



Local Government
CENTER

**PERFORMANCE MEASUREMENT,
BENCHMARKING
& OUTCOME-BASED BUDGETING
FOR WISCONSIN LOCAL
GOVERNMENT**

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PART 1

Basics of Performance Measurement

Performance budgeting cannot be implemented without a performance measurement system. A performance measurement system is a complex, long-term endeavor that cannot be instituted overnight.

Interim solution

A rudimentary form of PBB to be implemented until a formal system can be produced could include the following in each department's budget request:

a. An explanation of the department's overall goals

Have each department director produce a narrative page with the department's budget proposal. In that narrative, have the department director produce a brief description of the departments overall goals for the next budget year and how they relate to long-term goals.

b. An explanation of what the department has accomplished in the past year

Include in the narrative what the department director feels have been the department's significant accomplishments in the previous year. Also included should be what challenges were encountered that prevented or hampered the accomplishments of goals that were not achieved.

c. An explanation of what the department intends to accomplish in the coming year

This forces the department director to think through what he/she hopes to accomplish in the coming year. Done in consideration of a capital improvement plan and a strategic plan, this can be an effective starting point for full performance measurement goal setting. In effect, it puts the department director on notice that things are not going to just remain status quo but are moving toward a measurable system of constant improvement and gives the elected officials a better idea of what's actually happening in that department.

d. An explanation as to what is different from last year in the proposed budget and why

This won't necessarily be obvious. A discussion of what is different from last year's budget and why it is different, i.e. what caused the changes, what funding streams may be different, are there personnel changes?

e. A GASB compliant budget showing past year budget expenditures

A budget, produced to GASB standards, will provide information on previous year's budgets and expenditures so that comparisons of budgets and expenditures compared with stated and met goals at a glance.

Example:

GENERAL FUND					FY 0?/0?	Dept. 100
100 Administration	(last year's budget)	(last year's actual expended)	(present year's budget)	(what you expect to spend)	(next year)	
Description	FY0? Budget	FY0? Actual	FY0? Budget	FY0? Projected	FY0? Budget	Comments
101 Wages & Salaries	\$1,463,450	\$1,461,320	\$1,513,880	\$1,520,420	\$1,669,210	<i>Added new accountant</i>

While this "interim solution" by no means meets the requirement for a performance measurement system, it does improve administrative control and sets the manner of thinking necessary to implement a true performance measurement system.

Building the Performance Measurement System

Four Principles

Principle #1: Establish broad goals to guide government decision-making.

Probably the best place to start is to review the organization's Strategic Plan, Land Use Plan, Capital Plan, and any other plans which provide an indication as to what are the near-term and long-term goals for the community. This is the basis for developing policies, programs, service types, and service levels to be provided. The goals should be developed after an assessment of community conditions, a review of all applicable plans, and a review of internal operations.

Example: Improve ___% of municipal streets to PASER level ____ by _____.

Principle #2: Develop approaches to achieve goals.

Set specific policies, plans, programs, and management strategies to define how long-term goals will be achieved. Through these the government determines how it will go about accomplishing its goals. Simply put, “How are we going to do this or get there?”

Principle #3: Develop a budget with approaches to achieve goals.

Develop and adopt a financial plan and budget that move toward achievement of goals with the constraints of available resources. The preparation of a financial plan, capital improvement plan, and budget options are part of this effort. In that financial plan, a borrowing plan that takes advantage of favorable interest rates at points where the government can afford to borrow to achieve pre-determined projects is critical to financial success.

Principle #4: Evaluate performance and make adjustments

This is where we’ll spend the remainder of this manual, “How to do this.” Program and financial performance should be continually evaluated and adjustments made to achieve goals. Budgets, policies, and/or plans may all need to be adjusted based on performance data. However, a word of caution; it is easy to fall into a trap of chasing the target when attempting to achieve goals. Small, incremental changes based on performance data are more effective than quick, major changes that may prove to be over reactions that cause more damage than improvement. Measured responses to data are more likely to produce the desired results.

Performance Indicators

Performance indicators are specific numerical measurements for each aspect of performance which is under consideration. A point that must be remembered is that, for performance measurement purposes, the amounts that are actually used, not the amounts budgeted, are the relevant numbers

Performance indicators generally include the following:

- **Input**
- **Output**
- **Efficiency**
- **Service Quality**
- **Outcomes**

The performance indicators should also be accompanied by **explanatory data**.

