

### (iii) Operation Contract with Cost-plus

The operator presents an estimate or forecast of operation costs (not including capital costs, since the assets belong to the client) and the municipality or client pays a percentage above the estimated costs (a rate between 7-10%), which corresponds to the profit or earnings for private operator.

Under this regulation system, the operator in charge of the operation contract should hand out a set of information, such as the following: (i) volume collected, (ii) operation costs for the operator (which must be audited constantly), (iii) customers serviced; (iv) others.

### b. Summary on the Three Forms of Price Regulation Under the Operation Contract

The first two options for price regulation (lump sum and unit price) the price is regulated, as it is implied within the competitive bid.

In the price regulation through a “cost-plus” system, the price is regulated. In this case, the current situation of the municipalities in AMSS should be taken into account, as regards to the lack of experienced human resources in regulation issues and PPS forms. Both the empirical theory and evidence show that this type of price regulation (cost-plus), under a service contract in developing countries, may not generate profits due to improvements in efficiency, as this type of contract with this price setting mixture does not offer great incentives to cut costs.

#### Summary

Given the above, the implementation of an operation contract through “cost-plus” is not recommended.

In order to allow the private party to bear the total risk of the business, to reduce regulation costs and make incentives to reduce costs, the price regulation through a lump sum system is recommended for the contracts of operation.

### c. Other Regulation Elements for Operation Contracts

#### Terms

The operation contracts can be variable and the maximum duration is defined by the service life of the main assets involved in the corresponding functional category. That is, in the case of collection, the maximum duration of the contract should be 5 to 7 years. The empirical experience shows that such contracts last between 3 to 7 years for the case of collection.

On the other hand, evidence shows that the average service life of trucks in the municipalities of AMSS is in the range of 7 years.

Therefore, the recommendable term for such a contract of operation for AMSS would be 7 years.

#### Price adjustment or automatic price indexing

In general terms, the operation contracts are readjusted just like the contract of service; i.e., with a single or polynomial index.

### **“Force majeure” revision and costs transfer**

In general, a cost transfer situation can be adopted in a cost-plus system. For the specific case of AMSS, only this choice should be adopted according to the cases detailed in the section of regulation of cost transfers. (see Regulatory and institutional Framework).

### **K.5.3.3 Administration Contracts by means of Competitive Proposal**

#### **a. Definition of an Administration Contract and Terms**

In these types of contracts, the public sector receives supports to improve the administration of the enterprise. This is conducted through the contract-out of specialized consultants in these matters, or by just transferring the administration of the public enterprise into private hands. The private operator holds the responsibility of managing and controlling the costs of the entire system.

In most of the cases, the private party (administrator) obtains its revenues according to a “minimum fixed payment” plus the incentives based on predetermined goals, such as reduction of administration costs, or reduction of operation costs, increase in the user registration, incentives for increases in invoicing and collection, etc.

This type of contract, when applied to inefficient systems, generates great incentives to increase the efficiency of the systems and allow both parties (administrator and client) generate revenues.

It is a potentially good option to increase the productivity in the systems of developing countries, specially in Latin America, but it is rarely applied in collection or final disposal in the region.

The above mentioned could be attributed to several factors such as the following: (1) it is not a modality widely spread in Latin America for this kind of activities; therefore, public administrators search for other options, from a viewpoint of incentive efficiency, but such other options consequently could be inferior; (2) the unions of public enterprises generally oppose to this system, as this solution implies layoffs in order to increase efficiency; (3) there is a lack of enterprises that provide this kind of services in the region.

However, this contract is widely used for inefficient commercial systems in developed countries, where the commercial systems face problems such as those of AMSS (low coverage, low registry of users, etc.), to increase efficiency.

#### **b. Other Regulation Elements for Administration Contracts**

##### **Terms**

The term depends on the type of service rendered, ranging from 2 to 5 years for the collection and the commercial system. The optimal is to award such contracts through a competitive proposal.

##### **Price adjustment or automatic price indexing**

These contracts are based on lump sum; therefore, there is no price indexing. In countries with a high inflation rate, these contracts are readjusted according to the salaries increase rate, as their cost is based mainly on specialized or highly qualified labor input.

### **“Force majeure” revision and cost transfer**

There is no “force majeure” revision or cost transfer.

#### **K.5.3.4 Regulated Franchises**

##### **a. Definition of Regulated Exclusive Franchise**

Under this mode, the municipality or regulating entity hands the service exclusively to a private enterprise within the geographical boundaries or defined routes.

On the other hand, the private party pays the municipality or regulating entity a license fee for such franchise (in the case of concession such charge for the license is eliminated). The franchise can be called regulated franchise, where prices are regulated, and in the case such franchise is granted for a long term.

Under this type of PPS, the private enterprise is responsible for the operation, maintenance and administration of the system and, in some cases, even of the investment. The public sector is still responsible for the tariff policies, but not of the invoicing and collection.

When a regulated franchise is for a long term, generally the offer of initial prices (first period) is conducted through a bid process (competitive tender). The only difference between a franchise and a concession is that, under the franchise, the private party pays a fee or charge to the client as a right for the franchise.

The franchise can also be in competitive prices. This modality is widely used in the state of California, in the United States, for residential services. Please note that the franchise is awarded by means of competitive bids every 6 or 7 years.

The charges or prices are regulated by a maximum price (price cap) set by the municipality or regulating authority. The municipality has the right to monitor the private party and revoke the license in case it is necessary. In a franchise system, the private party is in charge of collecting the charges for the service.

In the franchise system, the operator is responsible for bearing all the costs, be it capital (investment), operation and maintenance, and commercial. It is also responsible for the commercial part and bears the risk. Please note that the price is regulated, but the invoicing and collection (commercial risk) is in hands of the private operator. Under this modality, all the regulation parameters of services, customers and tariffs must be clearly defined. The tariff is set by the municipality according to a “price cap” or by a “return rate” system.

##### ***Advantages of the exclusive franchise***

The practical experience of the United States shows that the main advantages of a long-term franchise system are the following:

- The level or quality of the service that users are used to is maintained.
- It minimizes the administrative effort to monitor contracts. That is, the transaction cost is reduced. The reduction of administrative costs is mainly due to the fact that the municipality has no invoicing and collection costs.

- In the long-term franchise (with regulated price) the interruption of the service is prevented during the transition periods.
- The municipality gets the flexibility of introducing new services or equipment and making changes in the programs without the need to change the operator.

#### *Disadvantages of the long-term exclusive franchise*

The practical experience of the United States shows that the main disadvantages of a long-term franchise system are the following:

- The municipality could end in high tariffs as a result of the charge for the franchise (10% or higher), or because efficiency is not achieved.
- Under a long-term franchise system, it is easy to result in information lag. That is, the regulating entity is unaware of the accurate costs of the private party and, in consequence, efficiency through the tariff reduction is not achieved.
- Under a long-term franchise system, there is a relatively high cost for regulation; therefore, this cost is transferred to the users.

#### **K.5.3.5 Franchise, Non Regulated or Non-exclusive Franchise (or Operation Licenses)**

A non regulated franchise is also known as a non-exclusive franchise or, as some people call it incorrectly, a competitive price franchise.

Under this PPS system, the owner of an operation license reaches agreements with the users. It is worth mentioning that such system is not applied to residential services. In general, this PPS form is applied for the industrial, commercial and construction waste collection services.

In the USA it is applied regularly to the services mentioned above. Around 90% of the industrial, commercial and construction waste collection franchises in the southern part of California are non regulated or non-exclusive franchises. *In general terms, the payment for the license ranges from 5% to 15% of the collection cost, being the average of 9.2%.*

In some cases, under this type of franchise, the municipality or regulating entity tends to regulate the following:

- a. Policies on the minimum requirements of collection equipment.
- b. Policies to renew licenses.
- c. Policies for recycling and quality of the service in case the providers render the recycling service.
- d. Minimum standards.
- e. Requirements of reports and delivery of information.

The problems of this type of franchise are the following:

- Lack of a standard service quality.
- There might be price discrimination towards some customers, in case few enterprises participate in the market.

enterprises participate in the market.

- Traffic jam problems could arise due to the several operators that work at a route or zone.
- Illegal dumping sites might arise if the operators are not duly controlled with regards to the final disposal, specially at developing countries.
- The generator must solve the service problems directly with the service provider.

#### **Advantages**

- In case of a great number of participants, the price could be competitive. The experience in the United States shows that the prices of a non-regulated franchise are lower than those from a regulated franchise whenever there is competition.
- There are no significant regulation costs, therefore tariffs can be lower than those from the regulated franchise.
- Different alternatives for the users are available and they can pay from diverse levels of service as they wish to.

*It is important to note that the current industrial and construction waste collection system in AMSS is operated almost 100% by private parties, but they do not pay for licenses. That is, it is an informal competitive market. It is recommended that this market work on a future basis under a non regulated franchise system or the granting of operation licenses in order to be able to track the final disposal and to estimate the volume generated.*

#### **K.5.3.6 Concession**

The rendering of solid waste management through a concession is widely spread at the United States and Canada. It has been recently used in Latin America for solid waste management and previously for other services such as water, electricity and public transportation.

