AGA

CORPORATE PARTNER ADVISORY GROUP RESEARCH

Performance-Based Management

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AGA's Corporate Partner Advisory Group (CPAG), executive director and director of research are creating research projects of value to governments, industry and the entire AGA membership. These studies are expected to result in reports assessing current and/or best practices and make recommendations for future improvements in federal, state and local governmental accounting, auditing and financial management. CPAG members support AGA research through either cooperative or sponsored research projects. "By undertaking research, AGA is fulfilling its mission as a thought leader in advancing government accountability," said AGA Executive Director Relmond Van Daniker, DBA, CPA. "This is one of numerous research initiatives that will benefit government and bridge the gap between the public and private sectors."

The CPAG was organized in 2001 as a business element within AGA. The mission of the CPAG is to bring industry and government executives together to exchange information, support professional development, improve communications and understanding, solve issues and build partnership and trust, thereby enhancing AGA's focus on advancing government accountability. Corporate member involvement in the CPAG is limited to organizations that sign up for the AGA Corporate Partner membership program.

For more information on the Research Program, please visit the Research Section of the AGA website at *www.agacgfm.org/research/default.aspx* or contact Anna Miller, AGA Director of Research, at *amiller@agacgfm.org.*

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EXECUTIVE SUMMARY

Public officials can speed up and enhance government reforms and transparency through performance-based management (PBM) right now with modest changes to existing information systems. PBM integrates existing financial, operations and other data into eye-opening and actionable facts for enlightened decisions. It is able to consistently track cost and performance over time and improve predictive ability. PBM is flexible, so that different entities can tailor it to their needs and still give top leaders consistent, cross-government views of performance and the cost of creating societal value.

PBM pilot participants:

- U.S. Coast Guard, Department of Homeland Security (DHS)
- Customs and Border Protection, DHS
- Federal Transit Administration, Department of Transportation (DOT)
- Foreign Service Retirement and Disability Fund, Department of State
- Department of the Interior
- Dryden Flight Research Center, National Aeronautics and Space Administration
- Veterans' Employment and Training Service, Department of Labor

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Government leaders without PBM (or something very like it) will miss opportunities to lower costs while improving performance. Their decisions will be based more on management experience and intuition than facts, instead of the right mix of all three. The chance of poor performance will be higher. Should fact-poor decisions continue to dominate, it will be harder to achieve an adequate return on investment (ROI) and other measures of achievement.

Why manage performance?

- It is at the core of results-oriented management (Is the ship on course?).
- It fosters internal learning and improvement (Is the ship running well?).

—adapted from Oregon Progress Board

PBM a success at federal entities. In 2008, seven federal government entities started piloting the development of PBM reports to take a fresh look at their financial and management data. Because of their experience, pilot participants and the advisory group (see Appendix A for a list of advisory group members) said that PBM delivers the following benefits:

- Integrates financial, internal control and performance data to provide insightful, multiple views of operations.
- Provides a structured way of combining all management and operations improvement initiatives.
- Links performance to specific line-item costs, not just overall program costs.
- Affords predictive and forward-looking support for performance-based budgeting.
- Helps assess risk, cost and performance and enables an agile response to changes in demand or environment.
- Enables elements in the enterprise architecture to be better understood and classified.
- Enhances transparency through multidimensional reporting that lets officials and citizens see cost, performance and internal control information in one snapshot.
- Improves communication among entity leaders and managers, policy makers, oversight groups, elected officials and citizens.
- Delivers what pilot participants call integrated awareness—the big picture information that decision-makers need to keep their organizations steering in the right strategic direction—and provides the data that managers need to detect and solve performance problems.

"With new information comes the opportunity to break old paradigms," said one pilot participant. Others pointed out how PBM uses statistical analysis to red-flag areas in need of low- or no-cost improvements that increase productivity. It facilitates "rolling up" or "drilling down" to different levels of cost and performance for root-cause analysis leading to successful change. PBM's fresh insights will inspire a creative approach to organizing and operating programs, help implement them, and document their progress and success. It is the ideal tool for achieving higher levels of performance, particularly in government.

Getting past a compliance mindset

Too often, government entities view reporting on financial, performance and other related matters as burdensome compliance with outside rules. PBM overcomes this compliance mindset by making financial reporting relevant to both the providers and the users of the information.

Integrated awareness plus transparency. This Phase II report is being published as a seemingly endless worldwide financial crisis affects all sectors of the economy. Federal, state and local governments have already begun to scale back on services and programs because they are experiencing or anticipating revenue shortfalls. At least one local government has declared bankruptcy, and some states are asking the federal government for bailout loans similar to those proffered to major corporations.

EXECUTIVE SUMMARY

> "PBM transparency helps to make performance 'self-correcting' because managers know that stakeholders will see and understand the same performance reports."
>
> —*U.S. Coast Guard pilot participant*

As with the failures of WorldCom and Enron, part of the problem is a lack of transparency. For governments, this is embodied in the current model of financial reporting, which—based as it is on the private sector model—provides little information of use in making management decisions. Improved transparency will only become a reality when:

- Data are freely available and independent of applications.
- Financial reporting incorporates more use of statistical tools to detect weaknesses and fundamental changes in the data.
- Universal intrinsic processes are recognized and management principles understood.
- Information is presented in an easy-to-understand format for nonfinancial people.
- Processing complexity is hidden within computer systems.
- Data are analyzed and audited independently of the user.
- Financial information and performance information are linked.
- A common logical framework is developed to use statistics to anticipate future performance if the current processes are not changed.
- Value to society and risk profiles are reported to taxpayers, legislative branches and watchdog groups.

The data challenge. The data and technology are available today for the advanced management analysis advocated in this report. Almost all the information needed already exists in myriad databases. However, finding and integrating the data are expensive so the data often go unused. The U.S. Coast Guard and the Federal Transit Administration said that it was harder than expected to find and align the internal data needed for their pilot tests. This is symptomatic of isolated, application-specific information systems, a problem common to far too many government entities.

XBRL (eXtensible Business Reporting Language; see Appendix C) can solve the problem. XBRL is an international industry standard for publishing, exchange and analysis of financial reports and data. Now required for standardizing the private sector financial reports to several federal regulatory entities, XBRL is a powerful way to achieve the same goal within and across government entities themselves.

The return on investment will be excellent: PBM supported by XBRL provides the reason and an affordable means to take advantage of the 21st-century management tools shown in Appendix D. These include dashboards, scorecards, strategy maps, statistical process controls, activity-based costing and sophisticated analytics. Such tools enable entities to:

- Articulate and communicate agency goals and link their initiatives to societal value.
- Monitor performance of programs, tactics and activities and their support of goals and mission.
- Provide context or relevance to programs, performance and resource use.
- Anticipate problems and alert management to needed action.
- Ascertain program effectiveness, using outcomes, outputs and societal value measurements.
- Increase accountability, collaboration and transparency of all program aspects.

Governmentwide PBM? We asked pilot project participants what they thought about expanding PBM throughout the federal government. Some of their responses:

- "A governmentwide PBM model would provide a clearer understanding for the agency and taxpayer alike of 'this is how we spend our money, and here is the impact on society.' In a rapidly changing world, you need to know if your processes are succeeding in ultimately meeting your stakeholders' needs."
- "We believe that PBM has value for our agency, and thus it would likely have value for all federal agencies. Further, there would be some opportunities for comparing the results of agencies across government, in that the reporting format would be similar. Finally, improved transparency would be of great value to the public, in a similar manner to the citizen-centric reporting initiative."

Many wanted to keep PBM voluntary until federal leaders start supporting this approach and deal with some of the obstacles to its adoption. Said one, "PBM should be at the entity's discretion unless top-level management buys in and takes a leadership role."

Until now, the call for government to "do more with less" has been more of a slogan than an actual management policy. Most governments in the world are going to have to do exactly that because for the next few years, there is going to be less: Revenues will be down while demand in many areas will go up. Seriously managing government performance, along with other leadership actions, will help mitigate the fiscal crisis while building a foundation for a new, more effective and more respected public service. Leaders need PBM or something very much like it, and the time to start is now.

PERFORMANCE-BASED MANAGEMENT

Introduction and overview

Calls for better transparency in government are on the rise, and citizens want more than information about fraud, waste and abuse. The more important questions: Are programs well managed and achieving results at a reasonable cost—and if not, why? Responding to those questions challenges many governments and their component entities, even though most of the data needed for the answers already exist. The reason: It is an arduous and costly task for most entities and their stakeholders to integrate and analyze the data to produce useful information.

> In Phase I of this research project, done in 2006–2007, the Association of Government Accountants (AGA) sponsored the development of a PBM model for use in government. The model produced (in a single-page report) the total cost of a government entity's major processes, the cost per unit of output delivered, performance measures of the output and indicators of the accuracy of all this information. In Phase II, done in 2008, AGA worked with seven federal entities to apply the model using actual data.

Performance-based management (PBM) can meet the challenge. It is designed to compile and deliver the data easily and routinely. Decision-makers can then use the data to manage and improve government and create the transparency that taxpayers want to ensure that needed change happens.

PBM answers complex questions

PBM's foundation is multidimensional reporting. This is important because questions about government performance are best answered with integrated information on finances, performance, budget, strategy, demand, work processes, internal controls, workload and other factors. Much of the current reporting on these factors is one-dimensional, such as financial reports that do not show the results of spending and that offer no easy way to "drill down" several levels of an organization to look for more detail.

Multidimensional reporting. *Figure 1* shows an important benefit of PBM: data integration that enables multidimensional reporting.

In *Figure 1*, each of the six sides of the cube represents a different dimension and information set of an entity's operations: strategic planning goals; forecasts of future workload and budget; budget, financial and performance management; and processes. Right now, most reports derived from this collection of data are one-dimensional (like the financial statement assessment shown in the bottom right corner of *Figure 1*) or, at best, two-dimensional. However, the other three reports shown at the right of the figure—on strategic planning, technology strategy and workload forecasts—require combining different types of financial and nonfinancial information. Such reports should form the nervous system of sound management decision-making, and in PBM they do.

Another important multidimensional analysis feature of PBM is its ability to allow users to drill down deep into operations to understand cost, program performance and other factors in a government entity's major processes and

Figure 1: PBM: Integrated data produce multidimensional reports
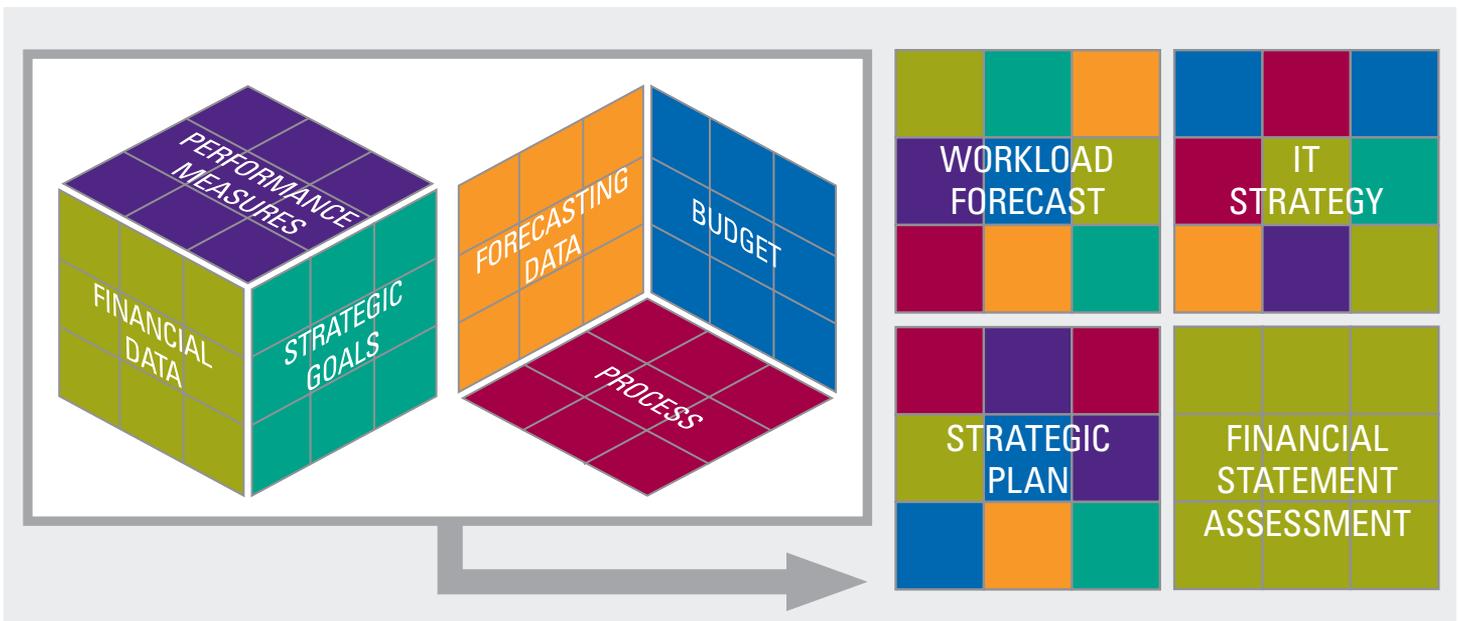
their component subprocesses. Drilling down is essential for making decisions about individual programs and for detecting performance problems (both activities will be important during an initiative to review all programs in an entity). The data needed for this drill-down are already present in existing information systems, but relationships between data and processes must be created.

Figure 2 is a portion of a PBM report produced by the U.S. Coast Guard during Phase II of this PBM research project; *Figure 5* shows more dimensions of the same processes.

Template for pilot project reporting

We used *Figure 3*, which is based on notional data from a hypothetical entity, in the Phase I report of our PBM research, completed in 2007. *Figure 3* is also the basic template used during the Phase II pilot projects. In the next section of this report, we will show variations of this same template done with real entities and real data by pilot teams; therefore, it is important to understand the table's parts before continuing to read this report.

From left to right, the columns in *Figure 3* are:

1. **The process being reported on.** Processes are how an entity does its work.

2. **Costs.** These are the costs incurred to date by a process.
3. **Number of units.** A process output measure.
4. **Unit description.** The nature of the unit.
5. **Unit cost.** The cost to complete one unit of output.
6. **Performance measure(s).** These are nonfinancial measures of performance toward achieving outcomes.
7. **Performance value.** The numeric value of the performance measure.
8. **Performance variation.** The deviation in process outputs over time. (We discuss this more in Appendix D.)
9. **Internal control variation.** A measure of the effectiveness of process controls, which are the procedures that an entity establishes to give reasonable assurance that it is achieving its primary objectives.
10. **Internal control best practice.** The best level of effectiveness known for a particular process control.

