GASB project – research reports

Service areas

A set of recommended indicators and the rationale for each indicator is provided below for each of the 12 service areas. The recommended indicators are organized according to the indicator types included under the term "service efforts and accomplishments."

Colleges and Universities

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 2-1
Recommended SEA Indicators for Colleges and Universities*

Indicator	Rationale for Selecting Indicator
Inputs:	
Instructional Expenditures:	
Current dollars	To provide a measure of the resources used to provide instruction
Constant dollars	
Number of Faculty:	
Full-time	To provide a measure of the number of faculty available to provide instruction
Total FTE	

Outputs:	
Number of Degrees and Certificates Awarded	To provide a measure of students satisfactorily completing educational requirements
Number of Student Credit Hours (SCH) Generated:	To provide a measure of work load and productivity
Unweighted	Weighting can be used to equate differences among disciplines and course levels
Weighted	
Number of FTE Students (fall semester)	To provide a measure of work load and productivity; FTE students are derived from student credit hours
Outcomes:	
Academic Test Scores:	
General education	
National exams:	
Average percentile score	To provide direct measures of student learning across the general education field, and comparisons with selected standards
Percentage scoring above 50th percentile	
Local exams:	
Average score	
Percentage scoring 700/0 or above	
Major field	
National exams:	
Average percentile score	To provide direct measures of students' learning in their chosen fields of study, and comparisons with selected standards
Percentage scoring above 50th percentile	
Local exams:	
Average score	
Percentage scoring 70% or above	
Student Ratings of Select Aspects of College,+ e.g.:	
Help in reaching select goals	

Increasing knowledge in major field	
Learning life-enriching skills	
Improving self-image	
Improving leadership skills	
Adequacy of General Education Program in Developing:	
Effective writing and speaking skills/habits	To provide student perceptions of the quality of instruction and guidance received; both cognitive and noncognitive dimensions are addressed
Independent work skills/habits	
Understanding of different philosophies and cultures	
Ability to define, analyze, and solve problems	
Adequacy of Academic Major Program in Areas Such as:	
Gaining knowledge of issues and trends pertinent to specialty	
Applying knowledge in defining and solving problems	
Identifying values and responding ethically	
Integrating career and personal goals	

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This exhibit does not provide illustrations of indicator disaggregation or of comparison data such as trends, targets, or other comparable entities. Both disaggregation and comparison data are important aspects of SEA reporting. They are discussed in the chapter and in the Overview.

[+]These sample criteria were taken or adapted from survey instruments used at Northeast Missouri State University.

<Top>

Economic Development

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 3-1
Recommended SEA Indicators for Economic Development: Business Attraction/Marketing Programs*

Indicator	Rationale for Selecting Indicator
Inputs:	
Dollars spent on the program's activities (current and constant dollars)	Provide information on the resources available to the program
Number of staff-hours expended by the program	
Outputs:	
Number and percentage of business prospects identified that may be interested in locating	Measure of the program's outreach function
Number of businesses from target industries identified that are interested in locating	Identifies success with targeted industries
Number of contacts made with firms interested in locating	Measure of program follow-up
Number of firms that received assistance from the program (by type of assistance)	Provides indication of the number of actual program clients
Percentage of leverage (nongovernmental) funds used to finance project	Estimate of amount of other funds leveraged by a program

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Exhibit 3-2
Recommended SEA Indicators for Economic Development: Financial Assistance Programs*

Indicator	Rationale for Selecting Indicator
Inputs:	
Dollars spent on the program's activities (current and constant dollars)	Provide information on the resources available to the program
Number of staff-hours expended by the program	

Outputs:	
Number of technical assistance seminars/workshops conducted	Measure of program activity; easily collected
Number of applications reviewed	Workload output measure
Number and percentage of applications approved	Information on the proportion of applications that are approved
Average length of time for review of an application	Service quality indicator
Number of loans (or loan guarantees) made	Workload output measure
Dollar value of loans (or loan guarantees) made	Provides information on total expenditures resulting from loans
Average loan (or loan guarantee) size	Provides information on average size of a project
Number of on-site monitoring visits conducted	Measure of program follow-up and monitoring
Outcomes:	
Intermediate outcomes:	
Number of loan applications processed and decided upon	Workload outcome measure for the program; easily collected
Total and average attendance at seminars/ workshops	Measure of the success of program outreach
Longer-term outcomes:	
Number of jobs added by firms receiving loans 12/24 months after receipt of loan	Major outcome indicator for financial assistance programs
Number of jobs retained by firms 12/24 months after receipt of loan	Major outcome for business in jeopardy of losing employees
Total and average amount of private capital leveraged by loans (or guarantees)	Leverage indicates the amount of capital the program was able to activate
Loan default rate (percentage of loans made that are currently in default)	Offers information on the "riskiness" of loans made
Percentage of scheduled repayments made on time	Provides an indication of loans behind in payments, but not in default
Percentage of clients rating information on the program,	Service quality indicators

including application instructions, as excellent, good, fair, or poor	
Percentage of clients rating the length of time for processing of their application as appropriate	
Percentage of clients rating the knowledge ability of program staff as excellent, good, fair, or poor	

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Exhibit 3-3
Recommended SEA Indicators for Economic Development: Export Programs*

Indicator	Rationale for Selecting Indicator
Inputs:	
Dollars spent on the program's activities	Provide information on the resources available to the program
Number of staff-hours expended by the program	
Outputs:	
Number of export seminars/ workshops	Activity measures
Number of trade shows conducted	
Number of catalog shows conducted	
Number of counseling sessions conducted	
Number of foreign trips made	Measure of activities in other countries
Number of different firms participating in trade shows	Counts of clients
Number of different firms participating in catalog shows	
Number of different firms participating in counseling sessions	
Outcomes:	
Intermediate outcomes:	

Number and percentage of firms that increased their interest in exporting as a result of assistance	Measure of increased interest in exporting
Number of trade leads generated from trade shows	Provide information on possible future sales
Number of trade leads generated from catalog shows	
Number of trade leads generated from international trips	
Longer-term outcomes:	
Number of client firms that began export trade activities (sales or production)	Measure of new export activity of clients
Number and percentage of clients that increase their export activity (sales, jobs, etc.)	Measure of increased export activities of clients
Dollar value of actual increased export sales from client firms	Major outcome measure for the program

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<Top>

Elementary and Secondary Education

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 4-2
Recommended SEA Indicators for Elementary and Secondary Education

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures[a] (in millions) (may be also broken out by type of activity such as instructional and administrative)	To provide a measure of resources used to provide services
Current dollars	
Constant dollars	
Total number of personnel	To provide a measure of the size of the organization

