EVALUATION OF EXISTING SERVICE FEE FOR SOLID WASTE MANAGEMENT

GOVERNORATE OF ALEXANDRIA

Prepared for:

Governorate of Alexandria, Egypt

Egyptian Environmental Policy Program

United States Agency for International Development

Prepared by:

Abt Associates Inc.
SCS Engineers
Community & Institutional Development
The Institute for Public-Private Partnerships

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BACKGROUND

In January, 2003 the Governorate of Alexandria (GOA) monitors began a survey of the commercial businesses in the GOA for the purpose of developing information that would be useful in restructuring solid waste management and public cleaning service rates. By late March, approximately 2000 individual businesses had been surveyed and the data transcribed to a computerized database. On March 27, members of the Solid Waste Assistance Team met with Mr. Kamel Ragheb to discuss potentially viable restructuring options. Our perception of the discussion and the proposed path forward includes the following:

1. A general consensus that there is likely to be little relationship between any of the parameters being used in the survey and the amount of waste generated at an individual business.

2. The desire of the GOA to avoid creating a fee schedule that attempts to base the fee on the amount of waste generated. Based on the negative response of businesses to the current method of assessing the fee based on power consumption, GOA officials believe that businesses will never accept any other fee that purports to be based on "predicted" waste generation.

3.   The GOA would prefer to assess fees that would be more similar to a general tax for "Keeping Alexandria Clean". Businesses would pay their "fair" share for all of the services that contribute to the general cleanliness; not for just having their waste collected. As described by Kamel, the GOA is not proposing a single flat rate, but rather, establishment of categories based on assignment of "points" based on such factors as:

    - income level of area
    - number of employees
    - floor space of business

4. The GOA would like advice and assistance from the Solid Waste Assistance Team in developing rates as described above. The GOA understands that practical implementation of such a system, in a manner that is acceptable to both the GOA staff and the business community, will not be easy. The following steps are required:

    - Select the appropriate factors to be used (based on what criteria if not waste generation?)
    - Weight the factors in relationship to each other
    - Create a "scoring" system
    - Develop fee categories
    - Calculate defensible fees that in the aggregate achieve the cost recovery goal

5. The Solid Waste Assistance Team agreed to analyze the existing data using regression analysis and other appropriate analytical tools to investigate potential relationships that can serve as a defensible foundation for development of the concept as envisioned by the GOA.

DATA ANALYSIS RESULTS

Application of analytical tools that measure the correlation between waste generation and power consumption, number of employees, floor space, and area income level to several specific types of business activities, e.g. juice shops, revealed no significant correlation. While business floor space and number of employees, did, in some cases reveal a weak relationship to waste generation, none of the analyses were statistically significant.

Even though none of the analyses were statistically significant, the Solid Waste Assistance Team ranked each of the potential variables in terms of best (1) to worst (4) correlation, to see if there was at least one variable that consistently had a better correlation. The results of the ranking are shown in Table 1. None of the variables consistently ranked as better than the others.

Because of a lack of statistical significance or even consistency in a weak correlation, a decision to use any of the variables as criteria for establishment of distinct rate categories will be largely subjective and defensible only from a pragmatic and/or public acceptability standpoint.

RECOMMENDED CRITERIA FOR ESTABLISHMENT OF RATES

As described above, there is no criterion for establishment of rates that is justified by its ability to predict the amount of waste produced by an individual business. Thus, as the only viable alternative to a flat rate or to charging each business based on exact measurement of their waste generation, we would recommend the use of income level and floor space of the business. The use of income level has proved to be generally acceptable and successful as the basis for residential rates. The use of business floor space is recommended as opposed to number of employees, as it is measurable by the GOA, and is a reasonable surrogate for the an individual businesses share of the total business community share of the total solid waste and public cleaning cost to be borne by the GOA. Thus, we are proposing a rate structure with individual rates for combinations of the following income level and floor space combinations:

- Area Income Level
    - High
    - Medium
    - Low

- Business Floor Space (m^2)
    - Up to and including 5
    - 6 to 10
    - 11 to 15
    - 15 to 25
    - 25 to 50
    - Over 50

Figure 2 depicts the results of a "calculator[1]" analysis using these income and floor space assumptions. Until the total expected user fee revenues for commercial establishments is known, the Solid Waste Assistance team has extrapolated an estimate based on the known ratio of revenue to commercial establishments in Cairo. The survey data reflected a total sample of 2,043 commercial establishments in Alexandria, thus a reasonable estimate of LE1.0 million per year was determined to be the user fee revenue goal, for this sample size. The calculator we have developed allows the analyst to insert the correct revenue goal figure when it is available.

The calculator creates a standard flat rate for six floor space ranges mentioned above. This standard flat rate applies to commercial establishments located in "high" income neighborhoods. For lower income neighborhoods—medium and low—the standard rate is reduced by a percentage. For medium income neighborhoods, the flat rate is calculated at 85% of the standard; for low-income neighborhoods, the flat rate is reduced by 50%. The calculator we have developed allows the analyst to vary these relationships as desired.

