DEPARTMENT OF HEALTH AND HUMAN SERVICES

ADMINISTRATION FOR CHILDREN AND FAMILIES

COMPANION GUIDE

COST/BENEFIT ANALYSIS ILLUSTRATED

AUGUST 1994

PREFACE

This *Companion Guide* was prepared in response to the requests of State professionals, especially those who participated in the State Cost/Benefit Workgroup. In particular, the workgroup requested that ACF provide examples of a cost/benefit analysis, prepared under the general guidelines of the *Feasibility, Alternatives, and Cost/Benefit Analysis Guide* issued initially by ACF in 1992. In addition, ACF developed a prototype set of spreadsheet templates and macros (with brief instruction sheet) to automate the development and production of cost/benefit analysis reports recommended by the Guide. These templates are available in Lotus 1-2-3™, Microsoft Excel™, and Borland Quattro-Pro™ formats. They are recommended only for experienced users since ACF can provide only limited phone support.

This *Companion Guide* provides a *generic* cost/benefit analysis. It does not attempt to address program-unique costs and benefits. It does serve to illustrate how a cost/benefit analysis is developed and documented to justify a proposed systems project.

ACF welcomes suggestions from those using this guide. After all, the true test of any manual is how well it supports analysts in the performance of their assigned tasks and whether it remains relevant and useful.

An *Evaluation, Comments, and Suggestions* form is included in Appendix A to this Guide. Comments and requests for information (including the spreadsheet templates) may be directed to:

Department of Health and Human Services
Administration for Children and Families
Director, Office of Information Systems Management
370 L'Enfant Promenade, SW
Washington, DC 20447-0001
(202) 401-6960

ACF would especially like to thank the participants of the State Cost/Benefit Workgroup for their participation and suggestions in support of the development of this guide.

Introduction and Purpose

"Measure a thousand times, and cut once" — Ancient Turkish Proverb

The Office of Information Systems Management (OISM) of the Administration for Children and Families (ACF) has a continuing interest in helping States to improve the quality and usefulness of the plans and studies that support their development of public benefit information systems. To this end, OISM has published the *Feasibility, Alternatives, and Cost/Benefit Analysis Guide* (the Guide), has sponsored State systems planning working groups, has developed a set of model spreadsheet templates for cost/benefit analysis, and has prepared cost/benefit training materials.

To augment these efforts, *and especially to respond to suggestions and comments by State working group participants and reviewers of draft versions of the Guide,* OISM has developed this *Companion Guide: Cost/Benefit Analysis Illustrated.* This optional guidance is intended to respond to the State working group's request for:

- Examples of sound cost/benefit studies,
- Clarification of what is required by law and regulation to be submitted to ACF,
- Differentiation between what may be developed and held in State files and what is submitted,
- Additional guidance in the area of developing benefits, and
- Further information on reporting actuals against a baseline.

This *Companion Guide* is, in a sense, four documents in one.

Chapter 1: Introduction and Purpose. This introductory chapter provides general information to supplement the information presented in the Cost/Benefit Guide. It also provides a section on developing benefits.

Chapter 2: Sample State Documentation. This chapter provides an example of a cost/benefit study prepared by a State and maintained in State files. It simply serves to

illustrate, when compared to Chapter 3, that the information submitted to ACF can be a summary of or extracts from the State's study.
This section in no way implies a standard, approach, or format that States must use.
Chapter 3: Sample State APD Documentation. This chapter provides an example of the part of the Implementation APD which addresses cost/benefit analysis. This example illustrates the summary or key information that ACF considers important. Among the most important factors are:

- Detailed descriptions of benefits, and
- Clear establishment of a baseline for later cost/benefit measurement and reporting.

This guide does not mandate a format. It does illustrate a sufficient level of detail for ACF's purposes since this section (and the other chapters) underwent review in ACF's program offices.

Chapter 4: Sample State APDU Documentation. This chapter is an example of a cost/benefit measurement report. It is written as though reporting in the second year of the project described in Chapters 2 and 3. This clarifies the relationship between the planning stage studies and the post-implementation measurement and reporting phase.

This *Companion Guide* stresses the importance of *completeness*, *reasonableness*, and *internal consistency* in a cost/benefit analysis. It is intended as a companion to the Guide, and not as a replacement. The Guide remains the definitive ACF reference on the subject of cost/benefit analysis to support State public benefit information systems advanced planning.

Definitions and Clarification of Terms . . . Not Policy

Cost/benefit analysis for public benefit information system planning purposes overlaps two distinct philosophic disciplines: economics and finance[1]. Each of these disciplines has been (and continues to be) the subject of tremendous volumes of research by academics and corporate and government scientists. As a result, and especially when discussions of cost/benefit analysis refer to these academic roots,

[1] Of course, to a lesser extent it also involves the disciplines of politics, sociology, computer and communications sciences, psychology, probability, statistics, etc.

endless nuances and subtleties, complex formulas, and difficult jargon can become involved.

Practical cost/benefit analysis is, at its heart, based on a simple, fair, common sense approach to comparing alternatives. However, because cost/benefit analysis usually involves evaluating monetary costs and benefits *over time*, some basic rules for handling such "time distributed" monetary values must be applied. Beyond these basic rules (which are discussed further below), practical cost/benefit analysis involves no more than basic arithmetic: adding, subtracting, multiplying and dividing.

The *Feasibility, Alternatives, and Cost/Benefit Analysis Guide* is based on methodologies and formats in current and common use within the Federal government. Most of the terminology in the Guide derives from the usage within Office of Management and Budget Circulars[2]. OMB Circulars are the primary vehicle by which the Executive branch establishes and disseminates Federal agency management policies that derive from Public Laws.

OMB identifies cost/benefit analysis as the recommended technique to use in formal, economic analysis of Government programs or projects. In this context, it is *social net benefits*, and not the benefits and costs to the government, that should be used as the basis for evaluating alternative approaches. This means that system benefits are evaluated not just from a State or Federal perspective, but also from a public perspective as well. What benefits accrue to citizens?

OMB also defines a less comprehensive approach, called cost-effectiveness analysis. An alternative is *cost-effective* if it costs the least of the alternatives, for a given amount of benefits. Cost-effectiveness analysis is appropriate when the benefits from competing alternatives are identical, or where a given level of benefits must be provided as the result of a specific new legislative or policy decision. Cost-effectiveness analysis is a one-sided cost/benefit analysis: only costs are analyzed.[3]

For ACF and most organizations, the standard metric for cost/benefit analysis of alternatives is

[2] In particular, OMB Circular No. A-94: *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, 57 Federal Register No. 218, November 10, 1992.

[3] Note that this paragraph discusses OMB's policy on cost-effectiveness analyses conducted by Federal agencies — not ACF's for the States. Federal cost-effectiveness analysis is most typically used in weapons acquisitions.

net present value (NPV). NPV is simply the difference between total projected benefits and total projected costs, and may be referred to as net benefit (or net

cost). Note that NPV may be negative (a net cost) for one alternative, and positive (a net benefit) for another alternative.

Another term sometimes used is return-on-investment (ROI). (The Guide uses the term benefit-cost ratio.) ROI is expressed as a percentage or a ratio — total projected benefits divided by total projected costs. If the NPV is positive, ROI will be greater than one and a net benefit results. A negative NPV means an ROI of less than one (and a net cost). Because the NPV incorporates a discount factor (to account for the time value of money, as noted above), sometimes a third metric, internal rate of return (IRR) is applied. The IRR is the value of the discount factor that results in an NPV of zero (that is, when projected total benefits *equal* projected total costs).

Although a positive net present value cannot always be demonstrated for all alternatives, efforts to measure it can produce useful insights, even when the monetary values of some benefits cannot be determined. Enumerating such benefits (e.g., in terms of clients served) can be helpful in identifying the full range of program effects, even if they cannot be assigned a dollar value, or monetized.

On the Importance of Being Consistent

Perhaps more important than the form and content of a cost/benefit analysis is its internal consistency.

If a cost/benefit analysis does not demonstrate internal consistency, nothing else matters; its results are meaningless. Internal consistency depends entirely on two things: that costs and benefits are assigned properly, and that the time value of money is considered.

Costs and benefits are assigned properly if nothing significant is left out, nothing that doesn't belong is included, and nothing gets counted twice. The Guide provides an outline of typical cost and benefit factors that *may* appear in a cost/benefit analysis; of course, any and all other significant factors should be included and explained as well. The things that don't belong in a cost/benefit analysis are the things that have already been paid for, and the gains that have already been achieved[4]. Counting

[4] Generally referred to as "sunk costs" and "realized benefits", respectively.

things twice often results when a cost or a benefit is included in two or more

categories, or when a cost or benefit that is included within a larger factor is included again, as a separate factor.

Future costs and benefits can be presented in terms of today's prices or in terms of future (inflated) prices. Using today's prices (called constant or real dollars) rather than future prices (called current or nominal dollars) is the generally preferred approach for planning purposes, since inflation is so difficult to predict. Whichever approach is selected *must* be applied **consistently** throughout the analysis.

The time value of money must be accounted for **consistently** throughout a cost/benefit analysis. Regardless of whether constant or current dollar values are used, a *discount factor* should be applied to future costs and benefits. The discount factor reflects a basic principle of economic analysis — that money today is worth more than money in the future. Because the most obvious effect of this economic principle is on interest rates, the discount factor is sometimes described as reflecting the impact of interest rates on future costs and benefits.[5] The 7% discount rate recommended for use in the Guide is based on the assumption that States will use constant dollars and that the systems will generate public benefits.[6]

Much of what comprises a cost/benefit analysis is presented in the form of spreadsheets or tables. The information is derived by calculation, applying formulas or rules to a given set of input values. It should be possible for an analyst to recreate the basic results of any internally consistent cost/benefit analysis by starting from only the initial values, assumptions and formulas that were used in that initial analysis. OMB puts this point more succinctly in Circular A-94: "Measures should be consistent with basic economic principles and should be replicable."

About the More Sophisticated Techniques

As noted above, new, advanced methods and techniques for cost/benefit analysis are constantly

[5] Note, as a point of interest only, that the discount factor used in a nominal (current) dollar analysis will be different from that used in a real (constant) dollar analysis.

[6] The foundation for the 7% policy is OMB Circular A-94.

being introduced, discussed and refined. Sometimes these techniques have a practical application to cost/benefit analysis for systems planning; often they add little in the way of new information or insights, and sometimes they serve only to confuse matters.

These techniques may involve:

- Using functions to estimate uncertain risks;
- Weighting benefits according to their relative importance;
- Evaluating external economies and diseconomies, spillovers or externalities;
- Measuring excess burdens or deadweight losses;
- Estimating prices absent market distortions such as excess burdens and externalities (shadow prices);
- Estimating willingness to pay; or
- Other methods or algorithms for financial or economic analysis.

Traditionally (and as is true in most areas of human endeavor), the new techniques that have real value find their way into the mainstream of practical cost/benefit analysis, while the questionable or overly complex techniques get left aside.

The bottom line: If you understand, and can explain, and can defend the use of these techniques in your cost/benefit analysis, and if they provide useful additional information, then use them. Otherwise, don't.

How much effort is all this worth?

One of the most frequently asked questions by analysts responsible for cost/benefit analyses is "how detailed does this thing need to be?" Put another way, how does one determine the "appropriate" scope or level-of-effort for any given cost/benefit analysis?

There are three traditional answers to the question of scope:

- Conduct a cost/benefit analysis with detail commensurate with the size and

scope of the acquisition.

- Make it as complete and detailed as it needs to be to support the decision it is intended to support.

- Spend up to 3% of the total projected system cost on planning (including needs, feasibility, alternatives, cost/benefit, risk, and requirements analyses).

Applying the "3%" rule: If the system is estimated to cost in the $6,000,000 to $8,000,000 range, the supporting analyses "should" cost from about $180,000 to $240,000. Cost/benefit analysis may comprise as much as 15% of the total initial planning effort, or from about $27,000 to $36,000 in this example. If a planning analyst receives $40,000 per year in salary and $20,000 per year in benefits, the total level of effort (in time) for the cost/benefit analysis should be from about 23 work weeks up to about 31 work weeks.

From another perspective, before any manager signs off on a plan to spend five or ten million or more taxpayers' dollars, he or she is going to want to see ample evidence that alternatives, costs, and benefits were analyzed, weighed, *and documented* carefully and completely.

Further, ACF emphasizes the importance of tracking and reporting "actuals" — the real costs and benefits that result from implementing a new public benefit information system. In order for the actuals to have any value or meaning, there must be a reasonably detailed "forecast", or pre-implementation cost/benefit analysis.

Assembling Data

A cost/benefit analysis can be no better than the basic numbers that are used to build it. In fact, a cost/benefit analysis can be *internally consistent* (see above), and yet be *practically useless* if unreasonable starting numbers were used.

After ensuring that a cost/benefit analysis is internally consistent, reviewers evaluate the *completeness* and *reasonableness* of the costs and benefits that are presented. Costs and benefits are complete when all significant factors have been identified and evaluated. Costs and benefits are reasonable if their sources and bases are clearly identified, explained and justified. As a rule of thumb, costs are simpler to identify and quantify than benefits, and require less in the way of explanation and justification. For example, new system hardware and software costs

usually are readily available, in adequate detail, from interested vendors. On the other hand, benefits are often speculative or uncertain and must be developed and documented carefully for inclusion in a cost/benefit analysis.

A good way to start is to assemble the team (sometimes a team of one!) that is to be responsible for developing source information. Make sure that the right people inside the organization are aware that a study is underway, and that they know who will be contacting them for information, and when. Much useful information can be developed through interviews or other survey techniques. Often, important cost or benefit factors will be identified by program managers or proposed system users that would not otherwise have been considered. As one member of such a cost/benefit analysis study team noted:

> *We had trouble with intangibles. Everybody had a gut feeling that we needed to do something, but they all wanted numbers before reaching consensus. So we went to the experts — the managers and users in areas affected by the project. We developed the benefits with their help. The final numbers stood up because of their source.*[7]

Cost information sources include internal budget, finance, operations, and human resources cost records and reports; reports to the public and outside organizations; management and staff directly, by interview or survey; commercial research organizations, such as DataPro or Gartner Group; and external information sources, such as other government organizations or vendors.

Benefit information sources include internal budget, finance, operations and human resources forecasts, projections, record systems and reports; management and staff directly, by interview or survey; and external sources, such as other government organizations.

A particularly useful way to project quantified benefits (and to determine costs for the status quo) is to find out exactly how much time is currently being spent, by activity, by (for example) child support enforcement specialists. Another method is to use survey techniques to determine (for example) the average number of new

[7] *ROI? There is a better way.*, Marc Dodge, **Corporate Computing**, May 1993, p. 109.

cases per month, time to process new cases (by type of case), number of referrals per month, time to complete referral forms, number of "locate" cases per month, time to complete various phases of locate activity, number of paternity cases per month, time to complete, etc. These "baseline" numbers can be used to estimate the value of system improvements that reduce the time necessary to perform specific functions, and thus increase the caseload that can be handled by an average caseworker. The increased caseload can be translated into dollars as cost savings or avoidances from reduction in overtime expenditure, reduction in staff, and / or reduction in staff growth.

Remember also that benefit information does not have to be expressed in monetary terms to be useful or have value. Competing alternatives may have comparable *quantifiable* (monetary) costs and benefits, and yet differ widely in terms of non-monetary or intangible benefits.

As with most worksheet-oriented problems, an electronic spreadsheet is the ideal tool to use in developing and producing tabular reports. A spreadsheet can automate routine tasks, such as the distribution of costs over time or the generation of summary or "roll-up" views of information. To illustrate these and other capabilities, OISM has developed a prototype set of spreadsheet templates and macros (with brief instruction sheet) to automate the development and production of cost/benefit analysis tabular reports. These templates are available in Lotus 1-2-3™, Microsoft Excel™, and Borland Quattro-Pro™ formats. They are recommended only for experienced users since ACF can provide only limited phone support.

Developing Benefits

Cost/benefit analysis in the private sector is normally concerned with determining whether expenditures will result in increased income. The effect on the bottom line is the primary concern. What net profit will result?

Only a handful of federal programs can conduct cost/benefit analyses as "profit" decisions — notably, the IRS and the Child Support Enforcement Program. These organizations generate collections (income) that offset (in a sense) the costs of the government's programs to collect or provide welfare support. In these systems, improved and integrated information systems can increase collections, resulting in a net gain for the government.

However, most public sector cost/benefit analysis is concerned with net program effect. The government does not charge for its services: public services or benefits are required by statute to be provided. So the government's obligation is not to maximize profit, but to make cost-effective expenditures and to deliver maximum benefits within the budget.

Therefore, most public sector cost/benefit analysis does not seek to increase program funds — but *to change the distribution of costs enough to support system development*

within the overall budgetary limitations of the organization. By this means, public agencies prove projects to be cost-effective.

ACF views cost/benefit analysis as serving four fundamental and equally important needs — to:

- Evaluate alternative mixes of financial, human, and information resources,
- Support wise economic decisions on proposed information system investments,
- Establish a performance baseline against which to measure the success of the systems project, and
- Provide fundamental management tools to maximize benefits and minimize costs.

Therefore, cost/benefit analysis is a process of developing "economic indicators" that serve as important tools in management decision-making. These economic indicators reflect how the distribution of costs change — so that the net effect on the program can be evaluated. The questions are:

- Can enough be "saved" in other categories to "pay for" the costs of developing the new system,[8] and
- Will the system project result in measurable improvements over current

[8] This process is sometimes referred to as work process re-engineering. Examples in this document include elimination of courier services and staff reassignment (Benefits 5 and 1, respectively, in Chapters 2 and 3).

operations?

Public sector cost/benefit analysis is not an accounting process. When benefits equal costs, the analysis has not proven the system will cost nothing. It has proven that the organization will remain within the overall, projected program budget — and that the projected benefits are sufficient to warrant the expenditure for the system project.

Given these precepts, ACF permits States to develop benefits in several ways, listed below in approximate order of preferability:

- Increased collections,
- Program cost savings,
- System cost savings,
- Program cost avoidances, and
- System cost avoidances.

In this context, *cost savings* apply when benefits are developed from firm, fixed costs approved in the State's law or budget (such as cost-of-living increases) or set in a contract to which the State is a party. *Cost avoidances* are more speculative and are based on reasoned projections of costs expected to develop and affect future budgets and expenditures. *The inherent nature of a cost avoidance calculation requires more rigorous analysis and justification*, because it is based on assumptions (estimated future staff needs) rather than facts (budgeted staff costs). [Compare, for example, the detail in Benefits 2 (cost savings) and 3 (cost avoidances) in Chapters 2 and 3.]

System costs are those costs that directly relate to the systems project and are included in the "cost side" of the cost/benefit analysis. *Program costs* are those *affected by the project but not obligated for the systems project itself*. Program costs are not on the "cost side" of the cost/benefit analysis, but may be the basis for claiming benefits. The table below shows the characteristics of each type of benefit.

Type of Benefit / Characteristic	Collections	Program Cost Savings	System Cost Savings	Program Cost Avoidances	System Cost Avoidances
Cost in Budget, Law, or Contract?		√	√		

Cost for System Development or Operation?			√		√
Cost for Program Operations?		√		√	
Could Affect Cost Side of Cost/Benefit Analysis?			√		√
Increased Revenues?	√				

Benefits Based on Increased Collections

For child support systems, States can base benefits on the expected effect of the new system on caseworker productivity, measured in terms of increased collections or other indicators. Claiming these benefits requires several steps, which begin during the feasibility and alternatives analysis. These steps include:

- Determining current problems and setting system objectives,
- Setting performance goals for collections or other indicators,
- Determining how the system will support the desired improvement,
- Calculating the probable effect on collections, and
- Determining how the improvement will be measured.

During the feasibility study, States identify system problems and set objectives. For example, the State could express system problems in terms of inadequate access to statewide or nationwide databases required to find absent parents, procedural or operational inefficiencies, unacceptable quality and timeliness of services to the public, or administrative overhead cutting caseworkers' available productive time. To fix those problems, the State develops objectives for the new system, such as online access to statewide and national databases, specific procedural and operational improvements, and the reduction of manual or administrative tasks that the caseworker must perform.

In order to determine how these improvements will affect performance, States must first have good information on what the current performance indicators are. These might include:

- Total successful "locates,"
- Average number of "locates" by caseworker,
- Rate of "locates" (in percentage) by total caseload,
- Average rate of "locates" (in percentage) by caseworker,
- Total collections (in dollars),
- Average collections (in dollars) by caseworker,
- Rate of collections (in percentage) by total caseload, and
- Average rate of collections (in percentage) by caseworker.

In addition, the State should collect or develop timeliness records on elapsed time until absent parents are located and until collection begins, stated in terms of time ranges. For example, the current system's "successful locate rate" is 10% within 30 days, 25% by 60 days, 40% by 90 days, and so forth.

Once the State has this information, the effect of system improvements can be evaluated and new performance objectives set which are both specific and measurable. At the same time the performance objectives are set, a plan to measure performance under the new system should be developed.

Since the cost/benefit analysis developed for this *Companion Guide* is "generic," it does not include a sample benefit for increased collections. However, States may want to consider that this benefit can be evaluated in two ways: the social net benefits[9] resulting directly from the collections and indirectly from reductions in welfare payments.

Benefits Based on Program Cost Savings

[9] OMB Circular A-94 provides: "Social net benefits, and not the benefits and costs to the Federal Government, should be the basis for evaluating Government programs or policies that have effects on private citizens or other levels of Government." ACF permits the calculation of social net benefits.

Benefits based on program cost savings evaluate the effect of the project, such as improved efficiency or elimination of costs, on currently budgeted or obligated funds.

The difference between costs budgeted for program operations under the *current* system and costs projected for program operations under the *new* system is claimed as a benefit for the alternative. This benefit helps offset the project costs.
Note that the budgeted and projected program costs are *not* included as costs in the analysis — only the difference as a benefit.