Outputs:	
Number of student-days (thousands)	To provide a general measure of workload
Number of students promoted/graduated	To provide a measure of students satisfactorily completing educational requirements
Carnegie units as percentage of required[b] (with number of required units shown parenthetically—can be reported by major subject area)	To provide an indication of courses taken by students in certain critical subject areas
Absenteeism rate	To provide a measure of student participation in classes and an indication of their interest in learning
Dropout rate	
Outcomes:	
Test score results-*for each major subject area*	To indicate the school's success in keeping students actively involved in the learning process
Average percentile on standardized tests	
Percentage of students above the tests' 50th percentile[c]	
Percentage of students reaching their grade level of proficiency or higher	To provide measures of student achievement in academic subjects and a comparison with expected achievement and established norms
Percentage of students achieving grade-level gain on achievement test[d] (may be presented for major subject areas as well as overall)	To provide a measure of student annual progress-the indicator is also used to develop a measure of cost-effectiveness
Percentage of students scoring higher than prespecified level of self-esteem	To provide an indication of the development of noncognitive skills and abilities generally considered as objectives of formal education
Percentage of students achieving specified physical fitness test standards	
Percentage of graduates gainfully employed or continuing education two years after graduation	To provide an indication of the school system's results in preparing graduates for further education or to become members of the workforce

Footnotes:

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a. A clear description of which expenditures are included or excluded should be provided.
b. One Carnegie unit equals five hours per week of instructional class time on a subject for an entire school year
c. The 50th percentile is the point that one-half of the students who were used to develop the test norm scored at or above and one-half scored below.
d. A grade-level gain is the measure of a student's progress by school year, as assessed by a test score, for example, from the 6.1

Exhibit 4-5
Candidate Explanatory Factors

Noncontrollable Factors (e.g., demographic)

1. Student enrollment figures
2. Percentage of students of minority racial/ethnic groups
3. Percentage of students on subsidized lunch program
4. Percentage of pupils in the school whose families receive welfare benefits
5. The total number and percentage of students in families below the poverty level
6. Percentage and number of students in compensatory education programs
7. Percentage of students with "limited English proficiency" and percentage enrolled in "English as a Second Language" classes
8. Percentage of students enrolled in special education classes
9. Distribution of entering test scores (such as from the end of previous school year)
10. Mobility rate (e.g., percentage of school's enrollment entering, or departing, after the start of the school year)
11. Per capita income
12. Property value per pupil
13. Percentage of students in gifted or talented programs

Controllable Factors

1. Student-teacher ratios
2. Percentage of student-hours spent in "overcrowded" classes
3. Percentage of teachers with Master's degree
4. Percentage of teachers who passed teacher competency tests
5. Teachers' entry salary (for entrants with a BA or for entrants with a Master's degree) and average teacher's salary after 10 years
6. Average teacher tenure
7. Number and percentage of teachers teaching out of their primary subject area
8. Teacher turnover rate

Note: Factors 1-13 are community demographic characteristics, generally outside the control of the school system. The school system has a significant degree of control over the other factors.

<Top>

Fire Department Programs

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 5-1
Recommended SEA Indicators for Fire Departments: Overall Performance*

Indicator	Rationale for Selecting Indicator
Inputs:	
Total Operating Expenditures	Provide information on funds used to provide services
Total Capital Expenditures	
Personnel	
Full-Time Personnel	Provide information on labor resources used; available
Part-Time and Volunteer Personnel	
Total Man-Hours Worked	
Outputs:	
Population Served	Provide a measure of workload; readily available
Residential	
Workforce	
Tourist, Average Daily	
Property Value Protected	
Residential	
Commercial	
Public Property	
Outcomes:	
Percentage of Citizens Rating Performance Satisfactory	Assesses citizen satisfaction and concern
ISO Fire Insurance Rating	An outside measure of overall fire risk
Total Dollars in Fire Losses	Attempts to quantify success (or failure) of all fire department efforts in minimizing property losses due to fire; readily available
Total Fire-Related Deaths	Attempts to quantify success (or failure) of all fire department efforts in minimizing deaths due to fire; readily available
Total Fire-Related Injuries	Attempts to quantify success (or failure) of all fire department efforts in minimizing injuries due to fire; readily available

Explanatory Data:

Area of Responsibility

Area served in square miles for municipality and peer-group cities.

Population density (population per square mile) for municipality and peer-group cities.

Fire Code Compliance

Percentage of buildings in compliance with fire code regulations for municipality and average for peer-group cities.

Other Data

This data should highlight any factors pertinent to fire-prevention or fire-suppression efforts of this fire department. It could include, for example, information regarding climate, rainfall, social disturbances, road conditions, structural conditions, or average age of buildings.

Exhibit 5-3
Recommended SEA Indicators for Fire Departments: Fire Prevention*

Indicator	Rationale for Selecting Indicator
Inputs:	
Personnel	
Full-Time Personnel	Provide information on labor resources used
Part-Time and Volunteer Personnel	
Total Man-Hours Worked	Provides information on labor resources used and workload
Total Operating Expenditures	Provides information on resources committed to prevention activity
Total Capital Expenditures	Provides information on allocation of resources between operations and capital
Outputs:	
Number of Inspections	
Number of Education Programs Offered	Measure activity level; readily available
Number of Fire Investigations Performed	

Outcomes:	
Number of Fires (Reported and Unreported)	Attempts to quantify success (or failure) of efforts to prevent fires
Percentage of Fires Preventable by Inspection or Education	Attempts to quantify need for additional efforts in fire prevention; measures effectiveness of inspection program
Number of Fires of Suspicious Origin	Aids in interpreting fire rates by identifying fires not preventable by education and inspection
Fires in Inspected/Uninspected Buildings	
Industrial	Measure effectiveness of inspection program
Other	
Citizens Participating in or Aware of Education Programs	Attempts to measure effectiveness of education programs
Efficiency:	
Expenditures per Capita	A measure of per capita cost of service information
Expenditures per $100,000 of Property Protected	Relates operating cost information to value of property protected

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<Top>

Hospitals

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 6-1
Recommended SEA Indicators for Hospitals*

Indicator	Rationale for Selecting Indicator
Inputs:	

