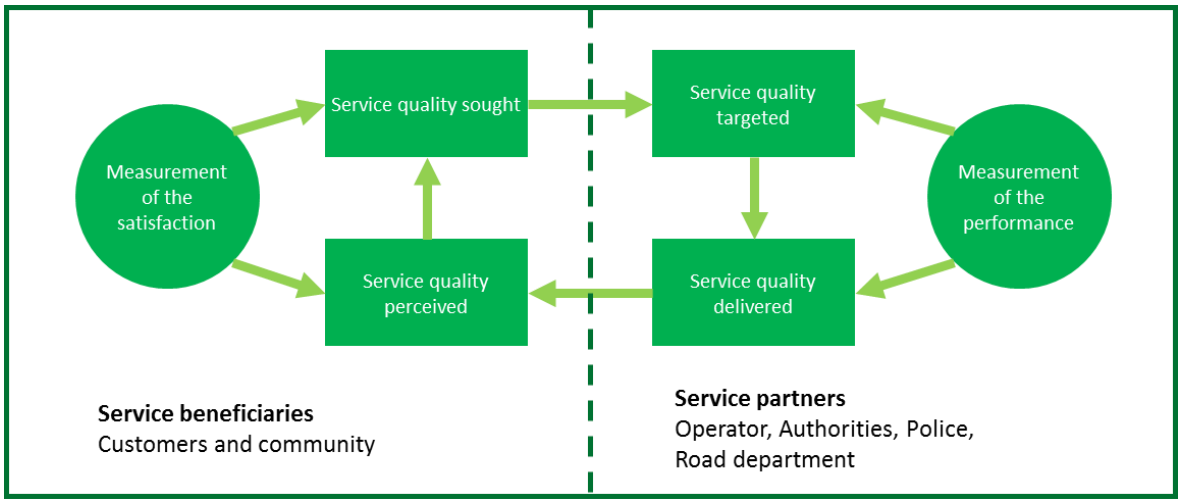

FIGURE 2 QUALITY SERVICE CYCLE. SOURCE: UNE-EN 13816. CERTIFICATION OF PUBLIC TRANSPORT SERVICE.

Allocation of the Service Contracts

A primary element to structure a city's transport system is to determine how the service contract will be allocated to the concessionaires. For instance, this can be done by assigning contracts by route, by groups of routes, by number of buses or distance covered, or by areas.

The operational model for the transport system should be selected taking into account characteristics of travel demand, the city's size and physical structure, service schedule and route design. Moreover, an initial assessment must be performed on the level of organization of the current private bus operators and the authority's institutional capacity. The choice of allocation model will have an impact on the types of services that can be offered in the system and on the elements chosen for the concession contracts (e.g. contract duration, remuneration model, etc.).

Four common allocation models are described below and discussed in more detail in Section 5.1 of the report:

By route

This kind of concession is based on an allocation by route, with the service being provided between a specific origin and a destination. The operator must offer a fixed supply of buses and comply with a pre-established path and schedule for every route. Although concessionaires are awarded a single route per contract, one operating company may operate various routes at the same time.

This type of model requires a transit authority with well-structured processes and staff that is able to handle the planning and operational burden of individual route allocations. This model is also recommended for cities with consolidated urban spaces, to guarantee that minimum changes to the route design are required through the life of the concession.

Such is the case for London, where a tendering process is implemented for each of the 675 routes in the Greater London Area. Each year, 15 to 20% of the routes are tendered. Prior to bidding, thorough reviews for each route are carried out by the authorities. In accordance with this review, the following aspects are defined or modified: i) specific bus routing; ii) timetable and service frequency; iii) type and capacity of buses, and iv) a series of Minimum Performance Standards (MPS) [1]. This scheme is also used in inter-municipal or regional services, assigning route by route according to the population and growth of each municipality or region. A critical component of the allocation scheme is that it tries to rotate operators in and out of the different routes in order to guarantee that one operator does not remain for a long period of time in the same route, thus stimulating competition and better mobility.

By group of routes

Under this model, a concessionaire is granted a group of routes with common or close origins and destinations. The motivation under such allocation is to promote operational efficiency due to conveniently located garages, workshops and offices close to such origins and destinations. Mexico City is an example of this model, since allocation is performed by group of routes (corridors) that make up a whole feeder or trunk service.

This model reduces the administrative, negotiation and auditing tasks that need to be performed by the authority, since there's a smaller number of concessions. It may be an attractive choice for cities that want to implement a route system but that do not have the administrative capacity to allocate concessions route-by-route.

By number of buses or distance covered

For this model, the transit authority defines the routes and their schedules, while the operator provides the fleet and the personnel, and complies with a set of performance and quality indicators set by the transit authority. Under this scheme the number of buses or the distance traveled is defined in the concession contract, but the actual route served by the operator may change over time, per the direction of the transit authority, to accommodate for changing circumstances. The BRT systems in Bogota (Colombia) and Uberlandia (Brazil) work with this allocation model.