Under a solid waste management concession system, the concessionaire enterprise is fully responsible for the services such as the operation, maintenance, administration and investment to expand the services.

It is also in charge of the invoicing and fee collection of the services; therefore, it also bears the commercial risk. In other words, a concession is equivalent to a franchise but without a payment or operation license.

Generally speaking, the option of concession for water, transportation or electricity applies to cases where the systems require large investments and the public sector does not have the capacity to make such investments or it simply does not want to invest resources upon the sector.

The contracts of concession can last from 6 to 30 years, depending on which functional category they are developing (collection, final disposal or so).

Technically speaking, the concession is defined by the capital account of the functional category; i.e., it is directly linked with the investment plan. For example,

for a sanitary landfill the duration depends on the service life of the selected site (generally from 20 to 25 years).

#### **K.5.3.7 Free Competition – Private Providers (both Formal and Informal)**

This PPS model is defined as a free market one, which is not regulated (it could be intentional or due to a lack of a model). In this case, the operator reaches an agreement or enters a contract with the solid waste generators directly and freely.

The application of this system upon “residential users” has the disadvantage of losing the economy of scale and quality of the service can be deteriorated. For such reason, **the application of this modality upon residential wastes is almost null.**

This free market approach is employed (or expands naturally as a market) in the case of industrial wastes and large commercial generators such as supermarkets, hotel, malls, etc. This system is also applied for construction wastes.

Currently there is free competition in AMSS for the collection of commercial, industrial and construction wastes, which is motivated by the lack of capacity of municipal services to cope with the increasingly demand.

When there is free competition in developing countries, collusion might be common, in case that a limited group of operators exists. In this case, private parties might tend to collude and increase the price artificially.

Price setting is an alternative but it generates regulation costs; therefore, both effects must be evaluated.

#### **K.5.3.8 BOT or BOT Inverse Contract and its Variants**

The BOT, BOOT and BOOT inverse contract systems and all its possible variants are generally applied to specific projects for the construction of drinkable water facilities or for wastewater treatment plants, power production plants, etc. In the case of solid wastes, this modality is mainly applied for the construction of sanitary landfills or transfer stations.

Under a BOT system and its variants, the private enterprise has the responsibility of engineering design, construction, operation, maintenance, administration, initial investment and expansion of the services. It may also be in charge (or not) of the invoicing and collection of the services; therefore, in this case the private enterprise bears the commercial risk. BOT projects are awarded through a competitive bid with a closed envelope (bidding method).

A BOT can be implemented under a rate of return type price regulatory system, although it can also be implemented under a pure price-cap system, or price-caps form of a model enterprise.

#### **K.5.4 General Review of Some Solid Waste PPS in Latin America**

A detail on the way of rendering services at the main cities in Latin America with participation by private sector is shown next.

Table K-83: Some PPS Forms in Latin America

Activity	Type of participation in several cities				
	Caracas	Santiago	Buenos Aires	Sao Paulo	Rio de Janeiro
Planning	U	M	U	U	U
Household collection	P	P (90%)	P / M (70% - 30%)	P	U/P
Sweeping	P	P (90%)	P / M	P	U
Transfer	P	Non-existent	P	P	U
Final disposal	P	P / U (50% - 50%)	P / U	P	U
Recycling	I	U / I	U / I	P / I	U / I
Invoicing	U	M	M	M	U
Supervision and contracts	U	M	U / M	U / M	U

Source: Bartone et al. (1991)

Notes:

U: General urban authority (IMAU of Caracas, EMERES of Santiago, DGLU of Buenos Aires, LIMPURB of Sao Paulo, COMLURB of Rio de Janeiro)

M: Urban sub-jurisdiction (Municipality, community, administrative region)

P: private operator

I: Informal private sector

From the above table it can be concluded that in most of the cities the collection and transfer is conducted by the private sector. The invoicing (commercial system) is in hands of the public sector. This can be the main cause that most of the commercial systems in Latin America does not work properly, because of the low coverage, low invoicing and low collection (PAHO/WHO, 1995, 1998). The aforementioned suggests that the private sector should incorporate more into this commercial activity.

### K.5.5 Rules of Competition for the Diverse Forms of PPS

The above achievement of efficiency for the different forms of PPS are based on clear competition rules. If the tender process is not implemented correctly, it is obvious that expenses are generated and eventually the situation might come of a greater inefficiency than in the present situation.

Given the above, minimum rules are set to ensure competition, which also appear in the "Institutional and Regulatory Framework" that will be subject to the consideration by Salvadoran authorities and are as follows:

#### a. Competition in Service Contract for Collection and Final Disposal

- In case of competition for the product (or for the market), i.e., a bid for a service contract in lump sum or unit prices, once the participants are selected according to minimum experience requirements, the awarding of the final contract (when the proposal is opened) will be only based on prices.
- The referential price will have to be delivered along with the bid bases.
- For the opening of the envelopes a minimum of 4 economic proposals are required for the award (in order to be regarded as competitive).
- If the price of the lowest economic proposal is greater than 25% of the specified or referential price delivered, the proposal will be declared null and a new invitation will be called.

**b. Competition in Administration Contracts**

- In case of competition for the product (or for the market), i.e., a bid for an administration contract in lump sum or unit prices, once the participants are selected according to minimum experience requirements, the awarding of the final contract (when the proposal is opened) will be only based on prices and level of incentives.
- For administration contracts, the referential price and proposed incentives will have to be delivered along with the bases.
- For the opening of the envelopes, a minimum of 3 economic proposals are required for the award (in order to be regarded as competitive).
- If the price of the lowest economic proposal is greater than 25% of the specified or referential price delivered and/or of the level of the incentives proposed (referential price) the proposal will be declared null and a new invitation will be called.

**c. Competition in Franchises and Concessions**

- For concession/franchise contracts, the invitation to tender will be published at an international level.
- A referential price will be delivered along with the bid bases.
- For franchise or concession contracts a minimum of 3 economic proposal is required to be presented in the opening of the proposal in order to consider it competitive.
- If the price is higher than 25% of the specified price (referential price), the proposal will be declared null.
- No concessions or franchises for a period greater than 7 years for the collection activity will be accepted (equivalent to the service life period of the equipment). The application of this PPS model for collection is not recommended, as a monopoly might be generated because the operator owns the customer database.
- A concession for final disposal whose ownership is private can be awarded without a competitive process, but its price will have to be regulated.

**K.5.6 Criteria for Selection of the Most Appropriate PPS Model for Solid Waste Management in AMSS**

Each of the most common PPS models for the management of municipal solid wastes has been defined above.

From the efficiency analysis (Progress Report 1 – April, 2000), it can be concluded that the situation of the diverse functional categories in AMSS is as follows:

- a. Collection and sweeping system:** its costs are very high and a low quality of the service; therefore, these two activities are considered as highly inefficient.
- b. Commercial system:** it is analyzed upon two relevant aspects; the first one refers to the invoicing and collection contracted out to two power distribution



companies (CAESS and DEL SUR). It is considered that the cost of the service of 1.50 to 2.00 colones per invoice is very high; in other Latin American countries the cost ranges around 3% of the invoice value.

The second aspect is linked with the management of the information used for invoicing. The customer database supplied by CAESS and DEL SUR has not been analyzed nor compared with the database of San Salvador municipality (cadastre), reminding that the customers of the service are billed in two manners: for the sanitary landfill according to the electricity consumption and the cleansing fee according to the surface of the real estate.

It can be considered that the management system is inefficient due to the following reasons: (i) the cadastre database or users is incomplete, (ii) a wrong codification of users; (iii) lack of an appropriate classification; (iii) lack of control of income per activity, location and type of users; (iv) there is a price discrimination, as some users are billed with an amount greater than the real one due to a mismanagement of the database.

- c. Final disposal system:** the price system is very high and with a moderate efficiency (wastes are not covered with soil every day). On the other hand, the environmental control of this activity is not conducted, and the damages due to a mismanagement upon the environment can be high; therefore, this might imply that the cost were higher and thus more inefficient.

#### **K.5.6.1 Selection Criteria for the Most Appropriate PPS Model for Collection and Sweeping in AMSS**

The criteria used for selecting the model that fits better for the case of AMSS are as follows:

1. Capacity to increase the service quality;
2. Skills to reduce or maintain tariffs;
3. Equity and fulfillment of social objectives;
4. Implementation feasibility,
5. Regulation cost and risks.

The meaning of each criterion is explained next:

##### **Criterion 1: Capacity to improve the service quality**

This means not only improvements in the coverage by the municipality but improvements of the environment and customer service as well. Customer service is an area where there can be several improvements due to a poor performance in the past.

##### **Criterion 2: Skills to reduce or keep tariffs**

This means the ability of PPS to reduce fees and keep costs low, which is one of the main goals of the PPS model.