Total cost	To provide a measure of resources used to provide services, to permit efficiency calculations, and to encourage resource comparisons
Support cost	
Medical care costs (nursing, etc.)	
Physical plant	
Full-time equivalent (medical staff, personnel, all staff, etc.)	
Outputs:	
Admissions (by payer class)	To continue the long tradition of reporting such data, which industry and experienced managers find useful, and to encourage output and efficiency comparisons
Patient days	
Average length of stay	
Occupancy rate	
Outpatient visits	
Discharges	
Outcomes:	
Mortality rates	To temper hospitals' quest for efficiency by focusing on a number of indicators of quality of care; "mortality rates" are self-explanatory; "surgeries related to admissions" attempts to identify an unusually high rate of surgeries; "infection rates" addresses care while in the hospital; "patient surveys" provide important clientele feedback on a wide array of issues; "admission denials" focuses on a hospital's possible tendency to admit only healthier patients to maximize Medicare payments, while attention to "readmission rates" reduces the chance that a hospital will release patients prematurely due to cost considerations
Surgeries per 100 admissions	
Infection rates (hospital-acquired)	
Results of random patient surveys (to collect patient views of care, food, cleanliness)	
Preadmission or admission denials	
Readmission rates (within 31 days)	
Admission rates (within 31 days for outpatient surgery)	
Efficiency:	

Total cost per inpatient day	To provide a variety of measures of efficiency of operations
Labor cost per inpatient day	
Cost per outpatient day	
Cost per discharge	
Nursing hours per inpatient day FTEs per occupied bed	
Cost per patient discharged who did not have a hospital-acquired illness during his or her stay	To provide an efficiency measure that relates inputs to service outcomes
Explanatory:	
Severity of illness	Any explanatory material needed to present clarification of specific measures and to discuss variations in the indicators from peer group and/or historical performance
Source of admission (elective, required, emergency)	
Comorbidity or complicating factors (disease factors, not intrinsic to the primary disease, that may have an impact on the patient outcome)	
Age	
Gender	
Staffing level (doctors, nurses)	
Percentage of admitted patients with income below poverty level	

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Note: The SEA report ideally should break out many of these indicators by diagnostic-related group. However, considerations of space, simplicity, and value to the user may require that this level of detail should instead be available on request and as supporting documentation. The report should contain comparisons over time with relevant peer groups and, as such information becomes public, with individual, competing hospitals.

<Top>

Mass Transit

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 7-1
Recommended SEA Indicators for Mass Transit*

Indicator	Rationale	Dissagregation Level	Limitations and Suggestions for Explanatory Variables
Inputs:			
Dollar Cost of Service in Constant Dollars and Cash Expenditures	To monitor resources expended and their growth, aside from inflation	Overall system and by type of system	A price index for transit services will suffer from typical shortcomings of any general price-level adjustment.
Unfunded Costs	To evaluate accruals for infrastructure replacement and deferred maintenance and repair	By system	Detection of inadequate rates or other revenue short- falls by tracking accumulated needs for future replacement funding depends on the ability to assess such needs; explanatory data on the conditions of tracks, bridges, roads, or similar infrastructure dimensions could be useful.
Staff Quantity, Utilization (e.g., labor hours per productive service hour), and Average Compensation (including retirement or fringe benefits)	To evaluate the most significant operating expense and whether transit staff is being used productively	By system and by type of staff (e.g., drivers, mechanics, administrators, and others)	Difficulties can arise in matching staff, particularly drivers, to peak and off-peak workload and some problems could stem from use of part-time drivers.
Outputs:			
Number of Vehicle Miles Number of	This provides an indicator of extensiveness of service and related demand, providing an	By type of system; by line or route; and by peak a.m. (7-7:59 and 8-8:59), peak p.m. (4:45-5:44 and 5:45-	Vehicle miles include deadhead and service miles (but have the advantage of objectivity of measurement from an

Passengers Passengers per Vehicle Mile (a productivity measure) Revenue Capacity Miles delivered	indication of length of routes and degree of stress on vehicles, as well as the likelihood of either a cutback of service or a crowded environment; it measures the amount of space or seat capacity delivered	6:44), and off-peak, 5, and reports by weekday, Saturday, Sunday, and holiday	odometer). Passengers will include fare and transfer passengers. Some averaging is inherent in determining the sum of seated capacity of all active vehicles.
Number of Transit Units Available Divided by Number of Transit Units Required at Peak Hour	Should a breakdown occur, this will provide an idea of the likelihood of replacement of the unit on a timely basis	By type of system, by an line or route	Users must appreciate that too high a ratio may indicate overcapitalization and that some allocations among lines or routes could be arbitrary since sharing across lines occurs.

Exhibit 7-1 (continued)

Indicator	Rationale	Dissagregation Level	Limitations and Suggestions for Explanatory Variables
Outcomes:			
Percentage of Population Served by Public Transportation	Assesses the extent to which public transportation facilitates commuting and is used	By system	Socioeconomic conditions population density fare and parking rates and traffic are all likely to influence the propensity of the citizenry to use mass transit.
Geographical Coverage, Route Spacing, Number of Transfers Required by the System Design, and Span of Service (Access) (e.g., area with transit Service available within One-half mile of residence —both urbanized area and Suburbs)	Convenience is affected by accessibility and operating hours	By service area and type of system; some detail by route and day of week	Population density, employment density, and auto ownership (at household level) affect demand and must be considered in assessing the propriety of the typical required walk to the bus stop; terrain and demand influence transfers.

Percentage of Late Trips (e.g., difference between actual and scheduled times is more than 3 minutes)	This reliability measure addresses the concerns of transit riders that they can arrive at their destination on time and it monitors the reported practice of transit systems as being indifferent to how late service is, once the "on-time" threshold fails to be met	By type of system; by line or route; by peak a.m., peak p.m., and off-peak; and by categories of off-schedule (e.g., 0-3 minutes, 4-5 minutes, 6-10 minutes, 11-15 minutes, 16-30 minutes, over 30 minutes)	To provide maximum service to the most heavily traveled routes. it may make sense to slow up more trips as a means of servicing more passengers: users should consider this trade-off.
Frequency of Service (average headway): Scheduled Time between Bus Arrivals at a Bus Stop (or train arrivals at a station)	This measures planned service to riders	By type of system; by terminal, station, or stop; and by peak a.m., peak p.m., and off-peak	Since scheduled times may not be met the next metric on actual waiting time must go hand in hand with scheduled headway.
Average Time Past Scheduled Time That a Passenger Waits for a Bus or Train (the presumption is that the amount of time allowed, on average, reflects expectations as to service.)	Measures service to riders and reflects passengers adaptation to unreliable service	By type of system; by terminal, station, or stop; by route; and by peak a.m., peak p.m., and off-peak	Sampling of bus stops should be statistically based to permit useful disaggregations, and some consideration must be given to geographical terrain and traffic conditions by the evaluator this can be a very costly measure.