Program Cost Savings Benefits	Yes	No
Cost in Budget, Law, or Contract?	√	
Cost for System Development or Operation?		√
Cost for Program Operations?	√	
Could Affect Cost Side of Cost/Benefit Analysis?		√

An example of this type of benefit is shown in Benefit 2, set forth in both Chapters 2 and 3. In this benefit, improved caseworker efficiency supported by system improvements is expected to reduce caseworker overtime pay. The program cost savings of $150,000 are listed as a benefit. Caseworker costs are not included on the cost side of the cost/benefit analysis. See the table below.

Benefit 2 — Program Cost Savings		
Year	**Cost Side**	**Benefit Side**
1		$ 150,000
2		150,000
3		150,000
4		150,000

5		150,000
Total		$ 600,000

Benefits Based on System Cost Savings

Benefits based on system cost savings evaluate the projected effect of the project on currently budgeted or obligated funds supporting systems operations.

Examples of this type of benefit include elimination of staff positions for systems operators and programmers, lower utility costs resulting from lower power consumption, and reduced costs for space when moving from centralized to distributed processing.

There are three ways to evaluate this "benefit" in a cost/benefit analysis. None is perfect: all are acceptable.

System Cost Savings Benefits	Yes	No
Cost in Budget, Law, or Contract?	√	
Cost for System Development or Operation?	√	
Cost for Program Operations?		√
Could Affect Cost Side of Cost/Benefit Analysis?	√	

Conventional wisdom suggests that the effect of the benefit be applied to either the cost *or* the benefit side of the cost/benefit analysis, not both. Those two alternatives are addressed first.

Benefits on the Cost Side Only. If the savings were shown only on the cost side, then reduced costs for the alternative would be revealed in a side-by-side comparison of current and proposed system costs, not by reviewing the benefits identified for the system.

There are three problems with this approach.

The first is that a benefit counted in the cost side can get "lost" when combined with other cost

elements in the same category and may not be measured during systems implementation and operation. While this may not be important for low dollar cost reductions such as utility costs, it may be quite significant when professional salary reductions are involved. For example, costs for systems programmers (expected to be reduced with the new system) would be combined in the cost analysis with other personnel costs, such as system operators, data entry staff, and security officers. When costs are combined with others on the cost side and no specific benefit is claimed, they are not identified as specific measurement goals.

Benefits are not "lost" when identified on the benefits side. They become discrete, performance management goals against which improvements achieved by the new system are measured.

The second problem is that measuring a benefit on the cost side reflects only the projected cost, not the improvement achieved over the status quo by the new system. For example, if the old system required $100,000 of systems programmers and the new system is projected to require $50,000, then actual costs of $75,000 are evaluated only from the perspective of a $25,000 cost overrun above projected cost — not of the $25,000 improvement over prior system operations. This is because actuals are compared to projected costs for the alternative — not the status quo. See the table on the next page.

Third, not only is the cost reduction from the status quo not available for performance measurement, it also is not available for offsetting the system development costs. If the intent is to evaluate *overall program effect*, this method does not assess the cost savings from the old system to the new system.

While this may not matter for low dollar cost savings between cost elements, it may be quite significant in areas where major reductions are projected.

Benefits on the Cost Side Only		
For:	**Cost Side**	**Benefit Side**
Status Quo	$100,000	
Alternative*	50,000	
Actual*	75,000	

*Figures in these rows are compared during cost measurement. Note that cost side figures would typically be combined with other staff costs in the cost analysis and lose their effectiveness as discrete, measurable goals.

Benefits on the Benefits Side Only. Some of the problems cited above are eliminated when a system cost savings benefit appears only on the benefits side: benefits are not lost, are measurable goals, and offset system development costs. In addition, the improvement over the status quo would be evident because the narrative benefit description would establish the basis for the $50,000 benefit — that is, $100,000 *status quo* costs less $50,000 projected costs for the alternative.

However, one major new problem is introduced. A cost element central to the systems project is not counted on the cost side — with the result that the total systems cost is not truly a total systems cost.

Status Quo		0
Alternative*		$ 50,000
Actual*		$25,000

*Figures in these rows are compared during cost measurement.

Benefits on the Cost and Benefit Side. The third method shows the respective costs for the current and proposed system and claims the difference as a cost savings on the benefits side of the analysis.

Viewed from an accounting perspective, some claim this is double counting. Using the systems programmer example, this argument suggests that if you project $50,000 in costs for systems programmers on the new system, then claim a cost savings benefit of $50,000 over the status quo,[10] you get a net cost of $0 for systems programmers, which is clearly incorrect.

However, the effect can be interpreted differently.

Accounting Perspective	
Assets (Benefits)	$ 50,000
Less Liabilities (Costs)	- 50,000
Net	0

[10] If the old system required $100,000 of systems programmers and the new system is projected to require $50,000, then the projected cost *savings* are $50,000 and the projected *costs* are $50,000.

Taking a net program effect approach, the data would mean that under the new system $50,000 is projected for systems programmers. Further, a $50,000 cost savings from the status quo helps offset new system costs and provides a measurable goal for new system operations. The perspective is — what can you buy with available funds? This helps the State evaluate the overall program effect of redistributing expenditures.

Net Program Effect Perspective	
$ 100,000 Buys You	
*	*
*	*
*	*
System Programmers	System Programmers and System
(Old System)	(New System)

This method is sometimes used by federal agencies and contractors. Given the importance of evaluating overall program effect and of establishing a measurable baseline, States may also use this method.

An example of a system cost saving calculated for net program effect is shown in Benefit 4 in Chapters 2 and 3. In this benefit, the current system is not able to meet peak processing loads, requiring the State to shift some of the processing load to outside service bureaus. The new system would handle all peak loads, so that budgeted costs for the service bureau would not have to be spent. These funds could offset system development costs.

The table below illustrates how the system programmer example would be calculated using both the cost and benefit side of the analysis.

Benefits on the Cost and Benefit Sides		
For:	**Cost Side**	**Benefit Side**

Status Quo	$ 100,000	0
Alternative*	50,000	$ 50,000
Actual*	75,000	25,000

*Figures in these rows are compared during cost measurement. Note that cost side figures would typically be combined with other staff costs in the cost analysis and would not serve as discrete performance management goals. On the benefits side, benefits have been achieved, although not as much as anticipated.

Benefits Based on Program Cost Avoidances

Benefits based on program cost avoidances calculate the effect of the project, such as improved caseworker efficiency or staffing for future caseloads, in increasing or decreasing budgetary spending levels. In other words, cost avoidances do not deal with fixed budgetary dollars, but on projected increases (or decreases) likely to be required in the budget.

As indicated previously, cost avoidances are more speculative than cost savings. They are based on reasoned projections of costs expected to develop and affect future budgets and expenditures. *The inherent nature of a cost avoidance calculation requires more rigorous analysis and justification.*

Program Cost Avoidance Benefits	Yes	No
Cost in Budget, Law, or Contract?		√
Cost for System Development or Operation?		√
Cost for Program Operations?	√	
Could Affect Cost Side of Cost/Benefit Analysis?		√

The difference between costs projected for program operations under the *current* system and costs projected for program operations under the *new* system is claimed as a benefit for the alternative. This benefit helps offset the project costs. Note that the projected program costs are *not* included as costs in the analysis — only the difference as a benefit.

An example of this type of benefit is shown in Benefit 3 in Chapters 2 and 3 and summarized in the table below. In this benefit, staffing increases in the number of

caseworkers are projected to be higher and start earlier for the current system than for the chosen alternative. In this case, the difference between the projected total annual salaries for caseworkers under the status quo and alternatives is claimed as a program cost avoidance benefit. Note that the explanation of the derivation and calculation of this benefit is far more thorough than that of Benefit 2, which claims a program cost savings.

Benefit 3 — Program Cost Avoidances		
Year	**Cost Side**	**Benefit Side**
1		0
2		$ 481,920
3		1,034,120
4		1,257,510
5		1,420,660
Total		$ 4,194,210

Benefits Based on System Cost Avoidances

Benefits based on system cost avoidances calculate the effect of the project, such as eliminating courier service fees by enhanced telecommunication capability, in increasing or decreasing budgetary spending levels. In other words, cost avoidances do not deal with fixed budgetary dollars, but with increases (or decreases) likely to be required in the budget.

To repeat, cost avoidances are more speculative than cost savings and require more rigorous analysis and justification.

System Cost Avoidance Benefits	Yes	No
Cost in Budget, Law, or Contract?		√
Cost for System Development or Operation?	√	
Cost for Program Operations?		√
Could Affect Cost Side of Cost/Benefit Analysis?	√	

As discussed in detail under the system cost savings section, there are three ways to evaluate this "benefit" in a cost/benefit analysis:

- Benefits on the cost side only,
- Benefits on the benefits side only, or
- Benefits on the cost and benefits sides.

None is perfect: all are acceptable.

A system cost avoidance calculated for net program effect (both cost and benefit sides) is shown in Benefit 5 in Chapters 2 and 3 and summarized in the table below. In this benefit, the State has begun to incur new expenses resulting from using courier services to deliver information to meet new program and timeliness mandates. The new system would meet this requirement through a new telecommunications network, so that funds would not have to be redirected and budgeted to cover these costs. This cost avoidance allows those funds to spent *differently,* supporting system development costs.

Benefit 5: System Cost Avoidances		
For:	**Cost Side**	**Benefit Side**
Status Quo	$ 650,000	0
Alternative*	65,000	$ 585,000
Actual*	65,000	585,000

*Figures in these rows are compared during cost measurement. Note that cost side figures would typically combined with other costs in the cost analysis and would not serve as discrete performance management goals. On the benefits side, benefits have been achieved as anticipated.

Sensitivity Analysis: Dealing with Uncertainty and Risk

Because cost/benefit analysis deals primarily with future events, many costs and most benefits are based on predictions. The degree of certainty of these predictions can vary: from "near certain", such as in estimating future costs for hardware maintenance on a new system, to highly speculative, such as in estimating the dollar value of an electronic mail system that *should* displace a substantial amount of memo and letter writing.

Most cost/benefit analyses are based on a single set of numbers, which usually represent the "best guess" by analysts as to the value of uncertain outcomes. In fact, the degree of risk that is inherent in a cost/benefit analysis depends entirely on the degree of confidence in such "best guesses". Sometimes, varying a single estimated value by a significant amount can alter the basic outcome of a cost/benefit analysis, by shifting the optimum net present value from one alternative to another. How should a cost/benefit analysis deal with such situations, when so much is at stake over what are essentially informed guesses? What is the effect on a cost/benefit analysis of altering the basic estimates or assumptions that went into its development?

The basic technique for resolving such issues is to perform a *sensitivity analysis*. A sensitivity analysis is a methodical approach to varying the basic or underlying assumptions contained within a cost/benefit analysis. Sensitivity analysis is the game of — *what if?* — and serves two important purposes. It validates the conclusions of a cost/benefit analysis by examining the effects of changes to the basic, underlying assumptions that formed the analysis, and it provides

a framework for subsequent recording and analysis of actual incurred costs and realized benefits.

A common approach to sensitivity analysis involves two steps. First, identify the range of possible values for each key variable[11]. A typical approach is to identify "high", "low", and "expected" values. Second, examine the effect on the outcome of the cost/benefit analysis (e.g., the net present value) as the high, low and expected values are plugged in, *while each of the other variables is held constant at its "expected" value*[12].

The sensitivity analysis may identify a *critical variable:* one that has the effect of shifting the optimum NPV from one alternative to another when its initial value is changed. When this occurs, it is usually an indication that additional research and analysis is needed, either to refine the estimate (i.e., narrow the expected range of values) for that critical variable, or to quantify other costs or benefits that may help differentiate between the alternatives.

The results of the sensitivity analysis should be a part of any cost/benefit analysis. As a system is implemented and becomes operational, the actual costs incurred and benefits realized will provide a confirmation (or refutation) of the "best guess" estimates that were used in the original planning.

When actual outcomes vary substantially from those projected, the sensitivity analysis can be revisited to determine whether the outcomes are within the range of possibilities that were identified by the sensitivity analysis. It's better to be wrong than to be surprised!

Actuals and Updates

Systems designers refer to a system's "life cycle," which underscores the fact that modern information systems are expected to serve a particular purpose for a *limited* period of time, after which (presumably) new technologies will have evolved such that the following generation system will cost less, run faster, be easier to use, and so forth.

[11] There should be no more than five or six "key" variables; more than this number adds complexity to the analysis without providing any additional meaningful information. If a cost-benefit analysis contains more than five or six highly uncertain variables, more research and data analysis is needed.

[12] To examine every possible combination of variables (e.g., a high, low and expected value for each of six variables) would result in 720 (6 factorial) separate outcomes! Such an exercise would likely be counter-productive.

Regardless of the stage in the life cycle of a public benefit information system, at some point it will be necessary to begin the planning process anew. For cost/benefit analysis, the best place to start is with the "status quo" — the existing system. The costs and benefits of the status quo provide a baseline from which alternative costs and benefits are estimated, and against which the alternatives will be compared.

During systems design, development, implementation, and operation, costs and benefits should be tracked and recorded in as much detail as possible (commensurate with the level of detail of the original cost/benefit analysis). These "actuals" should be recorded and updated over time, to provide a year-by-year (or quarter-by-quarter, month-by-month, etc.) view of how costs and benefits actually accrue.

Tracking and updating actuals provides a vital feedback-loop for management's use in controlling and maximizing the cost effectiveness of the project. In addition, the process will support the development of better cost/benefit analyses over time. Initial assumptions and formulas can be evaluated and adjusted as suggested by comparison with the results. This should be an iterative process; one of constant refinement. The methods and outcomes of cost/benefit analysis will be improved and management control will be enhanced by access to information systems planning projections and forecast-versus-actual reporting.

The Reviewer's Perspective

As the Introduction to the *Feasibility, Alternatives, and Cost/Benefit Analysis Guide* points out, it was developed for use by Federal personnel in evaluating State submissions, as well as for use by States in developing their submissions. In general, Federal reviewers of State cost/benefit analysis submissions look for three things: *completeness*, *reasonableness*, and *internal consistency:*

- **Completeness** in that all of the important cost and benefit factors have been identified, and that adequate discussion is provided to explain their sources and derivation.

- **Reasonableness** in that the assumptions, rationale, sources, derivations,

justifications, explanations, and projections are sound and defensible.

- **Internal consistency** in the assignment of costs and benefits, in the treatment of real or nominal dollars, and in the application of present value discounting.

Finally, and to sum up, the review process is certainly simplified when submitters have followed the guidance and used the worksheet formats presented in the Guide!

[Editor's Note: This chapter provides an example of a cost/benefit study prepared by a State and maintained in State files. It simply serves to illustrate, in comparison to Chapter 3, that the information submitted to ACF can be a summary of or extracts from the State's study. This section in no way implies a standard, approach, or format that States must use.]

State Cost/Benefit Analysis
Part 1. General Information

1.1 Summary

The system being assessed is the State's program benefits information system. The current system has been in place for eight years, no longer meets program requirements, will soon require sole source support contracts, and is technically obsolete and operationally expensive. It is not a viable alternative for future program operations.

This *status quo* system is written in COBOL and is running on an eight year old IBM compatible (VM) mainframe. This system will be unable to keep up with forecast increases in caseload. Further, this system will require an expensive engineering upgrade in peripherals and systems software during year 3. This upgrade is required by the manufacturer, in order to continue hardware and software maintenance services beyond year 3. The status quo system requires operation of a raised-floor "data center," a moderate sized staff of systems programmers and operators, and a moderate number of contract support personnel.

Alternative 1 is based on the development of a LAN-based distributed (client/server) relational database management system (RDBMS). This alternative uses low-cost PC-based hardware and a network-server version of a large-capacity RDBMS.

Alternative 2 also represents a LAN-based client/server relational data management system, but it differs from Alternative 1 in one important aspect. Alternative 2 involves the use of a symmetric multi-processing (SMP) RISC super-minicomputer as the RDBMS server.

[Editor's Note: This section identifies the existing system and all alternatives evaluated for costs and benefits. System requirements for the status quo and each alternative are briefly summarized. More comprehensive descriptions are typically a part of the feasibility study and requirements analysis.]

1.2 Environment

This project will support the future operations of the program benefits information system for a five-year systems life. A competitively selected contractor will develop the system under the supervision of the State's management information systems staff. System programmatic operations will be distributed by a client/server architecture supporting . . .

[Editor's Note: This section identifies the project sponsor(s), developers, users, and computer center or network where the software will be implemented; summarizes the system input, output, processing, and security/privacy requirements; and describes interactions with other systems or organizations. Information flow and physical diagrams ease presentation of the information.]

1.3 References

The primary references supporting and related to this cost/benefit study include:

- State feasibility study and alternatives analysis, dated . . .
- Planning Advance Planning Document (APD) approval dated . . .
- State Budget (1994-1999)
- State project requisition, approved by . . .
- *Time Distribution of Casework* and *Time Distribution of Clerical Duties* dated . . .
- *Performance Audit of Caseworkers,* dated . . .
- *Historical and Demographical Trends in Casework, Effect on the Future,* dated . . .
- *State Caseworker Staffing Master Plan,* dated . . .

[Editor's Note: This section references the project request or authorization, feasibility study, alternatives analysis, decision criteria, operational performance requirements, estimation parameters, and other related project documentation.]

Part 2. Management Summary

The State evaluated the feasibility of and alternatives for modernizing the information technology and processing procedures supporting its benefits programs. As detailed in the feasibility study, this systems project has the following primary objectives:

- Reduce system operational costs, primarily in the area of caseworker and clerical salaries,
- Eliminate delays caused by obsolete technology and system bottlenecks, and
- Provide more timely services to the public.

During the alternatives analysis, the State selected (and justified the selection of) two alternatives for evaluation of costs and benefits in comparison to the status quo. Both alternatives are considered viable solutions, serving to distribute processing and to achieve the system objectives with equivalent quantitative benefits. Alternative 1 is the State's selected approach for implementation because it is cost-beneficial and will breakeven in the fifth year of the systems life. See Figures 1 and 2.

Although the status quo (central data processing center and dumb terminals) is not a viable alternative, it is costed out as required by ACF instructions.

[Editor's Note: This section presents a concise overview of the cost/benefit analysis, including a comparative summary such as that in Figure 1.]

2.1 Scope

The purpose of this cost/benefit analysis is to determine the most cost-beneficial alternative over a five year systems life for modernizing the information technology and processing procedures supporting the benefits program and for operating the system. The analysis assesses two alternatives, both of which distribute processing power closer to the desktop. Once developed, the application will no longer be supported by the State's central data processing facility.

COMPARISON OF ALTERNATIVES			
Description	**Status Quo**	**Alternative 1**	**Alternative 2**
Total Present Value Benefits	0	8,690,663	8,690,663
Less Total Present Value Costs	7,658,159	8,497,668	10,651,811
Net Benefit (Cost)	-7,658,159	192,995	-1,961,148
Benefit/Cost Ratio	0	1.02	0.82
Breakeven (Months)	N/A	52	N/A

Figure 1

[Editor's Note: This section states the purpose of the cost/benefit analysis, the system life, and the ultimate effect of system development on current operations.]

2.2 Performance and Characteristics

Under the current system, caseload processing is only marginally within system capabilities. The workload is achieved at the expense of significant delays for clients, support from outside processing services to meet system overloads, and caseworker overtime.

Unfortunately, the current workload is not expected to remain level. It will increase, from 55,200 to an estimated 80,800 cases annually. See Figure 3.

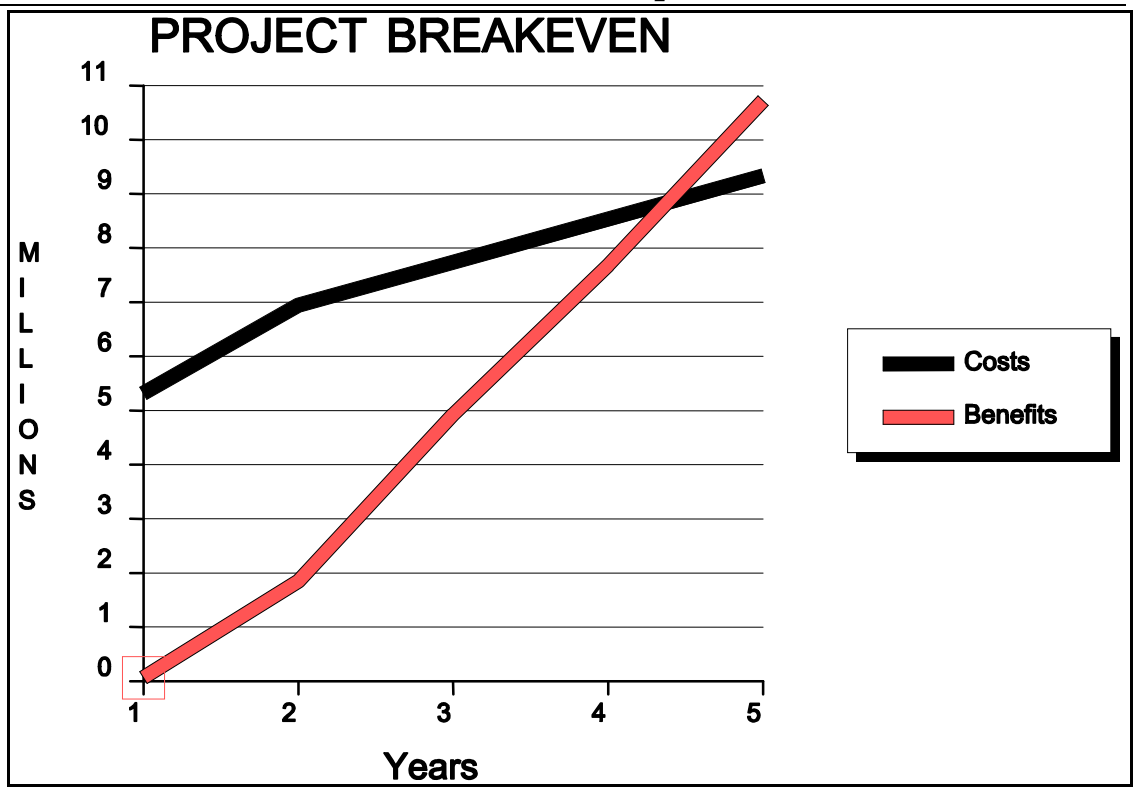


Figure 2

The projected caseloads were analyzed in a study conducted this year with contractor assistance, *Historical and Demographical Trends in Casework: Effect on the Future.*[1]
Both caseload burden and system inefficiency dramatically and negatively affect caseworker productivity. Updated technology is expected to reduce program and system operational costs in the areas of clerical and caseworker salaries, elimination of outside service bureau support and courier fees, and cancellation of the system engineering upgrade required in three years for the current system.