However, under this model the operators have an incentive to increase the number of buses and the kilometers travelled in order to receive higher income, thus generating excess supply. To address this issue, the authority must conduct greater oversight over service programming and identify possible mismatch between demand and supply. Such control and monitoring can be done in a more efficient way in smaller cities or in specific components of the transport system (e.g. trunk system). In fact, some cities that had adopted the fleet model are currently changing it to an allocation by area.

By area

In this model, an operator is responsible for providing service in a predefined geographical area that includes several routes. Under this model, the design of routes and operation planning process may be carried out either by the authority or the concessionaire. This set of routes can be optimized later by the operator or the transit authority to address changes in demand or to gain higher operational efficiency.

Also, for growing and more dynamic cities, this model may give more flexibility to answer the city's changing needs. It recognizes differences in the area's needs (demand behavior, infrastructure conditions, etc.) and allows the creation of specific local conditions that guarantee the business balance to the system and to each area operator.

Bogota's bus operation is based on concessions by corridors and feeders for the BRT lines and concessions covering areas of the zonal services. These area services divide the city into 13 zones around a central neutral zone, with each of the 13 zones allocated under a single concession.

Stockholm also uses these types of allocation, where it relies on the concessionaires to design route and plan operations within their allocated areas.

Criteria to compare allocation models

Based on the results of the case studies that were analyzed, a series of parameters were defined to take into account when deciding what allocation model best suits each city. These parameters, which are discussed in Section 5.1.5 of the report, are:

- Level of intervention of the transport authority.
- Flexibility to modify routes (supply adjustment).
- Economies of scale.
- Engagement of the authority in the operation of the system.
- Integration with other transport systems.
- Change from an existing to a desired transport system.

Roles and Responsibilities of Authority and Operators

The technical planning of the transport network is key to ensure the system is efficient and that good service quality is delivered. It is, however, a resource-intensive process that requires advanced technical capacities and financial resources, and its outcomes may be difficult to enforce. This planning includes route definition, bus dispatch, constant monitoring and evaluation, and the

adjustments of new contracts to meet changing needs.

It is critical for cities to consider the technical capabilities of authorities, operators and other service providers when assigning roles and responsibilities. There is a spectrum on how these roles and responsibilities may be delegated differently among stakeholders, which varies from city to city, depending on the local context. For instance, the planning process may be carried out mainly by the authorities (as is the case of London), by operators (as is de facto in cities with low institutional capacity), or balanced between authorities and operators (as is the case of Stockholm). First, let's explore London, a city that achieves high levels of quality of service and that constantly improves its transport network in response to a growing demand for public transport. Key to the city's transport success is the very technically strong and resource endowed institution Transport for London (TfL) – which plans, monitors and constantly adjusts the transport service provision of the city's bus system. TfL carefully plans new routes, including dispatch, considering current and projected demand, and it auctions the operation to private operators through a carefully planned procurement process. This model, although successful in delivering high service quality is also expensive and requires large government grants to operate.

Stockholm, a city that has succeeded in reducing emissions and improving the perceived service quality of its public transport has a different approach. Compared to London, Stockholm delegates more responsibilities to operators, empowering them to create a solid and competitive transport system, where they are responsible for the analysis, planning and local marketing of the services, which means they are fully responsible for guaranteeing service quality and service optimization. They also establish certain operational parameters, including definition of timetables and management of dispatch, allocation of resources by assigning drivers to vehicles and vehicles to routes, as well as the optimization of empty kilometers. Additionally, they are tasked with the acquisition, financing and maintenance of vehicles, as well as that of depots and shelters. Operators are entrusted with such important roles because their companies are strong, with high technical capabilities, vast international experience and the financial muscle necessary for large investments. Although private operators have most of the operational responsibilities, Storstockholms Lokaltrafik (SL), the regulation company that controls the private transport operators, remains a strong transport authority, able to define, control and oversee the compliance of operation contracts.

In contrast, in many Latin American cities with limited institutional capacity to carry out technical planning and enforce operating agreements, bus operators perform these functions even in cases where the law explicitly assigns them to the authorities. In these instances, the main driver determining planning and operations tend to be the operator's profit margins. This system, while not perfect, has some merits, as it draws on the practical expertise of the operators for some planning functions, such as the creation of new routes, a process that is demand-driven and may even be ultimately defined by trial and error. However, in these cities, the frequency, reliability and quality of service are typically poor.

The roles of the authority and operators of a city's transport system must ultimately ensure that the objectives and needs of all stakeholders involved are met and sustained over time, and critically, it must consider what division of roles and responsibilities are feasible given the local context and technical capacities of authorities and operators. How and what to delegate to each party must be carefully considered, taking into account the city's political, economic and social situation and must be explicitly defined in the concession contracts.