Indicator	**Rationale**	**Dissagregation Level**	**Limitations and Suggestions for Explanatory Variables**
Outcomes (continued):			
Train or Bus Cancellations Including en Route Cancellations and Runs Canceled or Missed (also report as a percentage of scheduled trips)	Such cancellations represent service reductions	By type of system, by route, by peak/off-peak, and by type of cancellation: 1. car shortage 2. equipment malfunction 3. train crew 4. incoming train is late, delaying	Controllability should be assessed, as should ripple effects across routes when evaluated using disaggregated information; these figures should be reviewed in tandem with passenger loads, since the cancellation could lead to fewer passengers being

		start, or creating "bunching" 5. accident 6. lack of service due to an event, such as a parade	delayed for shorter periods
Mean Distance between Failures (MDBF): Average Number of Miles Subway Cars (or Buses) Travel in Revenue Service during the Month before a Mechanical Failure Occurs Which Is Serious Enough to Cause a Train to Arrive Late at Its Destination	Measures service reliability; the lower the MDBF, the more irregular the service; this metric is most relevant to management	By type of system and by route	Problems arise in defining "late" arrival and in classifying defects found during inspections and preventive maintenance programs; moreover, if failure is a secondary reason for delay (e.g., construction is cited as primary failure), some systems do not track such breakdowns.
Number of Minutes Passed without Seeing a Policeman or Security Officer Perception of Safety	Affects the safety of travelers; while both verifiability and reliability can be questioned, visual Presence is expected to have a deterrent effect	By platform, bus stop, route, terminal, and station; by time period-peak a.m., peak p.m., off-peak, weekday and weekend, morning, afternoon, evening	Mere visual presence of a policeman does not necessarily deter crime, nor is it the most efficient approach to safety (e.g., audiovisual observation, like banks' security systems might be more effective); perceptions would be measurable through interviews or surveys but may not reflect reality.
Crime Statistics-Violent and Nonviolent (per 1000 passengers)	Reflects the safety of travelers	By system; by platform, bus stop, route, terminal, and station; by type of crime	Reporting of crime statistics tics has limitations, particularly due to unreported crimes.
Accidents per 100,000 Miles	Safety indicator	By system and by line or route	Unreported accidents and non revenue miles may cause inaccuracies; for comparison, the district traffic accident ratio per 100,000 miles could be reported.
Accidents and Injuries/ Fatalities (per	Affects the safety of travelers	By system, disaggregated by type:	Unreported accidents could distort numbers;

1,000 passengers or 100,000 passenger miles)		accident at station collision, or noncollision accident en route; also, disaggregated by severity of consequences (no injuries or fatalities; injuries; fatalities)	controls are required to ensure against omissions.

Indicator	Rationale	Dissagregation Level	Limitations and Suggestions for Explanatory Variables
Outcomes (continued):			
Passenger Environment Indicators-Percentage of Cars or Buses with: • No broken door panels • Operative doors • Adequate lights • Adequate climate control • Proper equipment (handrails, straps, seats, mirrors, floor mats, etc.) • No interior graffiti • Peeling paint • No excessive litter • No broken or graffitied glass (clear and operative windows) • No heavy dirt on floors • No excessive noise	Affects the comfort of passengers and ease of travel	By type of system and by line or route	Age of units and nature of neighborhood serviced, as well as passenger loads, are likely to affect these metrics; in addition, some measures are fairly subjective in assessment and will require trained observers (except for climate control which can be recorded by measurement devices).

• Operative lift features for buses • Elderly and handicapped stickers			
Load Factors (also, percentage of passengers standing; percentage of riders unable to board bus)	Overloading affects the comfort of passengers; underloading affects fare box recovery	By type of system; by line or route; and by peak a.m., peak p.m., and off-peak	This is difficult to measure In trains, though fare boxes facilitate tracking in buses.
Accuracy of Information provided to Passengers: • Response rate at telephone information center • Signs and map availability • Percentage of cars or buses with announcements • Legible system maps • Correctly labeled trains and buses • Correct signs	Ease of travel, particularly by new passengers	Overall system information phone lines, printed schedules, and announcements; by station or terminal announcement completeness, audibility, and accuracy; by type of system and by line and route detail for signs and maps	Some subjectivity in tracking exists; this assessment ought to be made by individuals unfamiliar with the system through direct experience and may require surveys of tourists.
Customer Satisfaction with Service (e.g. as indicated by number of complaints per 100,000 passengers or surveys of perceptions)	Feedback provided to address quality dimensions that are otherwise difficult to assess and to of monitor overall reasonableness of other measures from a passenger's vantage point	Overall system, by system, by line or route, and by nature of service attribute: • schedule reliability • service reliability • passenger environment • load factors • courtesy of drivers • courtesy of	The inherent limitations of surveys would likely apply as would problems of perceptions and experiences versus actual performance.

		other employees • information services • perceived safety • perceived efficiency • pricing	

Indicator	Rationale	Dissagregation Level	Limitations and Suggestions for Explanatory Variables
Outcomes (continued):			
Nonriders' Perceptions regarding Public Transportation (e.g., its reliability, safety, etc.)	Provides a means of addressing nonriders concerns in order to attract them as riders	Overall system	Perceptions (often measured through market research) may have little to do with reality, as by definition non riders are relatively uninformed.
Efficiency:			
Cost per Passenger	Efficiency measurement	By type of system basis and by line or route	Some adjustment for inflation should be noted across time (e.g., through the use of constant dollars).
Operating Cost per Mile	Efficiency measurement	By type of system basis and by line or route	Same as cost per passenger.
Fare Box Recovery of Operating Costs	Reflects whether services are self-sustaining and reveals cross-subsidization	By type of system and by line or route	System may not have a goal to be self-sustaining.
Required Subsidy per Passenger and per Mile	Reflects sources of financing and the extent of subsidization, other than charges to users	By type of system and by type of subsidy: UMTA State Local	Political environments can influence types of financing used; UMTA revenue may be largely uncontrollable.
Explanatory Variables:			

Nature of Services Provided, Particularly Scope of Demand Response Systems for the Handicapped and Elderly	A goal of mass transit frequently includes ensuring mobility to both the elderly and handicapped	By type of system and by service area By type of system	The special-interest-group focus of these services likely justifies separate analysis of demand response systems, yet the scope of services provided may effect performance measures for some aspects of operation
Average Vehicle Age and Remaining Life (quartile information also desirable); Replacement Cost of Fleet	Performance indicators should be viewed in the context of age of system and equipment and its replacement cost		The average value can be distorted by having a substantial number of purchases with virtually zero age; the quartile presentation is important in avoiding such a distortion.

Definitions of Key Terms

"Revenue Vehicle Miles: Total miles traveled by revenue vehicles while in revenue service. Excludes miles traveled to and from storage facilities and other deadhead travel.

Revenue Vehicle Hours: Total number of scheduled hours that a vehicle is in revenue service. Excludes hours consumed while traveling to and from storage facilities and during other deadhead travel.