[Editor's Note: This section states current and projected operational problems and introduces the anticipated benefits of the project.]

[1] Further information on the effect of projected workload increases on staffing is detailed in Benefit 3.

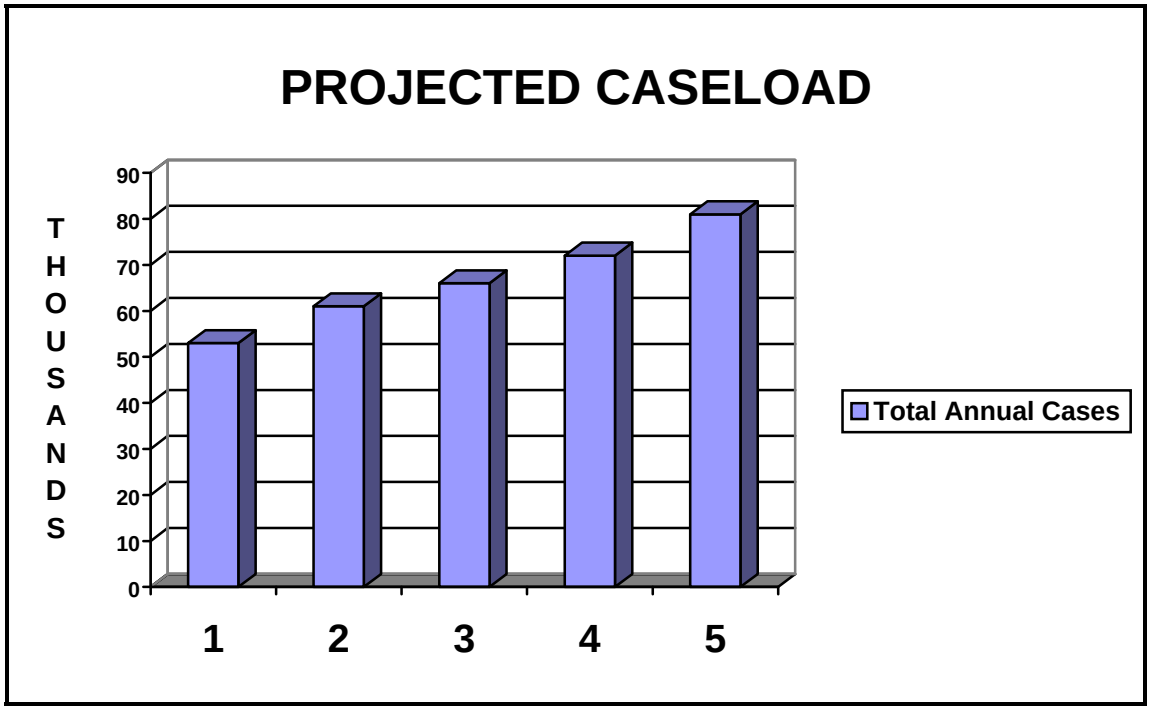


Figure 3

2.3 Assumptions

There are five major assumptions related to this cost/benefit analysis:

- No major changes will take place in the duties assigned to caseworkers over the systems life.[2]
- Workload growth will remain within the projections stated in Benefit 3.[3]
- There will be no new legislative or regulatory program mandates requiring overtime.

[2] This assumption is supported by the fact that caseworkers' duties have been stable since 1987, proven by review of a personnel audit conducted at that time — "Performance Audit of Caseworkers."

[3] This assumption is supported by the study "Historical and Demographical Trends in Casework: Effect on the Future."

- Commercial network services will be installed by mid-year in the first year, cutting courier service costs in half.[4]

- The system can be developed and implemented in a year and will remain operationally effective for at least another four years — resulting in a five year systems life.

[Editor's Note: This section states the assumptions under which the cost/benefit analysis was conducted.]

2.4 Methodology

This cost/benefit analysis was conducted by a team represented by the State program office, the budget and accounting office, and the office of economic analysis. The data was obtained by numerous methods, including estimation, comparison, simulation, observation, and quotation — and from various sources, including the budget, current obligations, work measurement (time and motion) studies, management records, and current contracts.

For example, current operational costs . . .

[Editor's Note: This section first summarizes and then details the procedures used for developing the cost/benefit analysis and the techniques used in estimating and computing costs and benefits.]

Part 3: Description of Alternatives

3.1 Current System

The current system is written in COBOL and is running on an eight year old IBM compatible (VM) mainframe. As a condition to continuing maintenance support, the manufacturer requires an expensive system engineering upgrade in peripherals and systems software during year 3. This upgrade will only affect maintainability, *not increase system capacity or capability to keep up with forecast increases in caseload.* The status quo system resides in a central data processing facility. It requires operation in a large, raised-floor site, supported by a moderate sized staff of

[4] This assumption is based on the current project management plan.

systems programmers and operators and a moderate number of contract support personnel . . .

[Editor's Note: This section first summarizes and then details the technical and operational characteristics of the current system. System diagrams or schematics simplify the presentation of information.]

3.2 Alternative 1

Alternative 1 is a LAN-based distributed (client/server) relational database management system (RDBMS). This alternative uses low-cost PC-based hardware and a network-server version of a large-capacity RDBMS . . .

[Editor's Note: This section first summarizes and then details the technical and operational characteristics of the first alternative. System diagrams or schematics simplify the presentation of information.]

3.3 Alternative 2

Alternative 2 is a LAN-based client/server relational database management system, but it differs from Alternative 1 in one important aspect. Alternative 2 involves the use of a symmetric multi-processing (SMP) RISC super-minicomputer as the RDBMS server . . .

[Editor's Note: This section first summarizes and then details the technical and operational characteristics of the second alternative. System diagrams or schematics simplify the presentation of information.]

3.4 Proposed Alternative

The State has chosen Alternative 1 because it meets the system objectives, is cost-beneficial, and will breakeven in the fifth year of the systems life.

[Editor's Note: This section summarizes the basis for selection of the chosen alternative.]

Part 4: Costs

The costs evaluated in this analysis are those which *directly* relate to the systems design, development, conversion, implementation, and operation. For the status quo, recurring costs include site and facility, equipment and software lease and maintenance, travel, training, supplies, security, and personnel salaries and benefits and support services *directly* supporting systems operations. The same categories are evaluated for the alternatives.

Non-recurring costs for the status quo include a systems engineering upgrade planned and budgeted for the third year of the systems life. Non-recurring costs for the alternatives include costs for new site and facilities, equipment, system testing, conversion, studies, procurement, database preparation, and overhead. Figure 4 provides a table of non-recurring and recurring costs.[5]

As provided in ACF's cost/benefit guide, total project costs are analyzed regardless of funding source (State and Federal) and regardless of cost allowability for purposes of Federal Financial Participation, both of which are addressed by other documents.

[Editor's Note: This section summarizes the developmental and operational costs of the status quo and each alternative.]

4.1 Non-Recurring Costs

Non-recurring costs for the *status quo* are generated by the hardware and software upgrade required by the manufacturer at year 3. The cost categories affected are equipment purchase and fees, software purchase, system testing, procurement and database preparation.

Non-recurring costs for the *alternatives* are caused by and relate to the new system procurement in year one. The cost categories affected are site and facility, equipment purchase and fees, system testing, conversion, studies, procurement, database preparation, and training. See Figure 5 for definitions.

[Editor's Note: This section provides more detail on non-recurring costs applying to the status quo and each alternative.]

[5] Details on system specifications are provided in the requirements analysis.

Non-Recurring Costs			
Cost Categories	Fxd	Cost Categories	Fxd
Site and Facility	•	Studies	•
· Purchase		Procurement	•
· Site Preparation/Modification		· Cost of Planning	
· Other		· Cost of Conducting	
Equipment Purchase/One Time Fees	•	Database Preparation	•
· ADP	•	Personnel	
· Data Communications	•	· Salaries	
· Environ. Conditioning		· Benefits	
· Security		· Contract Support Services	
· Other		· Extraordinary Personnel Costs	
Shipping		Travel	•
Installation	•	Training	
Software Purchase/One Time Fees	•	· Development	
· Operating System	•	· Trainee Expenses	
· Applications	•	· Trainer Expenses	
· Utilities	•	Overhead / Indirect Costs	
· Other		· Project and Technical	
System Testing	•	· Management	
Conversion	•	· Incremental	
· Data	•	· Lost Productivity	
· Software	•		
· Services			

Recurring Costs							
Cost Categories	Var	Adj	Fxd	Cost Categories	Var	Adj	Fxd
Site and Facility			•	Personnel			•
· Lease			•	· Salaries			•
· Maintenance Fees			•	· Benefits			•
· Other				Direct Support Services			•
Equipment Lease / Maintenance			•	· Contract			•
· ADP			•	· Detailed/Tasked			
· Data Communications			•	Travel			•
· Environ. Conditioning				Training			•
· Security				Supplies			•
· Other				Utilities			
Software Lease / Maintenance			•	Security			•
· Operating System			•	· Primary Facilities			•
· Applications			•	· Back-up Facilities			•
· Utilities			•	Overhead / Indirect Costs			•
· Other							

Figure 4

NON-RECURRING COSTS	
Cost Category	Description
Site and Facility	Includes site preparation and purchase of office furniture.
Equipment Purchase / One Time Fees	Includes the purchase of computer systems, peripherals, and local communications equipment. Also includes the costs of bundled software, maintenance, and fees.
Installation	Includes the installation and set up of equipment, software, furniture, and materials.
Software Purchase / One Time Fees	Includes the purchase or one-time licensing of systems programs, utilities, and applications programs for ADP and telecommunications equipment.
System Testing	Includes all costs over and above normal operational costs expended to test newly installed equipment.
Conversion	Includes one-time costs related to "clean up" and conversion of software, data, information, and media, not charged to other categories (such as personnel).
Studies	Covers the cost of one-time studies conducted during the systems design, development, and implementation.
Procurement	Includes the cost of planning for and conducting procurements.
Database Preparation	Covers the cost of preparing information for database management systems.
Training	Includes one-time costs to train staff on new equipment, software, testing procedures, and operational processes.

Figure 5

4.2 Recurring Costs

Recurring costs for the status quo and alternatives affect the following cost categories: site and facility, equipment lease and maintenance, software lease and maintenance, personnel salaries and benefits, direct support services, travel, training, supplies, and security. See Figure 6 for definitions.

[Editor's Note: This section provides more detail on recurring costs applying to the status quo and each alternative.]

RECURRING COSTS	
Cost Category	Description
Site and Facility	Includes the cost of space and a prorated amount for building maintenance.
Equipment Lease / Maintenance	Includes maintenance fees for computer systems and peripherals, data and voice communications equipment, and telecommunications lines.
Software Lease / Maintenance	Entails recurring licensing fees for systems programs and a prorated amount for new releases of commercial off-the-shelf software.
Personnel	Includes costs of staff (salaries, overtime, and benefits) devoted in full or in part to the system.
Direct Support Services	Includes contract support services staff costs (labor hour, contract G&A costs, and profit) dedicated in full or part to the project or system.
Travel	Includes monthly travel allocations for in-house personnel and contractors.
Training	Includes regularly scheduled training related to equipment, software, testing, and operational processes, initial and refresher.
Supplies	Includes monthly allocations to cover costs of supplies.
Security	Includes prorated costs related to security staff, *not* included under personnel costs above. Includes the prorated costs of support under the State's back-up contract and regular testing of disaster recovery sites.

Figure 6

Part 5: Benefits

Both alternatives are expected to generate the same specific quantitative benefits:

- Reduction in clerical staff,
- Reduction in caseworkers' overtime pay,
- Controlled staff expenditures in meeting caseload growth,
- Reduction in service bureau's processing costs,
- Reduction in courier service costs, and

- System upgrade cost savings.

The program and system cost avoidances and cost savings offset the systems development cost, thereby achieving net benefits for the project. No benefits were identified for the status quo.

[Editor's Note: This section summarizes the benefits related to the status quo (if any) and each alternative.]

5.1 Non-Recurring Benefits

Both alternatives would generate one non-recurring benefit: cost savings in the third year resulting from de-obligating in the budget a planned system engineering upgrade of the current system. Benefit 6 under narrative descriptions of benefits in section 5.4 provides details.

There are no non-recurring benefits for the status quo.

[Editor's Note: This section summarizes the non-recurring benefits applying to the status quo and each alternative.]

5.2 Recurring Benefits

Both alternatives would generate the same recurring benefits:

- Reduction in clerical staff (Benefit 1),
- Reduction in caseworkers' overtime pay (Benefit 2),
- Controlled staff expenditures in meeting caseload growth (Benefit 3),
- Reduction in service bureau's processing costs (Benefit 4), and
- Reduction in courier service costs (Benefit 5).

Note that three benefits address the effect of the new system on clerical and caseworker staff costs. Specifically, they project the effect of the new system on:

- Current clerical staff,

- Caseworker overtime expenses, and
- Future caseworker staffing requirements.

By establishing three distinct benefits for the effect of the system on staffing, the State has established three discrete, meaningful, quantitative performance goals and measurement factors as well. In addition, the effect of caseworker productivity improvements without an immediate budgetary effect — the State will not decrease current staff — will be measured as a qualitative benefit. The State values staff productivity as both a system goal and performance measurement goal.

The narrative descriptions of benefits in section 5.4 provide details.

There are no non-recurring benefits for the status quo.

[Editor's Note: This section summarizes the recurring benefits applying to the status quo and each alternative.]

5.3 Non-Quantifiable Benefits

Both alternatives are expected to generate qualitative benefits in addition to productivity improvement:

- Eliminating processing delays caused by obsolete technology,
- Providing more timely services to the public,
- Providing strategic support of agency program goals,
- Implementing systems architecture compatible with long-range strategies,
- Ensuring system flexibility, and
- Implementing proven technology with access to off-the-shelf software.

Although these qualitative benefits cannot be measured in dollars for offsetting systems development costs, several provide performance measurement goals and will be measured by the State. These goals are addressed by the State's cost/benefit measurement plan described in part 8 of this cost/benefit analysis.

[Editor's Note: This section summarizes the non-quantifiable (intangible) benefits applying to the status quo and each alternative. The status quo may not necessarily generate benefits.]

5.4 Narrative Descriptions of Benefits

The narrative descriptions of benefits begin on the next page.

[Editor's Note: This section summarizes in detailed narrative the benefits expected from the systems project. The basis for the calculations and the supporting documentation are provided or referenced. In addition, the State addresses how it will measure performance against the benefit.]

Benefit 1:
Reduction in Clerical Staff
[Effect of New System on Current Staff]

Scenario:

Under the current system, clerical staff support caseworkers in routine clerical functions, such as filing, typing letters, and copying. The new system will reduce the need for these services through capabilities such as centralized electronic files, automatic notice generation, and on-demand, on-site printing.
These improvements will result in a clerical staff reduction of 13 positions. [Clerical staff will be reassigned from the benefits program to the State's consumer services program.]

Basis for
Numbers: Clerical workload distribution was documented using automated work measurement techniques and time and motion analysis conducted over two week intervals at four separate review periods during the last fiscal year. Management records and observation were used to verify that the performance of duties did not vary significantly from the norm during this time period.
Once the distribution of work by category and time was known, the effect of elimination of certain functions through automation was assessed. With automated filing, notice, and printing, the State has planned to transfer thirteen clerical staff outside the benefits program.

The analysis and findings are documented in the State's study, *Time Distribution of Clerical Duties.* A copy of this study will be retained in the State's files as an aid to future cost and benefit measurement.

Assumptions: No major changes will take place in the duties assigned to clerical staff over the systems life.

Initial
Calculations of Benefit's
Value: The current average clerical salary of $25,100, times the State's average fringe rate of 25.5%, times 13 clerical positions, yields an annual cost savings of $409,507.

[Data on average salary and current fringe rate were provided by the State's personnel office.]

This information is shown in the cost/benefit analysis for both alternatives, as indicated by the following excerpt. There is no corresponding benefit for the status quo. [Note that constant dollars are used, since State personnel salary increases over the time period have not been approved by the legislature and budgeted.]

SYSTEM LIFE BENEFITS PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 1	-	409,507	409,507	409,507	409,507	1,638,028

Measurement Plan: Once the new system is operational, clerical staff workers will be reassigned and the benefits claimed as program cost savings.

Quantified Benefits Worksheet: Systems Life

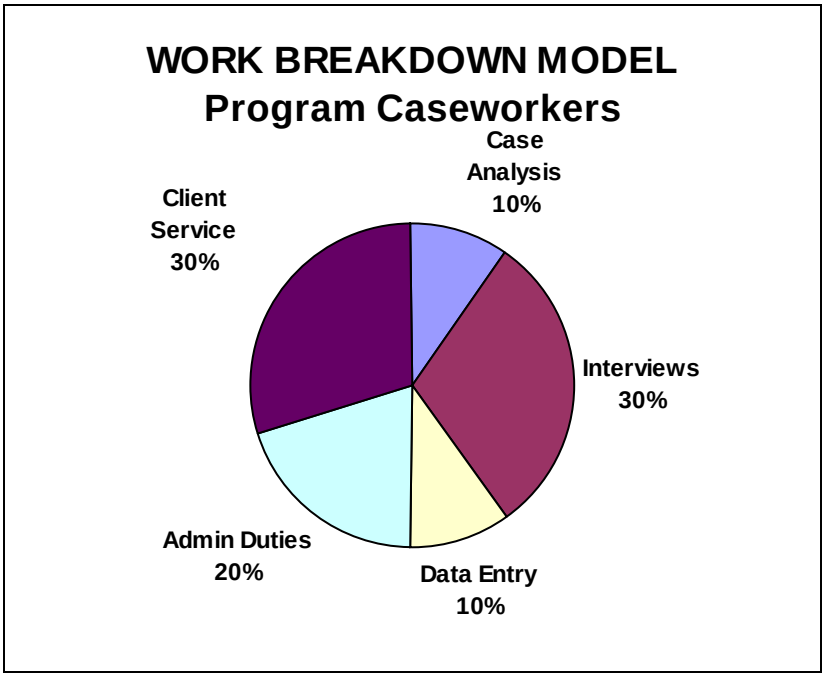
BENEFIT CATEGORY / DESCRIPTION								
Benefit Number: 1 **Description:** Reduce Clerical Staff								
STATUS QUO BENEFIT VALUE								
Assumptions: None. No benefit is claimed for the status quo								
Numbers			**Basis**			**Source**		
Current Measure/Volume:								
Projected Increase /Decrease Over Time:								
Current Value:								
System Life Benefits Profile: Status Quo								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	0	0	0	0	0	0	0	0
ALTERNATIVE 1 BENEFIT VALUE								
Numbers			**Basis**			**Source**		
Measure/Volume at Implementation: 13 clerical staff transferred			Staff reduction projected as result of automated system support improvements.			"Time Distribution of Clerical Duties" (program office)		
Projected Increase/Decrease Over Time: Stable			No change anticipated			"Time Distribution of Clerical Duties" (program office)		
Initial Value at Implementation: $409,507			$25,100 average annual salary X 1.255 to calculate loaded rate X 13 staff = $409,507			Loaded hourly rate from personnel office		
Systems Life Benefits Profile: Alternative 1								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	409,507	409,507	409,507	409,507	-	-	-	1,638,028

Benefit 2:
Reduction in Caseworkers' Overtime Pay
[Effect of New System on Overtime Expenses]

Scenario: Under the current system, caseworkers spend 20% of their time performing routine administrative functions, including tickler file maintenance, routine work scheduling, and manual tracking of cases. (See graph below.)

The new system will automate these functions, reducing caseworker administrative overhead 50%, to 10% of their time, enabling more time to be spent on case analysis. The most immediate effect of productivity improvement will be the reduction in caseworkers' overtime pay.

Under the current system, the State budgets $150,000 annually for overtime pay to caseworkers. The State projects that overtime pay for caseload processing will not be required after system implementation, due to reductions in administrative duties.



Basis for
Numbers: The workload distribution information was documented using automated work measurement techniques and time and motion analysis conducted over two week intervals at four separate review periods during the last fiscal year. Management records and observation were used

to verify that the performance of duties did not vary significantly from the norm during this time period. The analysis and findings are documented in the State's study, *Time Distribution of Casework.* A copy of this study will be retained in the State's files as an aid to future cost and benefit measurement.

Components of the administrative duties category include maintaining tickler files, performing work scheduling, manually tracking cases, and reporting to management. The time distribution of administrative duties, by caseworker per week, is shown in the table below. Expected improvements are reflected in the column to the right. (These improvements will be monitored and measured as qualitative benefits under the State's Cost/Benefit Measurement Plan.)

Average Weekly Distribution of Administrative Duties in Hours by Caseworker		
Description	**Current**	**Proposed**
Maintaining Tickler Files	1	0
Work Scheduling	2	1
Manual Tracking	2	1
Internal Reporting	3	2
TOTAL	8	4

Assumptions: Projected overtime is based on the State's most recent five-year budget (1994 - 1999), except that figures are expressed here in constant dollars. Copies of budgetary materials remain archived in the State.