Risk Allocation

Allocating risk between authorities and operators is an important aspect of concession design. When properly assigned, risk allocation can act as a powerful incentive to improve performance and can ensure the economic sustainability of the system; conversely, poor allocation can jeopardize efficiency and the operation of the system. The way risk is allocated in the cities included in the report varies considerably, not only due to different local objectives, but also because political considerations have a bearing on how this risk can be allocated. Therefore, there is no one-size-fits-all approach. Section 5.7 of the report discusses important aspects of risks including how they arise and the advantages and disadvantages of allocating them between different stakeholders. In this synthesis we briefly describe the main types of risk and present illustrative examples.
Some of the main types of risk associated to a public transport system are:

Demand risk

The variation produced in revenue resulting from the changes in the total number of passengers in relation to the expected demand. This risk can be allocated through different mechanisms (remuneration scheme, incentives, penalties) to a single stakeholder or shared among them. The allocation of demand risk varies greatly between cities.

Some cities allocate this risk entirely to the authority, as in the case of London, where the authority spends great resources ensuring its planning and projections are correct, thus minimizing its demand risk. Operator remuneration in London is based on service provision and does not dependent on the number of passengers, therefore any fluctuations on the demand for public transport are assumed by the authorities.

Other cities allocate demand risk to operators, through the zonal areas of Bogota and the VBP (Verified Paid Passengers) contracts in Stockholm. The rationale is that this risk allocation incentivizes operators to increase the demand for public transport. For instance, in Stockholm, transport authorities transfer the entire responsibility to plan the routes and timetables to the contractors for them to mitigate the demand risk. However, this allocation requires good planning from the operators during the tendering process. If this risk is not properly dimensioned, the city may end up facing the risk of an insolvent provider. To mitigate this possibility, Bogota has some safeguards, where the technical and social fares are reviewed periodically; therefore the operators bare the demand risk only until the next review process.

Yet, other cities opt for sharing demand risk between operators and transport authorities. Such is the case for some corridors of the Metrobús system in Mexico City, where operators are remunerated based on a combination of distance and demand, effectively sharing demand risk between authorities and operators.

Fare evasion risk

This refers to risk related to a decrease in fare income due to fraud in the payment system, technological failure, inappropriate subsidy management and control, or simply because users access the transit system without paying. The nature of this risk means that unless it is explicitly allocated and monitored, the bearer of demand risk also bears fare evasion risk.

In the London transport system, demand and fare evasion risks are underwritten by London Bus Services Limited (LBSL), a subsidiary of Transport for London (TfL). Fare evasion is reflected as a loss of potential revenue for LBSL. This risk is mitigated by carrying undercover operations across the entire transport network to detect and penalize fare dodgers. Because these penalties are high, their mere existence acts as a deterrent for evasion.

Operational risk

The economic effect produced by the erroneous estimates of operation, maintenance, staff, and contingency costs, which can generate additional expenses for the provision of the service or cause financial instability. In its majority, this risk is typically allocated to operators, as it is an important incentive to operate in an economically efficient manner. As the bearers of this risk, operators are motivated to reduce costs and find opportunities to operate efficiently.

Authorities can mitigate the risk of poorer quality of service from cost-reductions by applying deductions when failing to meet quality objectives. London and Mexico City are examples of this.

Many cities take on some of the operational risk by adjusting the technical fare or updating fares. This may be done, for example, to mitigate the risk of price fluctuation, operation overruns or inflation.

Implementation risk

The economic effect caused by the lack of readiness of the projected infrastructure, vehicles or other equipment and assets that are necessary for system functioning. The implementation risk, which can be shared, is usually assigned to the party responsible for the provision of infrastructure.

In the case of London, where LBSL Services is responsible for the implementation of the bus network infrastructure - which includes bus stops, stands and stations -, the operator's remuneration is not affected by the non-availability of such infrastructure. Therefore, any delay in the implementation of infrastructure that affects operation does not impact the revenue of operators.

In the case of Bogota, Transmilenio - the agency in charge of implementation - must compensate the transport operators contractually for possible income reduction due to delays in the implementation of the system.

Regulatory risk

The economic effect due to modifications to laws and regulations. This risk can actually refer to different types of risks related to changes in fuel type, wage or corporate taxes, environmental regulations, changes to fares or others. Each one may require a special allocation or mitigation strategy. There are some interesting examples of these types of risks.

In Bogota, the transport system was setup up considering that the bus fare would be able to cover the full cost of operating the system (i.e. technical fare). Authorities have the prerogative to define bus fares independently of the calculated technical fare but must assume any lost revenues if they do not match. Although the scenario was assumed to be of low probability, this situation has occurred several times in the last administrations.

In Mexico, operators' remuneration is adjusted yearly due to increases in the cost of fuel and inflation, and thus the risk is born by the authorities. On the other hand, risks related to environmental, wage and tax regulations are born by the operator.

Stockholm is subject to European law, and according to European regulation, concession contracts may be modified during the operation period by up to 10% of the amount of the contract. The contractors must assume this risk in the event that the authority considers that the contract value must be reduced.