Note that *Figure 3* shows on a single page a wealth of in-depth information about a government entity. This is another example of the multidimensional aspect of PBM, this time applied to two levels of operation. Entities that participated in PBM research added other important perspectives.

Figure 2: Example of major business processes and subprocesses at the U.S. Coast Guard (USCG)

Business Process: Drill-Down Example	FY 2007 Cost	Output Description
1. Process: Human Resources	$1,092,919,511	# of USCG employees served (military, reservist, civilian)
1.1. Subprocess: Performance measurement and evaluation of USCG officers	$35,531,401	# of active USCG officers
1.1.1 Subprocess: Officer performance measurement and evaluation at Electronic Systems Support Units (ESUs), Naval Engineering Support Units (NESUs) and Integrated Support Commands (ISCs)	$7,562,550	# of officer evaluations completed

Figure 3: Template table for PBM reporting

1. PBM Report Installation Services	2. Cost ($M)	3. Units	4. Unit Description	5. Unit Cost	Performance 6. Measure	7. Value	8. Variation	Internal Control Variation 9. Actual	10. Best Practice
OPERATING FORCES SUPPORT									
Air Operations	$14.0	30	station aircraft	$0.5M	mission hours lost per aircraft	120	63%	90%	93%
Port Operations	$5.5	3,000	ship-days	$1,833	steaming mission hours lost per ship	80	70%	92%	95%
Operations Support	$3.5	300	commands serviced	$11,666	total mission hours lost per command	100	65%	78%	85%
Total Operating Forces Support	$23.0								
COMMUNITY SUPPORT									
Personnel Support	$5.7	7,000	base population	$814	complaints per 1,000 personnel	50	70%	85%	67%
Housing	$5.0	500	housing & BOQ units	$10,000	% utilized	94%	42%	90%	75%
Total Community Support	$10.7								
BASE SUPPORT									
Facility Support	$7.1	2.0M	square foot	$4	utilization %	90%	66%	80%	80%
Environmental	$0.3	5	incidents handled	$50,000	environmental liability	$1.5M	80%	95%	95%
Public Safety	$4.0	2.0M	square foot	$2	critical incidents	175	70%	85%	85%
Command & Staff	$6.0	3,000	military population	$2,000	# of audit exceptions	37	80%	85%	88%
Total Base Support	$17.3								
Grand Total	$51.0								

Logic modeling and PBM

How do government programs help bring about outcomes desired by stakeholders and citizens? "Logic modeling" provides the following framework for making the connections:

Inputs → Processes → Outputs → Outcomes → Value

Traditionally, governments have measured inputs (budgets) and outputs (number of research grants, numbers of aircraft or citizens receiving a service). These are poor indicators of the success of a government program because they do not necessarily show how effective the program is (that is, the outcome) and how it creates societal value.

PBM's multidimensional nature facilitates the understanding of the relationships among the different parts of a logic model, presenting a chain of activities and events that can be described and monitored so they can be evaluated and improved.

PBM's multidimensional benefits

The just-discussed aspects of PBM enable governments to take an integrated approach to financial and program performance management. This helps chief financial officers (CFOs) and other leaders to:

- Understand the basic nature of their processes to guide the type of financial and nonfinancial information needed for making budgetary and management decisions in different entities and for government as a whole.
- Adjust priorities and resource utilization to support mission achievement.
- Improve financial transparency and accuracy.
- Create budget requests that take into account the required funding and the outputs and outcomes they expect to produce as a result of that funding.
- Reduce costs, optimize spending and process efficiency.
- Identify the causes of underperformance with root-cause analysis.
- See future possibilities sooner and set or adjust course accordingly.

(We will discuss other benefits in subsequent sections of this report.)

"Many of the current federal financial reporting models are lacking in terms of usefulness for day-to-day management and decision-making. Specifically, they do not bring together in a concise, coordinated and combined view the budget, spending, results and status/condition of an organization's internal controls. In other words, what did we plan, what resources did we receive, what did we spend, what did we get for that spending (e.g., outcomes and/or outputs), and can we rely on the reporting and program execution relative to the robustness of our management and internal controls?"

—*Phase II State Department participant*

PERFORMANCE-BASED MANAGEMENT

PBM demonstrated to be feasible in the federal government

Seven federal entities volunteered to take part in the pilot effort to implement PBM, using existing data sources and systems:

- U.S. Coast Guard, Department of Homeland Security (DHS)
- Customs and Border Protection, DHS
- Federal Transit Administration, Department of Transportation (DOT)
- Foreign Service Retirement and Disability Fund, Department of State
- Department of the Interior
- Dryden Flight Research Center, National Aeronautics and Space Administration
- Veterans' Employment and Training Service, Department of Labor

Although not all these entities were able to complete their pilots within the designated project schedule, all participated in making the research possible. Two entities made sufficient progress in their pilots to be able to prepare summaries that make up the source material for this section of the research report: the Federal Transit Administration (FTA) and the U.S. Coast Guard (USCG). *No entity reported that the PBM concept or approach was inappropriate for its organization; all are interested in continuing to explore the opportunities that PBM presents.* Some talked of governmentwide PBM:

- "A governmentwide PBM model would provide a clearer understanding for the agency and taxpayer alike of 'this is how we spend our money, and here's the impact on society.' In a rapidly changing world, you need to know if your processes are succeeding in ultimately meeting your stakeholders' needs. Moreover, there is a relatively simple way to quantify for the taxpayer what it is that your agency does with funding entrusted to it, and what the impact of that action is. In addition, it may be a fortuitous time for your organization to delve into this area of financial and performance integration as the topic itself will likely have increased attention under the next administration."

- "We believe that PBM has value for our agency, and thus it would likely have value for all federal agencies. Further, there would be some opportunities for comparing the results of agencies across government, in that the reporting format would be similar. Finally, improved transparency would be of great value to the public, in a similar manner to the citizen-centric reporting initiative."

PBM at the Federal Transit Administration

> "[Before this PBM pilot,] cost and performance information we got using cost accounting was a bit too high level and therefore limited in its usefulness to managers in making decisions. PBM gives us the granular-level details to make program decisions based on financial and value information."
>
> *— FTA Phase II participant, on the drill-down aspect of the PBM approach*

FTA is part of DOT and manages approximately $10 billion per year in grants to support public transportation across the country. Most grantees are transit agencies or local and state governments. FTA's administrative budget is less than 1 percent its total budget.

Traditional financial and performance reports are not always transparent or meaningful to FTA stakeholders such as a legislative oversight or budget committee, a central agency like the Office of Management and Budget (OMB), or a public transportation advocacy group. There was consensus inside the FTA that managerial cost accounting reports were limited in their value for management decision making at different levels. PBM appears to be able to meet both sets of needs at the FTA:

- Stakeholders have high-level information on program operations backed up by readily available details.
- Stakeholders and managers alike can see—in one place—information on goals and core processes such as total cost, performance (unit cost), response to demand, process quality and internal control.
- Managers can drill down much deeper for details and connect more logically to the "big picture"—and so can stakeholders, if this is needed.

One reason for FTA's joining the Phase II pilot was to move from simply complying with managerial cost accounting requirements to a more value-added system that delivers information more useful to managers because it helps them make decisions. FTA also wanted to be forward-thinking in terms of what it could do now to be more effective with taxpayer dollars in the future, especially given *rapid change* in the American public transportation environment caused by historic rises and fluctuations of gas prices. Says an FTA pilot project participant, "Americans took 10.3 billion trips on public transportation [in calendar year 2007], the highest level in 50 years. We expect that figure to be much higher [in the future]—so transit's time to act effectively is *now*."

PERFORMANCE-BASED MANAGEMENT

Figure 4: Federal Transit Administration PBM statement

	1. DOT Strategic Goal Allocations	2. Cost ($M)	3. Units	4. Unit Description	5. Federal Share of Unit Cost ($)	6. Measure	7. Value	8. Variation	9. Internal Control	10. Demand Attribute
							(Scale of 1 to 5)			
Goal/Outcome	Accessibility (supports DOT strategic goal of reduced congestion)									
Core Processes	**Grant Making**									
	System enhancement									
	Bus and bus facilities (non-add)	$27,858,965	827	vans (other)	33,719	# of vans purchased	4.00	3.50	4.50	1.00
	Elderly and persons w/ disabilities (non-add)	88,121,519	2,199	vans (other)	40,073	# of vans purchased	4.00	4.00	4.50	2.00
	Job access and reverse commute (non-add)	794,135	49	vans (other)	16,003	# of vans purchased	4.00	3.75	4.25	5.00
	Non-urbanized area formula (non-add)		179	vans (other)	39,961	# of vans purchased	3.00	4.00	4.50	1.00
	Urbanized area formula (non-add)		TBD	vans (other)	TBD	# of vans purchased	3.00	4.00	4.50	1.00
Goal/Outcome	Mobility (supports DOT strategic goal of reduced congestion)									
Core Processes	**Grant Making**									
	System expansion									
	Rail purchases (non-add)	91,499,484	97	rail car	939,589	# of rail cars purchased	4.00	4.60	4.25	5.00
	Stations (non-add)	119,251,486	TBD	new rail	TBD	number of rail stations	3.80	4.25	4.00	3.00
	Maintenance facilities (non add)	365,923,715	TBD	new rail	TBD	facilities and support facilities	2.70	4.75	4.00	2.00
	Miles of track (non-add)	605,035,313	TBD	new rail	TBD	number of miles of track	3.70	4.25	4.00	4.00
	Signal systems (non-add)	51,593,490	TBD	new rail	TBD	signal systems	2.90	4.75	3.75	1.00
	Electrical power (non-add)		TBD	new rail	TBD	power systems and enhancement	2.00	4.75	3.75	1.00
	Bus purchases (non-add)	218,080,404	1,883	bus	115,826	# of buses purchased	3.75	3.80	4.25	5.00
	Non-urbanized area formula grants (non-add)	14,522,875	363	vans (other)	40,008	# of vans purchased	4.25	3.80	4.50	4.00
	Non-urbanized area formula grants (not-add)	34,236,856	497	buses	68,887	# of buses purchased	4.25	4.60	4.50	4.00
	Rehabilitation and replacement									
	Non-rail stations (non-add)	1,900,783,023	1,381	non-rail	1,376,382	# of non-rail stations	4.00	3.80	4.25	4.00
	Non-rail maintenance facilities (non-add)	718,141,579	526	non-rail	1,365,288	# of non-rail maintenance facilities	4.25	1.90	4.25	3.00
	Stations (non-add)	560,918,549	3,043	rail	184,331	# of rail stations	4.00	3.80	4.25	3.00
	Maintenance facilities (non-add)	968,167,300	287	rail	3,373,405	# of rail maintenance facilities & support facilities	4.25	2.70	4.25	3.00
	Miles of track (non-add)	683,261,699	11,796	rail	57,923	# of miles of track	4.00	2.80	4.25	4.00
	Signal systems (non-add)	202,981,497	TBD	rail	TBD	signal systems	4.25	2.90	4.25	1.00
	Electrical power and enhancements (non-add)	101,967,156	TBD	rail	TBD	power systems and enhancements	4.25	2.00	4.25	1.00
Goal/Outcome	Environmental stewardship									
Core Processes	**Grant making**									
	System enhancement									
	Alternative transportation in parks and public	400,000	5	buses	80,000	# of vans purchased	3.75	4.40	4.50	2.00

FTA pilot team members saw PBM's potential for linking performance measures to more specific costs instead of overall programs. Finally, the agency already had a managerial cost accounting model when the pilot project started that the agency wanted to leverage by providing the context necessary for managers to see greater value in the model.

FTA's PBM financial report. *Figure 4* shows the PBM financial report that FTA developed for the Phase II pilot project. Note that it has many of the same categories as the template in *Figure 3*, but FTA tailored the report to its information needs and the data available.

From left to right, the FTA categories are:

1. Core process or subprocess being reported, attributed to societal goal or outcome (e.g., accessibility, mobility, environmental stewardship).

2. Total cost of the goal process during the fiscal year.

3. Number of units produced during the year.

4. Unit description.

5. Federal cost per unit (this is the federal contribution to the total cost of an item and does not include contributions by other organizations such as transit authorities).

6. A description of a process performance measure.

7. Value of the performance measure to meeting a particular societal goal (as judged by subject matter experts on a scale of 1 to 5, with 5 being most valuable).

8. Numeric value assigned by subject matter experts to process variation. (Variation relates to the predictability of repeating the results of a particular process and is discussed below under Process Variation and in Appendix D.)

9. Numeric value of the effectiveness of process controls, as judged by subject matter experts. (This was a substitute for variation of process controls.)

10. Demand attribute, the sensitivity to demand where the demand for a product is so great that the process needs to be adjusted. (This is discussed below under Demand Attributes.)

Figure 4 is also multilevel and focuses on grant-making, one of FTA's high-level processes, and its subprocesses: systems expansion, operations and maintenance, rehabilitation and replacement, system enhancement and planning.

Focus on obligations. An overarching goal for the pilot was to develop a useful reporting tool. Given this, the team decided to focus on obligations (that is, funds obligated through grants) instead of expenses because once funds are obligated through grants, it may take more than five years for the money to be expended. Therefore, obligations are closer to FTA's real financial status than annual expenses. PBM is flexible and allows adjustments to a basic template to make information more useful for both expenditure and obligation analysis and reports.

Reading the report. *Figure 4* shows the specific goals to which the report relates: reduced congestion. Going from left to right on the table:

- One of the core processes for achieving the goal is grant-making, the primary activity at FTA.

- Subprocesses of grant making include transit system enhancement, system expansion, and rehabilitation and replacement.

- A subprocess of system enhancement, "Elderly and Persons with Disabilities," is shown to obligate $88,121,519 for the purchase of 2,199 vans (the products of the subprocess) at a federal share of unit cost of $40,073 each.

- The performance measure for this grant-making subprocess is the number of vans purchased (2,199).

- Subject matter experts rated the value of this subprocess for achieving the goal of reduced congestion at a score of 4, with 1 being the lowest value and 5 the highest (more on this later in this section). As PBM matures at FTA, the goal is to shift to a more objective assessment of process value.

- The quality of the subprocess itself received a rating of 4, with 1 being a high level of process variation and 5 being a low level. This score indicates a good process.

- Internal control of this process is rated 4.5, with 1 being poor and 5 being excellent. Good internal controls help to reduce the risk of poor operations or outcomes.