No major changes will take place in the duties assigned to caseworkers over the systems life.

[This assumption is supported by a prior assessment of caseworkers' duties, conducted in 1987 as part of a personnel audit. The study, *Performance Audit of Caseworkers,* is attached to the time and motion study and will be retained in State files.]

Workload growth will remain within the projections stated in Benefit 3 and there will be no new program mandates requiring overtime.

Initial
Calculations
of Benefit's
Values: The current average caseworkers' salary of $42,000, divided by 2080 hours (working

hours in year), yields an average salary rate per hour of $20.19. With the addition of the State's average fringe rate of 25.5%, the average loaded pay rate per hour of caseworkers' time is $25.34.

Given an average of 46 weeks worked per year, times 4 hours saved per week, each worker can be projected to have 184 hours freed from routine administrative duties. Multiplying 184 hours times 120 caseworkers yields 22,080 hours times the loaded hourly rate of $25.34 equals annual savings of $559,507, more than enough to eliminate budgeted overtime expenditures of $150,000. No claim is made for the additional "savings" since current staff will not be reassigned or laid off. Instead, the effect of productivity improvement on future staffing is set forth in Benefit 3.

[Data on average salary, current fringe rate, and average weeks worked were provided by the State's personnel office.]

This benefit has an annual program cost savings value of $150,000. There are no benefit values for the status quo.

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 2	0	150,000	150,000	150,000	150,000	600,000

Measurement Plan: The State is preparing to adopt a new procedure for approving overtime work which will track overtime against a set of standard work categories. Under the new procedure, overtime requests which specify the purpose of "caseload processing" will require explanation and special management approvals. Since the new system is intended to reduce overtime caseload processing, management controls can ensure that other measures, such as reallocating workload, are taken before overtime is approved. Records will be kept and evaluated annually to determine whether this benefit has been achieved.

Productivity improvements will be measured as qualitative benefits under the Cost/Benefit Measurement Plan. Once the new system is operational, the caseworkers' workload distribution will be reassessed annually, using the same measuring tools and methodology used for projecting these benefits.

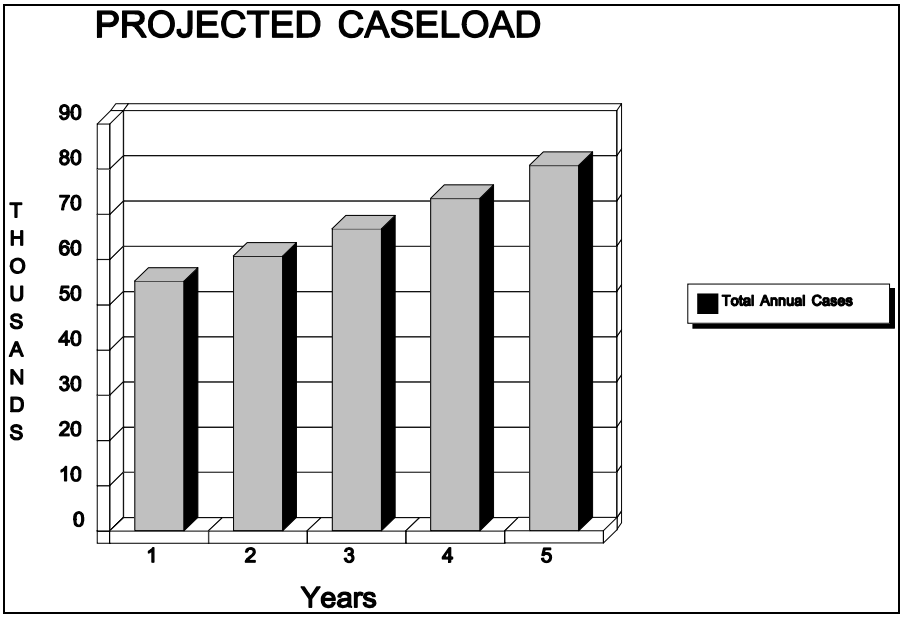
Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION								
Benefit Number: 2 **Description:** Reduction in Caseworkers' Overtime Pay								
STATUS QUO BENEFIT VALUE								
Assumptions: None. No benefit is claimed for the status quo. Figures below on current performance were used to determine cost savings for the alternatives.								
Numbers			**Basis**			**Source**		
Current Measure/Volume:			State Budget (1994-1999)			Budget office		
Projected Increase /Decrease Over Time:			State Budget (1994-1999)			Budget office		
Current Value:			State Budget (1994-1999)			Budget office		
System Life Benefits Profile: Status Quo								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	0	0	0	0	0	0	0	0
ALTERNATIVE 1 BENEFIT VALUE								
Numbers			**Basis**			**Source**		
Measure/Volume at Implementation: $150,000 annually			State Budget (1994-1999)			Budget office		
Projected Increase/Decrease Over Time: Stable			State Budget (1994-1999)			Budget office		
Initial Value at Implementation: $150,000 annually			State Budget (1994-1999)			Budget office		
Systems Life Benefits Profile: Alternative 1								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	150,000	150,000	150,000	150,000	-	-	-	600,000

Benefit 3:
Controlled Staff Expenditures in Meeting Caseload Growth
[Effect of New System on Future Staff Requirements]

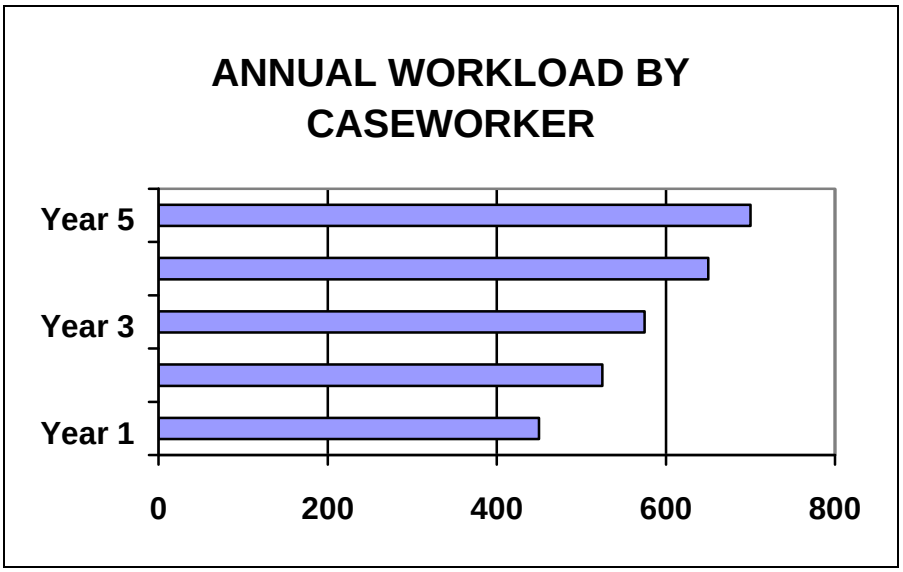
Scenario Under the current system, caseload processing is only marginally within system capabilities. The workload is achieved at the expense of significant delays for clients, support from outside processing services to meet system overloads, and caseworker overtime. (The latter was described in Benefit 2.)

Unfortunately, the current workload is not expected to remain level. It will increase, from 55,200 to an estimated 80,800 cases annually. See the graph below.



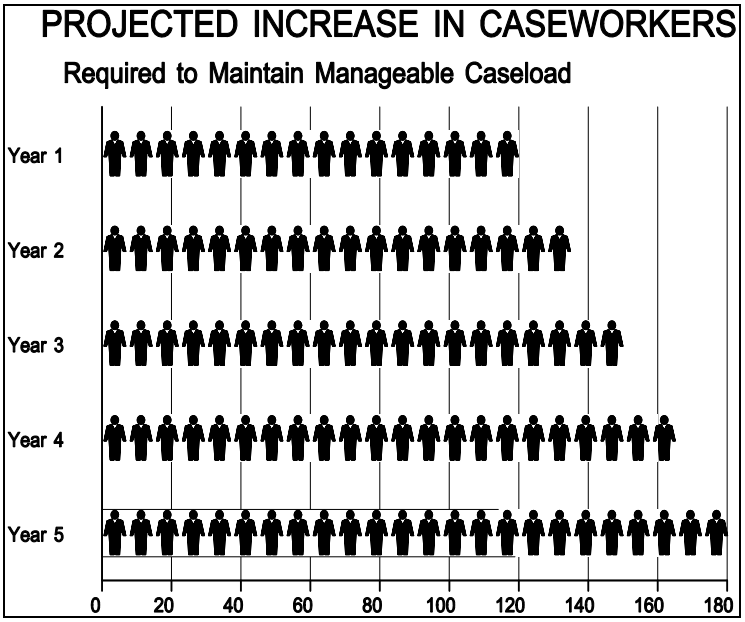
If management were to take no action, the caseworker burden would increase approximately 10% annually, from 460 to 673 cases per year. See the chart on the following page for the annual projected burden by caseworker, if no action is taken.

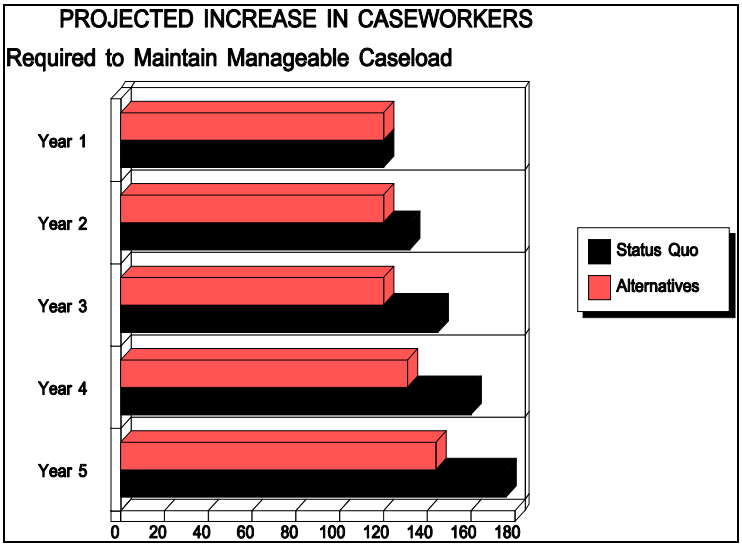
This situation is considered untenable by State management. The problem was analyzed and addressed in an internal State staffing plan. This plan addresses the number and timing of additional required staff and the manner in which they would be recruited and trained.



The results of this plan, showing the projected staff increase for the status quo, is depicted in the top chart on the next page. In order to maintain a ratio of about 460 cases annually per caseworker, staffing would increase from 120 caseworkers to 176 over five years.

However, with the new system, reductions in administrative duties (described in Benefit 2) would enable staff to handle more cases per year — from 460 cases annually per year to 560 cases per year. This would reduce the overall staff requirements projected as necessary — down from 176 in the fifth year to 144 — and delay recruitment of additional personnel until the fourth year of the system life. See the bottom chart on the following page for a comparison of projected staffing between the status quo and the alternatives. [Both alternatives would support the same staffing pattern.]


PROJECTED INCREASE IN CASEWORKERS
Required to Maintain Manageable Caseload
Year 1
Year 2
Year 3
Year 4
Year 5
0
20
40
60
80
100
120
140
160
180


PROJECTED INCREASE IN CASEWORKERS
Required to Maintain Manageable Caseload
Year 1
Year 2
Year 3
Year 4
Year 5
0
20
40
60
80
100
120
140
160
180
Status Quo
Alternatives

Basis for
Numbers: Projected caseloads are documented in a study conducted this year with contractor assistance, *Historical and Demographical Trends in Casework: Effect on the Future.* Next the State examined the effect of the projected caseload increase on current staff and devised a strategic staffing plan. The *State Caseworker Staffing Master Plan* was developed by a team represented by State management, personnel specialists, caseworker professional organization representatives, and contractor specialists. These studies will remain on file in the State throughout the development, implementation, and operation of this project.

Average case processing time is currently just over three hours, based on program management records on file in the State. Under the current system, caseworkers working 46 weeks per year at 32 hours per week on casework would have 1,472 hours, allowing them to process about 460 cases. Given the weekly gain of four hours for case processing that will accrue from the elimination of administrative duties (see Benefit 2), current staff working 46 weeks per year, 36 hours per week, with an average case processing time of under 3 hours, will be able to process management's projected goal of 560 cases per year. These figures are considered conservative based on the fact that other system improvements have not been factored in — and based on other States' records of processing similar cases in 2.5 hours, once modern technology was employed.

Assumptions: No major changes will take place in the duties assigned to caseworkers over the systems life. Workload growth will remain within the projections cited herein. There will be no new program mandates.

Initial
Calculations
of Benefit's
Values If no action is taken, the State's caseworker staff will increase from 120 to 176 over five years. The average annual salary for the current staff is $42,000. According to the State's staffing plan, new caseworkers would be hired under the State's three-year training program with annual salaries of $32,000, $34,000, and $36,000, for the first, second, and third years respectively. All dollars are constant dollars. No cost-of-living adjustments

or other salary increases are currently approved and, therefore, have not been factored into these calculations. See the top table on the following page.

If the new system is adopted, the State's caseworker staff will remain stable for three years, then increase by 11 in year 4 and 13 in year 5 to a total of 144 caseworkers. See the bottom table on the following page.

The difference between the total loaded salary projections establishes the estimated program cost avoidance reported as a benefit for the alternatives. See below. There is no corresponding benefit for the status quo.

SYSTEM LIFE BENEFITS PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Status Quo Salaries	6,325,200	6,807,120	7,359,320	8,024,470	8,737,310	37,253,420
Alternatives' Salaries	6,325,200	6,325,200	6,325,200	6,766,960	7,316,650	33,059,210
Benefit 3	0	481,920	1,034,120	1,257,510	1,420,660	4,194,210

[Note that caseworker costs are not included on the cost side of the cost/benefit analysis, since those costs do not directly support the systems project. The program cost differential effected by the systems project is claimed as a cost avoidance of the alternatives.]

Measurement Plan: The State will measure actual staffing salaries at the loaded rate and deduct the actuals from the projected status quo salaries, to determine whether the projected cost avoidance benefit has been achieved.

Projected Caseworker Expenses: Status Quo							
Year	**Staff**	**Salary**	**Total**	**Annual Salary**	**Total Staff**	**Fringe Rate**	**Loaded Salary**
1	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
2	120	42,000	5,040,000	5,424,000	132	0.255	6,807,120
	12	32,000	384,000				
3	120	42,000	5,040,000	5,864,000	145	0.255	7,359,320
	12	34,000	408,000				
	13	32,000	416,000				
4	120	42,000	5,040,000	6,394,000	160	0.255	8,024,470
	12	36,000	432,000				
	13	34,000	442,000				
	15	32,000	480,000				
5	120	42,000	5,040,000	6,962,000	176	0.255	8,737,310
	25	36,000	900,000				
	15	34,000	510,000				
	16	32,000	512,000				

Projected Caseworker Expenses: Alternatives							
Year	**Staff**	**Salary**	**Total**	**Annual Salary**	**Total Staff**	**Fringe Rate**	**Loaded Salary**
1	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
2	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
3				5,864,000	145	0.255	7,359,320
4	120	42,000	5,040,000	5,392,000	131	0.255	6,766,960
	11	32,000	352,000				
5	120	42,000	5,040,000	5,830,000	144	0.255	7,316,650
	11	34,000	374,000				
	13	32,000	416,000				

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION

Benefit Number: 3
Description: Controlled Staff Expenditures in Meeting Caseload Growth (See narrative for further detail on calculations.)

STATUS QUO BENEFIT VALUE

Assumptions: None. No benefit is claimed for the status quo. Figures below on projected staffing costs for the status quo were used to determine cost avoidance for the alternatives.

Numbers	Basis	Source
Current Measure/Volume: 120 caseworkers	State Staffing Plan	State Caseworker Staffing Master Plan
Projected Increase/Decrease Over Time: 10% to 176	State Staffing Plan	State Caseworker Staffing Master Plan
Current Value: $6,325,200 with variable cost increase	State Staffing Plan	State Caseworker Staffing Master Plan

System Life Projected Caseworker Costs: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
6,325,200	6,807,120	7,359,320	8,024,470	8,737,310	-	-	-	37,253,420

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: Workload growth will stay within the projections stated in Benefit 3. No new program mandates requiring overtime.

Numbers	Basis	Source
Measure/Volume at Implementation: 120	State Staffing Plan	State Caseworker Staffing Master Plan
Projected Increase/Decrease Over Time: Stable til year 4	State Staffing Plan	State Caseworker Staffing Master Plan
Initial Value at Implementation: $6,325,000	State Staffing Plan	State Caseworker Staffing Master Plan

System Life Projected Caseworker Costs: Alternatives

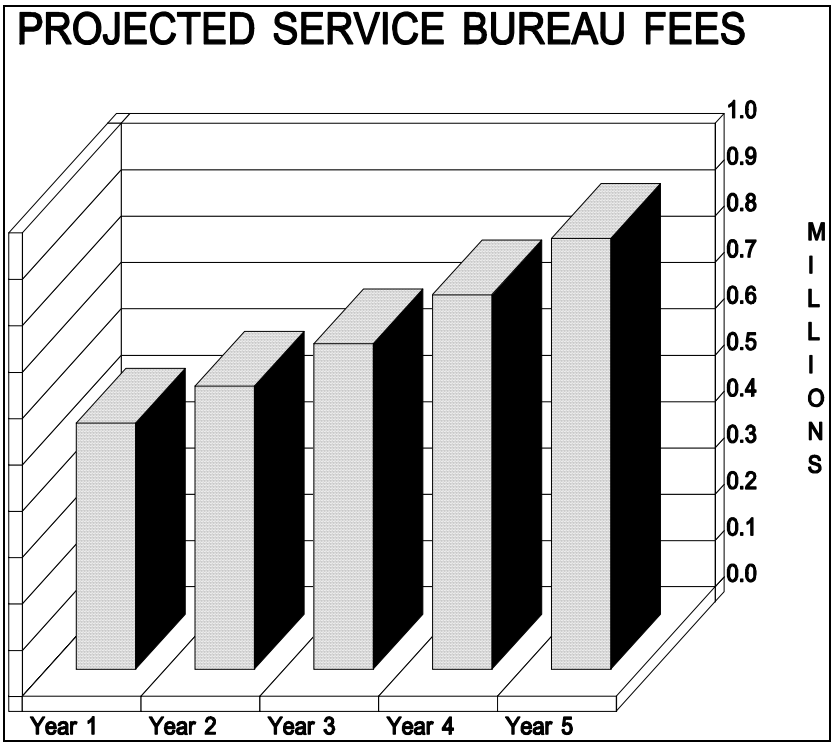
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
6,325,200	6,325,200	6,325,200	6,766,960	7,316,650				33,059,210

Systems Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
	481,920	1,034,120	1,257,510	1,420,660				4,194,210

Benefit 4:
Reduction in Service Bureau's Processing Costs

Scenario: Under the current system, backlogs in caseload processing are transferred to an outside service bureau. This is required since current processing resources are unable to handle peak processing loads at certain times of the year. See the chart below.



The new system will have sufficient capacity and capability to process all workload.

Basis for
Numbers: The information in the chart was provided by the State's procurement office, based on the State's current five-year service bureau contract. (This contract is used for other purposes, so eliminating service for caseload processing will not result in contract termination charges.) Between program workload and service bureau fixed-fee contract rates, the fixed price costs for service bureau processing will increase at about 15% per year. The contracts are maintained in the State's procurement office.

Assumptions: No major changes will take place in the duties assigned to caseworkers over the systems life. Workload growth will remain within the projections cited in Benefit 3. There will be no new program mandates.

Initial Calculation of Benefit's Value: Figures are from the State's five-year, fixed-price contract, and are in the State's current budget. (Dollars stated reflect fixed price contract rates and have not been adjusted by the State for inflation.) Since these figures are budgeted and approved systems-related costs, they are shown as costs for the status quo and first year of the alternatives and as system cost savings benefits for years 2 - 5 of the alternatives.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Support Services: Service Bureau Fees	531,300	610,995	702,644	808,041	929,247	3,582,227

SYSTEM LIFE COST PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Support Services: Service Bureau Fees	531,300	0	0	0	0	531,300

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 4	0	610,995	702,644	808,041	929,247	3,050,927

Measurement Plan: Service bureau charges in support of program operations are projected to be eliminated by the second year. The finance department maintains records by expenditure category and program office and will be able to confirm elimination of these costs.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION

Benefit Number: 4
Description: Reduction in Service Bureau's Processing Costs

STATUS QUO BENEFIT VALUE

Assumptions: None. No benefit claimed for the status quo. Figures below on current and future service bureau processing fees were used to determine cost savings for the alternatives.

Numbers	Basis	Source
Current Measure/Volume: $531,000	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Projected Increase/Decrease Over Time: 15% annually to $929,247	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Current Value: $531,000	State Budget (1994-1999) & Service Contract	Budget and Procurement offices

System Life Costs Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
531,300	610,995	702,644	808,041	929,247				3,582,227

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: No major changes will take place in caseworker's duties. Workload growth will remain within the projections stated in Benefit 3. No new program mandates.

