Maintaining Transit Effectiveness Under Major Financial Constraints

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TCRP
SYNTHESIS 112

TRANSIT COOPERATIVE RESEARCH PROGRAM

Maintaining Transit Effectiveness Under Major Financial Constraints

A Synthesis of Transit Practice

Sponsored by the Federal Transit Administration

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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP SYNTHESIS 112

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A Synthesis of Transit Practice

CONSULTANT
Joel Volinski
University of South Florida
Tampa, Florida

SUBJECT AREAS
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WASHINGTON, D.C.
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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academy of Sciences, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by TRB. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

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The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the Transit Development Corporation, the National Research Council, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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Cover figures: Transit agencies are seeking partnerships to have Wi-Fi installed in their trains and express buses to enhance passenger amenities while also generating revenue at no cost to the transit agency (*Source*: Sarah Fisher/*Daily Free Press* Staff).

Light rail and commuter rail trains that are fully wrapped with vinyl advertising are highly visible and very attractive to a number of businesses (*Source: Metro Magazine*, December 2012).

Cleveland's Healthline, which operates on the corridor that serves the heart of the city including the major hospitals and downtown (*Source*: Wikipedia).

FOREWORD

Transit administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the transit industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire transit community, the Transit Cooperative Research Program Oversight and Project Selection (TOPS) Committee authorized the Transportation Research Board to undertake a continuing study. This study, TCRP Project J-7, "Synthesis of Information Related to Transit Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute a TCRP report series, *Synthesis of Transit Practice.*

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Donna L. Vlasak
Senior Program Officer
Transportation
Research Board

This synthesis reports on hundreds of actions implemented by transit agencies to increase their cost-effectiveness, and describes how the agencies have engaged their communities during challenging fiscal circumstances. These actions have been generated from all functional areas of transit systems, making the report useful to virtually any transit employee or board member.

This synthesis includes an extensive literature review that, together with the survey responses from 40 of 46 transit agencies surveyed (an 87% response rate), provides information reflecting the experiences at more than 100 transit agencies in the United States. Four case examples offer more focused reviews of the efforts individual transit agencies have made to retain or expand their effectiveness in the communities they serve.

Joel Volinski, University of South Florida, Tampa, collected and synthesized the information and wrote the report, under the guidance of a panel of experts in the subject area. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

MAINTAINING TRANSIT EFFECTIVENESS UNDER MAJOR FINANCIAL CONSTRAINTS

SUMMARY

Transit agencies in the United States have frequently dealt with insufficient resources, but the "great recession" of 2007 to 2009 clearly presented the most difficult financial challenges most transit agencies have ever seen. The collapse of the real estate market and the decline in sales tax revenue substantially reduced the revenues typically available to support transit systems. Service was reduced in many communities, and transit agencies struggled to maintain their effectiveness. Essentially, this means that they needed to balance their budgets with reduced funds and maintain quality service in their communities while costs for such items as fuel and health care increased substantially, as did the demand for their service.

Transit agencies have responded by becoming more efficient in a great variety of ways. While gains from efficiencies are rarely sufficient themselves to balance transit agency budgets under such severe financial strain, each dollar saved or generated from new sources of revenue helps to maintain service in a community and demonstrates that the agency is doing everything possible without raising fares or increasing taxes. This synthesis examines the many ways transit agencies have reduced their costs and generated new revenues to help provide as many dollars as possible to maintain or increase service and thereby maintain their effectiveness.

The sampling plan to obtain information for this report was based on a survey that was issued to 46 transit agencies. Forty transit agencies completed the survey, representing an 87% response rate. This synthesis includes an extensive literature review that, together with the survey responses, provides information reflecting the experiences at more than 100 transit agencies in the United States. Four case examples offer more focused reviews of the efforts individual transit agencies have made to retain or expand their effectiveness in the communities they serve.

The most important findings of the synthesis follow. Advances in technology, usually purchased with capital dollars, have enabled transit agencies to conduct much better analyses than they could have done 10 years ago, allowing much more data-based decision making throughout the organization. Transit agencies are using superior analytics and technologies such as automatic passenger counters to pinpoint where and when riders use transit, allowing them to almost surgically modify service in ways that either save money with minimal impact on riders or allow the agency to invest the savings into service where it is most productive. Transit managers and their boards are also exercising greater discipline through the adoption of service guidelines or standards, resulting in their providing service in areas of higher demand while finding other, less expensive ways to serve areas that support the transit system through taxes but have a low demand for the service. This right-sizing of service is also reflected in the types and sizes of vehicles that are purchased, which are increasingly operating on more efficient alternative fuels. Optimization software

helps transit planners and schedulers develop more efficient runs and routes. Paratransit expenses are being managed more efficiently through

- Travel training to encourage the use of less expensive fixed-route service
- Better management of "no-shows"
- The incorporation of local taxi services to help handle peak demand
- Cooperative partnerships with nonprofit agencies
- The utilization of more fuel-efficient vehicles
- Firm but fair determinations of eligibility for service.

Contracting for lower-cost fixed-route service is becoming more common and, in some areas, has helped communities retain service that would otherwise have been eliminated or drastically reduced. Commonsense low-cost solutions such as the reduction of idling and consolidating the number of bus stops to enhance bus speeds have saved money and improved the reliability and quality of service. An increasing number of transit agencies are participating in the American Bus Benchmarking Group to examine their performance in relation to peers, leading to further improvements in productivity and quality.

Tremendous advances in office computer systems have resulted in reduced costs and better management of assets. Social media are increasingly being used to transmit real-time information to passengers. This is particularly timely as more people (especially younger people) are coming to rely on applications on cell phones to access information about transit service status. It also provides transit agencies the opportunity to reduce costs associated with printed materials.

Capital funds have been used strategically to reduce operating expenses through the purchase of more fuel-efficient vehicles and utility-efficient buildings and equipment. Improvements of this nature not only save transit agencies a considerable amount of money but also reduce their carbon footprint.

Health care costs are being better managed through a variety of techniques, including self-insurance strategies coupled with wellness programs and safety campaigns, the procurement of greater expertise to help control costs associated with workers' compensation and the Family and Medical Leave Act (FMLA), transitional work programs for employees unable to perform their regular duties because of injury, and the institution of high-deductible insurance plans to replace premium-based plans.

Transit agencies have downsized management and reorganized to become "flatter" and leaner. Most employees, including those represented by collective bargaining units, have seen minimal, if any, increases in pay at the same time that they have been asked to contribute more to health benefits. In some cases, pay increases are tied to overall agency performance judged through key performance indicators. Work rules, particularly in transit operations, that many see as antiquated have been eliminated or changed while guaranteed overtime has been reduced through negotiations with transit unions. Some pension systems have been changed from defined benefit plans to defined contribution plans for new employees. Some functions have been outsourced, while others have been brought in-house, depending on which option is more cost-effective.

Transit vehicle maintenance programs have found new ways to reduce inventory and its associated costs. More use of electrification of key accessories on buses has increased fuel mileage by as much as 15%. Better analytical capabilities of maintenance issues have been implemented through software and an investment in budget analysts that can track performance and work with managers to develop solutions.

Transit agency revenues have been increased by more aggressive sales of advertising opportunities to companies looking to promote their products or services. Ad space is now sold not only on bus exteriors and bus shelters but in almost every venue controlled by transit agencies that might be viewed by a pair of eyes or heard by a pair of ears, including on transit agency websites. Digital advertising is becoming more common, whether on kiosk panels, the sides of buses, or billboards on property owned by transit agencies. The sale of naming rights to major transit stations or routes has generated millions of dollars. More transit agencies, particularly in urban areas, are relaxing their restrictions on advertising alcohol, resulting in increased revenues. Audio advertising is now featured inside buses at a growing number of transit agencies. Transit stations serve not only as areas to advertise but as places that can provide convenient services—such as video rentals and virtual grocery shopping—that result in rental income to the transit agency and convenience for passengers.

Companies or organizations interested in improving access to their locations are open to sharing the costs of providing transit services, enabling transit systems to expand the service they offer. Transit agencies have developed cooperative relationships with universities, school districts, hospitals, downtown businesses, military bases, social service agencies, local governments, sporting venues, apartment complexes, and casinos, among others. These agreements not only provide additional revenue to the transit agency but also improve the relevance of the agency in its communities, which can lead to additional public support in the future.

This synthesis reports on hundreds of actions implemented by transit agencies to increase their cost-effectiveness and describes how the agencies have engaged their communities during challenging fiscal circumstances. These actions have been generated from all functional areas of transit systems, making the report useful to virtually any transit employee or board member. While the actions described helped transit agencies deal with the funding crisis brought on by the great recession, communities should continue to realize the benefits of these actions well into the future.

CHAPTER ONE

INTRODUCTION

PROJECT BACKGROUND AND DEFINITION OF "TRANSIT EFFECTIVENESS"

Transit agencies in the United States usually struggle to deliver the most effective service possible with limited resources. Most transit agencies have never had the luxury of abundant funding. However, the recent great recession substantially reduced revenues from formerly reliable sources such as property taxes and sales taxes. The decrease in property values and overall sales tax revenue, combined with rising costs of fuel and health care for their employees, resulted in most transit agencies increasing passenger fares and reducing total hours of service. The challenge became even greater as demand for transit services increased owing to higher unemployment and rising gas prices, causing more people to utilize transit in place of their private vehicles. This set of circumstances has compelled transit agencies to look more broadly at strategies to increase their efficiency and effectiveness. More than ever, it is vital that transit agencies adopt techniques and policies that enable them to deliver the most efficient service in the most cost-effective way. This synthesis identifies approaches and actions that agencies around the country have undertaken to make their service more efficient, financially sustainable, and responsive to the needs in their community. Managers of transit agencies could benefit from understanding what has worked and what pitfalls should be avoided.

This synthesis report was designed to review activities associated with the following items:

- Nonservice cost efficiencies
- Labor contract provisions and costs
- Service productivity
- Service design and effectiveness analysis
- Technology improvements
- Operating effects of capital investment
- Outsourcing
- Alternative revenue sources
- Identification of transit agencies that have implemented any of the above-mentioned measures, the motivation for doing so, and any processes used
- The types of analysis transit agencies are engaged in
- Documentation of any impacts of the initiatives.

Transit *efficiency* usually deals with per unit costs of service delivery and can be defined as achieving the most passengers per hour or mile at the lowest cost. On the other hand, *effectiveness* is often intended to mean whether the transit system is contributing to a community's goals, such as economic development, environmental sustainability, decreasing traffic congestion, and the provision of equitable mobility opportunities.

For the purposes of this synthesis, "transit effectiveness" will refer to actions taken by transit agencies that allow them to provide the most and best service possible while working with budget resources that have been stressed owing to dwindling revenues and rising costs. In this case, efficiency and effectiveness are not mutually exclusive. Much of the report will cover what could be referred to as "cost-effectiveness." Quite simply, without intelligent management of resources to maximize revenues and reduce costs for greater efficiencies, transit agencies cannot be effective in terms of accomplishing their service mission and the broad goals of their communities.

PURPOSE OF REPORT AND INTENDED AUDIENCE

This report examines the various actions transit agencies have taken to maintain their overall effectiveness as a public service and as an employer when budgets get very tight. Perhaps the one advantage of stressed budgets may be that they can stimulate more creativity and greater questioning of long-practiced procedures that might need revision. In the case of transit, a tight budget also requires improvement in an agency's ability to communicate its circumstances and seek reasoned input from its patrons who rely on the service to access jobs, education, medical treatment, shopping, and all other life-supporting services. Transit agencies have the additional challenge of needing to lead these efforts in an environment in which many new practices must be negotiated with a workforce composed primarily of organized labor in a political environment.

As one transit manager noted, "If there was a lot of money, anybody could manage this agency." This report is intended to collect as many examples as possible of ways that transit agencies across the United States have reduced their costs with the least (or no) painful reductions in service or loss of ridership, while also identifying various steps these agencies have taken to increase their revenues from

sources other than increased fares or traditional property, sales, or other taxes, which are difficult to raise during weak economic times. In short, the report will identify how better management at all levels has enabled transit agencies to provide the most service possible under tight fiscal constraints.

This synthesis will be of interest to transit managers throughout the country, regardless of their level in their agency and regardless of what aspect of the agency they are engaged in (e.g., operations, planning, administration, marketing, purchasing, finance, information systems, human resources). The report will also be of interest to transit agency policy boards, transit unions, businesses that supply the industry, and public transportation customers.

TECHNICAL APPROACH

The approach to this synthesis included the following:

- A literature review of papers and reports recorded in the Transport Research International Documentation (TRID) database to retrieve any scholarly articles in professional journals and reports prepared over the past 5 years that have addressed the subject of transit effectiveness, particularly under financial constraints.
- A review of articles over the past 5 years included in weekly or monthly transit industry journals such as *Mass Transit Magazine, Metro Magazine,* and *Passenger Transport*, as well as *TransitTalent*, a weekly e-zine that collects news stories focused on transit issues while also advertising open transit positions around the country. These publications proved to be the greatest source of information relevant to this synthesis, as they provided recent examples of actions taken by transit agencies to improve their cost-effectiveness.
- A review of articles included in http://www.transitnews.net, a paid subscription service that provides links to all transit-related stories appearing in various media throughout the country. Some of the articles chronicled the actions taken by transit agencies to deal with their financial challenges.
- Information received by the author from transit agencies around the country in response to ongoing inquiries he has made to stay abreast of this subject since the publication of his 2003 National Center for Transit Research report *Lessons Learned in Transit Efficiencies, Revenue Generation, and Cost Reductions.*
- A survey completed by 40 transit agencies of various sizes representing 17 states from every region of the country that included both closed and open-ended questions that asked agencies to describe their experience and the various techniques they have employed to maintain effectiveness in their communities. The survey was initially sent to 46 transit agencies; 40 agencies responded (87% response rate).
- Follow-up phone calls and e-mails with a number of the survey respondents to clarify information they provided in the survey.

ORGANIZATION OF THIS REPORT

Chapter two summarizes the findings from the literature search that featured the types of articles, papers, and reports listed earlier. Chapter three provides results of the survey developed for this project that documents how 40 transit agencies are improving their effectiveness in providing transit services under tight fiscal constraints. Chapter four provides case examples of four different transit agencies representing different parts of the United States. Chapter five summarizes the findings, presents conclusions, and offers items for further study.

Appendix A is the survey instrument used to gain information from the 40 participating transit agencies. This survey was available to complete either through a web-based link or in a Microsoft Word document. Appendix B is a list of all the transit agencies that responded to the survey. Appendices C through G provide additional information received in response to questions asked in the survey, particularly from transit agencies that had provided a considerable amount of detail in response to the questions.

This synthesis contains information on many hundreds of techniques that transit agencies are using to gain new revenue without raising fares or to reduce their costs without negatively affecting their passengers. Given the volume and detail of information in the report and the variety of transit functional areas it covers, it is unlikely that every reader will want to read the entire synthesis. However, readers are encouraged to review the table of contents describing chapters two and three to identify subject areas they are particularly interested in (e.g., operations, maintenance, marketing, planning). In both the literature review chapter and the survey responses chapter, the techniques that save transit agencies money are covered first and the techniques agencies have used to earn new revenue are covered last. Each technique to save money or gain revenue is categorized into the separate disciplines normally present in transit agencies. In addition, the agency that submitted the technique is identified, allowing those who wish to contact the agency in order to learn more to do so.

CHAPTER TWO

LITERATURE REVIEW

INTRODUCTION

This chapter summarizes findings from a literature review related to the subject of transit effectiveness. A search of the Transportation Research International Documentation (TRID) database was conducted to aid the review, using key words and phrases such as "transit efficiency," "transit creativity," and "transit effectiveness." Articles from industry journal publications such as *Mass Transit Magazine, Metro Magazine,* and *Passenger Transport* were reviewed, as well as articles on public transportation issues featured in daily newspapers from around the country made available through a paid subscription service (http://www.transitnews.net). In addition, the author reviewed dozens of e-mails sent directly from transit managers in response to related research that described actions they had taken to either reduce their operating costs without harming their passengers or generate new revenues to supplement their traditional sources of financial support. Both kinds of actions help transit agencies minimize or avoid fare increases and service reductions.

It can be argued that most public services have often operated on fairly lean budgets. As one transit manager noted when agreeing to participate in the survey for this project, "Frankly, it is the age-old question, 'How to deliver public services and facilities in times of dwindling resources.' It is just that this time the dwindling resources problem was even more acute." There is no doubt that most transit agencies throughout the country were under considerable stress in terms of financial resources starting in fiscal year 2009. A report produced by APTA in August 2011, *Impacts of the Recession on Public Transportation Agencies*, noted that almost 80% of public transit systems had implemented fare increases or service cuts in 2010 or were considering them for the future because of flat or decreased local and/or regional funding. Seventy-one percent of responding agencies saw flat or decreased local and/or regional funding, and 83% experienced flat or decreased state funding. The decreases followed an already stagnant funding situation in 2010. Sixty-three percent of larger agencies implemented or approved hiring freezes, while 75% of larger agencies reduced the number of positions and 46% of larger agencies reported implementing or approving layoffs. Capital funding was also affected as 85% of transit agencies experienced flat or decreased capital funding. Nearly one in three (31%) delayed vehicle acquisitions and 20% delayed capital maintenance (*1*).

The financial challenge experienced by transit agencies was further demonstrated by the difficulties experienced by suppliers to the industry. The same APTA report noted that 74% of private-sector businesses serving the public transit industry incurred flat or declining business from 2010 to 2011 as a result of uncertainty in federal investment, a down economy, and a lack of investment in transit at the state and local level. Of those reporting a decrease in business, the average decrease was 25%. Fifty-six percent reported that they lost business from their public transportation clients, and 52% of businesses said they expected to lay off employees or cut back hiring as a result.

From 2010 through 2013, newspapers and journals around the country featured headlines demonstrating the troubled financial state so many transit agencies had been experiencing:

- "Regional Transit lays off 37 employees"
- "MARTA to slash a quarter of service"
- "MTA to eliminate more than 1,000 positions"
- "Riders to feel steep CTA cuts Monday"
- "Without state aid, MBTA GM leaning toward fare hikes"
- "End of the line for PDRTA?"

The following headline and story provide an illustrative example of the challenges many transit systems in the country have faced:

Community Transit to Cut Service in 2012

> Community Transit CEO Joyce Eleanor announced that owing to continued low sales tax revenues the Snohomish County transit agency will resize its operations and cut its service 20% in February 2012. Community Transit cut service by 15% in June 2010, including elimination of Sunday and holiday service, but the long-term effects of the recession make another cut necessary.
>
> In 2007, before the recession began, Community Transit collected $76 million in sales tax revenue, its primary funding source. The past two years, sales tax collections have been stuck at about $62 million, Eleanor said. "These cuts are necessary to keep our agency sustainable, so that we can provide transportation for Snohomish County residents far into the future," she said. The 2012 service cut will equal about 80,000 hours of service, roughly the same amount of service that was cut in 2010. "By this time next year we will have cut about a third of the service

> and about a third of the employees that we had at the beginning of 2010," Eleanor said. (*2*)

Clearly, there has been great pressure on transit agencies, their suppliers, their employees, and their passengers. In response to this financial squeeze, virtually every discipline and functional area within transit agencies has contributed to helping the agencies become more efficient and cost-effective and, consequently, as effective as possible in their community. Some of the ideas and techniques that have been developed generate relatively small amounts of savings or revenue, while others have had much more considerable impact on the financial status of the transit agencies. Some of the techniques have allowed transit agencies to maintain levels of service that might have otherwise been cut, while others resulted in additional service in the community. Beyond the actual maintenance or addition of service, the various techniques also demonstrated to the communities they serve that the transit agencies were doing everything in their power to be good stewards of public funds and to provide as much service as they possibly could to the public before they considered asking for higher fares or increased tax support.

This chapter will summarize various techniques that different transit agencies in the United States have implemented to help address these conditions. The techniques are presented by functional area within transit agencies that were identified during the literature search through the various channels noted previously. A summary table of the various techniques is provided at the end of the narrative for each functional area.

COST-EFFECTIVENESS TECHNIQUES IN TRANSIT OPERATIONS AND PLANNING

Service Design

Brown and Thompson of Florida State University examined the effects of different system designs on transit ridership by comparing a radial system that focused on providing service to the downtown (Tarrant County, Texas) to a gridlike system that connected employment and population, wherever they locate, as directly as possible by transit routes (Broward County, Florida). The analysis shows that the transit system that seeks to serve all the dispersed jobs in a service area carries almost 400% more ridership per capita than does the transit system that seeks to serve primarily central business district (CBD) jobs, while each bus mile operated in the gridlike transit system carries about 35% more passengers than each bus mile in the CBD-focused transit system (*3*). However, a later paper by Jaroszynski and Brown analyzed the experience of StarMetro in Tallahassee, Florida, which converted from a downtown-oriented radial system to a decentralized grid system in 2011. They found that the system, although adding service, actually lost ridership and efficiency, and cautioned that when modifying a radial system to a gridlike system, sufficient frequency of service should be provided to account for the higher number of transfers likely to be necessary on the latter (*4*).

The San Joaquin Regional Transit District (RTD) in Stockton, California, created deviated fixed routes to serve areas formerly served only by general public and Americans with Disabilities Act dial-a-ride services. These new routes (with the same vehicles but newly designed vehicle graphics and a new name: Hopper) now serve fixed-route as well as dial-a-ride passengers. The new service greatly enhances mobility options for RTD's customers. In the county area of RTD's service area, ridership increased by 86%, while costs per passenger went from more than $50 to $19 per trip (D. DeMartino, General Manager/CEO, San Joaquin RTD, personal communication, Feb. 22, 2010).

Extra Board Efficiency

Research performed by the Oregon Transportation Research and Education Center (OTREC) University Transportation Center identified commonsense techniques to help improve the efficiency of the extra board (when bus operators fill in for the regular operators who are on vacation, sick, or absent for any other unforeseen reason) of TriMet in the Portland, Oregon, metropolitan area. For example, the practice of granting personal days off on Fridays, Saturdays, or Mondays (which are typically lower attendance days among regular duty operators) could be discouraged, as could the practice of scheduling in-service training for operators on Fridays or Mondays. Operators may pass up a piece of assigned work when its report time is less than 9 hours from the previous day's sign out. Pass-ups by regular duty operators were found to add to the volume of open work, while pass-ups by extra board operators contributed to increases in both report time and time lost from missed pull-outs. Regular operator pass-ups occur as a consequence of the work selection process or as a result of trading their assigned work with another operator. Thus, the quarterly work selection process should discourage operators from piecing runs together that include pass-up situations. Trades into pass-up situations should also be discouraged (*5*).

Contracting for Service

Contracting for fixed-route bus services has been practiced at many transit agencies for decades, but there has been a distinct increase in contracting activity in the past 4 years, primarily because of the financial stress experienced by transit systems across the country. Policy makers in New Orleans, Louisiana; Savannah, Georgia; Nassau County, New York; Austin, Texas; and North County San Diego, California, have all converted what had been publicly operated transit systems into privately operated services,

with the first three being done under a delegated management contract in which the contractor is responsible for all aspects of management and service provision. The Nassau County contract of $110 million is the largest privately operated bus contract in the United States (*6*). Because of the heightened interests in fixed-route bus service privatization in the 1980s and continued interest in the 1990s, a number of studies were conducted to examine cost savings and cost efficiency gains expected from service contracting. The first group of studies examined costs to provide transit service before and after contracting, and most of them reported cost savings and/or cost efficiency gains in contracted services. A study of fixed-route bus services in Denver by Peskin et al. showed 1-year cost savings of $2.5 million (12.5%) based on an incremental cost analysis and $5.1 million (25.8%) based on a fully allocated cost analysis (*7*). A fully allocated cost analysis of the Denver Regional Transit District by Public Financial Management reported savings of $40.1 million dollars (31%) or more over 9 years (*8*). Three studies on contracted service in the Foothill Transit system—commissioned by the Los Angeles County Transportation Commission and conducted by Ernst and Young—showed a 43% cost savings (*9–11*). Teal and Teal and Nemer found significant cost savings at the level of, on average, 39% for six fixed-route services and 43% for six commuter bus services (*12, 13*). While most studies examined cost savings and/or cost efficiency for the service contracted, Karlaftis et al. analyzed cost-efficiency for transit systems (*14*). They analyzed monthly data from an approximately 6-year period and found that cost efficiency increased by 22% (an 18% reduction in cost per vehicle mile) after all transit service routes in the Indianapolis transit system were contracted out to a private firm (*15*). A thorough review of the National Transit Database conducted by the National Center for Transit Research in 2011 revealed that contracted fixed-route transit service costs considerably less than directly operated service, as shown in Table 1 (*16*).

TABLE 1
OPERATING COST PER REVENUE-HOUR FOR FIXED-ROUTE SERVICE BY AGENCY SIZE

2008 Costs	Florida	Southeast U.S.	U.S.
All Agencies			
Directly Operated $ per Revenue-Hour	$98.10	$92.19	$119.61
Purchased Transportation $ Per Revenue-Hour	$54.27	$74.47	$88.92
Small Agencies			
Directly Operated $ per Revenue-Hour	$71.59	$61.87	$76.87
Purchased Transportation $ per Revenue-Hour	$61.15	$60.17	$75.61
Medium-Sized Agencies			
Directly Operated $ per Revenue-Hour	$77.48	$85.74	$96.50
Purchased Transportation $ per Revenue-Hour	$52.98	$79.44	$92.36
Large Agencies			
Directly Operated $ per Revenue-Hour	$104.98	$100.01	$129.58
Purchased Transportation $ per Revenue-Hour	$40.43	$44.20	$90.25

All-Door Boarding

In July 2011, the San Francisco Municipal Transportation Agency (SFMTA, aka Muni) instituted an all-door boarding policy to reduce dwell time at bus stops for greater passenger convenience and to improve the speed of buses (Figure 1). SFMTA also added 11 fare inspectors to increase enforcement. An analysis of five sampled routes conducted after the first month of implementation showed increases in the percentage of customer boarding through the rear door and a corresponding decrease in dwell times of up to 16% at heavily used stops (*17*). Seven months after Muni changed its policy to allow all-door boarding, the agency reported continued improvement in service and a drop in fare evasion. On average, all-door boarding has saved buses up to 4 seconds of dwell time per stop, according to SFMTA. Even such seemingly small time savings add up on routes with dozens of stops.

FIGURE 1 Passengers are allowed to board through all doors of SFMTA's bus fleet, allowing buses to more easily stay on schedule without the need for additional equipment. (*Source*: Brant Ward, *San Francisco Chronicle*.)

When comparing the 7 months of all-door boarding with the same months the previous year, the fare evasion rate decreased from 4.6% to 3.5%. The San Francisco Transit Riders Union (SFRTU) applauded SFMTA for implementing the policy change. "SFTRU has been a staunch advocate for all-door boarding and this report shows that when Muni puts its trust in riders, riders will return the favor," said Mario Tanev, who led the all-door boarding advocacy campaign for SFTRU. "Dwell times have gone down, and so has fare evasion. We don't need to reinvent the wheel in San Francisco; we just need to learn to roll it forward faster" (*18*). The change might also have helped alleviate over-

crowding, because riders boarding through the back door are more likely to fill up previously underutilized space in the back, leaving more room for passengers in the front.

TABLE 2
SUMMARY OF OPERATIONAL TECHNIQUES TO IMPROVE COST-EFFECTIVENESS

Transit Agency	Technique	Results
San Joaquin Regional Transit District	Establish deviated fixed-route service to replace fixed-route and paratransit service in areas of low demand	Ridership increased 86%, cost per trip decreased from $50 to $19
TriMet	Extraboard efficiencies by discouraging personal days off on Friday, Saturday, and Monday, and not scheduling training on Fridays and Mondays	Savings of up to $1 million
New Orleans RTA, Chatham Area Transit Authority, Nassau Inter County Express, and North County Transit District	Converting publicly operated transit systems to privately operated transit systems	Average savings of 25% on operating costs
San Francisco Municipal Transportation Agency	Allowance of all-door boarding on all buses	16% decrease in dwell time, better schedule adherence without need for more buses on route
Rochester Genesee RTA, The "T," New Jersey Transit, and Pinellas Suncoast Transit Authority	Route performance analysis	Saved millions of dollars by reducing service with little loss in ridership
North County Transit District and Lynx	Using smaller buses in areas of low demand	Substantial savings in fuel and operating costs
Southwest Transit	Reduced express service deadhead miles by parking buses downtown after in-bound trips to downtown	Saved more than $100,000 a year in reduced fuel and maintenance
Stark Area Regional Transit Authority and AC Transit	Not allowing buses to idle more than 5 minutes	Saved $200,000 at SARTA and $570,000 at AC Transit
Santa Clara Valley Transportation Authority	Shut down auxiliary power of light rail cars when parked	Savings in electricity of more than $1,000 a day
Chicago Transit Authority	Utilizing scheduling software to reduce layover time through interlining	Saved 100 vehicle-hours per weekday while also reducing vehicle requirements
Gainesville Regional Transit System	Training operators on how to deal with and counteract fare evasion	Gained $50,000 per year in farebox revenue

Service Productivity Evaluation

The Rochester-Genesee Regional Transportation Authority (RGRTA) established a formal route productivity evaluation program whereby each route is scored using a methodology that combines cost recovery and customer count. Low-scoring routes are selected for further review, such as adjusting schedules to increase headway times, exploring opportunities for employers who benefit from this route to partner with the authority and provide a subsidy for route support, or combining the route with another one that will still provide service to most of the current customers. The authority has saved millions from this protocol without significantly affecting customer service (R. Frye, CFO of the Rochester-Genesee RTA, personal communication, Feb. 17, 2010).

In a similar fashion, "The T" in Ft. Worth, Texas, established a Route Monitoring Committee composed of volunteer operators and customer service representatives who meet monthly with planning and scheduling staff to improve communication between the departments while creating an additional avenue to enhance service quality (Figure 2). "T" planning staff took advantage of this operating group's understanding of existing service to provide an initial brainstorm of potential service reductions. In lieu of the high costs associated with detailed surveys and studies, and to track system efficiencies, The T's committee used multiple evaluation tools—including a route performance index (RPI), farebox passenger counts, boarding and alighting counts, and origin-destination surveys—to recommend service reductions. The RPI is used to objectively measure the performance of a route relative to other routes within the same service classification. The key performance indicators (passengers per hour, passengers per mile, and subsidy per passenger) are compared against a standard in each route category (radial, crosstown, feeder, circulator, and express). The standard is set based on the previous fiscal year's average. Once the indices for each performance measure are calculated relative to each individual route, all values are normalized to a value of 1. A number of other suggestions from the Route Monitoring Committee and planning and scheduling staff were implemented as well, altogether reducing total bus hours by 4.5% and saving approximately $800,000 per year while having minimal impact on ridership (*19*).

New Jersey Transit's (NJT's) Bus Service Optimization initiative resulted from extensive examination of each of NJT's existing bus routes. The bus routes were broken down into 17 groups or geographic markets and reviewed using 20 separate metrics, including customers per hour, farebox recovery, and subsidy per customer. As a result of extensive study and analysis, NJT's Bus Service Optimization initiative forecast more than $3 million in annual operation savings. These savings were reflected in the FY 2013 budget and helped keep fares stable for the nearly 250 million customers who use NJT services on an annual basis. From these savings, NJT will immediately reinvest more than $1.02 million to expand and enhance bus service in the city of Newark, in addition to key corridors between Newark, Newark Airport, and Elizabeth. Bus Service Optimization will ensure that NJT uses its limited resources to provide the most efficient service to the most customers while holding fares steady (*20*).

FIGURE 2 A meeting of the T's Route Monitoring Committee that includes representatives of operations, planning, and customer service personnel. (*Source: Mass Transit Magazine*, June 30, 2010.)

The Pinellas Suncoast Transit Authority (PSTA) in St. Petersburg, Florida, outfitted a number of buses with automatic passenger counters and used them on all their routes to get a very accurate snapshot of exactly where riders were boarding and exiting. Through a meticulous route review process, ridership was analyzed by service day, route, trip, and bus stop. Route duplication was also reviewed and, in most cases, eliminated. This helped PSTA modify service in accordance with adopted guidelines to save 42,000 service hours while leaving virtually no customers without transportation. For every area affected by service changes, PSTA ensured that passengers had alternatives, and staff took time to explain where they could catch the bus, how far they would have to walk, and whether they would have to transfer (J.A. Recca, Director of Marketing, PSTA, personal communication, Mar. 3, 2010). Ridership was barely reduced. The Jacksonville (Florida) Transportation Authority (JTA) reported that it accurately measures service modifications by utilizing transit industry tools such as automated vehicle location information and automated passenger counters. JTA has successfully reduced 1.2 million miles and approximately 51,000 hours of service without any significant loss of ridership (J.B. Fishburn, Deputy Executive Director & Chief Financial Officer, JTA, personal communication, Jan. 9, 2010).

Vehicle Efficiencies

The North County Transit District (NCTD) in San Diego County, California, uses more 28-ft buses rather than 35- and 40-ft buses on routes where demand does not require larger buses. Leaders of the public agency say the 28-ft Star Trans buses cost less, are cheaper to operate, "go places the big guys can't," and better fit the communities they serve. The smaller buses cost less than half what the 40-ft buses typically cost ($147,612 compared with nearly $400,000) and cost less to operate per mile ($2.14 compared with the larger bus cost of $3.47) because of reduced operator costs negotiated as part of a 7-year, $178 million contract NCTD entered into with a transit management firm and the better fuel mileage achieved by the smaller buses. The smaller buses get 6–7 miles per gallon (mpg) compared with the 3.5 mpg the 40-footers achieve, on average (*21*).

The Central Florida Regional Transportation Authority (aka Lynx) also replaced low-ridership fixed-route service with smaller, more fuel-efficient vehicles and contracted out the service on three routes to realize a savings of $1 million annually. The most dramatic change occurred in the town of Oviedo, where the cost of service decreased from $626,990 to $161,175 per year (L. Darnall, Chief Operating Officer, Lynx, personal communication, Feb. 23, 2010).

Reducing Deadhead Miles and Idling and Scheduling Efficiencies

SouthWest Transit, the transit agency serving the southwest suburbs of Minneapolis, Minnesota, realizes savings in deadhead mileage by parking its buses near downtown Minneapolis rather than returning them to their home base after their in-bound express routes are completed. In order to save expense and be greener, the agency implemented a strategy of leaving about 50% of its fleet at the downtown destination area and shuttling the operators back to their garage, and reversing the process in the afternoon. The "Park Out" saves 665.4 mi per day of deadhead miles, or 125,761 mi annually. This translates to 22,866 gallons of fuel not used and, considering the cost of fuel and maintenance, yields a gross savings of $129,282. This also improves the agency's safety record by reducing the amount of risk related to the deadhead miles (D. Simoneau, Operations Manager, SouthWest Transit, personal communication, Feb. 17, 2010).

The Stark Area Regional Transit Authority in Canton, Ohio, saves more than $200,000 a year by not allowing bus drivers to keep their buses running if they are idle for more than 5 minutes (*22*). Similarly, AC Transit in Oakland, California, estimated savings of $570,000 by limiting idling of buses (*23*).

In March 2009, vehicle maintenance personnel for the Santa Clara Valley Transportation Authority in San Jose, California, began shutting down the auxiliary power on all light rail vehicles when they were parked. Auxiliary power is used to automatically start and stop train accessories (e.g., HVAC, lighting, and air compressor unit). Pullout operators then "aux on" their vehicles before beginning their safety walk-around. This resulted in a savings of approximately $1,000 per day or $360,000 per year (J. Smith, Chief Financial Officer, Santa Clara Valley Transportation Authority, personal communication, Jan. 6, 2010).

The Chicago Transit Authority (CTA) has saved more than $2.0 million dollars annually through more efficient

vehicle scheduling. The efficiencies were gained by using CTA's scheduling software program, HASTUS, which offers an advanced vehicle scheduling tool called MinBus. MinBus optimizes vehicle schedules by looking for opportunities to reduce excessive layover through interlining bus routes. By using MinBus at three CTA bus garages with high peak-to-base ratios of service, CTA saved more than 100 vehicle hours per weekday while reducing peak vehicle requirements. The optimization of MinBus software required staff training by the software vendor, GIRO, as well as staff time to run scenarios that saved vehicle hours and reduced peak vehicle requirements (J. Paquet, Vice President, Planning & Development, Chicago Transit Authority, personal communication, Jan. 18, 2010).

Fare Adherence Savings

The Gainesville Regional Transit System in Gainesville, Florida, trained bus drivers on how to deal with fare evasion when it was reported that too many people were riding with fake IDs and some drivers were letting friends ride free. Administrative staff conducted ride checks and watched the security camera tapes to see who was paying and who was not. Operators were then trained on how to deal with passengers engaging in fare evasion. (The first time the passengers are told they are being given a courtesy ride, the second time they're given a warning, and the third time they are called off the bus by a supervisor.) Fake IDs were confiscated, and word is reported to have gotten around the system pretty quickly, resulting in a savings of $50,000 in farebox revenue (J. Gomez, General Manager, Gainesville Regional Transit System, personal communication, Dec. 17, 2009).

COST-EFFECTIVENESS TECHNIQUES IN THE PROVISION OF PARATRANSIT SERVICES

Functional Assessments of Paratransit Riders

In an ongoing effort to improve service and provide it in the most cost-effective way possible, the Orange County Transportation Authority (OCTA) in Anaheim, California, completed one of only four state-of-the art indoor centers in the nation at which persons with disabilities can be qualified for complementary paratransit service. The service, called ACCESS, provides a million rides annually (Figure 3). Riders being evaluated are escorted through a series of tests that verify their ability to use fixed-route services, including boarding and exiting the bus, navigating through the center aisle, and using the farebox. The simulator provides accurate and efficient evaluation of riders' abilities while also improving the customer experience for the 58,000 ACCESS customers. The indoor facility houses a 40-ft bus surrounded by actual sidewalks and operating traffic signals to give users the feel of a real bus stop. It also contains curb-cuts and life-size murals depicting shops, business offices, and other unique venues such as Angels Stadium, making the test as real a simulation as possible. The $52,000 facility was built as part of OCTA's contract with C.A.R.E. Evaluators, which provides services to determine customers' eligibility to use ACCESS. Each month, approximately 500 people are certified or recertified to use the service. Before the center was established, riders were put through an outdoor evaluation that lasted an hour to test their ability to navigate uneven surfaces and curbs, but they did not board a bus. Evaluators can now test a customer's ability to navigate multiple surfaces, board a bus, and pay the fare, all in a controlled environment. The testing today can be completed in 30 minutes instead of an hour. This center helps to accurately determine whether a customer can use the fixed-route service for some trips, which can help to significantly reduce costs. Subsidizing ACCESS service costs OCTA $50.17 per ride, versus $3.76 on the fixed-route service (*24*).

FIGURE 3 A view of the indoor paratransit certification and travel training center of the Orange County Transportation Authority (*Source: Metro Magazine*, Mar. 30, 2012).

The Washington Metropolitan Area Transit Authority (WMATA) in Washington, D.C., decided to change the method it was using to determine eligibility for paratransit services after seeing cost increases of 22% a year. During the 4 years that third-party rehab centers were used to make eligibility determinations, the paratransit budget doubled from $52 million to $104 million a year. WMATA had been relying on rehab hospitals, assuming they had the appropriate expertise to make decisions on people's capabilities and paratransit eligibility. However, an investigation by WMATA revealed that the rehab center did not present the customers with the possibility of using bus or rail services. WMATA built its own facility at its headquarters, where paratransit assessments are now done. By streamlining its eligibility process and fine-tuning its travel training program, Metro has enabled customers with disabilities to travel more independently, improved the rider's experience, and saved the transit agency $25 million in FY 2011 (Figure 4). Passengers will be eligible for paratransit services, get a half-price fare card, or participate in travel training and become fixed-route users (*25*).

TABLE 3
SUMMARY OF PARATRANSIT TECHNIQUES TO IMPROVE COST-EFFECTIVENESS

Transit Agency	Technique	Results
Orange County Transportation Authority and Washington Area Metropolitan Transportation Authority	Established an in-house travel training and paratransit eligibility testing center	WMATA saved $25 million in 1 year, while OCTA expects to save millions while reducing the cost of trips from $50.17 to $3.76 when using fixed-route services
Clark County Public Transportation Benefit Area and Santa Clara Valley Transportation Authority	Use of minivans instead of cutaways and hybrid vehicles instead of gasoline or diesel vehicles	Vehicles achieve between 10 and 20 more miles per gallon
Valley Metro (Phoenix) and Transit Authority of River City	Contracts with local taxis to supplement regular paratransit service	Reduces the cost of paratransit trips from $3.00 to $20
Milwaukee County Transit	Produced 15-minute video to show the fixed-route options to the provider community for those with disabilities	Paratransit use has decreased as much as 20% among those living in assisted living facilities
Stark Area Regional Transit Authority	Established a firm no-show policy to help reduce missed trips	Agency reported substantial savings with very few penalties issued
Central Costa County Transportation Authority	Provides vehicles and training to social service agencies that then provide trips for many who had used CCCTA paratransit service	Paratransit ridership increases moderated and productivity on the transit agency paratransit system increased from 1.94 to 2.0 passengers per hour

FIGURE 4 A paratransit passenger is helped from a passenger van to visit the WMATA certification and travel training center (*Source: Metro Magazine*, Oct. 2, 2012).

Paratransit Vehicle Savings

Clark County Public Transportation Benefit Area (C-TRAN) in Vancouver, Washington, switched to minivans from cutaways for 12 paratransit vehicles to save about $65,000 per vehicle in capital cost and approximately 10 mpg in fuel cost (D. O'Regan, C-TRAN Controller, personal communication, Feb. 19, 2010).

The Santa Clara Valley Transportation Authority transitioned to Toyota Prius hybrid vehicles for both paratransit services and nonrevenue agency vehicles. The hybrid vehicles increased fuel economy by as much as three times compared with the cars they replaced (J. Smith, CFO, Santa Clara Valley Transportation Authority, Jan. 6, 2010).

Paratransit Contracting with Taxi Companies

A number of agencies have reported considerable cost savings by partnering with taxicabs through voucher arrangements to supplement regular paratransit service. Short trips are often less expensive by taxi than by contracted paratransit.

- In Scottsdale, Arizona, it was reported that a trip using dial-a-ride services cost the city approximately $29. The same trip provided by a taxicab resulted in a billing to the city of $9.47.
- In Torrance, California, the average paratransit trip is $30, while the average trip cost using a voucher is $13.
- Valley Metro Phoenix/Mesa reported a similar situation—a paratransit trip for dialysis is $27.50, while a dial-a-ride trip is approximately $35. The average taxi voucher trip paid by Valley Metro is $8.00. Valley Metro staff noted that vouchers provide more capacity at lower per trip costs, which enables them to provide an additional 30,000 to 40,000 trips per year with the same budget. The Mesa Mileage Reimbursement program pays an average of $6.50 per trip, compared with an average dial-a-ride trip of $32.31.
- In Flagstaff, a paratransit trip provided by the Northern Arizona Intergovernmental Public Transportation Authority is around $25. Mountain Lift Taxi Voucher program trips average between $7 and $8. These cost savings enabled the authority to increase the number of people who were able to access transportation services (*26*).
- The Transit Authority of River City (TARC) in Louisville, Kentucky, benefits from using Yellow Cabs primarily in peak periods of the day for will-calls and for assorted "leftover" or hard-to-route trips that would otherwise require TARC to create an inefficient primary contractor route. Cab use can expand and contract easily with seasonal or daily surges in customer demand, allowing TARC to avoid maintaining costly primary contractor/fixed-fleet infrastructure just to be ready for surges. TARC pays its primary contractor by revenue hour, and the contractor agrees to comply with paratransit regulations and requires its drivers to be trained. Consequently, making the contractor's routing more efficient (trips per hour) has been a priority, and the use of cabs has helped improve productivity directly and indirectly. The cabs

are paid meter rates, which can be audited with manifest mileage estimates. Additionally, there are often a number of people in the cab, comparable to cutaway use. The current Yellow Cab savings on average has been $2 to $3 per trip. The taxi savings fluctuate with the cost of diesel (used by the primary contractor fleet) and cost of gas (which can raise cab meter rates). Annual savings have varied from $175,000 to $350,000, depending on fluctuations in fuel costs. In addition, smaller vans used in the contractor's fleet get about six mpg more than the body-on-chassis vehicles, resulting in a savings of approximately $40,000 a year in FY 2010 (P. Rao, Director, Paratransit and Customer Service, Transit Authority of River City, personal communication, Mar. 2, 2010).