### **Criterion 3: Equity and fulfillment of social objectives**

The PPS will have to fulfill a double function: on the one hand there will be the need to provide a service with fair charges; on the other, it will be forced to provide a service at subsidized costs to sectors of the population with scarce economic resources. This last point can be removed if the municipality decides to intervene with subsidy policy and the service is rendered with a “lump sum” system.

### **Criterion 4: Implementation feasibility**

This criterion measures the potential to implement the type of PPS proposed. It takes into account the political desire for an efficient implementation and the opposition to the type of PPS by certain groups such as the Management office and labor unions.

### **Criterion 5: Regulation costs and risks**

This criterion measures the difficulty and cost of properly regulating the different alternatives of PPS for the collection sector. The greatest cost is assigned number 1, and the least cost number 5. Risk is regarded in the sense of falling in information lag (the private party handles the information about customers).

## **K.5.6.2 Contract of Service/Operation under Tender**

### **Criterion 1: Capacity to improve the service**

A contract of service assumes the operator to bring its own labor force or will have the control on organizing it; this contract will be more flexible if the equipment is also provided.

With a lump sum payment system there is an incentive of cutting costs, which could mean a reduction in the service quality, both in coverage and in improvements of the environment, if such activities lead to increases in the operating cost.

Under a unit price payment system, there is an incentive for the enterprise to forge weights and volumes to maximize their income. The Latin American experience suggests that this payment system leads to defraud the State and it is difficult to be controlled.

Even in this case, the contracts of service have the ability to improve total performance.

### **Criterion 2: Skills to reduce tariffs**

These variables are handled by the municipality that sets the tariff and is in charge of the collection. In the case of AMSS, tariff collection of solid wastes can be improved when such invoice is made along with the electricity charge, just like San Salvador municipality does.

By increasing the effectiveness of the fee collection for solid waste management, the customer base keeps high and the tariff can be kept low in general.

It is assumed that the lack of ability to determine the tariff creates pressure in the tariff itself. Such pressure will increase or decrease, depending on where the lump sum amount is set with respect to the income generated by the tariff change.

### **Criterion 3: Equity and fulfillment of social objectives**

The ability to allow equity in the tariff is in the hands of the municipality and regardless of who is managing the service. However, fulfilling the social objectives, such as providing the service in low-income areas, must be clearly defined in the service contract with the lump sum payment system.

Otherwise, operator will have an incentive of reducing costs regardless of the social objectives. Under a unit price payment system, the tariff is controlled by the municipality, but the operators will tend to provide the service in areas where the generation of solid wastes is greater and will ignore or provide an inefficient service in low waste generation areas and where access is difficult.

### **Criterion 4: Implementation feasibility**

Under a PPS through the service contract or operation contract, diverse municipalities will still control the tariffs. The difficulty to implement is setting the parameters of the service quality and the municipalities' having ability to collect the tariffs.

The lump sum payment system can create difficulties if the operator needs to reduce the labor force, to which the labor unions would oppose to it. When there is a service contract with a unit price system, the problem that will arise is the distortion of the amounts, the cost of measuring or weighing of the amounts and the alteration of weights by the operator.

Reducing the possible opportunistic activities by the private party means the creation of a skilled monitoring network, which is not easy to implement and control it; therefore, under such modality the feasibility of this type of program is reduced.

### **Criterion 5: Regulation cost and risks**

There are no significant regulation costs. In the "unit price" model, control over the weights recorded must be exercised, therefore, a trained inspector for weighbridges must be kept. In the "lump sum" modality, control is exercised upon the service quality, so that it is rendered according to the specifications, and upon the coverage so that the private party does not leave unattended the low-production areas (low-income) and those with difficulty to access.

**However, of all the types of PPS and forms of payment, the easiest to implement is a service contract with lump sum.**

## **K.5.6.3 Contract of Operation Under Cost-plus**

### **Criterion 1: Capacity to improve the services**

The cost-plus payment system is quite similar to that of the rate of return. Under this scheme there is an incentive of artificially increasing the cost (ratchet effect) and thus increase the revenues of the enterprise that controls this operation contract.

Under this system the service is improved substantially because the contractor is not in charge of fee collection from the users and therefore it is not exposed to the risk of loosing payment from the user.

**Criterion 2: Skill to reduce the tariffs**

This modality offers the possibility of improving the service quality, but the operator has the incentive of incurring the greatest cost possible, since it is not exposed to the risk of losing payment from the user.

This PPS formula and price regulation is not a good response to the effort of reducing the tariff.

**Criterion 3: Equity and fulfillment of social objectives**

It offers the possibility in the sense that the service expansion at any cost in order to increase the profit is one of the goals of the operator. This means that there will be no areas unattended and each potential user will be rendered the service, as this generates an additional income for the private service provider.

**Criterion 4: Implementation feasibility**

Under the cost-plus payment system, some kind of "benchmarking" measures to control costs and an additional infrastructure (highly qualified human staff and resources) that AMSS does not have at present would be required.

For those reasons, it is concluded that its proper implementation is not feasible in AMSS.

**Criterion 5: Regulation cost and risks**

The tendency of the private party is to increase costs, as it does not have the risk of losing payment from the user. Control should be exercised by verifying its costs versus costs of "benchmarking" as established reference. This requires a highly qualified, yet expensive, staff. There is the risk of withholding information about costs, if the inspectors do not have the ability to properly analyze the structure of real costs.

**K.5.6.4 Administration Contract**

**Criterion 1: Capacity to improve services**

The administration contract in sweeping, collection and final disposal under a fixed payment modality are not very flexible to changes and innovations, as the labor force and equipment available has to be utilized. In general, the staff is not very prone or skilled to changes. The ability to change is proportional to the level of control granted by the municipality to the private party, which is very limited in this case of PPS. When this type of contract is regulated under a price systems of payment with incentives, the results improve a little, but they could still be low.

**Criterion 2: Skills to reduce tariffs**

This PPS cannot considerably reduce tariffs due to its inability to control the service costs, such as the use of machinery or the magnitude of the labor force. In the case of a price system of fixed payment with incentive, the objective of reducing the tariffs depends on the fact that the municipality can adapt the management style imposed by the administration.

### **Criterion 3: Equity and fulfillment of social objectives**

Under a “fixed payment” system, the municipality still has the control over tariffs and this type of PPS provides the administration with the opportunity to expand the coverage of the service as required and as possible.

The equity and fulfillment of social objectives is possible only if the administrator is provided the tools to do it. In a payment system with incentives, the administrators, while searching an additional income, can expand the service coverage in order to obtain incentives.

### **Criterion 4: Implementation feasibility**

The administration contract under a fixed payment price system can ease the transition and the enterprise and the service in general can improve gradually. The municipalities would keep the control of the assets and the labor unions would not oppose to such, as there would be no layoffs to achieve efficiency.

When the price system is fixed price and incentives, the private party gets the incentives to cut costs, therefore, there would be a greater opposition by the labor unions and other groups interested.

### **Criterion 5: Regulation cost and risks**

The regulation cost is incurred from the verification of efficiency improvement goals in the functional categories contracted. The goals and the time to achieve them should be set in advance; as well as the level of the incentives and their conditions. On the other hand, the municipality is committed to making the necessary consensual decisions in order to improve efficiency, both in time and within scope. The private party must deliver the detailed information of the results being obtained (accountable, financial, commercial, technical information, according to the case) expeditiously and accurately, in order to avoid any case of information lag.

## **K.5.6.5 Franchise/Concession**

### **Criterion 1: Capacity to improve the services**

Franchises bring their own labor force and the capital and, therefore, have the maximum capacity to maximize resources. However, competitive bids should exist and be evaluated under clearly assessed parameters of service.

Franchises have the trend to reduce the marginal service as a consequence of offering the most competitive bid. Controlling the service quality under a competitive bidding is difficult to achieve. Under a price-cap and lump sum system, it should be taken into account that the regulation sets the required income, which in turn puts some pressure for reducing costs and as the only manner of increasing revenues.

This means that the users with the potential of not paying or those areas with a high cost for the service would receive a service of a lower quality. However, if strict parameters of the service quality are established with an efficient municipal control, both options could lead to improve the service at a low cost.

### **Criterion 2: Skill to reduce tariffs**

Complete and open competitive tenders will lead to a reduction in tariffs as long as there is no collusion among the bidders. Controlling the service quality is the problem under competitive tenders.

With a price-cap system, tariffs will be lowered as time goes by, if such fees were established correctly and the system is efficient. Since the enterprise income is fixed, there is a lot of pressure to cut costs, be it through the revenues by efficiency or through the reduction of the service quality.

This is the main reason to have price-caps as an alternative to cost-plus or rate of return. Under any system it is important to consider how to control costs, be it with a regulation that controls price-caps or lump sum.

The ability to reduce tariffs depends on whether the agreed contract amount is less than the income required at the moment of the agreement. Supposing that the private enterprise can improve the efficiency where the municipality could not do so and, therefore, reduce costs, then that will bring about lower costs and tariffs.