- However, despite being of good quality, the potential capability of the subprocess to handle an accelerating trend of demand for transit services for the elderly and disabled is rated only 2 (out of 5). "Demand for [these vans] is so great that this subprocess needs to be adjusted even though it scored well on value and variation," says an FTA pilot participant.

This single table is rich with information for stakeholders and managers alike. Equally important, it is really just a starting point for understanding: under a fully functioning PBM approach, there will be better data for ongoing analysis of the effectiveness of all FTA processes.

> "We see an opportunity where PBM can be used to more narrowly focus on the federal portion of the gap between actual and needed spending by federal, state and local levels required to maintain transit system conditions. This will give us a more accurate view of what the FTA does now and can do in the future to achieve desired societal outcomes."
>
> —*FTA pilot participant*

Societal value. One of the concepts that FTA explored during the PBM pilot was that of *societal value*. According to an FTA team member, "A government entity creates societal value when it provides a product or service that meets a critical social need. Societal value factors are the products

Value reporting at AARP

Today's financial reporting systems focus on reporting budgets, costs and assets. Measuring the value that these resources produce has been largely ignored, primarily because traditional financial reporting places conservative reporting above relevance. The advent of multidimensional accounting (such as that generated by PBM) makes value reporting simply a different way to classify and manage data.

The American Association of Retired Persons (AARP) is one of the nation's largest membership benefit and advocacy organizations, serving the over-50 population. Concurrent with Phase II, James Brimson, a co-researcher on the PBM project, was working with AARP to apply activity-based management (ABM) in a way that is similar to that being tested during the PBM pilot projects. (The AARP CFO also was a member of the Phase II advisory group.)

One of the concepts emerging from the AARP initiative was societal value. At AARP, Brimson distinguished between member value (services and products purchased from AARP by its members) and societal value (the value that AARP adds to society as a whole through advocacy and related activities). AARP wants to ensure that societal value receives top attention, so applying ABM to understanding it is important. Regular financial reports to the board of directors on societal value are slated to become routine at the nation's largest senior-citizen advocacy organization.

and services the entity provides to taxpayers to fulfill the needs of society. The set of societal needs we considered were based on the DOT strategic plan and FTA-specific objectives, including mobility, accessibility, environmental stewardship and safety." These particular societal values resonate with transit because they reflect the benefits from using public transportation.

The pilot team reported some initial difficulty in trying to tie outputs to outcomes in a meaningful way. They think that in the future this may be addressed by associating more specific ridership and other characteristics to outputs for a better linkage with societal outcomes.

Benefits. FTA reported the following benefits gained from the pilot project:

- Clearer vision of how to tie financial information to performance metrics and a better ability to link measures to more specific costs, instead of just to overall programs.
- Better display of the relationship between outputs and the growing demand for transit services needed by society.
- Potential to provide the FTA with better indicators on when organizational processes need to be improved.
- Enhancement of FTA's efforts to integrate financial statements, internal controls, performance and strategic planning for more robust, integrated decision-making.

Finally, the team said that the PBM methodology would contribute substantively to FTA's overall efforts to adapt to a rapidly changing environment in American public transportation. DOT's Assistant Secretary of Transportation for Budget and Programs/CFO met with the pilot team members and gave them favorable feedback on the PBM initiative.

Conclusion. FTA believes that PBM will add value within the agency. Tremendous changes occurring in the transit sector's environment make the ability to gauge process performance in meeting societal needs increasingly important. FTA thinks that focusing only on compliance is no longer satisfactory to the agency, nor is it being responsible to FTA stakeholders over the long term. Finally, the FTA team said that PBM supports the philosophy of making financial reporting more valuable as a decision-making tool than it is now perceived to be by most potential users of this information.

Next steps. The FTA team will implement a more rigorous approach to determining the value and variation of processes. The team would eventually like to integrate the summary results of performance-based management reporting into a brief document similar to the citizen-centric publications promoted by the Association of Government Accountants (AGA).[1] PBM will be broadened so that it is understood and used agencywide as a decision-making tool.

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Figure 5: Examples of macro and business processes in the PBM report by USCG

	FY 2007 Cost ($)	Output Description	# Output Units	Cost per Output Unit	Performance Measure Description	Performance Measure	Process Controls	Calculated Process Variation
Macro Process—Drill-Down Example								
Marine Safety	$233,148,033	# of domestic vessel inspections and foreign vessel examinations	79,000	2,951	see Section 3		see Section 4	information is not available
Subprocess—Commercial Vessel Safety	127,242,683	Information is not available						
Subprocess - Certificate of Inspection (COI) Program	23,226,337	# of COI-related cases closed in MISLE	10,631	2,185	administrative cycle time per case within MISLE (open to close)	142.7 Days (FY07)	Marine Safety Manuals (Vols. I and II)	see narrative report
Business Process—Drill-Down Example								
Process—Human Resources	1,092,919,511	# of CG employees (military/reservists/civilians) served	52,666	20,752	see Section 3		see Section 4	information is not available
Subprocess—Performance Measurement and Evaluation of CG Officers**	$35,531,401	# of active CG officers	8,561	4,150	(# of O-6 and below officer evaluations submitted to CG Personnel Command [CGPC]) ÷ (# of officer Evaluations required by CGPC)	99.4%	Personnel Manual: M1006A, Chapter 10	information is not available
Subprocess—Officer Performance Measurement and Evaluation at ESUs, NESUs, and ISCs	$7,562,550	# of officer evaluations completed	2,152	3,514	(# of O-6 and below officer evaluations submitted to CGPC) ÷ (# of officer evaluations required by CGPC)	99.3%	Personnel Manual M1006A, Chapter 10	information is not available

*Data are as of June 6, 2006; similar data not available for 2007.
**About 20 percent of Coast Guard human resources costs are associated with conducting performance evaluations.

PBM at the U.S. Coast Guard

The U.S. Coast Guard (USCG) is a military branch of the federal government involved in homeland security, law enforcement, search and rescue, marine environmental pollution, and response and maintenance of aids to navigation. Part of the Department of Homeland Security, USCG has about 40,150 men and women on active duty and a fiscal year (FY) 2008 operating expenses budget of about $5.9 billion.

When AGA asked USCG to participate in a pilot project, it eagerly agreed to participate for several reasons:

- USCG executives believe that financial and performance reporting can be improved.
- USCG has been undergoing a complex transformation from a program-focused to a performance-focused organization. It needs to integrate cost and performance information into one managerial model that is also useful for reporting.
- In support of transformation, USCG is developing and integrating decision-support systems and performance management policies and architectures that are consistent with the Malcolm Baldridge Award criteria.

Many of these initiatives are process- or activity-oriented and starting to converge. In addition, like the FTA, USCG had extensive experience with activity-based costing (ABC), which is an excellent means of understanding processes and their costs. USCG believed that this pilot project would provide a significant learning opportunity to improve understanding of process-based methodologies.

USCG's PBM report. The full report developed by USCG for the PBM pilot includes 14 tables showing different aspects and workups of cost, performance and other information. We present here some of the tables that revealed a fresh perspective for the Coast Guard.

Figure 5 shows USCG's adaptation of the PBM report template (shown in *Figure 3*). *Figure 5* shows only a portion of the full report, focusing instead on one example each of USCG's macro or core processes and of its business processes (for example, financial and other support services).

USCG's report is rich in detail and information on cost, outputs, controls and effectiveness. A quick perusal of *Figure 5* tells a reviewer the following:

- Marine Safety is a macro or core process which makes it important to the agency. The total annual cost of Marine Safety is $233,148,033, which buys 79,000 domestic or foreign vessel safety checks, with an average cost per unit of output of $2,951. (USCG had not previously determined the cost per output of its macro processes or business processes.)
- A subprocess of Marine Safety—the Certificate of Inspection (COI) program—accounted for 10,631 cases of inspections at a unit cost of $2,185. The performance
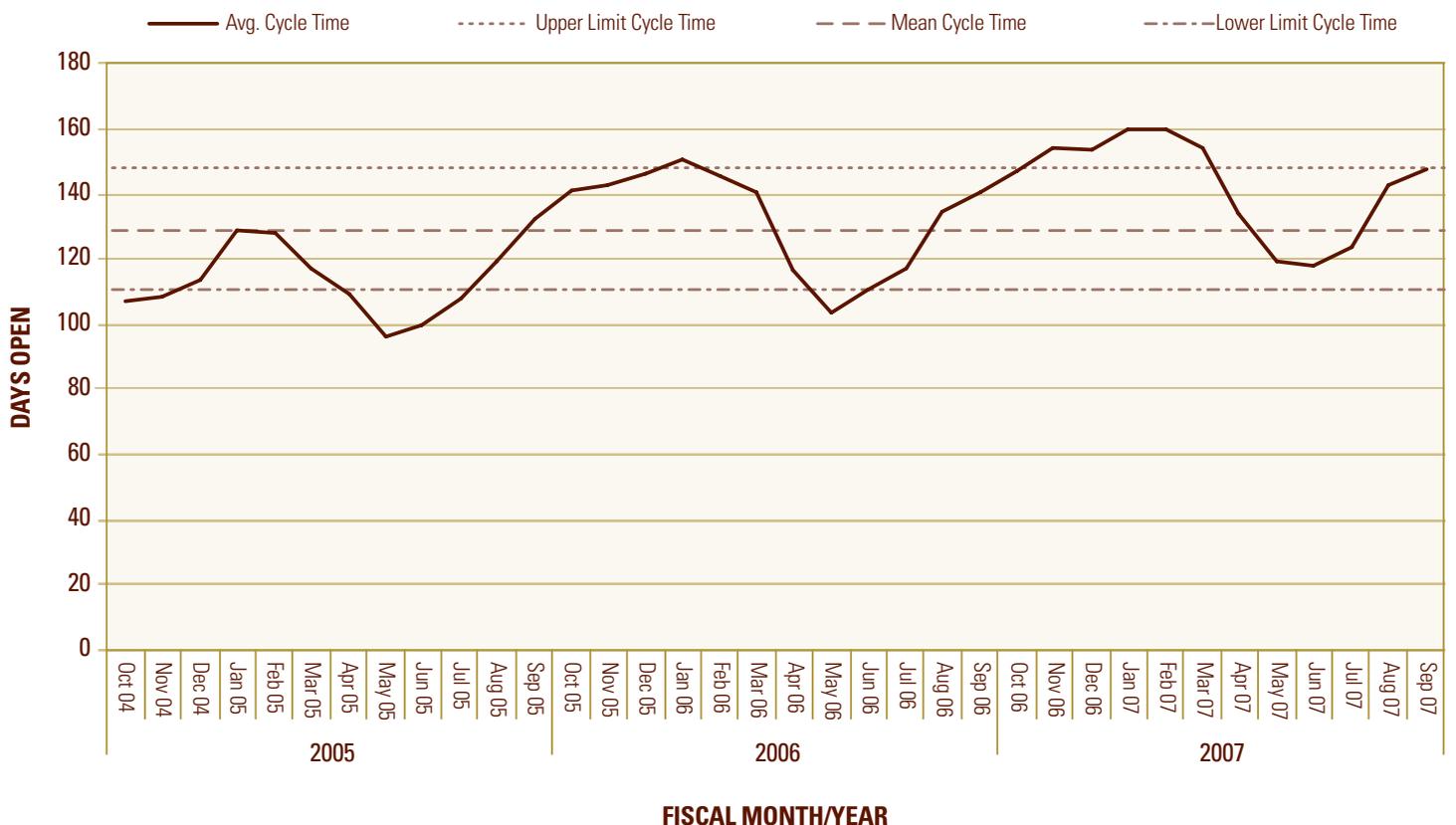
PERFORMANCE-BASED MANAGEMENT

Figure 6: USCG unit cost of representative outputs of business processes

Business Processes	FY 2007 Direct Cost and Overhead Allocation	Representative Output Description	FY 2007 # Output Units	Direct Cost and Overhead Allocation per Output Unit
Acquisition	$35,775,548	# of contracts greater than $100k	1,642	$21,788
Finances	154,843,604	# of payments (EFT and check payments)	200,974	770
Human Resources	1,092,919,511	# of CG employees (Military/Reservists/Civilians) served	51,548	21,202
Information Technology	153,825,171	# of CG PCs and servers (does not include comms, C2 and NAV devices)	51,536	2,985
Planning and Policy Development	14,855,071	# of schedules, plans and directives	Output TBD	
Maintenance and Logistics	1,108,427,346	# of requisitions for parts received by the ELC	46,212	23,986
Total Business Process Costs	**$2,560,646,251**			

Figure 7: USCG representative non-financial business measures of business processes

Business Processes	Performance Measure Description	Performance Measure
Acquisition	Performance Measure–TBD pending review	
Finances	Compliance: # of commercial payments made on-time ÷ total # of commercial payments = 115,567 comm. payments made on-time ÷ total # of comm. payments =	95.4% of commercial payments made on time (objective: maximize)
Human Resources	Cycle time: total # of personnel administrative document days old ÷ # of documents submitted = avg. # of personnel administrative days old 7,095,984 document days old ÷ 335,142 documents submitted =	Average document: 21 days old (objective: minimize)
Information Technology	Productivity: % CGDN availability. This measure represents the reliability of the Coast Guard Data Network (CGDN) by measuring the percentage of time that it is operational	99.96% Availability (objective: maximize to 100%)
Planning and Policy Development	Performance measure alignment with SOPP	TBD pending review
Maintenance and Logistics	Inventory readiness: # of requisitions completed by issuance from Engineering Logistics Center stores divided by the total # of requsitions received. 41,410 requisition filled from stores ÷ 46,210 requisitions received =	89.6% of requisitions filled from stores (objective: maximize)

Figure 8: Average cycle time per case closed: Certificate of Inspection vessel inspections

measure is "administrative cycle time per case," as measured between the time a case was opened and closed in USCG's Marine Information for Safety and Law Enforcement (MISLE) system, which was 142.7 days in FY 2007. Cycle time can be a measure of both efficiency and customer satisfaction.

- Process controls for the COI program are documented in specific manuals. The "Calculated Process Variation" column remains empty at the time of the writing of this report because USCG was still working on determining the most meaningful process data on which to report. Also, unlike the Phase I conceptual table (*Figure 1* of this report), the USCG statement does not include internal controls best practices.