Fixed-Route Travel Training

Milwaukee County Transit (MCT) in Wisconsin used New Freedom resources to develop a 15-min film for community presentations to case managers, the provider community, assisted living centers, and sheltered workshops as one way to shift paratransit rides to fixed-route rides through a free-fare program. Paratransit use for those participants has decreased up to 20% in some cases. MCT also developed cost-sharing agreements with other state and federally funded human service programs and began a comprehensive bus stop inventory project to identify barriers to using fixed route (C. Peot, Director of Paratransit Services, Milwaukee County Transit, personal communication, Feb. 18, 2010).

Paratransit Customer Policy Changes

The Stark Area Regional Transit Authority initiated an ADA policy to educate and control late cancels and no-shows on paratransit services. In the first months of this tightened program (with very few actual penalties to riders), no-shows and late cancels were substantially reduced, thereby cutting costs of sending vehicles to unneeded locations and enabling more service availability for needed rides (C.A. Kuczynski, Director, Finance & Administration, Stark Area Regional Transit Authority, personal communication, Mar. 1, 2010).

Paratransit Coordination with Nonprofit Volunteer Associations

The Central Contra Costa Transportation Authority (CCCTA) in Concord, California established the Community Connection program, which has allowed more trips to be made throughout the county at a very low cost as a result of partnerships with other programs that use volunteers and receive grants. CCCTA provides passenger vans that they would otherwise retire to social service agencies at no cost and provides training to volunteers and employees of the social service agencies on how to properly operate the vehicles. These agencies then provide trips to transportation-disadvantaged people who might otherwise use the far more expensive paratransit service offered by CCCTA known as LINK. Not only has this program expanded options for seniors with service tailored expressly for their individual needs, but capacity has been freed up on the LINK paratransit service for additional trips that were formerly taken by those now using a partner's Community Connection van. Ridership on LINK was growing at a rate of more than 3% per year; as a result of the program it stabilized and actually fell in 2007 nearly 1.5% over the previous fiscal year. This allowed 10% more same-day trips to be accommodated, and LINK is able to focus on serving the very frail persons for whom it was designed, with no service denials and within budget. In FY 2008, ridership on LINK grew by 4.6%, but productivity increased from 1.94 to 2 passengers per hour. Nearly 23% more same-day trips were provided as well (C. Dahlgren, Director of Administration, CCCTA, personal communication, Feb. 17, 2010).

COST-EFFECTIVENESS TECHNIQUES IN TRANSIT MAINTENANCE

Electrification of Bus Components

- To improve energy efficiency and reduce operational costs, Miami–Dade Transit (MDT) in Miami, Florida, initiated a pilot program to electrify key accessories on 13 county buses, which was deemed successful. The electrified accessories include the propulsion system, the radiator fans, and the HVAC system. Electric power steering will be added when the manufacturer makes it available. The electrified buses are expected to be 25% more fuel efficient. Based on the anticipated savings, the county expects to recoup its investment in the new technology within 4 years. The agency plans to electrify other bus components, such as power steering, doors, air compressors, and wheelchair ramps (*27*).
- The bus maintenance department at Portland, Oregon's TriMet works on reducing parasitic loads on diesel bus engines to increase fuel mileage and reduce cost per mile of operation. The agency partnered with Engineered Machine Products (EMP) to develop NASCAR technology, including a new electrical cooling system that runs off a single, powerful alternator, which improves engine power and efficiency to drive the wheels. When testing the EMP cooling system, TriMet noted a 5% to 8% improvement in miles per gallon, depending on time of year (S. Lomax, Acting Executive Director, TriMet, personal communication, Mar. 5, 2010).
- The Potomac Rappahannock Transportation Commission (PRTC) in Virginia also experienced positive results on its commuter buses. Test results showed that the retrofitted bus was 15% more fuel efficient than buses without

the electrical cooling system. By retrofitting 29 more buses, PRTC will save approximately $133,000 per year in fuel costs. The cost of the cooling system retrofit will be recovered in less than 3 years (*28*).

TABLE 4
SUMMARY OF MAINTENANCE TECHNIQUES TO IMPROVE COST-EFFECTIVENESS

Transit Agency	Technique	Results
Miami-Dade Transit, TriMet, Potomac Rappahannock Transportation Commission	Electrification of bus components, including the propulsion system, radiator fans, and heating, ventilation, and air conditioning systems	Agencies report an increase in engine power, fuel savings of up to 15%, and a return on investment in less than 3 years
Lane Transit District	Purchased diesel fuel in bulk when prices were low and stored it off site to be able to draw down when prices spike	The agency saved $250,000 and has a supply in the event of fuel shortages
Palm Tran	Purchased Puradyn oil filters to clean oil and increase intervals between oil changes, and use synthetic oil to triple the mileage between oil changes	Less need for maintenance for oil changes, and synthetic oil use for older fleet resulted in a savings of $11,000
IndyGo	Inventory software configures updates of min-max levels and reorder points based on use history, and technicians on the floor can order parts from their workstations	Only the parts needed are ordered in the quantity needed based on historical use and technicians have 15% more time to work on the floor versus waiting at the parts counter
Eight Canadian transit systems	Agencies have joined together to buy parts as part of an Integrated Planning Forecasting and Replenishment program	Bulk/joint purchasing through a supply chain consultant has resulted in a savings of 15% on parts from more than 380 different suppliers
TriMet	Remanufacture rather than recycle worn transmission parts	High return on investment and a savings of $250,000
TriMet	Use local machine shops to produce light rail parts deemed to be excessive in cost from original equipment manufacturer	Hundreds of rubber seals were purchased at significant savings
Rockford Mass Transit Division	Utilized capital funds to build a body shop and paint booth and now does 95% of its body work in-house	Cost of repairs has been reduced from $65 per hour to $36 per hour and eliminated mark-up on parts
Utah Transportation Authority	Contracted for cleaning services for all of its facilities	Saved $200,000 per year
Multiple agencies	Reduced bus washing from every day to only when needed based on weather	Reduced use of water and cleaning supplies by up to 50%

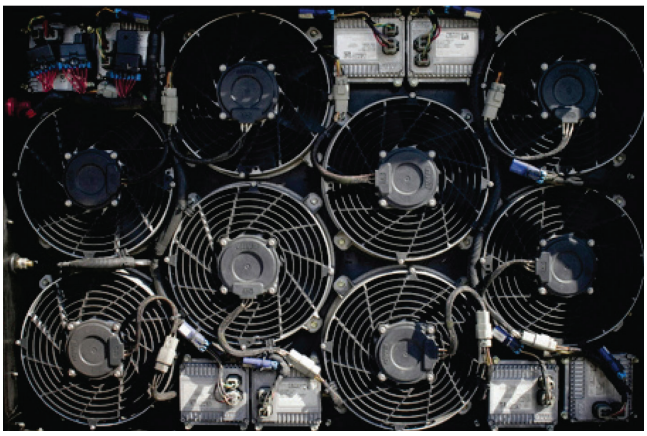

FIGURE 5 The Engineered Machine Products electrical cooling system for buses that provides a fuel-mileage-efficient alternative to hydraulic cooling systems (*Source: The Oregonian*, Aug. 20, 2009).

Fuel and Fluids Efficiencies

Lane Transit District (LTD) in Eugene, Oregon, bought a 6-month supply of diesel fuel when the price was low in 2009 and stored it in a secure fuel tank facility that had excess capacity. When diesel prices escalated, LTD began to use the stored fuel instead of buying at the market rate. While the strategy resulted in a relatively short-term benefit, LTD was able to protect at least $250,000 of fixed-route service that would otherwise have had to be eliminated. In the event of an emergency that cuts off fuel supplies, LTD is assured of a source (assuming delivery is possible). Should market prices drop again or look as though they will spike, capacity exists to add to the stored fuel. The fuel is stored in a secure off-site facility and the purchase price included delivery. Stored diesel fuel has a shelf life of approximately 18 months, which can be extended with additives and by mixing in newer fuel (D. Hellekson, CFO, Lane Transit, personal communication, Feb. 25, 2010).

Puradyn's oil filter systems were installed in two buses at Palm Tran in West Palm Beach, Florida; they are designed to clean the oil to increase intervals between oil changes. Palm Tran experienced an increase in oil change intervals from 6,000 mi to 18,000 mi on these two buses. The agency also changed from mineral-based transmission fluid to synthetic in the older portion of its bus fleet, which extended the drain interval from 12,000 mi to 48,000 mi. This change produced a savings of $11,000 in 2009 (J. Kavaliunas, Maintenance Director, Palm Tran, personal communication, Sep. 1, 2009).

Parts and Inventory Management Efficiencies

The Mincom Ellipse system has helped the maintenance team at IndyGo in Indianapolis, Indiana, improve inventory turnover and cost control through improved purchasing practices, the procurement bidding process, and judicious inventory counts resulting from automatic cycle counting. The system also configures updates of min-max levels and reorder points based on

use history. The Associated Parts List function plays a key role in maintenance efficiency. By pulling parts and kitting them in the shop before work is scheduled, maintenance tasks are expedited. As well, the Link-One part ordering system has enabled technicians working on the shop floor to order parts from their work stations instead of wasting time waiting at the parts counter. Mechanics have been trained on the new system. Wireless Internet access is now available in the garage and laptops have been stationed to encourage use of this new process. In the past, 15% of staff time could be spent waiting for parts. Now, IndyGo technicians spend more time actually working on vehicle maintenance, which allows more productivity in an 8-hour shift. The most obvious benefit is that less overtime is being accrued to complete maintenance tasks (M. Moles, Director of Maintenance, Indianapolis Public Transportation Corporation (IndyGo), personal communication, Apr. 2, 2010).

Eight Canadian transit systems have entered an agreement to join together to buy parts as part of an Integrated Planning Forecasting and Replenishment program that has saved 15% on the price of parts to date and is expected to have many other savings. The consortium retained the services of a supply chain consultant to develop key performance indicators for the eight partnering agencies, which had 26 different types of buses and typically worked with 380 different vendors with 44,500 stock-keeping units. Stock keepers' processing time can now be diverted to other functions. There is full transparency with all part costs and markup. Vendors like it because of dedicated volumes and predictable manufacturing schedules (*29*).

TriMet has worked with Voith to revise its transmission parts reclaim program. Critical used and worn transmission parts are now put through a remanufacturing process instead of being recycled. TriMet identified parts to be restored to original manufacturing specifications that show a high return on investment and saved more than $250,000 as a result of this program (S. Lomax, Acting Executive Director, TriMet, personal communication, Mar. 5, 2010).

TriMet's light rail purchasing staff uses local machine shops to produce repair parts that are determined to be excessive in cost or are difficult to obtain (e.g., long lead times). A recent example was a rubber seal that TriMet's purchasing department determined was too expensive from the original equipment manufacturer for the material involved. After first determining that the seal was not a safety-sensitive part, Purchasing commissioned a local rubber shop to produce an exact duplicate for first article testing. Once the new seal was approved by rail maintenance staff, hundreds were ordered for a special overhaul project at significant cost savings (B. deHamel, CFO, TriMet, personal communication, Dec. 28, 2009).

Miscellaneous Actions to Reduce Maintenance Expenses

- The Rockford Mass Transit Division (RMTD) in Rockford, Illinois, used capital funds to build a body shop and paint booth and now does 95% of its body work in-house. The agency calculates the cost of paying for its own body repair technician at approximately $36/hour; it had been paying an outside vendor $65/hour. Keeping the function in-house also gives RMTD a better handle on supply cost and eliminates the markup on parts (D. Engelkes, Maintenance Manager, Rockford Mass Transit District, personal communication, Dec. 16, 2009).
- While some support functions cost less to do in-house, others are less expensive when contracted out. The Utah Transportation Authority reported savings of $200,000/year when it contracted out cleaning services for its facilities (J. Benson, Chief Operating Officer, Utah Transit Authority, Dec. 10, 2009).
- The Chattanooga Area Regional Transit Authority reduced the cleaning of administrative and maintenance facilities from 5 days a week to 3 by having staff empty their own recyclables and individual trash receptacles (J. Veron, Director of Planning and Transportation, Chattanooga Area Regional Transportation Authority, personal communication, Dec. 17, 2009).
- A number of transit agencies report that they reduce the number of times they wash their buses by adjusting for weather and need.

COST-EFFECTIVENESS TECHNIQUES IN ADMINISTRATIVE MANAGEMENT

Transit agencies across the country have taken a number of actions to reduce costs associated with computer networks, health care, purchasing, and other administrative functions. Samples of the types of actions that have been taken to increase efficiencies and reduce costs are provided here.

Competitive Procurement of Administrative Services

The Red Rose Transit Authority in Lancaster, Pennsylvania, sought competitive bids for banking services after using the same bank for more than 10 years. On an annual basis, the authority requires a bank to handle roughly $8 million in various operating funds and grants. By seeking competitive bids, Red Rose saved $25,000. The new bank also picked up the cost of twice-a-week courier service to pick up farebox revenues (D. Kilmer, Executive Director, Red Rose Transit, personal communication, Mar. 1, 2010).

Revised Work Week for Administrative Staff

The Gainesville Regional Transit System (RTS) administrative staff changed from a 5-day to a 4-day, 10-hour-a-day work week. This resulted in $10,000 in cost savings, primarily owing to a reduction in utility costs (J. Gomez, General Manager, Gainesville RTS, personal communication, Dec. 17, 2009).

TABLE 5
SUMMARY OF ADMINISTRATIVE TECHNIQUES TO IMPROVE COST-EFFECTIVENESS

Transit Agency	Technique	Results
Red Rose Transit	Competitive procurement of banking services	Saved $25,000 annually and received free courier service to pick up farebox revenues
Gainesville Regional Transit System	Changed administrative staff from 5-day to 4-day work week	Saved $10,000 in utility expenses
Omnitrans	Developed an in-house web-based data warehousing application capable of automatically consolidating various data sources from package software to generate uniform reports and to extract data such as NTD	Saved $400,000 in NTD costs alone and cut down manual process time from more than weeks to a few minutes. Also allowed access to remote authorized personnel through a secured Virtual Private Network
Denver Regional Transit District	Use of "thin client" hardware in place of personal computers	Dramatically reduces set-up and maintenance time, uses 10% of the energy used by personal computers, provides three times longer life, and is 90% recyclable
Greater Cleveland Regional Transportation Authority	In-house development of TransitStat, a performance monitoring program and philosophy	Saved $15 million over first 2 years through better analysis of utilities, inventory, accidents, overtime, etc.
Bay Area Rapid Transit	Opt-out program for employees that can be covered by spouse's or previous employer's health care program	Providing $100 a month to those who opt out of using health care insurance provided by BART; saved $4 million over 8 years
Southeast Pennsylvania Transportation Authority	Contracts were ratified that called for union employees to contribute 1% of a 40-hour work week, and management employees to contribute 5% of their premium for health care	(Specific savings not reported)
Akron Metro	Hiring a Third Party Administrator for Family Medical Leave Act (FMLA) administration	A 15% decrease in the use of FMLA at Akron
New Jersey Transit	Hired a consultant to hire a consultant to examine the agency's medical, prescription drug, and dental plans	Identified opportunities to reduce the cost of these plans by negotiating a better cost structure
Chittenden County Transportation Authority	Switched from a premium based co-pay to a high deductible plan	Health care cost increases reduced to 0% and 6.7% the 2 years after the switch, with better coverage
Stark Area Regional Transit Authority	Instituted a Flexible Savings Account savings plans for pre-tax payments of health care costs and established a self-insured layer to hospitalization care	Saved $350,000 per year over previous expenses
Hillsborough Area Regional Transit Authority	Collected a portion of health care premiums from its employees and made claims payments of $100,000 or less without relying on an insurance company beyond administrative services	Anticipated savings of $1 million annually based on prior years experience
AC Transit	Hired third party administrator to address workers compensation claims and medical bills	Saved $930,000 annually on average
Knoxville Area Transit	Had workers compensation carrier speak directly to employees on what their stake is in fraud	A reduction of their premium for 3 years and expected further reductions in the future
Pace	Loss portfolio transfer to an insurance company	Pace paid the company $5.4 million to accept workers compensation and auto liability and was able to reduce the claims reserve by $7.1 million, thereby generating a one-time income recognition of $1.9 million

Administration Technology Savings

Omnitrans in San Bernardino, California, developed an in-house web-based data warehousing application capable of automatically consolidating various data sources from package software such as SAP's Enterprise Resource Planning, Trapeze, Siemens, and GFI to generate uniform reports and to extract data such as NTD and TransTrack. This warehousing application saved the agency around $400,000 just on the customized NTD report quoted by a third party vendor. The application also cut the manual process time from more than a few weeks to a few minutes. The web-based application also allows agency employees to look for information while they are on the road serving customers by going through a secured virtual private network (VPN) pipeline to the Internet. A VPN works as a private Internet tunnel to allow authorized personnel to access corporate information from public domains. It took the agency about 6 months to develop the data warehouse application. The application is transferable to other transit agencies that run similar programs running (e.g., Trapeze, Siemens, GFI, and SAP Enterprise Resource Planning). The application is also flexible enough to allow agencies that do not run the same programs to redirect the data sources with small modifications. In addition, Omnitrans introduced server virtualization techniques (a combination of Microsoft and VM Ware)

to consolidate the number of servers; so far, they have been reduced from 75 to 57, with a goal of reducing the number to 12. The reduction of physical servers saves the agency approximately $500,000 every 5 years on server replacement costs, and reduces energy consumption and physical data center space usage. Server virtualization also shortens the disaster recovery time from 3 days to less than an hour. By introducing virtualization technologies from vendors such as Microsoft and VM Ware, any company can significantly reduce recovery time from days to hours, assuming the company has the workable hardware available for recovery. Virtual technology employs what is called "snapshot" technology in conjunction with a dynamic resources assignment capability to make quick recovery a reality (W. Tsuie, Director of Information Technology, Omnitrans, personal communication, Nov. 30, 2009).

Thin Client Work Stations

The RTD in Denver, Colorado, is using "thin clients" rather than personal computers to eliminate hard drives and save all information to central servers. A thin client, formerly known as a "dummy terminal," today is a compact piece of computing technology that accesses data remotely through a connection to a server and brings a virtual desktop to the user. This dramatically reduces setup and maintenance time, uses 10% of the energy used by personal computers, provides three times longer life, and is 90% recyclable (*30*).

Management by Data Analysis

The Greater Cleveland Regional Transportation Authority (GCRTA) in Ohio created TransitStat, a performance monitoring program/philosophy. Based on similar systems established by the New York City Police Department and the city of Baltimore, Maryland, it requires managers, as a team, to use information systems to define, measure, analyze, improve, and control operations, and links performance to the authority's business strategies and goals. The management team, representing all disciplines in the agency, meets weekly or biweekly for performance-monitoring forums. These meetings are chaired by the executive director and assisted by a dedicated budget analyst who uses off-the-shelf software from Microsoft to track performance trends in virtually any area of the agency. These meetings ensure that the people needed to address issues are at the table and are jointly developing solutions. Between 2008 and 2010, TransitStat helped develop cost savings totaling nearly $15 million. The following are examples of the variety of savings identified:

- Inventory reduction—$750,000
- Lighting retrofits—$499,912
- Reductions in towing expenses—$252,000
- Electrical savings—$1,000,000
- Overtime savings—$4,399,501
- Health care audit—$1,000,000.

Results are measured weekly as opposed to monthly, quarterly, or yearly (*31*).

Health Care Savings

Health care costs have been a major driver of higher transit costs in the past decade. A survey conducted by Deloitte in 2010 and shared during an APTA webinar on December 11, 2012, indicated that 76% of *all* employers say health care cost containment is one of their five top strategic challenges. Transit agencies have been very active in identifying ways to continue to provide quality health care while costs are rising and revenues are often declining. The following are some actions they have taken:

- The Bay Area Rapid Transit (BART) district in Oakland, California, offered employees and retirees $100 a month if they voluntarily opted out of the district's medical benefits plan, if they were covered under the plan of a spouse or previous employer. This action saved the district $4 million over 8 years (Dorothy Dugger, General Manager, BART, personal communication, Mar. 30, 2010).
- In many transit agencies, employees were required to contribute a greater share of their salary toward health care benefits. At the Southeastern Pennsylvania Transportation Authority (SEPTA), union employees who have ratified contracts contribute 1% of a 40-hr work week, and management employees contribute 5% of their premium (D. Layton, Operating Budget Specialist, SEPTA, personal communication, Nov. 23, 2009).
- Akron Metro in Ohio hired an expert in Family and Medical Leave Act (FLMA) management and experienced a 15% decrease in the use of FMLA. New Jersey Transit hired a consultant to examine the agency's medical, prescription drug, and dental plans to identify opportunities to reduce the cost of these plans by negotiating a better cost structure with the benefits manager (M. Lihvarcik, Acting Chief Financial Officer and Treasurer, New Jersey Transit, personal communication, Nov. 23, 2009).
- The Chittenden County Transportation Authority (CCTA) in Burlington, Vermont, switched from a premium-based co-pay to a high deductible plan and reported savings of approximately $300,000. The agency's health care increases were 0% and 6.7% in the first 2 years after switching plans, and the health insurance product provides broader coverage to employees. Under CCTA's old plan, medical plan benefit expenses increased more than 25% in both years (C. Cole, General Manager, CCTA, personal communication, Feb. 24, 2010).
- The Stark Area Regional Transit Authority in Ohio instituted a flexible savings account plan for pre-tax payments of health care costs and established a self-insured layer for hospitalization care; it

saved $350,000/year over previous expenses (C.A. Kuczynski, Director, Finance & Administration, Stark Area Regional Transit Authority, personal communication, Mar. 1, 2010).
- After paying $5.4 million more in premiums to insurance companies than it paid in employee claims over 5 years, the Hillsborough Area Regional Transit Authority (HART) in Tampa, Florida, decided to become self-insured in 2011. The agency collected a portion of health care premiums from its employees and made claims payments of $100,000 or less without relying on an insurance company beyond administrative services. This move made financial sense for HART (*32*).

Workers' Compensation Savings

A number of agencies reported that they hired a third party with special expertise to help address the difficult issues associated with workers' compensation claims and medical bills. AC Transit in Oakland, California, hired a consulting firm that specializes in monitoring workers' compensation and reviewing all medical billings received by self-insured public agencies. The attention to detail and the challenging of charges being assessed to the agency has saved an average of $930,000/year for AC Transit (K. De Stigter, Chief Human Resource Officer, AC Transit, personal communication, Mar. 4, 2010).

Knoxville Area Transit (KAT) in Tennessee has seen a reduction in workers' comp claims by doing some small things to raise employee awareness. KAT invited the workers' compensation carrier in for safety meetings. The carrier focused on the employee stake in fraud and how each case affects each employee. The carrier also talked to the employees about cost and how that affects their paychecks. As a result, most employees take workers' compensation more seriously, and some employees have reported others they thought were "playing the system." KAT experienced a reduction in its premium for 3 years and expected further reductions in the future (C. Reynolds, Director of Risk Management, Knoxville Area Transit, personal communication, Nov. 23, 2009).

Loss Portfolio Savings

A loss portfolio transfer (LPT) is a method in which one party transfers future claims payment obligations (for one or more past annual periods) to another party for a fixed sum. The difference between an LPT and an annual insurance program is that an LPT is for past periods and an annual insurance program is for events yet to occur. The seller of the portfolio is able to remove some liabilities from its balance sheet. Properly done, an LPT is one of the few products in insurance that can be a win-win deal for both parties. Pace in Arlington Heights, Illinois, transferred the liability for all workers' compensation and auto liability claims that occurred from 1984 through 1998 to an insurance company. Pace paid the insurance company approximately $5.2 million to accept the liability and was able to reduce its claims reserve by $7.1 million, thereby generating a one-time income recognition of $1.9 million. The following are some of the reasons the insurance company could accept the liability for substantially less than the amount of Pace reserves:

- Pace's return on its investments is much lower than the insurance company's earnings. The insurance company can earn substantially more because it does not have the restrictions on investments that a government agency has.
- The liabilities assumed by an insurance company are often transferred to an offshore captive, with lower reserve requirements than those in the United States. This allows the insurance company to use part of the premium for other business purposes.
- Certain tax issues beneficial to an insurance company are not available to Pace, and certain regulatory requirements cause losses to be of some value to an insurance company (T. Brannon, Manager of Planning and Development, Pace, personal communication, Apr. 3, 2002).

COST-EFFECTIVENESS TECHNIQUES THROUGH STRATEGIC USE OF FACILITIES AND GREENER UTILITIES

Transit agencies have engaged in a variety of actions to help generate new revenue from strategic use of their facilities and properties beyond allowing advertising on them. Examples include performing vehicle maintenance work for profit for other agencies, charging for parking under guideways, leasing rights-of-way along rail corridors and tunnels to telecommunications companies to install fiber-optic cable, selling surplus property or charging rent for the use of property being held for future development, and charging the film industry for access to transit facilities and equipment (*33*, p. 4).

Leasing Rights-of-Way

A number of agencies have leased space along their rail lines or tunnels to the telecommunications industry to allow the installation of fiber-optic cable, resulting in millions of dollars in new revenue. Miami-Dade Transit leased space under its elevated rail line to a supermarket that needed additional parking spaces (*33*, p. 39).

Managing Excess Office Space

One of the silver linings for transit agencies that have had to downsize owing to tight fiscal constraints is that they might have excess office space that provides opportunities to consolidate. This can result in either reduced rental payments or the ability to rent space out to others. New Jersey Transit was able to consolidate functions and staff, allowing it to vacate one floor of its corporate headquarters and

TABLE 6
SUMMARY OF TECHNIQUES TO IMPROVE COST-EFFECTIVENESS THROUGH STRATEGIC USE OF CAPITAL FUNDS AND GREENER FACILITIES

Transit Agency	Technique	Results
Multiple rail agencies	Leasing rights-of-way of rail corridors for placing fiber-optic cable or other uses	Can generate millions of dollars in lease fees
New Jersey Transit, Chicago Transit Authority, and Southeast Pennsylvania Transportation Authority	Managing excess office space due to reduced staff	Savings or revenue of approximately $500,000 per year at NJT and CTA, and more than $7 million in revenue for SEPTA
Massachusetts Bay Transportation Authority	Securitizing parking facilities by selling to investors the long-term income associated with nearly 50,000 parking spaces	Received a lump sum payment that can be used to reduce debt payments
Santa Clara Valley Transit Authority	Entered a "power purchase" agreement with solar panel manufacturers and Wells Fargo to cover bus maintenance yards	Did not have to purchase panels and will save more than $100,000 per year for 20 years on utility bills
Connecticut Transit	Purchased generators and agreed to run them when general power demand is high	Receives advantageous rates from local utility company
Long Beach Transit	Had utility and materials audits conducted by suppliers of electricity, water, and waste management	Saved $50,000 per year through lower rates for electricity, rebates, and recycling
Pinellas Suncoast Transit Authority	Using solar-powered trash compactors at transit centers that reduce the number of pick-ups required and communicate electronically	Saves $9,000 per year through more efficient maintenance activities
Southeast Pennsylvania Transportation Authority	Clean offices during the day to diminish need for lights at night, motion detection light switches, film on south facing windows, using LED lights when possible	Has experienced a 12% reduction in energy use with associated reductions in energy bill
Southeast Pennsylvania Transportation Authority	Installation of a wayside energy storage device at substations	Savings of $190,000 a year and the opportunity to earn thousands of dollars in revenue by selling stored power

save $500,000 (M. Lihvarcik, Acting Chief Financial Officer and Treasurer, New Jersey Transit, personal communication, Nov. 23, 2009). The Chicago Transit Authority (CTA) will make $8.1 million over 15 years by leasing 21,770 ft^2 of excess space on the 11th floor of CTA headquarters to the National Able Network, a nonprofit organization that offers workforce development programs, counseling, training, and job placement services to veterans, low-income adults, and others (*34*). At SEPTA, the lease of railroad station buildings and space at the 1234 Market Street headquarters building generated $7.5 million in fiscal 2009 (D. Layton, Operating Budget Specialist, SEPTA Finance Division, personal communication, Nov. 23, 2009).

Leveraging Parking Facilities for Revenue

Many transit agencies in the United States own parking facilities that serve transit riders and sometimes other purposes. The Massachusetts Bay Transportation Authority (MBTA) decided to securitize the parking facilities at more than 100 locations by selling bonds secured by future parking revenues. In essence, this entailed selling to investors the long-term income associated with nearly 50,000 parking spaces in exchange for a lump-sum payment to the agency that could be used to reduce MBTA debt payments (*35*).

Utilities Savings

Utilities can also provide major potential cost savings for transit agencies, as well as reductions to the agencies' carbon footprints. Ozark Regional Transit in Arkansas saved 25% on its annual electric/natural gas bill by converting to fluorescent lighting, adding a waste oil heater to an indoor wash rack, and replacing the exterior administration building windows and adding awnings (P. Pumphreys, General Manager, Ozark Regional Transit, personal communication, Dec. 15, 2009). The Santa Clara Valley Transit Authority (VTA) in San Jose, California, installed solar panels at three bus maintenance yards to save money on utilities and reduce carbon emissions. Through a "power purchase" agreement with the panel manufacturers and Wells Fargo, VTA did not have to purchase the panels but will buy the electricity produced by them at rates expected to save $2.7 million over 20 years. The panels will provide shade for the buses parked underneath and will remove the same amount of greenhouse gases as planting 10,000 acres of trees (*36*).

Understanding Electrical Rate Structures and Managing Accordingly

Connecticut Transit lowered its electricity rates by agreeing to run building generators when general demand for power is high. Local utility companies provide very advantageous rates to customers who are willing to run generators during peak demand periods (*33*, p. 142).

Long Beach Transit (LBT) in California requested energy and material audits through various outside organizations, such as Southern California Edison, Los Angeles Water

Department, and Waste Management. All the audits were free and identified adjustments that could be made to maintenance plans and contracts that have saved the agency more than $50,000/year. Electricity plans were changed and work was shifted to lower-rate tiers, reducing the agency's bill by more than 15%. LBT changed its Southern California Edison rate plan to a "Base Interruptible Program." In the event of an overload on the grid, the agency is required to immediately shut down electricity and use its emergency generator. Charges for this rate program are based on time-of-use, with evening usage being the lowest cost. The agency shifted its heavy-use work—which includes trap cleaning and steam cleaning—to the evening. LBT discovered and applied for rebates available for programs getting ready to start and received more than $17,000 in 2010. The agency also realized an annual savings of more than $30,000 by emphasizing a recycling program. Solar-based irrigation clocks were installed that automatically contact a weather station to receive watering schedules and provide better input for maintenance, reducing overall water use (J. Rentino, Maintenance Analyst, Long Beach Transit, personal communication, Feb. 22, 2010).

Solar Trash Compactors

An example of making transit facilities more energy efficient and inexpensive on a smaller scale has been implemented by the Pinellas Suncoast Transit Authority in St. Petersburg, Florida, which has installed solar-powered trash compactors at its transit centers to reduce the need for costly trash pickups. Sensors inside the solar-powered trash cans keep track of how full they are and trigger a compaction cycle when needed. Once the can is full and can no longer be compacted, it sends an e-mail to PSTA's Facilities Maintenance Department telling staff it's ready to be emptied. This real-time notification allows crews to pinpoint pickups and make their rounds with greater efficiency, saving the agency $9,000 per year (*37*).

FIGURE 6 Some transit agency facilities are prime candidates to collect solar power from panels placed above maintenance yards or transit centers, such as these at Akron Metro purchased with federal capital grants (*Source:* Akron Metro website).

FIGURE 7 Solar trash compactors in Pinellas County, Florida, reduce the frequency of required trash removal.

Other Green and Energy-Saving Initiatives

SEPTA initiated a number of changes at its headquarters building to help save $100,000 annually in utility bills (*38*). Office cleaning schedules were changed to daytime to eliminate the need for most lights to remain on after hours. In addition, the agency installed motion-detection light switches, more efficient chillers and boilers, and less energy-hoggish elevators and escalators. Film has been applied to southside windows to eliminate the sauna effect the sun was having on offices and the need for power-hungry fans to beat the heat. SEPTA is also testing light-emitting diode (LED) lighting in some areas of its headquarters for possible use throughout the entire building, as well as at its train stations and bus depots. The agency is also considering whether to use the Market Street roof to capture wind power. These changes have contributed to a 12% reduction in energy use at SEPTA (*39*). The agency has increased its commitment to energy efficiency through a recently released Energy Action Plan that could save more than $2 million a year through reductions in energy use alone, with additional benefits expected. Included in the plan is a first-of-its-kind wayside energy storage device, funded by a state grant and installed at a power substation on the Market–Frankford Line, projected to save SEPTA up to $190,000 a year on energy costs and generate thousands more in new revenue as the stored power is resold on the energy market. A newly installed propulsion control system on the Broad Street Line has made subway operations more efficient and cut power costs by nearly 13%. The plan aims to leverage these savings to help finance much-needed capital improvements, many of which are on hold indefinitely owing to funding cuts (C. Baker, Kansas City Area Transportation Authority, personal communication, Feb. 23, 2010).

COST-EFFECTIVENESS TECHNIQUES IN TRANSIT MARKETING OF ADVERTISING OPPORTUNITIES

Marketing includes many functions. Clearly, it involves market analysis to identify potential riders and the develop-

TABLE 7
SUMMARY OF TECHNIQUES IN TRANSIT MARKETING OF ADVERTISING OPPORTUNITIES

Transit Agency	Technique	Results
Kansas City Area Transportation Authority, Greater Dayton Area Transit Authority, and Jacksonville Transportation Authority	Onboard audio advertising on buses that provide news, transit information, and advertising	Revenues ranging from $60,000 to more than $100,000 per year at small and midsize transit agencies, with no cost to install
New York City Transit, Chicago Transit Authority, and Big Blue Bus of Santa Monica	LED advertising panels on the street side of buses	Still being tested, potential to triple advertising revenue due to flexibility to change messages and be seen at night
TriMet, New York City Transit, Greater Cleveland Regional Transportation Authority, and CTA	Selling the naming rights to streetcar stations, BRT lines, major subway stations, and vehicles	Revenue has ranged from $500 a month for streetcar stops to $250,000 a year for BRT lines to $4 million (one time) for major rail stations
Valley Transit (Phoenix), Denver RTD, and Caltrain	Wrapping advertising on light rail and commuter rail vehicles	Income has ranged from $100,000 to $600,000 per year
Metropolitan Atlanta Regional Transportation Authority, and Santa Clara Valley Transportation Authority	Selling ads on the agency website	Santa Clara received $15,000, but expects, as do other transit agencies, to earn more given the high level of traffic
Massachusetts Bay Transportation Authority	Leasing space for billboards on transit property facing major roads	Agency has earned more than $1 million in revenue and expects more
Massachusetts Bay Transportation Authority	Contract for an online store carrying MBTA items such as mugs, T-shirts, etc.	The store raised $35,000 for MBTA in its first month
Chicago Transit Authority	Digital ad space at transit stations and on bus exteriors	Guaranteed a minimum of $3.3 million for all 5 years of a base contract with the Titan advertising company for digital ads on 92 displays at 17 rail stations and on 25 buses
Chicago Transit Authority	Groupon pre-purchased 250,000 3-day passes paying CTA $1.8 million upfront. Each pass is sold for $7.53 wholesale and offered to Groupon members for $9 instead of the regular price of $14	This brings an immediate influx of capital and hundreds of thousands of potential new riders to expand CTA's rider base
Chicago Transit Authority	Partnering with online grocery stores accessible through cell phone applications at transit stations	No reports of revenue realized, but this also allows customers to make better use of commute time
Chicago Transit Authority	Vending machines and ATMs at transit stations	Redbox Videos provides CTA with 7% of revenues and financial institutions are paying almost $1 million annually for space for ATMs

ment of strategies to inform people of available services and attract them. For the purposes of this report, marketing also includes the sale of advertising space on vehicles, in facilities, and almost anywhere else a pair of eyes or ears might notice. There have been many successful programs to sell space on buses, trains, and transit stops and stations, but the opportunities for companies to benefit from the exposure they can receive through transit have mushroomed in recent years. Every dollar collected through such programs helps transit agencies avoid fare increases or tax increases needed to support their system. The following are some examples of recent, innovative methods to make money from the sale of advertising.

Onboard Audio Advertising

The Kansas City Area Transportation Authority (KCATA), working with a company called Commuter Advertising, is one of a small but growing number of transit agencies in the country generating new advertising revenue for transit systems by means of location- and time-based audio/visual messages using existing annunciation systems on board transit vehicles. There were no start-up costs for KCATA. In addition to advertisements, the audio information that is broadcast includes the announcements of reroutes, snow alerts, and schedule changes. The ads are uploaded about every 10 days, and the staffperson who handles stop announcements on board buses takes care of the upload. KCATA is reimbursed for its minimal hours by Commuter Advertising, which claims they have made hundreds of thousands of dollars for clients including the Greater Dayton Regional Transit Authority, Toledo Area Regional Transportation Authority (TARTA), Champaign-Urbana Mass Transit District, Rockland County Department of Public Transportation, Pace, and the Jacksonville Transportation Authority. KCATA will receive 40% of all revenues, with an expectation of receiving $60,000 in the first year and higher amounts in the future. The audio ads open up opportunities for smaller businesses that might not be able to afford print or other electronic media advertising. With audio ads, businesses can purchase specific stops and specific times of day for a modest cost. The buses' global positioning systems trigger brief announcements on the interior public address systems as the vehicles pass an advertiser. The ads might advise riders that a particular shop is offering a special that day to passengers. National firms have also expressed interest. While a few people have complained about the audio ads, transit agency representatives report that there have been no strong objections to the program (*40*). Announcements

will override advertising as needed. TARTA was scheduled to receive 30% of revenue from the audio ads during the first 2 years, and 35% after that (no revenue estimate was available) (*40*). The Southwest Ohio Regional Transit Authority in Cincinnati, Ohio, also decided to add broadcast advertising inside Metro buses, a move that could generate as much as $200,000 in revenue for the transit system in the next 3 years (*41*). Hillsborough Area Regional Transit in Tampa, Florida, has also contracted with Commuter Advertising, with projected revenue of more than $460,000 over a period of 5 years (*42*).

Digital Exterior Advertising

Digital advertising using LED lights on the sides of buses is being tested in a number of cities, including New York, Chicago, and Santa Monica, California. The digital light boards, similar to digital billboards facing many highways, are installed only on the sidewalk-facing side of the buses, and the advertisements freeze while buses are on the freeway, so that drivers of other vehicles aren't distracted by flashing lights. Companies are able to buy ad space on the boards, which can cycle through ads every 2.7–10 seconds. Members of the risk management departments in Chicago and New York reported that they hadn't seen any increase in accidents. The advantage of digital advertising is that messages can be changed as often as the agency likes and can be programmed for maximum effect by time of day. The electronic sign is visually appealing and visible during evening hours as well as daylight hours. With all of this new capability, the digital boards have the potential to increase ad revenues fourfold. Early estimates put the figure at almost $6 million for Santa Monica's Big Blue Bus (*43*) (Figure 8). However, the digital panels are quite expensive ($50,000+) and carry some risks, such as damage should an accident occur, and the implementation of these signs remains limited to major markets such as New York and Chicago.

FIGURE 8 Digital LED ad signs on the side of buses are more visible at all times of day and night and are programmable to allow more ads to be shown and more revenue to be earned (*Source*: Suja Lowenthal, Santa Monica Big Blue Bus).

Sale of Naming Rights

An increasing number of transit agencies are earning new revenues by selling the naming rights to stations, routes, and vehicles. TriMet has sold the naming rights to Portland, Oregon, streetcar stops to local businesses for $500 a month, generating about $250,000 a year. In Portland, stops are identified by street names as well as sponsors. The businesses get their names on each side of the stop shelter and in an audible announcement inside each car when it reaches the stop. TriMet also sells sponsorships of the cars themselves for $25,000 a year. The Chicago Transit Authority let Apple reserve naming rights to a station in exchange for $3.9 million in station renovation money, and Philadelphia's SEPTA sold a station's naming rights to AT&T for $3 million over 5 years (*44*). New York's Metropolitan Transportation Authority sold the naming rights for a subway stop in Brooklyn for $4 million to Barclays Bank, whose name is also on the nearby Barclays Center sports arena (*45*). The Greater Cleveland Regional Transportation Authority sold the naming rights (The Healthline) to its Bus Rapid Transit route on Euclid Avenue to area hospitals served by the line for $6 million dollars, to be paid at a rate of $250,000 a year for 24 years (Figure 9).

Rail Advertising Wraps

Buses wrapped in advertising have been generating revenue for transit agencies for many years, but only recently have rail cars been used for such purposes (Figure 10). Valley Transit in Phoenix and the Denver Regional Transit District have recently sold the rights to place ads on the exterior of trains. Original estimates for revenue have been substantially exceeded and now top $600,000 a year for Valley Transit (*46*). In Denver, the largest ads cover the entire side of a light-rail car (88 ft long) and 10% of each window. For safety, ads cannot be placed on the bays in the car's front and back. RTD was scheduled to receive $1.6 million in 2012. The monthly rate for a full-side ad per car is $4,900, excluding production (*47*). Caltrain in San Carlos, California, has collected approximately $100,000 annually in revenues for selling advertising space on the exterior of its commuter rail cars (*48*).

Alcohol Advertising

Many transit agencies are allowing alcohol to be advertised on buses and trains because of the substantial revenue that can be gained. While there was some concern about negative community reaction, most major urban areas are fairly immune to this form of advertising. For bus systems, some have reported that they try to not place ads for alcohol on routes in close proximity to schools or churches (H. Foose, Public Information Officer, Metro Light Rail, Valley Transit, personal communication, Mar. 27, 2012). CTA allows alcohol ads on trains but not on buses, and not at stations where

FIGURE 9 Cleveland's Healthline, which operates on the corridor that serves the heart of the city including the major hospitals and downtown (*Source*: Wikipedia).

students make up more than 7.5% of riders (*49*). Selling ads for alcohol products is expected to generate $1.2 million additional dollars for CTA.

FIGURE 10 Light rail and commuter rail trains that are fully wrapped with vinyl advertising are highly visible and very attractive to a number of businesses (*Source: Metro Magazine*, December 2012).

New Ad Opportunities

Transit agencies seem to be selling advertising opportunities on every surface that might be seen by a sufficient number of people to be of interest to companies looking to promote their products.