Performance indicators must be quantifiable, measurable, relevant, understandable, and timely. Although some indicators may seem to be neither quantifiable nor measurable at

first glance, an objective analysis of the program's components will commonly review some aspect that is quantifiable, measurable, and relevant.

Input Indicators. Input indicators represent the resources allocated to and expended by a program. They include costs, both direct costs and fringe benefits, and labor hours. For instance, if the police DARE program is considered, input indicators might include the person-hours expended by the DARE officer, vehicle costs, costs of DARE shirts, and cost of presentation materials, to name a few. Inputs are the resources used to produce outputs and outcomes

Output indicators. Output indicators relate to the quantity of units produced; how much work has been done. They are the products and services delivered and are typically under managerial control. Outputs include not only the products and services produced by your organization but also by contractors. Examples might be:

- How many miles of sewer pipe have been visually inspected?
- How many citizens have been served?
- How many fires have been responded to?
- How many arrests have been made?

Efficiency Indicators. Efficiency indicators are determined by using the ration of inputs used per unit of output (or output per unit). Examples might be:

Cost per unit:

- Cost per ton of refuse collected
- Cost per mile of street or road paved
- Cost per prisoner boarded
- Cost per counter transaction

Productivity:

- Hours per customer complaint
- Plans reviewed per reviewer
- Arrests made per officer
- Water bills processed per clerk

Service Quality Indicators: Service quality indicators relate to how satisfied customers/citizens are; how accurately a service is provided; and/or how timely a service is provided. Examples might be:

- Percentage of respondents satisfied with service
- Frequency of repeat repairs
- Average wait time.

Outcome Indicators: Outcome indicators are the qualitative results associated with programs and services. Outcome indicators are the result of your program efforts and resource expenditures; the accomplishment. They focus on the “why” of providing a specific service. While outputs are what work the organization does, outcomes are what these outputs accomplish. Examples might include:

- Reduction in fire deaths/injuries
- Increase in job trainees who hold a job for more that six months
- Decrease in low birth-rate babies.
- Contract cost growth
- Fire losses
- Percent of late bills collected

Four-Step Methodology

A four step methodology is widely used and is a practical and useful process used to develop department performance measures. This particular approach is used by Fairfax County, VA and has been used as a model for a number of other governments.

Step 1: Review and Evaluate Existing Department Mission and Cost Center Goals.

Commonly the mission used should be the one described or identified during strategic planning processes. Performance measurement is directly linked to strategic planning and cannot be effective if strategic planning has not taken place. Goals give specific direction on how the department will achieve the stated mission. Goals are not generally quantified and span multiple budget years.

A good goal statement should:

- Begin with “To” followed by what you intend to do
- Say what the department or program area does
- Identify its customers and stakeholders
- State “why” the program or department exists
- Be associated with an outcome indicator

Template example:

“To provide/produce (fill in service or product) to (fill in customer) in order to (statement of what you intend to accomplish).”

Examples:

Maternal and Child Health Services

“To provide maternity, infant and child health care and/or case management to at-risk women, infants, and children in order to achieved optimum health and well-being.”

Highway Department:

“To provide construction and maintenance services to county roads and highways in order to achieve safe, continuous, uninterrupted flow transportation options for both citizens and commercial traffic within the county.”

Step 2: Identify a Service Area.

Identify the department’s **major** activities. Not everything the department does or every duty it performs, just the major activities that are critical to the success of the department’s mission; that consume a significant portion of the department’s budget; that are locally sensitive or frequently in the public or political spotlight; and those that have a significant customer service focus. It is also useful to group activities that have a common objective and/or common customers and stakeholders.

Example:

Police Service Areas = (1) Criminal investigation, (2) Traffic enforcement, (3) Community Policing, (4) Patrol, (5) Drug enforcement, (6) SWAT/TRT

How these are designated as service areas are entirely dependent upon how the organization operates and prioritizes. For instance, Drug Enforcement may be a separate service area or it may be part of Criminal Investigations depending on how the police/sheriff’s department is organized; on what portion is funding by specific designated sources, such as federal or state grants funding; or department priorities.

Community Policing may include all outreach efforts, such as DARE, Neighborhood Watch support, school officers, community service officers, or even general patrol. Grouping to form a service area is entirely dependent on how the individual department organizes, funds, and prioritizes its functions and how the fit together in a way that logically lends toward performance measurement.