The upper half of *Figure 5* shows a core process directly connected to the USCG mission. The lower half gives information about business processes that support all core processes: Human Resources. Before the pilot, USCG had not clearly articulated business processes as elements of a business architecture. Instead, these were referred to collectively as "overhead" or "indirect costs." During the pilot, the USCG team identified and defined six major business processes and their total costs. *Figure 5* shows the Human Resources business process and selected subprocesses:

- It is clear that Human Resources is a significant part of USCG expenses (about $1 billion), so it will be of interest to legislators and administration executives concerned with the budget.
- A subprocess, "Performance Measurement and Evaluation of CG Officers," applies to all uniformed officers. For each officer, this comes to $4,150 a year. The performance measure is the percentage of officers who receive evaluations, in this case virtually all officers, which is important because evaluations are supposed to be done annually. Internal controls for the subprocess are documented in a manual, and as noted earlier, USCG is still working on calculated process variation.

In summary, *Figure 5's* information provides a different type of value than do traditional financial statements. In addition, the procedures used to prepare the chart add more value to USCG than those for preparing a traditional financial statement.

Workup to the PBM report. In preparing the PBM report in *Figure 5*, USCG participants in the pilot developed several other reports and tables of interest to executives.

As noted earlier, before the pilot, USCG had identified 11 mission-oriented core or macro processes and had assigned total costs to each. Using a financial model of activity-based costing and a PBM approach, the USCG pilot team was able to create unit costs for each macro process. The USCG pilot team also calculated the unit costs of representative outputs from the business processes (as shown in *Figure 6*).

The USCG pilot team underscored the benefits of showing process costs:

"As a result of any process cost calculation, the natural question is, 'How/why does it cost so much?' This results in stakeholders asking important questions about improved transparency, increased granularity and greater confidence in the data; about what can be done to lower the costs; about what drives the costs of these processes; about how we define outputs, etc. . . . With new data comes the opportunity to break old paradigms. This should result in new knowledge that could be used to better manage processes and their costs. USCG must encourage further development of performance-based management and reporting."

Figure 7 shows representative non-financial business measures for the business processes. (These are not the only nonfinancial performance measures for USCG business processes.)

Variation. Before Phase II, USCG had not calculated process variation[2] or used control charts[3] on its high-level macro and business processes. Part of PBM involves monitoring process execution to detect process variation, with a goal of reducing it. A well-controlled, stable process should produce predictable results in the future, which is also valuable information in forecasting financial results.

USCG experimented with calculating variation in several of its processes. *Figure 8* is a control chart of a performance measure of the Marine Safety macro process: administrative cycle time per case under the Commercial Vessel Safety subprocess' Certificate of Inspection (COI) programs. (Information on cycle time is available from USCG's Marine Information for Safety and Law Enforcement [MISLE] system.)

Figure 8 showed USCG several things:

- Average cycle time of COI-related vessel inspection cases has a seasonal trend, increasing (a negative) during the fall, peaking at the end of the calendar year and then decreasing (a positive) during the spring. Possible reasons for seasonal variation include that the upward trend that begins in the late summer coincides with the "transfer period" in which inspectors rotate in and out of Marine Safety billets. The new inspectors have a learning curve, which would cause an increase in cycle time. The spike late during the calendar year is most likely the result of Marine Safety personnel taking leave time, so that fewer are available to do the work. With fewer personnel, it takes longer to close a case.
- Average cycle time appears to be trending upward over time. This may be a result of additional duties that are straining personnel resources, so that they have less time to close cases.

To reduce the variation, USCG will need to solve the problems that cause it. A control chart similar to that shown in *Figure 8* will indicate whether the solutions are working. Improvement will be marked first by decreases in variation within the upper and lower control limits and later by a downward trend in mean cycle time.

> "USCG should consider implementing process control charts into its process methodology in order to identify process problems and correct them."
>
> —*USCG pilot team recommendation*

Technology for presenting data. Both data and technology are available for advanced management analysis in government entities. Almost all the information needed already exists in myriad databases, but it sits there unused. The technology needed for management analysis and reporting also exists—indeed, it has been around for years. During the pilot, the USCG team also reviewed ways to present PBM information, such as performance dashboards. The USCG team said that the presentation of PBM results " . . . is an important consideration in its implementation. Easy-to-use dashboards are more likely to be understood, accepted and used by managers and leadership." (Appendix D has many examples of applications that are useful for creating, analyzing and displaying PBM reports.)

Benefits. USCG participants in the pilot report the following lessons learned in using PBM:

- Improved understanding of USCG's higher-level processes for public goals and for agency-readiness goals, which led to improved understanding and relabeling of elements in USCG's enterprise architecture.
- Better understanding of the relationship between organizational purpose and processes.
- Identification of measures to evaluate process performance and leading indicators of risk and performance, which are process metrics that lend themselves to predictability.
- Development of a basic methodology for assigning costs to business processes.

In addition, the pilot project team identified a number of gaps in USCG's ability to systematically collect authoritative data and consistent, repeatable metrics, which the agency intends to address and improve.

Conclusion. The USCG team members reached the following conclusion based on the results of their pilot project:

"(T)he project's results confirmed that the PBM concepts are applicable to USCG, and are informative. The detailed PBM Report, while perhaps not sufficiently accurate for decision-making purposes at this time, shows the possibilities that such information could become both invaluable and actionable, following additional research and validation. Indeed, the team encourages management to begin implementing this methodology to improve management transparency and accountability."

Next steps. After the pilot, the USCG team reviewed its challenges and developed plans for dealing with them. The team also identified short-, medium- and long-term solutions to take to the Coast Guard's executive management. Once the team members get management buy-in, they will proceed with implementing PBM.

Lessons learned from Phase II

Here are some of the important lessons learned during the second phase of this PBM research initiative:

- **PBM is feasible.** The experience of USCG and FTA show that it is feasible to produce a PBM financial report in the federal government.
- **Data were difficult to obtain.** Pilot projects reported some problems in gathering the nonfinancial data required for a PBM report. This is indicative of an underlying problem with federal government performance management information: the lack of *readily available* data on cost and performance. As said before in this report, for the most part the data needed already exist, but require extra effort to find and collect.
- **Time and resource constraints limited the teams.** Pilot PBM report production ran for a few months (March through June 2008) and was done mostly in the spare time of the entity pilot team members. Difficulty in obtaining data exacerbated the problem.
- **Terminology matters.** To create a concise report, we need to have agreed-upon definitions so that communication is accurate while using words economically.
- **Communication is essential.** Communication between program and information analysts/managers is essential, and barriers such as a compliance mind-set should be removed. Compliance itself is not the issue; the effort must be relevant to the intended user. If there is a perception of compliance and inflexibility, then the perception of relevance is lost.

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Federal legal guidelines for PBM

Federal entities will need guidelines for including a PBM report in their routine financial and performance reporting. These guidelines should cover how to integrate cost, performance and financial data in a performance-based report. (Appendix B of this report provides details of existing guidance that relate to PBM, including legislation, accounting principles and OMB directives.)

The Federal CFO Council, the Federal Accounting Standards Advisory Board (FASAB) and OMB should work to refine, align and provide instructive guidelines for implementing the integration of PBM reporting, standards, conventions and rules that support efforts to integrate financial and performance reporting. This will help ensure consistent financial and management reporting practices across the government. For PBM reporting, such new guidance would include:

- Objectives and requirements for PBM reporting, including factors used to judge its success.
- Definition of key processes, including process-oriented architectures and development methods that encourage efficient and effective implementation and appropriate documentation.
- Examples of how best to implement PBM reporting, an evaluation of its usefulness to the varied functions of entities, and process mapping of program or function characteristics.
- As required by the Federal Enterprise Architecture (FEA), a governmentwide taxonomy guideline for processes and subprocesses, including a logical framework for agencies to map their programs and activities, along with listings of logical output and performance measures for all processes and subprocesses.
- Expansion of OMB Circular A-123 to integrate performance-based financial data with process and reporting controls, in keeping with Section 2 of the Federal Managers' Financial Integrity Act requirements for statements of assurance concerning management, administrative and accounting controls.

Congressional buy-in and involvement are essential to the success of federal PBM reporting. As with current legislation, active and ongoing congressional involvement will expedite the adoption of PBM reporting and help sustain it over time.

XML/XBRL

To maximize the efficiency of implementing PBM, entities must have a technical architecture that supports consolidating and standardizing financial and nonfinancial data. In most cases, this is accomplished by using the eXtensible Markup Language (XML) to define how data will be shared by disparate systems. For business purposes, a specific variation of XML, the eXtensible Business Reporting Language (XBRL), was created. XBRL is an important enabler of PBM because it facilitates sharing data across institutional boundaries in ways that make it easier to do analysis and prepare reports of interest to decision makers.

> XBRL is the Rosetta Stone that will make PBM data integration possible.

In Phase I of this research effort, we proposed that XBRL, with its ability to give every transaction its own permanent DNA-like tag, could be the bridge that would make data available for financial, process and cost accounting applications, singly or in concert. In Phase II, as this section reports, we looked at how XBRL can create the robust metadata layer that forms the bedrock of data portability across systems, applications and usage. (Metadata show the context, content and structure of records and their management over time.) We also reviewed how XBRL could help meet requirements of the FEA, the CFO Act, the Government Performance and Results Act (GPRA) and the Government Paperwork Elimination Act of 1998.

XBRL tags encapsulate both data and linkbases that allow metadata, so that each data element is more precisely defined. For example, a data element is a fact, such as a line item in a budget. By itself, the data element is not very useful. However, if we tag the data element with the following information, we can use it in many ways:

- Exact definition of the fact
- To which entity it pertains
- Time period to which the fact relates
- Units in which the fact is reported
- Precision of the reported fact
- Provider of the fact
- Any calculations used to determine the fact
- Relationships between facts (e.g., fact A is the sum of facts B and C)

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Figure 9: Comparison of traditional and performance-based management reporting

Traditional reporting model	Performance-based management reporting model
One-to-One: One request for information pertains to only one requester.	**Many-to-Many:** Many related requests can be compiled into a single call for information, and then shared with many interested parties.
Single Audience: A single report has only a single audience based on a narrow interest.	**Broad Audience:** A single body of information can have an expansive audience that receives all or part of the original pool of information as the body moves down the supply chain.
Narrow Purpose: A single report has a narrow purpose. Should another purpose emerge, another separate report is created. Using a report for more than one purpose is too complex and expensive and undermines the integrity of the content.	**Broad Purpose:** A single body of information can have a set of puposes. Should another purpose emerge, the same body can be reused or slightly augmented. Reusing a body of information for more than one purpose is inexpensive, given that it is easily reconstituted without undermining the integrity of the content.
Static in Composition: The definition of a report does not change, once it is properly designed. Information is in a fixed format that recipients cannot easily customize.	**Dynamic Composition:** The definition of a body of information is intended to change over time. It is designed for requesters and reponders to readily adapt to changes and to use and view as best suits each individual recipient.
Transient: Each report instance quickly becomes irrelevant because of time, medium and format, limiting its use for other purposes. It is easier and more economical to replace the report than reuse it.	**Reusable:** Each report instance becomes irrelevant only with the passage of time, given that the medium and format do not limit the use of the information for other purposes.
Isolated Redundant Cost: Expensive and redundant, cost carried by single entity for each isolated use.	**Shared Minimal Cost:** Cost of reporting is distributed across all interested parties, with high opportunity for reuse of data, taxonomy and tooling.

Given metadata such as this, one is better able to perform objective analysis of factors such as the impact of material or personnel costs on budgets. Comparisons among entities also become more accurate and error-free. However, aggregates such as total costs say little about efficiency or how expenditures satisfy mission needs. To gain that insight requires disaggregating data elements into categories or dimensions such as geographic location of service, dates, demographics of those served and others.

Because of their flexibility, XBRL data elements provide intelligent data in which one can drill down and see metadata in the electronic document. In other words, XBRL data can be used flexibly, as opposed to static data in other file formats, such as HTML, .pdf, .doc. Finally, XBRL produces high-quality data because it can "self-audit" information from transactions.

XBRL in government

Our research found that XBRL is being adopted throughout the world for public service applications, primarily for financial reporting for financial institution oversight.

Government users of XBRL:

- Federal Deposit Insurance Corporation (FDIC)
- Federal Reserve System (FRS)
- Office of the Comptroller of the Currency (OCC)
- Securities and Exchange Commission (SEC; proposed in June 2008)
- Central governments of Japan, the Netherlands and Australia
- European Union financial industry regulators

In addition, the State of Oregon Controller's Office did an AGA-sponsored research project that explored the steps necessary to build a Governmental Accounting Standards Board (GASB)-based taxonomy for use by state and local governments in their financial reporting (*XBRL and Public Sector Financial Reporting— Standardized Business Reporting: the Oregon CAFR Project,* AGA CPAG Research Series: Report No. 16, September 2008).

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XBRL for PBM financial reporting: a suggested model

The current model for financial reporting in the federal government is static and produces a report with a narrow purpose. A PBM model would be dynamic and produce multipurpose reports. *Figure 9* compares the two models:

Structure of the model. An ideal PBM reporting model for government would be an information supply chain based on a shared services model with service-oriented architecture (SOA) and with XBRL as the carrier. Shared services are information technology (IT) services—such as hardware, software and communications—that are available from one provider and used by many customers. SOA consists of linked services (shared and unshared) that may reside inside or outside a user organization and that communicate and interoperate through agreed-upon standards. Many SOAs are built with XBRL as the information carrier and the Internet as the communication channel.

Outcomes of the work to date

Phase I of PBM research was another step in an evolutionary process of improving the transparency and utility of governmental financial reporting. During Phase I, government entities came to agreement that the current model of financial reporting was of limited value to users. Phase I also introduced the concepts underlying Process-Based Management.

During Phase II, federal entities produced PBM reports as each deemed best. Each implementation was very different in scope and objectives. Although these entities have only scratched the surface of the power of PBM, they saw its value. They also identified barriers to wider and deeper use of Performance-Based Management, of which the most critical were the difficulty of getting the data and extending their usage to other parts of an entity.

Next steps

All entities that participated in Phase II pilots have plans to move forward with PBM in their organizations. We believe it important to continue to support those teams with technical assistance and advice. We urge a Phase III of this research to help other entities begin to explore PBM as a new way to understand and improve their operations.

Conclusion

Our research demonstrates that PBM is both feasible and effective when applied in a government setting. It offers ways to use existing financial and performance data in ways that deliver the insights needed to change government operations for the better. PBM is a flexible approach, so it fits into any other sound management approach or methodology. It has the following benefits:

- Integrates a wide variety of management data into multi-dimensional views of operations.
- Links performance to specific line-item costs, not just to overall program costs.
- Is predictive and forward-looking, so it supports performance-based budgeting.
- Helps forecast risk, cost and performance and enables agile response to changes in demand or environment.
- Expands understanding and labeling of elements in the enterprise architecture.
- Enhances transparency through multidimensional reporting that lets officials and citizens see cost, performance and internal control information in one snapshot.
- Delivers what pilot participants call integrated awareness: the big-picture information that decision-makers need to keep their organizations steering in the right strategic direction. It also provides the data that managers need to detect and solve performance problems.