Numbers	Basis	Source
Measure/Volume at Implementation: $531,300	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Projected Increase/Decrease Over Time: Eliminated in second year.	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Initial Value at Implementation: -$531,000	State Budget (1994-1999) & Service Contract	Budget and Procurement offices

System Life Projected Costs Profile: Alternatives

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
531,300	-	-	-	-	-	-	-	531,300

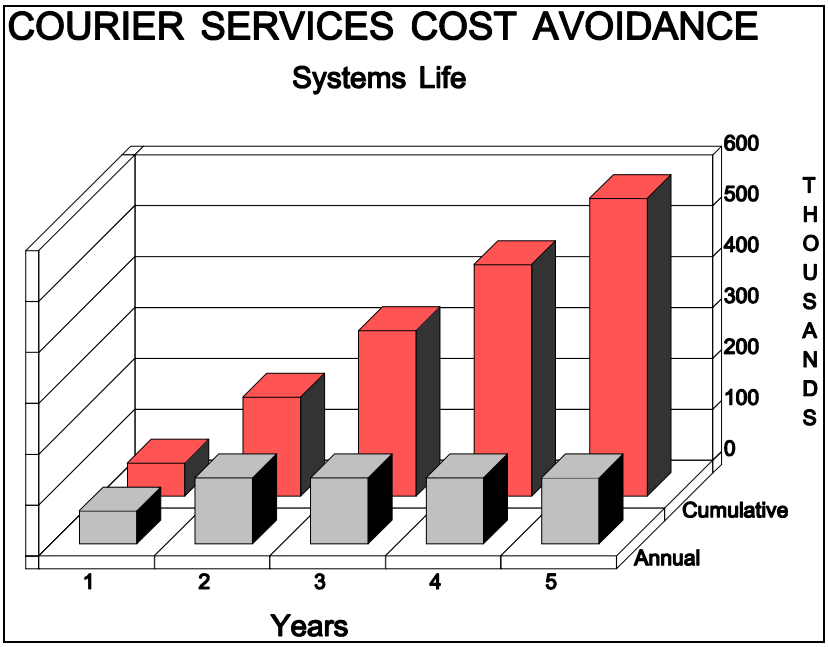
Systems Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	610,995	702,644	808,041	929,247	-	-	-	3,050,927

Benefit 5:
Reduction in Courier Service Costs

Scenario: Since the current system lacks statewide telecommunications support, the program relied on courier services last year to deliver time-sensitive material to meet new mandates for information timeliness. Since these costs were not anticipated nor budgeted, the expenses could only be met by reprogramming funds from a State emergency operating expense account.

To meet this expense in current or future years, funds would have to be reprogrammed from the program accounts. However, with the new system, electronic transmission will be used, eliminating the need to budget for this expense — resulting in a system cost avoidance.



Basis for
Numbers: Projected courier service costs are based on the State's most recent expenditures. Figures are expressed in constant dollars. Spending records are archived in the State. (A management study conducted at the time that courier services were adopted indicated that there were no more economical alternatives to meet this requirement, given the State's current technological limitations.)

Assumptions: Commercial network services will be installed by mid-year in the first year, cutting courier service costs in half.

Initial Calculations of Benefit's Value: The benefit has an average yearly value of $130,000, based on past expenditures. There are no benefit values for the status quo; however, costs are reflected since they are direct systems operational costs requiring funding. See the following excerpts.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Courier Service Fees	130,000	130,000	130,000	130,000	130,000	650,000

SYSTEM LIFE COST PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Courier Service Fees	65,000	0	0	0	0	65,000

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 5	65,000	130,000	130,000	130,000	130,000	585,000

Measurement Plan: Courier service charges in support of program operations are projected to be eliminated by mid-year in the first year. The finance department maintains records by expenditure category and program office and will be able to confirm elimination of these costs.

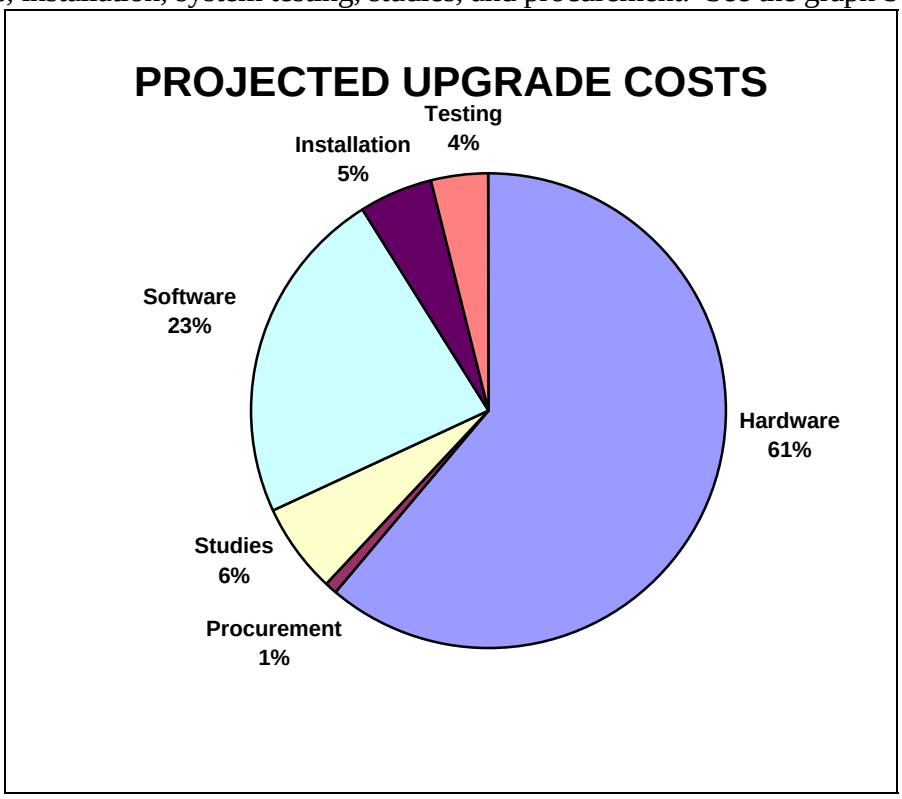
Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION								
Benefit Number: 5 **Description:** Reduction in Courier Service Costs								
STATUS QUO BENEFIT VALUE								
Assumptions: None. No benefit is claimed for the status quo. Figures below on current and future courier service fees were used to determine cost savings for the alternatives.								
Numbers			**Basis**			**Source**		
Current Measure/Volume: $130,000			State Budget (1994-1999)			Budget office		
Projected Increase/Decrease Over Time: Stable			State Budget (1994-1999)			Budget office		
Current Value: $130,000			State Budget (1994-1999)			Budget office		
System Life Costs Profile: Status Quo								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
130,000	130,000	130,000	130,000	130,000				650,000
ALTERNATIVE 1 BENEFIT VALUE								
Assumptions: Commercial network services will be installed by mid-year in the first year, cutting courier service costs in half.								
Numbers			**Basis**			**Source**		
Measure/Volume at Implementation: $130,000			State Budget (1994-1999)			Budget office		
Projected Increase/Decrease Over Time: Halved first year, eliminated second year.			State Budget (1994-1999)			Budget office		
Initial Value at Implementation: -$65,000			State Budget (1994-1999)			Budget office		
System Life Projected Costs Profile: Alternatives								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
65,000	-	-	-	-	-	-	-	65,000
Systems Life Benefits Profile: Alternative 1								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
65,000	130,000	130,000	130,000	130,000	-	-	-	585,000

Benefit 6:
System Engineering Upgrade Cost Savings

Scenario: Under the current system's plans and budgets, the status quo computer system is scheduled for a hardware and software engineering upgrade in the third year. This upgrade is required by the manufacturer, in order to continue hardware and software maintenance services beyond year 3. This upgrade does not affect the capacity or capability of the system's processing power. It simply makes the equipment eligible for continued maintenance support.

The upgrade is budgeted at $655,000, with expenditures for equipment and software purchase and fees, installation, system testing, studies, and procurement. See the graph below.



By implementing the alternative, the upgrade will not be made — resulting in a system cost savings.:

Basis for Numbers The figures were taken from the latest approved State budget. A copy will be maintained in the State.

Assumptions: None.

Initial Calculation of Benefit's Value: The benefit has a value of $655,000, as a cost-savings from the status quo.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
System upgrade	0	0	655,000	0	0	655,000

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 6	0	0	655,000	0	0	655,000

Measurement Plan: None required. Budgeted funds will be de-allocated and cost savings claimed in the third year.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION								
Benefit Number: 6 **Description:** System Upgrade Cost Savings								
STATUS QUO BENEFIT VALUE								
Assumptions: No benefit is claimed for the status quo. Figures below reflect costs budgeted for the status quo and used to determine cost savings for the alternatives.								
Numbers		**Basis**			**Source**			
Current Measure/Volume: $655,000 (third year)		State Budget (1994-1999)			Budget office			
Projected Increase/Decrease Over Time: Non-recurring		State Budget (1994-1999)			Budget office			
Current Value: $655,000		State Budget (1994-1999)			Budget office			
System Life Costs Profile: Status Quo								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	-	655,000	-	-	-	-	-	655,000
ALTERNATIVE 1 BENEFIT VALUE								
Assumptions: None								
Numbers		**Basis**			**Source**			
Measure/Volume at Implementation: None		State Budget (1994-1999)			Budget office			
Projected Increase/Decrease Over Time: Non-recurring (third year)		State Budget (1994-1999)			Budget office			
Initial Value at Implementation: None — $655,000 (third year)		State Budget (1994-1999)			Budget office			
Systems Life Benefits Profile: Alternative 1								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	-	655,000	-	-	-	-	-	655,000

Part 6: Comparative Cost/Benefit Summary

The table below summarizes the total present value costs and benefits, net benefit (or cost), benefit/cost ratio, and breakeven for the status quo and two alternatives. Alternative 1 is the State's chosen alternative because it yields a net benefit and will breakeven in the fifth year.

COMPARISON OF ALTERNATIVES			
Description	**Status Quo**	**Alternative 1**	**Alternative 2**
Total Present Value Benefits	0	8,690,663	8,690,663
Less Total Present Value Costs	7,658,159	8,497,668	10,651,811
Net Benefit (Cost)	-7,658,159	192,995	-1,961,148
Benefit/Cost Ratio	0	1.02	0.82
Breakeven (Months)	N/A	52	N/A

The following pages provide cost/benefit profiles for the status quo and each alternative. These tables indicate annual and system life non-recurring and recurring cost, annul and system life total costs, annual and system life present value cost, annual and system life projected benefits, annual and system life present value benefits, cumulative total projected costs, and brief descriptions of quantitative benefits.

[Editor's Note: This section provides the comparative costs and benefits for the status quo and each alternative.]

Cost/ Benefit Profile: Status Quo

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Non-Recurring Costs	0	0	655,000	0	0	655,000
Recurring Costs	1,621,868	1,621,868	1,621,868	1,721,868	1,821,868	8,409,340
Total Projected Costs	1,621,868	1,621,868	2,276,868	1,721,868	1,821,868	9,064,340
Total Present Value Costs	1,567,860	1,465,358	1,922,587	1,358,726	1,343,628	7,658,159
SYSTEM LIFE BENFITS PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Total Projected Benefits	0	0	0	0	0	0
Total Present Value Benefits	0	0	0	0	0	0
CUMULATIVE BENEFIT/COST PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Cumulative Total Projected Benefits	0	0	0	0	0	N/A
Cumulative Total Projected Costs	1,621,868	3,243,736	5,520,604	7,242,472	9,064,340	N/A

QUALITATIVE BENEFITS					
Benefits	Related System Objectives	Measure of Effectiveness			
		Very Effective	Effective	Minimally Effective	Not Effective
None					

Cost/ Benefit Profile: Alternative 1

SYSTEM LIFE COST PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Non-Recurring Costs	3,700,000	0	0	0	0	3,700,000
Recurring Costs	1,621,868	1,621,868	796,145	796,145	796,145	5,632,171
Total Projected Costs	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171
Total Present Value Costs	5,144,650	1,465,358	672,265	628,238	587,157	8,497,668
SYSTEM LIFE BENFITS PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
Total Present Value Benefits	62,836	1,610,418	2,601,825	2,174,016	2,241,568	8,690,663
CUMULATIVE BENEFIT/COST PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Cumulative Total Projected Benefits	65,000	1,847,422	4,928,693	7,683,751	10,723,165	N/A
Cumulative Total Projected Costs	5,321,868	6,943,736	7,739,881	8,536,026	9,332,171	N/A

QUALITATIVE BENEFITS					
Benefits	Related System Objectives	Measure of Effectiveness			
		Very Effective	Effective	Minimally Effective	Not Effective
Enhanced use of technology to speed up input, processing and transmission	Eliminate processing delays	√			
	Provide more timely service	√			
Support program goals and long range strategies		√			
Ensure flexibility and proven technology		√			

Cost/ Benefit Profile: Alternative 2

SYSTEM LIFE COST PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Non-Recurring Costs	5,765,000	0	0	0	0	5,765,000
Recurring Costs	1,621,868	1,621,868	862,745	862,745	862,745	5,831,971
Total Projected Costs	7,386,868	1,621,868	862,745	862,745	862,745	11,596,971
Total Present Value Costs	7,140,885	1,465,358	728,502	680,792	636,274	10,651,811
SYSTEM LIFE BENFITS PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
Total Present Value Benefits	62,836	1,610,418	2,601,825	2,174,016	2,241,568	8,690,663
CUMULATIVE BENEFIT/COST PROFILE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Cumulative Total Projected Benefits	65,000	1,847,422	4,928,693	7,683,751	10,723,165	N/A
Cumulative Total Projected Costs	7,386,868	9,008,736	9,871,481	10,734,226	11,596,971	N/A

QUALITATIVE BENEFITS					
Benefits	Related System Objectives	Measure of Effectiveness			
		Very Effective	Effective	Minimally Effective	Not Effective
Enhanced use of technology to speed up input, processing and transmission	Eliminate processing delays	√			
	Provide more timely service	√			
Support program goals and long range strategies		√			
Ensure flexibility and proven technology		√			

Part 7: Sensitivity Analysis

The sensitivity analysis conducted as part of this cost/benefit analysis centered on the factors expected to have the most effect on the net present value determination:

- Cost estimates for new equipment
- Workload projections and effect on staffing, and
- Project implementation schedule.

The results of the sensitivity analysis indicate that the selected alternative remains the best choice, even considering a range of factors …

[Editor's Note: this section introduces the State's approach to the sensitivity analysis, indicating the factors tested and the results]

7.1 Methodology

The state used four steps in testing the sensitivity of each factor and assessing its effect on the cost/benefit determination:

- Select the factor to be tested
- Hold all other factors in the analysis constant
- Rework the analysis, varying the estimates for the factor under consideration; and
- Check the results to see if the ranking of alternatives is materially affected.

[Editor's Note: this section describes the approach, assumptions and the model used for conducting the sensitivity analysis. This section describes in more detail than the introductory passage the factors tested. Examples of factors which could be considered during the sensitivity analysis are length of system life: volume, mix, or pattern of workload; requirements; system configuration and assumptions]

7.2 Sources of Information

The information used to test the factors …

[Editor's Note: this section details the sources of data used in the sensitivity analysis]

7.4 Results

The results of the sensitivity analysis indicate that the selected alternative remains the best choice within a range of factors …

[Editor's Note: this section details the results of the sensitivity analysis in more detail than the introductory passage. Normally a complete description and complete set of spreadsheets testing the effect of a range of numbers are included as a discreet section or an appendix to a cost/benefit analysis.]

7.5 Evaluation and Conclusion

The State has determined that the chosen alternative has a high probability of cost-effective implementation and will breakeven in the fifth year of the systems life. The selected system is expected to have a useful life of at least five years, and will more likely be in operation for six years. Detailed information on the sensitivity analysis is retained in the State files for reference during cost/benefit measurement.

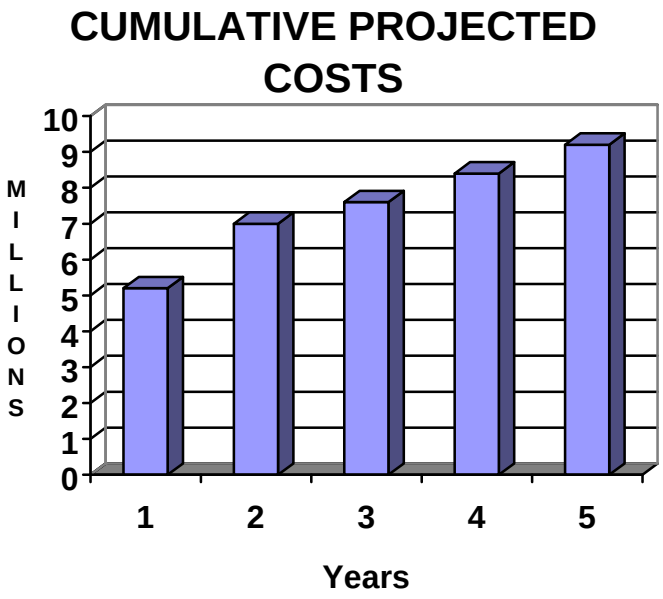
[Editor's Note: This summarizes the results of the State's sensitivity analysis and chosen course of action]

Part 8: Cost/Benefit Measurement Plan

Actual Costs will be measured against the selected alternative's projected costs by the finance office, subject to review and approval by the program office. Costs will be measured by category, but reported in the aggregate annually to ACF. Variances of over 10% will be explained by supporting documentation which addresses expenditures by category.

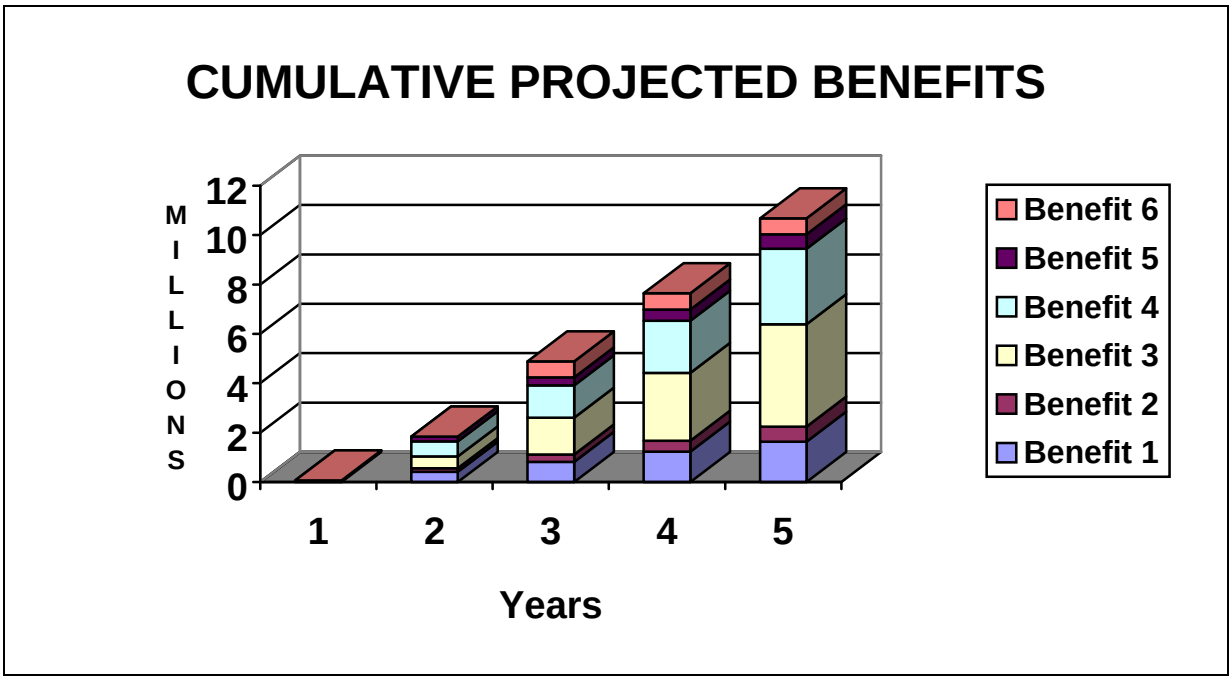
Th chart and tables below depict the cumulative and annual baselines against which actual project costs will be measured.

Benefits will be measured in accordance with the measurement plan listed at the end of each narrative benefit description in the preceding pages. The chart and table below depict the cumulative and annual baselines against which actual project benefits will be measured.



SYSTEM LIFE ANNUAL COST BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Projected Costs: Alternative 1	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171

ANNUAL AND SYSTEM LIFE BENEFITS BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 1	0	409,507	409,507	409,507	409,507	1,638,028
Benefit 2	0	150,000	150,000	150,000	150,000	600,000
Benefit 3	0	481,920	1,034,120	1,257,510	1,420,660	4,194,210
Benefit 4	0	610,995	702,644	808,041	929,247	3,050,927
Benefit 5	65,000	130,000	130,000	130,000	130,000	585,000
Benefit 6	0	0	655,000	0	0	655,000
Total	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165



The State also plans to measure whether qualitative improvements are achieved. Specifically, the State has established project goals to improve productivity, eliminate processing delays, and provide more timely services to the public.

Currently, the State experiences processing delays in three categories: input processing, internal control checks, and report transmission. Input processing is the time taken from receipt of information from the client until the data has been entered into the central database. Internal control checks involve the steps taken to verify client identity and eligibility and cross-check for duplicative entry. Report transmission begins after system processing is complete and continues until receipt of the information by the requesting party.

Regarding more timely provision of services to the public, two measures are critical: the time elapsed from initial client contact until (1) notification of acceptance of client data and (2) delay until provision of benefits.

The table on the next page shows the current operational performance and the target performance for the new system. Current data was developed based on management records on file in the State.

PERFORMANCE BASELINE AND TARGET		
Category	**Baseline Average**	**Target Average**
Administrative overhead	8 hours per week	4 hours per week
Input Processing	7 days	Same day
Internal control checks	3 days	1 day
Report transmission	4 days	Same day
Delay to notification	3 weeks	1 week
Delay to benefits	3 months	1 month

In summary, this cost/benefit measurement plan provides that the State will measure performance against both program and system goals - and against cost and benefit values. (See the table on the next page.) This information will serve as the baseline for reporting "actuals" in future APD Updates.

SYSTEM LIFE COST BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Non-Recurring Costs	3,700,00	0	0	0	0	0
Recurring Costs	1,621,868	1,621,868	796,145	796,145	796,145	5,632,171
Total Projected Costs	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171
SYSTEM LIFE BENFITS BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
CUMULATIVE BENEFIT / COST BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Cumulative Total Projected Benefits	65,000	1,847,422	4,928,693	7,683,751	10,723,165	N/A
Cumulative Total Projected Costs	5,321,868	6,943,736	7,739,881	8,536,026	9,332,171	N/A

[Editor's Note: Note that only projected - not present value - numbers establish the baseline. Present value numbers and present value discounting are not used once the most cost-beneficial alternative is chosen.]