Revenue Capacity-Miles (Computed): Revenue vehicle miles times the average passenger capacity of the active vehicles in the fleet. Average passenger capacity is determined by averaging the sum of the seated capacity and standing capacity of all active vehicles in the fleet.

Vehicle Miles: The total distance traveled by revenue vehicles, including both revenue miles and deadhead miles.

Vehicle Hours: The total hours of travel by revenue vehicles including scheduled hours consumed in passenger service and deadhead travel.

Fatality and Personal Injury: Accidents in which one or more persons are fatally injured and one or more persons receive personal injury, but no property damage results.

Fatality Only: Accidents in which one or more persons are fatally injured, but no property damage or other personal injury is involved.

Personal Injury Only: Accidents in which one or more persons receive personal injury, but no fatalities or property damage results.

Roadcalls for Mechanical Failure: A count of the revenue service interruptions during the reporting period caused by failure of some mechanical element of the revenue vehicle. (Mechanical failures are to include breakdowns of air equipment, brakes, body parts, doors, cooling system, heating system, electrical units, fuel system, engine, steering and front axle, rear axle and suspension and torque converters. Tire failures and fare box failures are not included.) These revenue service interruptions require assistance from someone other than the revenue vehicle operator (or crew) in order to restore the vehicle to an operating condition. Further, they

usually require the transfer of the passengers to another revenue vehicle for the completion of their trip.

Roadcalls for Other Reasons: A count of the revenue service interruptions during the reporting period caused by tire failure, farebox failure, air conditioning system, out of fuel-coolant-lubricant and other causes not included as mechanical failures.

Labor Hours for Inspection and Maintenance of Revenue vehicles: The labor hours of transit system maintenance personnel working on revenue vehicles for the period."

Source: U.S. Department of Transportation Urban Mass Transportation Administration Urban Mass Transportation Industry Uniform System of Accounts and Records and Reporting System. Vol. 20 (Report No. UMTA-IT-06-0094-77-1) (Washington DC. January 10 1977) pp 8.5-18.6-1.8.7-1.

<Top>

Police Department Programs

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 8-1
Recommended Police Department SEA indicators*

Indicator	Rationale for Selecting Indicator
Inputs:	
Budget expenditures	To provide a measure of financial resources used to provide services
Equipment, facilities, vehicles	To provide a measure of non personnel resources used to provide services
Number of personnel; hours expended	To provide a measure of the size of the organization and the human resources used to provide services
Outputs:	
Hours of patrol	To provide a measure of the quantity of patrol service provided; patrol is generally regarded as a primary product of police efforts
Responses to calls for service	To provide a measure of the quantity of response service provided
Crimes investigated	To provide a measure of the quantity of services provided by investigation units
Number of arrests	To provide a measure of the success of police efforts in apprehending criminal offenders

Persons participating in crime prevention activities	To provide a measure of the quantity of service provided by crime-prevention units
Outcomes:	
Deaths and bodily injury resulting from crime	To provide a measure of the effectiveness of police efforts in reducing the incidence of personal harm attributed to criminal activity
Value of property lost due to crime	To provide a measure of the effectiveness of police efforts in reducing the incidence of property loss due to criminal activity
Crimes committed per 100,000 population	To provide a measure of the effectiveness of police efforts in reducing criminal activity
Percentage of crimes cleared	To provide a measure of the effectiveness of police efforts in detection of criminal activity and apprehension of criminal offenders
Response time	To provide a measure of the quality of police response to calls
Citizen satisfaction	To provide a measure of the overall effectiveness of police efforts in meeting citizen needs
Efficiency:	
Cost per case assigned; cost per crime cleared	To provide an indication of the cost efficiency of police efforts
Personnel hours per crime cleared	To provide an indication of the productivity of personnel in providing police services
Explanatory Variables:	
• Population by age group • Unemployment rate • Number of households; number of business firms • Percentage of population below poverty level • Land area • Dollar value of property within jurisdiction • Demand • Calls for service • Cases assigned	To provide information on factors that are likely to affect the incidence and effects of criminal activity so that measures of output, outcome, and efficiency may be viewed in proper context

The recommended indicators presented in this exhibit are illustrative. They are intended to serve as a starting point for use in the development of a comprehensive set of SEA indicators for external reporting of an entity's results of operation. This exhibit does not provide illustrations of indicator disaggregation or of comparison data such as trends, targets, or other comparable entities. Both disaggregation and comparison data are important aspects of SEA reporting.

<Top>

Public Assistance Programs

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 9-1
Recommended SEA Indicators for AFDC and GA Programs *

Indicator	Rationale for Selecting Indicator
Inputs:	
Administrative cost of program (current and constant dollars)	Will provide basic information regarding total resources committed to program; can be used in ratio to determine program efficiency
Total cost-administrative cost plus benefit payments (current and constant dollars)	
Total staff-hours used to operate program	
Outputs:	
Total number of recipients	Can easily be calculated to allow gross comparison over time; can be used in ratio to determine program efficiency
Total amount of assistance provided	
Outcome Indicators:	
Percentage of applications processed within 45 days	Provide information as to how well service is being delivered; give an idea of whether secondary objectives of programs are being achieved; use of indicators is also cost-effective, since they are already required by the federal government for AFDC program
Percentage of cases predetermined within 6 months	
Percentage of fair hearing appeal decisions made within 90 days	
Positive payment error rates (overpayments)	
Negative payment error rates (underpayments)	
Overpayments recovered as a percentage of overpayments identified during the fiscal year	
Negative case accuracy rate	Provide information regarding the effectiveness of assistance programs in ensuring assistance for all who are eligible
Degree of difficulty of the	

application process	
Percentage of initial applicants completing the application process	
Percentage of surveyed who meet predetermined levels of physical health	Provide information on effectiveness of assistance programs in achieving basic standard of living
Percentage of surveyed who live in adequate housing	
Percentage of surveyed who do not live below poverty line	
Percentage of grants reduced due to employment	
Percentage of grants increased that had been reduced due to employment	Provide information regarding the effectiveness of assistance programs in achieving the secondary objective of self-sufficiency
Percentage of cases reopened within one year	
Percentage of cases not reopened within two years	
Efficiency Indicators:	
Number of accurate case actions processed	Provide a meaningful assessment of cost of assistance programs relative to accomplishments; will enable more valid comparisons of program cost over time and between jurisdictions
Per worker	
Administrative cost per case	
Staff-hours per accurate case action	
Administrative costs per dollar dispensed	Provides an indication of administrative cost-effectiveness
Explanatory Data:	
Examples are: • Unemployment rate • Number of cases per worker • Number or percentage of working recipients • Changes in regulations	