The best conclusion for this report is offered by a participant from the U.S. Department of State:

"Overall, federal financial management has seen tremendous improvements over the past decade, largely as a result of the hard work and devotion of people dedicated to furthering good governance. *However, we need to leverage these efforts and establish effective and value-added reporting models that further improve our governance framework and ability.* Our constituents, the U.S. taxpayers, our peers, our profession and our descendants deserve no less."

APPENDIX A

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APPENDIX B

Statutory requirements related to performance-based management

Federal entities will need guidelines for including a PBM report in their routine financial and performance reporting. These guidelines should cover how to integrate cost, performance and financial data in a performance-based report. In this section, we will point out the many existing guidelines that support PBM and suggest how to modify them and develop new ones.

Existing guidance for PBM

This section makes it clear that existing federal laws and guidelines will support PBM reporting as envisaged in this report. Indeed, they can even be said to *mandate* PBM reporting or something closely akin to it.

Legislation. The Government Performance and Results Act of 1993 (GPRA) is the foundation for integrating performance and financial measurement in the federal government and a mandate for results-oriented programs. Other legislation that supports PBM includes:

- The Federal Managers Financial Integrity Act (FMFIA) of 1982, which requires executive agencies to establish and evaluate internal accounting and administrative controls
- The Chief Financial Officers Act of 1990 (CFO Act) as amended by the Government Management Reform Act of 1994 (GMRA), which provides for systematic measurement of performance
- The Federal Financial Management Improvement Act of 1996 (FFMIA), which requires entities to prepare reports comparing resource use with activity results
- The Information Technology Management Reform Act (ITMRA) or the Clinger-Cohen Act of 1996, which encourages performance- and results-based management of IT investments, and the Federal Enterprise Architecture (FEA), an OMB initiative that, among other things, aims at improving the sharing of information governmentwide by complying with the Clinger-Cohen Act

Accounting principles. The Federal Accounting Standards Advisory Board (FASAB) is the body designated by the American Institute of Certified Public Accountants (AICPA) to establish accounting principles for Federal entities. FASAB support for PBM reporting includes:

- Statement of Federal Financial Accounting Concepts (SFFAC) No. 1, *Objectives of Federal Financial Reporting*
- SFFAC No. 2, *Entity and Display*
- Statement of Federal Financial Accounting Standards (SFFAS) No. 4, *Managerial Cost Accounting Concepts and Standards for the Federal Government*
- SFFAS No. 7, *Accounting for Revenue and Other Financing Sources and Concepts for Reconciling Budgetary and Financial Accounting*
- SFFAS No. 8, *Supplementary Stewardship Reporting*

Together, these FASAB pronouncements recognize that users of financial reports need quantitative performance measures and results linked to financial information to assess an entity's performance and evaluate underlying factors that may have affected it. SSFAC No. 2, *Entity and Display*, calls for a Statement of Net Cost to present the total and net costs of agency services, particularly how much of the services are financed by taxpayers. SSFAC No. 2 also mandates a Statement of Program Performance Measures that could be an early prototype of a PBM report. FASAB has not yet recommended standards for this new statement, but it is supposed to provide information that helps financial report users determine costs and results of programs. SFFAC No. 2 says that the new statement is " . . . likely to be the most important statement for those persons interested in how a Federal entity is using its resources."

Executive branch guidance. OMB guidance related to a PBM report includes:

- OMB Circular A-11, *Preparation, Execution, and Submission of the Budget*, which has guidelines for the Program Assessment Rating Tool (PART) and the Federal Enterprise Architecture (FEA) Business Reference Model (BRM), which uses a three-tier hierarchy to describe the business of government
- OMB Circular A-136, *Financial Reporting Requirements*, which shows the form and content of the Statement of Net Costs
- OMB Circular A-130, *Management of Federal Information Resources*, which requires entities to evaluate existing work processes before creating new or updating existing information systems
- OMB Bulletin A-123, *Management's Responsibility for Internal Control*, provides a basis for reporting on internal controls over the reporting of the material line items in a PBM report
- Federal Enterprise Architecture (FEA), OMB's business-based framework for governmentwide improvement, which supports the need for process decomposition and standardization across government

A Common Governmentwide Accounting Classification (CGAC) structure, established by OMB and its Financial Systems Integration Office (FSIO), establishes a standard method for classifying the financial effects of government business activities. This standardization will support PBM reporting by enhancing transparency, data sharing and cross-comparability among agencies. It also supports the use of XBRL in federal financial reporting—indeed, XBRL may be part of the solution to standardizing process and financial data throughout the federal government.

Finally, in keeping with GPRA, OMB management initiatives aimed at better integration of cost, performance and budgeting include the President's Management Agenda (PMA) and PART. (Guidelines for PART are in OMB Circular A-11.)

We believe that existing laws and guidance are strong mandates for PBM reporting and that most of the guidance needed for its reporting is already in place. However, we discuss next some areas that need clarification and tailoring to process-based reporting.

New or expanded guidance for PBM

FASAB, OMB and the Federal CFO Council should work together to refine, align and expand current financial guidance that supports efforts to integrate financial and performance reporting. This will promote consistent financial and management reporting practices across the government. For PBM reporting, such new guidance would include:

- Objectives for PBM reporting, including factors used to judge its success.
- Definition of key processes, including process-oriented architectures and development methods that encourage efficient and effective implementation and appropriate documentation.
- Examples of how best to implement PBM reporting, an evaluation of its usefulness to the varied functions of entities, and process mapping of program or function characteristics.
- A governmentwide taxonomy guideline for processes and subprocesses, including a logical framework for agencies to map their programs and activities, along with listings of logical output and performance measures for all processes and subprocesses.
- Expansion of OMB Circular A-123 to integrate process-based financial data with process and reporting controls.

Congressional buy-in and involvement are essential to the success of Federal PBM reporting. As with Section 2 of FMFIA, GPRA and the CFO Act, active and ongoing Congressional involvement will expedite the adoption of PBM reporting and help sustain it over time.

APPENDIX C

XBRL–PBM's Rosetta Stone[4]

This appendix examines the role that XBRL could play in providing the robust metadata layer that forms the bedrock of data portability across systems, applications, and usage and thus makes possible the long-awaited integration of financial and performance reporting in the Federal financial space. The paper also demonstrates how XBRL can act as an "enabler" for fulfilling the requirements of the Federal Enterprise Architecture (FEA; 2006), the Chief Financial Officers Act (CFO Act; 1990), the Government Performance and Results Act (GPRA; 1993) and the Government Paperwork Elimination Act (GPEA; 1998).

Using process-based accounting to enable performance management

The relationship between the Federal Enterprise Architecture (FEA) and process-based accounting. The FEA is a high-level framework intended to form the basis for enterprise architectures at all major federal entities. It originally consisted of a set of reference models for defining an entity's business (Business Reference Model), services (Service Component Reference Model) and data (Data Reference Model).[5] Individual entities would tailor these models by extending or modifying them to better describe their current operations, services and data (the "As-Is" model) and their desired "To-Be" model, based on the long-term business goals of the entity. The changes necessary to transform an entity from the As-Is to the To-Be state then form the basis for the entity's Capital Planning and Investment Control (CPIC) process. This means that potential investments can now be evaluated based on their contribution to the attainment of the To-Be state, which reflects the high-level goals of the enterprise. This, in short, is what the enterprise architecture process is all about: a current state (or architecture), an end state and a plan to get there.

The early FEA efforts concentrated on establishing an enterprise architecture (EA) framework at each entity; that is, an As-Is architecture, a To-Be architecture and a CPIC process defining how the transformation should be achieved. The development of these plans proved valuable in itself. Redundant systems and processes were identified and eliminated, and future goals for entities were clarified. These represented important savings to the government; however, one major question remained: What is the overall value of the transformation? Does the entity deliver sufficient additional value at the To-Be state to justify the cost of the transformation?

In early 2007, the government began to require objective measurements of the value of the transformation; it was no longer enough to develop a To-Be architecture that was "better," it was now necessary to quantify how much better the To-Be state would be compared with the cost of attaining it. This is where process-based accounting becomes particularly valuable. By looking at the problem from the top down, one can justify the actions from the bottom up.

Introducing a process-based view will help each entity optimize its internal processes and help it judge where and when to "contract out" services to other government or private organizations. The current federal e-government initiative encourages entities to identify services that they feel they perform particularly efficiently and make these available, for a fee, to other entities. An objective process such as process-based accounting can vastly simplify an entity's choice in a matter such as this.

Performance-based management and federal financial data standards. Process-based accounting, as an enabler of PBM, aids the linkage between financial reporting and performance measurement. For example, in traditional accounting, labor accounting transactions are recorded when employees are paid; however, the payroll cycle is disconnected from the actual workflows. Such accounting accurately portrays actual salary and wages cost, but cannot link it to work that generated the need for paying employees, *except through a separate data collection step*. Because process-based accounting seeks to report not only the salary and wages cost but also the amount of time needed by a worker of certain qualifications to complete a unit of output and how much workload was completed during the reporting period, it looks to a data generation methodology that enables the recording of both values (cost and performance) simultaneously. The FEA's Data Reference Model (DRM) creates a conceptual framework that specifically supports such capability (as shown in Figure C-1 and discussed below):

Figure C-1 shows three standardization areas: Data Description, Data Context and Data Sharing:

- **Data Description.** The Data Description standardization area of the DRM provides a means to capture uniformly the semantic and syntactic structure of data. This enables comparison of metadata (data about data) for purposes of harmonization and supports the ability to respond to questions regarding what is available in terms of data descriptions (metadata).
- **Data Context.** The Data Context standardization area establishes an approach to the categorization of data assets, using taxonomies and other descriptive information. In general, Data Context answers key questions about the data required within a Community of Interest (COI) and establishes the basis for data governance. Data Context also enables discovery of data and can provide linkages to the other FEA reference models, which are themselves taxonomies.

APPENDIX C

Figure C-1: DRM standardization areas
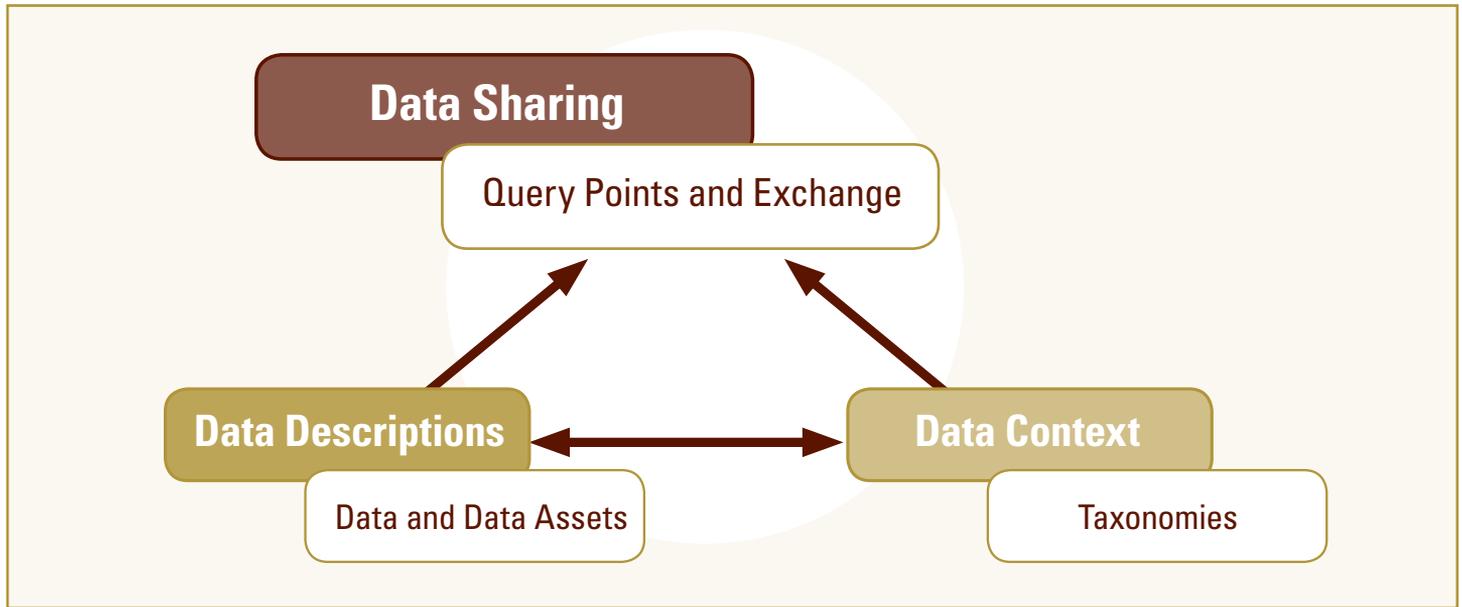
Source: The Data Reference Model v.2.0, 2005, of the Federal Enterprise Architecture

- **Data Sharing.** The Data Sharing standardization area describes the access and exchange of data, in which access consists of recurring requests (such as a query of a data asset) and exchange consists of fixed, recurring information exchanges between parties. Data sharing is enabled by capabilities provided by both the Data Context and Data Description standardization areas.

XBRL is a data standard that could fulfill the requirements of the Data Reference Model of the FEA and enable process-based reporting of financial data through its schema and taxonomy (see Figure C-2).

Figure C-2 shows the five standard linkbases of the XBRL taxonomy that enable tagging of source data for multiple uses:

1. **Presentation linkbase.** Structures taxonomy in the form of tables (rows/columns) and defines hierarchical relationships between elements, creating presentation "trees."

2. **Calculation linkbase.** Defines basic calculation rules, and subelements roll up to "know" the value of the parent element.

3. **Definition linkbase.** Defines standard types (roles) of relationships such as "general – special."

4. **Reference linkbase.** Defines the legal regulations related to the XBRL elements representing financial terms.

5. **Label linkbase.** XBRL enables assigning many different labels for one element, depending on the context and the language used.

XBRL's schema and taxonomy facilitate the kind of dimensional analysis mentioned in the next section.