It is important for planners to carefully evaluate the risks that the system implementation and operation may face, and to take the necessary precautions to mitigate them; to assign the risk appropriately considering the pros and cons of this allocation, and to consider the implementation of safeguards to alleviate risk bearing to avoid

situations that could jeopardize the functioning of the system.

Contract Duration

Based on a review of best practices on public transport concessions, a contract duration of 7 to 12 years is recommended. It is a reasonable period that allows the authority to improve the contract clauses between successive tendering processes. It encourages competition compared to longer-term contracts, as concessionaires will face competition more frequently.

New concession contracts typically require that operators use new buses, therefore bus routes with shorter concessions lengths can be expected to have newer more comfortable and reliable buses with higher emissions standards than longer ones.

Longer time periods may lead to market foreclosure, diminished competition and a complicated negotiation process to make changes to quality clauses or technical requirements. The useful life of assets is another important element in contract duration, as the fleet becomes older, failure rates increase and so do maintenance costs.

London and Bogota are contrasting examples of the implementation of different contract durations, and it is interesting to see the impact that these different terms have on the operation of the system.

London's concession contracts are set for an initial period of 5 years with a possible 2-year extension. This means that contracts for each route are tendered again every 5 to 7 years. In a calendar year, between 15 to 20% of the city's routes are tendered, with the tendering fairly distributed throughout the year. This constant flux of tendering and new contracts provides the transport authorities ample opportunities to build expertise in the tendering process and allows them to easily adjust contracts according to lessons learned and changing contexts (e.g. Olympics in 2012). This tendering process incentivizes the professionalization and continuous improvement of operators. Operators benefit from having dedicated teams innovate on ways to increase their competitive advantage versus other operators, so that their success rate in the tendering process increases. To accomplish this, operators measure their own performance and look for ways to improve it.

It is important to note, as mentioned in the previous section (*Quality Clauses, Incentives and Penalties*), that the 2-year extension is contingent on the bus operator meeting the quality requirements set by the *Extension Threshold*. The 5-year short-term concession of London makes the 40% time extension quite significant for the economics of the operators, making it one of the strongest incentives to meet quality clauses implemented in London.

Bogota in contrast, has much longer concession periods, hindering the possibility of adjusting contracts to better align the authority and operators' objectives. Because Transmilenio in Bogota was implemented in several phases, the contract duration was defined independently for each phase. Phases I and II have a concession period lasting up to 15 years or when the fleet reaches 850,000 kilometers. Phase III has an even longer period of 24 years, greatly limiting the possibility to improve contracts. Therefore, if the authority wants to change quality of service or technical requirements during the contract term a new negotiation is required.

The long term contracts in Bogota seemed to be used as a mechanism to mitigate the existing bus operators' unwillingness to implement the new model, and also from operators having to provide depots and cover the costs of the overhaul of the old units.

Implementing short-term concession contracts is nevertheless not always feasible. To ensure the viability of a concession,

expenses on new buses by concessionaires should be amortized over the lifetime of the contract, which, depending on the approved fares, may take a considerable amount of years. Given the much higher fares and subsidies available in London compared to Bogota, it is not surprising to see such a huge disparity in the length of concessions between these cities.

The contract duration is also determined by the responsibilities, services and investments that the operator must provide. In cities with limited resources, operators are sometimes requested to bear the costs of investments that should be made by the authority, as is the case in Bogota. The duration of concessions is also often used as a mechanism to mitigate resistance of existing operators to implement a new transport model, as was the case in Colombia for Bogota and Pasto. However, given the powerful influence that a short-term contract duration may have on exerting change and incentivizing good service, it is important for the authorities to avoid very long-term contracts, and would be well-advised to implement plans to shorten future concession contracts as much as possible.

In certain BRT systems, the contract duration is determined by the maximum number of kilometers a bus may travel before reaching its useful life, or the average kilometers of the total fleet. In this regard, typical limits for operated kilometers in Latin America range between 800,000 to 1,000,000 km for diesel vehicles and 1,800,000 km for hybrid vehicles. In the case of Transmilenio, the useful life of an articulated bus is set at one million kilometers per unit, which divided by the average value of kilometers/year per bus (between 80,000 and 100,000 km), results in an estimated useful life of 10 to 12 years.

If the contract duration is determined by the kilometers operated by the fleet, a clear and accessible methodology for kilometer measurement (odometer or high-precision GPS) should be defined before starting the operation. It must also be clear how kilometers will be measured on the operational and reserve fleet, and how both quantities will be added or averaged.

Table 1 shows a comparison of concession contract duration in the cities included in the study. London and Stockholm – the cities with the shortest contract periods – have well-established, long-standing public transport systems, and their experience has led them to prefer short-term contracts. They also have higher fares and government subsidies that allow operators to amortize capital expenses quicker than in other cities, making these contracts viable.