- The Massachusetts Bay Transportation Authority (MBTA) is selling space on its Charlie Card (*50*). It is also selling ads for its website, which has a half million unique visitors per month (*51*).
- The Metropolitan Atlanta Regional Transportation Authority (MARTA) has partnered with Municipal Media to run rotating advertisements at the top and bottom of its webpage and is exploring additional opportunities with other vendors in order to maximize its earnings. The pilot is estimated to generate about $1,000 to $5,000 a month for MARTA at no cost to the authority (*52*).
- Many agencies have sold space on their system maps to earn sufficient revenue to pay for the cost of producing the maps.
- Some agencies are selling space for vinyl ads on the floors of their buses (*53*).
- MBTA has earned more than $1 million by leasing space for billboards on property it owns that faces major highways. In addition to selling space on its vehicles and facilities, MBTA has created an online store, MBTAgifts.com, which sells myriad transit-touting items, including magnets, mugs, notebooks, greeting cards, and even flip-flops printed with a map of the subway. The store raised $35,000 for the MBTA in the first 30 days it was open. Operation of the store is contracted out, and MBTA receives a percentage of everything sold (*54*).
- Some of the nation's larger transit agencies sell the rights for advertisers to engage in "station domination," in which an entire station becomes an enormous ad. This tactic allows advertisers to blanket a station

with a variety of ads promoting the same product (e.g., decals on the platforms, ads wrapped around columns, and posters hanging from the shade canopies) (*55*).

- Interactive touchscreens are being used to bring in revenue in ways that can also assist passengers navigate the transit system (Figure 11). A project by the New York City MTA and the innovation firm Control Group plans to bring interactive high-definition displays to the subway stations. These screens will display ads but also show real-time information, such as a countdown to the next train, delays, service updates and outages, and a subway navigation map that will show users how to get to any station they tap (*56*). The Chicago Transit Authority is guaranteed a minimum of $3.3 million for all 5 years of a base contract with Titan advertising company for digital ads on 92 displays at 17 rail stations and on 25 buses (mentioned earlier under digital advertising on bus exteriors) (*57*).

Transit Fare Media Sales

CTA is partnering with Groupon, the deal-of-the-day website that has an estimated 36.9 million active customers and nearly 900,000 daily page views. This exposure allows CTA to advertise to a national and international audience. The partnership offered discounted 3-day passes to riders, marking the first-ever partnership between the Chicago-based daily deal site and a U.S. transit agency to sell fare media, according to CTA. Groupon prepurchased 250,000 three-day passes and paid CTA $1.8 million up front. Each pass is sold for $7.53 wholesale and offered to Groupon members for $9 instead of $14, the current price of a 3-day pass. The offer has a limit of four per person. Groupon will own the cards it purchases until they are sold and is responsible for selling the passes. This brings an immediate influx of capital and hundreds of thousands of potential new riders to expand CTA's rider base (*58*).

Partnering for Online Shopping at Transit Stations

A new way of advertising at transit stations not only earns transit agencies revenue but also allows commuters to spend their time more usefully while waiting at stations. Transportation media sales company Titan, online grocery store company Peapod.com, and transit agencies have partnered to use ad space at major stations to more closely engage riders during their commute (Figure 12). Peapod launched more than 100 sites at commuter rail stations in Boston, Connecticut, New York, New Jersey, Philadelphia, Washington, D.C., and Chicago. The virtual store technology features billboards with grocery "aisles" on the train platforms. Commuters with iPhones, iPads, or Android phones scan a QR code on the billboards to download a free PeapodMobile app and shop by scanning bar codes of the products displayed in the aisles. After registering on the Peapod website, commuters can use the time they are riding on the train to make selections from the online store and schedule home deliveries for the next day, or days or even weeks later. Once on the PeapodMobile app, customers have access to more than 11,000 products (*59*).

Vending Machines and ATMs

Another passenger convenience that also brings in additional revenue to transit agencies is the provision of vending machines at popular stations. CTA passengers can now rent a film or video game at some rail stations. The installation of

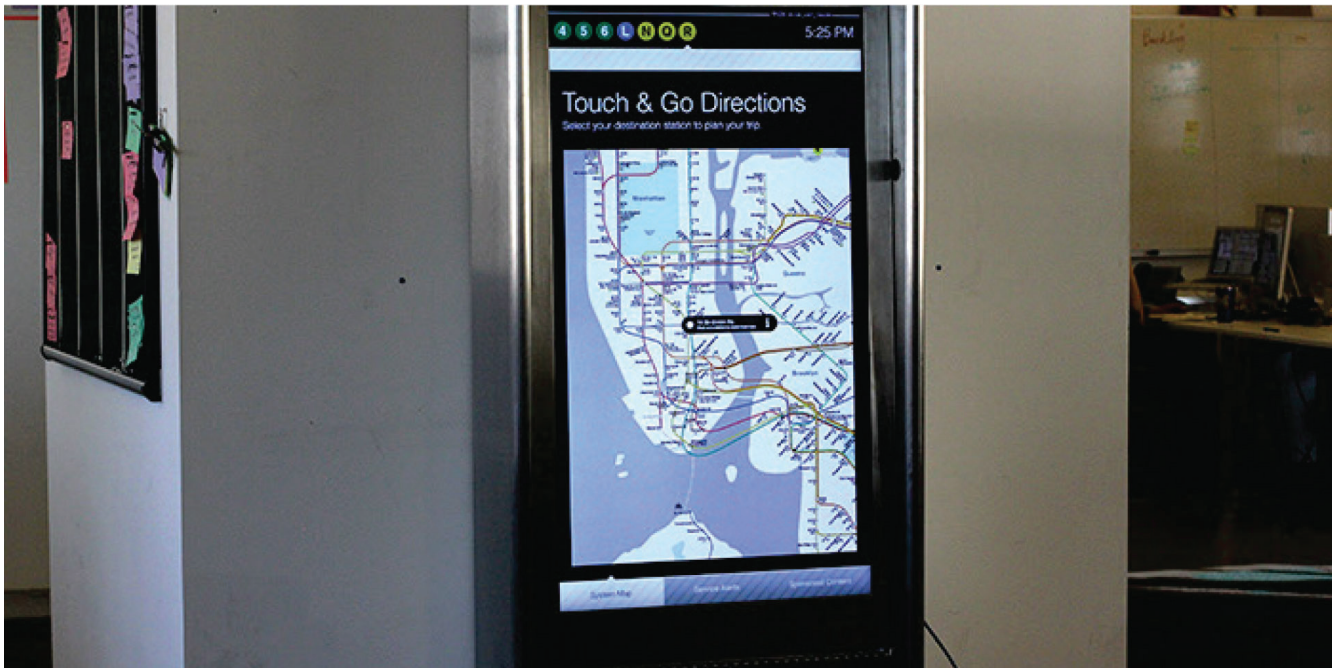

FIGURE 11 High-definition interactive displays that provide passenger information will also display ads at highly traveled train stations (*Source*: SmartPlanet.com, Mar. 20, 2013).

Redbox kiosk machines is the result of feedback from the public about what amenities riders want at CTA facilities (Figure 13). Redbox pays CTA a $35 monthly fee to cover electricity costs at each station, and CTA receives 7% of rental revenues (*60*). CTA has also expanded concession agreements with financial institutions for placement of ATMs at rail stations. The first phase of the ATM enhancement program will generate approximately $4.7 million over a 5-year period beginning in the second quarter of 2010. CTA is negotiating with other firms for further expansion of the ATM program, which will generate additional income (E.K. Gaynor, General Manager, Budget and Performance Management, Budget and Capital Finance, CTA, personal communication, Feb. 26, 2010).

FIGURE 12 Transit passengers in many cities can make more productive use of their commute time by taking advantage of virtual grocery shopping at major stations (*Source: Metro Magazine*, Jan. 2013).

FIGURE 13 Vending machines for popular items bring convenience to transit passengers in Chicago and rental revenue to the CTA (*Source: Chicago Tribune*, Dec.19, 2011).

IMPROVING TRANSIT EFFECTIVENESS THROUGH NEW FINANCING AND FUNDING

Property tax and sales tax revenues continue to be the primary source of funding for most transit systems in the United States. However, a few communities have recently received approval from taxpayers to establish new types of revenue to support transit operations.

Vehicle Registration Fees

In 2010, taxpayers in Marin County, California, approved a $10 increase in vehicle registration fees, which will generate more than $2 million to be divided among many transportation-related projects, with transit collecting 35% of the revenues. This new source of funds did not replace existing revenue sources and passed with 60% of the vote (*61*).

Transportation Utility Fees

In Corvallis, Oregon, the community voted in favor of the establishment of a transportation utility fee (TUF) to pay for its transit system. Starting in February 2011, a TUF of $2.75 was assessed to single-family residential customers' bills each month. The fee for transit operations replaced the portion of the city's general fund (property taxes) previously dedicated to transit, making those funds available for other uses, such as the library, parks and recreation, and police and fire departments. It also insulates the transit fund from possible cuts to the general fund to deal with the city's $3.1 million revenue shortfall. In addition to the fee being dedicated to transit, the city made the transit system fare-free and immediately saw a 40% increase in ridership (*62*).

Gas Taxes

In December 2009, the General Assembly of Rhode Island approved increasing the motor fuel tax by 2 cents to generate almost $9 million a year, which has all been provided to the Rhode Island Public Transportation Authority. The authority had been running a $12 million budget deficit, and officials were considering cutting service by 20% to stay solvent through the fiscal year. That would have meant eliminating 4.7 million trips per year, and eliminating and reducing bus routes. The Sierra Club and the Save the Bay environmental groups provided significant support in the passage of this new revenue stream (*63*).

Sales Taxes on Purchases Made over the Internet

Virginia recently approved a landmark transportation bill that assumes $258 million in tax receipts from online sales—about 65% of which would go toward infrastructure and abolishing the state gasoline tax. Maryland is also relying on this new source of revenue, if approved by the United States Congress. The state plans to apply online sales tax revenue toward offsetting an increase in its own gas taxes. Plans call for phasing in a hike of 20 cents per gallon between now and 2016, but about 7 cents of that could be offset by Internet sales taxes. If Congress does not pass the Marketplace Fairness Act, both states will be left with revenue shortfalls in

TABLE 8
SUMMARY OF NEW FUNDING AND FINANCING TECHNIQUES TO GENERATE NEW REVENUE SOURCES FOR TRANSIT

Transit Agency	Technique	Results
Marin Transit	Increase in annual vehicle registration fees of $10	Marin Transit collects 35% of the revenue generated, which resulted in $700,000 in 2011
Corvallis Transit System	Transportation utility fee replaced revenue from property taxes	Resulted in slightly more revenue and insulated revenue for transit from reductions in the general fund
Rhode Island Public Transportation Authority	Motor fuel taxes were increased by two cents statewide	$9 million additional dollars were generated and dedicated to the state transit system, avoided a 20% cut in service
Transit agencies in Virginia and Maryland	Sales taxes on purchases made over the Internet	Both states intend to supplement existing levels of transit investments with these new revenues
Boca Raton Circulator	Developer/employer voluntary contributions	Annual or one-time contributions are made as part of the development review process, paying for 24% of the system costs
Broward County Transit	Impact fees are assessed for new developments as part of a "concurrency" system	Fees collected can be used for capital or operating purposes; over $4 million has been collected
Port Authority of Allegheny County (PAT)	Financial support from the Allegheny Regional Asset District (RAD), a special-purpose area-wide unit of local government that supports regional assets	PAT received $3 million in an unrestricted grant from RAD that also leveraged million of additional state and federal funds
Denver Regional Transit District	Public-private partnership to help finance the Eagle P3 light rail expansion project	Private activity bonds were sold demonstrating the potential that exists to use private sector participation in transit projects

programs already approved in state budgets. In Maryland, drivers would be hit with the full 20 cent hike in gasoline taxes. "They're going to get the money they want for transportation," said Stephen Lee Davis of Transportation for America, "whether it's coming through the Internet sales tax or not." The consequences for Virginia will be a little more extreme. Instead of abolishing its gas tax as planned, the state will reverse course and raise it. Both states intend to supplement existing levels of transit investments with these new revenues (*64*).

Developer and Employer Impact Fees

The city of Boca Raton in southeast Florida developed a creative way to raise money for public transportation by requiring developers and employers to contribute to its cost. City officials refer to "voluntary contributions" whereby large employers are asked to make annual or one-time contributions if they are on a route that transports their employees or customers. "Voluntary" contributions are also part of development approvals. Based on either the square footage of developments or the amount of traffic they would generate, developers contribute a certain amount to the city's shuttle service. In return, developers get a break in other areas, such as the amount of parking they would have to provide. These fees provide approximately 24% of the revenues necessary to operate the service, which is seen as consistent with the city's sustainability goals (*65*).

Broward County, Florida, has been a leader in using impact fees for transit, for both capital and operating purposes. Broward County essentially overlaid a transit impact fee program on a Florida road impact fee program structure. The fee is assessed in 10 transit concurrency districts and is based on the size of the development at the permit stage and the number of anticipated transit trips. Service must be spread throughout the 10 districts using the county's service standard of providing bus trips every half hour (*66*). Although it has taken a great deal of careful planning to develop the transit concurrency system, and it is not a panacea for limited funding, it has generated more than $4 million for transit operations and capital projects.

Tapping Alternative Revenue Sources

The Port Authority of Allegheny County received support from an unexpected source in 2012 when the Allegheny Regional Asset District (RAD) board unanimously approved a $3 million allocation to PAT, a move that helped unlock millions more in state aid so the financially strapped transit agency could avoid grievous cuts. Traditionally, RAD has supported libraries, cultural facilities, parks, and stadiums. However, the executive director of RAD persuaded the board that transit is an asset in its own right, supporting many of the other cultural assets that RAD subsidizes. This was not intended to be an ongoing source of support for transit but to help it manage while looking for other, more permanent sources of funds (*67*).

Private Activity Bonds

Public-private partnerships are common in other countries but fairly rare in the United States. These partnerships between a private entity and a government agency are entered into to accomplish something that neither party alone could do; they spread the risks and costs for new projects between public and private parties. The private partners enter such agreements to earn a profit over time. The

public partner is able to leverage its limited funds to attract private investment for a capital project that is likely to be done more quickly, and therefore less expensively, with private partners often retaining the responsibility for design, building, operating, and maintaining a transportation facility. The Denver RTD successfully sold private activity bonds for its Eagle P3 light rail expansion, demonstrating the potential that exists to use private-sector participation in transit projects (*68*).

Surcharges on Tickets to Large Events

San Francisco Supervisor Scott Wiener has called on the city to study what a ticket surcharge of $1–$3 on tickets for large events would mean for the San Francisco Municipal Transit Agency's funding. Early numbers suggest that such a fee on music and sporting events could bring in somewhere between the low millions and the tens of millions of dollars, depending on the price and the size of the events to which the surcharge applied. Sporting events and large concerts add riders to the system and can add stress to local transit agencies, especially when those events coincide with the morning or evening commutes or other high-traffic scenarios. This method of raising new revenue for transit has not yet been approved but is being considered in San Francisco and some other cities (*69*).

IMPROVING TRANSIT EFFECTIVENESS THROUGH PARTNERSHIPS

Given the constraints that transit agencies have felt in terms of revenues from traditional sources, many of them seek to leverage their resources by forging new partnerships that bring nontraditional sources of support. These partnerships allow transit agencies to provide services or facilities where they would not otherwise be affordable or feasible. Private-sector partners have included shopping malls, business parks, museums, hotels, major employers, hospitals, casinos, and associations of businesses that pay partially or fully for new service. Public-sector partners include military bases, universities, public schools, transportation management associations, downtown development authorities, convention centers, social service agencies, and cities that help pay for new or extended service. These agreements not only help pay for new hours of service but can also allow opportunities for transit agencies to restructure service in parts of the community (*33*, p. 6). These partnerships can also improve the transit agency's image and relevance in a community, and can result in improved quality of service for passengers.

Partnering with Major Employers

An excellent example of a nontraditional partnership exists between the Monterey-Salinas Transit agency (MTS) in California and the Presidio military base in Monterey. This service is intended to meet the transportation needs of students, faculty, and staff of the Presidio of Monterey (a military training base) who commute to work or school from the communities on the Monterey Peninsula and from Salinas and San Jose on weekdays (Figure 14). The service, which includes 12 new or redesigned commuter routes, is fully integrated with existing bus service, operates on fixed schedules, and uses established bus stops (*70*). The military base was becoming overwhelmed with private vehicles and, with security concerns becoming more prominent, the Presidio leaders wanted to find transportation alternatives for those who worked at the base. While the transit service funded through the agreement is intended to primarily address the needs of the personnel on the base, it is open to

TABLE 9
SUMMARY OF PARTNERSHIP TECHNIQUES TO IMPROVE COST-EFFECTIVENESS

Transit Agency	Technique	Results
Monterey–Salinas Transit	Agreement with the Presidio military training base in which base personnel used the Federal Transit Benefit/Transportation Incentive Program	$1.5 million was made available to pay for 12 new routes primarily benefitting the military base, but open to the general public
Intercity Transit	Partnership to provide vehicles to a nonprofit employment agency that expands mobility for people seeking employment and job training	"Village Vans" has provided more than 42,000 trips and 94% of clients have found employment, reducing the need for specialized transportation
Lake Erie Transit	Partnership with the local Road Commission to build a new biodiesel fueling station	The fueling station is nearby the transit agency allowing easy access to more affordable alternative fuel
Massachusetts Bay Transportation Authority	Provision of Wi-Fi capabilities on board MBTA trains	Wi-Fi will be installed at no cost, benefiting passengers and providing advertising revenue for the private partner
Santa Clara Valley Transportation Authority	Allowing private paratransit contractor to move from a leased facility to a facility transferred to SCVTA from the county sheriff	SCVTA paratransit expenses were decreased by $250,000 per year
Santa Clara Valley Transportation Authority	Agreement with farmer to let his sheep and goats graze on SCVTA property not yet developed	Saved $14,000 per year in field maintenance and herbicides
Broward County Transit	Interlocal agreements with 20 municipalities to provide local circulator service with minibuses and partial operating funding provided by BCT	Broward County Transit has been able to straighten out its county routes and let cities provide local circulator services, resulting in reduced costs and increased ridership

the public as well. The full hourly costs associated with this service, which amount to more than $1.5 million annually, is paid by the Federal Transit Benefit/Transportation Incentive Program established by Executive Order 13150 through the Department of Transportation; the commuter service is being used by approximately 1,000 military base personnel (H. Harvath, Assistant General Manager, Finance and Administration, Monterey-Salinas Transit, personal communication, Feb. 18, 2010).

FIGURE 14 Monterey–Salinas Transit has been able to expand its service in the community through a partnership with the Presidio Military Training Base (*Source: Metro Magazine Dispatches*, June 26, 2013).

Partnering with Nonprofit Agencies

Intercity Transit in Olympia, Washington, partners with a program called Village Vans, which provides transportation assistance for low-income residents pursuing employment and job training (Figure 15). Transportation can also be provided to child care centers or food banks that can help stabilize people's lives. The drivers of the vans are trainees; they are not paid but receive work experience, job search coaching, and skill-building lessons. Intercity Transit provides the vans, and grants provide the majority for operating expenses. Since it started in 2002, 94% of all trainees have found successful employment. This program has the strong support of 20 community service organizations and has provided more than 42,000 trips since its inception (*71*).

Partnering with Other Public Agencies

Lake Erie Transit (LET) in Michigan partnered with the Monroe County Road Commission (MCRC) to build a new biodiesel fueling station that will reduce the transit agency's operating expenses by enabling it to purchase biodiesel and save on fuel costs. The station was built on MCRC property. The partnership allowed MCRC to upgrade its existing fueling station and provided LET with a nearby, affordable biodiesel fueling location. By collaborating, the two agencies met their needs and avoided potential duplication in the future. Compared with traditional diesel, the use of biodiesel will save thousands of tons of exhaust emissions that cause smog and acid rain, as well as particulate matter (*72*).

FIGURE 15 Nonprofit agencies such as Village Vans can complement services provided by transit agencies and help keep costs for specialized transportation low (*Source: Bus Ride Magazine*, May 2010).

Broward County Transit (BCT) in Florida has reached agreements with 20 of the 30 cities in the county to minimize meandering routes that serve condominiums and other facilities that are off the grid system (Figure 16). BCT leases (for $1 a year) minibuses to the cities and provides technical assistance in terms of scheduling, while the cities operate the minibuses with their own personnel or through contracts that they manage. This has allowed BCT routes to stay on the major roads, providing faster and more direct service that helps to build ridership. The cities provide more customized service in their communities, which allows people to get to the front door of a shopping center or condominium. BCT provides approximately half the operating cost for the city circulators, which is 75% less than the amount it would cost BCT to provide the service itself. All city circulators are required to connect with BCT routes at the nearest transfer center. Hence, the circulators serve as feeders to and distributors from the county system, thereby increasing mobility and transit ridership and minimizing the first mile/last mile challenge many transit passengers face. The city circulators also help reduce the cost of paratransit service, because the circulators can often accommodate the needs of people with disabilities (*33*).

Partnering with Private-Sector Entities

The Massachusetts Bay Transportation Authority (MBTA) will be seeking bids and a partner to install enhanced Wi-Fi capability at no cost to enhance the amenities that more than 50,000 passengers can enjoy on trains, ferries, and at select commuter rail stations (Figure 17). The enhanced Wi-Fi service would be a win-win-win proposition: the MBTA will

have the capability installed at no cost, passengers will be able to enjoy its benefits at no cost, and the successful bidder will get an advertising and commercial partnership with MBTA. The New York Metropolitan Transportation Authority (MTA) pursued a similar partnership for its wireless network in the Grand Central Station and Park Avenue tunnels, as well as on Metro-North trains and the Long Island Railroad, at no cost to the MTA. The arrangement is expected to provide significant improvements in customer service, railroad operations, and emergency management, and improve radio communication for operating department employees, the MTA Police, and other first responders (*73*).

FIGURE 16 Broward County Transit's community bus program has resulted in more extensive customized service in 20 different cities at very low cost to the transit agency because of partnerships with the cities (*Source*: Broward County Transit).

FIGURE 17 Transit agencies are seeking partnerships to have Wi-Fi installed in their trains and express buses to enhance passenger amenities while also generating revenue at no cost to the transit agency (*Source*: Sarah Fisher/*Daily Free Press* Staff).

The Santa Clara Valley Transportation Authority (VTA) in San Jose, California, was able to decrease paratransit expenses by approximately $250,000 per year by moving the contractor's operating facility from its leased facility to a location already being leased at no cost to VTA as a result of a property use exchange with the County Sheriff (J. Smith, Chief Financial Officer, VTA, personal communication, Jan. 6, 2010). VTA also engaged in a very low-tech but efficient and green way to maintain the grounds on one of its properties: VTA welcomed a herd of sheep and goats to graze at the Cerone Division during the spring months, at no cost to VTA (Figure 18). Allowing the sheep and goats to graze reduced the need to mow the fields several times and reduced the need to apply herbicides to control the growth of vegetation. VTA saved approximately $14,000 by partnering with these professional grazers.

FIGURE 18 VTA uses a low-tech method to save money by partnering with a local sheep farmer to maintain open fields at one of their properties (*Source*: Joseph Smith, CFO, VTA).

CHAPTER THREE

SURVEY RESULTS FROM TRANSIT AGENCIES ENGAGED IN PROMOTING TRANSIT EFFECTIVENESS

SURVEY METHODOLOGY

The purpose of any TCRP synthesis is to summarize the current state of the practice in the transit industry, usually through a survey of public transit agencies that provides information and a snapshot in time of agencies' experience. The survey developed and approved for this synthesis included a considerable number of open-ended questions, making the survey a bit more challenging to analyze than one that includes mostly multiple-choice questions. Using contact information from the APTA electronic directory, the principal investigator sent an initial e-mail to the directors of 205 transit agencies throughout the United States with a copy of the project scope attached.

Positive responses were received from 40 of 46 transit agency directors (87%) throughout the country, indicating their willingness to participate in the survey. The web-based version of the survey was beta-tested by four transit agencies that made very useful comments that were incorporated into the final survey.

A total of 40 agencies ultimately completed the survey, representing an 87% response rate. The sizes of the participating agencies are listed Figure 19 and presented geographically in Figure 20 and Appendix B. The responding agencies represent a mix of small (less than 100 buses), medium (100–500 buses and train cars), and large (more than 500 buses and train cars) transit systems. These 40 transit system participants represent 17 different states from coast to coast and the District of Columbia.

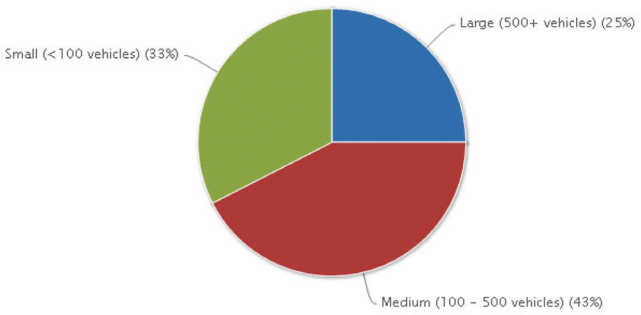

FIGURE 19 Size of responding transit agencies by numbers of vehicles.

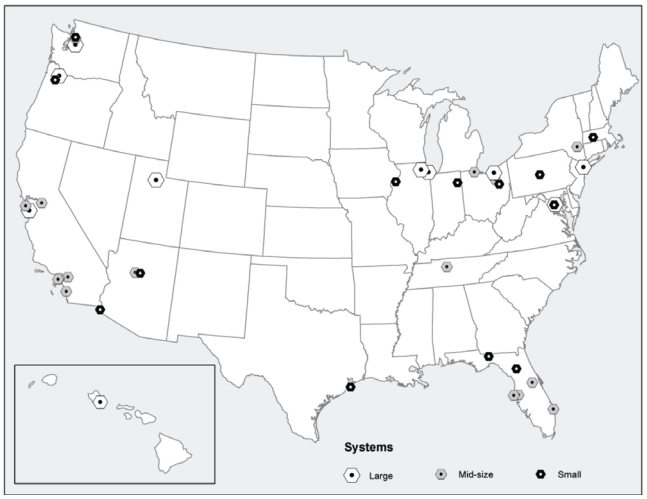

FIGURE 20 Geographical location of survey respondents.

Small Transit System Respondents

1. Arlington Transit (ART)—Arlington County, Virginia
2. Capitol Area Transportation Authority (CATA)—Lansing, Michigan
3. Centre Area Transportation Authority (CATA)—State College, Pennsylvania
4. Everett Transit—Everett, Washington
5. Fort Wayne Public Transit (Citilink)—Fort Wayne, Indiana
6. Galveston Island Transit—Galveston, Texas
7. Go West Transit—Western Illinois University/Quad Cities, Moline, Illinois
8. Northern Arizona Intergovernmental Public Transportation Authority—Flagstaff, Arizona
9. Salem-Keizer Transit (Cherriots)—Salem, Oregon
10. Stark Area Regional Transit Authority (STARK)—Canton, Ohio

11. Star Metro—Tallahassee, Florida
12. UMASS—Amherst, Massachusetts
13. Yuma County Intergovernmental Public Transportation Authority—Yuma, Arizona

Medium Transit System Respondents

1. Akron Metro—Akron, Ohio
2. Capital District Transit Authority (CDTA)—Albany, New York
3. Central Florida Regional Transportation Authority (LYNX)—Orlando, Florida
4. Community Transit—Snohomish County, Washington
5. Foothill Transit—West Covina, California
6. Hillsborough Area Regional Transit Authority (HART)—Tampa, Florida
7. Long Beach Transit (LBT)—Long Beach, California
8. Nashville Metropolitan Transit Authority—Nashville, Tennessee
9. North County Transit District (NCTD)—Oceanside, California
10. Omnitrans—San Bernardino, California
11. Palm Tran—West Palm Beach, Florida
12. Pinellas Suncoast Transit Authority (PSTA)—St. Petersburg, Florida
13. Regional Transit System (RTS)—Gainesville, Florida
14. San Joaquin Regional Transit District (SJRTD)—Stockton, California
15. SamTrans—San Carlos, California
16. Toledo Area Regional Transit Authority (TARTA)—Toledo, Ohio
17. Valley Metro—Phoenix, Arizona

Large Transit System Respondents

1. Chicago Transit Authority (CTA)—Chicago, Illinois
2. Greater Cleveland Regional Transit Authority (GCRTA)—Cleveland, Ohio
3. King County Metro Transit—Seattle, Washington
4. New York City Transit (NYCT)—New York, New York
5. Pace—Arlington Heights, Illinois
6. Santa Clara Valley Transportation Authority (SCVTA)—San Jose, California
7. The Bus—City and County of Honolulu, Hawaii
8. TriMet—Portland, Oregon
9. Utah Transit Authority (UTA)—Salt Lake City, Utah
10. Washington Metropolitan Area Transit Authority (WMATA)—Washington, DC

Representatives of the Chicago Regional Transportation Authority provided the responses for both the Chicago Transit Authority and Pace.

TRANSIT AGENCIES' WORKING DEFINITIONS OF TRANSIT EFFECTIVENESS AND FINANCIAL SUSTAINABILITY

Question 6 of the survey asked the following: "In keeping with the title of this TCRP project, how do you define 'transit effectiveness?'" Many responses primarily emphasized cost-effectiveness. While no one definition was offered by the responding agencies, themes associated with efficiency, productivity, social awareness, quality, customer sensitivity, and contributing to community goals were frequently mentioned. Samples of the responses are shown below, and more definitions offered by respondents (not including the agencies included as case studies) are provided in Appendix C.

- Accomplishing stated goals such as provision of mobility, providing an alternative to the car, and congestion reduction. (The Bus)
- Providing cost-efficient, safe, on-time, reliable, and clean transportation. (NYCT)
- Providing transit services in the most cost-effective way to the most people possible within the funding provided by our local community and the state. (Capitol Area Transportation Authority)
- An integrated, multimodal transit system that provides efficient, cost-effective, and innovative service to the customer. (Valley Metro)
- Transit effectiveness is defined as balancing the diverse mobility needs of the community we serve with the available resources that fund our family of services.

While maximizing ridership and revenue are part of transit effectiveness, sensitivities to local community needs, and regulatory compliance (ex: Title VI) must be a part of any definition. (Samtrans)

- Transit effectiveness is transporting as many people as possible to as many destinations as feasible in the most cost-effective way. (Star Metro)
- It is the policy of the authority to have an efficient transit system that is responsive to market needs, seeks the highest and best use of funds, obtains maximum benefit for each dollar spent, increases transit usage per capita, and enhances Santa Clara Valley's environment and quality of life. (SCVTA)

Question 6b asked if the respondent's definition of "transit effectiveness" was part of the goal structure driving its organization. A clear majority of 80% indicated that it was (Figure 21).

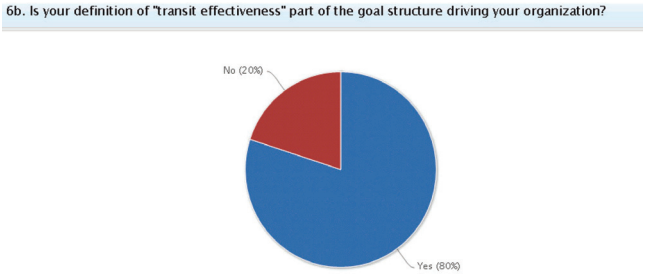

FIGURE 21 Percentage of responding transit agencies that include measures of transit effectiveness in their organizational goals (*Source*: Survey responses).

Question 7 asked for the respondent's definition of financial sustainability and what tools were needed to achieve it. Again, there was no common definition, but many respondents indicated the need for long-term and reliable dedicated revenue streams, conservative and competent financial planning, community support, and adequate reserves. Two of the most comprehensive definitions are provided here; the remainder of the definitions offered by respondents are provided in Appendix D.

TriMet provided the following definition to describe a financially sustainable transit agency:

Financially sustainable transit systems have a financial forecast that is continually updated. In addition, financially sustainable systems have the following practices:

1. Without exception, one-time-only revenues are used to support one-time-only expenditures. Continuing revenues are used to support continuing expenditures or one-time expenditures

2. Continuing revenues and expenditures are in balance throughout the forecast. Revenue and expenditure assumptions are realistic.

3. Unrestricted ending fund balances meet board goals throughout the forecast.

4. Capital assets are in a state of good repair.

5. Actuarial assumptions for pension funding are realistic, with 100% of pensions funded each year.

6. The agency is able to afford the current medical benefit premiums for retired employees.

7. Senior lien debt service is less than 7.5% of continuing revenues throughout the forecast.

8. Able to control costs and fund the existing transit system on balance over all business cycles with the current revenue base, including maintaining schedule reliability and relieving peak crowding.

WMATA provided the following definition of a financially sustainable transit agency:

> All transit systems in the U.S. require substantial public funding support for both ongoing operations and capital investment, and this is unlikely to change in the near future. Yet at all levels of government—federal, state, and local—transit systems must compete for limited funds with many other necessary public services, including public safety, education, and health care. Thus, for a transit system to be financially sustainable, it must consistently demonstrate to riders, voters, and elected officials that it is using the public's funds efficiently and delivering highly valued services. The actions required to achieve this might include:
>
> - Holding down cost growth by rigorously monitoring both key cost drivers at the margin (such as overtime or parts and materials) as well as structural trends in wage rates, health care costs, pensions, and other employee-related costs.
> - Prioritizing capital investments and rehabilitating or replacing assets on schedule to ensure reliability, safety, and reduction of downstream operating costs.
> - Modifying services regularly as travel and development patterns change, in order to respond to rider needs and avoid either overcrowding or underutilization of expensive assets.
> - Increasing fares on a regular (rather than irregular) basis in a manner that balances rider income growth, prices for competing modes, and the need to maintain farebox recovery in order to mitigate subsidy growth.
>
> Further, a transit agency needs a broad array of tools in order to undertake these actions, including:
>
> 1. Frequent passenger surveys and other feedback mechanisms (e.g., active involvement on social media).
>
> 2. Up-to-date economic and demographic datasets.
>
> 3. Real-time reporting on ridership and system utilization by route, time period, etc.
>
> 4. Real-time reporting on key cost drivers.

5. Explicit methodology for prioritizing capital investments.

6. Regular correspondence and interaction with funding partners at all levels to ensure that a strong "return on investment" message is transmitted.

PROCESSES FOR RECEIVING PUBLIC INPUT

Question 8 asked, "Have you put any program in place to receive structured input from your ridership and/or your community to advise them of the fiscal stress and to ask them what their preferences would be if you had to reduce service (e.g., increase the fare rather than cut service, reduce frequency versus reduce span of service, etc.) or as you are planning new service?" Sixty-eight percent of respondents answered that they had done so. Virtually all respondents noted the public hearing process used to share information and collect comments and suggestions, and many noted the modifications they made to proposed service changes as a result. Only six respondents directly addressed whether their passengers would prefer raising fares to cutting service. All six said their passengers clearly preferred raising fares. Community Transit and King County Metro Transit both implemented particularly interesting public input processes that are described in the case examples later in the synthesis. The following responses represent those that went beyond the traditional public hearing process:

- SamTrans is now working on a comprehensive operations analysis called SamTrans Service Plan (SSP) with a goal of increasing ridership by 5% with the same service level. Recommended service changes were developed and presented to the public through a series of events in the fall of 2012. More than 1,200 comments were received from nine community meetings, 16 city council meetings, three tabling events, multiple Bus Operator outreach communications, and online survey, and written and phone comments. A new recommended service change has been developed based on the input; it will be presented at four public meetings in March and a formal public hearing in April, with tentative adoption in May. (San Mateo County Transit)
- In FY 2009, we undertook a budget-balancing action after the failure of a ballot measure. We eliminated Saturday service, by board decision, because the service-level reductions to balance the budget were drastic. In prior years there were service cuts through route elimination and frequency reduction. I did get approval from the board to delay the weekday reductions in order to receive community input. We held a series of open houses to gather information from the community. We then used that information to entirely redesign our weekday service. We then went back out to the community to receive comment on our plan, built on their original input. We made some minor changes to routing based on feedback. As a result we focused our service on the 3 C's concept (corridors, circulators, and centers). We are not able to fully implement the 3 C's concept, so we focused on providing the best corridor service we could. We are now building the transit centers that will eventually allow us to provide circulator service (we are providing some circulator service but not at the levels called for in the plan). The idea is that if we can provide high-quality corridor service, people will support our commitment and when the timing is right they will support a ballot measure to bring back weekend service and circulator service. (Salem Kaiser Transit)
- Last year, our FY 2013 proposed budget contemplated fare adjustments and certain bus service changes. To get input from customers and other stakeholders, we conducted town hall meetings and public hearings, invited feedback through cyber cafes, and engaged riders online and in person (mailback surveys). We also developed a video tool to describe what was proposed. Over the years, and last year was no exception, our customers preferred increased fares over service cuts. But they would prefer that the local jurisdictions that support Metro pay a higher share of the operating support required. (Washington Metropolitan Area Transportation Authority)
- In response to precipitous declines in FY 2009 sales tax revenues and alarming deficit projections subsequent to adoption of the FY 2010 and FY 2011 biennial budget, the Valley Transit Authority (VTA) Board of Directors appointed an Ad Hoc Financial Recovery Committee in December 2009. The committee consisted of three board members and was supported by a stakeholder group with representatives from business, labor, VTA advisory committees, and other communities of interest. The committee's directive was to review VTA's financial structure and to develop recommendations for the board that addressed VTA's long-term structural deficit beyond FY 2011 to ensure the continued sustainability of transit services in Santa Clara County.

  The committee held biweekly meetings beginning in January 2010 and spent considerable time reviewing VTA's financial structure and economic projections. After careful consideration and analysis, at its September 1, 2010, meeting, the committee unanimously approved "Guidance on Operating Expenditure Priorities, Key Financial Principles, and Deficit Reduction Targets," containing financial priorities, principles, and debt reduction targets to guide VTA in becoming a more financially stable and sustainable organization. The deficit reduction targets were identified in the areas of internal efficiencies, employee expenses, service delivery and new revenue. The stakeholders expressed their unanimous agreement with the document based on amendments recommended by committee members and stakeholders. The committee's recommendation was

presented to the board of directors at a Special Meeting on October 22, 2010, and approved unanimously by the board on December 9, 2010.

The Expenditure Prioritization and Key Financial Principles were used to develop the FY 2012 and FY 2013 operating budget and will be followed again in preparation of the recommended FY 2014 and FY 2015 operating budget. Implementation of these principles and priorities has led to a reduction of reliance on eligible capital funding for operating-related purposes, improved collaboration toward negotiating sustainable bargaining unit agreements, and service plans designed to improve transit sustainability. (Santa Clara Valley Transit Authority)

Reorganization of Transit Agencies

Question 9a asked, "Have you modified how your agency is organized as one means of reducing costs and possibly improving efficiency?" Sixty-three percent indicated that they had done so. Many respondents indicated that they had experienced substantial reductions in administrative personnel in order to save as much service as possible, causing numerous shifts in responsibility among remaining staff. There also appeared to be a growing recognition of the need to emphasize community relations more than in the past. One agency completely modified its organization by contracting out all operations and maintenance functions previously performed by public agency employees. Question 9c asked, "If you answered yes to question 9a, were there any lessons learned that could be shared, and has there been evidence of staff burnout?" Samples of responses to both questions (when provided by respondent) are provided here.

- NYCT reduced administrative positions by 15% by eliminating positions in all departments. As a result some functions were eliminated and others were consolidated. In addition, NYCT transferred 188 positions to the new Business Service Center (BSC) developed by MTA, our parent agency. The BSC is designed to centralize specific functions such as payroll and disbursements. Any efficiency reductions resulting from the BSC were taken at the MTA level. If staff reductions are not based on seniority, there needs to be a clear method to determine which staff members will be retained based on performance and productivity. Ideally there should be substantial ongoing performance reviews for all administrative and professional staff to facilitate an objective response. (New York City Transit)
- Overall staff positions were eliminated and responsibilities broadened. We closed one of our bus district facilities and redistributed the 200 buses (and direct operating staff) that were based there to other operating districts. The immediate result was a $3 million reduction in overhead. There was no staff burnout. Our advice? Just do it. (Greater Cleveland RTA)
- Bus and dial-a-ride operations and Light Rail operations have recently been brought under one agency. They were formally two different agencies with two CEOs, and parallel staff structures. Plans are under way to unify fixed-route operations with Mesa and Tempe effective July 2013. (Valley Metro)
- CTA underwent considerable management overhaul in 2011 and 2012, eliminating 200 positions, including a number of positions at the senior staff level: vice presidents, general managers, and directors. The leaner management structure averages 21 frontline staffers for every manager. The results are saving approximately $22 million annually, with changes to sick and vacation leave policy estimated to save an additional $15 million over the next 6 years. (Chicago Transit Authority)
- Completed an extensive restructuring in 2010, eliminating about 100 nonservice positions. Staff has been more stressed since the reductions. (Utah Transit Authority)
- We completed a 100% review of our organizational structure. We eliminated two divisions by combining responsibilities. We also added a small community relations division to focus on public outreach, marketing, communications, and customer service. Our community told us they don't know much about us and how we benefit the community. We have committed to improving that effort in order for the community to understand our community role. Part of that is designed to help us in a future ballot measure. There has been a bit of burnout as people are doing more. What we have really noticed is that quality is being impacted. People are doing a good job but we are so busy moving from activity to activity that we are just getting by and not spending a lot of time trying to look ahead. (Salem Kaiser Transit)
- In 2011, there was a reduction in force and the number of departments reporting directly to the CEO was reduced to four. In 2012, the Administration Division was eliminated and the departments were distributed to the other chiefs, which then reduced the number of departmental direct reports to three. Also a classification and compensation study was completed in 2012. Consolidation of duties has led to increased workload on staff and subsequently high turnover. (Hillsborough Area Regional Transit Authority)
- There has not been any large-scale reorganization but there has been modest outsourcing (some IT functions and cash counting), while most departments have seen a reduction in staff. There has not been evidence of staff burnout. Outsourcing as a way of reducing costs comes with reduced quality of service and has continued questions about the effectiveness of the change. (Omnitrans)
- Fewer people (10% reduction in employees). A more focused effort on financing and aligning what we spend to what we earn. Our transit development plan

has guided service planning efforts to produce a much leaner service delivery system that is now operating with more effectiveness. There is a limit to how much smarter and harder you can work. (Capitol District Transit Authority)

- We reduced the number of safety and security staff by eliminating two part-time positions. The structure and invoicing methodology have been changed from a cost per hour to a cost per mile basis to encourage contractor compliance with published schedules. Customer Service and Operations have been realigned under the same director to encourage synergies and efficiency. As long as you tell staff there may be cuts prior to the actual cut along with an explanation why the cuts are necessary, then the overall experience will not be that bad. Staff was anticipating the reduction so when it occurred it was not a surprise. (Foothill Transit)
- If we can't afford it, we don't do it. We focus on the core of why we are in business . . . to provide public transit services that enhance and improve the quality of life for the residents in our community. We had to give managers "permission" to do less. Our standards are still high, but there were nice but nonessential programs that had to be cut back or put on hold. Some managers saw these nonessential projects or programs as essential, so they had a difficult time letting go. Staff burnout occurred as a result of the 2009 American Recovery and Reinvestment Act projects. Suddenly, we had $16 million to spend as soon as possible and that was on top of an already heavy workload. (Long Beach Transit)
- We have seen a little staff tension, but we have tried to help by communicating with employees (particularly managers) frequently, asking for employee input and participation in decision making related to reallocating resources, and increased internal staff development. We also insist that everybody help share in the additional load. Employees who are not pulling their weight are identified, coached, and ultimately released if they cannot or will not improve their performance. We believe allowing poor performers to remain on staff could discourage the employees who have been willing to meet the challenges of doing more with less. (San Joaquin RTD)
- We have cut overhead positions and increased responsibility at Director and Executive Director level positions. The same or more work is spread over fewer positions. Sometimes this is good and leads to better cooperation, sometimes it takes longer for work to get done, sometimes work doesn't get done, and sometimes there is burnout when people are given more responsibility with the same resources. (TriMet)
- We are engaged in an ongoing effort to control staffing levels and filling only critical positions. Approximately 60 positions or 9% of SamTrans's 724 authorized positions are vacant, and 13 of the positions are not being budgeted. The executive leadership was restructured, with two chief officer positions eliminated with their areas of responsibility allocated to existing management. The Public Affairs Department was formed into its own division, with an executive officer position. There is an annual wage and benefit savings of approximately $2.4 million from the 13 authorized positions not being budgeted. Staff burnout is a concern. To avoid real problems from it, there are regular all-hands staff meetings to keep employees up to date on the situation and informed of efforts to resolve the fiscal crisis. The openness and honesty of management have led to trust by the employees. Individual officers also check with their staff regularly for "how is everybody doing," and employees are fully supported when they request time off for vacations and personal needs. The Public Affairs Division is relatively new, but already there has been increased communication to the public and to elected city officials in the county. Elected officials are now better understanding the services SamTrans provides to the community and that transportation is essential to sustaining other county services. And now elected officials are considering distributing part of a new temporary sales tax to help fund critical transportation services provided by SamTrans. (San Mateo County Transit District)

Question 10 asked respondents how they felt their agencies were performing given the changes they had been through. They were given seven choices, without benefit of definitions for the choices. Exactly half stated that they were doing more with the same or fewer resources. Only 7% indicated that they were doing less with less. The results are shown in Figure 22.