### **Criterion 3: Equity and fulfillment of social objectives**

In the case of the regulated franchise, the municipality is still responsible for the tariff policy; it can decide over a cross-subsidy scheme so that all the users have a service with similar quality.

### **Criterion 4: Implementation feasibility**

There is a drastic reduction of administrative and operative staff. The private party is in charge of all the functional categories, including invoicing and collection, which might generate the opposition from unions and departments. Tariffs can become higher due to the payment for the franchise (10 %) and the non-fulfillment of efficiency.

### **Criterion 5: Regulation cost and risk**

The private party bears the administrative costs of invoicing and collection, as well as the risk of non-payment by the users. This reduces the costs of transaction, but the regulation costs to monitor the quality, since the private party will try to lower its costs to compensate the license fee (the right for the franchise). Under a long-term franchise, the client is ignorant of the costs of the private party and efficiency is not achieved by reducing the tariffs. This risk of information lag increases the regulation costs.

#### **K.5.6.6 Selection of the Most Appropriate PPS Model for Collection in San Salvador Municipality (Example)**

Table K-84 shows the ranking of each modalities of PPS in the solid waste collection in the municipality of San Salvador, taking into account the five criteria of analysis for each one of them.

Ranking from number 1 to 5 for the different types of PPS as used. Number 1 means the poorest qualification and number 5 is the highest rank in terms of how the criteria established are met.

The service contract with lump sum (price-cap) has the highest ranking and is recommended as the most appropriate PPS modality for the collection service in the municipality of San Salvador. The following results are for the consideration of the counterpart to analyze and discuss them.

Table K-84: Ranking for the Different Forms of PPS (Ranking Example for the Municipality of San Salvador)

PPS type and price regulation	Capacity to improve the service	Skill to reduce tariffs	Ability to increase equity and fulfill social objectives	Feasibility to implement	Regulation cost and risks	Total points	Ranking
<b>Service Contract</b>							
Lump sum (price-cap)	4	4	4	4	5	21	1
Unit prices	4	3	4	3	3	17	2
<b>Operation Contract</b>							
Cost-plus	4	2	4	2	2	14	5
Competitive prices	3	4	3	3	3	16	3
<b>Administration Contract</b>							
Fixed payment	2	2	3	4	2	13	6
Fixed payment + incentive	3	3	3	3	3	15	4
<b>Franchise or Concession</b>							
Regulated prices	4	2	3	2	1	13	6
Competitive							
Lump sum (price-cap)	3	3	3	3	2	14	5
Unit prices	3	2	3	2	1	13	6

Note: Information prepared by the Study Team

## K.6 Database Management

### K.6.1 Introduction

Most of the billing systems of the municipal services concerning collection and final disposal charge the rate in accordance with the total area of the property or charge an annual uniform rate. In San Salvador Metropolitan Area (AMSS), a new billing method has been implemented as from April of 1999, jointly with MIDES Project.

This new method consists of the rate fixation for the cleansing and final disposal fee in proportion to the average of electricity consumption, and its collection is in charge of Electricity Distribution Companies (EDE). It is very innovative but attention should be paid to Data Base (DB) management, fee rate assignment and users' categories that are detailed below.

### K.6.2 Current Structures

From April 1999, the use of this collection method began jointly with MIDES project. Whereas final disposal rates are charged according to the average electricity consumption that varies according to the different municipalities, the Electricity Distribution Companies (EDE) charge a commission for the fee collection through the corresponding invoice (See Table K-85).

Table K-85: Commission of EDE for Rate Collection

Municipality	Rates	Commission	
		CAESS	DELSUR
San Salvador	Cleansing and final disposal and public lighting	¢ 2.00+VAT	¢ 2.00+VAT
Cuscatancingo	Cleansing and public lighting	¢ 2.52+VAT	
Soyapango	Cleansing and final disposal and public lighting	¢ 1.55+VAT	
Nejapa	System is not applied		
Apopa	Final disposal	¢ 1.55+VAT	
Mejicanos	Final disposal	¢ 1.55+VAT	
Ayutuxtepeque	Final disposal	¢ 1.55+VAT	
Ciudad Delgado	Final disposal	¢ 1.55+VAT	
Ilopango	Final disposal	¢ 1.55+VAT	
San Marcos	Final disposal		¢ 1.55+VAT
Nueva S. S.	Cleansing and final disposal		¢ 1.55+VAT

### K.6.2.1 Database Structure Utilized by the Current System

#### DB structure for charging the rates

No	Detail	Type
1	Current account (NCC)	Number of current account of clients used by EDE
2	Account (zone, route, sequence)	Code of the client's identification
3	Meter	Number of electric consumption meter
4	Municipality account	Customer's code for the municipality
5	Cleansing fee rate	Cleansing fee amount set by the municipality
6	Public lighting fee rate	Cleansing fee amount set by the municipality
7	Updated code	Code of registration update

#### Biannual consumption database

No	Detail	Type
1	Meter	Number of electric consumption meter
2	Current account	Number of current account of clients used by EDE
3	Number of sequential account	Number of sequential account assigned
4	Name	Name of user
5	Address	User's address
6	Tariff	Tariff of electric consumption
7	Type of service	Type of service being provided
8	Consumption 1	Electricity consumption
9	Consumption 2	Electricity consumption
10	Consumption 3	Electricity consumption
11	Consumption 4	Electricity consumption
12	Consumption 5	Electricity consumption
13	Consumption 6	Electricity consumption



**Fee collection database**

No	Detail	Type
1	Current account	Number of current account of clients used by EDE
2	Municipality' account	Clients code by the municipality
3	Account (zone + route + sequence)	Code of the client's identification
5	Meter number	Number of electricity consumption meter
6	Date of payment (YYMMDD)	Date of bill payment
7	Municipality's rate 1 (cleansing)	Amount of cleansing fee charged
8	Municipality's rate 2 (public lighting)	Amount of public lighting fee charged
9	Municipality's rate 3 (other)	Amount of other charged rates
10	Total paid amount	Total value of payment
11	Place of payment	Payment place
12	Period (month and year) paid	Period corresponding to payment

**K.6.2.2 Information Flow between the Municipalities and Electricity Distribution Companies**

EDE send the relative information biannually about the customers (biannual consumption database) to the municipality, with their respective electricity consumption, by means of diskettes or CDs, so that these data can help the municipalities update their users' database (regarding new, inactive or disconnected users). Then the municipalities should process the information of the average consumption and update their users' database by assigning their respective rates, and then send this information back so that these rates can be charged in the invoice that will be issued monthly by EDE. Consequently, when invoices are collected, such information should be returned again to the corresponding municipality to allow the updating of its DB again (see the figure below).

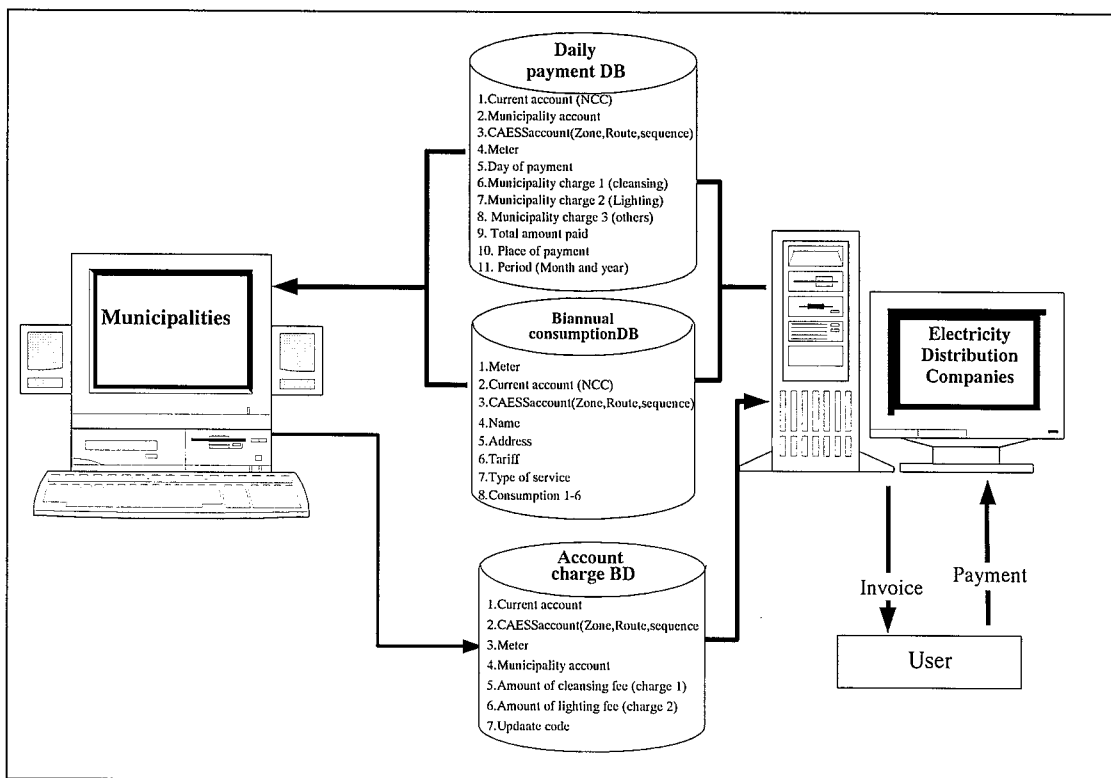


Figure K-12: Information Flow in the Current Fee Collection System

### K.6.2.3 Data Processing

Currently, the above-mentioned database processing of the collection system is not being carried out by the respective municipalities due to a lack of human and economic resources (See Table K-86).