XBRL and the interactive data model

So what *is* XBRL? XBRL is based on eXtensible Markup Language (XML), which is extended (hence the "X") to allow the storage and transfer of financial data across disparate systems in the business reporting supply chain, using Internet-based technologies. XBRL tags not only encapsulate the data but also provide linkbases that allow metadata, so that each data element is more precisely defined. The basic components of XBRL are the taxonomy, instance document and style sheet. The taxonomy or schema (.xsd) defines the name and contents of all elements that are permissible in a certain document (identified as a "tag"). A tag is similar to a barcode: it provides metadata or information about the element (think optical scanning).

Taxonomy gives the structure of the document an order in which the elements must appear, much like an old-fashioned outline. The instance document (.xml) includes the actual values for each element, together with references to the taxonomy to which the values should conform. These references are the linkbases that provide labels, calculations, references to authoritative literature, etc. Finally, the style sheet (.xsl) renders the data for display in the desired format (for example, a Web page or Excel document). The data can be easily presented in various formats to display via a Web browser or in other software packages such as Excel. Because of their flexibility, XBRL data elements provide intelligent data in which one can drill down and see metadata in the electronic document. In other words, users can get information about the data, as opposed to static data contained in a basic HyperText Markup Language (HTML) document or any other file format that contains static data (such as MS PowerPoint or MS Word documents).

Figure C-2: XBRL architecture

XBRL Architecture
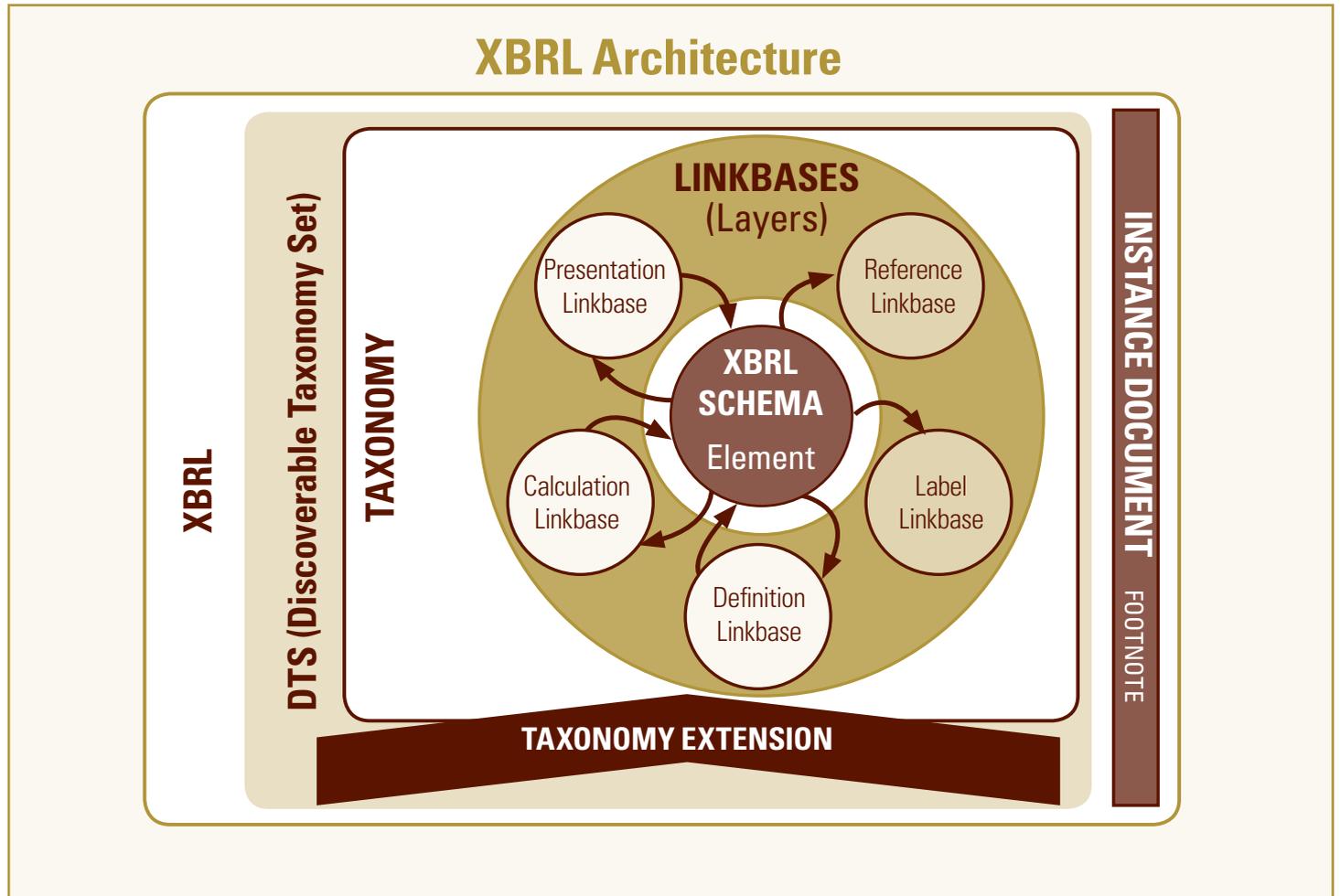
XBRL and financial interactive data

XBRL has continued to evolve since its early roots in financial reporting. XBRL has been designed to be relatively generic and has potential for cross-industry use; in addition, the recent addition of XBRL features such as dimensions and formulas positions XBRL well as a standard multidimensional modeling language.

The banking industry took an early lead in defining industry-specific XBRL taxonomies. The Common Reporting framework (COREP) and the Financial Reporting framework (FINREP) were designed specifically for the European banking industry and have been successfully deployed in that region. The U.S. Federal Deposit Insurance Corporation (FDIC) has also been successfully using XBRL for banking call reports, enabling more than 8,000 banks to file in a more automated fashion. Along with the management benefits that FDIC has derived internally from XBRL, it has improved the banking industry and its transparency to the financial markets.

More recently, public financial reporting has taken a huge step forward with entities like Japan's Financial Services Agency (FSA) and the U.S. Securities and Exchange Commission (SEC) progressing with their XBRL programs. SEC is taking steps toward a broad and deep XBRL framework by recommending the use of a dimension-heavy Generally Accepted Accounting Principles (GAAP) taxonomy and by proposing the use of XBRL for regulating mutual fund risk returns and credit rating reforms.

In June 2008, the SEC proposed that U.S. firms use XBRL to format their financial disclosure statements. The SEC currently endorses a phased approach to XBRL adoption, starting first in 2009 with companies that have market capitalizations in excess of $5 billion; smaller firms would have until 2011 to get XBRL-compliant. In fact, U.S. regulatory bodies have been proponents of XBRL adoption for some time. The SEC already sponsored a pilot program whereby organizations could opt to use XBRL to report their financial information.

Overall, XBRL has the potential to effect strong public policy in the scope of Basel II,[6] the Sarbanes-Oxley Act and the White House Office of Management and Budget (OMB) Circular A-123, *Management's Responsibility for Internal Control*.

The Netherlands is effectively using XBRL in many projects, including Water Management and Tax Applications. Countries like the Netherlands and Australia are moving past the single entity approach and building shared services that support XBRL. This gives them a foundation for many other PBM applications within participating entities and the adoption of process-based financial reports.

XBRL for process-based financial reporting: a suggested model

The reporting model that fits the needs of process-based financial reporting in the public sector could best be described as "an information supply chain based on a shared services model with a service-oriented architecture." XBRL could be the carrier of the information supply chain. The concept of an information supply chain emphasizes the notion that information is portable and can be "reused," which is to say, it is not just gathered and provided once, but is passed along a chain of interested parties.

XBRL and process-based reporting opportunities

Over the past decade, the following have become clear:

- Structured processes, such as the government budgetary cycle, are part of a larger financial reporting framework slowly coming into our vision across many governments.

- Increased need for transparency and increased capabilities for collaboration among governments, businesses and citizens will continue to put pressure on all aspects of reporting to adopt data standards, likely XBRL.

- A tighter relationship, such as that required between budgetary formulation and budget execution, enabled by XBRL, will allow for easier budget modifications and changes in spending and cost containment practices.

- Structured budgetary information will continue to expose the need for enhanced key performance indicators (KPIs) within operational systems. This top-down viewpoint confirms the importance of structured budgeting using a technology enabler such as XBRL.

XBRL has the potential to become the financial and performance management reporting language of the future. However, to get real value from XBRL, entities may need to tag their data from within a PBM environment that offers the processes and controls necessary to keep information secure, accurate and consistent while providing traceability of compliance steps. Entities that take the initiative to build a PBM solution that includes financial governance, risk management and compliance applications add even more trust and security to the statutory reporting process because they make more visible the controls and processes that create and validate financial statement numbers. This data architecture is transparent enough to allow CFOs, financial managers, budget directors and even program managers to see deep into the numbers, gain confidence, report faster and make better decisions.

In the future, there will be great opportunities to leverage XBRL through the adoption of subsets of the XBRL standard, such as XBRL GL (General Ledger). Because XBRL GL starts with a common representation of business documents (such as purchase orders, invoices and checks), it provides a single framework for representing data as they flow from system to system. Ultimately, this is expected to create a seamless audit trail for financial, tax, statutory, statistical and management reporting.

This is where the link between the FEA, performance management, process-based reporting and the use of XBRL comes full circle. As more private and public sector organizations adopt these standards, transparency and process alignment to budgets and expenses will improve. This will yield better awareness of the data, better intelligence and (ultimately) better enterprisewide performance and better decision-making. This, in turn, yields better results for public sector organizations and their constituents and citizens.

PBM technology guide

Plans, budgets and audits uphold an entity's accountability to taxpayers. To support these critical activities, many entities rely on data from multiple, conflicting spreadsheets and siloed enterprise resource planning (ERP) and transactional systems. Some agencies employ performance measurement and/or financial applications and even analytics, but use these technologies in isolation from each other. In contrast (as seen in *Figure D-1*), performance-based management (PBM) integrates strategic, performance, financial and analytical data and produces reports that are effective, efficient and repeatable.

This appendix will highlight technologies and examples employed to help entities implement a PBM solution to improve performance and foster confident decision making. The resulting PBM information can be distributed in many different ways and formats, such as dashboards, scorecards and strategy maps.

Strategic and performance measurement applications

These applications help people to support their entities' missions and execute strategies. They:

- Articulate and communicate agency goals and the initiatives that support them.
- Monitor performance of programs, tactics and activities and their support of goals and mission.
- Provide context or relevance to programs, performance and resource use.
- Identify where problems exist and alert management to needed action.
- Ascertain program effectiveness, using outcomes and outputs.
- Increase accountability, collaboration and transparency of all program aspects.

Figure D-1: Example of an integrated PBM-type report created with strategic performance, financial, analytic and data management applications

See Figure D-5 for detailed view

See Figure D-4 for detailed view

See Figure D-2 for detailed view
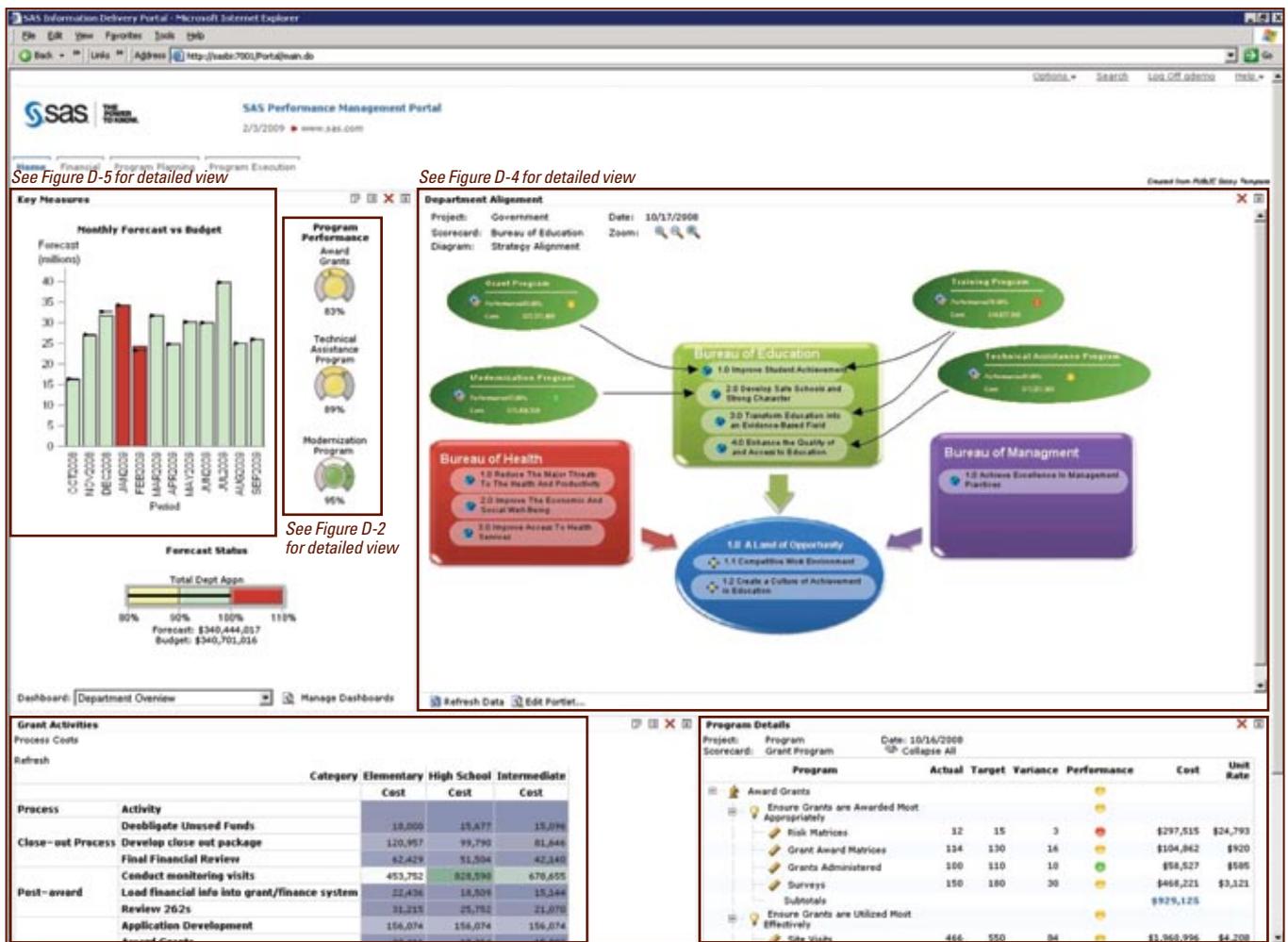
See Figure D-7 for detailed view

See Figure D-3 for detailed view

APPENDIX D

Here are some examples of the information delivered by strategic and performance measurement applications:

- A large government organization gathers and analyzes real-time performance information, then shares it with internal and external stakeholders across multiple channels.
- A parolee/offender supervision agency assesses risk and manages performance, alerts case officers to potential offender recidivism and recommends appropriate interventions.
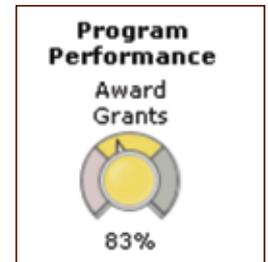
Figure D-1 shows strategic performance, financial, analytic and data management applications integrated into one view. *Figures D-2, D-3* and *D-4*, which show some of the components of *Figure D-1*, are discussed below.