Step 3: Service Area Objectives

Service area objectives are outcome-based statements of what will be accomplished within the budget year. While strategic plans stretch across multiple years and usually cannot be accomplished in one year, the annual budget addresses the portion of the plan the agency can accomplish in a given fiscal year.

Each service area should have at least one objective statement and at least one indicator of each type, specifically output, efficiency, service quality and outcome. The service area objective should clearly demonstrate progress toward the department/cost center goal. Ideally, each objective should have an attainable target level with a basis of scientific research, industry practice, peer average, or Board policy. Departments should

focus on quantified objectives and develop applicable targets for the next annual budget process.

In most cases, a service area objective should address the following:

- Support the department/cost center goal statement
- Reflect planned benefits to customers
- Be written to allow measurement of progress
- Be quantifiable within the fiscal year time frame
- Describe a quantifiable future target level (if appropriate)

Example:

Fire Services

- 1) Achieve and maintain an ISO rating of 4 or better.
- 2) Maintain/reduce average response times to 7 minutes or less within the corporate municipal limits.
- 3) Reduce fire deaths to 1 per 10,000 population per year or less.

Caution is necessary with some objectives to ensure accurate performance data. For instance, it should be specified when the 7 minutes of the response time begins and ends. Does the time begin when the dispatch center receives the 911 call, when the fire department is paged, or when the trucks leave the fire station? Does the time end when the first fire apparatus arrives on the scene or when fire suppression/rescue operations actually begin? Being clear and consistent in the goal ensures valid performance data.

Template:

“To improve/reduce/maintain (accomplishment) by (a number or percentage), (from x to y) toward a target of (a number).”

Additional example:

“To improve the immunization completion rate of children served by the Health department by 3 percentage points, from 77 percent to 80 percent, toward a target of 90 percent, which is the Health People year 2010 goal”

Step 4: Identity indicators that measure progress on objectives.

Indicators are the first-level data for reporting performance and, wherever possible, at least one output, efficiency, service quality, and outcome indicator should be developed for each service objective.

When developing indicators, you should ask how you can measure whether you are meeting your objectives.

Indicator Definitions and Examples

Category	Definition	Example
Input	Resources used to produce an output	Cost (direct costs plus fringe benefits) Staff hours
Output	Quantity or number of units produced. Activity-oriented, measurable and usually managerial control	Residential properties assessed Clients served Calls responded to
Efficiency	Inputs per unit of output or outputs per input	Cost per appraised Appraisals per appraiser
Service Quality	Timeliness, accuracy and/or customer satisfaction of the service provided	Errors per data entry operator Response time Percentage of customers satisfied

Input Indicators are the resources used to produce an output. They most often include funds and staff hours but may include other resources. Commonly included here are

- costs (budgeted and actual)
- Staff-year equivalents (SYE)
- Full-time equivalents (FTE)
- Direct labor hours (DLH)

Costs used as an input indicator commonly include direct costs plus fringe benefit costs. Direct costs are those devoted to a particular service and include:

- Personnel services
- Operating expenses
- Recovered costs
- Capital equipment

Output Indicators address what was produced or provided. They usually end with an “ed.” They should answer the questions:

- “What services were delivered?”
- What volume was provided?
- How many units of service were provided?

Example:

Service Area	Indicator
Fire Suppression	Incidents responded to
Human Resources	Vacancies filled
Library	New materials circulated

Efficiency Indicators present inputs used per unit of output, such as the cost per unit where the input is in money/dollars or productivity where the input is staff hours per unit of output. This is where you first get an indication of what you’re getting for the resources you expend. Examples include:

- Cost per senior lunch served (senior services)
- Cost per client (general government)
- Investigations conducted per detective (police/public safety)
- Hours per fire inspection (fire/public safety)
- Cost per vacancy filled (human resources)

Example:

Efficiency Indicators

Service Area	Indicator
Fire Suppression	Cost per incident
Human Resources	Cost per vacancy filled
Senior Services	Cost per client
Custodial Services	Cost per square foot cleaned

Service Quality Indicators measure customer satisfaction, timeliness, and/or accuracy of a service. Some ways in which we can measure service quality are through:

- Customer surveys
- Response logs
- Error rates
- Failure rates
- Grading systems, such as PASER

Examples:

Service Area	Indicator
Fire Suppression	Average suppression response time
Human Resources	Satisfaction rate with vacancy processing
Senior Services	Percent of clients satisfied with services provided
Custodial Services	Percent of customers satisfied with custodial services

Outcome Indicators describe the benefit of the service to the customer and what was changed or accomplished as a result of the service. Questions to ask might include:

- How has the customer benefited?
- Why is the customer better off?
- What is the impact of the service?