City	Operation contracts period	
	Organized bus system	BRT system
Bogota (Colombia)	24 years	15 years
Pasto (Colombia)	15 years	---
León (Mexico)	15 years	---
Mexico City (Mexico)	10 years	10 years
Uberlandia (Brazil)	10 years	10 years
Stockholm (Sweden)	8-10 years	---
London (England)	5 years	---

TABLE 1 CONTRACT DURATION IN DIFFERENT BRT AND TRADITIONAL TRANSPORT SYSTEMS

Remuneration Scheme

The amount payable to the operator for the provision of the bus service, referred to as remuneration scheme, should be defined in the concession contracts, along with incentives and penalties designed to guarantee operator performance and compliance with quality of service indicators.

The operator's total revenue is made up of:

a. **The payment mechanism** for the operator, which may be a combination of remuneration per vehicle, number of passengers, kilometers logged, among others. The importance of each variable within remuneration will influence the strategies the operator will develop to maximize income and reduce costs.

b. **The incentives** (reward, bonus) and **penalties** (economic penalties, fines) will be calculated according to their compliance with the service standards. This mechanism is detailed in the next section of this synthesis and in Section 5.5 of the report.

This section focuses on remuneration schemes, of which three types are discussed: remuneration by buses, by kilometers, and by passengers. In practice, hybrid remuneration schemes based on these individual schemes are usually adopted. A longer discussion on the merits of each remuneration scheme is presented in the complete study in Section 5.3. In this section, a brief explanation of each remuneration scheme is presented followed by a discussion on the remuneration scheme applied by different cities.

Remuneration by buses

Remuneration is granted to the operator for each vehicle that is registered and operational in the transport system. The compensation per unit may vary according to vehicle type, size, technology and age. In this sense, the contract must define a clear base line for payment based on the aforementioned characteristics.

Remuneration by kilometers

Remuneration is granted to the operator based on the number of commercial kilometers logged on each type of vehicle. Each vehicle typology and propulsion technology has a different cost per kilometer covered, so the contract should define a clear methodology to determine both the number of kilometers and their unit price. If the contract period is significantly long, a methodology should be defined to periodically update the cost of the most important cost components (fuel, oil, tires and labor costs, among others)[1].

Remuneration by passengers

Remuneration is granted to the operator based on the number of paid passengers. Under this model, demand risk is totally or partially transferred to the operator. Therefore, it should be assessed whether the operator is capable of designing mechanisms to promote demand and control user payment evasion.

Under the London remuneration scheme, TfL retains the fare revenue and the operator pays the full operating costs. The amount payable to the operator for the provision of the bus service is based on an agreed yearly contract price, minus deductions for kilometers not operated for reasons under the bus operator's control. In addition, the incentive scheme includes payments and deductions.

In Mexico City's Metrobús, the bus operation remuneration is a function of the kilometers operated and, for some corridors, the system's demand. Regarding the corridors that only take into consideration kilometers, the bus remuneration is equivalent to the driven kilometers multiplied by the contractual agreed payment per kilometer. In the case of corridors that consider demand, there is a fixed payment per kilometer travelled for each demand interval. The cost per kilometer paid to the operator is different for each demand interval. For both types of remuneration, the payment per kilometer is adjusted annually based on the weighted average consumer price index and annual diesel increment.

In addition to choosing the adequate scheme for each city, a payment mechanism must be chosen depending on whether the service is for a trunk or a feeder.

When users access the system through stations and no validation takes place on the

[1] The contracts of Phases I and II of the trunk line component of Transmilenio include an adjustment to the cost basket every 3 to 5 years.

vehicles, there are operational difficulties in appraising and identifying the demand of each route/vehicle, since payments are usually made at the stations' entrances and several routes can be taken at each station. For trunk services, it is recommended to assign remuneration schemes by vehicle and/or kilometer but not by the number of paid passengers. The income of the concession holders will depend solely on operational variables, as is the case of the different trunk stages of Transmilenio in Bogota and the Integrated Transport System or SIT in Uberlandia. These models provide flexibility to adapt supply to demand and to adopt new technologies and vehicles types.

Ideally the feeder service remuneration, unlike trunk operation, should depend on the number of paid passengers. In this type of service, the operator usually has a direct impact on demand, since the company can define strategies or perform daily control of the routes to improve quality of service and promote boarding. However, it may be more appropriate to develop a payment scheme that combines passengers, vehicle and kilometers to avoid the undesirable consequences of on-street competition.

Quality Clauses, Incentives and Penalties

Quality clauses are used to translate stakeholders' needs into performance objectives. They give operators clarity on what performance is expected of them and provide authorities with clear guidelines to evaluate such performance. Contracts thus should reflect a set of rules that ensures that user perception of service quality is as close as possible to the expected quality. In this regard, clauses should be built based on the following premises:

- Every service quality criterion shall be based upon predefined policies established by the authority.
- Each parameter must be associated with clear indicators, with respect to a baseline and an expected outcome. Every indicator must be specific, measurable, time-bound and feasible.
- The responsible party, tools and frequency of measurement should be clearly defined from the beginning.
- The authority should define the staff and tools required to perform quality control.