Table K-86: Entities in charge of DB Process

Municipality	In charge of DB process	Distributor in charge of Fee Collection
San Salvador	By itself	CAESS, DELSUR
Cuscatancingo	By itself	CAESS
Soyapango	By itself	CAESS
Nejapa	Not using this system	
Apopa	MIDES-CINTEC	CAESS
Mejicanos	MIDES-CINTEC	CAESS
Ayutuxtepeque	MIDES-CINTEC	CAESS
Ciudad Delgado	MIDES-CINTEC	CAESS
Ilopango	MIDES-CINTEC	CAESS
San Marcos	MIDES-CINTEC	DELSUR
Nueva S.S.	MIDES-CINTEC	DELSUR

In view of this current situation, the information flow and process is summarized as follows (See the figure below).

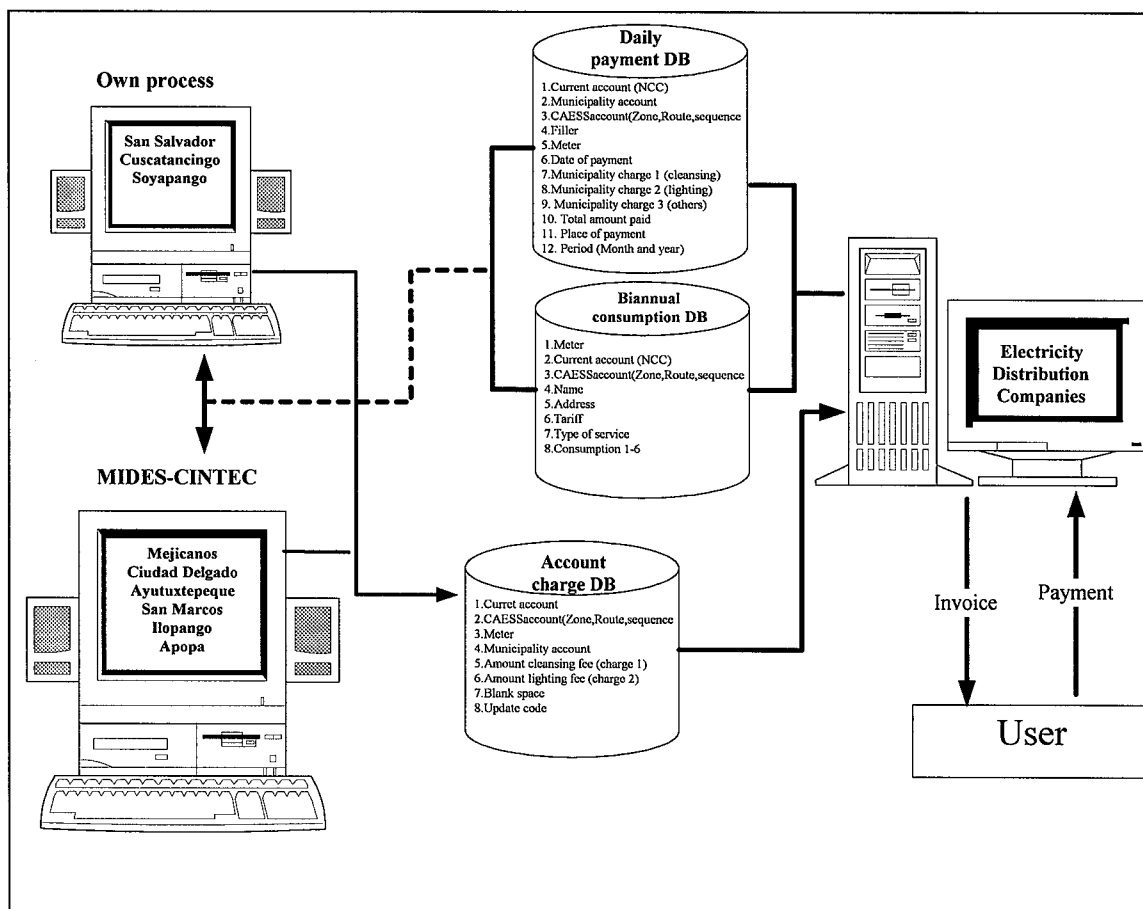


Figure K-13: Data Flow of Current Fee Collection System

The municipalities that are processing data with their own resources have knowledge of data flows and their corresponding problems, which will be solved by introducing new technologies and human resources. Other municipalities only have data of the total invoices collected or pending invoices etc; however, they have no direct control over the data of users nor the categories in which the cleansing services are being rendered directly. That is to say, they neither know with accuracy how many houses, nor the categories of the users they are providing the service to.

Municipalities are left without such information that it is of supreme importance to allow the cleansing service continue being efficient and at a low cost. They will have to take urgent measures to solve this problem, municipalities should manage their own DB and have knowledge on the number of users to whom the service is being provided, as well as what will be the rate that will be assigned to them.

### **K.6.3 Problems and Deficiency of the Current System**

Due to the absence of databases in the municipalities and difficult access to that of the municipalities being processed by MIDES, access and analysis of the database has only been possible in San Salvador municipality.

#### **K.6.3.1 Problems Reported by CAESS**

The problems of joint collection with the municipal fee reported by CAESS are as follows:

- The same people come every month to our customer attention centers claiming that the charge of the corresponding municipality should be annulled by diverse reasons (which is authorized by the respective municipality in its receipt), and the problem is not solved because the change is not conducted upon the databases.
- There are customer problems in the sense that boundaries among municipalities are not clearly defined, and annulment of rates is authorized anyway.
- Some problems have been reported by the municipality of Ciudad Delgado, because they are including upon their jurisdiction customers from a zone that is being discussed at the Legislative Assembly due to the fact these people belong to no municipality at all. The annulment of municipal fees upon the receipts is authorized by Cuscatancingo, since they consider that these people belong to their municipality.
- The customers' claims due to high collection fees charged upon some of them who once had some kind of business, but now the property are houses.
- All the above means that electricity invoices should be printed out again without repeating municipal fees at our attention centers.
- The information that is received in diskette from the municipalities sometimes is not correct, since they bring us information of previous months that has been corrected later; this fact creates delays in our billing system.
- The charge information is received until the first day of every month from San Salvador municipality, since that information is controlled by the Court of Accounts; therefore, this causes delays in our billing program.

- There are many bills that are repeated in different municipalities and between municipalities themselves.
- There are many accounts in each municipality that differ from those in our files (possibly outdated in their database).

The summary of the above is that the control of customers' portfolio, the assignment of rates and the classification of users has not been controlled appropriately. It is important to mention that serious problems exist with customers' database, their categories and the assignment of rates. If these data are not controlled and updated, it will be very difficult that this method operates efficiently.

### **K.6.3.2 Deficiency in the Users' Database**

From the analysis above it has been noticed that the users' service database is not being updated and controlled appropriately. In any system the customers' or client's portfolio is the most important thing, and if it is not managed, neither estimations nor an appropriate global vision will ever be achieved to provide the city's cleansing service efficiently.

The following deficiencies can be observed in the users' database:

- A meticulous analysis of the users' DB by EDE and the municipalities' cadastre DB has not been conducted yet. Unified lists of the customers is therefore unavailable.
- Updating of the users' DB is not carried out periodically along with EDE's DB. In such a way, the registry or discharge of customers is not known with accuracy.
- Users' category of activities or income level cannot be identified. Under such conditions residential, commercial and industrial customers may be paying the same rate.
- It is very difficult to identify the users geographically speaking. This implies that whether the service is being provided with accuracy is unknown.
- The control of fee assignment and its updating is not conducted periodically. This implies that errors in assigning high fees can occur and that will bring about customers' dissatisfaction and thus income reduction.

### **K.6.3.3 Analysis of San Salvador Municipality DB**

The municipality San Salvador collects the final disposal fee in proportion to the consumed electricity amount (0.075 colons/kWh), being the minimum charge of 5 colones/month and a maximum of 300 colones/month through the collection service by CAESS and DELSUR. All the analyses that will be detailed below were conducted based on the DB of fee assignment, collections and customers, in the period of April 1999 through March 2000.

#### **a. Users' Databases**

Table K-87 summarizes the total users billed and paid by CAESS and DELSUR. It is clearly shown that the collection system using the service provided by EDE is very efficient since they can bill up to 98% (CAESS) and 92% (DELSUR) of the customers. The collection average percentage of both is more than 80%.