Another recommendation we would make, which is not reflected in the calculator, is the treatment of larger commercial establishments. Currently, the calculator shows a flat rate of LE96 for all spaces above $50M^2$. It may be more equitable—and more beneficial to the governorate—to impose an actual M^2 rate for all establishments above $50M^2$. For example, the governorate could establish a flat rate of LE2 per month for each M^2 of floor space. This rate for large commercial spaces would be standardized regardless of the general neighborhood income.

Finally, we must emphasize that this "calculator" is simply an example of an approach Alexandria may wish to take. The user fees can be much more finely developed once more detail is available on the universe of commercial enterprises in Alexandria.

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[1] The calculator is an Excel worksheet which is being transmitted to the Governorate along with instructions for use.

Table 1. Alexandria Commercial Business Waste Generation Correlation Analysis Results				
Business Activity	**Variable Rank**			
	Area Income	**Power Usage (kwh)**	**Floor Space (m²)**	**Employees**
Autoparts	1	3	4	2
Bakery	4	2	1	3
Barber	4	1	2	3
Butcher	4	3	2	1
Carpenter	4	1	2	3
Chicken Seller	2	4	3	1
Clothes	4	1	3	2
Confectioner	3	2	4	1
Coffee Shop	4	3	1	2
Grocery	4	3	2	1
Juice Shop	3	2	4	1
Nuts	4	2	1	3
Pharmacy	3	2	4	1
Restaurant	4	2	3	1
Supermarket	1	3	4	2
Telephone Store	4	2	1	3
Average Rank	**3.31**	**2.25**	**2.56**	**1.88**

Figure 1: EXAMPLE Results of Alexandria User Fee Calculations

Commercial Revenue Goal	**1,000,000**
Projected Delinquency (%)	**10%**
Cost of Collection (%)	**3%**
Commercial Fee Billing	*1,149,425*
Monthly Billing	*95,785*
Test	95,874

High Income

M^2	Customers	Monthly Fee	Gross Income Per month
0-5	34	16	544
6-10	148	32	4,736
11-15	157	48	7,536
16-25	184	64	11,776
26-50	93	80	7,440
>50	48	96	4,608
	664		36,640

Medium Income

M^2	Customers	Monthly Fee	Gross Income Per month
0-5	67	14	911
6-10	322	27	8,758
11-15	262	41	10,690
16-25	298	54	16,211
26-50	188	68	12,784
>50	70	82	5,712
	1207		55,066

Low Income

M^2	Customers	Monthly Fee	Gross Income Per month
0-5	8	8	64
6-10	60	16	960
11-15	54	24	1,296
16-25	28	32	896
26-50	13	40	520
>50	9	48	432
	172		4,168

Instructions for Entering Data into Calculator
Governorate of Alexandria

1

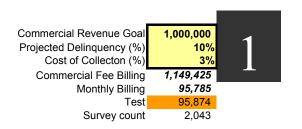Enter data into yellow shaded areas only. The rest of the worksheet is protected and cannot be changed.
1. Enter the User Fee Revenue goal for commercial establishments in Alexandria.
2. Next, enter the anticipated "delinquency" rate on collections of user fees. This is the % of customers who will not pay their user fees.
3. Enter the estimated cost of collection as a percentage. For example, the Electricity Corporation may charge 3% to handle collections on behalf of the Governorate.
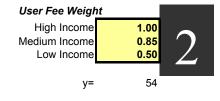
2

Enter the percentage by which the "Space Fee" will be adjusted based on neighborhood income. Generally, the high income figure should be 1.00. Try to make adjustments only to the medium and low income neighborhoods.

The "Test" amount (shown in orange shading) should equal or exceed the monthly billing amount.

Alexandria Solid Waste Fee Calculation Example

Commercial Revenue Goal	1,000,000	
Projected Delinquency (%)	10%	**1**
Cost of Collecton (%)	3%	
Commercial Fee Billing	1,149,425	
Monthly Billing	95,785	
Test	95,874	
Survey count	2,043	

User Fee Weight

High Income	1.00	
Medium Income	0.85	**2**
Low Income	0.50	
y=	54	

Space Fee

	M^2
1	0-5
2	6-10
3	11-15
4	16-25
5	26-50
6	>50

High Income

% of Count	M^2	Customers	Monthly Fee	Gross Income
1.66%	0-5	34	16	544
7.24%	6-10	148	32	4,736
7.68%	11-15	157	48	7,536
9.01%	16-25	184	64	11,776
4.55%	26-50	93	80	7,440
2.35%	>50	48	96	4,608
		664		36,640

Medium Income

% of Count	M^2	Customers	Monthly Fee	Gross Income
3.28%	0-5	67	14	911
15.76%	6-10	322	27	8,758
12.82%	11-15	262	41	10,690
14.59%	16-25	298	54	16,211
9.20%	26-50	188	68	12,784
3.43%	>50	70	82	5,712
		1207		55,066

Low Income

% of Count	M^2	Customers	Monthly Fee	Gross Income
0.39%	0-5	8	8	64
2.94%	6-10	60	16	960
2.64%	11-15	54	24	1,296
1.37%	16-25	28	32	896
0.64%	26-50	13	40	520
0.44%	>50	9	48	432
		172		4,168