• Staffing problems	

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<Top>

Public Health

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 10-1
Recommended SEA Indicators for Chronic Disease*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (may be broken out by program or activity) in current and constant dollars	Measure of resources used to provide services
Output:	
Number of Patients Treated	Widely accepted measures used by public health professionals to measure program outputs
Number of Persons Screened	
Number Participating in Education Programs	
Number of Clients/Training Sessions	
Average Worker-Hours per Client	
Percentage of Target Population Served	
Outcome:	
Mortality Rates	Measure of death due to chronic diseases
Morbidity Rates	Indication of prevalence of chronic diseases
Target Group with Controlled Conditions	Indication of program effectiveness
Restricted-Activity Days per Person	Indication of quality of life after onset of chronic
Bed-Disability Days per Person	Disease

Percentage of Patients (Target Group) with Controlled Conditions	Indication of the accomplishment of short-term program objectives
Efficiency:	
Cost of Medical Supplies per Unit	Measure of agency's efficiency in acquisition of supplies
Program Costs/Number of Patients with Controlled Chronic Disease	Indication of agency's costs in achieving each case of controlled chronic disease
Projected Costs Saved/Prevention Program Costs	Indication of agency's efficiency in reducing future public health costs
Program Hours per Controlled Chronic Disease Case	Indication of program hours employed to achieve each case of controlled chronic disease

Exhibit 10-2

Recommended SEA Indicators for Sexually Transmitted Diseases*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (may be broken out by program or Activity) in current and constant dollars	Measure of resources used to provide services
Output:	
Number of Persons Screened	Widely reported measures in practice that provide an indication of program outputs
Number of Screened Infected Patients That Were Treated and Time Factors Related to Service Delivery	
Number of Interviewing/Counseling Sessions Assigned per Worker with Time Factors Related to Service Delivery	
Number of Investigations Completed and Time Factors Related to Service Delivery	
Outcome:	
Incidence Data by Type of STD	Widely reported measure, provides an indication of spread of STDs
Projected Number of STD Cases Prevented	Indication of the accomplishment of short-term objectives
Percentage of Positive Gonorrhea Cultures for Females Who Return for Test of Cure	

Efficiency:	
Economic Savings from Prevented Cases/ Program Costs	Indication of the agency's efficiency in reducing the economic impact of STD cases
Education and Counseling Hours/STD Cases	Commonly reported efficiency measure that provides an indication of efficiency in reported cases due to outreach efforts
Cost per Patient or Visit	Indication of the efficiency of patient treatment operations

Exhibit 10-3

Recommended SEA Indicators for Sexually Transmitted Diseases-AIDS*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (may be broken out by program or Activity) in current and constant dollars	Measure of resources used to provide services
Output:	
Number of AIDS Antibody Tests Given	Indication of AIDS prevention and treatment program outputs
Number of AIDS Educational Seminars	
Number of AIDS Cases Treated	
Number of True/False Positive Results for AIDS	
Community Plan to Control the Spread of AIDS	
Measure of Attitudes of the Target Population Based on Surveys	
Outcome:	
Reported AIDS Cases and Deaths	Widely reported measure that may be legally required in some states
Percentage of Population or Number of Persons with the HIV Virus Based on Statistically Valid Sample Survey Methods	Indication of the prevalence of the HIV virus
Rate of Newborn Babies Testing Positive for HIV Virus	Indication of spreading of the HIV virus
Percentage of Target Population That Has Attended AIDS Workshops That Report a Change in Risky Behavior	To provide an indication of the accomplishment of short-term objectives
Level of AIDS Knowledge in Population Based on	

Survey Data	
Percentage of Population That Has Changed Risky Behavior, Based on Survey Data	

Exhibit 10-4

Recommended SEA Indicators for Maternal and Child Health (MCH) Care*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (may be broken out by program or Activity) in current and constant dollars	Measure of resources used to provide services
Output:	
Number of Clients Admitted to MCH Program	Widely reported measures that provide an indication of MCH program outputs
Number of Clinic Visits per Month	
Number of Prenatal and Postnatal Mothers Contacted	
Number of Persons Receiving Family Planning Services	
Number of Pregnant Women Receiving Care in First Trimester	
Outcome:	
Infant Mortality Rate	Widely accepted measures used by public health officials to measure MCH program outcomes
Low Birth-Weight Rates	
Teenage Pregnancy Rate	
Rate of Lead Poisoning Cases	
Reported Cases of Preventable Diseases in Children	
Maternal Death Rates	
Death Rates for Children	
Number of Clients Authorized to Be Served and Actually Served by WIC	Widely reported measures by MCH program to provide indicators of the accomplishment of short-term MCH program objectives
Percentage of Low Birth-Weight Babies in Target Population	

Percentage of Teenage Pregnancies among Those Participating in Educational or Training Programs	
Projected Low Birth-Weight Births Prevented	
Projected Infant Deaths Prevented	
Cases of Measles Prevented	
Efficiency:	
Cost per Immunization	Indication of the agency's efficiency in providing immunizations
Cost of WIC Supplements per Unit	Indication of the agency's efficiency in purchasing WIC supplements
Number of Premature Births/Number of Patients	Indication of the agency's efficiency in reducing premature births
Projected Health Care Costs Saved through Routine Check-ups/Costs of Routine Check-ups	Indication of agency's efficiency in reducing future health care costs

Exhibit 10-5

Recommended SEA Indicators for Control of Stress and Violent Behavior*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (may be broken out by program or activity) in current and constant dollars	To provide a measure of resources used to provide services
Output:	
Number of Rape Counseling Hours	To provide an indication of program outputs related to training and counseling sessions that are commonly used interventions in the control of stress and violent behavior
Percentage of Target Population in Stress Management	
Training and Programs	
Number of Child Abuse Training and Counseling Sessions	
Outcome:	

Suicide Death Rates, 15-24 Years of Age	Readily available statistics that can be used to provide an indication of health and death outcomes related to stress and/or violent behavior
Death Rates from Homicide and Legal Intervention	
Incidence of Hypertension	
Reported Rape Cases	
Violent Crime Rates	
Number or Rate of Permanent Disability Cases Due to Violence	
Reported Child Abuse Cases	
Patients with Controlled Blood Pressures Participating in Stress Management Training Sessions	To provide an indication of the accomplishment of short-term program objectives related to control of stress and violent behavior
Potential Years of Life Saved Due to Intervention Programs	

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point for use in the development of a comprehensive set of SEA indicators for external reporting of an entity's results of operation.