Table K-87: Total Users Billed and Collected by CAESS-DELSUR  
(April/1999-March/2000)

EDE	Category of Consumption (kWh)	Total users	Billing		Payment		%	Billing %		Payment %	
			Cleansin	Landfill	Cleansin	Landfill		Cleansin	Landfill	Cleansin	Landfill
CAESS	00. N/A	3,911	2,427	0	1,186	0	0.4%	62.1%	0.0%	48.9%	
	01. 1-49	135,517	55,208	131,039	43,396	99,434	12.5%	40.7%	96.7%	78.6%	75.9%
	02. 50-99	213,729	110,188	210,936	88,616	160,801	19.8%	51.6%	98.7%	80.4%	76.2%
	03. 100-149	172,233	105,532	169,888	86,538	135,008	15.9%	61.3%	98.6%	82.0%	79.5%
	04. 150-199	130,762	88,061	129,026	73,700	104,662	12.1%	67.3%	98.7%	83.7%	81.1%
	05. 200-249	90,704	63,876	89,443	54,356	74,200	8.4%	70.4%	98.6%	85.1%	83.0%
	06. 250-299	62,824	44,624	62,022	38,206	51,700	5.8%	71.0%	98.7%	85.6%	83.4%
	07. 300-399	80,491	57,058	79,398	49,503	67,096	7.4%	70.9%	98.6%	86.8%	84.5%
	08. 400-499	45,510	30,724	44,907	26,663	37,993	4.2%	67.5%	98.7%	86.8%	84.6%
	09. 500-999	87,622	53,349	86,647	46,860	74,775	8.1%	60.9%	98.9%	87.8%	86.3%
	10. 1000-1499	27,450	13,828	27,175	12,241	23,500	2.5%	50.4%	99.0%	88.5%	86.5%
	13. 2500-2999	22,340	10,084	22,111	8,886	18,636	2.1%	45.1%	99.0%	88.1%	84.3%
	14. 3000-3499	2,428	832	2,386	654	1,385	0.2%	34.3%	98.3%	78.6%	58.0%
	15. 3500-3999	1,412	388	1,407	259	696	0.1%	27.5%	99.6%	66.8%	49.5%
	16. 4000-	5,043	1,065	4,923	703	2,009	0.5%	21.1%	97.6%	66.0%	40.8%
	<b>Total CAESS</b>		<b>1,081,976</b>	<b>637,244</b>	<b>1,061,30</b>	<b>531,767</b>	<b>851,895</b>	<b>100.0%</b>	<b>58.9%</b>	<b>98.1%</b>	<b>83.4%</b>
DELSUR	00. N/A	3,214	3,177	0	946	0	1.2%	98.8%	0.0%	29.8%	
	01. 1-49	2,240	2,202	0	1,737	0	0.8%	98.3%	0.0%	78.9%	
	02. 50-99	87,507	51,389	83,936	41,920	67,147	32.1%	58.7%	95.9%	81.6%	80.0%
	03. 100-149	54,100	37,546	50,287	31,111	40,892	19.8%	69.4%	93.0%	82.9%	81.3%
	04. 150-199	41,760	30,146	38,791	25,266	31,929	15.3%	72.2%	92.9%	83.8%	82.3%
	05. 200-249	25,656	18,341	23,919	15,212	19,407	9.4%	71.5%	93.2%	82.9%	81.1%
	06. 250-299	15,822	11,338	14,809	9,520	12,212	5.8%	71.7%	93.6%	84.0%	82.5%
	07. 300-399	17,402	11,501	16,397	9,760	13,587	6.4%	66.1%	94.2%	84.9%	82.9%
	08. 400-499	7,940	5,167	7,540	4,328	6,245	2.9%	65.1%	95.0%	83.8%	82.8%
	09. 500-999	11,976	6,229	11,426	5,329	9,627	4.4%	52.0%	95.4%	85.6%	84.3%
	10. 1000-1499	2,645	1,112	2,533	943	2,136	1.0%	42.0%	95.8%	84.8%	84.3%
	13. 2500-2999	1,796	708	1,680	599	1,350	0.7%	39.4%	93.5%	84.6%	80.4%
	14. 3000-3499	155	85	151	66	104	0.1%	54.8%	97.4%	77.6%	68.9%
	15. 3500-3999	88	19	88	14	79	0.0%	21.6%	100.0%	73.7%	89.8%
	16. 4000-	457	139	399	110	338	0.2%	30.4%	87.3%	79.1%	84.7%
	<b>Total DELSUR</b>		<b>272,758</b>	<b>179,099</b>	<b>251,956</b>	<b>146,861</b>	<b>205,053</b>	<b>100.0%</b>	<b>65.7%</b>	<b>92.4%</b>	<b>82.0%</b>

An important aspect that should be kept in mind is the low billing percentage of the cleansing service that only accounts for 58% to 65%. This is due to the fact that the municipality's cadastre database does not match unified with EDE's DB, and therefore the corresponding billing cannot be carried out. Urgent measures should be taken in order to update the cadets DB and be able to manage an updated users' DB and, in this way, a complete billing will improve revenues.

There are some customers that were not assigned to a category with regard to their consumption because the users' DB is not updated periodically along with that of EDE's. Therefore, the average consumption of these users is unknown and the corresponding fees cannot be assigned.

#### b. Customers' Categories and Assignment of Fees

With the existing users' DB it is impossible to distinguish to what categories they belong to; i.e., it is unknown whether they are residential or ICI customers. For such reasons, this report differentiates between residential ones (consumption less than 500 kwh/month), and the rest are classified as ICI, keeping in mind the average consumption per subscriber published by SIGET (see Table K-88). In Table K-89,

about 13,618 customers are assumed to be ICI, plus some businesses that probably do not consume a lot of electricity, however they generate more wastes and pay the same fee that residential ones.

Table K-88: Monthly Average Consumption per Subscriber in 1999

Tension	Demand	Consumption type	AVERAGE (KW/H)	
			CAESS	DELSUR
Low voltage	I. -Low demand (0 < kW < 10)	Residential (consumption < 200 kwh)	83	78
		Residential (consumption > 200 kwh)	379	367
		General use	390	340
		Public lighting	7,725	3,237
	II. -Medium demand (10 < kW < 50)	Without power metering	2,986	937
		With power metering	5,095	3,732
Half voltage	I. -Medium demand (10 < kW < 50)	With power metering	5,763	11,092
	II. -High demand (> 50 kW)		57,300	78,775

Source: Super Intendencia General de Electricidad y Telecomunicaciones (SIGET)

It is urgent to identify every single ICI, as well as the recording of their waste generation, in order to assign a fair fee to all of them.

Table K-89: Monthly Average of Users and Number

Category of User consumption (kWh)	Monthly average								Total No. of users	Residential and ICI
	CAESS				DELSUR					
	Number of users	Consump tion (kwh)	Fee		Number of users	Consump tion (kwh)	Fee			
Cleansing			Landfill	Cleansing			Landfill			
00. N/A	326	0.0	205.6	0.0	268	0.0	45.8	0.0	594	77,648
01. 1-49	11,293	25.0	19.8	4.9	187	28.0	35.2	0.0	11,480	
02. 50-99	17,811	74.0	16.8	5.7	7,292	73.8	14.1	5.3	25,103	
03. 100-149	14,353	122.8	22.8	9.1	4,508	123.2	16.8	8.6	18,861	
04. 150-199	10,897	172.6	29.4	12.8	3,480	173.0	22.1	12.0	14,377	
05. 200-249	7,559	222.5	37.4	16.5	2,138	222.2	26.8	15.5	9,697	
06. 250-299	5,235	272.8	40.4	20.2	1,319	272.2	30.1	19.1	6,554	
07. 300-399	6,708	344.4	48.5	25.5	1,450	341.7	33.1	24.2	8,158	
08. 400-499	3,793	444.6	57.0	32.9	662	444.6	42.8	31.7	4,454	
09. 500-999	7,302	687.7	75.5	51.0	998	674.8	55.7	48.3	8,300	13,618
10. 1000-1499	2,288	1,209.6	102.1	89.8	220	1,209.0	85.4	86.9	2,508	
13. 2500-2999	1,862	2,048.1	125.2	152.1	150	1,962.6	121.1	137.4	2,011	
14. 3000-3499	202	3,219.2	125.4	237.3	13	3,276.8	123.7	240.2	215	
15. 3500-3999	118	3,740.9	206.4	279.6	7	3,685.5	104.1	276.4	125	
16. 4000-	420	7,456.5	122.0	292.4	38	6,171.5	173.3	263.4	458	
<b>Total</b>	<b>90,165</b>	<b>1,336.0</b>	<b>82.3</b>	<b>82.0</b>	<b>22,730</b>	<b>1,243.9</b>	<b>62.0</b>	<b>77.9</b>	<b>112,895</b>	

Categorization of customers according to the average of electricity consumption must be conducted periodically. In the municipality of San Salvador in the period from April/1999 to March/2000, a single average calculated from January/1998 to December/1998 was used. It is therefore that during this whole collection period the averages were not updated; this is why a fair fee cannot be achieved. Table K-90 shows a calculation for a customer for the period of July/1999 to May/2000. The final

disposal fee that has been assigned to this user is ¢ 6.075 for an average consumption of 81 kwh/month; since the consumption categories have not been updated, the same fee was charged to this customer throughout the whole period. It is observed that the user has had an average consumption from July/1999 to December of the same year not so variable, but from January/2000 its consumption increased; however, it continues paying the same fee since rates were not updated. In the *Cost 2* column of Table K-90 a biannual average has been calculated; i.e., an average of the last 6 months and the different fees to be paid by the customer each month are observed. It is indispensable that fees be updated periodically, if it is expected to assign a fair fee related with the electricity consumption.