Examples:

Service Area	Indicator
Fire Suppression	Fire deaths per 100,000 population Fire Injuries per 100,000 population
Human Resources	Average recruitment time
Senior Services	Percent of clients who remain in the community after one year of service or information
Custodial Services	Percentile comparisons of cost per square foot to IFMA standards

When you place all of the indicators into a matrix with each service area and its objective included, you get a chart like the following example:

Service Area	Objective	Input	Output	Efficiency	Service Quality	Outcome
Fire Suppression	To maintain fire loss at 0.02% or less of Total Property Valuation, while striving to minimize fire deaths and injuries by keeping civilian fire deaths to less than 1 per 100,000 and fire injuries to less than 10 per 100,000	Budget/actual costs Staff	Incidents responded to	Cost per incident	Average suppression response time (in minutes)	Fire deaths per 100,000 population Fire loss Fire injuries per 100,000 population
Capital Facilities	To monitor design and construction activities in order to maintain construction cost growth at no more than 5.0 percent	Budget/actual costs Staff	Projects completed	Engineering design costs as a percent of total project cost	Percent of projects completed on time	Contract cost growth (percent)

An example of how an indicator matrix may look when performance data is presented:

Service Area	Objective	Input	Output	Efficiency	Service Quality	Outcome
Street Reconstruction	5%	\$1,374,500	4	4.7%	75%	7%
Capital Facilities	Maintain construction cost growth to no more than 5 percent	Budget/actual costs Staff	Projects completed	Engineering design costs as a percent of total project cost	Percent of projects completed on time	Contract cost growth (%)

Important when analyzing this data is to ensure consideration is made in explanatory data as to what conditions or circumstances may have caused or contributed to service quality and outcomes not meeting expectations.

The Logic Model

A logic model (or outcome-sequence chart) that diagrams the continuum of relevant factors for a performance measurement system is a useful way to summarize the flow across the information categories. It acts as a picture of a program and a way to show the relationship between what we put in (inputs), what we do (outputs) and what results occur (outcomes). It provides a sequence of “if/then” relationships that reflect the core of program planning and evaluation in which the short, medium and long-term outcome criteria can be applied to not only the present budget year but to the long-term capital and strategic plans.

When constructing the Logic Model, begin with the end in mind. Start by asking the questions:

- What results are we seeking?
- What are we hoping to accomplish?
- How will we accomplish it?

Logic Model

Inputs	Outputs	Outcomes		
What we invest	What we do	Short-Term	Medium-Term	Long-Term
Staff Dollars Volunteers Materials Equipment Technology	Workshops Outreach Inspections	Awareness Knowledge Attitudes Skills	Behavior Decisions Policies	Conditions Environment Social Economic Civic

Logic Model – Fire Suppression

Inputs	Outputs	Outcomes		
What we invest	What we do	Short-Term	Medium-Term	Long-Term
Staff Dollars Volunteers Materials Technology	Training Inspections Emergency response	Inspections Suppression responses Public education	Response time Fire containment Prevalence of smoke detectors	Protection of lives & property (fire deaths, injuries)

An alternative to the Logic Model is the Performance Management Model.

Performance Management Model

GOALS	General Goals of Program: <ul style="list-style-type: none">• Provide quality services to all customers• Maintain or improve performance• Provide economical services
INPUTS	Resources: <ul style="list-style-type: none">• Money• Facilities• Equipment• Supplies• Contracted services
ACTIVITIES	Work processes: <ul style="list-style-type: none">• Salting roads• Making arrests• Processing bills• Performing inspections
OUTPUTS	Goods & Services produced: <ul style="list-style-type: none">• Statistical measurements• Miles of roads repaired• Tons hauled or recycled• Positions filled
OUTCOMES	Results and Impacts: <ul style="list-style-type: none">• 100% of customers will report being qualified• 95% will be error free• 90% of services will be within +/- 2% of comparable service within the private sector
PEFORMANCE	Measurement <ul style="list-style-type: none">• Administration of customer satisfaction surveys• Tracking number of jobs, error rates, average per job• Cost comparison to private sector services• Quarterly and annual reports summarizing services provided, outputs and outcome achievement

Either of these models provides a good basis for establishing a performance measurements system. Both direct you to the results you need provided quality data is applied in each step.