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<Top>

Road Maintenance

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 11.1
Recommended SEA Indicators for Road Maintenance*

Indicator	Rationale for Selecting Indicator
Inputs:	
Expenditures (current and constant dollars)	Data normally gathered; provides a breakdown by type of resources used
Total	

By activity	
Labor hours	
Quantity of material by type	
Equipment hours by type	
Outputs:	
Pavement miles resurfaced	Measures accomplishments of maintenance program
Pavement miles seal coated	
Number of potholes repaired (or tons of premix applied)	
Miles of curb/gutter/sidewalk replaced	
Number of street utility cuts repaired	
Number of storm inlets repaired/cleaned	
Miles of preventive maintenance	Important measures that require careful definition and typically must be based on engineering judgment
Miles of deferred maintenance (i.e., postponed work)	
Outcomes/Quality:	
Number and percentage of lane miles of road whose condition was either improved or maintained at a satisfactory level (i.e., PSI > 2.5)	Ties maintenance accomplishments to changes in road condition and level-of-service goals
Lane miles in poor, fair, satisfactory, and excellent condition	
Road rideability as measured by such devices as Mays Meter	A reliable, repeatable, and commonly used method for measuring roughness
Pavement distress indicators measured by visual condition surveys that relate to maintenance performance (e.g., number of lane miles with severe alligator cracking)	Easy to collect, but considerable engineering knowledge required to correlate with maintenance outcomes, quality, or needs
Percentage of lane miles at acceptable rating level	Relates pavement condition to level-of-service goal
Percentage of roads seal coated out of total requiring such work	Compares accomplishments to needed work
Average quality assurance measures achieved on completion of maintenance resurfacing (e.g., average smoothness)	>Measures on-site work quality; quality assurance/control >is becoming increasingly important in road work

Year-to-year change in the average service life of different types of maintenance work on different categories of highways	Indicates whether maintenance work is longer lasting
Citizen perceptions of road condition based on public opinion surveys	Measures perceptions of users
Average time to respond to citizen complaints	Measures responsiveness to concerns of road users

Exhibit 11.1 (continued)

Indicator	Rationale for Selecting Indicator
Efficiency	
Ratio of inputs to outputs:	
Average unit dollar cost for labor, equipment, and material for particular types of repair such as average labor-hours per mile of street resurfaced	Measures efficiency in a widely used and easy-to-compute manner
Measures related to outcomes/quality:	
Number of miles maintained in a "satisfactory" or better condition per dollar of expenditure by road category (i.e., PSI > 2.5)	Relates productivity to changes in road condition and level-of-service goal
Number of miles improved to or maintained at PSI > 2.5 per dollar of expenditure by road category	Relates productivity to quantitative level of-service goal
Comparison of performance measures for in-house and contract labor by maintenance activity	Helps determine whether different types of maintenance should be contracted out
Explanatory Data:	
Weather (degree days, freeze-thaw cycles)	Helps explain exceptional or unusual values of performance indicators
Terrain (flat, rolling, mountainous)	
Type of road (flexible, rigid)	
Traffic volume and percentage of trucks (or equivalent single-axle loads)	
Average time or distance to work sites	
Lane miles of agency maintenance responsibility by road type	
Pavement age distribution	
Other unusual work circumstances	

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<Top>

Sanitation Collection and Disposal

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 12-1
Recommended SEA Indicators for Solid-Waste Collection*

Indicators	Rationale for Selecting Indicator
Inputs:	
Expenditures	
Current dollar[a,b] Constant dollar[a,b]	Provides information on total resources input
Number of personnel	Provides a breakdown of resources by labor and capital
Number of vehicles[b]	
Outputs:	
Number of customers served[a,b]	Provides a measure of workload; enables comparison over time; provides data for unit costs
Tons of waste collected[a,b]	
Outcomes:	
Percentage of scheduled collections missed[a,b]	Attempts to quantify whether service goals were reached, data are readily available
Percentage of scheduled collections not completed on schedule[a,b]	
Percentage of streets rated acceptably clean[b]	Objective assessment of service goal

Average customer satisfaction rating[a,b]	Assesses customer satisfaction with the service
Number of customer complaints	
Efficiency:	
Cost per ton of solid waste collected[a,b]	Indicates efficiency; already widely used; will enable comparisons with other jurisdictions
Cost per customer served[a,b]	
Tons of solid waste collected per employee[a,b]	Useful in assessing employee efficiency
Explanatory Information:	
Frequency of collections[a,b]	
Location of collections[a,b]	
Composition of solid waste	
Climatic conditions	
Terrain	
Average wages of employees	
Type of agency(ies) providing the service	
Type of contract with service provider (if relevant)	Indicates level of convenience to customer; usually readily available
Average number of customers per collection route-mile[a]	
Types of vehicle	
Crew size on vehicle	
Type of containers used by customers	
Percentage of recyclable waste recycled	
Transfer costs	

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development of a comprehensive set of SEA indicators for external reporting of an entity's results of operation.

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[a]Designates an indicator for which it would be desirable to disaggregate by customer type (commercial, single-residential, multiple-residential).

[b]Designates an indicator that should be disaggregated by district.

Exhibit 12-2
Recommended SEA Indicators for Solid-Waste Disposal: Landfills*

Indicators	Rationale for Selecting Indicator
Inputs:	
Expenditures	Provides information on total resources input
Current dollar	
Constant dollar	
Number of personnel	Provides a breakdown of resources by labor and capital
Number of vehicles	
Outputs:	
Actual tons processed during period	Indicators of workload; useful for year-to-year comparisons; can be used to help assess remaining life of landfill
Average daily tons processed	
Cubic yards of landfill used	
Outcomes:	
Percentage of days that environmental standards are met (leachate, surface water, groundwater, noxious gas)	Assesses the impact the landfill has on the environment
Tons of toxic material as percentage of total material deposited in landfill	Assesses damage to soil and surrounding environment
Percentage of independent inspections detecting odor, debris, or noise problems	Provides information for evaluating the landfill's operations and how it affects the surrounding community
Number of citizen complaints	
Dollar amount expended due to personal or	

property damage from landfill operations	
Revenue received from landfill customers	Indicates economic contribution of landfill
Total operating revenue as a percentage of cost	
Efficiency:	
Cost per ton of solid waste processed	Indicator of efficiency; useful for year-to-year comparisons
Explanatory Information:	
Composition of disposed waste	
Type of landfill liner	
Type and amount of landfill cover	
Type of pollution controls	
Climatic conditions	
Future use of landfill (number of capacity tons remaining)	
Capacity	
Daily processing (in tons)	
Number of years	

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Exhibit 12.3
Recommended SEA Indicators for Street Sweeping*

Indicators	Rationale for Selecting Indicator
Inputs:	
Expenditures	
Current dollar	Provide information on total resources input

Constant dollar	
Number of personnel	Provide a breakdown of resources by labor and capital
Number of vehicles	
Outputs:	
Number of street-miles cleaned[a]	
Percentage of street-miles receiving	Provides information on workload
Regular street sweeping[a]	
Tons of refuse collected[a]	
Outcomes:	
Percentage of street sweepings not completed on schedule[a]	Provides information on the timeliness of cleanings
Average customer satisfaction rating[a]	Indicates customer perception of the service
Percentage of streets rated acceptably clean	Provides assessment of service objectives
Efficiency:	
Cost per mile of street cleaned	Indicates efficiency; provides composite information relating input to output
Cost per ton of refuse collected	
Explanatory Information:	
Frequency of street cleanings per month[a]	
Miles of street requiring street cleaning	
Terrain	
Climatic conditions	
Vehicle traffic	
Pedestrian traffic	
Parking conditions	

Building density	
Use of sand during winter	

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<Top>

Water and Wastewater Treatment

The following exhibit is adapted from *Service Efforts and Accomplishments: Its Time Has Come – An Overview*, by Harry P. Hatry, James R. Fountain, Jr., Jonathan M. Sullivan and Lorraine Kremer, editors.