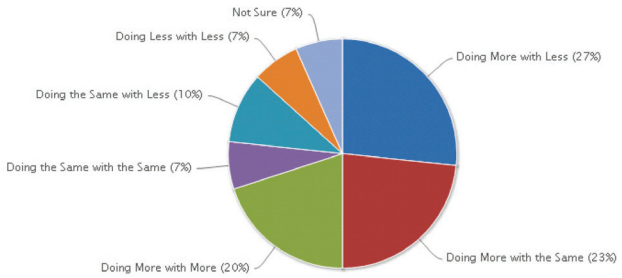

FIGURE 22 How responding transit agencies feel they are doing with their current level of financial resources comparing fiscal year 2012 to fiscal year 2008 (*Source*: Survey responses).

MAINTAINING TRANSIT EFFECTIVENESS THROUGH MORE DATA-DRIVEN MANAGEMENT

Question 11 asked, "Have you implemented any new form of managing through the use of better data (e.g., the TransitStat program in Cleveland, Six Sigma process in Miami, ISO 14001 certification in Salt Lake City)?" Forty-three percent of respon-

dents answered affirmatively, identifying an array of tools that help them manage better by using data more effectively.

- New York City Transit has started to track vehicle location to provide customer service and service management using Automatic Train Supervision, Communication-Based Train Control, and Bus Time data.
- Invented TransitStat, trained many staff in the Six Sigma Process, and are now embarking on the Partnership for Excellence and moving toward the Baldrige Award. (Greater Cleveland RTA)
- The Chicago Regional Transportation Authority, with cooperation from each of its service boards, implemented a performance measurement program in 2008 and is in the process of developing performance targets. The RTA uses National Transit Database (NTD) data to develop a performance measurement "report card," which covers various service measures over a 5-year time period. Performance measures are reported for each mode and service board, as well as in an aggregated regional perspective. Additionally, performance is reported in relation to comparable peers, again on regional and subregional (modal) basis, each year. The RTA also initiated a Capital Asset Condition Assessment of the regional transportation system's assets in 2009 based on a sampling of all its physical assets. Annual updates of the assessment report are conducted to provide a review of the current physical condition of system assets and a 10-year projection of capital reinvestment needs. The asset condition report has been instrumental in drawing attention to the underinvestment in the capital infrastructure of the region. It has focused capital program development on improving the state of good repair of the system.
- CTA completed a contract in 2012 with a third party vendor that will utilize barcoding technology to manage its supply chain process, providing access to national networks of parts and material distributors in a just-in-time procurement system. Tighter control in inventory has allowed CTA to project a slower rate of growth in material expenses for 2014 and 2015. (Chicago Transit Authority)
- In addition to ISO 9001 and ISO 14001, we implemented lean management principles and tools that have improved efficiency and reliability. (Utah Transit Authority)
- We have implemented a Microsoft Structured Query Language (SQL) data warehouse for consolidating organizational data and a Microsoft SharePoint front end for management report distribution. (Salem Kaiser Transit)
- We collect huge amounts of data through our CAD-AVL system, which we use to monitor our key performance indicators and to process ridership information. These include automated passenger counters (APCs) and validation of the APC data using videos. We have more than 50% of our bus fleet and 40% of our light rail fleet collecting huge amounts of ridership data. We use Trapeze Gateway, a tool to validate and process ridership; Trapeze Viewpoint to analyze ridership data; and SAP, an enterprise resource planning (ERP) system for preventive maintenance and monitoring of employee absenteeism. We monitor various key performance indicators, such as on-time performance, miles between mechanical failures, absenteeism, service reliability, etc., and they are reported quarterly to the board (Transit Operations Performance Report). We have monthly monitoring and internal reporting of all operating statistics and an Annual Transit Service Plan that focuses on improvements to service, and we regularly conduct "on board" surveys. (Santa Clara Valley Transportation Authority)
- In 2003, the MTA completed an extensive strategic planning process that focuses on results for our customers. This process is called Results Matter. Staff members from all levels of our organization were involved in the initial planning process, which included an assessment of emerging issues and trends that would be affecting our organization and customers for many years. This process allowed us to set goals that had to be achieved to get ahead of the issues and trends. Through this process, we developed an organizational mission statement and organization goals. Then we took the process one step further and studied each and every function of the organization. All functions were grouped by common purpose into about 20 programs. We developed performance measures for each of the programs that defined success for the program. Program goals were incorporated into each employee's annual performance appraisal, and they received evaluation scores and pay increases based on their success in meeting the goals of the Results Matter plan. Our organizational chart was also modified to ensure that employees had the proper reporting structure to help them achieve the results of their programs. The Results Matter process has been very successful for us. We obtain valuable information needed to make good business decisions; our employees now understand how their individual work contributes to the organizational goals; and we are able to use the information to make a business case for resources. In a 5-year period, we were able to meet or exceed many of the goals we had set for the Results Matter plan. We share our result measures with the metro government, and we have seen substantial increases in the level of financial support they provide to us since implementation of the Results Matter process. The Results Matter plan is a living document and is regularly revised as we reach goals or if we want to change the focus of parts of the organization. (Nashville MTA)
- We have created management information reports along the lines of TransitStat in order to track performance in our Operations and Maintenance Departments. Our operations reports focus on tracking the riders per rev-

enue hour on routes in order to identify areas of underutilization for use in our service planning process. Our maintenance reports focus on tracking maintenance costs on a subfleet level in order to identify trends in fleet expenses. This was particularly beneficial when deciding which buses to replace when new vehicles became available. (Centre Area Transportation Authority)

Two transit systems (San Joaquin RTD and SamTrans) provided more detailed responses to question 11.

San Joaquin RTD

- TransTrack provides a business intelligence solution that transforms volumes of data into meaningful information for our managers and executive leadership to use in developing immediate actions, strategies, and plans to ensure optimal operations and performance. The result is a more efficient, reliable, and streamlined system for capturing data and analyzing our Key Performance Indicators (KPIs).
- American Bus Benchmarking Group participation (ABBG). Expected results from our ongoing ABBG participation include
  - Savings on resources by learning where and how to be more productive
  - Savings on resources by taking into account other members' experiences (no need to reinvent the wheel)
  - Improved allocation and prioritization of resources by understanding where most improvements can be achieved
  - Savings on resources on research/consultants
  - Availability of an expert network with quick information exchange
  - Better informed and more creative staff.
- Environmental and Sustainability Management System (ESMS). Participation in a federally funded ESMS training program through Virginia Tech provided valuable lessons and examples in environmental issues as well as overall business management. Expected results for our ongoing ESMS participation include
  - Cost savings
  - ISO 14001 certification
  - Document and data control for consistent, reliable, accessible, and more easily understood information. (San Joaquin RTD)

SamTrans

SamTrans recently implemented a new farebox recovery system and a predictive bus arrival/departure system shortly before that. The system is being used to better monitor on-time performance (OTP), and schedules are being adjusted accordingly. The data are also being used along with surveys to help identify trip patterns. SamTrans has seen a ridership decline since implementing the new farebox system. However, the farebox revenue is relatively flat, indicating better collection of the proper revenue and more accurate information as to the number of trips. Eventually, manual OTP sampling data collection will be eliminated, which will reduce labor costs. Use of the new systems and data is resulting in improved service and increasing ridership, while helping to reduce labor costs.

Also, for the last few years, SamTrans has been using a 360-leadership model that is based on data (research). This instrument (the eXpansive Leadership Model—XLM) has been validated in the transit industry.

1. The CEO or a member of the executive team discusses a possible candidate (leader), who might benefit from 360 feedback, with an outside leadership consultant.
2. If both agree, the leader is invited to complete the assessment online (http://xlmassessment.com/).
3. The leader reviews his/her confidential, 25-page report with the leadership consultant.
4. They create a leadership development plan that leverages the leader's strengths and helps manage weaknesses.
5. Depending on the situation, the leader than implements the plan with the help of a few others (peers, boss, our leadership consultant).

SamTrans has had outstanding results, especially when 360 feedback is combined with results-oriented coaching. Leaders grow their emotional intelligence and improve teamwork, strategic thinking, and several other critical leadership competencies.

SamTrans developed an internal Supervisor Academy that takes line employees into first-time supervisor positions and a Leadership Academy for existing management team members to prepare them for career advancement. (Samtrans)

USE OF INCENTIVES TO ENCOURAGE TRANSIT EFFECTIVENESS

Question 12 asked, "Did you put into place any incentives for your managers and employees to help find ways to raise revenues or reduce expenses without harming the best interests of your passengers?" Only 14 (35%) of responding agencies indicated that they had used some form of incentives since FY 2008. Most did not provide precise cause-and-effect information, but the most telling responses are shown here.

- Our TEAM program rewards employees for achieving established goals in areas such as safety, attendance, customer satisfaction, on-time performance, ridership, revenue, and attendance. Incentives are mostly nonfinancial and provide an ability to grow professionally and become better managers. Results were outstanding. (Greater Cleveland RTA)
- Pace implemented departmental goals to increase ridership and reduce costs. Managers are evaluated on performance to goals. Compensation can be affected through performance evaluation process. Generally positive results—increased ridership and favorable-to-budget expense performance. (Pace)
- We created a Leadership Action Program (LAP) that combines leadership training and training on how to analytically design programs to achieve cost savings. LAP is a 6-month training program that provides training on leadership skills necessary to advance within

the organization, while also asking participants to develop cost-saving techniques. We have had six LAP classes, with 8–10 graduates per class. Each graduate is required to develop a program to reduce costs or generate additional revenue of $6,000. Many real programs have come from the course, such as a weekend consolidation of our two dispatch centers, which saved more than $50,000 per year. (Omnitrans)

- The incentives used were found in the employee planning documents. Employee planning documents are used to rate an employee's annual performance and determine annual salary increase levels. Performance-based pay raises were calculated by the comparison of our goals and the actual improvements. We have consistently raised revenues by creating new revenue sources, improving current revenue sources, and partnering with private-sector companies. Our expenses were reduced or increases were deferred through labor negotiations that provided for no wage increases for 2 years, improved absence policies, and a wellness program that is showing initial signs of lowering health care expenses. (Nashville MTA)
- We adopted a quarterly performance incentive program tied to safety, attendance, and customer service. Our cost per hour dropped from $89.43 to $85.44 between FY 2008 and FY 2012. Employee satisfaction has remained flat. (Northern Arizona Intergovernmental Public Transportation Authority)
- Pay incentives are given out if the agency successfully hits seven of nine key performance indicators, which include operating within budget. Results have been good. Employees know they play a part in how the agency operates. (Foothill Transit)
- We use a performance-based incentive program with 35% linked to agency goals and 65% linked to job-specific goals. Among the agency goals, NCTD aimed to increase ridership by 5%, increase nongrant revenues by 5%, and hold cost per revenue mile to the previous year level. Ridership increased by 5.5%, nongrant revenues increased by 15.1%, but cost per revenue mile increased from $10.14 to $10.80, primarily as a result of a management decision to incur one-time costs (professional services) that should benefit NCTD efficiency in the long term. (North County Transit District)
- The main incentive for employees is keeping as many jobs as possible while providing the highest level of service to our passengers. We also formed a cost containment committee composed of employees from different departments to encourage employee engagement and participation in identifying ways to reduce costs in the organization. We maintained as many jobs as possible while providing the highest level of service within our financial means (balanced budget). (San Joaquin RTD)

Question 12d asked, "What other actions have been taken to improve your fiscal status through collaboration with your workforce (e.g., gain sharing)?" Five agencies provided a response:

- More cross-training, drilled down for more in-the-field operator input, and recognition programs. (UMASS)
- Our labor contracts provide for wage increases, if any, that are tied to revenues. (Greater Cleveland RTA)
- Lean management including key performance indicators for each team, timely performance feedback, and mechanisms to gather and implement employer improvement ideas. (Utah Transit Authority)
- HART established an employee wellness committee composed of representatives from both bargaining and nonbargaining staff. The purpose is to corroboratively develop and implement programs and activities targeted at producing a healthier employee workforce, thereby reducing health care costs. (Hillsborough Area Regional Transit Authority)
- We modified the way planned and unplanned time off is covered. This involved agreement with the union and customization of the work assignment technology. (Capitol Area Transportation Authority)

REDUCING EXPENSES THROUGH COLLECTIVE BARGAINING AND CONTRACTING

Question 13 asked, "What labor contract provisions have you addressed to maintain effectiveness?" Figure 23 shows the responses to multiple choices that were presented in the survey. Respondents were asked to specify the work rule modifications they had negotiated; they provided the following answers:

- Work assignment rules (Capitol Area Transportation Authority)
- Establishing shift differential pay instead of overtime. Shift differential is a small increment per hour added to runs that finish between 8 p.m. and 2 a.m., giving the union an increase in the shift differential from $0.08 to $0.16 in return for CTA making a commitment to control the number of employees who are required to work longer than 13 hours. (Chicago Transit Authority)
- Working suspensions and mandatory overtime assignments. (Hillsborough Area Regional Transit Authority)
- Work schedules (four 10-hour days, three 12-hour days) allow direct reports for construction project work. (WMATA)
- A change in the labor agreement allowing all new employees to remain on the extra board during their 90-day probation period has reduced daily overtime expenses. In addition, new operators are becoming familiar with the entire system, making for much more well-rounded and informed operators. (Nashville MTA)
- Overtime after 40 hours per week rather than after 8 hours per day. No holiday pay for represented employees when we do not provide service. No benefits for full-time employees who do not complete 80% of their scheduled work per year. These changes were the result of an arbitration decision. (San Joaquin RTD)

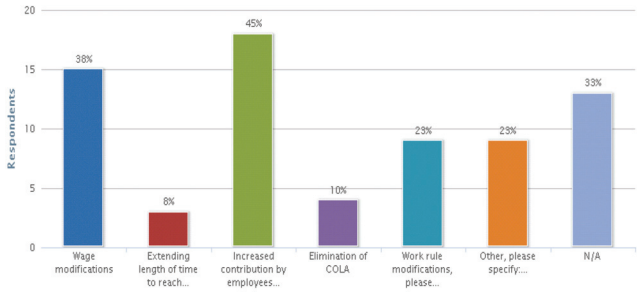

FIGURE 23 Percentage of respondents that modified labor agreements by type of modification (*Source*: Survey responses).

Under the "other" category, respondents provided the following information:

- Pension programs were modified. (Long Beach Transit)
- Establishing the relationship between wage increases, if any, and revenues. (Greater Cleveland RTA)
- Adopted a new wage range for noncommercial driver's license operators. (Stark Area Regional Transit Authority)
- We are not unionized. The city of Tallahassee did forgo the cost-of-living adjustment during FY 2010, implemented furlough days in FY 2009, and added a parking fee for city employees. (Star Metro)
- Furloughs. Wage freeze. Wage increase deferral. Employee pension contribution. Defined contribution retiree medical program option for new employees. Increased employee contributions to pension. Established a second tier benefit contribution for new employees. Established a voluntary defined contribution retiree medical program for new employees: Employees hired (or re-hired) on or after January 1, 2012, may elect to voluntarily enroll in a defined contribution retiree medical program in lieu of the defined benefit retiree program. These employees shall receive a defined contribution in the amount of $400 per month toward the cost of medical expenses in retirement. The employer contributions shall vest over time, with 100% after 10 years of employment. (Santa Clara Valley Transportation Authority)
- Contracted out operations of all transit services. (North County Transit District)

Question 13b asked, "If you modified any of your labor contract provisions, what provisions were changed and how much was saved with the changes?" Respondents provided the following answers:

- Pension plan provisions were changed to provide for employee contributions to meet actuarial requirements of the plan. Health care plan provisions were changed to provide for greater cost sharing with employees. (Long Beach Transit)
- Wage increases tied to revenues (and ability to pay), and increased health care co-pays and deductibles, with credits for nonsmokers and annual physicals. (Greater Cleveland RTA)
- Changes to work assignments saved $1 million in the first year. (Capitol Area Transportation Authority)
- CTA work rule modifications included establishing shift differential pay instead of overtime. Providing greater flexibility in scheduled starting times for employees. Paid holidays recognizing birthdays and hiring anniversaries were replaced by one personal day and more liberal use of vacation time. Allowing different trade unions to work together on projects, without regard to union jurisdiction. Vacation day allowances and pay for separation were capped at 25 days (separation pay for vacation days was previously capped at 88). As part of a comprehensive labor agreement, CTA was able to reduce its operating expenses by $6 million from the previous year but was also able to "bend the cost curve" to slow the growth of its unionized labor costs, which would have been more than $60 million higher than the previous year if the contract had maintained the status quo. (Chicago Transit Authority)
- $300,000 saved by ending 8-hour guarantee. (Stark Area Regional Transit Authority)
- We were successful in negotiating a new contract that for the first time had a period of no wage increases and reduced annual increases compared with the 30-year historical trend. While it didn't save money, it slowed the trend of historical increases. (Salem Kaiser Transit)
- Health care contributions—$750,000 per year. Impasse articles are health care, wages, and extra board. (Hillsborough Area Regional Transit Authority)
- Savings related to furloughs, wage freezes, and wage deferrals for FY 2010 and FY 2011 were estimated at $27.6 million. (Santa Clara Valley Transportation Authority)
- Omnitrans has had a salary freeze in place for 4 years. The union representing mechanics and clerical staff agreed to a furlough program that lasted approximately 1 year. The reduction was 1 work day per month.
- Initial estimates show a savings of the equivalent of eight FTEs as a result of the no-fault absence policy. Our first quarter reports for the health plan after completing the wellness plan show a 10% decrease in health care expenses. We also expect to realize less sick time, resulting in a decrease in our overtime expenses. (Nashville MTA)
- A new class of operators, special service operator (SSO), was established to adjust the wage scale to a more affordable level. SSOs still receive the same medical benefits but are not required to possess a commercial driver's license. It is not known how much savings were achieved, although the top SSO operator hourly wage equals 56% of the top regular operator hourly wage. (Akron Metro)
- In our last collective bargaining, we limited wage increases to 2%. The previous collective bargaining agreement included annual increases of 4.9%, so a 2.9% savings ($0.58/hour) could be imputed. Health

insurance was changed to a deductible program, with a savings equivalent to at least $0.40/hour. (Centre Area Transportation Authority)
- We closed our defined benefit pension plan to all new employees and replaced it with a defined contribution plan. (Lynx)
- In our last labor contract, favorable work rule and contract language changes included reduction in straight run requirements by time of day and of percentage of work; change in how overtime is earned; creation of four 10-hour days as an option for runs; increased use of part-time operators; more aggressive attendance policy. (Toledo Area Regional Transit Authority)
- Wage modifications—no savings. We have tried to minimize wage escalation. Increased contribution by employees to health benefits—$15.3 million in savings for FY 2010–FY 2012. Work rule modifications: alternate work schedule (AWS) and direct reports result in increased productivity owing to less setup and takedown time with AWS and less paid travel time with direct reporting to the worksite. (Washington Area Metropolitan Transit Authority)
- Amalgamated Transit Union (ATU) Operator and Maintenance Employee Contract—2-year wage freeze, linked third-year wage increase to fare and sales tax revenue increases. Savings of $1 million in FY 2012, $975,000 in FY 2013. All four bargaining units (ATU and Teamsters) increased from zero contribution to 10% medical premium contribution by end of collective bargaining agreement (CBA) term. Increased employee contribution to pension from zero to 5% by the end of CBA term, negotiated a second tier (lesser benefit) retirement formula for new hires: $930,000 savings in FY 2012, $2.2 million savings in FY 2013, includes administrative employee savings. Froze tenure step progressions in contract. Increased use of part-time employees from near zero to 17%. (SamTrans)

Question 14a asked, "Have you seriously considered, or actually implemented, any outsourcing of any functions?" and provided multiple-choice responses as noted in Figure 24. Under the "Other" category, respondents provided the following information:

- Paratransit
- Inventory management of paratransit/nonrevenue vehicles
- Security, logistics
- Legal, engineering, printing
- Family Medical Leave Act administration
- Helpdesk, paratransit operations, engineering design and construction support, rail line segment work—major contracts, escalator replacement
- IT, cash counting
- Law enforcement
- Transit advertising.

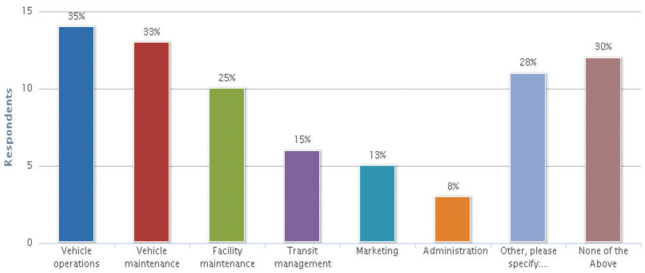

FIGURE 24 Percentage of responding transit agencies that have outsourced functions by type of function (*Source*: Survey responses).

Question 14b went on to ask, "What have been the results of each of your outsourcing efforts?" The responses are provided here:

- Paratransit operations have been outsourced, which provides a significant cost savings over doing the operations in-house. (Palm Tran)
- Outsourcing a greater percentage of paratransit services and inventory saved us money and enhanced our ability to serve more customers. (Greater Cleveland RTA)
- Valley Metro has always contracted vehicle operations and vehicle maintenance for fixed-route bus service. Rail operations are contracted, but rail vehicle maintenance was recently brought in-house. (Valley Metro)
- CTA outsources security services through the Chicago Police Department (CPD). As part of its 2012 budget, CTA invested $10 million to hire 50 full-time police officers to patrol the rail and bus system across the city. CPD security services, plus the addition of 1,800 cameras at rail stations, resulted in more than 900 arrests since June 2011. In addition, CTA outsources parts supply for vehicle maintenance. CTA entered into a contract with Genuine Parts Company d/b/a NAPA in November 2012 for up to $70 million per year for parts with a disadvantaged business enterprise (DBE) goal of 18% the first year and up to 26% by the fifth year. CTA's standard DBE goal is 12%. The benefit of this agreement is that it will allow CTA to get out of the vendor-owned inventory business. CTA will only have to manage one contract instead of the 1,200 it currently manages and will move to a paperless, just-in-time supply management system. (Chicago Transit Authority)
- Significant savings were achieved by outsourcing rail vehicle cleaning, shop janitorial services, and upholstering. (Utah Transit Authority)
- We have used contractors for a number of building maintenance tasks or problems we don't have the equipment to fix. Some of our marketing is contracted out if we don't have the expertise to complete it. (Stark Area Regional Transit Authority)
- Increased efficiency in health care administration and reduction of costs; decline in unplanned/unscheduled leave because of FMLA occurrences.

Better ability to staff. (Hillsborough Area Regional Transit Authority)
- Limited savings and a reduction in the quality of service in each area that was outsourced (IT and cash counting). (Omnitrans)
- Landscaping at all properties is outsourced. We have improved the general appearance of our properties and now have experts performing the landscaping work, resulting in improved grounds maintenance. (Nashville MTA)
- People don't even know we contract out. We contracted out from the beginning. Once we saw the cost differential (before inception) we decided this was the most cost-efficient way to go. We have saved a ton of money. We are able to control costs, maintain control, and still employ many, many people. (Go West Transit)
- Outsourcing operations or maintenance is done to contain labor expense associated with our workforce. The result is less expense for the same services. (Capitol District Transit Authority)
- Lower operating costs. Less risk to YCIPTA for operations and maintenance. (Yuma County Intergovernmental Public Transportation Authority)
- We have a private-sector contractor who provides transit management, operations and maintenance under county oversight. Within the county, several positions—including the transit technology manager, bus stop manager, and transit marketing specialist—are outsourced (not to the same contractor). (Arlington Transit)
- Commuter and light rail services have been contracted out since inception. Fixed-route service was recently contracted out to include vehicle operations, vehicle maintenance, and facility maintenance. Financially this decision reset the baseline, which reduced expenses by approximately 25%. However, this contract transitioned NCTD from compliance oversight of internal programs to a contracts management compliance oversight agency. As a result, several functions/costs were merely changed rather than eliminated. (North County Transit District)

TRANSIT EFFECTIVENESS GAINS THROUGH BETTER MANAGEMENT OF HEALTH CARE COSTS AND WORKERS' COMPENSATION EXPENSES

As noted in the literature search chapter, health care costs are among the top five concerns of virtually every employer, and most transit agencies have struggled to provide health care for their employees and stay within their budgets. Consequently, virtually all responses to Questions 15a and 15b are provided here. Question 15a asked, "Have you found ways to decrease or better control the cost of insurance (health, liability, workers comp, etc.) at your agency?" The vast majority (78%) indicated that they had. Question 15b asked respondents to provide details on what was done and, when available, what the estimated savings have been. Their answers are provided here:

- Transit competitively bid its major medical benefits contracts in 2010 for the first time in decades, with the new contracts taking effect January 1, 2011. This action produced savings of approximately $30 million annually. (New York City Transit)
- We negotiated with health insurance companies and asked employees to contribute more to their health care plans. (Long Beach Transit)
- 1. Better control of workers' compensation costs. 2. Better training and technology to reduce accidents and claims. 3. Higher co-pays and premiums for health insurance. 4. Regarding absenteeism, a stronger focus on getting them back, more supervisory accountability, and providing more alternative work duties appear to be having a positive impact. (Greater Cleveland RTA)
- We are self-insured and, by changing our third party administrator to one with a more competitive network, we saved $700,000 in the first year. (Capitol Area Transportation Authority)
- Valley Metro passed more costs of health insurance on to the employee with higher co-pays. Also, we have decreased benefits on health insurance to control the costs. Although health insurance costs increase each year, these steps meant a lower percentage increase than what it would have been if we had not made the necessary changes to the health care plan.
- Pace has achieved significant savings in health care costs through the following:
  - Higher employee deductibles and co-pays
  - Incentives to not participate in plan if other coverage is available
  - PPO and prescription network discounts
  - Wellness program.
- In 2012, the Chicago Transit Authority created a task force dedicated to scrutinizing workers' compensation claims. As a result, the monthly average of claims was reduced from 108 in 2011 to 91 in 2012. As further evidence of the success of this program, CTA's FY 2013 budget allowed for the one-time release of $12 million from its injury and damages reserve fund. Additionally, CTA's health care program has renewed its focus on preventive care and establishing economies of scale through partnerships with other organizations. Financial impacts remain to be seen.
- A premium differential is offered based on participation in the wellness program. All smoking in facilities and vehicles was prohibited effective May 2013. (Utah Transit Authority)
- We moved our health care from a fully insured program to a partially self-insured program. We saved about $500,000 the first year. We have been a member of the Ohio Transit Risk Pool for a number of years for liability insurance. Through the pool, we are looking at includ-

ing health care as well as liability. For workers' comp, we used a transitional work program to get people back to work quickly. (Stark Area Regional Transit Authority)
- Moved from fully insured health care to self-insured health plan and saved approximately $1.3 million. (Hillsborough Area Regional Transit Authority)
- Because we contract all service we have no visible insurance costs. We write into our contract that all accidents and all liability are the responsibility of the contractor. The amount built in to cover that is unquantifiable. We pay no claims, and even build in that the contractor must cover any damage to our vehicles. (Go West Transit)
- We negotiated an unbundled workers' compensation program and contracted directly with a vendor for workers' compensation medical bill review services. Before this change we were spending nearly $1,000,000 per year on medical bill review and managed care services. As a result of this change we now spend less than $250,000 for those same services. We have further controlled and reduced workers' compensation expenses through aggressive loss-control techniques, which include an early return to work program; engaging supervisors, managers, and superintendents in the claims review process; and aggressive oversight and management of our third party administrator. (Santa Clara Valley Transportation Authority)
- To reduce workers' compensation costs, we have used preassessment physical exams before hiring for positions to ensure that new hires can perform the physical requirements of the job. Savings have been estimated at about $161,000, the number of workers' comp claims has gone down, and the cost per claim has gone down. Also, cameras on the buses have reduced the number of assaults on buses, reducing claims and liability. (Omnitrans)
- Whenever we emphasize our job awareness safety program, there appears to be a correlation to fairly significant reductions in workers' compensation claims, usually around $200,000 to $400,000. (Nashville MTA)
- For workers' compensation, we changed our plan design and essentially became partially self-insured for a savings of approximately $90,000. Also, all health and ancillary insurance products were placed to bid, and a wellness program was created for all employees. The combined savings from these actions is approximately $50,000. (Toledo Area Regional Transit Authority)
- 1. Established a Wellness Program to promote healthy lifestyle among employees, thus reducing medical insurance cost (still in its infancy; no measurable results yet). 2. Awarded a contract for general liability claims program third party administrator services to a new provider specializing in transit agency self-insured claims programs to increase efficiency and reduce cost (52% cost savings compared with previous provider). 3. Established a quarterly review of workers' compensation claims. 4. Established a safety committee that meets every month to discuss safety issues and identify ways of promoting safety in the organization. 5. Made available a flexible spending plan (with higher co-pay) to reduce costs. 6. Currently looking into outsourcing the administration of the Family Medical Leave Act program. (San Joaquin RTD)
- WMATA has adopted several loss-control measures and training programs that have successfully reduced the annual number of workers' compensation claims over the last few years: an 8% reduction in the number of claims in FY 2012 compared with FY 2011. But overall costs have increased as a result of increases in medical expenses and wages. WMATA has also adopted several loss-control measures and training programs that have reduced the annual number of third party liability claims: a 15% reduction in the number of claims in FY 2012 compared with FY 2011.

A comprehensive approach to reducing insurance costs, specifically workers' compensation and general liability, came from Pinellas Suncoast Transit Authority (PSTA) in St. Petersburg, Florida.

PSTA's workers' compensation (WC) program is administered through the Risk Management Division with the external assistance of a third party administrator (TPA), Johns Eastern Company, Inc.

1. The risk management team has a risk specialist/claims adjuster who manages all injured nonlitigated employee claims on an individual basis, as well as the Modified Duty/Turn to Work Program.

2. The risk team also has a risk supervisor/claims adjuster, certified in workers' compensation litigation, who manages all litigated employee claims.

3. The risk team has an external registered nurse, certified rehabilitation registered nurse, qualified rehabilitation professional, nurse case manager, and rehabilitation specialist who assist one-on-one with all complicated employee injury cases.

4. Active case management updates are provided using a team approach: (external) workers' compensation legal counsel, third party administrator adjuster, and RN case manager; and (internal) the risk management team and human resources (as required) on a monthly/bimonthly conference call.

5. PSTA's top priorities for risk management are timely treatment, quality of care, and communication.

6. During the past 8 years PSTA has seen the number of employees, transit mileage, employee paid hours, and vehicles increase by a third. Reportable workers' compensation claims have fluctuated between

5% and 10%. The total cost of WC claims has been reduced by 43%.

During 2007–08, PSTA's property, general liability, and vehicle programs, and new expanded property facilities were transferred to the new in-house risk management claims adjuster position. This program also included the implementation of CS STARS RIMS to manage all past and future risk management claims.

1. This program has been divided between our senior adjuster's management of nonlitigated and litigated claims management.

2. Another critical factor is the successful, intense management of our digital video security systems, in place on buses since 2002. This helps our adjusters and legal counsel decide whether to settle or not.

3. The State of Florida Statute under Title XLV Chapter 768.28 has assisted with our agency's sovereign immunity protection in tort action. Since October 2011, any claim/judgment was limited to $200,000/$300,000. (Before October 2011, any claim/judgment was limited to $100,000/$200,000.)

4. During the past 8 years our operations have expanded with regard to the total number of employees, transit mileage, employee paid hours, and vehicles. The number of claims has fluctuated from 5% to13%. The total cost of our in-house claims management program increased only 14% from 2003 to 2004.

5. PSTA's adjusters were able to reduce the total number of claims managed by 35% between 2003–04 and 2011–12. Legal has successfully litigated all PSTA's claims exposures.

IMPROVING TRANSIT EFFECTIVENESS THROUGH BETTER ATTENDANCE CONTROLS

Question 20 asked, "Have you had success in implementing new ways of managing absenteeism due to sick leave, workers' compensation, and Family Medical Leave?" Public transportation is extremely labor intensive and must provide service in accordance with schedules the public can rely on. Hence, employees must be available to provide every hour of scheduled service. High rates of absenteeism require a large extra board or the use of overtime in operations and maintenance. This issue remains challenging, but 43% of the respondents indicated that they are developing ways to reduce absenteeism.

- We partnered with the private sector to provide a light-duty return-to-work pilot program for employees on workers' compensation. Lost time dropped an average of 27% during the testing periods. (Long Beach Transit)
- The more effort we put into managing these costs, the better we do. Absenteeism has dropped from 7% to 5%. (Greater Cleveland RTA)
- Outsourcing family medical leave administration to a third party has resulted in a reduction in noncompliance and risk savings in FMLA-related overtime. (Hillsborough Area Regional Transit Authority)
- CTA fired approximately 62 bus and rail operators in 2012 for being tardy or absent, a dramatic increase over the nine fired in 2011 for the same causes. Female employees at CTA now receive 6 weeks of fully paid leave after the birth of a child, and fathers or domestic/civil union partners receive 2 weeks. Changes to the review procedures for workers' compensation claims allowed for the one-time release of $12 million from CTA's injury and damages reserve fund in 2013. (Chicago Transit Authority)
- In the area of workers' compensation, we sped up the process for injury forms to get to the claims section to a median of 2 days. We have a large number of alternative work assignments (light duty) for employees while they are off on job injury. We notify employees when their family medical leave and other protected leave will run out so they know when they will be subject to medical termination. We do not grant extended and unlimited leaves. We don't let employees pick work shifts or routes if they don't have a full medical release for the time of the service change. Chiefs contact employees weekly to check on progress and remind them of work. (King County Metro)
- WMATA has taken many steps to improve employee availability. The At Risk Program identifies a category of employees who have two or more injuries within a 24-month period. These employees have a one-on-one discussion with management on the root causes of the injuries. An action plan is developed by the employees and their managers. This is a joint commitment. The process allows employees to become stakeholders in making their workplace safer and helps reduce the risk of future injuries to themselves or others. When the program started in October 2009, a total of 266 employees were deemed at risk agencywide; as of February 4, 2013, there were 175. (Washington Metropolitan Area Transportation Authority)
- WMATA's Transitional Duty Program establishes alternative or modified work that employees can perform in their home divisions within the physical restrictions imposed by their doctors for a limited time. This enables employees to return to work as soon as the next business day and prevents lost time or unnecessary time away from work. The program keeps employees connected to WMATA during their recovery. Since implementation in July 2009, the average number of days an employee in the program is out of work has decreased from 91 to 47.

- WMATA's excessive absenteeism policy outlines for employees what is considered excessive use of sick leave. The policy is administered through the chain of command. The absenteeism manager conducts one-on-one meetings with employees regarding their absence and the absenteeism policy. Employees are sent to WMATA's medical office for an evaluation to ensure that they are physically fit to do their job. The Return to Work (RTW) group monitors employees for a minimum of 90 days and implements additional actions if warranted. The program also keeps a line of sight on employees who are out on long-term leave status ensuring that there is frequent communication between employees and managers.
- The workers' compensation unit of the Risk Management Department of VTA administers the workers' compensation claim functions and ensures that work-related injuries are reported in a timely manner and that injured employees are given prompt, appropriate, and necessary medical and indemnity benefits in relation to their industrial injuries. VTA has also implemented the Transitional Work Program (TWP), which provides modified duties for injured employees to allow them to return to productive work during their recovery and pending their return to full duty, to the benefit of both the employees and VTA. TWP is designed for all Amalgamated Transit Union (ATU) employees who sustain an industrial or nonindustrial injury or illness. The employee must have a medical condition that temporarily limits their ability to work in their usual and customary job. Medical eligibility for the program is determined by the treating physician. (Santa Clara Valley Transportation Authority)
- ART's employee injury rate is very low as a result of constant and consistent communication throughout the workforce to encourage workplace awareness. For employees who wish to take an extended leave of absence or choose to go on family medical leave owing to family emergencies, we offer modified work schedules. Modified schedules enable these employees to continue to receive a paycheck, to minimize the financial impact on the employee and the employer. (Arlington Transit)
- NCTD revised the compensated absences policy by consolidating vacation and sick time into one paid time off (PTO) allocation. The PTO allocation offers fewer total days off than the previous model and has resulted in moderate savings to the agency. (North County Transit District)
- Our "no fault" absence policy has reduced the number of full-time equivalents (FTEs) needed to cover daily absences by eight FTEs. (Nashville MTA)

TRANSIT EFFICIENCY GAINS FROM OPERATIONS

Question 16a asked, "In terms of bus/train operational productivity, have you taken any of the following steps to improve service efficiency?" As with health care, this function has been a major source of cost reduction/control and increased cost-effectiveness for transit agencies of all sizes, with virtually every agency reporting significant activity. The responses received are shown in Figure 25. Under the "Other" category, the following activities were reported:

- Implementation of select bus service/bus rapid transit
- Eliminated the Ride-Free area
- Utilization of GIS data; use of on-board survey data
- Introduction of bus/train tracker
- Long-range planning/land use study.

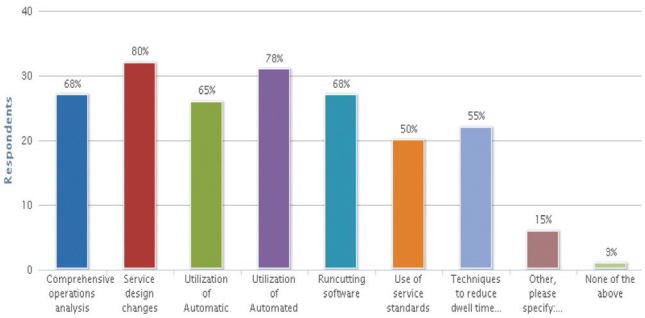

FIGURE 25 Percentage of responding transit agencies that have taken actions to improve operations service efficiency by type of action (*Source*: Survey responses).

Question 16b asked, "What was the effect of each of the techniques that you implemented in question 16a in terms of savings or improved ridership?" Relatively few respondents emphasized overall cost savings from these operations and planning activities, partially resulting from reinvestment of resources from low-performing routes to high-performing routes, where increased demand was straining the capacity of the service vehicles. However, those system changes would not have been possible without the opportunities they found to save resources from underperforming routes. Most agencies stressed the various techniques' importance to improved quality of service in terms of schedule adherence, reliability, and other factors critical to the passenger experience.

Question 24a requested the following complementary information: "Please provide the most significant steps and actions that your Operations and Safety departments have taken to become more efficient, generate revenues, or reduce costs." Some of the responses to Questions 16b and 24a are shown here. For additional responses to Question 24a, see Appendix E.

- Bus rapid transit (BRT) implementation—off-board fare collection; traffic signal priority; bus lanes; branded buses; elimination of timepoints; elimination of multiple branches. Introduction of low-floor, three-door buses has resulted in time savings of approximately 20%, depending on route direction and time of day. These savings were invested directly into more

frequent service. Ridership has increased by at least 10% on all four BRT corridors. (New York City Transit)
- Given a 125% increase in ridership over the last 5 years, increasing ridership was not the most critical factor to address. The need is to improve on-time performance and running times, and to find more cost-effective ways of dealing with the dramatic increase in ridership. (Palm Tran)
- Traffic signal priority is still under development, so its impact is not yet known. The introduction of bus and train tracker applications gives customers real-time information on when the next vehicle will arrive, reducing passenger anxiety and potentially increasing ridership. (Chicago Transit Authority)
- Improved run-cutting software and emphasis on efficiency has enabled SamTrans to reduce budgeted overtime for bus operators from 23% of regular hours to 15.5%. (Samtrans)
- New hires and less absenteeism has decreased overtime by $200,000, while new security cameras have reduced claims by an estimated $100,000. (Gainesville Regional Transit System)
- We used these data along with customer input to redesign our entire service in FY 2009 instead of just cutting existing frequency or routes. (Salem Kaiser Transit)
- After comprehensive operations analysis, Metro Red Line running time and service plan has been adjusted since FY 2011 to improve service reliability. (Washington Metropolitan Area Transportation Authority)
- Reducing the number of bus stops has improved operational speeds. (Star Metro)
- After implementation of the comprehensive operations analysis in early FY 2008, we saw increases in ridership in FY 2009 despite the economic recession that occurred. Bus ridership increased 4.2% and light rail ridership increased 2.9%. (Santa Clara Valley Transportation Authority)
- We have successfully used automated passenger counter (APC) data, run-cutting software, and service standards. PSTA's new real-time automatic vehicle location (AVL) system allows passengers at every bus stop throughout the system to know exactly when the bus will arrive/depart. (Pinellas Suncoast Transit Authority)
- Our passengers crave the information that AVL provides, and that has exploded. We have an intense amount of data, and that has helped us fend off anti-mass-transit interests many times. They are overwhelmed by what we can prove to them. (Go West Transit)
- Service design changes have led to the decision to implement express routes in high-density corridors. APC and AVL data have led to decisions to remove stops from routes and fine tune running times. Transit signal prioritization has been utilized to reduce the need for expansion of running times but has not proved effective in reducing running time. (Centre ATA)
- The AVL system is used by our service monitors so they do not have to go out to the field. (Foothill Transit)
- We changed the practice whereby all express buses needed to return to remote garages; under the new system, buses are parked downtown at a new transit center, resulting in a reduction in deadhead time. Savings estimated at approximately $175,000 per year. (The Bus)
- We instituted station staffing reductions and saved $55.6 million. (NYCT)
- We became more efficient by moving from paper to paperless processes, establishing electronic connections to the Department of Motor Vehicles for transmission of DMV reports, electronic filing, and retrieval. Electronic notepads and the Vigil system standardized the testing process and training notifications to commercial driver's license (CDL) holders and eliminated paperwork processing. (Long Beach Transit)
- We have made training processes more efficient through the use of more computer-based learning tools. (UMASS)
- Through more data-based management analysis, the agency reduced operator overtime by 30% or $150,000 annually, reduced towing costs by 60%, reduced non-revenue fleet inventory costs by $200,000 per year, and consolidated facilities to save more than $3 million annually in overhead. An analysis and emphasis on increased safety practices resulted in reduced liability and a decrease of $2 million in claims paid in 2012 compared with 2010. (Greater Cleveland RTA)
- As of July 1, 2013, the fixed-route operations between Mesa and Tempe were unified. Prior to this date fixed-route operations were two separate contracts. By unifying the fixed-route operations, the agency will save approximately $3.6 million annually. (Valley Transit)
- Our agency practiced enhanced fare enforcement by bus operators, eliminated reverse fare collection from a free-fare zone, and eliminated poor performing service. (Utah Transit Authority)
- We use bus simulators to help train our operators. This saves fuel and time on the road. (Star Metro)
- We provide safety and security services, such as threat and vulnerability assessments, safety reviews, and training through in-house resources to save on consultant/contractor fees. (Hillsborough Area Regional Transit Authority)
- We increased fare inspection by reallocating time of road and rail supervisors to also inspect fares. (TriMet)
- The Centre Area Transportation Authority in State College, Pennsylvania has moved to a method of eliminating low ridership trips to provide meal breaks on several routes. This has saved approximately four driver pay hours per weekday, or roughly $20,000 annually.
- Renegotiated the operating contract with First Transit, assumed a lot of the operating expenses, and re-procured items as a government agency, thus lowering costs and avoiding overhead associated with the

expense. (Yuma County Intergovernmental Public Transportation Authority)

- Operations has implemented a mobility plan to increase the efficiency of the fixed-route system as it interacts with two train systems. This increased bus ridership over 5 months by 155,631 (4.8%) and increased bus fare revenue over 5 months by $176,965 (5.3%). (North County Transit District)
- Omnitrans instituted a number of changes resulting in reduced costs, including these: (1) An automated operator check-in eliminated the manual card reader process and saved $75,000 in manpower and administrative costs. (2) Decentralized dispatching from two locations were combined into one location on weekends to save $100,000 per year. (3) The implementation of Transit Master allowed for the elimination of passenger counters and outsourcing of data analysis, resulting in a savings of $100,000 per year. (4) Contracting out two weekend routes that were operating below the approved passengers per vehicle service hour saved $35,000 per year. (5) An injury/illness prevention program was established for bus operators covering subjects such as back-safe stretching techniques, managing emotions, and safer motions/body mechanics. It helped produce savings of $124,344 in the first 6 months as the agency experienced 22 fewer injuries compared to the same time the previous year.
- We monitor accidents and look at trends. From that we target training. We don't use a time clock. The system is set up to pay operators unless they call off. Payroll by exception has eliminated a lot of daily work. (Stark Area Regional Transit Authority)
- Recently reinstated the use of part-time bus operators, which will provide more flexibility and help to control costs, including overtime hours. (Samtrans)
- Contracted with a private security company to provide consistent, constant presence at transit centers and reduced the contract for local police services to save $70,000 per year. (Salem Kaiser Transit)
- To control overtime we engage in earlier planning for events and a detailed review of overtime hours. A detailed review of propulsion usage resulted in $15 million in savings. (WMATA)
- Monthly safety meetings are planned around the schedules of the operators so that 100% attendance is achieved. Road supervisors stationed in the yard remind operators of safety during pull-out and when returning to base. Hourly safety messages are announced over the radio by dispatch. We learned from Houston Metro to have people with disabilities participate in driver training. (Arlington Transit)
- We implemented more neighborhood shuttles using smaller body-on-chassis vehicles, which has enabled us to reduce operating costs by eliminating fixed-route service and replacing it with on-demand small bus routes. (Lynx)

TRANSIT EFFECTIVENESS THROUGH SERVICE PLANNING AND SCHEDULING

The most significant expense any transit agency has is the cost associated with operating hours of service, and any meaningful reductions in an agency's budget would almost always include a reduction of actual hours of service to the public. Developing service reduction proposals starts with analysis from the service planning section of a transit agency. Question 5 of the survey asked agencies if they decreased service and, if so, in what fashion? Figure 26 indicates the steps transit agencies reported taking to reduce their expenses by reducing services between FY 2008 and FY 2012.