Table K-90: Comparison of Assigned Fee

Period of consumption	Monthly consumption (kWh)	Continuous biannual average (kWh)	Cost 1	Cost 2
			Cost assigned by consumption of 81kwh (¢ 6.075)	¢ 0.075/Kwh
Jul-1999	81	81.0	6.075	6.08
Aug-1999	86	83.5	6.075	6.26
Sep-1999	77	81.3	6.075	6.10
Oct-1999	83	81.8	6.075	6.13
Nov-1999	75	80.4	6.075	6.03
Dec-1999	76	79.7	6.075	5.98
Jan-2000	213	101.7	6.075	7.63
Feb-2000	399	153.8	6.075	11.54
Sea-2000	398	207.3	6.075	15.55
Apr-2000	256	236.2	6.075	17.71
May-2000	305	274.5	6.075	20.59
		Total	66.83	109.59

### c. Billing

Regarding the billing process, a high percentage is observed for cleansing fee (83%) and final disposal fee (80.1%), but it is also remarkable the low percentage of customers that have an average consumption of more than 3000 kwh/month. It can be assumed that ICIs that generate more wastes are both paying a low fee and are to date with respect to their payments.

Table K-91: Total Amount Billed by CAESS and DELSUR

Consumption category	Total users	Cleansing (colones)				Landfill (colones)			
		Average payment	Billed	Collected	%	Average payment	Billed	Charged	%
00. N/A	7,125	125.7	779,358	443,818	56.9%		0	0	
01. 1-49	137,757	27.5	2,760,813	2,186,341	79.2%	4.9	657,483	497,953	75.7%
02. 50-99	301,236	15.5	4,812,727	3,784,851	78.6%	5.5	1,677,146	1,299,710	77.5%
03. 100-149	226,333	19.8	4,840,192	3,933,394	81.3%	8.8	2,029,294	1,622,575	80.0%
04. 150-199	172,522	25.7	4,763,773	3,890,554	81.7%	12.4	2,173,248	1,769,978	81.4%
05. 200-249	116,360	32.1	4,082,046	3,423,084	83.9%	16.0	1,894,020	1,563,171	82.5%
06. 250-299	78,646	35.3	3,016,094	2,528,589	83.8%	19.7	1,571,289	1,307,081	83.2%
07. 300-399	97,893	40.8	4,482,629	3,833,866	85.5%	24.8	2,471,427	2,083,088	84.3%
08. 400-499	53,450	49.9	2,932,725	2,464,805	84.0%	32.3	1,748,999	1,475,319	84.4%
09. 500-999	99,598	65.6	7,283,926	6,349,778	87.2%	49.7	5,048,622	4,341,250	86.0%
10. 1000-1499	30,095	93.8	3,029,122	2,686,697	88.7%	88.4	2,694,590	2,323,550	86.2%
13. 2500-2999	24,136	123.2	3,015,855	2,639,030	87.5%	144.8	3,644,401	3,048,171	83.6%
14. 3000-3499	2,583	124.6	323,862	246,360	76.1%	238.8	613,765	359,844	58.6%
15. 3500-3999	1,500	155.3	294,989	212,753	72.1%	278.0	419,035	217,690	52.0%
16. 4000-	5,500	147.7	683,649	458,582	67.1%	277.9	1,596,600	703,867	44.1%
<b>Total</b>	<b>1,354,734</b>		<b>47,101,758</b>	<b>39,082,502</b>	<b>83.0%</b>		<b>28,239,918</b>	<b>22,613,247</b>	<b>80.1%</b>

Table K-92 compares the monthly amounts that MIDES bills to municipalities for final disposal fee. It also calculates the amount of commissions charged by EDE that is ¢ 0.67 per invoice, considering that EDE charge ¢ 2 for public lighting, cleansing and final disposal rates fees. A deficit of more than 9 million colones is perceived.

Table K-92: Total Amount Billed by MIDES (Final Disposal)

Year	Month	Total users	Invoices		Amount (colones)		Commission 0.67 ¢/bill	Total income	Billed by MIDES	Balance
			Billed	Collected	Billed	Collected				
1999	04	112,622	111,137	90,065	2,456,260	2,068,605	74,091	1,994,513	1,572,633	495,971
	05	112,230	107,427	86,876	2,389,765	2,001,353	71,618	1,929,735	2,734,579	-733,226
	06	112,279	110,398	89,086	2,436,279	1,857,957	73,599	1,784,359	3,047,977	-1,190,019
	07	110,479	108,674	87,665	2,336,083	1,834,242	72,449	1,761,793	3,149,577	-1,315,335
	08	111,233	109,003	87,849	2,349,136	1,832,992	72,669	1,760,323	3,149,577	-1,316,585
	09	111,473	108,878	87,945	2,347,286	1,847,069	72,585	1,774,484	3,062,897	-1,215,827
	10	111,579	108,954	87,703	2,348,742	1,837,683	72,636	1,765,047	3,117,502	-1,279,819
	11	117,619	109,437	87,787	2,361,309	1,838,325	72,958	1,765,367	2,856,969	-1,018,644
2000	12	116,379	113,646	90,624	2,427,124	1,872,047	75,764	1,796,283	3,008,267	-1,136,220
	01	110,062	107,494	87,140	2,123,711	1,777,072	71,663	1,705,409	2,841,018	-1,063,946
	02	114,269	111,705	90,742	2,389,365	2,006,822	74,470	1,932,352	No data	
	03	114,510	106,511	83,466	2,274,857	1,839,079	71,007	1,768,072	No data	
<b>Total</b>		<b>1,354,734</b>	<b>1,313,264</b>	<b>1,056,948</b>	<b>28,239,918</b>	<b>22,613,247</b>	<b>875,509</b>	<b>21,737,738</b>	<b>28,540,996</b>	<b>-9,773,650</b>

The collection system by means of EDE is a good option, but for the fee assignment according to energy consumption an in-depth study and identification of all ICIs will have to be carried out. Table K-92 clearly shows that with the current fee assignment it is not possible to meet the high cost of final disposal fee (US\$18/ton).



## K.6.4 Proposal of the Collection System Improvement

### K.6.4.1 Objectives of the Improvement

It is of supreme urgency to have the effective control and to improve the collection system, which will bring about efficiency for billing and thus will generate greater revenues, an improved service and larger collection coverage without having to increase the fees.

### K.6.4.2 Data Flow

For a better database control, it is necessary to make some changes in data flows and changes in controlling devices. The purpose of the system proposed is to become an integral system in which manipulation of data and bills is avoided, thus increasing efficiency in the registration of clients, assignment of a fair fee and collection efficiency.