Part VII

Example Scenarios

First of all, it should be noted that using performance measurement techniques is not limited to a prescribed methodology. Local governments can modify their approaches to whatever best suits their needs. In these scenarios, we simply seek to provide examples of how an issue might be approached. What is paramount is that a system be used that leads local governments to make decisions that are in their best interest; prevents the mistake of attempting to “fix” a problem that does not exist; and leads to addressing “the disease” rather than just “the symptoms.”

Recognizing that performance measurement can be used both as a shorter-term problem solving tool as well as the traditional planning and budgeting management tool, the following scenarios represent examples of using performance measurement in those venues:

Scenario #1

Addressing a Problem

The issue:

Response time for fire departments are critically important not only for how they affect fire suppression and life saving efforts but for the community’s ISO rating and how that affects property insurance rates. The city council has been receiving complaints/allegations that the fire department’s response times have become unacceptably slow. In response, the City Manager directs the Fire Chief to begin tracking the department’s response times for the next month. The reasons for doing this performance tracking are:

- (A) To defend the department’s response performance from unwarranted criticism and avoid fixing a problem that may not exist;
- (B) To determine if there actually is a problem, what is causing it and what can be done to remediate it;
- (C) To use this as an opportunity to still improve performance even if it already meets the established goals

Establishing the Benchmarks:

Some of the benchmarks we can use might include:

Internal 1. Average response times for all municipal public safety departments
 2. Response times per mile traveled

External Average response times for fire departments in other comparable municipalities:

1. Possum Hollow
2. South Park
3. Bug Tussle
4. Rorke's Drift

Using external benchmarks with similar situations is an excellent way to ensure you're not "fixing" a "non-problem." If no one else is doing better than you are, you are probably not in need of major restructuring and you can concentrate on determining whether attaining any improvement is worth the monetary costs. A key here is to note any significant differences in how you provide the service compared with how your chosen benchmark provides the services.

The Four-Step Methodology:

We will want to utilize the Four Step Methodology in this process to ensure we have a clearly understood mission: the correct service area is being considered; we have a clear objective; and we've correctly identified the indicators we need to use in measuring our progress toward our objective.

Step 1: Review and evaluate existing department mission and cost center goals:

In this case, a reasonable response to this step might be **"To provide emergency and non-emergency services to anyone requiring assistance in our service area."** This keeps us focused on the department's true mission and avoids "mission creep."

Step 2: Identify a Service Area:

In this case, while the fire department also does fire prevention, fire prevention education, inspections, disaster planning and a variety of other services, we will concentrate on those service areas that require an emergency response: **Fire Suppression and Extrication/Rescue.**

Step 3: Identify the Service Area Objective:

Remembering our earlier discussion on objective statements and knowing we have a set goal of a seven (7) minute response time to anywhere in our area of responsibility, we make our objective statement:

“Arrival of first fire/emergency apparatus on scene within seven (7) minutes of dispatch anywhere within the municipality”

Step 4: Identify indicators that measure progress on objectives.

Since our objective specifically relates to response time, we’re going to want to concentrate on those factors that may affect response time, such as time from dispatch to reporting on station:

- During normal workdays
- During rush hour traffic
- At night, after dark
- Under adverse weather conditions
- During unusual events (bridge washed out, parade on Main Street, etc.)
- Other calls requiring response at the same time
- During periods of reduced manning levels
- During times when equipment availability is diminished

In our present scenario we’ll concentrate on adverse weather and reduced manning.

Data Collection:

Using a spreadsheet or data base to collect our performance data allows us to place all pertinent information in front of us for tabulation. Such a spreadsheet might look like the following:

Date	Call	Dispatch	On Station	Response time	Manning	Weather conditions	Other calls	Other conditions
5/18/2009	Structure fire – 1404 Elm Street	12:45 AM	12:54 AM	9 min	75%	Light rain	No	Construction on E. Washington
5/18/2009	Two car collision w/injuries at Lake & Jackson St.	7:23 AM	7:34 AM	11 min	75%	Light rain	Yes – Elm St. Fire	heavy rush hour traffic
5/18/2009	Alarm box malfunction – Menard’s	9:10 AM	9:15 AM	5 minutes	75%	Cloudy	No	None

Data Compilations

Now we have collected our data and compiled it. In this case we are using the month of December 2008. We find that our fire department has responded to 342 emergency calls during the month and our average response time was 8 minutes and 4 seconds. We then place that information into a matrix with other pertinent known and related data. The matrix might look like this:

MATRIX

Service Area	Objective	Input	Output	Efficiency	Service Quality	Outcome
Fire Suppression	To ensure arrival of first fire/emergency apparatus on scene within seven (7) minutes of dispatch anywhere within municipal limits	Actual costs equipment staff/firefighters	# incidents responded to	avg. cost per response	avg. response time	acceptable response time for ISO and benchmarks
Response time	7 minutes	1 engine, 1 truck, 6 firefighters, fuel	342	\$1,055	8 minutes, 4 seconds	acceptable response time considering manning and weather conditions

An analysis of the most applicable data related to manning and weather revealed a number of pertinent facts:

Number of responses during periods of reduced manning (75% manning or lower) **184**
Average response time: **7 minutes 15 seconds**

Number of responses during or within 24 hours of a 3 inch snowfall or an ice event: **127**
Average response time: **9 minutes 32 seconds**

Number of responses w/full manning and no weather event: **102**
Average response time: **6 minutes 30 seconds**

Note: The adding up the responses will not necessarily add up to the total number of responses because some responses will show up multiple times in the tracking process. This does not present a problem as we are considering average comparisons.

Additionally, when we compile the averages from our chosen benchmark communities for comparison, we find:

Average response time for all benchmark communities: **8 minutes 10 seconds**

Explanatory Data

Remember that we must include explanatory data regarding our performance data compilations to ensure we have recognized unusual circumstances and do not make faulty decisions based on skewed data. In this case, we conducted this study over the month of December, 2008 in southern Wisconsin. Our explanatory data statement may read like this:

“Data collection period was conducted during month of December 2008 when the municipality suffered the snowiest December in recorded history and budget deficits mandated 2/3 of shifts be manned at 75%. Some responses experienced both snow/ice events and reduced manning.”

This explanatory data assists us in analyzing our performance data to produce a summary, such as:

Summary

“After analyzing the collected data, and considering the conditions discussed in the explanatory data, we have determined that, while the department did not reach it’s stated goal of seven (7) minutes or less for each response time, it did meet an acceptable response time average of 8 minutes, 4 seconds from dispatch to reporting “on station.” The deviation from the 7 minute goal was caused by unprecedented manning reductions and record-breaking winter weather that hindered responses. Under normal conditions the department actually exceeded the set goal by nearly 8 percentage points and one half minute. Additionally, when compared to chosen benchmark communities, our department bettered their average response time by six (6) seconds under identical conditions.”

In preparing this summary, we have:

- 1)** Verified that our fire department’s response times are acceptable; i.e. we’re not “broken” in that we need to make changes in how the fire department operates. Don’t “fix” what isn’t broken.
- 2)** We have verified that reduced manning does, in fact, negatively affect response times but reduced manning only lengthened response times by an average of fifteen (15) seconds.
- 3)** We have verified that snow and ice events posed the greatest detriment to meeting response time goals, to the point of adding an average to 2 minutes, 32 seconds to response times

With this information, we can now ask pertinent management questions, such as:

- 1) Is the cost savings realized by the manning reductions worth the additional average response time increase of 15 seconds?
- 2) Is there something that can be done to minimize the negative effects of snow on the fire department's response time? At what cost?
- 3) Is there something that can be done outside of the fire department's control to improve response times in bad weather? What coordination with or actions by the Street/Public Works Departments may be necessary to improve FD response times during adverse weather?
- 4) Since we've begun collecting data on response times, is it worth collecting data on other issues which could improve our ISO rating? Water pressure and availability? Vehicle condition? Specialized equipment?
- 5) Is there a specific location or general area where response times appear to be slower? Why?
- 6) What is the actual minimal acceptable response time before it becomes unacceptable

In such a situation, once management questions are being raised and the performance data has stripped away the distracters, a simple issue might come to mind such as changing the priority in snow plowing routes for the streets department. A "common sense" solution may come to mind that otherwise might not have been considered by merely focusing on the fire department, such as, has there been a major subdivision built since the snow plowing routes were established and prioritized and has that subdivision shifted the population center of the municipality? If so, the plow route priority may need to be adjusted to better serve that new area of population density both for fire protection and general transportation. Hence, the problem can be fixed with no additional cost. In collecting the data, we have already noted the location of the service call, the response time, and the weather conditions at the time so we already have the data proving our conclusion.

Analyzing the collected data can prove invaluable in your decision-making and efficiency efforts.