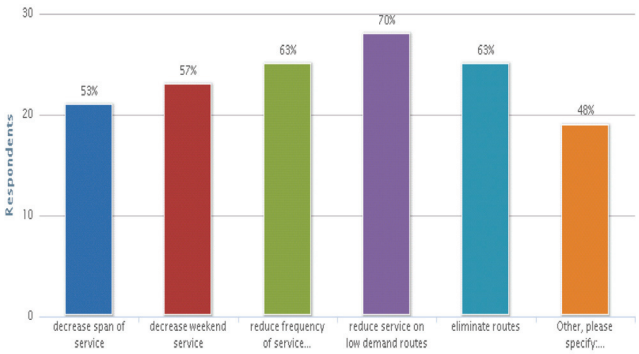

FIGURE 26 Percentage of responding transit agencies that reduced service by type of reduction between 2008 and 2012 (*Source*: Survey responses).

The most common action taken by transit agencies was to reduce service on low-demand routes; eliminating routes and reducing frequency of service was close behind. Among those who reported taking other actions than those shown in Figure 21, one agency reported that it combined routes, another reduced night service, and a third eliminated Sunday service.

Question 24c asked, "Please provide the most significant steps and actions that your planning and scheduling department has taken to become more efficient, generate new revenues, and/or reduce costs." It is evident that new technologies such as automatic passenger counters have allowed transit planners to know precisely the level of ridership by route, by segment of route, by day, and by time of day. With this information, service planners have been able to recommend reducing service on certain routes, service that is usually reinvested in productive routes that require more resources and capacity. The result is a spike in productivity and efficiency for the transit agency, with additional improvements in schedule adherence and reliability. There are also examples of transit services being redesigned from radial to grid systems and areas of low demand being served through more economical methods. Additional techniques are described in Appendix E.

- We restructured our four circulator routes (Passport service) to reduce service cost by $17,000 per week

(which was later reinvested to alleviate overcrowding on other routes). The Passport service reduction was accomplished through route revisions and also by using larger buses so that frequency could be slightly reduced. (Long Beach Transit)

- Software has helped us tweak schedules. We continually look at all services and receive input from drivers and supervisors to make service improvements. Our scheduling department looks at all routes every year to reduce layover time, deadhead, and route duplication, which saved $20,000 this year. (UMASS)
- APCs provide more accurate understanding of the customer boarding and disembarking activities. AVL provides a record of actual on-time performance, which is used to better allocate running times to improve on-time performance. Service standards allow us to focus our attention on routes that are in need of more capacity and those that need refinement to improve productivity. (Capitol Area Transportation Authority)
- We used service standards and APC data to eliminate lowest performing service. Trapeze Blockbuster software has saved significant operating (labor) costs. (Utah Transit Authority)
- Our run-cutting process for the fixed-route division is continuously improving and we have realized decreased percentages of deadhead times as a result of this process. Most of the improvements were realized by using the functions in our Trapeze scheduling software to better schedule our daily work. (Nashville MTA)
- TriMet has been able to improve on-time performance without adding costs by using data to improve scheduling accuracy and by re-allocating inefficient service to service that needs hours added to improve on-time performance.
- We have completed some minor changes to service design, primarily a significant reduction in a general public dial-a-ride system in the fringe areas of our service area. This was replaced with a series of community circulators that were designed off of the dial-a-ride trip patterns. The result allowed for both additional funding through competitive grants and an increase in ridership, while significantly decreasing the cost per trip in the areas served. The new program helped bring down program-specific cost per passenger from $22 per passenger to $12 per passenger. (Omnitrans)
- Our restructured routes to better service California State University at Long Beach resulted in a very successful UPASS program, which the university funds with an escalating amount that is now $525,000 annually in new revenue for that service. (Long Beach Transit)
- Run-cutting software has resulted in the use of more split runs and four 10-hour shifts, which has reduced operating costs. (Lynx)
- We increased fares for on-board purchases (off-board fares were kept the same), and eliminated free transfers with single-ride tickets (passengers are now required to purchase at least an all-day pass to transfer).
- In 2010, CTA implemented service cuts for both rail and bus. Vehicle revenue hours for rail decreased by 5.1% while bus hours decreased by almost 15%. The service reductions were implemented on low-demand routes and/or times of day, resulting in a 2010 ridership decrease of less than 1%. These cuts resulted in a $23 million decrease in 2010 operating expenses. In December 2012 CTA implemented a plan that reduced 12 duplicative or low-ridership routes in exchange for increasing service on 48 of the city's most overcrowded bus routes and rail lines. The operating expense impact is anticipated to be minimal but with the potential of increased ridership. (Chicago Transit Authority)
- Trapeze Blockbuster tool saved our agency approximately $400,000 yearly. (Utah Transit Authority)
- We reduced frequency in low productivity areas and eliminated or merged low-density routes. These actions saved approximately $4 million annually. (Hillsborough Area Regional Transit Authority)
- In the past 2 years staff has become more aggressive in reviewing the numerous criteria available to identify service that is not meeting standards and areas that need service adjustments. With this information we make recommendations to the jurisdictions and our board of directors to eliminate and increase services with the intent of being cost neutral. This allows for more efficient service, reduces overcrowding, increases on-time performance, and increases ridership and revenues. Additionally, the annual budget process allows for the submittal of initiatives to increase service levels that require additional funding. However, the services recommended are based on criteria review, input from customers, study efforts, and concurrence from jurisdictions willing to subsidize service expansion. These efforts also increase ridership/revenue, on-time performance, and customer satisfaction. (Washington Metropolitan Area Transportation Authority)
- The biggest change we made was adopting the COA (comprehensive operations analysis) in 2008, which changed our focus from geographic coverage to serving higher-demand areas. It was a cost-neutral project, but the result was increased productivity. Each year we scrutinize the service we provide and reallocate resources as needed. We reduce service where it's not being used as well and add it where more service is needed. This keeps the system as productive as possible. We also have an Annual Transit Service Plan that comprehensively reviews the system. In addition, we have added new express vehicles with Wi-Fi, high-back seats, and overhead luggage racks; these vehicles have improved the ridership on the express system significantly. (Santa Clara Valley Transportation Authority)
- Using AVL data, Planning has gone trip-by-trip to develop time-sensitive runtimes. This has allowed for the reduction in some midday and weekend vehicle deployments. Additionally, using this information, a few

routes have been interlined where none had been regularly interlined before. This allowed for a one vehicle savings. These combined efforts enabled to redeploy resources to meet rising demand elsewhere. (Omnitrans)

- Since the fuel crisis in 2000, we have primarily been in a position of maintaining and expanding routes, which has increased ridership. As part of our normal service review process, scheduling has adjusted trip times, deleted later evening or midday trips that had the lowest ridership, and added buses where standing loads were occurring. (Nashville MTA)
- We are moving from a time transfer/pulse system to a modified grid system with decentralized transfer points. This will save about 5 minutes per trip of recovery time. (Northern Arizona Intergovernmental Public Transportation Authority)
- The Planning Department has begun to incorporate modeling techniques into the design and implementation of new transit routes as well as the review of the current system. These modeling techniques will be assimilated into other aspects of planning, including scheduling. The Planning Department has integrated several software packages (Geographic Information Systems, Farebox, and Fleetnet software) that track and analyze various sources of transit data. The new information gives METRO a better handle on how resources are being spent and allocated. (Akron Metro RTA)
- We have eliminated low-productivity trips on various routes throughout our system. We have cut midday trips on our commuter routes and eliminated selected evening and Saturday trips. More important, we have converted regular trips on our busiest student housing routes to express trips, which are highly efficient. Estimated savings are $100,000+ annually. (Centre Area Transit Authority)
- Through our participation in groups such as professional transportation associations and the American Bus Benchmarking Group, we learned about and ultimately implemented deviated fixed-route services to offset paratransit costs while increasing ridership (ridership up nearly 90%, with costs down more than 60%); bus rapid transit (providing many more passenger trips with reduced service hours); and our no-pay for holidays program. (San Joaquin RTD)
- We operate different service levels on different days of the week. For example, on Thanksgiving, Christmas, and New Year's Day, we operate a special schedule that is approximately 25% fewer service hours than on a normal Sunday. We have received no complaints about this reduced schedule. In addition, on one route we operate a different level of service on Fridays than we do Monday through Thursday because demand is significantly lower. (Long Beach Transit)

Question 16c asked, "Have you been able to demonstrate any of the following efficiencies?" while providing multiple-choice answers. Figure 27 presents the summarized responses. In the "Other" category, respondents noted efficiencies in the form of on-time performance and decreased costs per passenger.

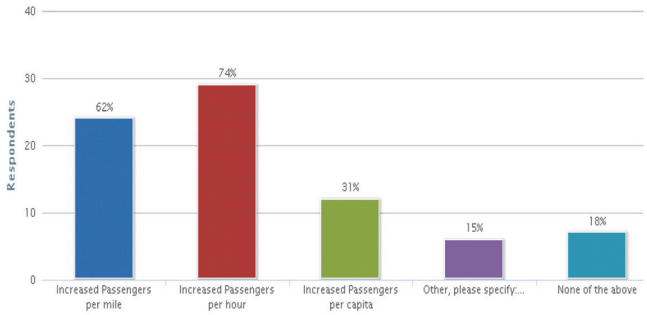

FIGURE 27 Percentage of transit agencies reporting achieved service efficiencies by category (*Source*: Survey responses).

TRANSIT EFFECTIVENESS THROUGH MAINTENANCE EFFICIENCIES

Question 24b asked, "Please provide the most significant steps and actions that your Maintenance Department has taken to become more efficient, generate new revenues, and/or reduce costs." The responses include new maintenance performance software, less expensive alternative fuels, electrification of engine systems, warranty recovery, the consolidation of facilities, more efficient lighting and utilities, establishing a just-in-time inventory system, contracting out some repairs while bringing others in-house, modifying work shift hours, and changing work rules. Descriptions of actions taken at responding agencies are provided here:

- We introduced a new program to improve miles per gallon on buses. Actions included the following: (1) Inflated tires with nitrogen instead of air. (2) Made improvements to wheel alignment program, including performing wheel alignment to front and rear wheels. (3) Began campaign to reduce parasitic load on engines by electrification of air conditioning and engine cooling fan system. (The Bus)
- We closed the Amsterdam depot to save $5.6 million and reduced operating hours at the Meredith depot to save $2.0 million. We reduced terminal car cleaning to save $14.8 million and extended rail car subway maintenance system cycles from 6 to 6.5 years to save $137.2 million. (New York City Transit)
- In FY 2013, Maintenance has taken on the task of expanding our asset management plan to incorporate all assets and is currently completing a facility maintenance plan. This includes doing an inventory and assessment of all assets, reviewing planned maintenance, and developing a long-term capital rehab/replacement program. This will be folded into our fleet maintenance plan utilizing our business application

software, which is currently undergoing an upgrade. With the software upgrade, we are also incorporating missing Publicly Acceptable Specification (PAS) 55 elements for a comprehensive asset management plan. With the implementation of the asset plan and software upgrade, we will be able to use benchmarks to monitor, measure, and control our costs. (Long Beach Transit)

- Fuel savings from the implementation of 64 compressed natural gas (CNG) coaches at our satellite facilities (even considering electricity for compression and maintenance and depreciation of station) is projected to be more than $500,000 a year, with 29% of the miles being converted to CNG. Within the project we were also able to implement an upgrade of the shop lighting by replacing inefficient halogen lights with T8s, providing $38,000 annual savings in reduced electricity and a return on investment of 11 months when we include the rebates we received from our electricity company. Another project with major savings is working with a vendor to rebuild our hybrid drive motors and generators versus buying new. Our staff was able to determine that internal gears were failing and could be replaced at a cost savings of $6,000 each, totaling an average savings of $120,000 a year. The ongoing effort of our quality assurance staff, looking at parts and rebuilds (in-house and externally), continues to result in cost savings. Our electronic rebuild shop, the main source for our internal rebuilds, continues to build parts valued at an average of more than $35,000 a month using only one FTE and nominal parts for repairs. (Long Beach Transit)
- For FY 2014 we received funding for a project to provide more timely information to our technicians and supervisors with the Phase I implementation of Smart Maintenance. This program starts by creating a smart document for our technicians for planned maintenance and inventory assessments. It provides instructions as well as quality control checks and advice to technicians as they are performing their job. It will provide real-time updates in our work order system, allowing supervisors to see the progress of all work assigned. We anticipate that the use of this technology will help us become more efficient and definitely reduce costs in the future. (Long Beach Transit)
- Added a second shift mechanic to reduce on-call costs to save $20,000 per year. (UMASS)
- Changes in shift times based on analysis of road calls and workloads increased efficiency and reduced mechanical problems. We are testing propane-powered paratransit vehicles, which should reduce operating expenses while providing a cleaner environment. (GCRTA)
- Changed from contracted light rail vehicle (LRV) maintenance to in-house LRV maintenance, saving $1.6 million in the first year. (Valley Metro)
- The Chicago Transit Authority completed a contract in 2012 with a third party vendor that will utilize bar-coding technology to manage its supply chain process, providing access to national networks of parts and material distributors in a just-in-time procurement system. Tighter control in inventory has allowed CTA to project a slower rate of growth in material expenses for 2014 and 2015.
- We reduced parts utilization through establishment of daily targets and reduced road calls by staging mechanics at bus hubs to perform light repairs. Additionally, we improved fuel economy with engine/transmission reprogramming. (Utah Transit Authority)
- Using recapped tires reduced the number of tires that needed to be disposed of and saved roughly $15,000 during a 5-year contract (as opposed to purchasing one-time-use tires). (Salem Kaiser Transit)
- All lighting in the shop has been changed from high-pressure sodium to T5. This reduced our utility bill by approximately $375 a month. When fueling CNG buses it was found that if we lower the fill pressure to 3600 psi and use only two compressors as opposed to three it saves approximately $1,000 per month in compressor electricity, In 2011 an aged automatic bus wash was replaced with an efficient new model that uses fewer chemicals for water treatment ($3,000 annually) and also uses less water ($1,800 annually). By separating out used metal, we receive about $400 annually for the nonferrous metal. (Salem Kaiser Transit)
- Purchased 19 cost-efficient paratransit minivans (instead of cutaways), resulting in a one-time capital savings of $950,000 and an annual savings of $52,478 as a result of better fuel mileage. (Hillsborough Area Regional Transit)
- The Santa Clara Valley Transportation Authority uses SAP Enterprise Asset Management software to efficiently monitor preventive maintenance through maintenance cycle plans. Due to effective monitoring of labor hours and material costs through SAP, we have been able to minimize costs. We also rebuild major components in-house, thus bringing down material costs.
- Omnitrans reported numerous cost-saving techniques, including these: (1) Brought maintenance on leased relief cars in-house instead of paying a vendor for this service, saving $6,500 per year. (2) Clean-up time for mechanics was reduced from two 10-minute allotments to two 5-minute allotments, returning $108,000 dollars or "wrench time" without increasing employee count. (3) Bus washes were reduced from every other day to every third day to save $11,800 in electricity and water/sewer charges. (4) Bus detailing was reduced from four times per year to three times per year to save $30,000. (5) The agency purchased equipment necessary to service John Deere injectors. The equipment cost $5,800, but the agency saved $12,000 in the first year alone.
- We purchased a waste oil heater to reduce the cost of providing hot water for the bus wash. Developmentally disabled workers were used for office and bus cleaning.

Buses that were retired were kept and used for spare parts. (Toledo Area Regional Transit Authority)
- The bus maintenance department has recently been contracted out, which has reduced operating costs associated with carrying excess inventory by approximately $250,000 annually. (North County Transit District)
- Maintenance has been focused on improving the information gathering and dissemination of maintenance issues in order to improve the overall efficiency of the department. Actions supporting this include the elimination of a cleaner position in order to free up budget for an analyst, an overhaul of the preventive maintenance program to be more vehicle specific, and a redesign of the daily report operators file on the condition of the vehicles they drive. By collecting and reporting better information, the quality of repairs has improved, which makes the overall vehicle reliability improve as well. This past year saw the need to expand our service rapidly—too quickly to obtain the necessary vehicles by the start of the new service. Maintenance was able to absorb a 10 extra bus requirement for the 3 months necessary to obtain the needed vehicles, while still maintaining the vehicles' condition. The MTA had investigated renting vehicles; it would have cost approximately $500,000 to do so. (Nashville MTA)
- Implemented electric fan drive: result was 7% better mpg. (The Bus)
- We started a fuel-hedging program in July 2009 that saved the agency approximately $125,000 in FY 2009, $1,028,000 in FY 2010, and $1,955,000 in FY 2011. (Nashville MTA)

MAINTAINING TRANSIT EFFECTIVENESS THROUGH USE OF TECHNOLOGY

Question 19 asked, "How has new technology in any area of your agency helped to reduce your costs and/or improve your efficiency?" Agencies were asked to provide specifics in terms of what was done and the financial impact on their budget and service quality. As with many other topics covered in this synthesis, respondents had many significant examples to share, many of which are provided here. A number of agencies that reported multiple applications of new technology are listed in Appendix F, including King County Metro, Long Beach Transit, Washington Metropolitan Area Transportation Authority, Santa Clara Valley Transportation Authority, and Community Transit. Other agencies' experiences with new technology are provided here:

- AVL/GPS has improved on-time performance. Signal priority and off-board fare collection have increased speed of travel. Our audible pedestrian warning system has all but eliminated pedestrian accidents. (Greater Cleveland RTA)
- In-house data reporting, payroll reporting, and operations systems have helped streamline processes. There have been no direct savings, but we have realized operations efficiencies (HASTUS and driver feedback has helped), and we can spend more time on other projects. (UMASS)
- In the area of paratransit, we are now scheduling electronically; using interactive voice response to call customers with ride time changes; and electronically collecting mileage, performance, and ridership data, which were previously manually entered. In maintenance, we are now entering work orders and time on each task electronically by task, and mechanics note what they did on buses in the computer. This was previously done by hand. (Capitol Area Transportation Authority)
- Implementation of new financial software allowed for improved reporting, actual to budget comparisons, and efficiencies in payroll and accounting. (Valley Metro)
- Security has also been bolstered by the installation of approximately 1,800 high-resolution security cameras at CTA's rail stations, leading to 184 arrests.
- Pace has employed scheduling software to reduce operating costs for both fixed-route and ADA paratransit service.
- Development of stop-specific real-time transit arrival tools has resulted in 2 million rider inquiries a month by phone and text messaging. This has allowed the agency to reduce on-street signage costs while improving the customer experience. Direct annual savings are estimated at roughly $200,000, in the form of staff reduction and material cost reduction. (TriMet)
- Development of an online, open source, multimodal trip planner that serves riders at the rate of roughly 500,000 trips planned each month. This technology has allowed the agency to reduce customer service staff, along with reductions in schedule-related collateral material. Annual savings are estimated to be at least $300,000. (TriMet)
- AVL has improved schedule adherence and customer awareness, which has led to a reduction in customer calls and complaints. APCs have improved service design by helping identify less productive services or areas. APCs have also helped RTS consolidate bus stops and improve schedule adherence. (Gainesville RTS)
- Trapeze run-cutting software has helped reduce the deadhead times in our operations department. (Nashville MTA)
- There is no question that our AVL infrastructure has changed us. We know how our shuttles are spaced in real time. We know if a vehicle is speeding. We know if a particular driver is laggard (or speedy). However, I can't say that new technology has had a measurable impact on budget. (Go West Transit)
- Use of the AVL system has allowed us to operate with less on-street supervision than was previously required. (Centre Area Transportation Authority)
- A new farebox system ensures collection of full fare by counting coins and indicating if full fare was paid.

Previously, bus operators could not count coins in the box as this would have added to dwell time. The new farebox system also allows for magnetic cards. An ACS system with GPS provides accurate on-time performance data, which is necessary for scheduling. The ACS/GPS also provides boarding information, which is critical as SamTrans is currently working on a comprehensive operations analysis. New technology is also used extensively in bus maintenance and operations. Consequently, SamTrans is operating more than 26,000 miles between road calls. (Samtrans)

- The most significant change was the installation of new scheduling software for both fixed-route and paratransit. For paratransit, passengers per hour increased approximately 25%, allowing the service to grow by a similar percentage without an increase in budget. Additionally, automatic call-back software was installed to alert paratransit passengers when the bus was in the vicinity so they could be ready when it arrived. This program has reduced no-shows and dwell time for the service. (Toledo Area Regional Transit Authority)
- TextBus service features a text message/SMS-based information system that provides upcoming bus arrival information on demand for every RTD bus stop. After finding purchased solutions too expensive, RTD developed TextBus internally between its Marketing and Information Technology Departments for just $60 start-up costs to purchase the local telephone number and 1 cent per message ongoing costs. There are more than 3,000 unique users per month, and nearly 15,000 completed requests per month. San Joaquin RTD also uses this service to quickly communicate service interruptions to its customers. In addition, RTD uses Facebook, YouTube, and Twitter to quickly send information and to interact with customers at no cost.
- Technology is used in every department at Capitol District Transit Authority. In the back office, enterprise resource planning systems support human resources and finance functions; work and inventory management support the maintenance and procurement functions; scheduling applications support transportation and planning functions; and custom-built web applications support the safety and training functions. Intelligent transportation systems enable dispatchers to stay connected to resources on the street (CAD/AVL), while customer benefits include real-time passenger information signs and mobile applications, stop announcements, and fare collection systems.

MAINTAINING TRANSIT EFFECTIVENESS THROUGH STRATEGIC USE OF CAPITAL FUNDS

Question 21 asked, "Have you been able to reduce your operating costs through strategic use of your capital funding?" The vast majority of respondents (77%) reported that they have used capital funding sources to help reduce current operating expenses and avoid future expenses, which enables them to provide a safe, attractive service to the public. Capital funds have been utilized to build new Leadership in Environmental and Energy Design (LEED) certified buildings with lower utility costs, purchase alternative-fuel buses that reduce fuel costs, upgrade computer software for administrative efficiency, build dedicated lanes for transit to improve operating speeds, and pay for maintenance expenses, which helps reduce the operating budget. A list of unduplicated techniques is provided here.

- New York City Transit will be building a short (half-mile) exclusive busway under an elevated subway right-of-way. This will allow buses entering and leaving a major transit center and a major bus depot to travel directly to their streets of operation without having to operate in a slow, circuitous manner through a highly congested neighborhood. The annual operating cost savings for the Ridgewood Busway is estimated to be approximately $1 million.
- In the information service area, by leveraging new technologies acquired using capital funding, Long Beach Transit is able to improve its operational efficiency and reduce the need for additional personnel to perform the same tasks, thus reducing the operating costs. For example, an interactive voice response (IVR) system is used to disseminate departure and arrival information to customers automatically on the phone, thus allowing customer service personnel to focus on resolving customer issues with the same level of staff. Over the past 12 years, our capital plan has helped us keep the costs of materials and labor stable.
- New vehicles and facility investments have undoubtedly decreased the growth rate in operating costs. The purchase of new rail cars and new buses decreases the maintenance hours needed to maintain older vehicles and reduces in-service failures. The new rail car's parts have a 2-year warranty, reducing material costs. The Chicago Regional Transportation Authority is currently in the process of evaluating the operating cost impact of capital expenditures and hopes to have a more thorough understanding of this area in the near future. (Chicago Transit Authority)
- Replacement vehicles have replaced most inefficient buses. Technology upgrades in vehicle maintenance systems have improved efficiency. An electronic fare collection system has facilitated increased fare revenue. (Utah Transit Authority)
- In 2011 an aged automatic bus wash was replaced with an efficient new model that uses fewer chemicals for water treatment (saving $3,000 annually) and less water (saving $1,800 annually). (Salem Kaiser Transit)
- Our new building will save 750 hours a year in idling alone, because the buses are parked inside and won't have to be aired up daily. (Go West Transit)

- HART's capital program includes revitalization and build-out of many outdated facilities. (1) The 21st Avenue Operations Building will be LEED-certified. Coupled with consolidation of staff into the new building from separate temporary facilities, this will produce projected operations and utilities cost savings up to 25%. (2) Build-out of the Ybor Streetcar Facility (which houses HART's administrative staff) will include replacing inefficient HVAC systems and insulation, and upgrading access control systems and lighting, for a projected 10% savings in energy costs. (3) The impending construction of a CNG fueling station will allow HART to replace its diesel vehicle fleet with more efficient and cost-effective CNG-powered vehicles. CNG is approximately $1.50–$2.00 less per gallon equivalency than diesel fuel, which is projected to save a minimum of $16,000 per day in fuel costs alone when the full fleet is converted. CNG also burns cleaner and will lower maintenance costs on engine repairs. (4) Upgrades to the heavy maintenance/preventive maintenance facility's heating, ventilation, and lighting systems save energy costs, and the increased lighting and installation of radiant heating systems in these buildings have had a major impact on working conditions for the maintenance staff servicing and maintaining buses, vans, and other vehicles in these structures. The increased quality of work and reductions in employee health issues will mean cost savings in productivity and less lost time and inefficiency. (D. DeMartino, General Manager/CEO, San Joaquin RTD, personal communication, Feb. 22, 2010)
- The Yukon transfer center renovations demolished and replaced an existing driver break room, which includes a new public restroom facility with low-flow toilet fixtures, LED lighting and high-efficiency split-system air conditioning, and four additional bus bays. The bus canopy system was reroofed and all canopy lighting was replaced with energy-efficient LEDs. Operating costs are estimated to be reduced by 10% to15%. Also, larger demand-response vans are being replaced with minivans that have 50% better fuel economy. (Hillsborough Area Regional Transit Authority)
- Bus stop and pedestrian improvements in strategic locations have increased fixed-route use and reduced ADA paratransit use. Transit-preferential treatments have saved travel time. More fuel-efficient vehicles have improved fuel efficiency and low-floor buses have diverted demand from ADA paratransit. (TriMet)
- VTA purchased seventy 40-ft low-floor hybrid diesel-electric buses. These buses get 5.55 mpg of diesel fuel compared with 4.10 with a standard 40-ft diesel-powered bus. (Santa Clara Valley Transportation Authority)
- We built a $4.5 million building and stopped paying $120,000 per year in rent. We also invested in a fleet of hybrid electric buses, which reduced our fuel costs by 25%. (Northern Arizona Intergovernmental Public Transportation Authority).
- Approximately $600,000 of our maintenance budget is capitalized by using our FTA 5307 allocation. (Star Metro)
- Most significantly, we have been able to acquire Congestion Mitigation Air Quality (CMAQ) funding and use this for the purchase of biofuels. In calendar year 2012, approximately 500,000 gallons of biofuel were purchased and paid for with 80% federal dollars. (Toledo Area Regional Transit Authority)
- CMAQ grants helped fund the replacement of older diesel buses with hybrid-electric buses. These buses will require less maintenance and fuel, reducing their lifecycle costs. RTD uses Prop 1B state bonds to upgrade IT, maintenance, and facilities infrastructure, which reduces the maintenance costs as well as costs related to failures in these areas. Furthermore, these upgrades have allowed RTD to operate more efficiently. RTD was also successful in obtaining FTA state of good repair grants to build a consolidated operations and maintenance facility that will significantly reduce operational costs by consolidating multiple outdated facilities. (San Joaquin RTD)
- WMATA has installed automated credit card readers at parking facilities, reducing staff and operating costs; invested in energy-efficient parking lot lighting; installed composite third rail; purchased new rail cars that will reduce operating and maintenance costs; constructed rail and bus facilities to LEED standards; made HVAC system improvements throughout the system; and reduced the amount of hard-copy records through the introduction of an electronic records management system. (Washington Metropolitan Area Transportation Authority)
- The primary goal of King County Metro's capital program is the preservation of our infrastructure. However, examples of savings/efficiencies from capital investments include purchasing upgraded scheduling software, which has saved $12 million so far and continues to support more efficient scheduling. Also, energy-saving components of capital projects have provided a reduction in utility costs of about $200,000 annually, while other projects are still in progress.

MAINTAINING TRANSIT EFFECTIVENESS THROUGH THE CREATIVE USE OF ASSETS

Question 23 asked, "What new ways have you discovered to take advantage of your equipment, facilities, or employees to earn new revenue?" The majority of respondents provided examples of selling space on vehicles, facilities, websites, fare cards, and digital signs, as well as through audio announcements. Some have been able to sell naming rights to transit stations or routes. Other agencies reported making

additional revenue through their parking facilities, by leasing empty space, by selling gas to the public from facilities built to fuel their own vehicles, or by earning revenues from high-occupancy toll lanes. The details of such arrangements are provided here. The examples found through the literature search are not included in what is reported here.

- Recently, we have been approached on a few occasions to provide shuttle service for special events that are going on in the city, when the facility does not have adequate parking to accommodate the attendance. We have been able to provide this service with the manpower allotted for that day(s). This has allowed us to generate additional income. (Long Beach Transit)
- CDL training for other nonagency departments generates $5,000 per year. (UMASS)
- Metro recently entered an agreement with the Public Stadium Authority to allow parking at an employee-only lot for sporting events, which resulted in approximately $11 million. Metro also sells advertising space in the Downtown Seattle Transit Tunnel stations, resulting in average annual revenue of $519,506 from 2009 through 2012. (King County Metro)
- In 2009, CTA entered into an agreement with Apple Inc. for the refurbishment of the North Clybourn Red Line Station and landscaping at the nearby bus turnaround, while Apple built a new retail store on property adjacent to the station. Per the agreement, CTA completed the refurbishment of the interior of the station while Apple's private contractor completed exterior work. Apple paid all costs of the exterior, interior, and platform refurbishment and CTA's costs for design and construction management for all portions of the station refurbishment project up to $3.9 million. In return, CTA granted Apple naming rights at the station. Work was completed in late 2010. (Chicago Transit Authority)
- CTA has also established a corporate partnership program to promote corporate investment in its transit system. Benefits to the corporate partner include being promoted in CTA press releases, having the right to advertise on the CTA system, and having its name or logo incorporated into a CTA station name and signage. In 2012, CTA launched an official program to sell the business naming and sponsorship rights to 11 of its stations. Contract agreements are still pending for station naming rights. Current corporate partners include the *Chicago Sun-Times* and Miller Coors, which sponsor penny rides on the first day of school for Chicago Public School children and on New Year's Eve for all riders on CTA, respectively. CTA's agreement with Sun-Times Media Productions, LLC is for 3 years plus a 3-year option, totaling $900,000 for the first 3-year agreement and an additional $900,000 if an additional 3-year agreement is entered. The agreement would cover out-of-pocket costs incurred by CTA as a result of providing free rides to students. CTA's 3-year (plus 3-year option) sponsorship agreement with Miller Coors to provide free rides on New Year's Eve allows the company to advertise in stations and on fare cards sold in predetermined stations. The total contract value, including option years, is $1.4 million. CTA estimates a total of $154,000 in lost revenues on New Year's Eve every year. This sponsorship agreement will result in an estimated $1.1 million in revenue for CTA over 6 years. In addition, CTA expects to bring in more than $1 million a year in non-farebox revenue from the display of alcohol ads on trains and in stations. (Chicago Transit Authority)
- We allow public use of our CNG station. We earn approximately $1,000 per month. We have so much good public relations. I am being quoted in media in other states. (Stark Area Regional Transit Authority)
- We have leased unused space at maintenance facilities. (Utah Transit Authority)
- SamTrans issued a contract for a company to provide new bus shelters that will have advertising in them. The company pays for shelter manufacturing and installation, as well as the maintenance of the shelters. This allows SamTrans to save capital expense (shelter) and operating expense (maintenance). Each shelter costs about $10,000. Ninety-five shelters have been installed. The ads also generate revenue of approximately $250,000. SamTrans rebid its contract for exterior advertising on vehicles and negotiated with the successful proposer to pay our annual fee in advance instead of monthly. The annual revenue generated is $655,000 (and increases each year).
- At the present time, WMATA is exploring new mediums: wallscapes on facilities, wrapped parking structures, branded Smart Trip cards, and enhanced shelter advertising. We continually strive to reduce the burden on fares and subsidies by increasing our nonpassenger revenues. Aside from the traditional transit advertising, we employed tunnel advertising for approximately 4 years, generating between $30,000 and $75,000 per year; however, the logistics of installing tunnel advertising, the difficulty in auditing "views," and the production costs made this medium less than attractive to both advertisers and the authority. (Washington Metropolitan Area Transportation Authority)
- We have added an advertising component to our traditional transit advertising mix in the form of opt-in ads as part of our real-time arrival text messaging service. The revenue from this avenue is minimal at this point. We are currently considering adding advertising to our website with an expectation that this could generate as much as $300,000 in additional ad revenue for the agency annually. (TriMet)
- VTA expanded options for advertising on VTA property, including ads placed on the "splash page" that customers see when they log on to the VTA Wi-Fi on

our trains and express buses. This revenue has generated $16,500 a year and helped to underwrite the cost of providing the Wi-Fi service on our vehicles. Advertising space is now sold on the VTA website and in VTA's monthly customer newsletter *Take One*. We have entered into permit agreements with vendors, such as a provider of gourmet food trucks, at our park and ride lots to encourage use of transit to access fun family activities. Changes in our service, particularly changes that have reduced travel time—such as the introduction of new express bus routes with an upgraded vehicle (reclining seats, Wi-Fi, luggage racks, etc.)—have generated additional ridership and revenue. (Santa Clara Valley Transportation Authority)

- VTA is working with partners on transit-oriented joint development projects based on an established joint development policy. The objective is to create long-term revenue for VTA at a rate of return that is competitive in the market. It also emphasizes planning for the highest and most efficient land uses at transit stations and along rail corridors, and increased ridership. We also partnered with the state DOT to convert carpool lanes to express lanes. Tolls from solo drivers are collected and revenues from these tolls are used for operation, maintenance, enforcement costs, and transit improvements within the corridors. (Santa Clara Valley Transportation Authority)
- Republic Parking operates and maintains all parking structures and areas that we open, and we receive a percentage of the revenues from these facilities. (Nashville MTA)
- There are plans to allow other agencies to use a test lane that we will open. That might produce some revenue. The Illinois Department of Transportation makes us test every vehicle twice a year. This includes the cost of the test, 70 miles on each vehicle to get to the test, and the cost of labor. We will get a test lane in our new facility that will save these costs, and we may open this to other agencies that might want to save those same costs. (Go West Transit)
- We sell Greyhound tickets to generate a commission for local match revenues. (Yuma County Intergovernmental Public Transportation Authority)
- We have increased advertising to allow audio ads on board the vehicles through our stop announcement system for a revenue increase of approximately $100,000. Additional revenue ideas under way include maintenance and fueling of local nonprofit vehicles, vehicle storage, and driver training for nonprofit agencies. (Toledo Area Regional Transit Authority)
- We revised our advertising policy, brought our advertising program in-house, and increased advertising on our buses. Our revenues increased from $25,000 to $50,000. (Northern Arizona Intergovernmental Public Transportation Authority)
- The placement of advertising on farebox passes generated a savings of $25,000. Media trade with the *Palm Beach Post* for bus advertising (exterior and interior) generates a yearly savings of $70,000 for ad placements. (Palm Tran)
- We advertise on our own fleet, paying for production costs only. A bus wrap costs only $4,500 to produce but nets $10,000 in value in the first month of display. Our contactor works with us to leave ads up as long as possible, extending the value. The contract also provides $25,000 per year in digital billboard space at no cost. (Salem Kaiser Transit)
- In 2012, both THS, Inc. and HART amended their advertising policies to include alcohol and cigar advertising only on the streetcar. As a result, more than $96,000 in new advertising revenue will be achieved on an annual basis. (Hillsborough Area Regional Transit Authority)
- NYCT has 103 digital two-sided screens that display advertising and agency messaging. A banner on the bottom of stairwell screens displays the current service status, while a certain percentage of screens are reserved for transit messaging. These digital screens generated $9.5 million in new ad revenue in 2012. NYCT also has 10 digital billboards that are anticipated to generate approximately $7 million in new ad revenue for 2013. Ad sales on MetroCards were taken over in-house in the fourth quarter of 2012. While an outside contractor generated $700,000 in new revenue for 2012, the agency anticipates generating approximately $7 million in new ad revenue for 2013. (New York City Transit)

MAINTAINING TRANSIT EFFECTIVENESS THROUGH MORE EFFICIENT MARKETING

Question 24d asked, "Please provide the most significant steps and actions that your Marketing department has taken to become more efficient, generate new revenues, and/or reduce costs." While marketing departments engage in many activities, most are taking advantage of new social media and other communications technologies to reach the public more quickly and less expensively, and to receive feedback from customers. Capital grants have allowed the purchase of printing equipment that improves the capability of transit agencies to produce printed materials in-house less expensively than by contracting for such services. The responses here demonstrate the actions transit agency marketing programs are taking to help build and retain ridership and earn new revenues.

- The marketing department, which also includes customer service, has become more efficient by training the telephone information clerks to perform other tasks to minimize downtime, such as to process customer

comments. The IVR system has allowed our telephone information clerks to spend more quality time on the phone with new users of the system, which creates a better impression and long-term ridership growth. A rider rewards program was implemented to offer discounts at local businesses to create additional value to a bus pass and to increase pass purchases and persuade current riders to ride more often. (Long Beach Transit)

- The specifications for the *Rider's Guide* were changed by using a different paper stock and using clear design and typesetting techniques, leading to an annual savings of $20,000. An additional $40,000 annual savings were generated by designing, typesetting, and providing 75% of materials in-house, including all collaterals, campaigns, route maps, and outreach materials and notices. (Palm Tran)
- Improved operation of our telephone information system based on TransitStat performance analysis. We are now taking 20% more calls with the same staff. (Greater Cleveland RTA)
- We combined contracts for advertising and distribution services, saving tens of thousands of dollars annually. We now produce half as many *Transit Books* as in previous years, relying more on our online tools. We now use in-house graphic design services versus contracted service, saving the agency $300,000 annually. (Valley Transit)
- SamTrans has saved money by moving some of its passes from paper flash passes to the regional fare card, Clipper, in addition to introducing some magnetic stripe tickets to use in its new fareboxes. The budget for fare media has decreased by $42,000 over the past few years.
- 1. We contract out for graphic design services, eliminating the need for a full-time graphic designer. In 2011–12, we spent $19,000 in contracted services, compared with the average cost of hiring a full-time employee at $107,000. 2. To reduce printing costs, we use the state purchasing agreement with Office Max for printing services. Costs savings are estimated to be as much as 50% on some products. 3. In 2011–12 we used capital funds to purchase a plotter so that large-format printing can be done in-house. Printing just one trade show display in-house saves $550. Staff has been able to improve efficiency and avoid several thousand dollars in printing expense. 4. When we redesigned our website, we used Drupal for content management. This open source Short Message Service saves hours of staff time in maintaining the website. 5. The district's marketing strategy depends heavily on high-value, inexpensive media such as Facebook, Twitter, and subscriber e-mail. (Salem Kaiser Transit)
- There have been staffing reductions in outreach, on-street customer information, and customer service by way of consolidating functions and embracing new technology. In the last several years, this has easily resulted in $500,000 in annual savings. There have also been material reductions in on-street customer information, such as schedules and signage, by taking advantage of technology opportunities. This represents savings of roughly $100,000 per year. Program revenue gains of an average of $1 million per year for the last 10 years have been attained by way of an efficient approach to marketing packaged fare programs to employers and colleges. The agency has also benefitted from a transit advertising contract that features a guarantee that has allowed us to realize transit ad revenue of more than $5 million per year during economic times that generate significantly less actual advertising revenue. (TriMet)
- The Marketing Department was able to offset the annual printing of our system map by selling an ad on the back. We also partnered with the Department of Health and featured a list of produce stands on the face of the map, with related icons at their specific locations, in return for dollars for printing. (Pinellas Suncoast Transit Authority)
- Omnitrans brought the bus stop amenities maintenance program in-house and hired three full-time employees, leased trucks, and purchased the necessary equipment for less than bids to have work done by a contractor, saving $100,000 a year. The agency also brought its website administration in-house by having its information technology and marketing staffs maintain website content and functionality, saving $20,000 per year.
- Nashville MTA has taken a number of steps to make our marketing department more efficient. (1) We produce smaller print jobs in-house. We have the capability through our color printers to produce smaller high-quality print jobs (customer flyers) for public dissemination internally. Professional printing costs may range from $0.25 to $0.50 per color copy. In-house expenditures are significantly less with the appropriate printers/copiers. The cost of the paper is less than $10 a ream for 500 sheets. What would cost $25 or more for outside production for "quick print" is significantly reduced by printing in-house, resulting in a savings of 90%. (2) We use digital media more frequently. Our increased usage of e-News blasts, social media, and the website also reduces printing costs and provides another resource to get information out quickly to customers. News releases, customer notices, and newsletters are predominantly distributed through e-mail, social media, and/or our websites. This is not only cost-effective, in that paper copies are reduced, but the cost of postage to mail the newsletters is significantly reduced, as well as the need for more paper through production and mailing. It also allows more information to be available and accessible to the public at large. (3) Cross-training of communications employees—all employees in marketing and communications have specific job duties and responsibilities; however, each one has a working knowledge of the other's jobs so they

can cover for one another if necessary. As an example, all the employees have a working knowledge of our graphic design program. This allows for any graphic design alterations to projects to be done in-house with no delay in the project. This saves time, and not using an outside contractor saves money. (4) More partnerships with businesses or agencies for cross-promotions provide opportunities for exposure at low cost. For example, McDonald's Smooth Fusion Tour generated publicity for both McDonalds and Nashville MTA; Metro Nashville Arts Commission–28th/31s Avenue Connector project resulted in six unique transit shelters for our system and publicity for Nashville MTA; Metro Nashville Arts Commission Poetry in Motion project generated positive publicity for Nashville MTA; the Miller Coors Halloween sponsorship generated additional revenue and promoted our services and brand name. By agreeing to partner with Miller Coors for a fourth consecutive year on this promotion and extend the bus schedules on 20 MTA bus, we generated nearly $18,000.