Quality clauses are generally classified in the following categories: Quality, Productivity and Externalities. The first category of indicators measures user perception of service quality and provides essential information for service improvement and future planning; the second category measures the efficiency and efficacy of the resources with respect to the provision of the service; the last category includes the collateral effects of the operation, for example pollutant emissions. Each category may encompass different indices that cities can use to achieve predefined objectives. Examples of these can be found in Section 5.4 of the report.

To ensure quality clauses are met, incentives and penalties are typically used to promote behaviors that are conducive to their attainment and curb those that may jeopardize them. Quality incentives are included in concession contracts to generate high quality service provision, operational cost reduction and operational efficiency maximization; penalties are used to discourage service standards below previously defined parameters.

Cities that spend the time and resources drafting a well-thought-out set of strategic incentives and penalties are usually rewarded with predictable operators' behavior and better quality of service. This is not a straight-forward task, though as a dedicated team, it is necessary to draft incentives and monitor behaviors and performance. Also, to sustain and improve good performance and quality of service, these incentives and penalties need to be reviewed and updated

periodically to reflect changing objectives and local contexts. This can be challenging for long-term contracts, and thus it is important to put in place mechanisms that allow for periodic reviews and adjustments.

London is a good example of the effective use of different mechanisms to incentivize good performance and the provision of good quality of service. The city has a set of indicators to measure performance quality that takes into account the regularity and punctuality of services, driver and vehicle quality, mechanical fleet conditions, customer satisfaction, contract compliance and safety. It uses these indicators (except safety, which the city considers non-negotiable), to build a Minimum Performance Standards (MPS) index, which is used annually to compare the operators' annual performance on each route against the contracted MPS. If the operators' performance is over the MPS, it can earn up to 15% of the contract in bonus payments, but if performance is under the MPS, it can have up to 10% deducted from the contract price. Since TfL uses a robust cost model to limit operators' profit margin above a pre-established base remuneration, this system of bonuses and penalties acts as a strong economic incentive for operators to perform well.

London's short 5-year concession also lends itself well to ensure that quality objectives are achieved. These concessions may be extended for 2 additional years – a 40% extension – if the operator meets or exceeds the *Extension Threshold*, which is linked to, but with higher standards than the MPS. Meeting or exceeding the *Extension Threshold* implies that operators have to outperform the average services standards for at least 4 quarters. It is a powerful incentive that stimulates the delivery of higher service standards consistently.

Given the low margins with which bus concessionaires operate, a two-year extension in which presumably operators could have access to better operating margins - as they are likely to have amortized their concession related investments – is an attractive prospect. It is also worth noting that this powerful contract-extension incentive requires no additional government funds.

Bogota, similarly to other Latin American cities, also applies a set of quality indicators to measure performance. It has an economic bonus that trunk operators of the BRT system can receive if their performance index is above 80% for the month. The funds for bonus payments comes from savings kept from the penalties applied to operators. The money available is distributed among the operators that were awarded a bonus in proportion to their final quality score.

This system of bonuses is attractive in that it is not dependent on additional government expenditure. However, operators with good performance are rewarded only if there are operators that have not performed up to standard on the same period. It is a system of incentives that does not send clear signals consistently. For instance, an operator that greatly exceeds the performance target may not get a bonus if there were no penalties collected for that period; another operator that consistently misses the performance target may, in theory, get a bonus in a period in which it met the target.

An important aspect to consider when drafting quality clauses, incentives and penalties is their potential impact on the costs of running the system. A case in point is Stockholm, where transport authorities have aggressive plans to guarantee sustainable and clean mobility, making the city a pioneer in the use of clean energy in their public transport, and which has resulted in 87% of its fleet running on alternative fuels with reduced emissions. However, contracts usually specify very detailed requirements - such as the use of biogas or a particular type of fabric for seats - instead of establishing criteria for which the contractor has flexibility in deciding how to meet, at potentially lower cost. For example,

specification of the use of biogas-powered vehicles precludes the contractors from using other types of clean fuels that could meet standards more cost-effectively. The inclusion of numerous non-standard requirements for the vehicles in a specific contract has caused an increase in service quality, albeit with an increase in operational costs [2].

There are other illustrative examples on how incentives and penalties can be applied to promote the attainment of quality objectives. The report that accompanies this synthesis contains dedicated sections for London, Bogota, Mexico City, Stockholm and Uberlandia that discuss incentives and penalties mechanisms used by these cities.

Incentives and penalties are powerful tools that authorities can use to promote good performance from the operators. An effective system of incentives and penalties can have a transformational effect on the transport systems of a city. Spending the time and resources to develop, evaluate and regularly update incentives and penalties can be a cost-effective endeavor to sustain and improve good service quality.

Contract Assignment Process for Transformations

The contract assignment process can be carried out in two different ways: through a bargaining process with existing transport entities (bus drivers, bus owners, affiliating companies, among others), or by carrying out a tendering process.