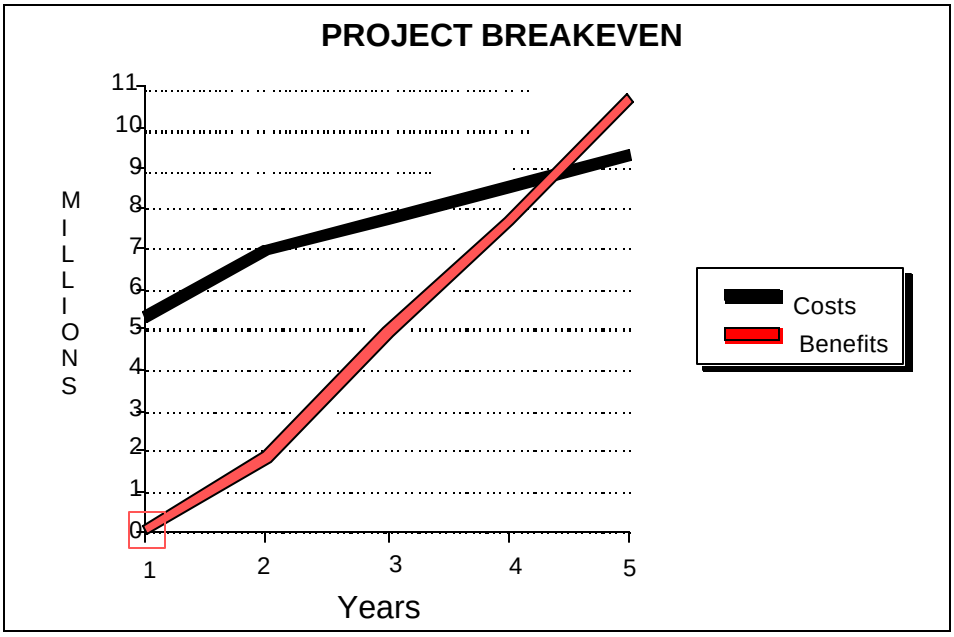
[Editor's Note: This chapter provides an example of the part of an Implementation APD that addresses cost/benefit analysis. This example illustrates the summary or key information that ACF considers important. Among the most important factors are detailed descriptions of benefits and clear establishment of a baseline for later cost/benefit measurement and reporting. This guide does not mandate a format. It does illustrate a sufficient level of detail for ACF's purposes since this section (and the other chapters) underwent review in ACF's program offices.]

Implementation Advance Planning Document (Section IV)
Cost/Benefit Analysis

Overview: The State has evaluated the feasibility of and alternatives for modernizing the information technology and processing procedures supporting its benefits programs. As detailed in the feasibility study, this systems project has the following primary objectives:

- Reduce system operational costs, primarily in the area of clerical and caseworker salaries,
- Eliminate delays caused by obsolete technology and system bottlenecks, and
- Provide more timely services to the public.

During the alternatives analysis, the State selected (and justified the selection of) two alternatives for evaluation of costs and benefits in comparison to the status quo. Both alternatives are considered viable solutions, serving to distribute some degree of processing and to achieve the system objectives with equivalent quantitative benefits. Alternative 1 is the State's selected approach for implementation because it is cost-beneficial and will breakeven in the fifth year of the systems life. See the chart on the next page and table on page 3-34.



[The status quo (central data processing center and dumb terminals) is not a viable alternative, but is costed out as required by ACF instructions.]

Costs: The costs evaluated in this analysis are those that directly relate to the systems design, development, conversion, implementation, and operation. For the status quo, recurring costs include site and facility, equipment and software lease and maintenance, travel, training, supplies, security, and personnel salaries (including benefits) and support services *directly* supporting systems development and operation. The same categories are evaluated for the alternatives.

Nonrecurring costs for the status quo include a systems upgrade planned and budgeted for the third year of the systems life. Nonrecurring costs for the alternatives include costs for new site and facilities, equipment, system testing, conversion, studies, procurement, database preparation, and overhead. Details are provided in the requirements analysis.

Cost spreadsheets are attached beginning on page 3-37.

[As provided in ACF's cost/benefit guide, total project costs are analyzed regardless of funding source (State and Federal) and regardless of cost allowability for purposes of Federal Financial Participation, both of which are addressed by other documents.]

Benefits: The status quo is not considered a viable alternative: no benefits are evaluated.

Both alternatives are expected to generate the same specific quantitative benefits:

- Reduction in clerical staff,
- Reduction in caseworkers' overtime pay,
- Controlled staff expenditures in meeting caseload growth,
- Reduction in service bureau's processing costs,
- Reduction in courier service costs, and
- System upgrade cost savings.

Note that three benefits address the effect of the new system on clerical and caseworker staff costs. Specifically, they project the effect of the new system on:

- Current clerical staff,
- Caseworker overtime expenses, and
- Future caseworker staffing requirements.

By establishing three distinct benefits for the effect of the system on staffing, the State has established three discrete, meaningful, quantitative performance goals and measures as well. In addition, the effect of caseworker productivity improvements without an immediate budgetary effect — the State will not decrease current staff — will be measured as a

qualitative benefit. The State values staff productivity as both a system goal and performance measurement goal.

The program cost avoidances and cost savings offset the systems development cost, thereby achieving net benefits for the project. Benefit spreadsheets are attached beginning on page 3-41.

In addition, qualitative benefits are anticipated to accrue by:

- Eliminating processing delays caused by obsolete technology,
- Providing more timely services to the public,
- Providing strategic support of agency program goals,
- Implementing systems architecture compatible with long-range strategies,
- Ensuring system flexibility, and
- Implementing proven technology with access to off-the-shelf software.
-

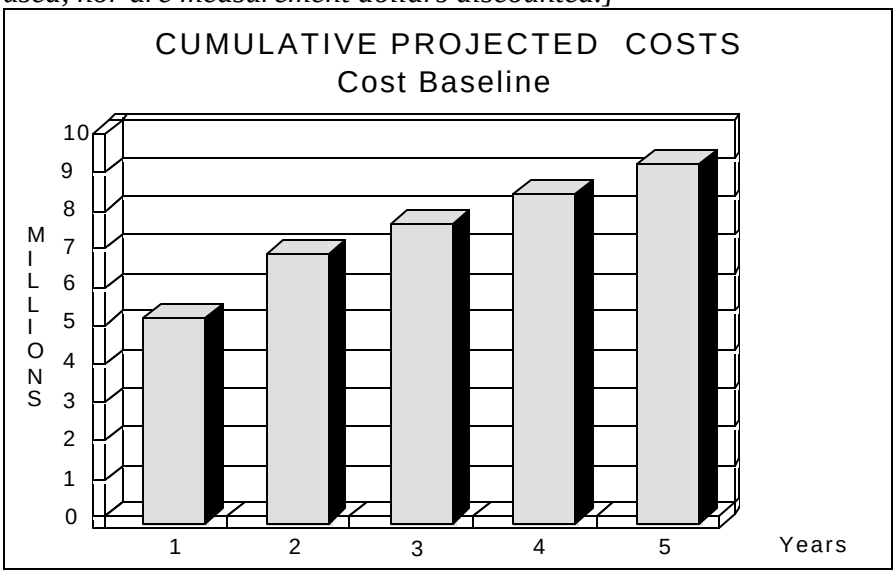
Although these qualitative benefits cannot be measured in dollars for offsetting systems development costs, several provide performance measurement goals and will be measured by the State.

Cost/Benefit Measurement Plan:

Actual costs will be measured against the selected alternative's projected costs by the finance office, subject to review and approval by the program office. Costs will be measured by category, but reported in the aggregate annually to ACF. Variances of over 10% will be explained by supporting documentation which addresses expenditures by category. The chart and table below depict the cumulative and annual baselines against which actual project costs will be measured.

See pages 3-37 through 3-40 for cost spreadsheets for the selected alternative over the systems life.

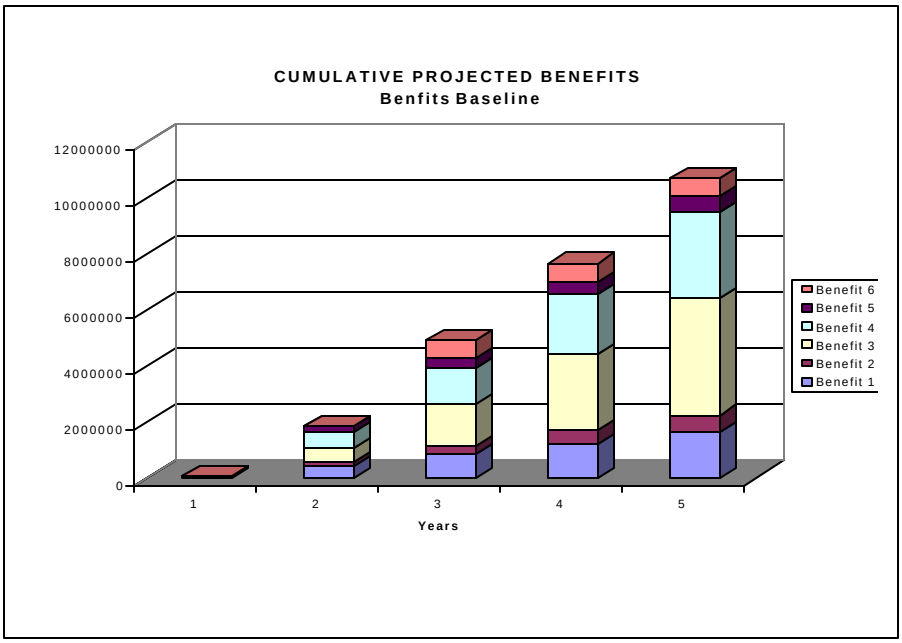
[Editor's Note: As a reminder, the costs measured against are the projected costs for the selected alternative from the cost/benefit analysis. Status quo costs are not used, present value discounted costs are not used, nor are measurement dollars discounted.]



SYSTEM LIFE ANNUAL COST BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Projected Costs: Alternative 1	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171

Benefits will be measured in accordance with the measurement plan listed at the end of each narrative benefit description in the following pages.

The following chart and table depict the cumulative and annual baselines against which actual project benefits will be measured.



ANNUAL AND SYSTEM LIFE BENEFITS BASELINE						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 1	0	409,507	409,507	409,507	409,507	1,638,028
Benefit 2	0	150,000	150,000	150,000	150,000	600,000
Benefit 3	0	481,920	1,034,120	1,257,510	1,420,660	4,194,210
Benefit 4	0	610,995	702,644	808,041	929,247	3,050,927
Benefit 5	65,000	130,000	130,000	130,000	130,000	585,000
Benefit 6	0	0	655,000	0	0	655,000
Total	**65,000**	**1,782,422**	**3,081,271**	**2,755,058**	**3,039,414**	**10,723,165**

The State also plans to measure whether qualitative improvements are achieved. Specifically, the State has established project goals to improve productivity, eliminate processing delays, and provide more timely services to the public.

Currently, the State experiences processing delays in three categories: input processing, internal control checks, and report transmission. Input processing is the time taken from receipt of information from the client until the data has been entered into the central database. Internal control checks involve the steps taken to verify client identity and eligibility and cross-check for duplicative entry. Report transmission begins after system processing is complete and continues until receipt of the information by the requesting party.

Regarding more timely provision of services to the public, two measures are critical: the time elapsed from initial client contact until (1) notification of acceptance of client data and (2) delay until provision of benefits.

The table below shows the current operational performance and the target performance for the new system. Current data was developed based on management records on file in the State.

PERFORMANCE BASELINE AND TARGET		
Category	**Baseline Average**	**Target Average**
Administrative overhead	8 hours per week	4 hours per week
Input processing	7 days	Same day
Internal control checks	3 days	1 day
Report transmission	4 days	Same day
Delay to notification	3 weeks	1 week
Delay to benefits	3 months	1 month

In summary, this cost/benefit measurement plan provides that the State will measure performance against both program and system goals — and against cost and benefit values. This information will serve as the baseline for reporting "actuals" in future APD Updates. See the table on page 3-36.

Response to ACF's Criteria:

We thoroughly evaluated the performance of and described the systems life costs of the status quo in the feasibility study, alternatives analysis, and cost/benefit analysis.

During the alternatives analysis, we considered a broad range of alternatives. We addressed six alternatives, varying in terms of technology and source. Those alternatives included systems modification and transfer. The reasons for selection of the two alternatives for cost/benefit analysis are documented in the alternatives analysis.

We applied cost/benefit analysis to the status quo and two viable alternatives. We evaluated all on a systems life basis, using present value discounting at 7%. Constant dollars were used.

We consider the evaluation and documentation of costs and benefits to be thorough, detailed, and well documented. Back-up documentation and studies will be maintained in the State throughout the systems life of the project. The cost and benefit projections are well documented and provide a sound basis for cost/benefit measurement.

Net benefits (costs), benefit/cost ratios, and breakeven points were calculated for the two alternatives. (See page 3-35) We consider the selected alternative reasonable and fully capable of meeting our systems objectives.

We have set forth a clear set of projected costs and benefits against which actuals can be measured. We have also set forth qualitative measures, linked to program objectives, which can be measured.

A narrative description of benefits (with benefit measurement plans), a cost/benefit profile for the selected alternative, and a comparison of alternatives follow.

[Editor's Note: This section is based on the criteria set forth in ACF's "Feasibility, Alternatives, and Cost/Benefit Analysis Guide" on pages 1-5 and 1-6.]

Benefit 1:
Reduction in Clerical Staff
[Effect of New System on Current Staff]

Scenario: Under the current system, clerical staff support caseworkers in routine clerical functions, such as filing, typing letters, and copying. The new system will reduce the need for these services through capabilities such as centralized electronic files, automatic notice generation, and on-demand, on-site printing.

These improvements will result in a clerical staff reduction of 13 positions. [Clerical staff will be reassigned from the benefits program to the State's consumer services program.]

Basis for Numbers: Clerical workload distribution was documented using automated work measurement techniques and time and motion analysis conducted over two week intervals at four separate review periods during the last fiscal year. Management records and observation were used to verify that the performance of duties did not vary significantly from the norm during this time period.

Once the distribution of work by category and time was known, the effect of elimination of certain functions through automation was assessed. With automated filing, notice, and printing, the State has planned to transfer thirteen clerical staff outside the benefits program.

The analysis and findings are documented in the State's study, *Time Distribution of Clerical Duties.* A copy of this study will be retained in the State's files as an aid to future cost and benefit measurement.

Assumptions: No major changes will take place in the duties assigned to clerical staff over the systems life.

Initial Calculations of Benefit's Value: The current average clerical salary of $25,100, times the State's average fringe rate of 25.5%, times 13 clerical positions, yields an annual cost savings of $409,507.

[Data on average salary, current fringe rate, and average weeks worked were provided by the State's personnel office.]

This information is shown in the cost/benefit analysis for both alternatives, as indicated by the following excerpt. There is no corresponding benefit for the status quo. [Note that constant dollars are used, since State personnel salary increases over the time period have not been approved by the legislature and budgeted.]

SYSTEM LIFE BENEFITS PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 1	-	409,507	409,507	409,507	409,507	1,638,028

Measurement Plan: Once the new system is operational, clerical staff workers will be reassigned and the benefits claimed as program cost savings.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION
Benefit Number: 1 **Description:** Reduce Clerical staff
STATUS QUO BENEFIT VALUE
Assumptions: None. No benefit is claimed for the status quo

Numbers	Basis	Source
Current Measure/Volume:		
Projected Increase/Decrease Over Time:		
Current Value:		

System Life Benefits Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	0	0	0	0	0	0	0	0

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: No major change will take place in the duties assigned to clerical staff over the systems life

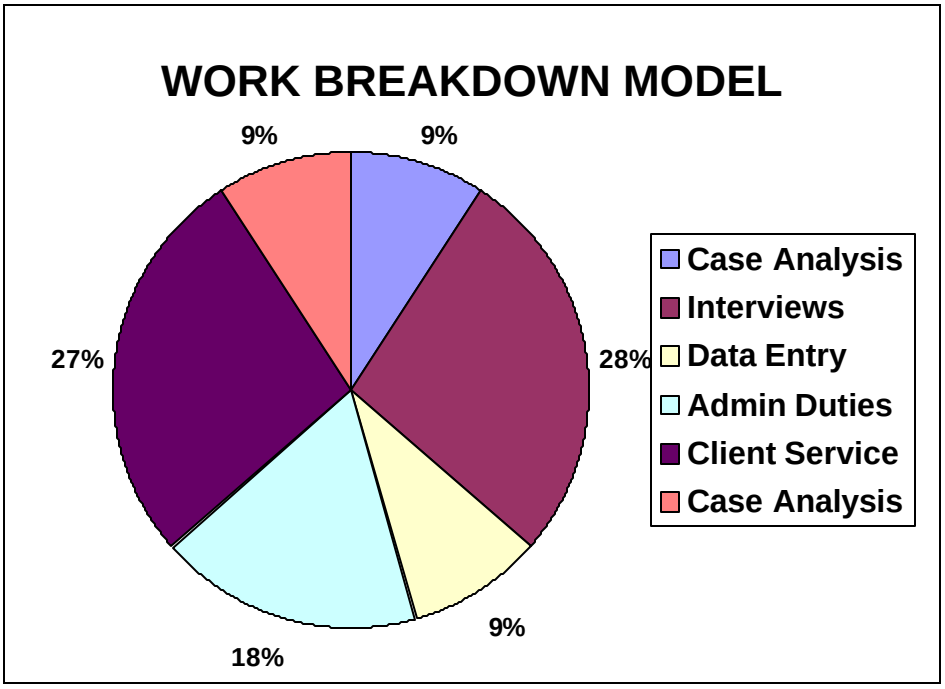
Numbers	Basis	Source
Measure/Volume at implementation: 13 clerical staff transferred	Staff reduction projected as result of automated system support improvements	"Time distribution of Clerical duties" (program office)
Projected Increase/Decrease Over Time: Stable	No change anticipated	Time distribution of Clerical duties" (program office)
Initial Value at Implementation	$25,100 average annual salary X 1.255 to calculate loaded rate X 13 staff = $409,507	Loaded hourly rate from personnel office

System Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	409,507	409,507	409,507	409,507	-	-	-	1,638,028

Benefit 2:
Reduction in Caseworkers' Overtime Pay
[Effect of New System on Overtime Expenses]

Scenario: Under the current system, caseworkers spend 20% of their time performing routine administrative functions, including tickler file maintenance, routine work scheduling, and manual tracking of cases. (See graph below.)



The new system will automate these functions, reducing caseworker administrative overhead 50%, to 10% of their time, enabling more time to be spent on case analysis. The most immediate effect of productivity improvement will be the reduction in caseworkers' overtime pay.

Under the current system, the State budgets $150,000 annually for overtime pay to caseworkers. The State projects that overtime pay for caseload processing will not be required after

system implementation, due to reductions in administrative duties.

Basis for Numbers: The workload distribution information was documented using automated work measurement techniques and time and motion analysis conducted over two week intervals at four separate review periods during the last fiscal year. Management records and observation were used to verify that the performance of duties did not vary significantly from the norm during this time period. The analysis and findings are documented in the State's study, *Time Distribution of Casework.* A copy of this study will be retained in the State's files as an aid to future cost and benefit measurement.

Components of the administrative duties category include maintaining tickler files, performing work scheduling, manually tracking cases, and reporting to management. The time distribution of administrative duties, by caseworker per week, is shown in the table below. Expected improvements are reflected in the column to the right. (These improvements will be monitored and measured as qualitative benefits under the State's Cost/Benefit Measurement Plan.)

Average Weekly Distribution of Administrative Duties in Hours by Caseworker		
Description	**Current**	**Proposed**
Maintaining Tickler Files	1	0
Work Scheduling	2	1
Manual Tracking	2	1
Internal Reporting	3	2
TOTAL	8	4

Projected overtime is based on the State's most recent five-year budget (1994 - 1999), except that figures are expressed here in constant dollars. Copies of budgetary materials remain archived in the State.

Assumptions: No major changes will take place in the duties assigned to caseworkers over the systems life.

[This assumption is supported by a prior assessment of caseworkers' duties, conducted in 1987 as part of a personnel audit. The study, *Performance Audit of Caseworkers,* is attached to the time and motion study and will be retained in State files.]

Workload growth will remain within the projections stated in Benefit 3 and there will be no new program mandates requiring overtime.

Initial Calculations of Benefit's Values: The current average caseworkers' salary of $42,000, divided by 2080 hours (working hours in year), yields an average salary rate per hour of $20.19. With the addition of the State's average fringe rate of 25.5%, the average loaded pay rate per hour of caseworkers' time is $25.34.

Given an average of 46 weeks worked per year, times 4 hours saved per week, each worker can be projected to have 184 hours freed from routine administrative duties. Multiplying 184 hours times 120 caseworkers yields 22,080 hours times the loaded hourly rate of $25.34 equals annual savings of $559,507, more than enough to eliminate budgeted overtime expenditures of $150,000. No claim is made for the additional "savings" since current staff will not be reassigned or laid off. Instead, the effect of productivity improvement on future staffing is set forth in Benefit 3.

[Data on average salary, current fringe rate, and average weeks worked were provided by the State's personnel office.]

This benefit has an annual program cost savings value of $150,000. There are no benefit values for the status quo.

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 2	0	150,000	150,000	150,000	150,000	600,000

Measurement Plan: The State is preparing to adopt a new procedure for approving overtime work which will track overtime against a set of standard work categories. Under the new procedure, overtime requests which specify the purpose of "caseload processing" will require explanation and special management approvals. Since the new system is intended to reduce overtime caseload processing, management controls can ensure that other measures, such as reallocating workload, are taken before overtime is approved. Records will be kept and evaluated annually to determine whether this benefit has been achieved.