Dashboards (*Figure D-2*). A favorite of managers, dashboards provide a quick overview of what is happening within an organization, surfacing performance and financial information relevant to the user.

Scorecards (*Figure D-3*). Although these provide a snapshot of performance as well, scorecards like that in *Figure D-3* are primarily used to manage performance more strategically, charting progress toward specific objectives. They show how well agencies are executing on objectives and how performance and activities are interrelated. They also alert management to underperformance or other issues, when needed.

Figure D-2: Element of a dashboard

Figure D-3: Scorecard containing program details tying cost and performance

Program	Actual	Target	Variance	Performance	Cost	Unit Rate
Award Grants				🟡		
Ensure Grants are Awarded Most Appropriately				🟡		
Risk Matrices	12	15	3	🔴	$297,515	$24,793
Grant Award Matrices	114	130	16	🟡	$104,862	$920
Grants Administered	100	110	10	🟢	$58,527	$585
Surveys	150	180	30	🟡	$468,221	$3,121
Subtotals					$929,125	
Ensure Grants are Utilized Most Effectively				🟡		
Site Visits	466	550	84	🟡	$1,960,996	$4,208
LOA Loaded	200	250	50	🔴	$56,088	$280
262s Reviewed	1200	1500	300	🔴	$78,036	$65
Grants Terminated Prematurely	5	5	0	🟢		
Subtotals					$2,095,120	
Efficient Grant Administration				🔴		
Unobligated Funds	84	100	16	🟡	$48,773	$581
Final Reports	200	250	50	🔴	$156,073	$780
Closeout Packages	100	150	50	🔴	$302,392	$3,024
Grantee Satisfaction	6	12	6	🔴		
Subtotals					$507,238	

Program Details — Project: Program — Date: 10/16/2008 — Scorecard: Grant Program — Collapse All

Refresh Data   Edit Portlet...

Appendix D

Figure D-4: Strategy map/relationship diagram
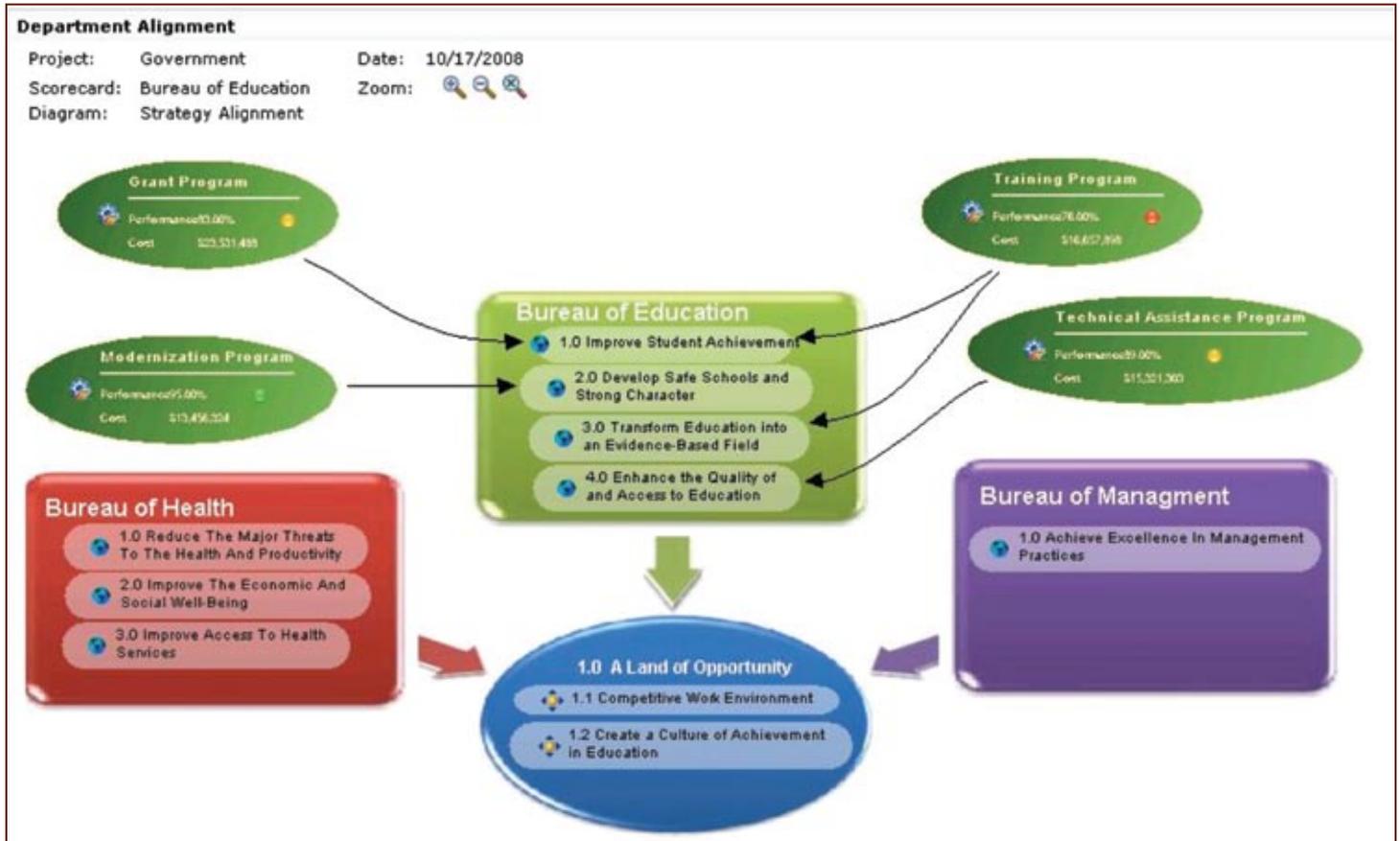
Figure D-5: Example of budgeting and planning: forecast vs. budget for all offices and programs
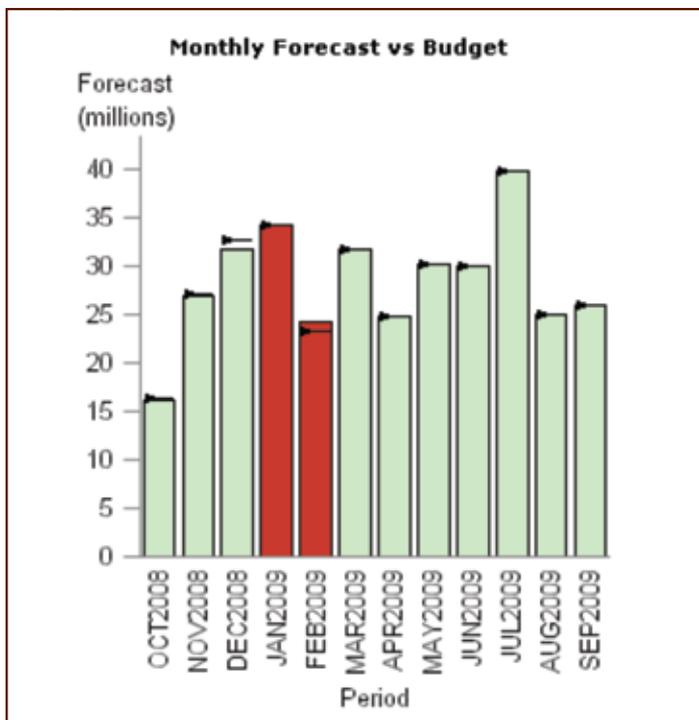
- **Strategy maps or relational diagrams (*Figure D-4*).** These diagrams surface activities and indicators from various parts of the entity, their interrelations and their support of the organization's mission to provide a visual macro view of an organization's strategy. Strategy maps and relationship diagrams show how department strategies are supported by bureaus that are related to programs. Programs are the means to carry out the desired strategy.

Financial applications

Financial applications ensure that financial reports are accurate, comprehensive, consistent and auditable. They:

- Automate and speed the consolidation process.
- Increase budgeting process efficiency, accuracy and consistency.
- Improve auditability and financial and process transparency.
- Provide more frequent, accurate forecasts.
- Help agencies control costs and understand why costs are incurred.

Figure D-6: Financial consolidation and reporting example: detailed financials

Government in the 21st Century	Department/Agency/Reporting Entity Consolidated Balance Sheet For Dept.: Bureau of Education As of: March 2009	
	Current year	Prior year
Assets (Note 2)		
Intragovernmental		
1. Fund Balance With Treasury	$37,714,696,906	$33,297,636,674
2. Investments	306,610	204,995
3. Accounts Receivable	246,063	83,661
4. Loans Receivable	93,645	31,039
5. Other	32,133	10,925
6. Total Intragovernmental	*37,715,579,556*	*33,298,070,095*
7. Cash	47,695,156,679	42,109,237,428
8. Invesments	16,134,414	14,244,796
9. Accounts Receivable, Net	447,637,006	395,211,121
10. Taxes Receivable, Net	1,449,649,415	1,200,047,231
11. Loans Receivable, Net	7,624,612	6,906,392
12. Inventory and Related Property		
13. General Property, Plant and Equipment	104,191,595	91,966,976
14. Other Assets	1,381,004	1,219,265
15. Total Assets	**$87,437,354,281**	**$77,116,903,304**

Here are some examples of the information delivered by financial applications:

- A state department of transportation aligns activities with a realistic picture of costs and value, ultimately saving more than $2 million annually.
- A state museum performs sophisticated budgeting and long-range planning, tracking expenses on multiyear projects and passing a recent audit with no adjustments.
- A branch of the U.S. military reduces costs and cycle times needed to justify requirements, trimming 565 person-hours for a 42 percent reduction in cycle times within one year.

Financial budgeting and planning. These applications let an entity create budgets, plans and forecasts that can easily be updated. They automatically track changes to source data and classify and track data from source-data systems or data-entry forms. This promotes transparency between source data and the final consolidated results or between plans and budgets. This technology also supports rolling forecasts, top-down and bottom-up budgeting and budget-cycle seeding, and it has capabilities for workflow control (see *Figure D-5*, which is also an element of *Figure D-1*).

Financial consolidations and reporting (*Figure D-6*). These applications provide a transparent environment for managing financial and operational data to produce timely, accurate and relevant reports. Transparency is achieved by extending control of information horizontally across the enterprise and vertically between transaction-oriented systems and the higher-level financial management system. (*Figure D-6* is not included in the information contained in *Figure D-1*).

Activity-based costing (*Figure D-7*). Activity-based costing (ABC) helps agencies understand the true costs of programs and services and who is consuming these services by accurately measuring the cost and performance of resources, activities and cost objects (outputs). Similar cost analytics software can provide accurate cost calculations based on the rule-driven allocation of expenses and revenue down to the lowest level: the individual transaction. With this complete, accurate and detailed view of costs, agencies can streamline processes and reduce costs.

ABC model (*Figure D-8*). The activity cost analysis shown in *Figure D-7* is based on an ABC model such as that shown in *Figure D-8* (this is not an element of *Figure D-1*). Building such a model begins with a definition of "resources," usually the chart of accounts, rolled up into a departmental or other hierarchical structure. The next step is to define the activities within the system. Resources (costs) are then allocated to activities, based on the cost drivers identified. Finally, the cost of an activity is allocated to "cost objects" (such as services) based on the consumption of the activity (that is, driver volumes).

Figure D-7: Activity cost analysis by category

Grant Activities

Process Costs

Refresh

Process	Activity	Category		
		Elementary	High School	Intermediate
Close out process	Deobligate unused funds	$18000	$15,677	$15,096
	Develop closeout package	120, 957	99,790	81,646
	Final financial review	62,429	51,504	42,140
Post-award	Conduct monitoring visits	453,752	828,590	678,655
	Lead financial info into grant/finance system	88 ,406	10 ,509	15,144
	Review 262s	31 ,215	25,752	21,070
Pre-award	Application development	156 ,074	156,074	156,074
	Award grants	23,411	19,314	15,802
	Grant award recommendations	36,794	36,794	31,275

Figure D-8: Activity-based costing model
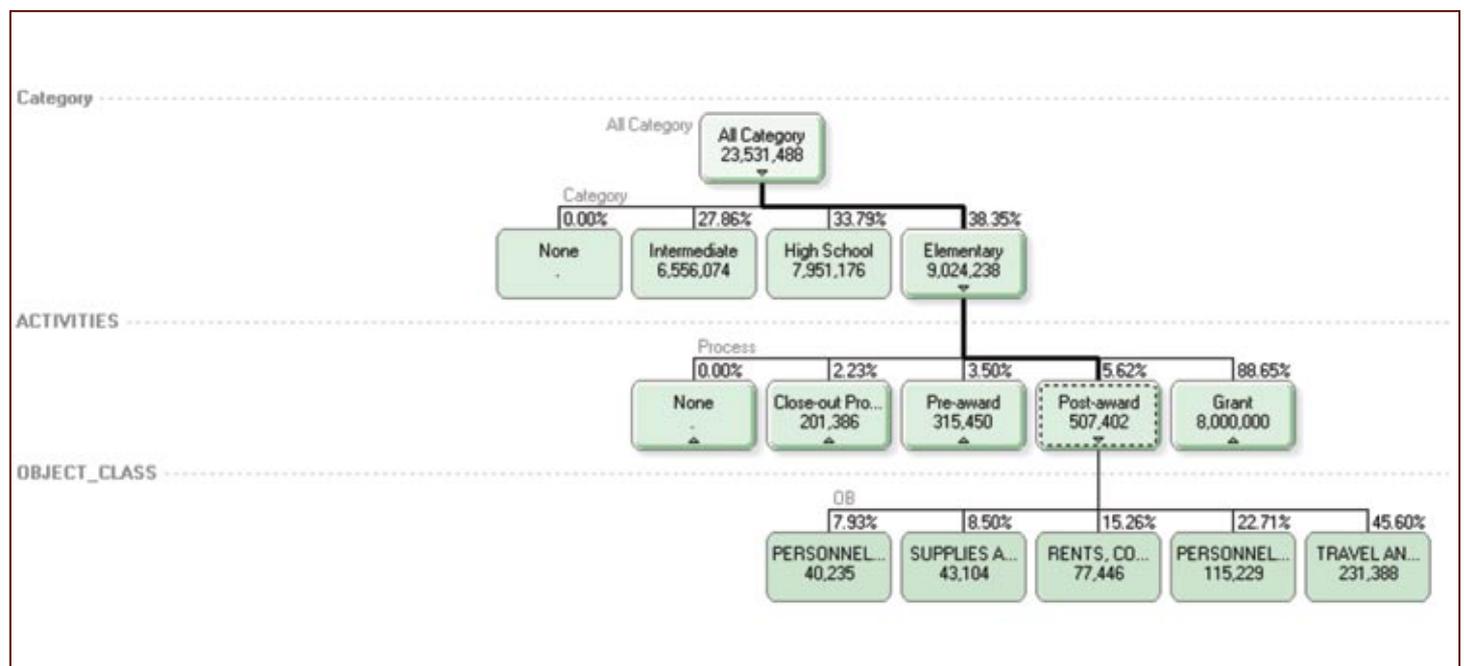
Analytic applications

These applications provide insight to support confident decisions. They:

- Analyze trends
- Identify, understand and reduce process variability
- Find hidden patterns/reveal opportunities
- Forecast and predict events
- Identify problem root causes and their effects
- Determine the best course of action, given objectives, constraints, data available and decisions that can be made

Some examples of the use of analytic applications include:

- A Defense agency discovers anomalies or indications of warnings that a computer network attack may occur, halting attacks in progress and predicting and preventing future attacks.
- A state personnel office helps build talent supply ahead of demand by predicting departures, retirements and vacancies and developing work force plans to fill them.
- A division of the Department of Health and Human Services identifies correlations between chronic diseases like diabetes and hypertension, as well as alcohol abuse and methamphetamine abuse, improving intervention and prevention efforts.