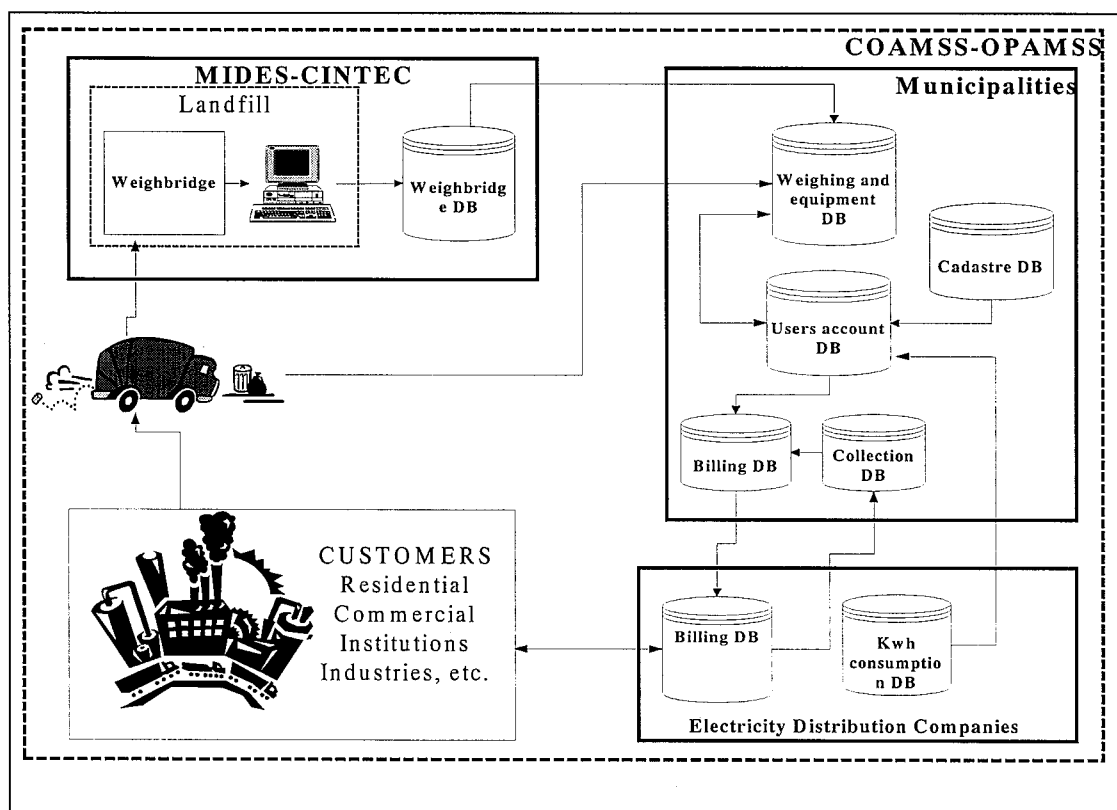


Figure K-14: Proposed Data Flow

### K.6.4.3 Entities Involved in the System

- Municipalities

The municipalities will have to invest more in human resources and computer equipment to begin managing databases, which are indispensable for the control of this billing system. Figure K-15 shows the databases that the respective municipalities should control.

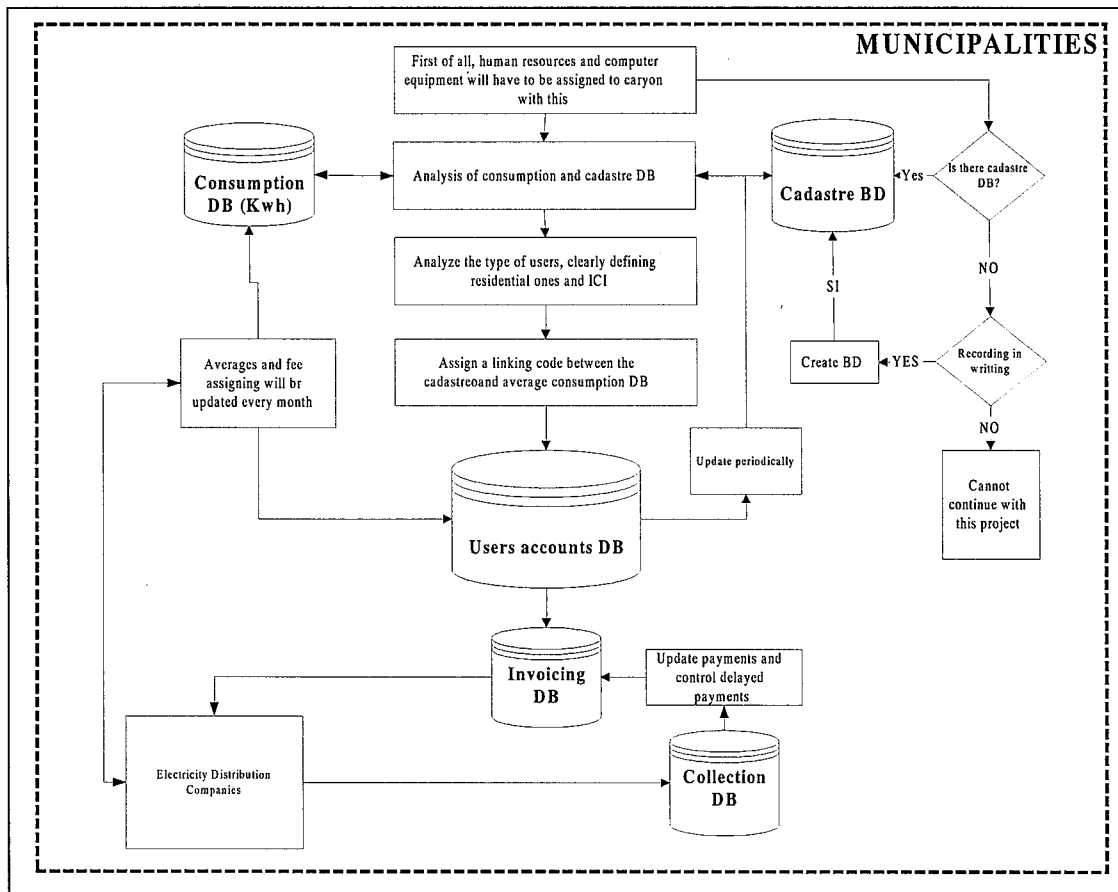


Figure K-15: Databases under the Municipality's Control

By having a users database, the municipalities will have to see the possibility of connecting to the records of the sanitation department in order to verify if the collection service is actually being provided to the user. This is very important, otherwise, inappropriate cleansing and final disposal fees will be charged upon the citizens. The coverage of the electricity service and the collection service coverage should be kept in mind.

Figure K-16 presents the databases that should be managed for the control of the daily waste collection works, the collection routes and equipment. If there is no such DB, it will be very difficult to have a general control. Therefore it is necessary that the whole data become digital, so that an efficient and sustainable cleansing service can be provided.

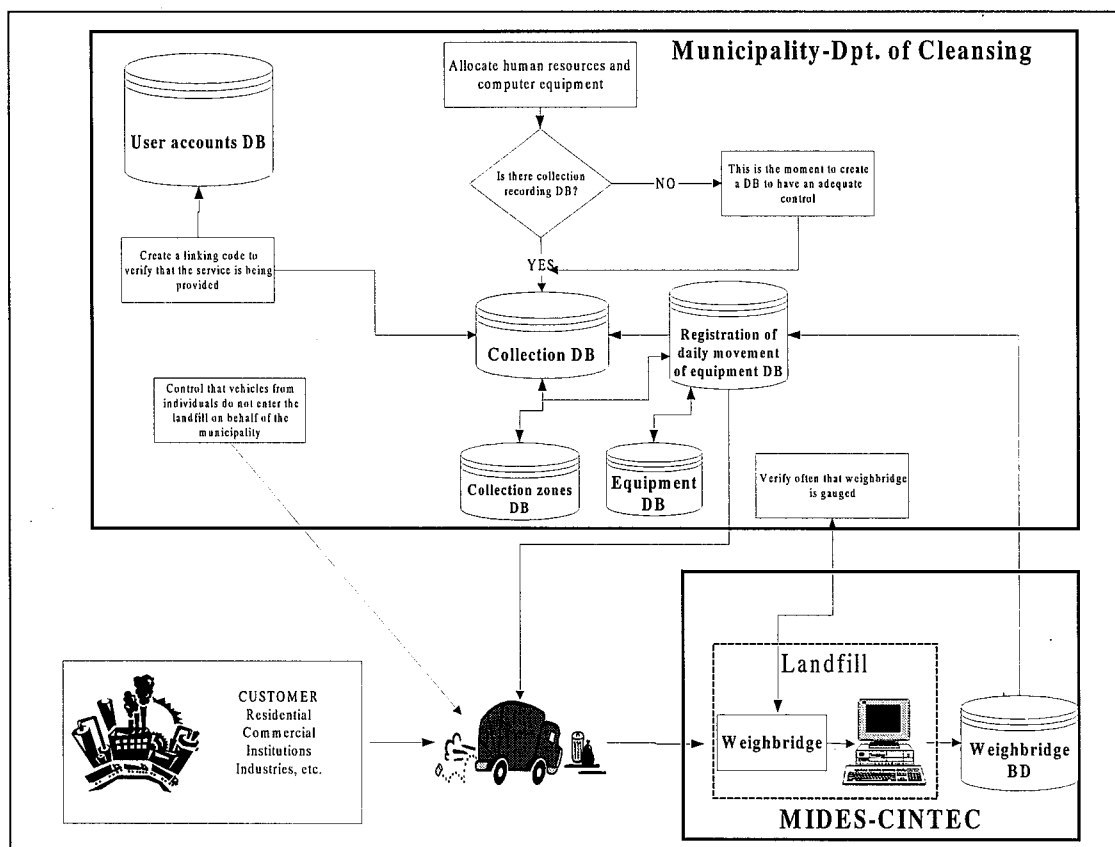


Figure K-16: Database for Collection Control

- MIDES-CINTEC

This entity will have to provide the municipalities with the weight data of the waste disposed of at the landfill and control the calibration of the weighbridge periodically.

- COAMSS-OPAMSS

It should be the body controlling the entire procedure, processing and managing all the DB. It should detect boundary problems among the municipalities and take action for solving this problem. It should offer technical support to the municipalities that cannot process said database by themselves.

- Electricity Distribution Companies

EDE should provide DB of the customers' consumption every month, as well as update registration and discharge of the clients. Municipalities and EDE should jointly analyze the boundary problems among the municipalities, and in this way the users' DB will match each other.