Scenario #2

Capital Planning & Decision-Making

The Issue:

The Baldwin County Board of Supervisors wants to maximize the value of their spending on road and highway maintenance and would like to tie performance data into their strategic and capital improvement planning. The county's strategic plan transportation chapter sets a goal of achieving and maintaining all county roads to a PASER rating of 6 or better within the next ten (10) years. They want you, the Highway Commissioner, to collect data that will help them prepare plans and budget for road and highway maintenance to maximize the value of maintenance dollars spent and move toward achieving the aforementioned transportation strategic plan goal based on the best performing maintenance methods for each type of road or highway. The reasons for this data collection will be to:

- 1) Determine whether chip seal, slurry coat, overlay or grind/resurface is most cost effective on county roads and highways
- 2) Provide data for decision-making on percentage of road maintenance dollars to be spent on each of the three maintenance methods
- 3) Determine the feasibility of the strategic plan goal of achieving and maintaining a PASER rating of 6 or better on all county roads within the next ten (10) years.
- 4) Determine a general cost estimate for achieving different levels of maintenance when maximizing maintenance dollars.

Establishing the benchmarks:

Some of the benchmarks we may use are:

Internal:

- 1) previous year's average per foot maintenance costs
- 2) Previous year's PASER ratings at one and five years following maintenance

External:

- 1) Steele County
- 2) Pine Barrens County
- 3) City of Murphy's Landing

The Four-Step Methodology:

Again in this scenario, we will utilize the Four-Step Methodology to we clearly understand and have properly addressed our mission, service area, objective, and indicators.

Step 1: Review and evaluate existing department mission and cost center goals:

In this scenario our answer might read like: **“To provide a well maintained motor vehicle transportation network throughout Baldwin County.”**

Step 2: Identify a Service Area:

In this case, while the highway department does a variety of work, including it’s own pavement repairs, snow plowing, litter pickup, etc., this service would apply to **“contractor and department provided pavement maintenance.”**

Step 3: Identify the Service Area Objective:

Remembering here that our objective is related to both a capital expenditure plan and strategic plan, we are looking for data that will be collected and may change over time. When we revisit our tasking, a reasonable objective might read:

“Maintain all county highways and roads to a PASER rating of 6 or better within ten years at current funding levels (adjusted for inflation)”

While accomplishing this performance level at current funding levels may be rather optimistic, it sets a goal which emphasizes the need to find the most efficient and effective payment maintenance methods applicable to the county’s location and circumstances.

Step: 4: Identify indicators that measure progress on objectives.

Since our objective relates to both quality of pavement condition and cost of maintaining that desired condition, we should look primarily at:

- Cost versus PASER rating at the end of 1 year
- Cost versus PASER rating at the end of 5 years
- PASER rating at the end of each period for each type of maintenance
 - (1) reconstruction
 - (2) grind/overlay
 - (3) slurry seal
 - (4) chip seal
 - (5) crack router & fill

Data Collection:

As in the first scenario, we can easily use a spreadsheet to collect and collate the data we need to answer our performance and planning questions. While the data portrayed below is not necessarily realistic regarding current costs, it does reflect how actual data can be collected in a useful format.

Baldwin County Highway/Road Maintenance

Highway Road	Initial PASER rating	Maintenance applied	Number of feet maintained	Total Project Cost	Cost per foot	Avg. Traffic count per month	PASER Rating End of 1 Yr	PASER Rating End of 5 Yrs	Cost/PASER rating at end of 5 yrs	Explanatory Data
Foxboro Road	4	overlay	3,000	\$34,000	\$11.33	18,700	9	7	\$4,857.14	
Highway 133	7	crack sealing	6,400	\$8,700	\$1.36	84,000	7	5	\$1,740.00	10% state funded
Valley Road	1	Total reconstruction	2,500	\$178,000	\$71.20	16,050	9	7	\$25,428.57	Includes replace washed out short bridge & culvert
Elm Street	5	Slurry seal	1,500	\$15,800	\$10.53	8,500	9	7	\$2,257.14	

Now that we have collected our data and compiled it, we will again want to place our results and all pertinent data into a matrix for facilitate decision-making. Our matrix might look like this:

MATRIX

Service Area	Objective	Input	Output	Efficiency	Service Quality	Outcome
Highways & Roads	To maintain all county highways and roads to a PASER rating of 6 or better within ten years at current funding levels	Actual costs (in-house & contract)	# of feet, highway & road, receiving maintenance	Average cost per foot maintained	Average PASER rating after (1) & (5) year(s)	Probable avg. PASER rating after 10 years
Hwy & Road Maintenance	PASER 6+	\$336,700	14,150 ft.	\$23.63	8.26 6.71	5.16

From the data we have compiled, we can make some conclusions.