Productivity improvements will be measured as qualitative benefits under the Cost/Benefit Measurement Plan. Once the new system is operational, the caseworkers' workload distribution will be reassessed annually, using the same measuring tools and methodology used for projecting these benefits.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION
Benefit Number: 2 **Description:** Reduction in Caseworker's Overtime Pay
STATUS QUO BENEFIT VALUE
Assumptions: None. No benefit is claimed for the status quo. Figures below on current performance were used to determine cost savings for the alternative

Numbers	Basis	Source
Current Measure/Volume: $150,000 annually	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Stable	State Budget (1994-1999)	Budget office
Current Value: $150,000 annually	State Budget (1994-1999)	Budget office

System Life Benefits Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	0	0	0	0	0	0	0	0

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: Workload growth will remain within the projections stated in Benefit 3 and there will be no new program mandates requiring overtime

Numbers	Basis	Source
Measure/Volume at implementation: $150,000	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Stable	State Budget (1994-1999)	Budget office
Initial Value at Implementation: $150,000	State Budget (1994-1999)	Budget office

System Life Benefits Profile: Alternative 1

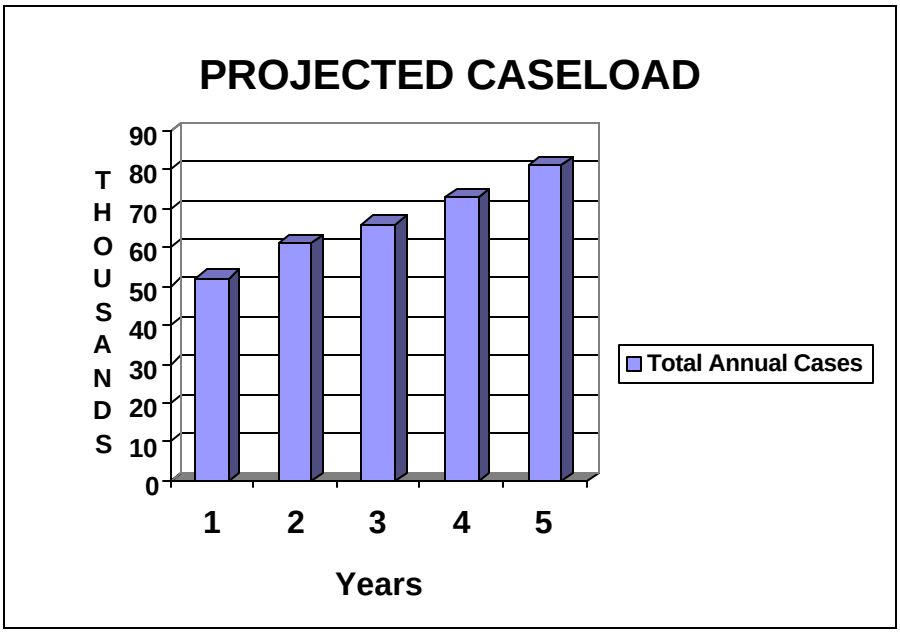
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-	150,0000	150,0000	150,0000	150,0000	-	-	-	600,000

Benefit 3:
Controlled Staff Expenditures in Meeting Caseload Growth
[Effect of New System on Future Staff Requirements]

Scenario

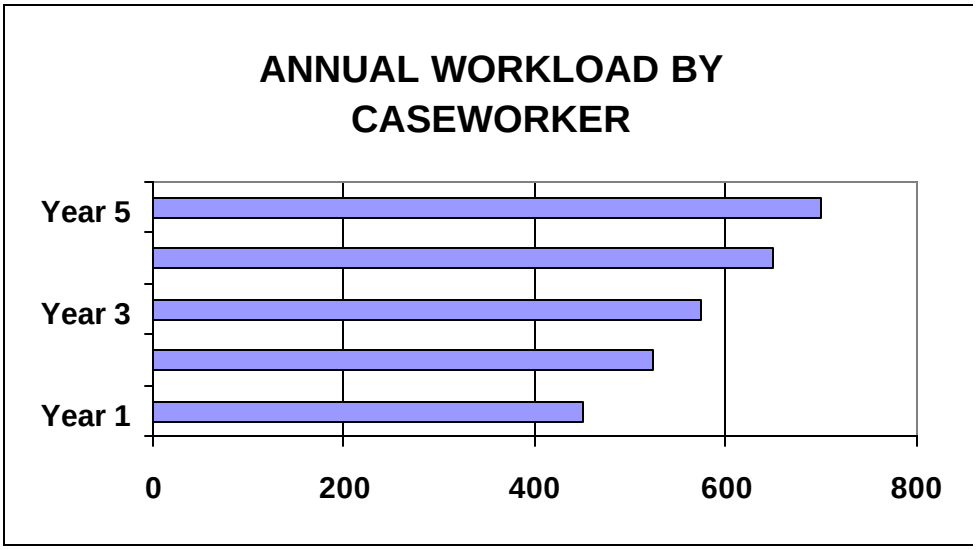
Under the current system, caseload processing is only marginally within system capabilities. The workload is achieved at the expense of significant delays for clients, support from outside processing services to meet system overloads, and caseworker overtime. (The latter was described in Benefit 2.)

Unfortunately, the current workload is not expected to remain level. It will increase, from 55,200 to an estimated 80,800 cases annually. See the graph below.



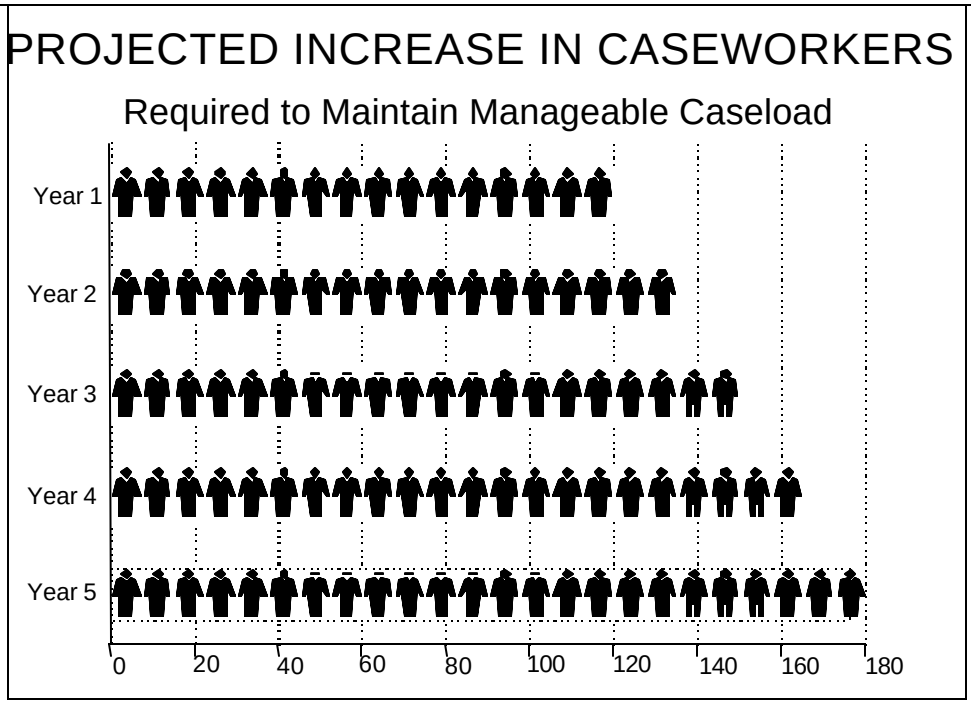
If management were to take no action, the caseworker burden would increase approximately 10% annually, from 460 to 673 cases per year. See the chart on the following page for the annual projected burden by caseworker, if no action is taken.

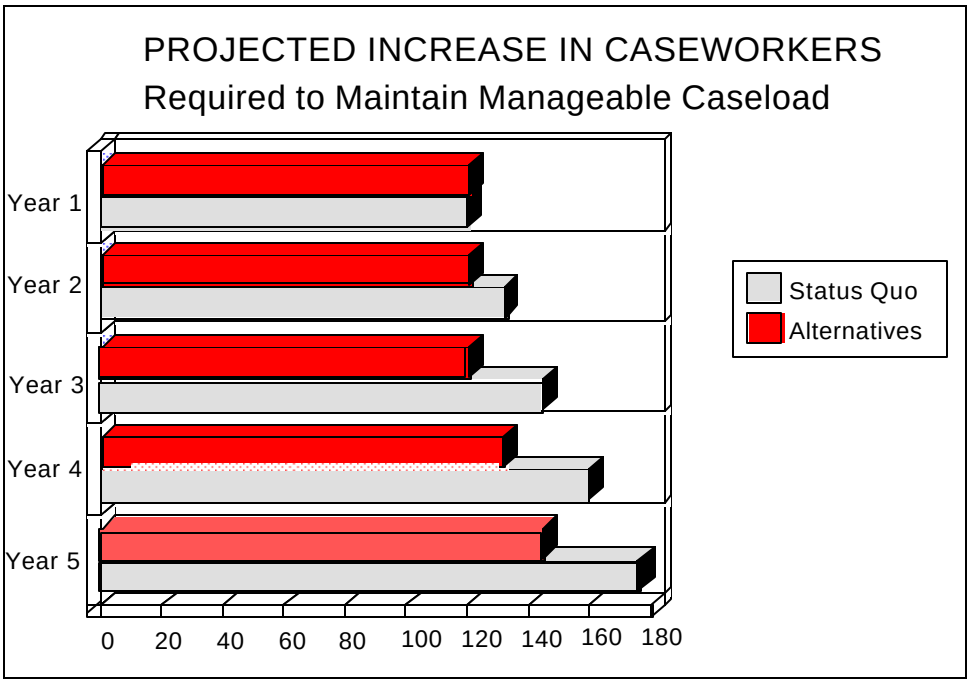
This situation is considered untenable by State management. The problem was analyzed and addressed in an internal State staffing plan. This plan addresses the number and timing of additional required staff and the manner in which they would be recruited and trained.



The results of this plan, showing the projected staff increase for the status quo, is depicted in the top chart on the next page. In order to maintain a ratio of about 460 cases annually per caseworker, staffing would increase from 120 caseworkers to 176 over five years.

However, with the new system, reductions in administrative duties (described in Benefit 2) would enable staff to handle more cases per year — from 460 cases annually per year to 560 cases per year. This would reduce the overall staff requirements projected as necessary — down from 176 in the fifth year to 144 — and delay recruitment of additional personnel until the fourth year of the system life. See the bottom chart on the following page for a comparison of projected staffing between the status quo and the alternatives. [Both alternatives would support the same staffing pattern.]


PROJECTED INCREASE IN CASEWORKERS
Required to Maintain Manageable Caseload
Year 1
Year 2
Year 3
Year 4
Year 5
0
20
40
60
80
100
120
140
160
180


PROJECTED INCREASE IN CASEWORKERS
Required to Maintain Manageable Caseload
Year 1
Year 2
Year 3
Year 4
Year 5
0
20
40
60
80
100
120
140
160
180
Status Quo
Alternatives

Basis for Numbers: Projected caseloads are documented in a study conducted this year with contractor assistance, *Historical and Demographical Trends in Casework: Effect on the Future.* Next the State examined the effect of the projected caseload increase on current staff and devised a strategic staffing plan. The *State Caseworker Staffing Master Plan* was developed by a team represented by State management, personnel specialists, caseworker professional organization representatives, and contractor specialists. These studies will remain on file in the State throughout the development, implementation, and operation of this project.

Average case processing time is currently just over three hours, based on program management records on file in the State. Under the current system, caseworkers working 46 weeks per year at 32 hours per week on casework would have 1,472 hours, allowing them to process about 460 cases. Given the weekly gain of four hours for case processing that will accrue from the elimination of administrative duties (see Benefit 2), current staff working 46 weeks per year, 36 hours per week, with an average case processing time of under 3 hours, will be able to process management's projected goal of 560 cases per year. These figures are considered conservative based on the fact that other system improvements have not been factored in — and based on other States' records of processing similar cases in 2.5 hours, once modern technology was employed.

Assumptions: No major changes will take place in the duties assigned to caseworkers over the systems life. Workload growth will remain within the projections cited herein. There will be no new program mandates.

Initial Calculations of Benefit's Values If no action is taken, the State's caseworker staff will increase from 120 to 176 over five years. The average annual salary for the current staff is $42,000. According to the State's staffing plan, new caseworkers would be hired under the State's three-year training program with annual salaries of $32,000, $34,000, and $36,000, for the first, second, and third years respectively. All dollars are constant dollars. No cost-of-living adjustments or other salary increases are currently approved and, therefore,

have not been factored into these calculations. See the top table on page 3-22.

If the new system is adopted, the State's caseworker staff will remain stable for three years, then increase by 11 in year 4 and 13 in year 5 to a total of 144 caseworkers. See the bottom table on the following page.

The difference between the total loaded salary projections establishes the estimated program cost avoidance reported as a benefit for the alternatives. See below. There is no corresponding benefit for the status quo.

SYSTEM LIFE BENEFITS PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Status Quo Salaries	6,325,200	6,807,120	7,359,320	8,024,470	8,737,310	37,253,420
Alternatives' Salaries	6,325,200	6,325,200	6,325,200	6,766,960	7,316,650	33,059,210
Benefit 3	0	481,920	1,034,120	1,257,510	1,420,660	4,194,210

[Note that caseworker costs are not included on the cost side of the cost/benefit analysis, since those costs do not directly support the systems project. The program cost differential effected by the systems project is claimed as a cost avoidance of the alternatives.]

Measurement Plan: The State will measure actual staffing salaries at the loaded rate and deduct the actuals from the projected status quo salaries, to determine whether the projected cost avoidance benefit has been achieved.

Projected Caseworker Expenses: Status Quo							
Year	**Staff**	**Salary**	**Total**	**Annual Salary**	**Total Staff**	**Fringe Rate**	**Loaded Salary**
1	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
2	120	42,000	5,040,000	5,424,000	132	0.255	6,807,120
	12	32,000	384,000				
3	120	42,000	5,040,000	5,864,000	145	0.255	7,359,320
	12	34,000	408,000				
	13	32,000	416,000				
4	120	42,000	5,040,000	6,394,000	160	0.255	8,024,470
	12	36,000	432,000				
	13	34,000	442,000				
	15	32,000	480,000				
5	120	42,000	5,040,000	6,962,000	176	0.255	8,737,310
	25	36,000	900,000				
	15	34,000	510,000				
	16	32,000	512,000				

Projected Caseworker Expenses: Alternatives							
Year	**Staff**	**Salary**	**Total**	**Annual Salary**	**Total Staff**	**Fringe Rate**	**Loaded Salary**
1	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
2	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
3	120	42,000	5,040,000	5,040,000	120	0.255	6,325,200
4	120	42,000	5,040,000	5,392,000	131	0.255	6,766,960
	11	32,000	352,000				
5	120	42,000	5,040,000	5,830,000	144	0.255	7,316,650
	11	34,000	374,000				
	13	32,000	416,000				

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION

Benefit Number: 3
Description: Controlled Staff Expenditures in Meeting Caseload Growth (see narrative for further detail on calculation)

STATUS QUO BENEFIT VALUE

Assumptions: None. No benefit is claimed for the status quo. Figures below on projected staffing costs for the status quo were used to determine cost avoidance for the alternatives.

Numbers	Basis	Source
Current Measure/Volume: 120 caseworkers	State Staffing Plan	State Caseworker Staffing Master Plan
Projected Increase/Decrease Over Time: 10% to 176	State Staffing Plan	State Caseworker Staffing Master Plan
Current Value: $6,325,200 with variable cost increase	State Staffing Plan	State Caseworker Staffing Master Plan

System Life Caseworker Costs: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
6,325,200	6,807,120	7,359,320	8,024,470	8,737,310	-	-	-	37,253,420

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: Workload growth will remain within the projections stated in Benefit 3 and there will be no new program mandates requiring overtime

Numbers	Basis	Source
Measure/Volume at implementation: 120	State Staffing Plan	State Caseworker Staffing Master Plan
Projected Increase/Decrease Over Time: Stable til year 4	State Staffing Plan	State Caseworker Staffing Master Plan
Initial Value at Implementation: $6,325,200	State Staffing Plan	State Caseworker Staffing Master Plan

System Life Projected Caseworker Costs: Alternatives

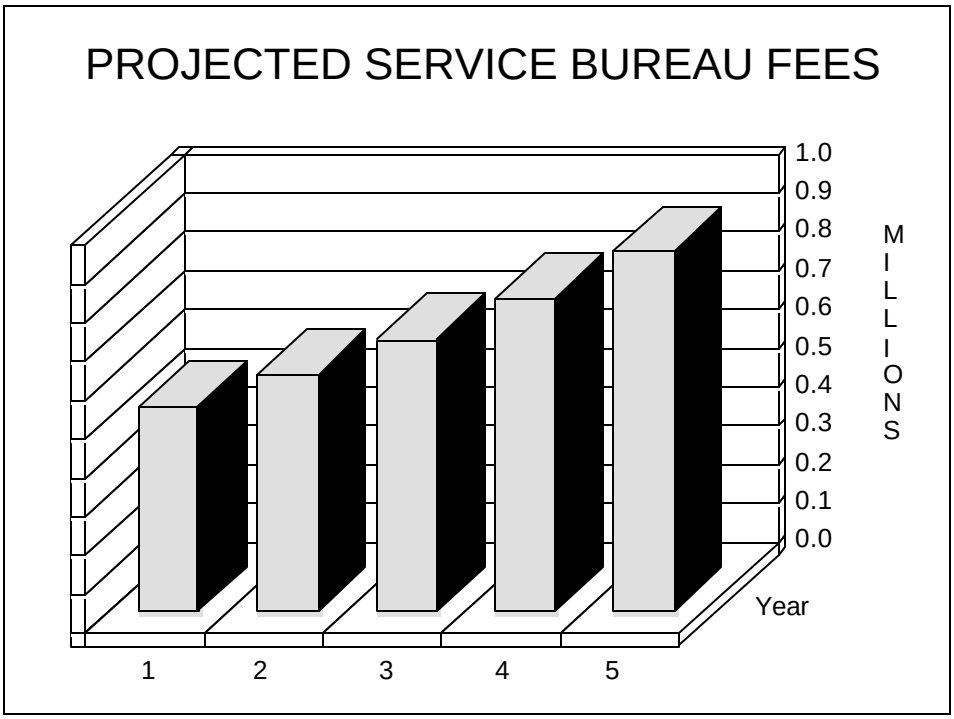
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
6,325,200	6,325,200	6,325,200	6,766,960	7,316,650	-	-	-	33,059,210

System Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	481,920	1,034,120	1,257,510	1,420,660	-	-	-	4,194,210

Benefit 4:
Reduction in Service Bureau's Processing Costs

Scenario: Under the current system, backlogs in caseload processing are transferred to an outside service bureau. This is required since current processing resources are unable to handle peak processing loads at certain times of the year. See the chart below.



The new system will have sufficient capacity and capability to process all workload.

Basis for Numbers: The information in the chart was provided by the State's procurement office, based on the State's current five-year service bureau contract. (This contract is used for other purposes, so eliminating service for caseload processing will not result in contract termination charges.) Between program workload and service bureau fixed-fee contract rates, the fixed

price costs for service bureau processing will increase at about 15% per year. The contracts are maintained in the State's procurement office.

Assumptions: No major changes will take place in the duties assigned to caseworkers over the systems life. Workload growth will remain within the projections cited in Benefit 3. There will be no new program mandates.

Initial Calculation of Benefit's Value: Figures are from the State's five-year, fixed-price contract, and are in the State's current budget. (Dollars stated reflect fixed price contract rates and have not been adjusted by the State for inflation.) Since these figures are budgeted and approved systems-related costs, they are shown as costs for the status quo and first year of the alternatives and as system cost savings benefits for years 2 - 5 of the alternatives.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Support Services: Service Bureau Fees	531,300	610,995	702,644	808,041	929,247	3,582,227

SYSTEM LIFE COST PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Support Services: Service Bureau Fees	531,300	0	0	0	0	531,300

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 4	0	610,995	702,644	808,041	929,247	3,050,927

Measurement Plan: Service bureau charges in support of program operations are projected to be eliminated by the second year. The finance department maintains records by expenditure category and program office and will be able to confirm elimination of these costs.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION

Benefit Number: 4
Description: Reduction in Service Bureau's Processing Costs

STATUS QUO BENEFIT VALUE

Assumptions: None. No benefit is claimed for the status quo. Figures below on current and future service bureau processing fees were used to determine cost savings for the alternatives.

Numbers	Basis	Source
Current Measure/Volume: $531,000 annually	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Projected Increase/Decrease Over Time: 15% annually to $929,247	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Current Value: $531,000 annually	State Budget (1994-1999) & Service Contract	Budget and Procurement offices

System Life Cost Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
531,000	610,995	702,644	808,041	929,247	-	-	-	3,581,927

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: No major changes will take place in caseworker's duties. Workload growth will remain within the projections stated in Benefit 3. No new program mandates.