In a transport reorganization process, contract assignment through bargaining with existing operators is often used as a way to minimize potential social impacts and to secure backing from key stakeholders. When using this option, it is not uncommon for cities to negotiate as well as for existing operators to help finance the transformation by investing in infrastructure. This bargaining approach may be desirable when the transformation involves several stages, as this can help gather support from other transport operators (as in Mexico's Metrobús system).

This bargaining process has drawbacks that could be very significant in some contexts. As part of the bargaining process - especially if operators are asked to support the transformation with capital - operators may ask for special assurances, such as a long contract duration (as in Bogota's 15 and 24-year concessions for different stages of the Transmilenio), hindering the leverage that shorter concessions have on ensuring the provision of quality service and the usage of new, more comfortable and less pollutant buses. Furthermore, this process can limit access to the market to new and more efficient competitors for years or even decades. Existing operators also need to be reorganized, which could be a challenging process depending on the level of informality in which they were operating.

Contract assignment through a tendering process is, in contrast, a way of bringing new competition to the provision of transport services. This process can attract new and more efficient operators with experience in the provision of quality service in other cities. However, it is a more difficult process to implement, socially and politically speaking. A tendering process could bring strong resistance from current operators to the transformation, especially in places where they have enjoyed long concession contracts or where renewing their concessions has gone unchallenged by competition. Santiago, in Chile (not included in this study), opted for this approach in 2002 when a tendering process for the new Transantiago system was announced [3]. This left existing operators unhappy, mounting a strong opposition, blocking roads and stopping service, resulting in several people detained and buses confiscated [4].

Cities looking to reorganize their transport systems should carefully consider how best to execute the contract assignment process. Given the need for social support that these transformations entail, it is not surprising that a bargaining process is favored. Nevertheless, it is critical for the long-term success of the transformation for safeguards to be considered to mitigate the drawbacks of this approach, and that the shortest, economically viable duration of contracts is secured. This can help bring healthy competition to the system sooner.

Cities also benefit from helping existing operators acquire new business skills to run more efficient operations. This is beneficial regardless of the contract assignment process chosen, but critical when a bargaining process is chosen.

Implementing the transformation requires careful planning and consideration of the local context. Bargaining and tendering processes will require different approaches to secure social support and for the success of the various steps involved in the reorganization.

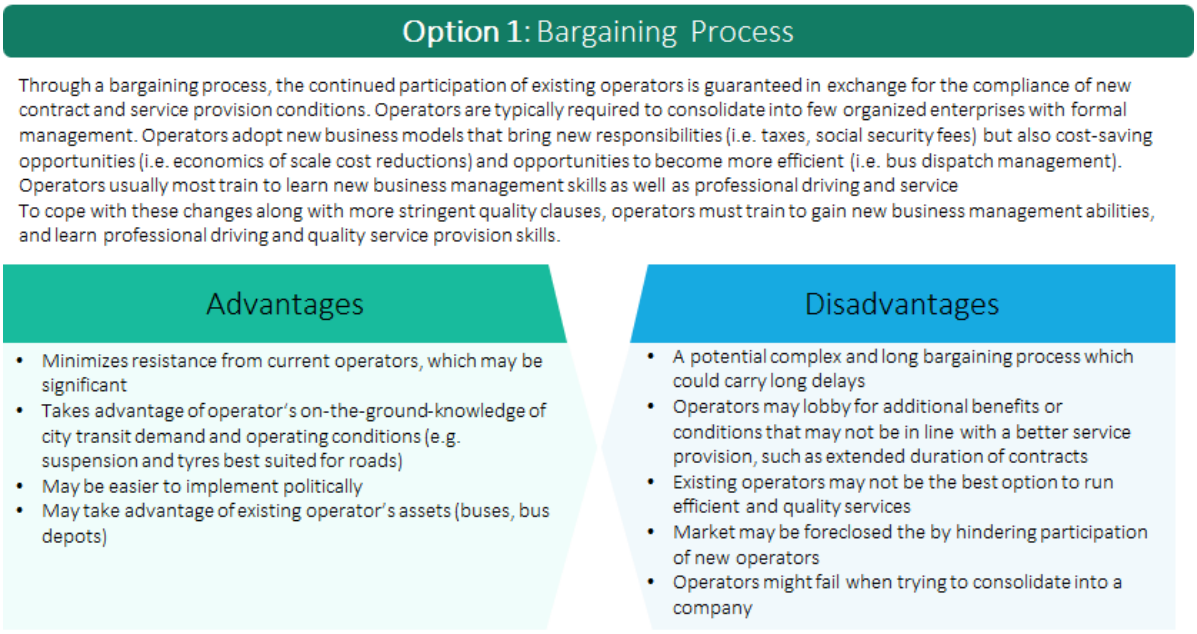

FIGURE 3 ADVANTAGES AND DISADVANTAGES OF A BARGAINING PROCESS

Option 2: Tendering Process

The procurement of concessions is carried through a tendering process open to new competition. Through this process, companies that comply with a set of requirements (organizational, legal, technical, financial) may participate in the process. To participate in the process, existing operators must organize into competitive business entities. The government may choose to assist existing operators in acquiring the required set of skills and coach them on the tendering process.
This process can serve as a backup option if a bargaining process fails.