- METRO's marketing efforts rely heavily on trades, our strong partnerships, and the flexibility to be available at a moment's notice to members of our community. We attend any community show where we are allowed to set up for free or at a minimal cost. We also trade out space at shows and trade advertising and maximize social media presence whenever possible. We registered our speaker's bureau at all our local libraries and speak regularly to local organizations, nonprofits, and schools. All of our staff are encouraged to represent us in their volunteer efforts and to be on community boards, committees, and the like, increasing our reach to riders and nonriders. We do all the creative work in-house, from writing jingles and ad copy to producing the radio spots, designing the print ads, and writing, directing, and producing videos. Because we do all the creative in-house, trade advertising, and look for effective media buys, we have saved upwards of $200,000 over the past 5 years. (Akron Metro)
- New York City Transit (NYCT) has made great strides in communicating more effectively with its passengers and the public at large to provide information on a real-time basis to keep passengers informed of the status of service. The agency developed a Global Messaging System whereby with one entry (such as an unplanned service change) the system automatically updates other communications systems, such as the web, urban panels, on-the-go kiosks, service status signs, and Twitter.
  - NYCT's expanded use of e-mail/texts provides alerts on planned and unplanned service changes, with such messages posted by agency staff on a 24/7 basis. The website has been improved for greater utility, providing easier navigation information and the real-time service status of each bus route and subway line. The website also provides details on upcoming planned service changes as well as elevator and escalator outages.
  - The agency's TripPlanner+ has been repositioned on the MTA.info home page for better visibility. ADA-accessible trip information is also available as well as three alternative itineraries for any trip, with information provided. The TripPlanner+ automatically reroutes around planned services changes. A Weekender Website is also provided for subway diversions from 3 p.m. Friday to 5 a.m. Monday, with an interactive diagrammatic map using blinking station dots to indicate where work is taking place by line, station, or borough, with the opportunity to click to a neighborhood map for orientation.
  - NYCT has partnered with Google AdSense, which sells ad space on the agency's website at no cost to NYCT. This has generated more than $663,000 to date, with the anticipation of $1 million in total earnings by the end of 2013.
  - Real-time bus arrival information is available through desktop, mobile phones, or text messaging. Information is provided by intersection, bus route, and bus stop code.
  - Next train arrival signs are present at 153 stations and provide next train arrival information in fare-control areas, at transfer points, and on platforms. These signs also transmit live and prerecorded audio and visual messages to stations from the Rail Control Center.
  - Interactive information kiosks are self-service devices with access to various travel and information applications. Revenue will be generated through digital media. In addition, a pilot Help Point project is being tested that provides direct communication between the customer and a customer service agent. These are positioned with a highly visible blue beacon and have two button functions (one information/one emergency). Nineteen devices are now installed along subway platforms, fare-control areas, and mezzanines. To make it easier for passengers to reach NYCT information, all MTA information is available by dialing 511.

MAINTAINING TRANSIT EFFECTIVENESS THROUGH PARTNERSHIPS

Question 17 asked, "Have you entered into any partnerships with any of the following organizations that have helped share the cost of providing new or existing service?" The question offered multiple choice answers. Figure 28 summarizes the responses to those choices. In the "Other" category, respondents named additional partners with whom they have worked:

- Local businesses
- Apartment housing developers/owners

- Management companies for office complexes
- Transportation management associations and commuter assistance programs
- Greyhound Lines
- Local disability groups for paratransit services, including veterans services
- Other social service agencies.

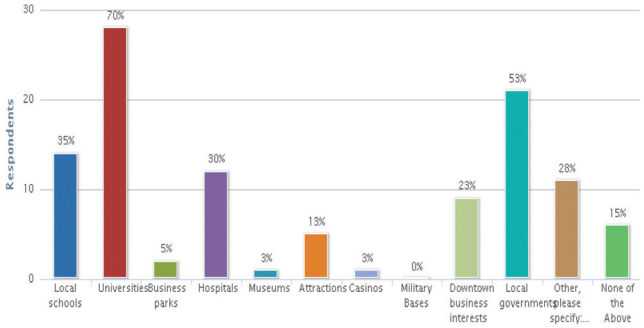

FIGURE 28 Percentage of transit agencies that have entered partnerships by type of partnership (*Source*: Survey responses).

Question 17b asked respondents to provide specific examples of the partnerships they engage in and to explain the benefits to the community and the bottom line to the transit agency in terms of revenue and/or ridership. The concept of transit agencies partnering with other public and private entities has exploded in the past 15 years. A summary of reported partnership activities is provided here. Additional examples of partnerships with King County Metro, Nashville MTA, Community Transit, and the Washington Metropolitan Area Transportation Authority are provided in Appendix G.

- California State University at Long Beach pays Long Beach Transit per boarding for student, faculty, and staff. The parking commission in a popular shopping district pays for employees to ride with funds from the city. A rider rewards program communicates benefits to customers (such as vendor discounts) in exchange for the business promoting public transit. (Long Beach Transit)
- The major impact of our partnerships has been on increased ridership. Naming rights agreements with businesses have resulted in increased revenues. Agreements with several colleges, the largest being Cleveland State University and Case Western, pay RTA a fee per enrolled student for unlimited access to our services. There are resale agreements with many local school districts to use or to resell our passes to students who may not qualify for subsidized or free transportation services. Fourteen different entities have partnered with RTA to invest in an expanded downtown trolley (rubber tired) service to the tune of $3.6 million over 3 years. The Rib Cookoff has partnered with RTA for enhanced rail service to its 4-day (Labor Day weekend) event; RTA is paid a piece of the gate (50 cents per ticket sold) with a minimum paid to RTA for 20,000 attendees ($10,000). The Cleveland Film Festival is paying RTA to operate additional rail service after normal service ends to benefit festival attendees. The last regularly scheduled trains leave Tower City at 1:00 a.m. The film festival is funding four additional trains to leave Tower City at 1:35 a.m. (Greater Cleveland RTA)
- The agreement between Capital Area Transportation Authority and Michigan State University increased ridership by 3 million on campus but also increased ridership systemwide by 3 million.
- A financial working group has been initiated to better coordinate funding issues between local governments and the transit agency. Integration of transit service with the city of Tempe and Valley Metro is under way. Development of regional paratransit operations and coordination of a regional fare structure for demand-response services are other forms of partnerships. (Valley Metro)
- Pace has partnered with local schools, universities, hospitals, and especially with local governments, which contribute significantly to fund Pace's many dial-a-ride paratransit operations.
- CTA has entered into multiple intergovernmental agreements with cities in which it operates (for example, Chicago, Evanston, Oak Park) for the provision of additional security services as well as groundskeeping services on its properties. In addition, CTA is committed to providing quality service to and from places of employment and recreation. It has partnered with the University of Chicago, Soldier Field, UPS, the Wrigley Company, and other attractions, hospitals, and downtown business interests to provide subsidized service. CTA has begun renegotiating these contracts to decrease and/or eliminate the operating and overhead costs it incurs for such service. (Chicago Transit Authority)
- Two cities contributed operating costs for a new streetcar. One city and county contributed operating costs for new express bus service. One city and county contributed operating costs for new bus service. Salt Lake City, the Chamber of Commerce, and a university are preparing to contribute operating costs for increased light rail service. (Utah Transit Authority)
- The county agreed to fund a route that transports veterans to the Cleveland Veterans Administration Hospital. (Stark Area Regional Transit Authority)
- SamTrans has a Shuttles Program that provides the "last mile" to link rail stations with business parks, hospitals, schools, and other major employers. This program was started in the 1990s. Typically, employers pay 50% of the costs, various government grants pay 25%, and SamTrans pays 25%. Anyone is allowed to ride the buses for free.
- State and local governments have provided most of the local match for TriMet's light rail system capital construction. Businesses have taxed themselves through a

local improvement district for light rail system amenities. Businesses and local governments have donated land for light rail project construction.

- San Jose State University (SJSU) is contributing $50,000 in FY 2013, or approximately 4%, of SCVTA's DASH shuttle operating cost. Approximately two-thirds of the DASH ridership is attributed to SJSU riders. Lockheed Martin is contributing $53,634 in 2013, or approximately 25% of the Red ACE shuttle's operating cost. Approximately 25% of the Red ACE shuttle ridership is attributed to Lockheed Martin riders. (Santa Clara Valley Transportation Authority)
- RTS has an agreement with the University of Florida and Santa Fe Community College for unlimited prepaid access to students, faculty, and staff. There is also an employee pass program that provides discounted prepaid annual passes for the area's largest employers; it has more than 30,000 participants. (Gainesville RTS)
- We developed a U-Pass partnership with four local colleges and universities. During the first year, this partnership generated $750,000 in revenue and added 1.4 million trips. Following the successful launch, a local trade school and a charter high school have joined the U-Pass program. (Omnitrans)
- Flagstaff Medical Center and Coconino County have purchased an Eco-Pass (Deep Discount Program) for all employees. Northern Arizona University pays half the costs of a high-frequency bus rapid bus transit (BRT) system connecting downtown Flagstaff to the heart of the campus. (Northern Arizona Intergovernmental Public Transportation Authority)
- Unable to initiate a universal pass program at Penn State, CATA developed a similar program through off-campus student housing complexes. We currently contract with 15 apartment complexes, each of which includes prepaid transit passes as one of the amenities they offer their tenants. (Centre Area Transportation Authority)
- Go West Transit saved $1.25 million over 5 years by making its operating contract contingent on the school districts. Go West represents the University of Western Illinois, and the system wouldn't even exist without a full partnership between the city and the university. The city could never afford to provide the local share, and the university could not sustain the capital infrastructure. The two entities share the university's facility and contingent contracts with the school district. Go West does not provide any school service. A savings of $1.2 million dollars can be quantified from that contract and an additional $150,000 a year is saved in shared services.
- Universities and hospitals have helped underwrite routes for Ft. Wayne Public Transit. The Downtown Improvement District has co-marketed the transit agency's services. The city provided match for an FTA livability grant for sidewalk/ADA improvements. (Ft. Wayne Pubic Transit)
- Virginia Hospital Center pays a subsidy in exchange for employees riding free on two routes. In effect, this subsidy is supporting late night service that otherwise wouldn't be warranted. An office complex pays a subsidy in exchange for free rides to and from two Metrorail stations. An apartment complex pays a subsidy in exchange for free rides to a Metrorail station. These last two arrangements have resulted in substantial ridership. (Arlington Transit)
- The North County Transit District has partnered with a local hospital to increase frequency on Route 353 to serve as a shuttle between two hospital facilities. The hospital pays NCTD approximately $90,000 per year for increased service on the route. In addition, the Reservation Transportation Authority pays NCTD approximately $385,000 per year for increased service on two rural routes primarily serving several reservation casinos.
- We have one local university that pays the fully allocated cost for a route to its campus; this generates approximately 90,000 passengers per year. We have also started several contracts through our paratransit service to provide rides to area agencies. The largest contract is with the Department of Developmental Disabilities for approximately $2 million per year. (Toledo Area Regional Transit Authority)

CHAPTER FOUR

CASE EXAMPLES

INTRODUCTION

The literature review and the survey results provide an overview of the major activities transit agencies are engaged in to maintain effectiveness under tight financial constraints. After a review of all returned surveys, four agencies were chosen as case example sites. The case examples allow an opportunity to focus on the range of actions taken by specific transit agencies. This provides a better perspective on the challenges they have faced and continue to face, and how they are dealing with them. It also provides details on how they engaged their communities in determining the appropriate actions to take in the face of substantial fiscal challenges, and the choices necessary to deal with those challenges.

The case example sites were selected on the following basis. First, it seems appropriate to include transit agencies of different sizes, because they have different conditions in which they operate and different resources available to them. A mix of transit agencies of different sizes responded to the survey. Therefore, two large (more than 500 vehicles) and two medium (100 to 500 vehicles) agencies are featured in the case examples. The final determination was based on the completeness of their surveys and their clear commitment to managing as effectively as possible under difficult circumstances. The four sites for the case examples are King County Metro in Seattle, Washington; Community Transit in Snohomish County, Washington; the Greater Cleveland Regional Transit Authority in Cleveland, Ohio; and the Hillsborough Area Regional Transit Authority in Tampa, Florida.

KING COUNTY METRO, SEATTLE, WASHINGTON

King County Metro is a large transit system serving the greater Seattle, Washington, area. Metro provides a broad range of public transportation services across King County, with a service area of more than 2,000 square miles that is home to 1.9 million people (Figure 29). Metro is the 10th largest bus transit agency in the nation.

Metro operates about 220 bus and trolley routes that provided 116.4 million passenger trips in 2012. RapidRide bus rapid transit is a growing part of Metro service; six RapidRide lines will be in place by fall 2013. Metro also operates the South Lake Union Streetcar. Other services include dial-a-ride transit (DART), door-to-door Access van service for people with disabilities who can't use regular buses, and a taxi script program. Metro operates the largest publicly owned vanpool program in the country, with more than 1,200 vans providing more than 3 million trips per year. In 2012, Metro's overall ridership for all fixed-route, DART, Access, and vanpool services was 120 million passenger trips. Metro maintains 130 park-and-ride lots that are used by almost 20,000 commuters daily. The Metro fleet has about 1,450 vehicles, including standard and articulated coaches, electric trolleys, dual-powered buses, hybrid diesel-electric buses, and streetcars. All Metro buses have wheelchair lifts and are equipped with bicycle racks. The information provided here is taken directly from the survey Metro staff completed for this synthesis, with their permission.

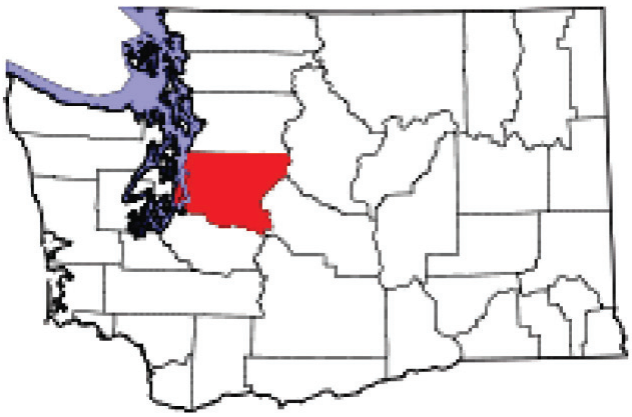

FIGURE 29 Map of King County, Washington (*Source*: Wikipedia).

Metro defines "transit effectiveness" as follows:

> "Under the policy guidance of our 2011–2021 Strategic Plan, Metro strives to create a system of public transportation services that emphasizes productivity (measured by rides/platform hour and passenger miles/platform mile) while ensuring social equity and providing geographic value throughout King County. The objectives in this area are to emphasize planning and delivery of productive services; to control costs through efficiencies; to appropriate capital assets to support efficient and effective service delivery; to provide services to match the markets; and to]seek to establish a sustainable funding structure to support short- and long-term public transportation needs."

Metro's goals, objectives, and strategies are articulated in the strategic plan and reflected in service guidelines. The plan and guidelines were adopted by the King County Council, the governing body for Metro. The strategic plan specifically directs Metro to manage the public transportation system through service guidelines and performance measures.

The guidelines are used to actively manage the system and have been the basis for service planning decisions since they were adopted in 2011. Annually, Metro provides a service guidelines report outlining the potential investment and reductions. Metro uses information from the guidelines to help inform service changes three times a year.

Metro staff believe that a system that is financially sustainable is one that can continue to deliver its products and services within the available revenue. The framework for determining Metro's financial sustainability is provided by Metro's adopted fund management policies, which ensure that any services that are added can be supported from existing, predicted revenue sources. A financial model is used to determine program financial sustainability. This model is constantly modified to reflect changing economic and other conditions. Maintaining target fund balance levels identified in the adopted fund management policies ensures program sustainability.

Metro faced the specter of reduced services with the onset of the national recession that became evident in calendar year 2008. Between 2008 and 2012, Metro took a number of actions to deal with the need to reduce service to stay within its reduced budget authority. On many routes, the agency decreased the span of service, decreased weekend service, decreased the frequency of service, and reduced service on low-demand routes. It eliminated some routes to address the financial challenges. Metro also improved system productivity through improvements in bus scheduling efficiency.

Public Input

King County Metro Transit is part of a general purpose government. Policy decisions are made by a publicly elected county council consisting of nine members. All proposals get intensive public scrutiny. Public involvement was a critical part of the adoption of the strategic plan and the service guidelines, and the passing of the congestion reduction charge (CRC). In 2011, when the county council was authorized to implement the CRC, it held public meetings that were filled beyond capacity with supporters of transit. To fight congestion and preserve transit, King County residents began paying a $20 CRC in June 2012 when registering or renewing their car license tags. The charge will be collected through May 2014 and is expected to generate approximately $50 million over a 2-year time span to help make up King County Metro's revenue deficit caused by the great recession. When county residents register their vehicles, their registration includes an invitation to obtain eight tickets for free bus trips on Metro as an incentive to use Metro transit services and thereby help reduce congestion. Metro offers the option of donating the value of the tickets to a fund to support low-income residents who rely on the bus.

A nine-point plan was developed in 2009 to address the agency's financial situation. This plan was developed and approved by the King County Council through the budget adoption process, which included public comment. Metro as an agency is committed to public engagement and transparency. The agency upholds this commitment by involving the community in its planning process and making public engagement a part of every major service change or new service initiative. Metro reaches out to customers and the public through a variety of forums and media channels.

Information about Metro Transit's current financial situation is included in communications materials for specific service planning projects. People are also engaged to determine their preferences and priorities for service allocation by means of project surveys. For example, Metro included the following question in a targeted survey to riders of the recently launched RapidRide C line:

> Metro has experienced a revenue shortfall in recent years. To maintain transit service levels Metro has cut costs and focused on making the best use of our resources to serve the most riders. Given limited resources, added service in one area means service must be cut somewhere else. How confident are you that Metro is providing the best service it can with the resources it has?

In a more recent survey, respondents were asked to provide feedback on where Metro should focus its scarce resources to address service concerns in the I-90 corridor: providing greater frequency, addressing overcrowding, or investing in faster trips. Community feedback is reviewed on a project-by-project basis and helps shape Metro's decision-making process for service changes. For instance, community members might indicate that span of service is more important than frequency on a given route, which guides Metro's planning efforts. The agency finds this is critical in an era of scarce resources, when tough choices have to be made.

Nine-Point Plan to Deal with the Impact of the Recession

In 2009, Metro staff developed the following plan after exhaustive communications with the public. This action plan addressed what would otherwise have been a 17% reduction of transit service and was approved by the King County Council.

Action 1—Deferred bus service expansion by first scaling back growth, with the exception of the RapidRide program and already approved service partnership agreements. The revenue gap assumes growth in bus service, primarily

associated with the implementation of Transit Now. Delaying that expansion closes the gap. This effectively leverages funding from other agencies and saves $36 million over the next 4 years.

Action 2—Substantially cutting the capital program by reprioritizing the Metro Transit capital program, mainly by purchasing fewer buses. With service cuts and delayed expansion, fewer investments are needed. This saves $83 million over the next 4 years.

Action 3—Non-service-related cuts. The plan calls for reducing programs not associated with basic service by roughly 10%. Programs include reorganizations and efficiencies, fewer new transit police, eliminating much of the agency's printed materials, reductions in customer service and park and ride landscaping, and an expanded cleaning cycles for buses. These cuts were selected to enable Metro to minimize impacts to its service and save $27 million over the next 4 years.

Action 4—Raising new revenue through a property tax swap. This would be accomplished by reprioritizing transportation dollars now spent on passenger ferries to buses by using 5.5 cents of the new property tax authority granted by the 2009 legislature. By law, the first 1 cent of this must be dedicated to expanded bus service across SR-520, while the remaining 4.5 cents will be used to preserve planned new RapidRide service around the county. This would be offset by rolling back 4.5 cents of the Ferry District levy and 1 cent of the Automated Fingerprint Identification System (AFIS) levy. The 5.5 cent new property tax levy for Metro would raise $58 million over the next 4 years. More important, using the property tax in this way will create dedicated, sustainable service for more than 16 million riders annually on crucial transportation corridors that link urban centers and jobs.

Action 5—Tapping into operating reserves to help stabilize service levels. Current county financial policies call for maintaining a 30-day operating reserve of $50 million. Although some reserves are needed, it makes little sense to be adding money to reserves while cutting service. During this financial emergency, lowering this amount to roughly 2 weeks of operating reserves will help in 2009 and beyond by stabilizing service levels and offsetting additional fare increases, freeing up $40 million over the next 4 years.

Action 6—Increasing fares by 25 cents in 2011. Bus riders must also be part of the solution. This increase is in addition to an already planned 25 cent fare increase in 2010 and increases in 2008 and 2009. This will improve Metro's estimated operating revenue to operating expense ratio to 28%. It is also a more modest approach to increasing fares than the council has proposed and is intended to balance cost recovery with affordability to transit riders rather than driving them away when they need transit most. This will result in $35 million more in net revenue over the next 4 years.

Action 7—Using fleet replacement reserves to help stabilize the revenue base and significantly help with the deficit during this crisis. Using the one-time excess fleet replacement reserves recently identified by the county auditor and spending them over the next 4 years will provide $100 million over that time to support existing service levels.

Action 8—Implementing operating efficiencies from the forthcoming transit performance audit recommendations. There is a Metro performance audit currently under way that is likely to identify operating efficiencies that the auditor and Metro staff believe will help the agency achieve some of the efficiencies indicated, particularly in how service is planned and scheduled. To the extent Metro can achieve these efficiencies over the next few years, these savings are likely to offset or buy back a portion of the anticipated service reductions. However, it is premature to assign a dollar savings to these efficiencies today.

Action 9—And the final and most difficult action: reducing bus service. Despite all the actions outlined previously, there is a remaining deficit of about $30 million over the biennium and $90 million over the next 4 years. This amount equates to a bus system that will need to shrink by 310,000 hours of annual service over the next 2 years—roughly 9% of the overall bus system.

As of 2013, Metro has been able to defer major system cuts. Through scheduling efficiencies, service restructures to improve systemwide productivity, and the use of one-time resources—combined with the 2-year CRC, which will sunset in June 2014—the agency has been able to essentially maintain service levels with less revenue as the region continues to discuss revenue solutions for transit and transportation funding.

Managing Through the Use of Better Data

King County is dedicated to continually improving performance, and a number of resources and tools are available to support these efforts. These tools include formal ones such as Lean (a systematic, customer-centric approach to identifying and eliminating waste through continuous improvement, originally developed by Toyota to describe the philosophy and approach demonstrated in the Toyota production system) and less formal ones such as process mapping. Many of the improvements in this area were identified in the 2009 performance audit, which stressed the importance of data-based decisions.

A Regional Transit Task Force (RTTF) was convened in 2010 to consider a new policy framework for Metro as the agency faced both a growing demand for transit services and a

worsening financial outlook. The task force represented many areas of the county and many points of view. Recommendations that emerged from the process included the importance of emphasizing productivity, ensuring that bus services are available for those most dependent on transit, and providing value to communities throughout King County. The RTTF also emphasized the importance of transparency, efficiency, and performance-based decision making. These recommendations influenced the strategic plan and guidelines.

Since 2009 Metro has made strides to improve the use of planning, strategic approaches, and systematic, effective data analysis to inform and drive organizational choices. In general, the agency increased its use of data and commitment to transparency while clarifying its performance measurement. From an internal perspective, Metro's various sections are now required to align work group goals with Metro's strategic plan. This has allowed the agency to focus on fewer goals and specifically on the goals of the strategic plan.

Improvements include the following:

- *Increased transparency.* Creation of an accountability website on which an array of monthly and annual data are posted (http://metro.kingcounty.gov/am/accountability/performance.html).
- *Development and application of service guidelines.* These guidelines identify quantifiable measures to assess service and inform service planning decision making. Metro used these guidelines to restructure or reduce 100,000 hours of low-performing service throughout King County in 2012, redeploying those hours to address service quality needs and underserved corridors. The hours reduced and the investments made were based on data analysis of the transit system from the service guidelines.
- *Reporting.* A service guidelines report is published annually, and a progress report on the strategic plan and goals is published biennially.
- *Enhanced business planning.* A business plan is submitted annually with the budget that outlines how initiatives align with work group goals. Metro recently incorporated near-term actions as part of its business planning; these actions provide a way to measure accomplishments and identify potential new initiatives.
- *Enhanced tools.* Software was upgraded to improve fixed asset management.
- *Environmental sustainability management system.* The implementation of an environmental sustainability management system to obtain ISO 14001certification is still in progress.
- *Creation of a new work group dedicated to planning and performance measurement.* The strategic planning and analysis workgroup manages the updates and reporting for the Strategic Plan for Public Transportation and service guidelines, conducts long-range planning, manages interdepartmental project teams, compiles and analyzes data, and prepares Metro's primary performance management reports.

Many factors led to Metro's implementation of more data-driven processes. As an agency, King County adopted the new strategic plan as part of the county executive's effort to reform county government by focusing on customer service, partnerships, and ways to bring down the cost of government. This agencywide effort was complemented by the Regional Transit Task Force, the performance audit, and adoption of a new Metro strategic plan and guidelines, which have led to a more transparent, objective process and Metro's commitment to continuous improvement. The entire agency is involved. Metro's goal is to make it part of how everyone does their job. No special incentives were offered to employees to accomplish these goals.

Collective Bargaining Agreement Modifications

In an industry as labor intensive as public transportation, it is difficult to achieve all savings that are necessary without addressing represented employees' wages or work rules. Metro eliminated the 3% cost-of-living adjustment (COLA) for the ATU bargaining unit and the 2% floor for other units. A wage freeze was also instituted for 1 year. Work rules were changed to allow part-time operators to do open work before it was offered to full-time operators at overtime or off the extra board. These changes produced an estimated annual savings of $500,000. Spurred by a performance audit in 2009, Metro also removed more than 20% of time allotted to layover (recovery time when operators get some break/rest) in 2010 and 2011. This helped save roughly $12 million annually in operating costs and removed the need for about 50 peak coaches. However, Metro also saw its on-time performance slip below its target of 80% to about 75%. During the same period the percentage of time that operators did not get a 5-minute break (a contractual guarantee) increased from about 7% to about 17%. Metro met routinely with Local 587 union representatives throughout this time. This effort has become a primary issue for the union in the upcoming labor negotiations. Metro continues to monitor key scheduling/performance metrics and took actions in 2011 and 2012 that have helped improve on-time performance and eased the impacts drivers felt during the 2010–11 period.

King County modified its health care benefit plans, which required an increase in annual deductibles and co-pays for employees instead of having premium share. The county as a whole bargained a healthy incentives system for medical benefits, through which employees and spouses could engage in self-directed programs lasting 10 weeks a year related to weight loss, stress, exercise, and other health-related factors to achieve the most efficient levels of co-pay and deductibles.

In the area of workers' compensation and attendance, King County Metro sped up the process for injury forms to get to the claims section, with a median of 2 days. Metro established a large number of alternative work assignments (light duty) for employees while they are off on job injury. Employees are notified of when their family medical leave and other protected leave will run out so they know when they might be subject to medical termination. Metro does not grant extended and unlimited leaves, nor does the agency let employees pick work shifts or routes if they don't have a full medical release for the time of the service change. Chiefs contact employees weekly to check on progress and remind them of the agency and their work.

Metro did not contract out fixed-route service as part of its efficiency plans. However, the agency addressed different methods of service delivery in areas of lower demand.

The strategic plan and guidelines and the CRC ordinance called for the right-sizing of targeted fixed-route services to reduce operating costs. The primary objective is to provide more efficient and appropriate levels of service that will continue to meet a community's mobility needs. Metro recognizes that a one-size-fits-all approach to bus service may not meet every community's needs and is seeking cost-effective and innovative transit options for rural King County. Metro created a report that explores when and where alternative service delivery should be used and engaged communities in a discussion about how to implement alternative service strategies. That report includes case studies and potential tools for right-sizing service in rural areas. Consistent with this direction, Metro has converted selected routes to dial-a-ride transit service. Metro is also in the process of developing some pilot projects that are likely to use contracted services. One major goal of right-sizing is to save money. The projects are still in the early stages, and some have not yet been implemented. Cost savings have yet to be determined.

Service Planning Initiatives to Reduce Costs and Increase Efficiencies

Metro engaged in almost every activity possible to improve its operational efficiencies, including a comprehensive operations analysis, service design changes, use of automated vehicle location (AVL) and automated passenger counter (APC) data, run-cutting software, the use of service standards, and techniques to reduce dwell time at stops.

- *Scheduling efficiencies.* Schedulers made use of more advanced scheduling techniques that were possible through Metro's HASTUS scheduling software. This required additional training and tool "tuning" but played a key role in trimming roughly $12 million in annual operating costs from system schedules without cutting service to customers. This effort was primarily executed in 2010 and 2011, but the skills and tools added then continue to provide ongoing benefits. Scheduling efficiencies in 2010/2011 also helped reduce peak coach needs by more than 50 vehicles. There were trade-offs, however, with respect to reliability. On-time performance fell roughly about 5 percentage points, from 80% to 75%, during 2010–11. The agency has slowly started to rebuild on-time performance above 76% in 2012 as it makes new investments to address service reliability issues.
- *Use of service guidelines, APC data, and quantitative analysis.* King County Metro has collected data by means of APC for years, but the data have become more important as the agency implements new service guidelines. APC and AVL data help track route performance, which is an important part of service planning decision making under the adopted service guidelines.
- *Service design.* Lower performing services were reduced either in span or by removing less productive portions of the route, or were eliminated altogether. Routes were only eliminated if there were adequate service alternatives. Metro's customer complaints increased; however, much of the service cut from such routes was reinvested into routes experiencing overcrowding and reliability issues. As noted previously, service was redesigned in rural areas of the county.
- *Elimination of the ride-free area:* For years, Metro provided a fare-free zone in much of its downtown area to encourage the use of transit for short trips, but this policy was discontinued. The travel time, farebox recovery, and ridership impacts of the elimination of the ride-free area are undetermined at this point. Initial estimates suggested that Metro could increase revenue by $2.2 million in 2013 and 2014, and $2.7 million in 2014, but this is not yet proven.
- *Stop consolidation.* Metro has been implementing stop consolidation efforts in recent years, but with the threat of budget shortages, Metro was able to streamline the process and implement stop consolidation projects more quickly.

Metro has experienced an increase in passengers per hour, passengers per mile, and passengers per capita, largely because of the service changes described previously. Ridership productivity has also increased as a result of partnerships that have been formed with universities, local schools, local governments, and hospitals. Metro has long used partnerships as part of its business model, and they were in place before the 2008 financial challenges. However, Metro scaled back some of the partnerships as a result of the national recession, as some partners were not able to provide their share of funding. The agency will continue to explore partnership opportunities with other jurisdictions as a way to promote transit-supportive actions.

The most prominent partnership is the one with the University of Washington (UW) that resulted in the establishment of the U-PASS program. The initial partnership included

maintaining existing pass revenue levels but providing access to 100% of the student population and 50-50 partnership for new service hours. Increasing access throughout the population resulted in substantial ridership increases. UW made payments for additional service hours for 6 years, after which Metro absorbed them. UW has partnered for additional service on an as-needed basis since then, usually for 2 or 3 years. The current UW contract for transit access (U-PASS) generates approximately $19 million for King County Metro.

While not considered long-term partnerships, King County Metro does contract with outside organizations to provide public transit service to support special events and major league sports events. Under these contracts, 100% of King County Metro's costs are paid for by the event sponsor and/or farebox revenue.

Using Capital Funds to Maintain Transit Effectiveness

Metro has achieved substantial savings through the use of capital funds in the following areas:

- Upgraded scheduling software has saved $12 million to date and continues to support more efficient scheduling.
- Energy-saving components of capital projects have provided a reduction in utility costs of approximately $200,000 annually, with other projects still in progress.
- Timely replacement of fixed assets at the end of their serviceable life will reduce operating and maintenance costs.

Investments in projects to promote speed and reliability improve service quality, which is extremely important, but they are often neutral in terms of actual savings in operating costs. The diversion of capital funds to support operations has led to the deferral of purchasing new buses, which in turn has led to higher operating costs as older vehicles are kept longer.

While Metro has made capital investments that have made the agency more efficient, almost all of those systems now require resources to maintain them that were not required before, and some of the investments pay off only under certain conditions. For example, bus hybrid technology reduces operating costs compared with diesel when the price of diesel fuel is higher; otherwise, Metro believes hybrid buses have a higher life cycle cost. The use of capital funds to support operations in the past few years has allowed Metro to defer significant system reductions; however, the agency believes this is not sustainable. The primary goal of the capital program is the preservation of system infrastructure in a state of good repair.

Maintaining Transit Effectiveness Through New Revenue and Greater Efficiencies

King County Metro identified a number of actions that have helped generate new revenues or reduce costs through better management, some of which have already been mentioned. These actions are described here:

- Metro recently entered an agreement with the Public Stadium Authority to allow parking at an employee-only lot for sporting events, which resulted in approximately $11 million.
- Advertising opportunities in downtown Seattle transit tunnel stations resulted in average annual ad revenue of $519,506 from 2009 through 2012.
- Metro has been able to reduce the number of reserve pool operators who fill in when other operators are absent through closer monitoring of staffing needs, strategic hiring practices, more flexible use of part-time staff, and the creation of a system board (operators who can fill in for absentees at any base).
- Based on analysis of staffing efficiencies, Metro eliminated a total of 125 back-up operator positions. Part-time drivers or drivers working overtime are now used to fill more of the planned and unplanned absences. Savings are estimated at $1.45 million annually.
- Preventive maintenance targets were broadened to extend the intervals for inspections, saving approximately $400,000 annually.
- The implementation of new service guidelines as part of the service planning process helps manage the system for increased productivity, while balancing social equity and geographic value Using the guidelines following council direction, Metro reinvested roughly 100,000 annual service hours from lower productivity services into services that were overcrowded, unreliable, or below target service levels.
- The marketing and service information budget has been reduced significantly since 2004, resulting in layoffs and reduced services, such as fewer printed timetables, less signage, and decreases in marketing and promotions. In the past 2 years, Metro has had dollars added for emergency adverse weather communications, and the marketing group has also been fortunate to have grant dollars available for other transit projects. However, much work has to be jobbed out to accomplish the tasks. The growing acceptance of the web as a tool to access transit information has helped offset the printing costs, but there is still a baseline of timetable printing needed to meet the demands from the portion of the market that is not totally connected through the Internet. Metro has stopped printing system maps altogether.
- Revenue generation is through a transit advertising contract with an outside vendor. That contract had a minimum annual guarantee that was renegotiated lower as a result of the recession, which resulted in slightly less net revenue to Metro because of lower sales volume. However, Metro added new products that could be marketed, most notably advertising in the downtown Seattle transit tunnel.

- The Transit Finance and Budget office has helped the entire organization reduce costs by providing support. This group has been responsible for communicating all the actions taken and working with other areas of King County government to reduce costs. This group assisted in completing the recommendations from the 2009 performance audit and provides the financial framework for decision making. The group consists of six staff and has not been reduced. Accounting services are purchased from central King County government agencies.
- Upgrading HVAC systems with more energy-efficient equipment has resulted in the following savings. (1) Replacing HVAC systems at four transit bases, reducing planned energy use on average by approximately 25% to 30%. (2) Conducting 25 energy upgrade projects that will save a total of 11,700 million BTUs (British thermal units) each year and produce an annual cost savings of $184,000 with the help of $784,000 in contracted utility rebates. (3) Replacement of bus garage ventilation fans and related equipment at North Base is projected to save nearly 2 million kilowatt hours per year, resulting in an annual savings of $116,483. Nearly half of the project's equipment cost is being covered by incentive payments from Seattle City Light.
- For paratransit cost savings, Metro has instituted conditional eligibility for riders, focused on fare enforcement that has increased revenues and had an impact on ridership, and developed competitive bids for contracted services. Proposed cost-saving measures include limiting service hours to parallel fixed-route services in specified areas. Metro utilizes travel training to help customers who might otherwise rely on Access use regular fixed-route service. The savings for 2012 due to travel training was roughly $1.2 million. Metro has also studied the effects of moving closer to providing ADA minimum levels of service, which could save money. There has been no action on this option to date.

All the actions that have been taken have allowed King County Metro to preserve service levels for several years longer than originally projected. Had these actions not been taken, the level of service cut required to reach a sustainable service level would be higher than the 17% that is currently planned should new revenues not be authorized by the state legislature.

COMMUNITY TRANSIT—SNOHOMISH COUNTY, WASHINGTON

Community Transit is a mid-sized transit agency serving the public transportation needs of Snohomish County, Washington, which is located east of Puget Sound and north of King County (see Figure 30). Community Transit's Public Transportation Benefit Area has a population of about a half million people. Community Transit operates buses in Snohomish County and to downtown Seattle, the University of Washington, and Seattle's eastside suburbs in King County. Community Transit operates local and commuter bus routes (including a bus rapid transit service called Swift), vanpools, and paratransit services. The fleet is composed of 268 fixed-route and paratransit vehicles.

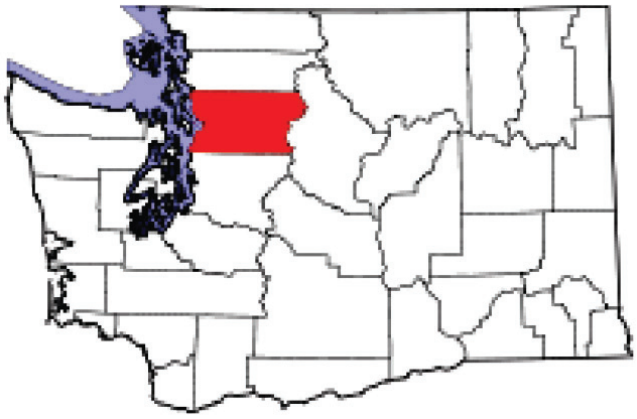

FIGURE 30 Map of Snohomish County, Washington (*Source*: Wikipedia).

The national recession had a substantial impact on Community Transit. The total operating budget was reduced from $102,070,615 in FY 2008 to $84,574,691 in FY 2012. Service hours provided were reduced from 694,621 in FY 2008 to 596,456 in FY 2012. Ridership decreased from 11,918,776 in FY 2008 to 9,107,632 in FY 2012. Few transit agencies in the country experienced as painful a level of service reductions as Community Transit over the past 5 years. The information provided here is taken directly from the survey Community Transit staff completed for this synthesis.

Community Transit defines "transit effectiveness" as follows:

- Meeting mobility needs in a cost-effective manner
- A sustainable balance between the goals of maximizing service productivity and providing geographic coverage
- Matching service levels to their markets
- A connective network that promotes a "think transit first" philosophy.

The agency's idea of transit effectiveness is expressed in its vision, *Think Transit First:*

> We will provide fast, frequent, reliable, and affordable public transportation connecting all major destinations in Snohomish County. People will enjoy the ease and comfort of being transported on buses in priority lanes rather than driving in traffic. Transit will be the first choice, not just for commuting to work but for all travel. Efficient bus service will allow communities to grow

> in ways that are economically and environmentally sustainable. People will be healthy while saving time and money. We will all Think Transit First.

The vision requires frequent bus service on a connected network of transit emphasis corridors. Service along these corridors must be supported by high-intensity land use to provide a strong transit market. Priority lanes and other infrastructure will be needed to keep buses moving as congestion increases. Appropriately scaled transit service in lower-demand markets will connect with and feed transit emphasis corridors. This vision is documented in the Long-Range Transit Plan adopted in 2011 and the Six-Year Transit Development Plan, which is updated and adopted annually.

The agency has also been guided by short-term shared outcomes:

- Increase ridership to 12 million boardings by 2017 within existing resources (goal will be updated if new revenue stream is secured)
- Reduce or maintain average cost per rider.

Community Transit annually tracks and reports the following board-adopted measures:

- Boardings per capita
- Boardings per revenue hour
- Customer commendations per 100,000 boardings
- Customer complaints per 100,000 boardings
- Voluntary employee turnover
- Cost per passenger mile
- Cost per revenue hour
- Farebox recovery
- Revenue hours per employee.

The agency also has board-adopted service design guidelines that require an appropriate match between market demand and service level. As described in the Long-Range Transit Plan, service guidelines prioritize frequent service on transit emphasis corridors with high travel demand. A key element of the overall travel demand management/travel systems management (TDM/TSM) program is ongoing monitoring of travel demand, community development, and infrastructure investment to ensure that service levels keep pace with overall corridor development.

Community Transit has worked extensively with land use authorities to affect the transit operating environment. Snohomish County and partner cities are changing development regulations to focus activity around transit emphasis corridors and provide incentives for transit-oriented development and infrastructure improvements that will enhance transit productivity and speed. The prioritization of frequent service on transit emphasis corridors has resulted in the system carrying a record number of passengers per service hour. Community Transit's near-term priority is improving the performance of current routes and preventing any further service cuts.

Swift and other core routes in Community Transit's system generally provide direct, frequent service between major destinations. In addition to Swift, core trunk lines in the local service network provide the fastest way to get between major destinations on the bus. As described in the Long-Range Transit Plan, over time some of these corridors will transition to Swift service. Timing of future Swift implementation will depend on agency financial capacity, development of market demand, and construction of transit-priority infrastructure such as bus lanes.

Community Transit's service is more efficient than at any time in the agency's 36-year history. The network restructure implemented in 2012 was modeled on the Long-Range Transit Plan, concentrating frequent service on transit emphasis corridors to more effectively meet demand. New transit technologies will allow further refinement of this network and deploy service in the most productive way possible.

The focus on refinement and optimization of the fixed-route network will continue as better data on system performance is obtained and progress is made on the ridership goal of 12 million passenger boardings by 2017 without significant expansion of service.

Public Input

Given the substantial cuts in revenue, Community Transit found it vital to engage the public in discussing the options available to the community. The agency conducted the following activities:

- Conducted a transit values exercise with multiple constituencies both internal and external to the agency. This exercise presented a zero sum choice to participants, forcing values-based choices that identified their priorities when they were faced with reducing/constraining the service and service quality available to them. This exercise informed decision makers about customers' views regarding service frequency, geographic coverage, span, cost, service to transit-dependent populations, service to "choice" riders, and so on. As reported in the 2012 edition of *Passenger Transport's Annual Meeting*,

  > "The Transit Values Exercise was designed as a game to a certain extent that involved small groups working to cut 20% of their 'cost points' as managers of a fictional public transit agency. Each group received profile cards of fictional bus riders that told their stories and gave certain values to their transit use. The most important value was cost, which was tied to the relative cost of providing service to that rider. Groups achieved their objectives by eliminating enough riders to cut their cost

points by 20%. The key to success was for a group to reach consensus on its values. For instance, a table that valued geographic coverage often sacrificed efficiency and ridership. If maintaining ridership was important, coverage was usually reduced. At the end of the exercise, each table's results were shown to the larger group and participants were surprised at how different they were. A discussion followed on what the real-world impacts of these decisions would be on real people."