- A large government organization analyzes inventory across the field to reduce costs, increase storage space, decrease management and forecast future needs, synchronizing supply with maintenance changes.
- Implementing a corporatewide Six Sigma strategy, a large manufacturer improved throughput, output and quality. In less than two years, this generated a direct return on investment of $14 million and an additional $1.5 million on other projects.

Analytics. There is a wide and varied set of analytic tools that meet a host of business issues. These include predictive analytics and descriptive modeling, data mining, text mining, forecasting, optimization, simulation, experimental design and more. Leading to new insights, analytics provide a range of techniques and processes for the collection, classification, analysis and interpretation of data to reveal patterns, anomalies, key variables and relationships. *Figures D-9* and *D-10* are examples of analytics that support performance-based management reporting.

Statistical process control (SPC). SPC helps organizations to reduce variability and optimize processes. Beyond basic process control, it incorporates more advanced statistical analyses for additional insights into processes and improvement opportunities. As part of an ongoing cycle of continuous process improvement, SPC can help you fine-tune your processes to the virtually error-free Six Sigma level.

Figure D-9: Example of forecasting chart
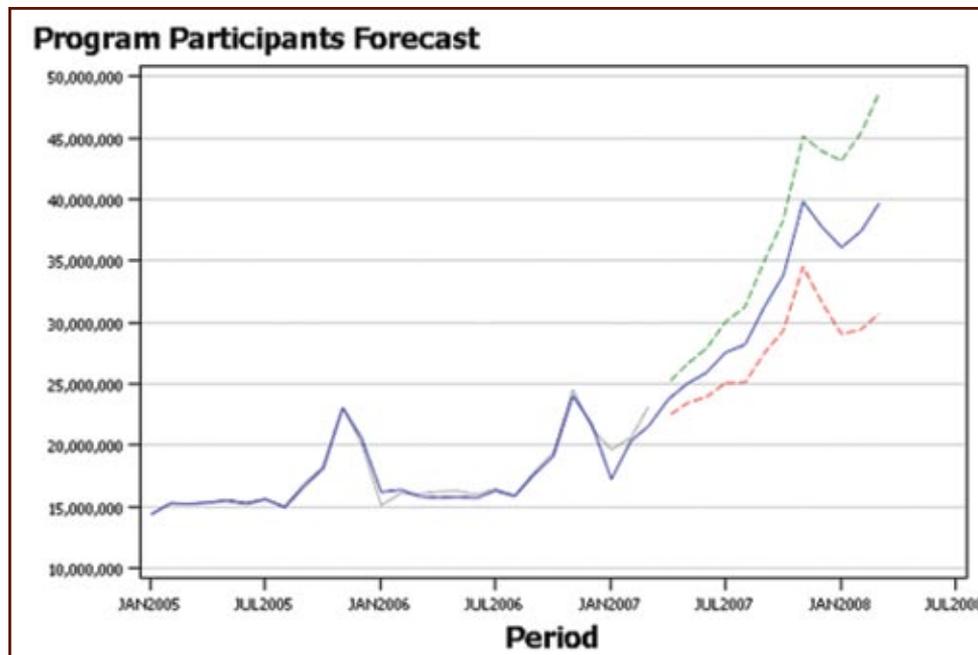
APPENDIX D

Measuring and reporting process variation together make up an important part of SPC, Six Sigma and PBM. When a process varies erratically in cycle time, unit cost or other measures of quality or efficiency, it is said to be out of control, and any attempt to improve it will likely fail. When a process performs in a consistent manner (i.e., its variation is within normal bounds and regular), it is said to be in control. Processes that are in control can be improved, and one of the indicators of this improvement is less variations.

Because variation is so important, one of SPC's key tools is the control chart. A control chart can show how consistently a process is performing, compares process performance to requirements, and provides an index of process capability as an ongoing, accurate direction for quality improvement. Control charts and process capability indices also evaluate the results of initiatives designed to improve a process. For example, *Figure D-10* is a control chart showing variation before and after a change or improvement to a process that is in control. After the change, there is less variation in the process, while the average level of quality (the solid black line in the middle of the figure) has increased.

Multivariate analyses. These analyses include many methods for modeling data with two or more independent variables or for identifying relationships among several variables without designating particular ones as response or explanatory variables.

Data management

Data management applications provide a foundation of transparency and consistency. They access data from many and diverse sources, including spreadsheets, reporting applications, ERP, and transactional and third-party sources (such as benchmarking data). These applications also clean, rationalize and normalize data to remove redundancies, inaccuracies and inconsistencies. XBRL is a component of PBM data management.

Examples of data management include:

- A major hospital integrates and analyzes data from 29 sources and communicates strategy and performance measures so that front-line health care providers can immediately act on adverse trends and can see how their daily work supports patient care and the hospital's strategy.
- A local government agency combines and analyzes information from several sources to provide critical, strategic work force intelligence to aid in collective bargaining with unions and in outside "on-the-fly" contract negotiations.

Data management comprises several technologies and processes, including, but not limited to, data integration, quality, integrity and enrichment. Using data management technology, organizations can transform and combine disparate data, remove inaccuracies, standardize on common data definitions, parse values and cleanse dirty data to create consistent, reliable information.

Figure D-10: Control chart showing variation before and after a change or improvement
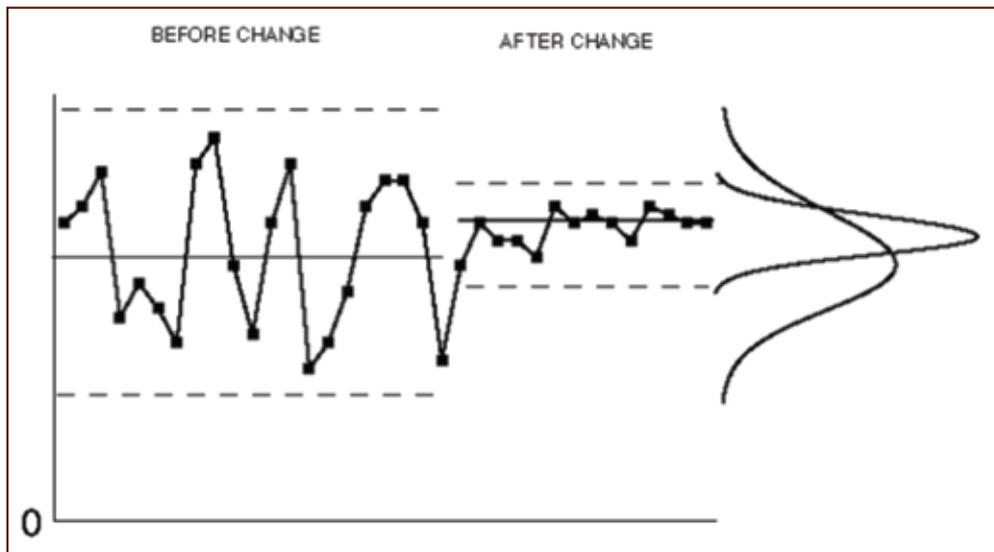
A wide variety of benefits

Using PBM and the just-described applications, government can take a truly integrated approach to PBM to:

- Adjust priorities and resource utilization to save money while supporting the mission.
- Improve financial transparency and accuracy.
- Create budget requests that take into account the required funding, plus the outputs and outcomes they expect to produce as a result of that funding.
- Reduce costs and optimize spending and process efficiency.
- Identify the causes of underperformance with root-cause analysis.
- Detect previously unknown patterns that might indicate cause-and-effect relationships and relative strength between measures.
- Expose which "key" performance indicators really are important, what drives them, how they influence each other and how they contribute to organization-level goals.
- See future possibilities sooner and set course accordingly.
- Predict what will likely happen (such as the age distribution of the work force in five years).

- Analyze scenarios, run simulations and model the impact of decisions.
- Perform what-if analyses to gauge potential outcomes based on different scenarios.
- Optimize processes and program effectiveness by identifying the best possible path, given objectives, available data and constraints.
- Establish a financial linkage to long-term efforts in achieving an entity's vision.

Applications enable full power of PBM

As discussed throughout this report, the data needed for effective performance-based management already exist within most government databases, but is hard to pull together and use. As Appendix D and *Figure D-11* show, the software applications just discussed are what bring together the data and transforms them into valuable information for decision making. Like the data, these applications already exist, are widely used and help deliver results in government and industry alike. PBM is the way to harness both these resources to achieve better and more cost-effective government service.

Figure D-11: The data sources and software of performance-based management
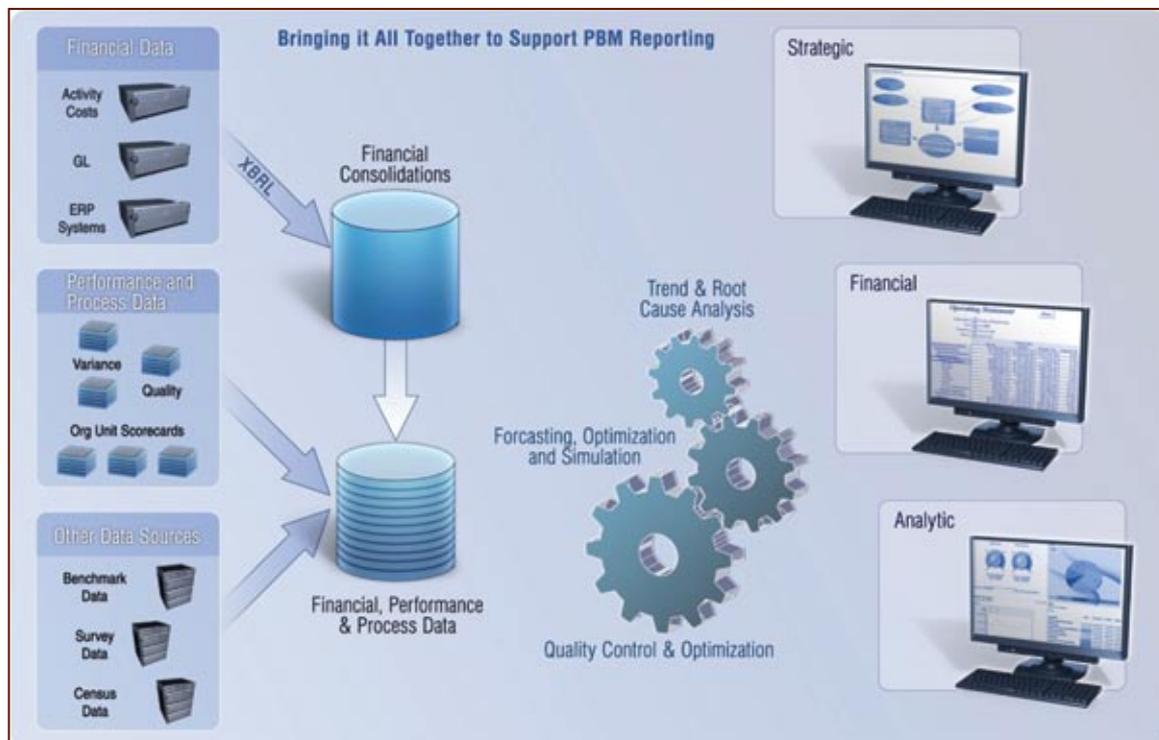
End Notes

1. According to AGA, "[C]itizen-centric based reports detail government finances in a visually appealing, clear and understandable four-page document. The suggested format shows community information—such as population figures, regional characteristics and government goals for the community—on the first page, and the second page presents a performance report on key missions and service. The third page details cost and revenue information, and the fourth looks forward to the year ahead." (For more information, go to http://www.agacgfm.org/citizen/.)

2. Process variation is a statistical measure of the deviation from the norm of process performance. All processes vary, and the amount of variation affects process efficiency and effectiveness. On average, a stable process has minimal variation, producing the same result at the same cost during the same cycle time. Process variation is influenced by many factors, referred to as "cost and performance drivers." Improved performance comes from improving by adjusting to the drivers that cause process variation. (For more information, see Statistical Process Control in Appendix D.)

3. Control charts are tools used to distinguish between normal and abnormal variation in a process; they show if the process is performing correctly or if there is a problem.

4. Portions of this appendix are from "Performance-Based Federal Financial Reporting (PBRL) and eXtensible Business Reporting Language (XBRL)," by Sunil Datt, Luther Hampton, Mike Rowling and Steven Feller of IBM Global Business Services, September 2008.

5. The FEA actually comprises several additional models; these models contain supporting information and have been omitted to keep the discussion simple.

6. Recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision in 2004. Basel II creates an international standard that banking regulators can use when formulating regulations on the amount of capital that banks must to put aside to guard against financial and operational risks.

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