Numbers	Basis	Source
Measure/Volume at implementation: $531,300	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Projected Increase/Decrease Over Time: Eliminated in second year	State Budget (1994-1999) & Service Contract	Budget and Procurement offices
Initial Value at Implementation: -$531,000	State Budget (1994-1999) & Service Contract	Budget and Procurement offices

System Life Cost Profile: Alternatives

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
531,500	-	-	-	-	-	-	-	531,500

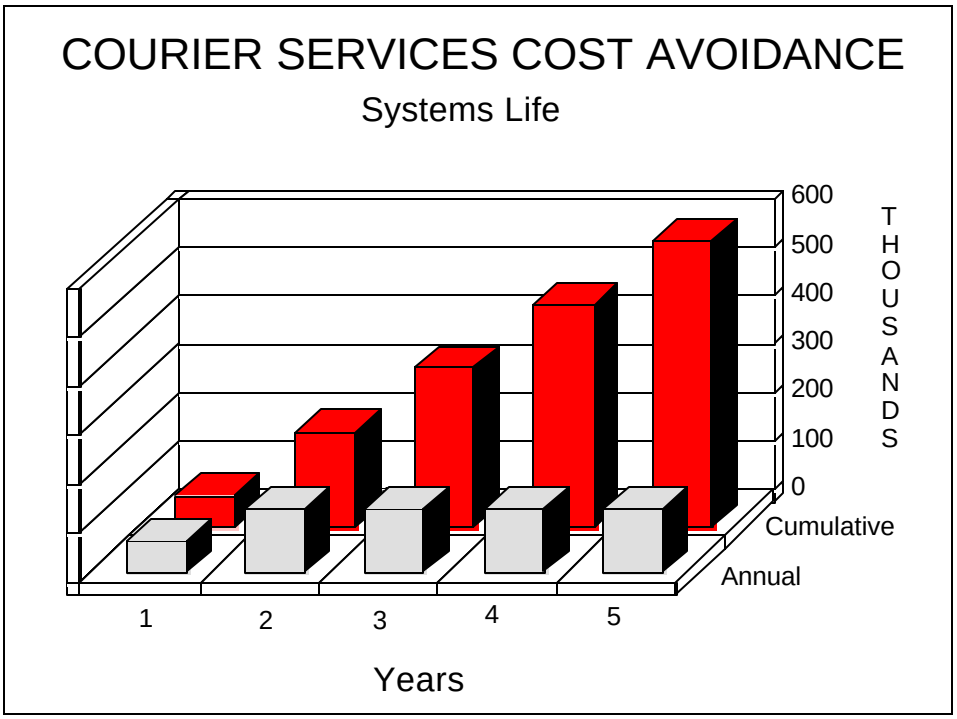
System Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	610,995	702,644	808,041	929,247	-	-	-	3,050,927

Benefit 5:
Reduction in Courier Service Costs

Scenario: Since the current system lacks statewide telecommunications support, the program relied on courier services last year to deliver time-sensitive material to meet new mandates for information timeliness. Since these costs were not anticipated nor budgeted, the expenses could only be met by reprogramming funds from a State emergency operating expense account.

To meet this expense in current or future years, funds would have to be reprogrammed from the program accounts. However, with the new system, electronic transmission will be used, eliminating the need to budget for this expense — resulting in a system cost avoidance.



Basis for Numbers: Projected courier service costs are based on the State's most recent expenditures. Figures are expressed in constant dollars. Spending records are archived in the State. (A management study conducted at the time that courier services were adopted indicated that there were no more economical alternatives to meet this requirement, given the State's current technological limitations.)

Assumptions: Commercial network services will be installed by mid-year in the first year, cutting courier service costs in half.

Initial Calculations of Benefit's Value: The benefit has an average yearly value of $130,000, based on past expenditures. There are no benefit values for the status quo; however, costs are reflected since they are direct systems operational costs requiring funding. See the following excerpts.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Courier Service Fees	130,000	130,000	130,000	130,000	130,000	650,000

SYSTEM LIFE COST PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Courier Service Fees	65,000	0	0	0	0	65,000

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 5	65,000	130,000	130,000	130,000	130,000	585,000

Measurement Plan: Courier service charges in support of program operations are projected to be eliminated by mid-year in the first year. The finance department maintains records by expenditure category and program office and will be able to confirm elimination of these costs.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION
Benefit Number: 5 **Description:** Reduction in Courier Service Costs

STATUS QUO BENEFIT VALUE
Assumptions: None. No benefit is claimed for the status quo. Figures below on current and future courier service fees were used to determine cost savings for the alternative

Numbers	Basis	Source
Current Measure/Volume: $130,000	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Stable	State Budget (1994-1999)	Budget office
Current Value: $130,000 annually	State Budget (1994-1999)	Budget office

System Life Benefits Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
130,000	130,000	130,000	130,000	130,000	-	-	-	650,000

ALTERNATIVE 1 BENEFIT VALUE
Assumptions: Commercial network services will be installed by mid-year in the first year, cutting courier service costs in half.

Numbers	Basis	Source
Measure/Volume at implementation: $150,000	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Stable	State Budget (1994-1999)	Budget office
Initial Value at Implementation: $150,000	State Budget (1994-1999)	Budget office

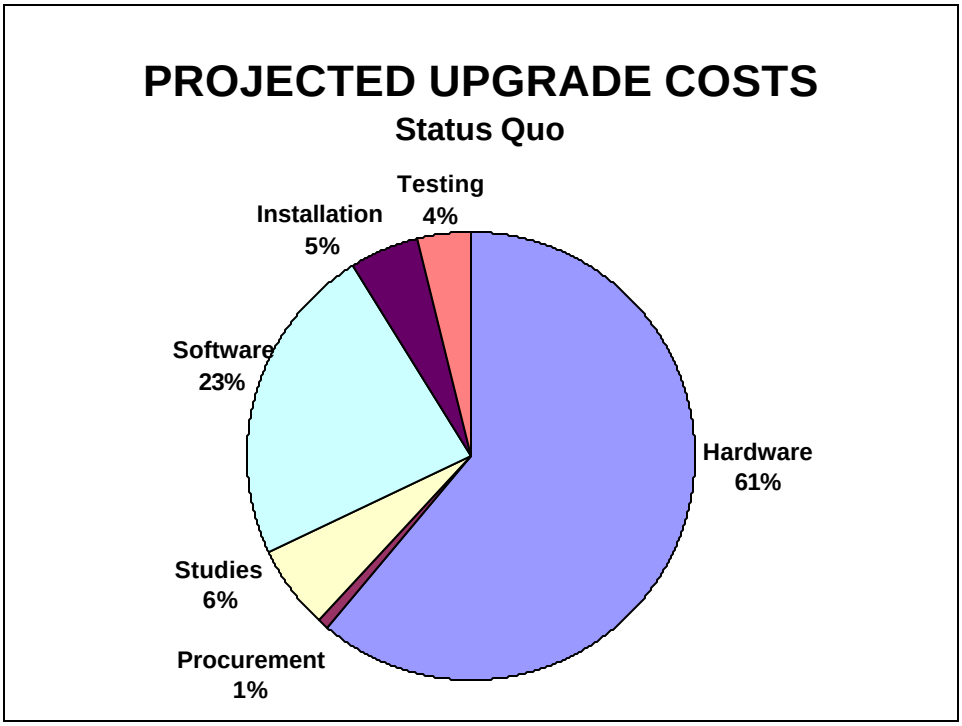
System Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
65,000	130,0000	130,0000	130,0000	130,0000	-	-	-	5,265,000

Benefit 6:
System Engineering Upgrade Cost Savings

Scenario: Under the current systems plans and budgets, the status quo computer system is scheduled for a hardware and software engineering upgrade in the third year. This upgrade is required by the manufacturer, in order to continue hardware and software maintenance services beyond year 3. This upgrade does not affect the capacity or capability of the system's processing power. It simply makes the equipment eligible for continued maintenance support.

The upgrade is budgeted at $655,000, with expenditures for equipment and software purchase and fees, installation, system testing, studies, and procurement. See the graph below.



By implementing the alternative, the upgrade will not be made — resulting in a system cost savings.

Basis for Numbers: The figures were taken from the latest approved State budget. A copy will be maintained in the State.

Assumptions: None.

Initial Calculation of Benefit's Value: The benefit has a value of $655,000, as a system cost savings from the status quo.

SYSTEM LIFE COST PROFILE: STATUS QUO						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
System upgrade	0	0	655,000	0	0	655,000

SYSTEM LIFE BENEFIT PROFILE: ALTERNATIVES						
Description	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefit 6	0	0	655,000	0	0	655,000

Measurement Plan: None required. Budgeted funds will be de-allocated and cost savings claimed in the third year.

Quantified Benefits Worksheet: Systems Life

BENEFIT CATEGORY / DESCRIPTION
Benefit Number: 6 **Description:** System Upgrade Cost Savings
STATUS QUO BENEFIT VALUE
Assumptions: No benefit is claimed for the status quo. Figures below reflect costs budgeted for the status quo and used to determine cost savings for the alternative

Numbers	Basis	Source
Current Measure/Volume: $655,000 (third year)	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Non-recurring	State Budget (1994-1999)	Budget office
Current Value: $655,000 annually	State Budget (1994-1999)	Budget office

System Life Benefits Profile: Status Quo

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
0	0	655,000	0	0	0	0	0	655,000

ALTERNATIVE 1 BENEFIT VALUE

Assumptions: None

Numbers	Basis	Source
Measure/Volume at implementation: None	State Budget (1994-1999)	Budget office
Projected Increase/Decrease Over Time: Non-recurring (third year)	State Budget (1994-1999)	Budget office
Initial Value at Implementation: None - $655,000 (third year)	State Budget (1994-1999)	Budget office

System Life Benefits Profile: Alternative 1

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
-		655,0000			-	-	-	655,000

Cost / Benefit Profile

Alternative 1 Constant Dollars

SYSTEM LIFE COST PROFILE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Non-Recurring Costs	3,700,000	0	0	0	0	3,700,000
Recurring Costs	1,621,868	1,621,868	796,145	796,145	796,145	5,632,171
Total Projected Costs	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171
Total Present Value Costs	5,144,650	1,465,358	672,265	628,238	587,157	8,497,668
SYSTEM LIFE BENEFITS PROFILE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
Total Present Value Benefits	62,836	1,610,418	2,601,825	2,174,016	2,241,568	8,690,663
CUMULATIVE BENEFIT / COST PROFILE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cumulative Total Projected Benefits	65,000	1,847,422	4,928,693	7,683,751	10,723,165	N/A
Cumulative Total Projected Costs	5,321,868	6,943,736	7,739,881	8,536,026	9,332,171	N/A

QUALITATIVE BENEFITS					
Benefits	Related System Objectives	Measure of Effectiveness			
		Very Effective	Effective	Minimally Effective	Not Effective
Enhanced use of technology to speed up input, processing, and transmission	Eliminate processing delays Provide more timely services	√ √			
Support program goals and long range strategies		√			
Ensure flexibility and proven technology		√			

COMPARISON OF ALTERNATIVES

Constant Dollars

QUANTITATIVE FACTORS			
Description	**Status Quo**	**Alternative 1**	**Alternative 2**
Total Present Value Benefits	0	8,690,663	8,690,663
Less Total Present Value Costs	7,658,159	8,497,668	10,652,110
Net Benefit (Cost)	-7,658,159	192,995	-1,961,447
Benefit/Cost Ratio	0.00	1.02	0.82
Breakeven (Months)	N/A	52	N/A

QUALITATIVE FACTORS			
Description: Enhanced use of technology to speed up input, processing, and transmission in order to: • Eliminate processing delays, and • Provide more timely services.	N/A	Highly Effective	Highly Effective
Support program goals and long range strategies		Highly Effective	Highly Effective
Ensure flexibility and proven technology		Highly Effective	Highly Effective

Cost Measurement Baseline

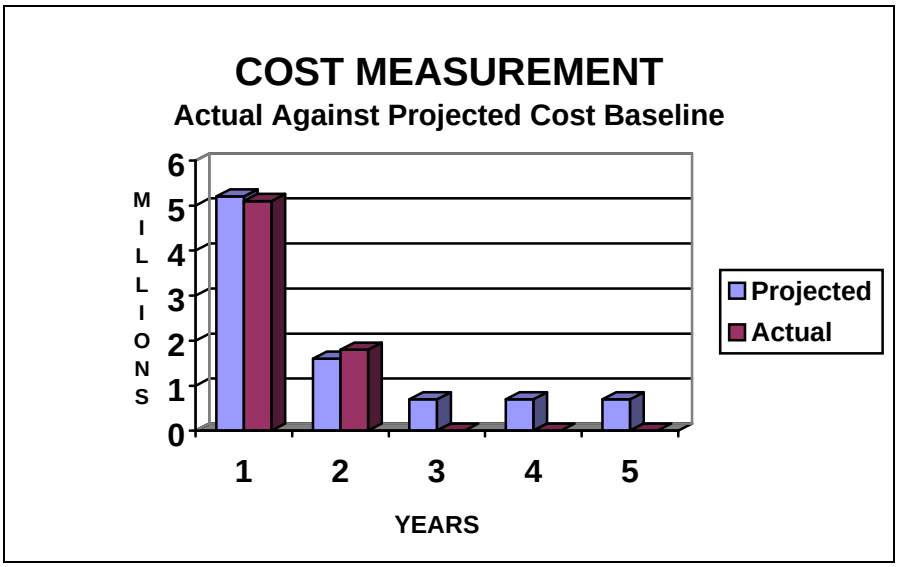
SYSTEM LIFE COST BASELINE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Non-Recurring Costs	3,700,000	0	0	0	0	3,700,000
Recurring Costs	1,621,868	1,621,868	796,145	796,145	796,145	5,632,171
Total Projected Costs	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171
SYSTEM LIFE BENEFITS BASELINE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
CUMULATIVE BENEFIT / COST BASELINE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cumulative Total Projected Benefits	1	3	6	10	15	N/A
Cumulative Total Projected Costs	3,700,000	3,700,000	3,700,000	3,700,000	3,700,000	N/A

[Editor's Note: This chapter is an example of a cost/benefit measurement report. It is written as though reporting in the second year of the project described in Chapters 2 and 3. This clarifies the relationship between the planning stage studies and the post-implementation measurement and reporting phase.]

Annual APD Update: Section VII
Cost / Benefit Measurement Report: Year 2

Overview: Costs and benefits are conforming closely with those projected during the planning phase of this systems development project.

Costs: Costs incurred this fiscal year were about ten percent more than projected for this fiscal year, primarily due to support services and training costs. In response, the State has initiated cost control procedures to closely regulate contractor task assignments and performance and to provide in-house training. Further, reduced expenditures will be sought in the site and facility categories, given the local recession in the commercial real estate market and the corresponding drop in market prices. Part of this year's costs were offset by last year's lower than anticipated prices, which resulted from keen competition for the system hardware contract.

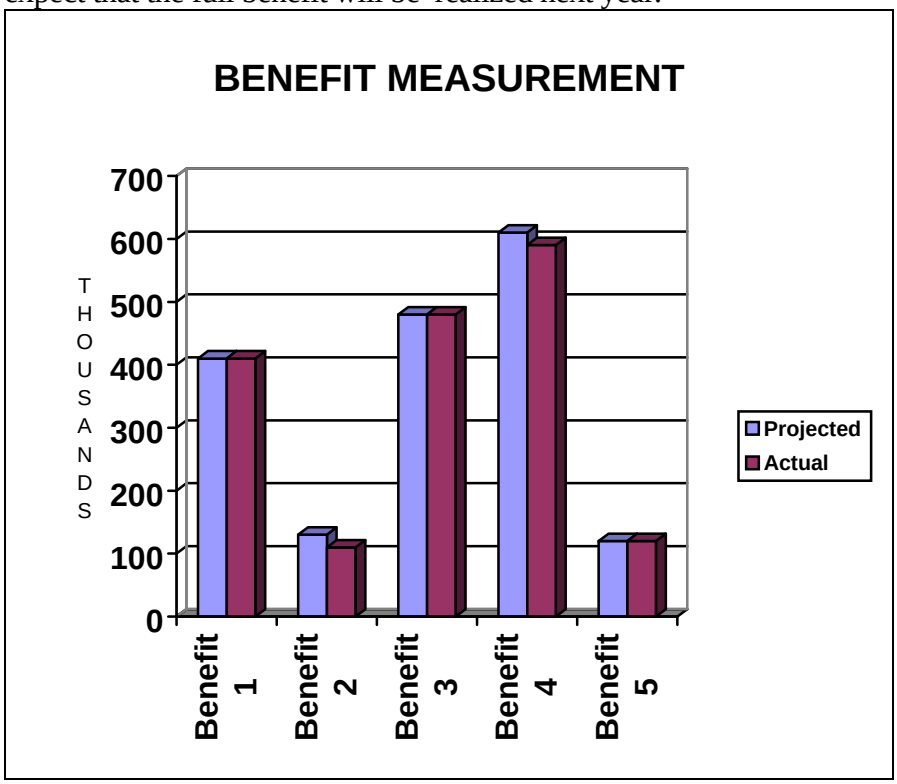


The graph at the top of the next page depicts the relationship of actual costs to projected costs. Details are on page 5

Benefits Measurement: Benefits were lower than anticipated in only two of the six benefit categories: overtime (benefit 2) and service bureau processing costs (benefit 4).

Overtime was reduced $111,291 — $38,709 short of the $150,000 target. The overtime was required early in the year, when caseworkers were adapting to the new system and had not yet achieved operational efficiency. Given the performance of the last eight months, we expect that the full reduction of $150,000 will be met next year.

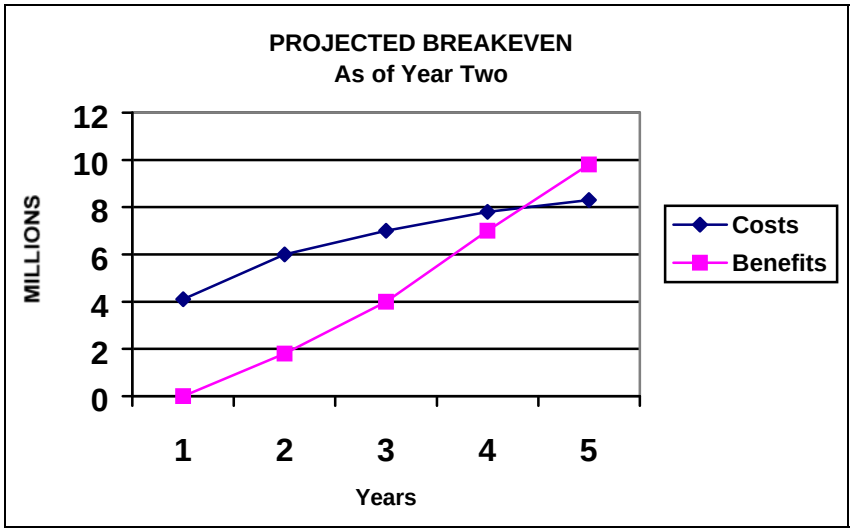
Moderate service bureau processing costs ($21,655) were incurred this year, due to a slight slippage in full cut-over to the new system. Fully $589,340 of the projected $610,995 in benefits was realized. We expect that the full benefit will be realized next year.



The graph at the bottom of the preceding page depicts the relationship of actual benefits to projected benefits. Details are provided on page 5.

The State's plan to reduce caseworkers' administrative duties to 10% of their time has been realized (benefit 1), proven by repeating the study originally conducted in support of the cost/benefit analysis. In addition, the objective to control staff expenditures in meeting caseload growth was realized this year (benefit 3) and is on track for future years. With the new system and reductions in administrative duties, caseworker caseload increased from the old system's average of 460 per year, to 500 (annualized) in the first six months and 550 (annualized) in the last six months. Increasing operational efficiency and minor procedural improvements (already effected) should enable the caseworkers to attain the projected 560 case workload next year. Finally, the projected cost savings resulting from eliminating the use of courier services was realized (benefit 5).

Projected Breakeven: The State still anticipates that the systems project will breakeven, at approximately the same time as originally projected. See below.



Performance Baseline: The State has also made considerable progress toward the performance objectives set forth in the cost/benefit analysis. The chart below shows the baseline, current average, and target average.

The current average was based on the last six months of operations, considered a more accurate representation due to increasing operational efficiency. While the goal has not been achieved in all cases, the State is implementing procedural changes to support full realization of the benefits by next year.

PERFORMANCE BASELINE AND TARGET			
Category	**Baseline**	**Current Average**	**Target Average**
Input processing	7 days	3 days	Same day
Internal control checks	3 days	**1 day**	**1 day**
Report transmission	4 days	**Same day**	**Same day**
Acceptance of client data	3 weeks	8 days	1 week
Delay to benefits	3 months	6 weeks	1 month

Summary: There were no unanticipated costs. There are preliminary indications that some unanticipated benefits may accrue. Based on information provided by the personnel office, absenteeism and employee turnover rates among caseworkers have decreased significantly. If this trend continues, the staffing plan may be further reduced for increased cost-avoidance benefits.

Cost / Benefit Measurement Profile
Year Two

SYSTEM LIFE COST PROFILE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Non-Recurring Costs*	3,580,472	0	0	0	0	3,580,472
Recurring Costs*	1,621,868	1,782,320	0	0	0	3,404,188
Total Costs*	5,202,340	1,782,320	0	0	0	6,984,660
Total Projected Costs	5,321,868	1,621,868	796,145	796,145	796,145	9,332,171
Difference	-119,528	160,452	0	0	0	40,924
SYSTEM LIFE BENEFITS PROFILE						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Benefits*	65,000	1,722,058	0	0	0	1,787,058
Total Projected Benefits	65,000	1,782,422	3,081,271	2,755,058	3,039,414	10,723,165
Difference	0	-60,364	0	0	0	-60,364
CUMULATIVE BENEFIT / COST PROFILE (ACTUAL AND PROJECTED)						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cumulative Total Actual and Projected Benefits*	65,000	1,787,058	4,868,329	7,623,387	10,662,801	N/A
Cumulative Total Actual and Projected Costs*	5,202,340	6,984,660	7,780,805	8,576,950	9,373,095	N/A

COMPARISONS			
Description	Actual to Date	Current Projected	Baseline
Total Benefits	1,787,058	10,662,801	10,723,165
Less Total Costs	6,984,660	9,373,095	9,332,171
Net Benefit (Cost)	-5,197,602	1,289,706	1,390,994
Benefit/Cost Ratio	.26	1.14	1.15
Breakeven	N/A	58	58

* Actuals, years 1 and 2.