- Conducted multiple outreach events in the community with riders, business leaders, elected officials, opinion leaders, and the media.
- Presented three options for system redesign to the board of directors, and ended up with one that was a hybrid, reflecting input from the board, public, and staff on how best to reestablish a sustainable cost structure while preserving as much service as possible and reflecting what was learned about our customers' transit values.
- The result was that Community Transit reestablished an affordable cost structure while achieving more efficient service as measured by an increased number of riders per hour, despite service levels being greatly reduced from prerecession levels. However, because of lack of funding, service levels remain at only a fraction of the level needed to satisfy customer demand.

Given the substantial nature of required budget reductions, it is no surprise that the organization was changed dramatically. Community Transit ultimately

- Commissioned an independent organizational assessment (performance audit) to identify areas where cost efficiencies could be found
- Consolidated business functions, resulting in staff reductions (e.g., combining public affairs, customer relations, marketing, and communications)
- Eliminated staff functions deemed to be unaffordable (e.g., maintenance instructor, public records specialist, and facilities maintenance technical staff.)
- Adopted a 2-year strategy in 2011–12 to resize the agency to an affordable cost structure, reducing service levels by 37% and staff positions by 29%
- Eliminated administrative positions at all levels in the organization, beginning with executive positions, including laying off the deputy CEO and the director of marketing
- Reduced total FTEs by 206 positions or roughly 29% of the workforce
- Revised delegation of authority to achieve more efficient administrative processes.

This level of change did not occur without negative effects, and the agency reported what it had learned from the experience that might benefit other agencies:

- A comprehensive after-action review was conducted involving 40 to 50 key staff members to identify what was done well that could be built upon and where there were opportunities for improvement if faced with similar circumstances in the future. There were many lessons learned and reported to the board of directors.
- There was a deep sense of grieving during the layoff period and thereafter. There were increased levels of stress, lowered morale, risk avoidance, and withdrawal.
- Giving employees ample notice of layoff was helpful in transitioning the workload to remaining employees, and it allowed employees to remain in their jobs while they looked for other employment. However, it also contributed to "survivor guilt syndrome" among employees who retained their jobs.
- The general feeling was that the workload was higher for remaining staff in the immediate aftermath of laying off 29% of the workforce. Employees believed they were working harder but accomplishing less.
- High-seniority coach operators who were accustomed to bidding preferred work assignments now had lower seniority and had to bid undesirable assignments, which has been generally demoralizing.
- With regard to core product (service hours), the agency is doing less with less.
- With regard to primary outcome (ridership productivity), the agency is doing more with less.
- With regard to many administrative staff functions, the agency is doing the same or more with less.

Managing Through the Use of Better Data

Even before the recession, it had become clear that in order to meet the transit demands identified in its region's Metropolitan Transportation Plan, Community Transit would need to identify new revenues and focus the network to carry more people per dollar. The recession forced faster action in order to survive. The goal was to retain as many riders as possible in the process.

The policy framework provided by the board was to maximize productivity (boardings per hour) while retaining a basic level of geographic coverage in the service area. Extensive data were compiled that allowed a hard look at the cost and performance of all services. The agency focused heavily on measures of ridership, cost per hour, and subsidy per passenger. These data helped inform discussions with the board and the general public, and drove changes in service planning and in the format and content of system performance reporting.

Community Transit is developing a transit technology program that will use the most advanced technology available to keep buses and DART vehicles on schedule, provide real-time information to passengers, and provide data to enable improved operational management and service planning. The program will

- Track each vehicle's location with GPS

- Provide passengers with an estimated time of arrival at any given stop
- Automatically count passengers
- Automatically announce stops
- Use computer-aided dispatch
- Give coach operators and dispatchers more communication and sophisticated tools.

The system was implemented for DART service in 2010. Community Transit has seen significant improvement in the productivity of this service since the introduction of the technology. Even before full implementation, Community Transit embarked on a program to collect and analyze an unprecedented quantity and scope of data in preparation for major service cuts/system redesign because of the economic downturn. The data were organized, analyzed, and presented using new formats. Data included

- Systemwide on-board customer survey (origin-destination, trip purpose, demographics)
- A comprehensive operational audit, including complete stop-level boarding, deboarding, on-time performance, and a travel time survey of all routes for a complete service day
- Automated farebox data
- NTD Section 15 survey data
- Productivity and cost-per-rider data for all services
- Public input on service alternatives through Survey Monkey
- Spatial (GIS) and cost-benefit analysis of all of the above
- Development of a transit values exercise (described earlier).

This effort has driven a change in how Community Transit formats and reports data and also in how data are discussed with the board, riders, stakeholders, and employees. Agency leaders note that data do not drive or make decisions. Data inform choices that are made based on the goals and values of the organization. The result has been that a 37% service cut resulted in weekday ridership reduction of only 4% and a total ridership reduction of 12%.

To develop this enhanced ability to analyze service, new resources were required that cost the agency money but obviously provided a high return on investment.

Planning Resources

- Created a data program manager staff position to lead data collection, processing, and analysis efforts
- Training and mentoring of service planning staff in the use of Geographic Information Systems, Excel, and other data analysis tools and techniques
- Consultant support for systemwide survey efforts
- Modification of various business processes
- The transit values exercise was developed with a team of employees (no consultant support) over the course of approximately 2 months.

Information Technology Resources

- Created project manager staff positions (1.5 FTEs) to implement the Advanced Public Transportation System (APTS)
- Created application support staff positions (1.5 FTEs) to provide ongoing application support and maintenance (for APTS—the CAD AVL system)
- Built out a network operations center (NOC) to allow the APTS to run in a premium environment for high availability, high security, and high capacity/performance
- Training and mentoring of operations staff in the use of proactive system monitoring tools and business intelligence and other data analysis tools and techniques.

Community Transit offered different forms of incentives to solicit ideas from employees and to identify options that would save the agency money:

- Established a voluntary separation incentive for top wage-earning employees.
- Established a voluntary unpaid leave program.
- Developed a cost-saving incentive program called Dollars and Sense to encourage employees to make suggestions on how to curb costs. The winner was announced at an all-employee meeting.
- Increased use of an existing performance-based cash incentive program to reward exemplary performance.
- Established a Buy Local for Transit program aimed primarily at local residents, encouraging retail buying in the local area to generate sales tax revenue for local transit. The agency relies on local sales tax revenues to support public transportation, and the more people buy their goods and services in Snohomish County (rather than over the Internet or in neighboring counties), the more revenue will be available for transit service provided by Community Transit.
- As part of the organizational assessment, employees were given the opportunity to complete a survey about the agency and make suggestions about cost cutting and communication.
- A staff organizational development specialist conducted employee focus groups to generate cost-saving ideas.

Community Transit reported that the results of these efforts were as follows:

- Some savings from the voluntary separation program
- Modest savings in everyday expenses
- Increased employee awareness and sensitivity about the priority to curb costs wherever possible.

Other Employee Contributions to Dealing with the Deficit

Community Transit employees participated in dealing with the financial deficit in the following ways:

- Three of four union bargaining units accepted wage concessions to help out. A zero percent wage increase was agreed to for 2011.
- Administrative staff had severely constrained market- and merit-based wage growth for 4 years.
- Initiated a dollar contribution from non-union employees to employer-paid medical insurance for the first time.

Community Transit experienced chronic unscheduled absences among coach operators that had an adverse effect on service in the form of missed trips. The union strongly resisted efforts to improve attendance among employees who were frequently absent. This led to a strain that spilled over to other aspects of the labor/management relationship.

Community Transit's principal outsourcing efforts are contracts for the operation of a small portion of fixed-route bus service and all paratransit service. The contracted fixed-route service is comparable to the agency's directly operated service and costs about 70% of what it costs the agency to deliver the same service. The difference is in the cost of employment; for example, wages, benefits, work rules, and labor laws. A Request for Proposals for paratransit services resulted in an award that was about 15% less than the preceding contract.

Project teams are routinely used to help improve the efficiency and effectiveness of operations and services. It is difficult to quantify the results of some of these teams, but examples of various project teams and their impacts are provided here:

- A project team composed of operational and procurement staff was formed to implement a new uniform contract for ATU bargaining employees. The uniform procurement team saved the agency approximately $64,000 and procured better quality products through the process.
- The service recovery team found new and innovative ways to replace a defunct field report position that was used to recover services when they were interrupted for various reasons. The old field report program was extremely costly to the agency. Previously, the field report positions cost the agency more than $300,000 per year. By using existing resources differently, Community Transit was able to provide similar services to those of the old field report position for less than $3,000 per year.
- A project team completed a sleep room for bus operators. Many operators have long splits and live some distance from their work base. Rather than having to spend gas money driving home to rest between shifts, they can rest in the sleep room. This project has proved popular with the bus operators.

Service Planning Initiatives to Reduce Costs and Increase Efficiencies

Many of the data collection techniques used by Community Transit have been described. The agency engaged in a comprehensive operations analysis; service design changes; use of APCs, AVL, run-cutting software, and service standards; and participation in long-range land use planning.

Generally, the effects of these initiatives are to develop effective and efficient schedules, and to operate the system on time and at an affordable cost. Since the start of the great recession, productivity, as measured by boardings per hour, improved more than 25%. Service levels were reduced by 37%, including eliminating service on Sundays and major holidays. Overall service productivity increased more than 27%; more than 50% on some routes. Ridership overall decreased only 12%, and average weekday ridership has remained at 96% of prerecession service levels.

Community Transit entered into a partnership with the city of Everett/Everett Transit to implement and sustain a bus rapid transit line that spans the two service areas. Community Transit led the design and construction and operates the line, named Swift. The service is partially financed through a partnership agreement with the city of Everett whereby a fraction of the city's transit sales tax revenue is allocated to Community Transit. The city of Everett also financed construction of Swift stations within the city and the north terminal at Everett Station.

The result is that constituents are served in an integrated fashion along an important transit emphasis corridor, resulting in the highest ridership in the Community Transit network. Today Swift BRT carries one in seven Community Transit riders and is attracting new people to transit every day. Local jurisdictions have embraced Swift, recognizing its potential to reshape their communities. Lynnwood, Everett, Mukilteo, and Snohomish County have either adopted or are considering land-use changes that would incentivize transit-oriented development around Swift stations.

Using Capital Funds and Technology to Enhance Transit Effectiveness

Community Transit has taken advantage of capital funding to help improve service quality and reduce operating costs in the following ways:

- Smart Card (ORCA) and off-board ticket machines on BRT: These systems speed passenger boarding time,

which reduces dwell time at stops for more efficient operation.
- Installation of AVL/APC systems is expected to reduce the cost of field data collection. Data from the systems will result in less unproductive running time.
- Implementation of CAD/AVL on paratransit, paired with more active use of Trapeze, has resulted in productivity improving from 2.15 passengers per hour to 2.3 passengers per hour. This translates into serving the same number of riders with fewer service hours.
- Purchase of double-deck buses allows the agency to carry more passengers with a single driver. Demand can be met with fewer drivers during peak hours.
- Signal priority throughout the corridor can provide a shortened red light or an extended green light to keep Swift moving quickly.
- Queue jumps are another element of on-street technology that help buses maintain speed and reliability. Swift buses now get a head start with a queue jump light. All of these technologies contribute to faster running times, allowing buses to carry more people per service hour.

Since the great recession, new capital funding has been directed principally at preservation of infrastructure. Projects have included replacing aged buses and other rolling stock, failing roofs, failing paving systems, failing underground storage facilities and related systems, stormwater collection and treatment systems, and security and video surveillance systems. It is generally accepted that if left unaddressed, failing capital infrastructure will lead to unnecessarily higher operating costs. By properly maintaining or replacing aged capital assets, unnecessary increases in operating cost are avoided.

Other improvements to managing the agency that result in improved service to the public include

- The Trapeze OPS Sign-in Terminal in Transportation has improved efficiencies in the window dispatcher's work. Dispatchers no longer spend their time monitoring the sign-in sheet and can focus on covering work and other duties.
- Online reporting for the 360 vanpool groups managed by Community Transit provides time savings and better accuracy on reports for area vanpool fleet coordinators. The time savings allow the coordinators to concentrate on other necessary duties.
- In marketing, Facebook has allowed two-way communication with customers to discuss issues and solutions to transit operations and other questions. Community Transit video programs can now reach a larger audience. This also provides savings on print material. WebEx allows the agency to communicate with its employer audience and helps save money in travel and the cost of finding a meeting location. Ning allows the agency to provide information electronically and allows customers to share ideas electronically and instantaneously. FlickR allows staff to photo share with other staff in the agency. This saves staff time by having all photo resources in one easy-to-access location.

Maintaining Transit Effectiveness Through Operations Efficiencies

Community Transit has been extremely active in finding ways to reduce costs and improve service to the public. The agency reported the following actions:

- Developed an ISO-compliant environmental management system (EMS). This has reduced the frequency and severity of adverse environmental events, resulting in reduced costs for remedial and corrective response. Improved performance has also qualified the agency for less stringent oversight schedules from regulatory agencies, resulting in reduced permit fees and charges for oversight inspections and audits.
- Modernized and expanded video surveillance systems for operational facilities. This has led to an undetermined amount of deterred illegal and malicious activity. More important, video surveillance recordings are useful in investigating and prosecuting illegal and malicious activity.
- A "bait car" program has helped reduce vehicle theft at park-and-ride facilities.
- A special emphasis training program that focused on avoiding bus/pedestrian accidents contributed to a record of no pedestrian accidents in 2012.
- Community Transit is implementing a workforce management (scheduling) module for its Trapeze OPS software that will automate several processes, such as requests for time off and coach operator bids. The software is expected to reduce costly scheduling errors and significantly reduce manual data processing with regard to coach operator requests for time off.
- Management made changes to the coach operator bids in 2011 and in 2012. There are three bids a year. Before 2011, bids were held for 10 hours on Saturday and 6 hours on Sunday, which meant that about of 28 senior operators had to be road-relieved to bid. In 2011, the bid was held for 6 hours on Saturday and 10 hours on Sunday, reducing the need for road coverage to 12 senior operators. Since 2012, because of a reduction in staff, the bid has been held entirely on Sunday. Because no service is currently being provided on Sunday, there is no need for road reliefs. The cost of the bidding process has been reduced from $18,018 to $1,894 (for supervisor overtime).
- With the reduction in staff, cell phone services for managers and supervisors were renegotiated, saving approximately $8,000 a year.
- Outside resources have been used to analyze staffing and look for ways to improve internal processes.

For example, an extra board study was recently completed to ensure that report and extra boards that support coach operator absences are properly sized. Community Transit is also using outside resources to analyze family medical leave and workers compensation processes.

Maintaining Transit Effectiveness Through Other Agency Efficiencies

Community Transit has taken many other steps to maintain transit effectiveness by identifying savings that are ultimately used to pay for service to the public. The agency reported the following:

- Warranty recovery efforts remain strong and efficient, resulting in a return of $126,000 in 2012.
- Advertising was broadened to include a wider range of the bus fleet, with additional and unique products such as the Double Tall and Swift BRT fleet.
- The BusPlus book budget was cut based on delivering bus schedule information to customers through the Internet and other electronic media (e.g., blog, Facebook, and govdelivery alerts). This saved the agency up to $200,000.
- Advertising self-promotion was cut dramatically from $200,000 at its peak to $15,000. Social media channels are now used to communicate to passengers and the public.
- The bike map was totally sponsored by an outside partner, saving $5,000.
- Negotiated with vendors who have multiyear contracts with price escalation clauses to voluntarily reduce or forgo their contractually provided price increases.
- Refinanced debt in 2010 to obtain lower interest rates and to defer payment on principal to improve cash flow and defer service cuts as long as possible.
- Provided new programs, such as Go to You refresher training and video route training, to deliver training more efficiently and cost-effectively.
- Deferral of the paid time off cashout program.
- Changed vendors for life and disability coverage and the Employee Assistance Program (EAP) to achieve cost savings.
- Successful lobbying of the state resulted in new temporary revenue (slightly more than $500,000 annually).
- VanGo allowed Community Transit to provide vehicles to groups or organizations that were affected by service cuts. The vans provide service to customers who lost essential bus service during the downturn.

In spite of all ways Community Transit is trying to maintain effectiveness, the agency's 6-year transit development plan does not include any new service. While modest growth in revenues is forecast, so are modest increases in the cost structure owing to inflation and new unfunded mandates. Continuing investment in infrastructure preservation is also competing for resources. Community Transit states that if the economy improves at a faster rate than forecast, perhaps new service could be added.

GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY, CLEVELAND, OHIO

The Greater Cleveland Regional Transportation Authority (GCRTA) is a large transit agency serving the public transportation needs of Cleveland and the surrounding suburbs of Cuyahoga County in northeastern Ohio. The service area, shown in Figure 31, has a population of approximately 1.2 million.

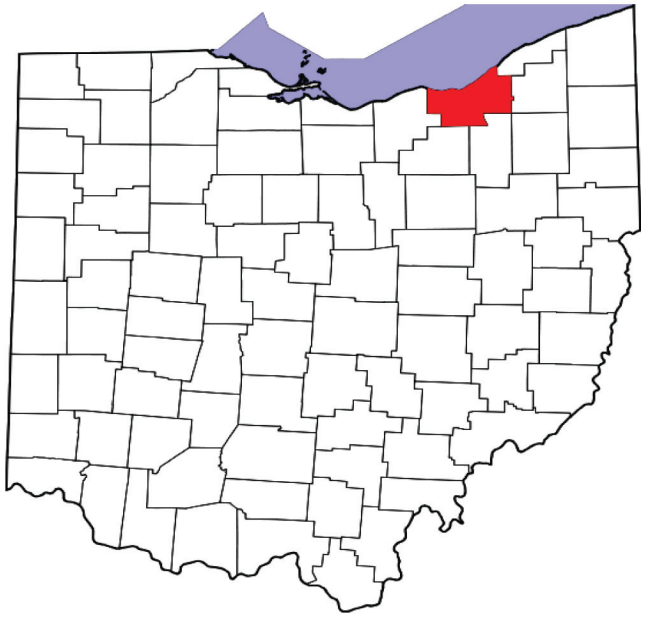

FIGURE 31 Map of Cuyahoga County, Ohio (*Source*: Wikipedia).

GCRTA operates one heavy rail line and two interurban light rail lines, as well as a fleet of almost 500 buses that features a prominent bus rapid transit line (the Healthline). The agency also provides paratransit service, with a fleet of more than 80 vehicles.

The great recession had a substantial impact on the Cleveland area and GCRTA. The authority's total operating budget was reduced from $240 million in FY 2008 to $223 million in FY 2012. Service hours were reduced from 2,240,000 in FY 2008 to 1,790,000 in FY 2012. Ridership decreased from 57,900,000 passenger trips in FY 2008 to 48,200,000 in FY 2012. From 2008 to 2011, GCRTA reduced its span of service hours and weekend service, reduced its frequency of service and level of service on low-demand routes, eliminated some routes, and raised fares three times. The information provided here is taken from the survey the

agency completed for this synthesis, as well as follow-up e-mails with the general manager.

GCTRA defined the "transit effectiveness" it pursued as follows:

> With our motto of 'Quality Service, Every Passenger, Every Day,' RTA took significant and aggressive steps to reduce overhead and expenses while, at the same time, improving the quality of our product.

All employees are evaluated and compensated on the basis of key performance indicators that measure the agency's effectiveness. GCRTA defines a "financially sustainable" transit system as one that has financial resources to enable the agency to provide sustainable levels of service to the public in good economic times and to provide reserve funds to allow an orderly and well-planned reduction of service levels in times of deep and sustained economic downturn. The agency experienced significant loss of operating revenue and ridership during the recession. Through a series of public meetings in many different venues, passengers made it very clear that they would prefer fare increases over reductions in service whenever possible. The public also provided excellent suggestions on how to modify service cuts to reduce the negative impact any cuts would make on their mobility needs. GCRTA improved its passengers per mile from 31 in 2008 to 33 in 2012. With a slightly improved economy and through a series of efficiency measures, GCRTA began to increase the number of service hours provided to the public in FY 2012 and expects to be able to continue to offer small increases in the future.

Managing Through the Use of Better Data

GCRTA has been an industry leader in pursuing improvements in efficiency through more careful analysis of performance made possible not only by improved data collection but by having managers from different functional areas work together as a team to identify solutions throughout the agency. The agency developed the TransitStat monitoring system, patterned after the New York Police Department's CompStat and Baltimore, Maryland's CitiStat. The system entails frequent gathering, reviewing, analyzing, and monitoring of the agency's critical success measures (CSMs), and links the data systems to performance and accountability. GCRTA believes that the most important factor in obtaining breakthrough performance is data-driven management. TransitStat requires the agency's management to use information systems to define, measure, analyze, improve, and control their operations and link the performance to the authority's business strategies and goals.

TransitStat is regarded as a philosophy as well as a data analysis program. Weekly and biweekly performance monitoring forums are attended by the agency's entire executive management team, the budget/performance analyst, and relevant department directors. This ensures that the people who can address issues are at the table, thereby eliminating excuses. Everyone at the meeting is encouraged to suggest solutions, no matter what functional area of the agency they work in. Results are measured weekly as opposed to monthly, quarterly, or yearly.

Since 2008, TransitStat has helped to

- Encourage data-driven decision making
- Identify cross-functional gaps
- Identify latent operation issues
- Identify negative trends early
- Create a solutions-based culture in the organization.

TransitStat has helped identify cost-saving measures totaling more than $25 million between 2008 and 2011, including these:

• Paratransit operator overtime reduction	$76,722
• Inventory reduction	$750,000
• Disputed electrical meter charges	$523,750
• Engineering retrofit of substation	$216,000
• Lighting retrofits	$499,912
• Towing reduction	$252,000 (60% reduction)
• Fuel hedging program	$15,261,726
• Electrical savings	$7,000,000
• Health care audit	$1,000,000
• 2009 overtime savings	$2,086,792 (30% reduction)

There have been other efficiency gains through the use of TransitStat. By analyzing road calls and breakdowns, changes were made in the resources dedicated to different shift times that resulted in increased efficiency, fewer mechanical problems, and fewer road calls and tow truck requirements. An analysis of employee performance in the customer call center led to improvements that enabled the same staff to take 20% more calls.

GCRTA notes that the data analysis software it uses is part of the Microsoft Office suite of programs and is available to virtually anyone. The agency dedicates a budget analyst to develop the reports, charts, and graphs that help managers track the performance of the agency from week to week. The time spent by the managers in such meetings is not insignificant, but the agency says it is a worthwhile investment to make for the results it has achieved.

Consistent with the value GCRTA places on data-driven management, the agency also participates in the American Bus Benchmarking Group (ABBG). The agency believes that this group helps GCRTA determine how well it is doing in comparison with others who believe they are doing things "relatively well," and enables the agency to learn and share

best practices with others. The following description of the ABBG is taken directly from the website developed for this effort (*74*).

> The American Bus Benchmarking Group was established in 2011 to provide a confidential forum for mid-sized bus organizations in America to learn from each other by comparing performance, sharing experiences, and identifying best practices. Benchmarking is defined by the ABBG as *A systematic process of continuously measuring, comparing and understanding organizations' performance and changes in performance of a diversity of key business processes against comparable peers to gain information which will help the participating organizations to improve their performance.*
>
> The objectives of the American Bus Benchmarking Group are:
>
> - To develop a concise, well-balanced, and comparable key performance indicator system for performance measurement for use by American bus agencies that will determine strengths and weaknesses, prioritize areas for improvement, and support dialogue with stakeholders (e.g., senior management, board, government).
> - To provide benefits to all members by understanding the reasons for performance levels and trends and by identifying best practices.
> - To facilitate the sharing of knowledge and best or otherwise interesting practices in a confidential environment.
> - To establish an ongoing benchmarking process that considers the financial and labor resources available to participating mid-sized agencies.
>
> Cooperation, independence, speed, and confidentiality are the guiding principles of the group and are central to its success. The group is administered and facilitated by the Railway and Transport Strategy Centre (RTSC) at Imperial College London, a world leader in public transport benchmarking. The RTSC was set up in 1992 as a center of excellence serving the transport industry on strategic, technology, economic, and policy issues, and as a research and teaching unit within the Centre for Transport Studies.
>
> The ABBG builds upon years of experience in the CoMET and Nova metro benchmarking groups and the International Bus Benchmarking Group, facilitated by RTSC since 1994, 1998, and 2004, respectively.

The ABBG currently has 16 members from throughout the United States who pay a fee to have their performance data objectively reviewed by the RTSC, and members benefit by working collaboratively and measuring each other against uniform performance definitions and measures. The ultimate result of the group's work is intended to be improved efficiencies and cost savings.

GCRTA strongly believes that organizational change requires leadership and training. In addition to inventing TransitStat and joining the ABBG, GCRTA has trained many staff in the Six Sigma Process and is now embarking on the Partnership for Excellence and moving toward the Malcolm Baldrige Award. The Baldrige program oversees the nation's only presidential award for performance excellence, while offering criteria, assessments, tools, training, and a community for those dedicated to helping organizations improve (*75*).

Other Employee Contributions to Dealing with the Deficit

GCRTA has established an incentive program that rewards employees for achieving established goals in areas such as safety, attendance, customer satisfaction, on-time performance, ridership, revenue, and attendance. An agreement reached with the local ATU ties pay increases to increases in revenue the agency collects, if there are any. The agency also increased co-pays and deductibles for health care, though credits are provided to those who have annual physicals and can verify that they are nonsmokers.

GCRTA put a stronger focus on reducing workers' compensation costs through more supervisory accountability to stay in touch with those who were out of work because of injury, and by providing more alternative work duties to those who are collecting workers' compensation as an incentive to return to their regular duties as soon as they are able.

The agency also put more emphasis on monitoring sick leave and absenteeism, resulting in a reduction in absenteeism from 7% to 5%. GCRTA contracted out paratransit vehicle operations and the inventory management of paratransit to save additional dollars.

Operations and Service Planning Initiatives to Reduce Costs and Increase Efficiencies

GCRTA has been active in using as many tools as possible to optimize its service planning, including the completion of a comprehensive operations analysis; using run-cutting software, APCs, and an AVL system; and instituting service design changes, including the provision of circulators in areas of relatively low demand. The establishment of the Healthline BRT corridor on Euclid Avenue employs numerous techniques to speed up service, including a reduction in the number of bus stops, traffic signal priority, all-door boarding, and off-board fare payments. While the agency has lost ridership over the past 5 years, it has improved its metrics in terms of passengers per hour and passengers per mile, and is beginning to regain the lost ridership caused by service reductions and the poor economy. GCRTA also consolidated bus districts, which reduced overhead and utility costs by more than $3 million annually.

Maintaining Transit Effectiveness Through Partnerships

GCRTA has entered into partnerships with various entitles to help generate additional revenue and establish new service. The agency has an agreement with the major health

institutions in the city, which paid for the naming rights to the BRT service along the Euclid corridor, resulting in $250,000 in revenue each year for 10 years. In addition, a number of companies—such as Huntington Bank, PNC Bank, and Cleveland State University—have agreed to pay $30,000 per year for 10 years for the naming rights at stations near their locations. Several agreements have been reached with area colleges (the largest being Cleveland State University and Case Western) that pay GCRTA a fee per enrolled student for unlimited access to all transit services. GCRTA also has had agreements with several dozen school districts to allow them to purchase transit passes to provide to their students for transportation at a reduced rate ($1.50 compared to the regular adult rate of $2.25). The agreements allow the school districts to sell passes at cost to students who may not be eligible for free passes from the schools. For example, a school policy might be to provide passes only to those students who live at least 3 miles from school, but students who live closer might want to use public transit and can purchase the passes directly from the school. As of October 2012, GCRTA started allowing students under age 18 to purchase the lower-priced passes, as well as all-day passes, directly on the buses or at ticket vending machines with a valid school ID.

Fourteen different entities have partnered with GCRTA in the amount of $3.6 million over 3 years to support an expanded downtown rubber-tired trolley service. On a smaller scale, the Rib Cookoff has partnered with GCRTA for enhanced rail service to its 4-day (Labor Day weekend) event. GCRTA receives a piece of the gate (50 cents per ticket sold), with a minimum of $10,000. Finally, the Cleveland Film Festival is paying GCRTA to operate additional rail service after normal service ends to benefit festival attendees. The last regularly scheduled trains leave Tower City at 1:00 a.m., but the festival funds four additional trains that leave at 1:35 a.m.

HILLSBOROUGH AREA REGIONAL TRANSIT AUTHORITY, TAMPA, FLORIDA

The Hillsborough Area Regional Transit Authority (HART) is a mid-sized transit agency serving the public transportation needs of the greater Tampa area in Hillsborough County, Florida (shown in Figure 32). The service area has a population of approximately 1.2 million. HART provides fixed-route local and express bus service, door-to-door paratransit service, and flex-route neighborhood connector service. It recently implemented a bus rapid transit line and manages the TECO streetcar in downtown Tampa.

The great recession had a negative effect on HART, though not as severe an impact as that experienced by Community Transit or the Greater Cleveland Regional Transit Authority. HART's total operating budget increased only slightly from $58.4 million in FY 2008 to $60.7 million in FY 2012. Given the effects of higher costs for fuel and health insurance, hours of service were decreased from 677,380 in FY 2008 to 651,504 in FY 2012. However, ridership increased substantially from 12,587,000 passenger trips in FY 2008 to 14,654,000 in FY 2012 (16.5%), resulting in some of the most impressive efficiency gains in the country. The information provided here is taken from the survey the agency completed for this synthesis and through follow-up e-mail communications with Philip Hale, the General Manager of HART.

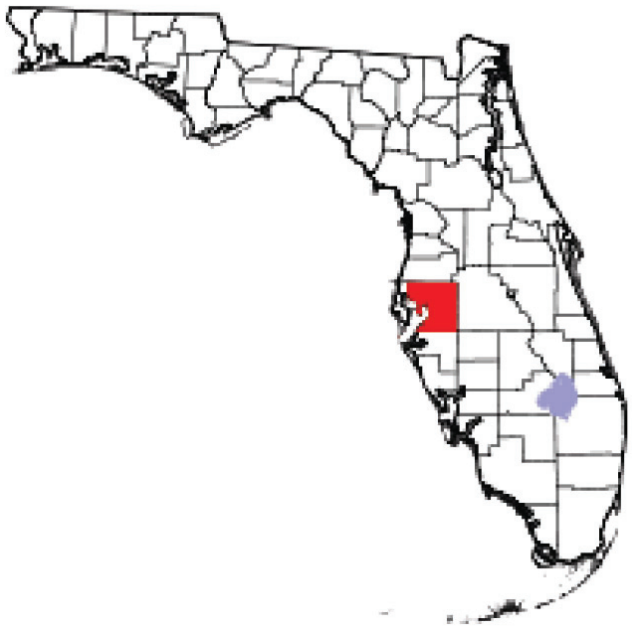

FIGURE 32 Map of Hillsborough County, Florida (*Source*: Wikipedia).

HART defines "transit effectiveness" as follows:

> For HART, "transit effectiveness" is defined as the agency's ability to maintain current service levels, both in fixed-route and paratransit, in a fashion that meets not only the needs of the passengers, but also delivering that service in an economical, cost-effective manner. HART focuses on enhancing service on existing routes to make the service more attractive and a competitive option for transportation. While doing so, HART focuses on the fundamentals; that is, providing high-quality bus service and ADA-compliant paratransit service, operating within its financial means by providing service that is sustainable over the long term while continuing to implement cost efficiency improvements in the delivery of service, the development of capital projects, and supporting regulatory administrative programs. To support transit effectiveness, HART ensures sufficient resources are directed at capital projects by maintaining assets in a state of good repair, completing accessibility improvements at all bus stops and other transit facilities, and looking for opportunities to secure funding for projects that enhance access to transit, maintain assets, improve service reliability, and address environmental and sustainability initiatives. HART also routinely evaluates current service to ensure that it meets demand as projected, and that the

> agency is investing taxpayer resources in the county in an equitable as well as effective fashion.

HART defines a "financially sustainable" system as follows:

> A "financially sustainable" transit system is one that lives within its means, balancing service levels with available revenues, and develops a "rainy day" approach to establishing reserves for the future in case of revenue shortfalls, emerging infrastructure needs, or service expansion or enhancement. It could be argued that the real tools needed for fiscal sustainability are more corporate philosophy in the arena of strategic planning than tangible tools. A strong edict on strategic planning, both for service and financial management, provides a baseline by which all decisions, short and long term, can be measured, analyzed, and evaluated. Without clear strategic focus, a transit organization can spin its wheels, consistently providing funding for underperforming routes, expansion that doesn't meet the needs of the community, or investing in capital or the next hot topical project that doesn't align with the core strategic goals of the organization.

Maintaining Transit Effectiveness Through Administrative Actions Addressing Health Care Costs and Employee Availability

HART negotiated with its workforce to require employees to collectively pay an additional $750,000 toward health care benefits. The agency also decided to change from a fully insured health care plan to a self-insured health care plan and realized a savings of $1.3 million a year. HART established an employee wellness committee composed of representatives from both bargaining and no-bargaining staff to collaboratively develop and implement programs and activities targeted at producing a healthier workforce, thereby reducing health care costs. Employees can participate for free in the wellness program, and they receive incentives to participate, including grocery gift cards and eligibility for prize drawings at wellness program events. The responsibility for administering the Family Medical Leave Act was outsourced to a third party with specific expertise, resulting in a decline in unplanned/unscheduled leave and reduced overtime expenses associated with such leave. HART is also considering establishing a modified duty program for employees absent as a result of workers' compensation issues.

Operations and Service Planning Initiatives to Reduce Costs and Increase Efficiencies

HART did not report establishing any new process beyond public meetings to collect input from the public as it made changes to service hours throughout the system. However, it engaged in considerable analysis of system performance through a comprehensive operations analysis, automatic passenger counters, and an automated vehicle location system. Information gathered from these sources allowed the agency to identify how service hours could be redistributed from routes without strong ridership to those that needed more capacity in a way that not only avoided losing passengers but resulted in substantial increases in ridership. Reduced frequency in low-productivity areas and the elimination or merger of low-density routes saved approximately $4 million annually.

HART reduced deadhead mileage and operator travel times through creative scheduling, thereby further reducing unproductive operations expenses. The agency also selectively consolidated bus stops to make service slightly faster and more attractive. This careful reallocation of resources from nonproductive to productive routes resulted in an increase in passengers per hour from 21 in FY 2008 to 25 in FY 2012, as well as increases in passengers per mile and per capita.

HART's operations staff engaged in a number of other activities to help reduce costs, including the following:

- Conducting safety and security activities, such as threat and vulnerability assessments, safety reviews, and training in-house to save on consultant/contractor fees
- Creating several committees to review safety processes and procedures to mitigate issues that arise so as to not have costly repairs or incidents
- Instituting a risk assessment for environmental compliance.

Maintenance Initiatives to Reduce Costs and Increase Efficiencies

HART maintenance managers reported saving money in the following ways:

- LED lighting installed at the University Area Transit Center (estimated annual savings of $2,040)
- Installed larger trash compactor to reduce the number of trash compactor pulls (estimated annual savings of $8,000)
- Recycling used oil (estimated annual revenue of $15,600)
- Recycling scrap metal (estimated annual revenue of $6,000)
- Purchased 19 cost-efficient paratransit minivans instead of cutaways (estimated one-time savings of $950,000)
- Better fuel economy with new paratransit minivans (estimated annual savings of $52,478).

Improving Transit Effectiveness Through Marketing of Advertising Opportunities

As most transit agencies have done, HART has sold advertising on buses and shelters for many years. In March 2011, when the contract for selling advertising space came up for renewal, HART entered into an agreement for transit

advertising revenue on its bus fleet with a different company, Direct Media USA. During its first year, the company surpassed its guaranteed revenue goal of $375,000 by 53%. Actual revenue to HART was $575,000. As noted in the literature review, HART awarded a new advertising generating contract in December 2012 to Commuter Advertising through which the existing on-board annunciation system is used to sell 10- to 15-second advertising announcements that can be scheduled systemwide, multiroute, individual route, by bus stop, by time of day, or even by language. This system will be installed at no cost to HART. The contract terms are 3 years with two 1-year options. While the guaranteed revenue per year is $12,000 ($60,000 over 5 years), projected revenue for HART over the 5-year period is $459,900. In addition, in 2012 HART and Tampa Historic Streetcar, Inc., amended their advertising policy to include alcohol and cigar advertising on the streetcar only. As a result, more than $96,000 in new advertising revenue will be earned on an annual basis.

Improving Transit Effectiveness Through Strategic Use of Capital Funds

HART's capital program includes revitalization and build-out of many outdated facilities that will result in reduced operating costs, including the following improvements:

1. The 21st Avenue Operations Building will be LEED-certified. Coupled with consolidation of staff into the new building from separate temporary facilities, this will produce projected operations and utilities cost savings up to 25% over baseline before the project's completion.

2. Build-out of the Ybor Streetcar Facility (which houses HART's administrative staff) will include replacing an inefficient HVAC system and insulation, and upgrading access control systems and lighting, with projected savings of 10% in energy costs.

3. The impending construction of a CNG fueling station will allow HART to replace its diesel vehicle fleet with more efficient and cost-effective CNG-powered vehicles. Current pricing of CNG is approximately $1.50–$2.00 less per gallon equivalency than diesel fuel. HART believes CNG will emit fewer pollutants and lower the cost of engine maintenance, and will provide a minimum savings of $16,000 per day in fuel costs alone when the full fleet is converted.

4. Upgrades to the heavy maintenance/preventive maintenance facility's heating, ventilation, and lighting systems clearly reduced energy costs. In addition, HART reports that the increased lighting and the installation of radiant heating systems have resulted in a major upgrade in working conditions for the maintenance staff that services and maintains buses, vans, and other vehicles in these structures. Productivity and the quality of work have increased, and reductions in employee health issues have resulted in cost savings.

5. The Yukon transfer center was renovated, which included demolishing and replacing the existing driver break room. It now includes a new public restroom facility with low-flow toilet fixtures, LED lighting and high-efficiency split-system air conditioning, and four additional bus bays. The bus canopy system was reroofed and all canopy lighting was replaced with energy-efficient LED lights. Operating costs are estimated to be reduced by 10% to 15%.

CHAPTER FIVE

CONCLUSIONS AND AREAS OF FUTURE STUDY

CONCLUSIONS

This synthesis examines the many ways transit agencies have reduced their costs and generated new revenues to help provide as many dollars as possible to maintain or increase service and thereby maintain their effectiveness. Forty transit agencies completed the survey, representing an 87% response rate.

Transit agencies throughout the country have responded to the challenges they have faced as a result of reduced revenues from traditional sources caused by the great recession. Virtually every function in transit agencies (planning, operations, maintenance, marketing, paratransit, finance, and administration) has identified and implemented new ways of fulfilling its responsibilities that have either saved money through new efficiencies or generated new, nontraditional revenues. Although these savings and new revenues are not usually enough to replace the revenues that are lost in a bad economy, they are nonetheless significant. Every dollar saved or newly earned translates into fewer reduced service hours, the retention of existing service, or, in some cases, new service in the community. Through these actions, transit agencies help themselves maintain their effectiveness as providers of mobility. They also demonstrate to the communities they serve that transit managers are doing all they can with the assets (equipment, facilities, employees) they manage to help avoid service reductions, fare increases, or new taxes.

The following are the primary methods of reducing or containing expenses:

1. Implementation of data-driven management systems through which staff can more thoroughly analyze trends and causes of expenses or performance deficiencies, allowing the agency to develop appropriate solutions that are driven by facts rather than best guesses or anecdotal information, resulting in considerable savings and improved service to the public.

2. Engaging in performance benchmarking with peer agencies to identify shortcomings and opportunities for improvement.

3. Reorganizing to create flatter agencies with attendant reduction of management positions and consolidation of functions under fewer managers (though this comes with risk of burnout), and the consolidation of facilities where appropriate.

4. The strategic use of capital funds to reduce operating expenses, such as installing or building new energy-efficient systems, purchasing more fuel-efficient vehicles, or building new LEED-certified facilities.

5. Reducing energy and fuel use through programs such as regenerative power, electrifying bus cooling systems, reduced idling, energy audits, and rate structure analysis, and participating in base interruptible electric utility programs to reduce electrical rates and utility bills.

6. Right-sizing vehicle fleets for the level of demand that exists and using more fuel-efficient vehicles for every type of bus or van service and other agency support vehicles.

7. Improved management of health care costs through self-insurance, high-deductible programs rather than premium-based co-pay programs, and opt-out programs for employees with access to other health plans.

8. Better management of workers' compensation claims and family medical leave through specialized expertise, usually provided by third party administrators, as well as implementation of safety and wellness programs.

9. Improving employee availability through more emphasis on monitoring and controlling absenteeism, including implementation of light duty programs for those on workers' compensation leave.

10. Contracting for a variety of functions (e.g., fixed-route bus, rail, and paratransit services) if healthy competition exists, political support is present, and contract management skills are sufficient.

11. Modification of outdated work rules, changing the payment for overtime to apply after 40 hours a week rather than after 8 hours a day, and more use of part time operators to help transit agencies reduce costs.

12. Limiting and sometimes reducing paratransit expenses through more disciplined determinations of eligibility and the establishment of eligibility centers, travel training, scheduling software, mobile data terminals, no-show policies, the use of taxis for meeting peak demand, interactive voice response technology, videos to show travel options, and partnerships with nonprofit organizations.

13. Using optimization software that produces more efficient fixed-route scheduling and run cutting, and reduces deadhead mileage.

14. Using advances in office technology to create efficient data warehousing, server virtualization, and thin clients, all of which save agencies time, effort, energy, and money, and provide data for better decision making.

15. Using digital video cameras to capture activity in and around a bus to counter false injury claims and enhance security, and using pedestrian alert audio technology to help avoid collisions with pedestrians at intersections.

16. Using training simulators and computer-based learning tools to save time and fuel costs.

17. Using social media and websites to help reduce traditional marketing activities and expenses, and provide more real-time information to passengers through e-mails and texts, while taking advantage of automated trip planners and interactive voice response systems to free customer service agents to engage in providing information through social media outlets.

18. Using maintenance performance software, staying current on warranty recovery, establishing just-in-time inventory systems, contracting out some repairs while bringing others in-house, modifying work shift hours and personnel based on when buses are most needed, and changing work rules where appropriate and feasible.

The following are the primary means of earning new revenues:

1. The sale of transit-controlled venues for advertisements (both visual and audio) in new ways, such as digital messages, train wraps, light-emitting diode (LED) signs on buses, advertisements on agency websites and Wi-Fi splash pages, naming rights to stations and routes, billboards on transit agency property, "station domination" (providing exclusive rights to individual businesses to turn a station into a significant advertisement), and selling space on virtually any surface or in any area the transit authority controls.

2. Leasing space within transit corridors to communications firms for fiber-optic lines, and leasing office space that is empty because of staff reductions.

3. Partnerships with private entities such as business parks, hotels, hospitals, casinos, shopping malls, professional sports venues, apartment complexes, museums, and downtown business districts that help pay for services that benefit the businesses as well as the general public.

4. Partnerships with other public organizations such as universities, local municipalities, military bases, local school districts, convention centers, commuter assistance programs, and social service agencies that help pay for new service that is also available to the general public.