First, we have a snapshot average as to how much we are spending per foot of asphalt. From this, we can make policy decisions as to whether this is an acceptable level of efficiency. We can also make policy decisions based on our outcome for the amount of funds programmed for highway and road maintenance.

Most important to our stated goal is that we have used the data to come up with an estimate that indicates the highways and roads we perform maintenance on this year. If we continue to use our present “mix” of methods, will **probably not achieve** our stated strategic goal of maintaining a PASER rating of 6 or better after ten years.

Since we have determined that our present “mix” is not likely to achieve our stated goal, we can return to our compiled data to determine the optimal mix of maintenance methodologies that will most likely allow us to reach our goal. By analyzing the compiled data, we may find:

- 1) Crack sealing is necessary for the maintenance of new or recently reconstructed asphalt but is ineffective in maintaining our desired PASER levels on streets more than five years old
- 2) Chip seal is very inexpensive but is effective for no more than four years and impractical for surfaces with average daily traffic counts of 5,000. Hence, it is of little value in maintaining our PASER goal over ten years.
- 3) Slurry coat, while only effective on asphalt surfaces with an initial PASER rating of at least 5, offers an efficient method of maintaining highways and roads within the stated PASER goals.
- 4) Re grind & overlay is more expensive than slurry coat by ___% but far less expensive than reconstruction and the most cost-effective method of achieving the PASER goal for surfaces that are too deteriorated for only a slurry coat but do not have a compromised street foundation mandating reconstruction.
- 5) Reconstruction is the only option for highways and streets where the base is compromised but is far too expensive to be used except where no other option will work.

Considering these findings, we may decide to concentrate 60 or 70% of our highway and road budget on slurry coat and re grind/overlay to make most effective and efficient use of those funds and maximize our chances of achieving our ten year PASER goal. However, it must be remembered that this is only one year’s findings and a strategic plan would continue to be updated as additional year’s data becomes available and is analyzed.

Note: These findings are only an example to illustrate how the system would work; real findings on pavement maintenance may be far different than those shown here.

Explanatory Data

In this scenario, anomalies that might affect the validity of our data could include more (summer flooding or winter snow removal) precipitation than normal; extreme spikes in cost, such as fuel and asphalt; or changes in state mandates or highway aids. Explanatory data here might appear as:

“Asphalt costs for 2009 were 43% lower than 2008 due, largely, to the higher price of crude oil and played a major factor in the 2009 contract costs. A return to the prices of 2008 or higher in coming years may skew future data and require modification of the capital and strategic plans.”

Again, the explanatory data helps to ensure we don't make the wrong deductions from our compiled data and to remind us that there are factors that could significantly change the next year's data. Data is fluid and, when used to help produce and annually navigate a capital and strategic plan, so must the plans be flexible in the face of present conditions. The explanatory data assists us in analyzing our performance data to produce a summary, such as:

Summary

“After analyzing the collected and compiled data and considering the caution noted in the explanatory data, data indicates that the capital plan and strategic plan goals can best be achieved by a calculated “mix” of maintenance methodologies which concentrate efforts using a “slurry coat” after crack sealing at approximately seven years after reconstruction and a regrind/resurface at approximately the fifteen year mark to achieve an overall PASER goal of 6 or better on all streets and roads within ten years”

By preparing the summary, we have set the basic parameters for how we can make our capital improvement plan work and achieve our strategic plan goals. We have also provided a basis for future year performance data collection and analysis. Since we are dealing with “plans” here, all assumptions made with one year's data are subject to change or revision when data from additional years is added to the performance data base. Again, it is important to emphasize the need for good explanatory data to identify unusual or artificial factors that could skew outcomes and wrongly bias decision-making.

When we also consider funding limitations, we may find we must make a recommendation such as:

Slurry and regrind/resurface should receive approx. 65% of the highway and road maintenance budget, with crack sealing included under those programs. Chip seal should be limited to no more than 5% of the budget with its use restricted to the most rural roads with daily average traffic totals of less than 1,000. Funding levels will not allow for reconstruction at the 25 year level as desired so the maintenance mix will budget 30% of the budget to reconstruction with a 30 – 32 year reconstruction schedule.