Advantages

- Promotes competition and incentivizes continuous improvement
- More stringent requirements may be defined than through the bargaining process
- Guarantees the best operator that delivers the service required at the best price is selected
- Incentivizes the adoption of innovative business models and operating strategies to minimize costs and be competitive
- It allows for fast implementation

Disadvantages

- May create significant social and economical impacts among existing operators
- Possible resistance for project implementation
- Political difficulties for project implementation
- New operating companies may lack awareness of mobility dynamics
- To enter the market, new operators may need significant capital investments

FIGURE 4 ADVANTAGES AND DISADVANTAGES OF A TENDERING PROCESS

03 CONCLUSIONS

This synthesis serves as a general guideline with concrete examples from the cities that were studied, to design a concession model that best suits the needs of a city, while considering the capacity, motivations and possible behaviors that stakeholders may exhibit.

There is no ideal concession model; each city must develop its own solutions to implement the transport system that fits its needs and circumstances – a tailor-made plan that considers the political, social, economic and technological state and feasibility of implementation.

First and foremost, the objectives of what the city wants to achieve with the new transport system and how to go about implementing it, must be clearly defined: what does it want to achieve (lower emissions, reduce congestion, lower costs for the user, etc.); how will it tackle the various challenges it faces along the way (negotiating with operators, tax regulations, etc.); is it a simple restructure of the system or a complete transformation.

The city should then consider the needs of the main stakeholders in order to establish the structural elements that define the city's transport system: how the public transport service is to be allocated (route by route, group of routes, fleet/kilometers, areas or zones, or hybrid systems) and how the roles and responsibilities are to be assigned among the stakeholders (i.e. who takes over the technical planning process). Defining these critical elements can help decision makers decide on the technical elements that help shape concession contracts. These elements include risk allocation, contract duration, remuneration scheme and the definition of quality clauses, incentives and penalties. The careful consideration of these technical elements can help ensure that a quality service is delivered and that the city's objectives are met.

These are some of the essential aspects that decision makers must keep in mind when drawing out their solution plan:

- ✓ Contracts must strike a delicate balance between being clear and allowing for flexibility to change or alter certain clauses if needed.
- ✓ Quality parameters must be well defined in the contracts in order to lay the groundwork for the mechanisms of incentives and penalties, to encourage operators to reach the levels of service established in the quality clauses, and guarantee that they do not cause economic instability to operating companies.
- ✓ The definition of the contract's terms should be based on the assets' (especially vehicles) useful life, the financial structure of the concession and the risks assigned to the operating companies. It may be desirable to minimize contract duration provided the above elements are considered. International experience has demonstrated that contract terms lasting between 10 and 12 years are reasonable.

- ✓ Define clear roles for both the authority and the operators; this in turn will facilitate not only the allocation of risk that each agent will handle based on their capacity to control and mitigate it, but the adequate remuneration scheme to amortize operational costs and recover investments to receive profit margins.
- ✓ The incentive and penalty mechanism in the contract must be part of a strategy to motivate operating companies to reach certain levels of service. It must seek to ensure high quality provision of the service, maximize operational efficiency and minimize negative externalities. The development of this tool must be based on the system's needs and specific challenges. In addition, incentive and penalty rules must be clear and measurable, as well as aligned with the institutional capacity of the authority that must perform its monitoring and control.
- ✓ The agreement shall include clauses to handle contractual changes, actions to be taken in case of poor results and improvement mechanisms among others.

Ultimately, be it a tendering or bargaining process, the procurement process and implementation of the system must be carried out with transparency and be goal-oriented; in turn, the results must be aligned with public policy goals, always keeping in mind users' needs. These processes are in constant evolution, which is why, among the goals established for the chosen concession model, there must be one that considers continuous follow up to measure the real impact of the newly installed model.

The implementation of the concession model is also critical to ensure the success of the transformation. A successful transformation of a city's transport system that minimizes problems and obstacles requires the careful and successful completion of a number of steps. First, **pre-feasibility studies** should be carried out to create a baseline, diagnose the current regulatory framework, infrastructure and technical capacities of stakeholders, consider possible solutions, and ultimately choose a general approach. Then, authorities should carry out **institutional strengthening** to create an adequate legal framework, recruit qualified personnel and assign responsibilities. Authorities can then conduct **feasibility studies** to implement detailed technical, technological, legal and financial planning of the desired transformation or project. **Infrastructure implementation**, **preparation** and **pre-operation**, as well as a **media plan** will also need to be developed to ensure equipment and infrastructure are acquired and constructed correctly, and that users and other stakeholders are properly informed of the new system. Section 6 of the main report discusses these elements in more detail.

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The Global Green Growth Institute was founded to support and promote a model of economic growth known as "green growth", which targets key aspects of economic performance such as poverty reduction, job creation, social inclusion and environmental sustainability.

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