Exhibit 13-1
Recommended SEA Indicators for Drinking Water

Indicator	Rationale for Selecting Indicator
Inputs:	
Total cost of operations	To allow comparison of cost with other departments and water entities
Cost per household or type of service	
Miles of pipeline	To indicate the size of the operations for which the entity is responsible
Number and capacity of treatment plants	
Number of employee hours	To indicate time spent on providing the service
Outputs:	
Miles of water lines maintained, repaired, and inspected (by geographic area)	To indicate amount of infrastructure maintained
Feet of new line constructed	To indicate the increase in the infrastructure to meet the needs of industry and the community in general
Number of new services connected, by customer type	
Number of breaks, leaks, etc., repaired (by geographic area)	To indicate the level of work performed on existing system beyond general maintenance
Total gallons pumped, metered, and treated	To disclose how many gallons were pumped, metered, and treated

Percentage of total gallons pumped by user category:	
Residential	To disclose the client mix and the amount of unaccounted-for-water
Commercial	
Industrial	
Used by department	
Free to schools, etc.	
Unaccounted-for	
Outcomes:	
Percentage of total gallons pumped that were metered	To indicate how many of the gallons pumped were metered
Number of calls about interrupted service	To determine how well the infrastructure is maintained
Number of main breaks	To indicate the condition of the infrastructure water lines
Number of breaks, leaks, etc., per 100 miles of pipeline per year (by geographic area, by severity, and type of pipeline)	
Percentage of service interruptions cleared in goal period of time	To indicate the ability of the service group to clear service calls within goal time
Percentage of breaks, leaks, and so forth, repaired within x hours of notification	
Number of complaints:	To indicate the quality of the water and the service delivery from the customers' perspective
Water pressure	
Water taste	
Water odor	
Water color	
Other (by geographic area)	
Number of days did not meet federal and/or state standards (Include reason for noncompliance.)	Indication of quality of water
Primary-health related	
Secondary-aesthetic	

Efficiency:	
Cost per million gallons pumped:	To indicate the cost of providing the service and the breakdown of the cost
Treatment	
Distribution	
Containment	
Other	
Explanatory:	
Type of source of water supply and distance to source	The cost of water is affected by the type (above or below ground) and distance to the source and the difficulty in obtaining and bringing the water to the treatment facility
Quality of water at intake and treatments	The quality of source water is an important determinant of treatment cost
Average daily demand (by month)	To indicate the current demands on the system and to show how demand has changed over time
Billing rates:	
Residential	To determine the different billing rates
Commercial	
Industrial	
Total revenue from customer billing/total cost	To determine how much the city is subsidizing the department
Population served	To allow the reader to understand the size and demographics of the system
Square mile	
Maximum daily demand/system capacity	To indicate the level of excess capacity in the system
Treatment-plant capacity (by treatment plant)	To indicate the general flow capacity
Holding-tank capacity	To indicate storage capacity in the system
Debt service coverage ratio	To show ability to pay debt
Projected water demand in 5 years/current capacity	To indicate the need for future expansion and funding

Exhibit 13-2
Recommended SEA Indicators for Wastewater Treatment*

Indicator	Rationale for Selecting Indicator
Inputs:	
Total cost of operations	To allow comparison of costs to other departments and other wastewater entities
Cost per capita of wastewater treated	
Number and treatment capacity of plants and level of treatment provided by each	To provide a picture of the size of operations for which the entity is responsible
Miles of infrastructure (pipeline)	
Number of employee hours	To indicate time spent on providing the service
Outputs:	
Miles of sewer pipe maintained, repaired, and inspected (by geographic area)	To indicate amount of infrastructure maintained, repaired, and inspected
Percentage of miles maintained requiring repair	
Percentage of above repaired this year	
Miles of new sewer constructed	To indicate the increase in the infrastructure to meet the needs of industry and the community in general
Number of new services connected	
Number of service calls completed (by geographic area)	To indicate the level of work performed on existing system beyond general maintenance
Amount of wastewater treated (by treatment type) (BG):	
Primary treatment	To indicate the flow through the system and the relative volumes requiring various treatments
Secondary treatment	
Tertiary treatment	
Dry tons of sludge produced	To indicate the volume of dry sludge produced
Outcomes:	
Number of main stoppages per 100 miles of sewer main (by geographic area)	To determine how well the infrastructure is maintained

Average service response time (in hours)	
Number of complaints (by geographic area)	To indicate the quality of service, particularly from the customer's perspective
Number of days effluent exceeded federal and/or state standards-number of violations of discharge permit (Include reasons for noncompliance.)	
Number of days influent exceeded treatment plant capacity	To indicate the ability of treatment process to remove pollution adequately
Number of gallons effluent that did not meet federal standards/total number of gallons processed through system	
Quality of water in receiving body downstream from discharge	
Infiltration and inflow ratio	To indicate the condition of the infrastructure and the effectiveness of the maintenance program
Efficiency:	
Percentage of repairs completed within goal time	To indicate ability of the service group to clear calls within goal time
Wastewater treatment cost per 1,000 gallons	
Treated (by treatment type):	To indicate the cost of providing the service and for comparison with other wastewater entities
Primary treatment	
Secondary treatment	
Tertiary treatment	
Sludge disposal or use cost per dry ton	
Revenue from sales of by-products less costs	
Explanatory:	
Description of what the receiving body is used for	To provide information on the systems impact on the environment
Population served	To allow the reader to understand the size and demographics of the system
Square miles served	
Average daily flow/maximum daily treatment capacity	To indicate the extent of excess capacity

(by treatment plant)	
Debt service coverage ratio	To show ability to pay debt
Projected needed capacity in 5 years/current capacity	To indicate the need for future expansion and funding
Total revenues from customer billings/total operating costs and debt service	To determine how much the city is subsidizing the department

<Top>