5. Increases in farebox revenue from additional ridership because of better analysis of utilization patterns and service standards that support strategic reallocation of service from low-demand areas to routes that require additional capacity or improved reliability, and from comprehensive operations analyses that often identify new service patterns and methods of serving communities that will attract more ridership.

AREAS OF FUTURE STUDY

The development of partnerships with a variety of public and private organizations has brought in additional revenue for transit agencies and has resulted in additional service and ridership. Many transit agencies around the country have reached agreements with universities in their communities to serve as the primary provider of public transportation to students, faculty, and administrative staff for transportation both on and off campus. Conferences dealing with this kind of partnership are now held, reports have been written, and a considerable amount of information is exchanged among transit agencies that engage in this activity. However, a similar body of knowledge is not available regarding agreements between local public schools and public transportation agencies in the United States. Some of the agencies responding to the survey for this synthesis reported that they had reached agreements with their local school systems (such as middle schools and high schools) to be the primary provider of transportation service to local school students. However, there is little information available on the structure of such relationships and continuing uncertainties as to the legality of providing such service. It is an area worthy of continued investigation and clarification. Developing such services

can help local school districts with their own tight budgets by relieving them of the responsibility of providing some or all of their yellow bus service. This would also produce increased revenue and ridership for public transportation agencies. A report prepared for the Canadian Urban Transportation Association in 2000 found that of the 23 transit agencies that had reported increases in ridership from 1990 to 2000, 19 had worked closely with their local school boards to accommodate students for school transportation purposes (*76*). Many details need to be addressed when such arrangements are made. Some partnerships might be formal, while others can be informal. A synthesis on this topic in the United States would be very timely, as both school districts and public transportation agencies will almost certainly deal with tight budgets in the future, and both might be in a position to benefit from partnerships in transporting students.

In addition to the downturn most transit agencies experienced because of the national economy, some agencies realized that they had a more systemic challenge in terms of long-term financial sustainability. The Metropolitan Transportation Commission of the San Francisco Bay Area launched the Transit Sustainability Project to examine trends and identify issues as a first step toward financial sustainability. The initial findings of this project indicated that operating costs among the Big Seven transit agencies in the Bay Area increased 83% from 1997 to 2008, while service hours increased only 15% and ridership increased only 7% (*77*).

While the situation in the San Francisco Bay Area might be among the more severe, it is not inconsistent with the overall trends in the transit industry in the United States. Virginia Tech researcher Ralph Buehler summarized the situation in an article comparing the output of transit investments in the United States to those in Germany; these two industrialized western countries have approximately the same per capita income and many other similarities, including a thriving automobile industry. While fuel prices and taxes on cars are significantly higher in Germany, many reforms have been implemented in that country to dramatically increase the efficiency of transit services, resulting in a much higher market share for transit.

> Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), subsidies for public transport in the USA have increased considerably: from $14 billion in 1991 to $32 billion in 2007 (APTA 2009). Even adjusted for inflation, this constitutes a 50% rise in annual funding for public transport. At first glance, it appears that increased funding was successful. Over the same period, vehicle kilometers of public transport supply rose by almost 20% and passenger trips increased by 16% (APTA 2009). However, controlling for population growth, public transport passenger kilometers and trips per capita have hardly increased at all. Moreover, the share of operating expenses covered by farebox revenue fell from 37% in 1992 to less than 33% in 2007 (APTA 2009). Public transport in Germany captures five times as high a market share as in the USA. (*78*)

More research could be done to address the systemic issue of rising costs in the transit industry to help ensure its viability and its competitiveness among public services seeking public funding.

Another area for future study is how transit agencies are dealing with the cost of pension plans. A number of transit agencies will find it challenging to maintain the same level of pension benefits that have been provided in the past without cutting service or raising fares.

Finally, it would appear that researchers might consider revisiting the Simpson-Curtin elasticity model, which addresses how ridership responds to increases and decreases in fares. The general rule of thumb proffered by the model is that ridership will decrease approximately 3% for every 10% increase in base fare. However, many transit agencies increased their fares during the great recession to address the budget gaps caused by reduced property and sales tax revenues without losing ridership. Many survey respondents indicated that their passengers clearly preferred fare increases to reduced service in order to balance budgets. Some agencies even gained ridership with increased fares, in spite of maintaining the same level of service or reducing it. A number of factors, such as higher unemployment and underemployment, higher gas prices, and a new attitude toward transit among younger adults have no doubt affected travel behavior, requiring a recalculation of fare elasticities for public transit agencies.

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APPENDIX A

Questionnaire/Survey Instrument

The following questionnaire was sent to 46 public transportation agencies in the United States. The questionnaire could be completed in hard copy or through a weblink. Forty of the 46 agencies provided responses.

QUESTIONNAIRE/SURVEY QUESTIONS—MAINTAINING TRANSIT EFFECTIVENESS UNDER MAJOR FINANCIAL CONSTRAINTS—TCRP PROJECT SA-30

Name of your agency?_____

Your name and contact information (phone and e-mail)? _____

What is the size of your agency by peak vehicles (including directly operated and contracted bus, rail, and paratransit vehicles)?

Large (500+ vehicles)

Medium (100–500 vehicles)

Small (less than 100 vehicles)

1a. What was your total operating budget in FY 2008 (for all service including directly operated and contracted)?

1b. What was your total operating budget in FY 2012 (for all service including directly operated and contracted)?

1c. What was your capital budget in FY 2008?

1d. What was your capital budget in FY 2012?

2a. What were your total directly operated service hours in FY 2008?

2b. What were your total contracted service hours in FY 2008?

2c. What were your total directly operated service hours in FY 2012?

2d. What were your total contracted service hours in FY 2012?

3a. What were your passengers per hour for all your fixed route service in FY 2008? (Please round to nearest whole number.)

3b. What were your passengers per hour for all your fixed route service in FY 2012? (Please round to nearest whole number.)

4a. What was your total annual ridership in FY 2008?

4b. What was your total annual ridership in FY 2012?

5. If you decreased service between FY 2008 and FY 2012, did you....

- ☐ decrease span of service (hours during the day)
- ☐ decrease weekend service
- ☐ reduce frequency of service (headways)
- ☐ reduce service on low demand routes
- ☐ eliminate routes
- ☐ Other, please specify:

6a. In keeping with the title of this TCRP project, how do you define "transit effectiveness?"

_____

6b. Is your definition of "transit effectiveness" part of the goal structure driving your organization?

☐ Yes

☐ No

6c. If you answered yes to question #6b, how are those goals articulated and translated into implementation?

7. Please identify what you think a "financially sustainable" transit system is, what tools you need to achieve such a system, and how realistic it is to obtain such tools.

8a. Have you put any program in place to receive structured input from your ridership and/or your community to advise them of the fiscal stress and to ask them what their preferences would be if you had to reduce service (e.g., increase the fare rather than cut service, reduce frequency versus reduce span of service, etc.) or as you are planning new service?

☐ Yes

☐ No

8b. If you answered yes to question #8a, what were the results of seeking such input, what actions have you taken as a result, and what were the results in terms of transit effectiveness?

9a. Have you modified how your agency is organized as one means of reducing costs and possibly improving efficiency?

☐ Yes

☐ No

9b. If you answered yes to question #9a, please succinctly describe the reorganization.

9c. If you answered yes to question #9a, were there any lessons learned that could be shared, and has there been evidence of staff burnout?

10. Would you say you are _____

☐ Doing more with less resources

☐ Doing the same with less resources

☐ Doing less with less resources

☐ Doing more with the same resources

11a. Have you implemented any new form of managing through the use of better data (e.g., the TransitStat program in Cleveland, Six Sigma process in Miami, ISO 14001 certification in Salt Lake City)?

☐ Yes

☐ No

11b. If you answered yes to question #11a, please describe the process you used so that others can understand well enough to consider using it. What have been the results?

11c. If you answered yes to question #11a, how and why did you come to implement this more data-driven management technique?

11d. If you answered yes to question #11a, how much effort and/or resources are required to conduct the method you implemented?

12a. Did you put into place any incentives for your managers and employees to help find ways to raise revenues or reduce expenses without harming the best interests of your passengers?

- ☐ Yes
- ☐ No

12b. If you answered yes to question #12a, what were the incentives that you used?

12c. If you answered yes to question #12a, what were the results?

12d. What other actions have been taken to improve your fiscal status through collaboration with your workforce (e.g., gainsharing)?

13a. What labor contract provisions have you addressed to maintain effectiveness?

- ☐ Wage modifications
- ☐ Extending length of time to reach top of the pay range
- ☐ Increased contribution by employees to health benefits
- ☐ Elimination of COLA
- ☐ Work rule modifications, please specify: _____
- ☐ Other (please specify):
- ☐ N/A

13b. If you modified any of your labor contract provisions, what provisions were changed and how much was saved with the changes?

13c. Have there been any negative or positive consequences to the quality of your service or in your labor/management relationship as a result of the labor negotiations or changed work rules?

- ☐ Yes
- ☐ No

13d. If you answered yes to question #13c, what were the consequences?

14a. Have you seriously considered, or actually implemented, any outsourcing of any functions:

- ☐ Vehicle operations
- ☐ Vehicle maintenance
- ☐ Facility maintenance
- ☐ Transit management
- ☐ Marketing
- ☐ Administration
- ☐ Other, please specify: _____
- ☐ N/A

14b. What have been the results of each of your outsourcing efforts?

15a. Have you found ways to decrease or better control the cost of insurance (health, liability, workers comp, etc.) at your agency?

- ☐ Yes
- ☐ No

15b. If you answered yes to question #15a, please provide details on what was done and what the estimated savings have been.

16a. In terms of bus/train operational productivity, have you taken any of the following steps to improve service efficiency?

- ☐ Comprehensive operations analysis
- ☐ Service design changes
- ☐ Utilization of Automatic Passenger Counting (APC) data
- ☐ Utilization of Automated Vehicle Location (AVL) data
- ☐ Runcutting software
- ☐ Use of service standards
- ☐ Techniques to reduce dwell time (reducing number of bus stops, traffic signal priority, all door boarding, etc.)
- ☐ Other, please specify: _____
- ☐ None of the above

16b. What was the effect of each of the techniques that you implemented in question 16a in terms of savings or improved ridership?

16c. In reference to question #16a, have you been able to demonstrate any of the following efficiencies:

- ☐ Increased passengers per mile
- ☐ Increased passengers per hour
- ☐ Increased passengers per capita
- ☐ Other, please specify: _____
- ☐ None of the above

17a Have you entered into any partnerships with any of the following organizations that have helped share the cost of providing new or existing service?

- ☐ Local schools
- ☐ Universities
- ☐ Business parks
- ☐ Hospitals
- ☐ Museums
- ☐ Attractions
- ☐ Casinos
- ☐ Military bases
- ☐ Downtown business interests
- ☐ Local governments
- ☐ Other, please specify: _____
- ☐ None of the above

17b. If you have entered partnerships noted in question #17a, please provide specifics on those agreements and what they have meant in either new revenues or reduced costs and the effect on transit ridership.

18a. Have you implemented efficiencies that you have discovered from other transit agencies?

- ☐ Yes
- ☐ No

18b. If you answered yes to question #18a, what techniques did you learn and what were the results?

19. How has new technology in any area of your agency helped to reduce your costs and/or improve your efficiency? (Please provide specifics in terms of what was done and the financial impact on your budget.)

20a. Have you had success in implementing new ways of managing absenteeism due to sick leave, workers compensation, FMLA?

☐ Yes

☐ No

20b. If you answered yes to question #20a, please provide specifics and financial results.

21a. Have you been able to reduce your operating costs through strategic use of your capital funding?

☐ Yes

☐ No

21b. If you answered yes to question #21a, please provide specific applications and financial results.

22a. What are you capital needs in dollars over the next five years? (enter numerals only—no dollar signs, rounded to the nearest whole number).

22b. What is your projected capital funding over the next five years? (enter numerals only—no dollar signs, rounded to the nearest whole number).

23. What new ways have you discovered to take advantage of your equipment, facilities, or employees to earn new revenue (e.g., new ways of advertising on vehicles/property, charging owners of recreational vehicles to use your bus wash facilities, charging for CDL training of non-transit-agency people, etc.)? Please be specific in terms of agreements and fiscal results.

Question 24 asks for information from your various major departments. We understand that there might be overlap between departments such as Operations and Service Planning, but please do your best to place your answers in what you believe are the most appropriate departments:

24a. Please provide the most significant steps and actions that your Operations and Safety departments have taken to become more efficient, generate new revenues, and/or reduce costs. Please provide estimates of savings or new revenues.

24b. Please provide the most significant steps and actions that your Maintenance department has taken to become more efficient, generate new revenues, and/or reduce costs. Please provide estimates of savings or new revenues.

24c. Please provide the most significant steps and actions that your Planning and Scheduling department has taken to become more efficient, generate new revenues, and/or reduce costs. Please provide estimates of savings or new revenues.

24d. Please provide the most significant steps and actions that your Marketing department has taken to become more efficient, generate new revenues, and/or reduce costs. Please provide estimates of savings or new revenues.

24e. Please provide the most significant steps and actions that your Finance and Accounting department has taken to become more efficient, generate new revenues, and/or reduce agency costs. Please provide estimates of savings or new revenues.

25. Please describe any other methods you have implemented to notably help either reduce costs or generate new revenues not described in any of your other answers, and please provide the estimated savings or revenues they have achieved. Far from being limited to these suggestions, it could include actions such as reducing utility costs, refinancing debt, safety/risk management improvements, methods to control paratransit costs, procurement methods, being entrepreneurial with your facilities, vehicles, and employees, etc.

26a. Do you see the actions you have taken and the improving fiscal situation allowing you to provide additional service in the near future?

☐ Yes

☐ No

26b. If you answered no to question #25a, why not?

26c. If you answered yes to question #25a, how much new service will be possible and when?

Thank you very much for your generous willingness to participate in this survey! We are sure that the results will be of high interest and practical use to all operating transit agencies.

APPENDIX B

Survey Respondents

The following 40 transit agencies participated in TCRP project SA-30, Maintaining Transit Effectiveness under Tight Financial Constraints, by responding to the survey either through the web-based instrument or by submitting a Word version. The systems are categorized by size and listed alphabetically.

Small Transit System Respondents

1. Arlington Transit (ART)—Arlington County, Virginia
2. Capitol Area Transportation Authority (CATA)—Lansing, Michigan
3. Centre Area Transportation Authority (CATA)—State College, Pennsylvania
4. Everett Transit—Everett, Washington
5. Fort Wayne Public Transit (Citilink)—Fort Wayne, Indiana
6. Galveston Island Transit—Galveston, Texas
7. Go West Transit—Western Illinois University/Quad Cities, Moline, Illinois
8. Northern Arizona Intergovernmental Public Transportation Authority—Flagstaff, Arizona
9. Salem-Keizer Transit (Cherriots)—Salem, Oregon
10. Stark Area Regional Transit Authority (STARK)—Canton, Ohio
11. Star Metro—Tallahassee, Florida
12. UMASS—Amherst, Massachusetts
13. Yuma County Intergovernmental Public Transportation Authority—Yuma, Arizona

Medium Transit System Respondents

1. Akron Metro—Akron, Ohio
2. Capital District Transit Authority (CDTA)—Albany, New York
3. Central Florida Regional Transportation Authority (LYNX)—Orlando, Florida
4. Community Transit—Snohomish County, Washington
5. Foothill Transit—West Covina, California
6. Hillsborough Area Regional Transit Authority (HART)—Tampa, Florida
7. Long Beach Transit (LBT)—Long Beach, California
8. Nashville Metropolitan Transit Authority—Nashville, Tennessee
9. North County Transit District (NCTD)—Oceanside, California

10. Omnitrans—San Bernardino, California
11. Palm Tran—West Palm Beach, Florida
12. Pinellas Suncoast Transit Authority (PSTA)—St. Petersburg, Florida
13. Regional Transit System (RTS)—Gainesville, Florida
14. San Joaquin Regional Transit District (SJRTD)—Stockton, California
15. Samtrans—San Carlos, California
16. Toledo Area Regional Transit Authority (TARTA)—Toledo, Ohio
17. Valley Metro—Phoenix, Arizona

Large Transit System Respondents

1. Chicago Transit Authority (CTA)—Chicago, Illinois (response prepared by the Chicago Regional Transportation Authority)
2. Greater Cleveland Regional Transit Authority (GCRTA)—Cleveland, Ohio
3. King County Metro Transit—Seattle, Washington
4. New York City Transit (NYCT)—New York, New York
5. Pace—Arlington Heights, Illinois (response prepared by the Chicago Regional Transportation Authority)
6. Santa Clara Valley Transportation Authority (SCVTA)—San Jose, California
7. The Bus—City and County of Honolulu, Hawaii
8. TriMet—Portland, Oregon
9. Utah Transit Authority (UTA)—Salt Lake City, Utah
10. Washington Metropolitan Area Transit Authority (WMATA)—Washington, DC

APPENDIX C

Additional Responses to Survey Question #6: "In Keeping with the Title of This TCRP Project, How Do You Define 'Transit Effectiveness?'"

1. I define transit effectiveness in two main categories: slow and steady service improvements and customer focus. In order to make steady improvements, I maintain a very practical, cost-conscious approach to providing the necessary service without the "build it and they will come" mentality. There are so many projects that we could be part of, plus outside pressure (political and otherwise), that are exciting short-term, but would put us into massive debt and harm the organization long-term. The balance is providing the right amount and appropriate types of service that is desired by the customer by constantly answering the question, "Do we go where our customers want to go?" while making the slow and steady improvements to our system as funding allows. (LBT)

2. The RTA maintains a system of performance measures, several of which are key to measuring transit effectiveness: passengers per vehicle revenue mile and passengers per vehicle revenue hour. We also calculate transit capacity utilization and use that as a measure of transit effectiveness combined with efficiency. In addition, we look at measures of solvency to ensure there are sufficient resources to meet budgetary needs. The fare recovery ratio is our primary indicator in this area. The RTA is mandated by state law to maintain a 50% recovery ratio (with certain credits and exclusions allowed in the calculation). We also look at transit effectiveness more broadly in terms of the fiscal health and sustainability of the system from a longer-term 10-year perspective. We have a 10-year financial model that forecasts operating revenue, public funding, and expenses to determine whether the level of service being provided is sustainable. This 10-year outlook is also required by state legislation. (CTA)

3. Transit effectiveness should be associated with performance indicators that measure productivity, effectiveness, and efficiency as well as customer service satisfaction. (SJRTD)

4. Transit effectiveness is measured based on some combined definition of service provided (in terms of hours, miles, or percentage), that the transit service area covers the total area, and a measure or measures of the service performance such as passengers per hour. (Palm Tran)

5. Transit effectiveness is defined by the agency's strategic goals: (1) Build and Maintain a Premier Safety Culture and System, (2) Meet or Exceed Customer Expectations by Consistently Delivering Quality Service, (3) Ensure Financial Stability and Invest in Our People and Assets, (4) Improve Regional Mobility and Connect Communities. We evaluate our transit effectiveness through performance measures and targets linked to each strategic goal. (WMATA)

6. Provide the most efficient, productive transit service possible. (UMASS)

7. Connecting people with the places they want to go. Our strategic operations plan, called the 3C's plan, calls for an operations model of high-frequency corridor service between transit centers and supplemented by circulator service at each transit center. The three C's: centers, circulators, and corridors. The plan is to provide a series of smaller buses that travel through neighborhoods or other areas and bring riders to the transit centers. There they transfer to another circulator or a corridor route or conduct their business in the vicinity of the transit center. (Salem Kaiser)

8. Boarding rides per service hour and cost per ride. (TriMet)

9. Delivering the level and quality of service in accordance with the agency's adopted goals and objectives. (Gainesville RTS)

10. Maximizing ridership with available funding. (Nashville MTA)

11. Transit effectiveness is documented delivery of measurable, clearly defined, community-supported service goals. (NAIPTA)

12. Providing public transit service that is safe, reliable, efficient, and popular. Service effectiveness is evaluated by Specific, Measureable, Achievable, Relevant and Time-phased performance indicators that offer accountability to METRO's Board of Trustees and taxpayers. (Akron Metro RTA)

13. Ability to efficiently and effectively carry the most possible people safely. (Go West Transit)

14. Servicing the largest percentage of ridership utilizing selected modes with maximum utilization of drivers and allowable payroll budget. (Galveston Transit)

15. Providing a broad span of service, tailoring the service density to ridership demand, operating efficiently, and offering those amenities valued by the customers, while meeting the needs of multiple constituencies both inside and external to the agency. (Centre ATA)

16. Services that meet established performance standards, which include subsidy per passenger and passengers per hour. (Yuma County Transit)

17. Transit effectiveness is moving the highest number of passengers efficiently and safely. (Foothill Transit)

18. Arlington County's adopted Master Transportation Plan, including the Transit Element, has several measures of transit effectiveness, including the proportion of the county within walking distance of transit service; progress toward achieving the Primary Transit Network (PTN) objectives on major corridors of an 18-hour service span every day with 15-minute service frequencies; 30-minute peak service frequencies on the Secondary Transit Network (STN); Maintenance of a 35% Cost-Recovery on the PTN and 20% Cost-Recovery on the STN; and Maintenance of 35 Passengers per Revenue Hour on the PTN and12 on the STN. (Arlington Transit)

19. Transit effectiveness is defined as a transit service meeting customer demand within a service area by delivering transit service that maximizes the use of available funding to provide transit service for the community. (North County Transit District)

20. Transit effectiveness should be associated with performance indicators that measure productivity, effectiveness, and efficiency as well as customer service satisfaction. (San Joaquin RTD)

21. Transit effectiveness is being able meet the communities' growing transit demands while effectively and efficiently managing available resources. (Omnitrans)

APPENDIX D

Additional Responses to Survey Question #7: "Please Identify What You Think a 'Financially Sustainable' Transit System Is, What Tools You Need to Achieve Such a System, and How Realistic It Is to Obtain Such Tools."

1. Financial sustainability for a publicly funded transit system is defined as a service plan that can be continued for at least 5–10 years based on conservative revenue and expense estimates. Sustainability requires a dedicated funding source with a minimum 10–20 year term, highly competent financial and operational management, and solid elected official and community support. When present, these three sustainability elements are self-reinforcing. However, if any one component is missing, the system is at risk and cannot be considered sustainable until all components are restored. (Northern Arizona Intergovernmental Public Transportation Authority)

2. In addition to maintaining an appropriate amount of emergency reserves, a financially sustainable transit system incorporates the principles outlined in Question 6a: slow and steady service improvements and customer focus. Simply put, if we can't afford to do something above and beyond our current level of service, we wait until additional resources flow in or we actively seek out special grants. With the fact that we are using taxpayers' money always top of mind, we take a very commonsense and financially prudent approach to running the day-to-day operations. We scrutinize every major purchase and at times rule out "wants" in favor of "critical needs." This approach lends itself to providing the tools needed to achieve such a system, which becomes a reality with continuous monitoring. (Long Beach Transit)

3. Financial sustainability means there is a long-term (5-year+) financial outlook that includes expenditure and revenue forecasts that appear feasible, attainable, and sustainable. (The Bus)

4. Ensuring that the costs of providing transit do not exceed all revenue. Costs and revenues are monitored to achieve this goal. (New York City Transit)

5. A financially sustainable transit system is a system with a dedicated and balanced revenue stream. Tools needed are a menu of dedicated revenues to fund the operating and capital needs. With public and legislative support, I feel it is realistic to obtain. (UMASS)

6. Financially sustainable is defined as an agency that has the resources to provide the service today and into the future. It would have funding resources that are dedicated to transit without having to be appropriated annually at the state and federal level, and have a local source of funding that does not have to be renewed every 5 years. It would also have tools to expand operating and capital funding as demand for transit grows. (Capitol Area Transportation Authority)

7. Identifying performance standards/benchmarks for subsidy per rider or boardings per mile. Having revenue generated from a variety of sources, which do not sunset, to mitigate economic downturns and minimize dependence on a single revenue source. The state legislature must act to allow the agency to diversify its revenue sources, which at this point is very unlikely. The legislature is also hesitant to authorize tax measures that do not sunset, so every 20 years the agency is essentially in danger of losing all of its revenues. (Valley Metro)

8. A financially sustainable transit system would feature sufficient growth in public funding and operating revenue to cover reasonably increasing operating expenses without one-time fixes and a fully funded capital program to achieve and maintain a state of good repair. In the Chicago region, transit is funded by a dedicated sales tax and real estate transfer tax; financial sustainability would require consistent regional economic growth to support tax revenue for transit, regular fare increases linked to CPI, labor contracts with modest wage increases and work rule improvements, pension reform, effective management of fuel expenses, a stable state fiscal outlook, and an increased federal and state commitment for capital funding. While it may be possible to achieve each of these requirements as a stand-alone item, the probability of achieving all of them concurrently is very low. (Chicago Transit Authority)

9. Ability to provide a level and quality of service to meet the needs of a community. Ability to maintain equipment and facilities in a state of good repair. Ability to retain a qualified, professional workforce. Ability to keep transit fares affordable. (Utah Transit Authority)

10. A financially sustainable transit system is an agency that provides a level of service that can be maintained for a 5-year period based on a conservative financial forecast. It is not an agency that makes continuous small cuts each year. You need accurate and reliable financial forecasting tools, a financially responsible CBA, and a plan for slow growth. It is realistic to achieve if that is your philosophy. (Salem Kaiser Transit)

11. A "financially sustainable" transit system is one that prudently aligns ongoing operating costs with available ongoing resources and takes the necessary steps to protect its financial liquidity by building and maintaining reserves. VTA has several policies that work in combination toward developing and maintaining a financially sustainable transit system. The Financial Stability Policy (FSP) was developed by an Ad Hoc Financial Recovery Committee in response to precipitous declines in FY 2009 sales tax revenues and alarming deficit projections subsequent to adoption of the FY 2010 and FY 2011 Biennial Budget. The FSP provides guidance on expenditure prioritization in development of Biennial Operating Budgets and associated financial plans. In addition, the FSP includes key principles to establish a framework for policy direction to the Board of Directors and staff during the creation of the biennial budget and when addressing the structural deficit in VTA's operating budget. The FSP was adopted by the Board of Directors in December 2010. In addition to the policies noted previously, VTA has both an Operating Reserve Policy and a Sales Tax Stabilization Fund Policy that guide the maintenance of a prudent level of reserves which serve to protect financial liquidity. (Santa Clara Valley Transportation Authority)

12. A continuous and stable funding source is the primary tool needed to maintain and sustain a transit system. It is difficult but should be possible to obtain dedicated funding as long as the community agrees that existing and planned transit service is needed. The community should be willing to support long-term transit funding if the expectation is clear and the service delivered matches that expectation. The service area for funding may be smaller than desired at first but could increase over time with effective transit service delivery. (Gainesville Regional Transit System)

13. A financially sustainable transit system is one that can provide service to meet the needs of growing customer demand with balanced projected revenue and expenditures streams. The primary tools needed are reasonably accurate and reliable cost and revenue projections. (Omnitrans)

14. A financially sustainable transit system would be one that could provide safe, reliable, and frequent bus transportation to a community at a reasonable fare that competes or is more advantageous than the cost to operate automobile. With farebox recovery at a minimum of 25%, a sustainable transit agency will require significant financial support from local and regional governments, as well as state support. Dedicated funding would be advantageous as a backstop to the government support. The other necessary component is for the agency to have access to reasonable amounts of capital funding (federal, state, and local) to enable the agency to maintain and replace its operating fleet within a reasonable useful life. Without government support, a sustainable transit agency would not exist. (Nashville MTA)

15. A "financially sustainable" transit system would keep its costs within an acceptable range relative to revenues. Operating margins would improve over time, resulting from continuous operating cost containment and operating revenue expansion. Tools needed would include an appropriate set of financial goals, targets and performance measures, along with supportive policies and collective bargaining agreements. (Akron Metro)

16. A financially sustainable system is one in which financial resources are such that services provided to customers are not at risk of reduction or elimination in a short or intermediate time frame because of adverse development of financial variables such as unexpected changes in revenues, expenses, capital requirements, debt obligations, etc. A financially sustainable system is able to produce a balanced budget on average over the long term by funding, from current revenues, all service extension/expansion, current expense and expense obligations, current capital expense, reserves for preservation of capital infrastructure, reserves for growth in capital infrastructure, debt service, and reserves for unanticipated adverse financial developments. Tools/skills needed to achieve such a system include:

    - Fiscal prudence and literacy among elected governing boards and executive leadership.
    - Integrated financial plans including short term (1–3 years); intermediate term (3–6 years); and long range (6–20 years).
    - Funding sources that are reliable, stable, indexed to growth in demand, and dedicated to the public transportation mission.
    - Tools to better manage growth in the overall cost structure and particularly the cost of employment: wages, benefits, and unfunded mandates for new and expanded employer-paid programs. Also, better tools are needed to manage abuse and fraudulent use of these programs, as in chronic abusers of paid leave, workers compensation and FMLA benefits. (Community Transit)

17. A financially sustainable transit system has access to predictable, dedicated, growing sources of funding that, when combined with fares and other revenues, are sufficient to reasonably meet the needs of its riders and other constituencies. The tools needed to attain this goal include the establishment of strong community support, the maintenance of solid relationships with funding partners, the adherence to sound service level and fare revenue policies, and Board and management commitment to prudent stewardship of available resources. These tools are obtainable, but it takes a lot of work over a long period of time. (Centre Area Transportation Authority)

18. A financially sustainable transit system would be characterized as having a broad-based funding structure so that it could survive negative changes in economic conditions without negatively impacting passengers. Tools that would allow such a funding structure include the ability to allocate funding as needed to and from capital to operating purposes as needed based on local conditions. To achieve such a system would require significant changes in federal and state legislation. (Toledo Area Regional Transit Authority)

19. A financially sustainable transit system is one that can operate within its budget and have reserves available in case of emergencies. Tools needed are a conservative budget that is realistic and can be adhered to. This requires careful planning and constant observation and analyzing of the routes. (Foothill Transit)

20. "Financially sustainable" is a term that varies in the eyes of the local and state elected officials who provide financial support. Educating those officials on the need to support transit and define realistic farebox and other local revenue objectives requires a wide variety of tools and venues, including community development; support for those who cannot transport themselves; comparative comprehensive government subsidy requirements (holistic construction, maintenance, traffic, police, etc.) for walking, ridesharing, transit, and single-occupancy auto; and realization of non-farebox revenue enhancements from increased property tax values and increased sales tax receipts for properties with transit service. These tools are focused on shaping perspective. Whether these tools are realistic depends on the perspectives of the media, elected officials, and key stakeholders, and the willingness of transit officials to engage the public. (Arlington Transit)

21. A financially sustainable transit system provides a level of service at a net cost that best meets customer demand for the foreseeable future, while allowing for reasonable variances in funding levels. (North County Transit District)

22. A transit system is financially sustainable when it is not elastic to drastic changes in revenue levels. Its level of service is designed based upon "normal" and reasonably projected revenue flow. When there is emergence of new funding, excess funding can be allocated to deferred activities outside of providing the core services, but still in support of its core services. (San Joaquin Regional Transit District)

APPENDIX E

Additional Responses to Survey Question #24 Dealing with Transit Efficiency Gains from Operations, Service Planning, and Scheduling

This appendix provides additional information on how transit agencies have made their operations more efficient through better service planning.

The following response was provided by King County Metro in Seattle, Washington:

- *Scheduling efficiencies.* For HASTUS, schedulers made use of more advanced scheduling techniques that were possible in our scheduling software. This required additional training and tool "tuning," but played a key role in trimming roughly $12 million in annual operating costs from our schedules without cutting service to customers. This effort was primarily executed in 2010 and 2011, but the skills/tools added then continue to add benefit in the way we schedule today. Scheduling efficiencies in 2010/2011 also helped reduce peak coach needs by more than 50 coaches.
- *Challenges of scheduling efficiencies.* There were trade-offs with respect to reliability. We've seen agency on-time performance roughly fall about 5 percentage points from 80% to 75% during 2010/2011. We've started to see some rebuilding of the on-time performance measure in 2012, back above 76%, as Metro makes new investments to address service reliability issues.
- *Use of service guidelines, APC data, and more quantitative analysis.* We have collected data through APC for years, but the data have become more important as we implement our new service guidelines. Our APC and AVL data help us track route performance, which is an important part of service planning decision making under the guidelines.
- *Service design.* Reinvesting low-performing services into services with overcrowding, reliability issues, or below-target service levels. Lower-performing services were reduced either in span or by removing less productive portions of the route, or eliminated altogether. Routes were only eliminated if there were adequate service alternatives. Our customer complaints increased as a result of this.
- *Elimination of the ride-free area.* The travel time, farebox recovery and ridership impacts of the elimination of the ride-free area are undetermined at this point. The analysis will not be completed till later this spring. Initial estimates suggested that Metro could increase revenue by $2.2 million in 2013 and 2014, and $2.7 million in 2014, but this is not yet proven.
- *Stop consolidation.* Metro has been implementing stop consolidation efforts in recent years, but with the threat of budget shortages, Metro was able to streamline the process and implement stop consolidation projects more quickly.

The following response was provided by Long Beach Transit in Long Beach, California:

- Service design changes were implemented to better serve California State University Long Beach when we implemented a UPASS program. One example of rerouting was new service to an area with large student housing and activities, resulting in 50% of riders of that route now being associated with CSULB. Ridership on all CSULB-related routes increased from 1,500 boardings/day to 10,000 boardings/day over 4 years. Interlining of routes saves on the number of buses needed to provide service.
- AVL data are constantly being used to tweak runtimes to improve schedule adherence. While it's difficult to quantify what effect this has had on ridership, it is well known that poor schedule reliability is one reason that drives people away from transit, and in our last customer survey the agency received an all-time high score in the question asking about schedule reliability. Proper scheduling can also save money through service efficiencies.
- Run-cutting software put out by GIRO continues to improve with each release. Our upgrade from HASTUS 2004 to HASTUS 2008 has resulted in a pay-to-platform improvement from 1.07 in February 2008 to 1.06 in February 2013. The pay-to-platform ratio is the ratio of the amount of time for which drivers get paid compared with the amount of time they actually work. For example, because drivers are guaranteed 8 hours even if they work less, a driver who worked a 7-hour run and got paid for 8 hours would have a pay-to-platform ratio of 8/7 = 1.14.
- While our service standards are systemwide, they cause us to review routes that fall below standard (such as boardings per vehicle service hour or on-time performance).
- Techniques to reduce dwell time. In September 2012, we segregated routes at two of our busiest stops in the downtown area so that each line only stopped at one of the two stops (the two stops are about 400 feet apart). This move was done to improve safety, reduce congestion, and improve schedule reliability.
- GIS data allow us to analyze passenger boarding/alighting activity in comparison with bus capacity, so we can identify overcrowded and underutilized routes and make appropriate adjustments in service to save money and increase ridership.

On-board survey data provide information on how route changes would impact riders, allowing us, for example, to compare alternative route segments to both save money and improve ridership.

The following information was provided by the Capitol District Transit Authority in Albany, New York:

1. Comprehensive Operations Analysis. We tightened segment times to reduce unnecessary layover times, making a more efficient schedule.

2. We restructured 80% of our routes, combining underachieving ones and eliminating ones that didn't meet criteria.

3. We used both APCs and AVL data when doing the Comprehensive Analysis.

4. We used our run-cutting software to actually make runs longer while downsizing headcounts, which showed a great deal of savings.

5. We consolidated bus stops on all routes to reduce dwell time. Additionally, we are using Transit Signal Priority on our BRT line, and it helps a great deal with controlling schedules. All these actions have resulted in increased ridership percentages of 6% to 8% across the board. They have also contributed to savings because of fewer operators needed to provide the same amount of service hours.

The following information was provided by North County Transit District, serving north San Diego County:

A Comprehensive Operations Analysis is in process.

Service design changes—Mobility Plan implementation of phase 1 in FY 2012 reduced service levels while maintaining ridership. Subsequent phases add back service and have increased ridership.

AVL—Utilized AVL data to assess on-time performance of contractor, and apply liquidated damages when applicable.

Signal priority—Utilized on Route 350, which has improved travel time of the route, thus attracting more riders.

The following information was provided by Valley Metro, serving the greater Phoenix area:

Service Design Changes: As part of the Valley Express Efficiency Assessment, Valley Metro staff met with representatives of member cities and undertook a review of express routes throughout the system. As a result, low-productivity routes were reduced and/or restructured to better serve park-and-rides, or they were eliminated.

Utilization of Automatic Passenger Counters data: APCs on vehicles are used as much as possible. At this time, approximately 40% of buses are equipped with an APC. All light rail vehicles are equipped with APCs.

Utilization of Automatic Vehicle Location (AVL) data: Valley Metro operations staff utilizes ZONAR at schedule change times as a runtime tool. Besides using AVL, staff also rides routes that are operating at a lower runtime goal and routes that receive complaints from either customers or operators.

Use of service standards: Service standards were created as part of the Regional Transportation Plan. Valley Metro reviews these standards for improvements and expansion.

Reducing number of bus stops, traffic signal priority: The standard for bus stops in the Phoenix metropolitan area is ¼ mile for local service. Express or limited service stops are typically 1 mile or less apart in a downtown area. Signal priority is available for our LINK BRT service in Mesa and Chandler.

The following was provided by Community Transit, serving Snohomish County, Washington:

Generally, the object of our planning initiatives is to develop effective and efficient schedules and to operate the system on time and at an affordable cost. We designed service cuts over 2 years eliminating 37% of service yet preserving 88% of total ridership and

96% of weekday ridership. We have reduced the cost per rider and increased overall productivity more than 27%; more than 50% on many routes. Key elements of the service plan are:

- Reduced high-cost services on the edge of the operating day when overhead is high in relation to service demand. Eliminated the earliest and latest services, reducing the amount of time the operating bases are open.
- Reduced trips by feeding multiple long haul routes to a single point for consolidation to a common destination.
- Consolidated trip times and markets on various routes to reduce the number of trips operated.
- Straightened routes (eliminating deviations and loops) to shorten running time.
- Consolidated stops and time points to speed running times.
- Eliminated collector leg of commuter trips where other options were available (e.g., local route options or park-and-ride capacity).
- Analyzed running times and modified routes to better match optimum cycle times.
- Improved coordination between run cutting and manpower scheduling.

Community Transit's system in 2012 carried 27% more people than it did in 2008, with the same level of service. This represents a significant improvement in productivity. Since the start of the great recession, productivity, as measured by boardings per hour, has improved more than 25%.

Developed fare increase recommendations implemented in 2010 and 2013. As part of the strategy to sustain service, regular fare increases are integral to the agency. Beginning in 2013, a fare increase is assumed every 2 years. Increased fare revenue will help offset cost increases.

We negotiated a partnership agreement with the city of Everett and implemented the Swift BRT line, including off-board fare collection and a vehicle designed to reduce dwell times to 10 seconds or less.

The following information was provided by the Northern Arizona Intergovernmental Public Transportation Authority in Flagstaff:

We built a small section of dedicated transitway to provide an advantage to the bus through a congested area. We are also realigning routes to shift from a time-transfer, centralized "pulse" system to several decentralized connection centers distributed around town. We are also evaluating the use of floating layovers to reduce recovery time and give operators a break while also keeping the buses moving. Our definition of a floating layover may not be an industry standard; however, we are experimenting with five buses on a 75-minute route with six operators. This would maintain a 15-minute headway and keep the buses rolling without need for recovery at the end of each trip, while still giving operators a 15-minute break on each 75-minute run.

APPENDIX F

Additional Responses to Survey Question #19: "How Has New Technology in Any Area of Your Agency Helped to Reduce Your Costs and/or Improve Your Efficiency?"

The following information was provided by Long Beach Transit in Long Beach, California:

- From a service perspective, improvements in the run-cutting algorithm implemented in the 2008 upgrade of our HASTUS scheduling software have resulted in an increase in the number of straight runs available without any corresponding increase in costs.
- Information from GFI ridership reports has allowed service to be reduced on poorly performing services in order to be added onto overcrowded services with no effect on ridership and no complaints.
- AVL/GPS helps with on-time performance, more efficient deployment of buses, and increased security for buses and persons onboard.
- Our Interactive Voice Response system and mobile applications have resulted in reduced calls to our telephone information center, allowing staff to assume additional or other responsibilities.
- Our swipe fare cards provide additional ridership data. From an information services perspective, for more than 6 years, Long Beach Transit has been leveraging new virtualization technologies in our data center. Virtualization has allowed us to simplify our infrastructure as we create a more dynamic and flexible datacenter with proven server and datacenter virtualization solutions. Virtualization also helps us reduce capital expenses through server consolidation and reduces operating expenses through automation, while minimizing both planned and unplanned downtime. With automated operations management for the new dynamic virtual infrastructures, we can accelerate service delivery, improve operational efficiency, ensure compliance, and reduce risk.
- With the replacement schedule of 20 servers annually, the consolidation through virtualization has saved approximately $200,000 annually.
- With automation, we're able to "do more with less," thus reducing the need for an additional full-time employee.
- With the smaller environmental footprint through virtualization, we're able to save on power consumption, air conditioning, etc., realizing a savings in power of an estimated $5,000 annually.

The following information was provided by King County Metro in Seattle, Washington:

- During the past 3 years we have completed some major technology projects that enable us to operate more efficiently and provide more and better services to customers. These systems enable us to provide real-time information and other information for customers. We have seen an increase in operating costs as these systems shift from being capital projects to being operational.
- We implemented a subscription service in 2009 that is an extremely efficient method of reaching targeted audiences in a timely manner. The service has grown to more than 50,000 subscribers for transit topics. We're currently sending about 2,500 e-mail and text alerts to subscribers per year. It is just a matter of drafting and sending the message, whether it's about something happening right now or something that is planned for a future time that will impact transit service. While the exact impact on the budget is not known, for a relatively reasonable cost, GovDelivery handles the entire back-end, subscription management, routing, organization, RSS and other social media feeds. If we were trying to do all those things as well, it would cost significantly more in terms of money and other resources.
- Schedulers made use of more advanced scheduling techniques that were possible in our HASTUS scheduling software. This required additional training and tool "tuning," but played a key role in trimming roughly $12 million in annual operating costs from our schedules without cutting service to customers. This effort was primarily executed in 2010 and 2011, but the skills/tools added then continue to add benefit in the way we schedule today.

The following information was provided by the Washington Metropolitan Area Transportation Authority in Washington, D.C.:

The rollout of overtime analytic reports through Cognos business intelligence and performance management software is providing detailed visibility into how we are incurring overtime costs, enabling managers to identify opportunities and strategies for avoiding overtime.

WMATA implemented the Fleetwatch fluid management system. Fleetwatch monitors fluids used and mileage in both our revenue and service fleets. It improves the preventive maintenance process by allowing us to better align our mileage-based preventive maintenance. It also highlights abnormal fluid usage, which allows us to catch problems early and avoid costly corrective maintenance actions.

WMATA upgraded its Trapeze scheduling system. Trapeze creates all the rail and bus revenue service schedules. WMATA is now able to create more efficient schedules that lead to fewer requirements for rail cars, buses, operators, or overtime. Conversely, the reductions can and have been applied to service improvements without the need for additional rail cars, buses, or operators.

WMATA implemented the MicroFocus mainframe virtual environment. WMATA was able to migrate all remaining legacy systems from this environment to a virtual server environment. This allowed WMATA to return its mainframe, saving substantial costs in software licensing and hardware maintenance.

WMATA is in the process of implementing an Electronic Records Management program. To date, this program has eliminated storage requirements for 2,500 physical bus operator files, converting them to electronic records, and is in the process of eliminating the paper forms associated with those files. Similar automation and file-scanning efforts are under way for Worker's Compensation and Procurement. The program's "de-duplication" program (in conjunction with the Data Center and Infrastructure group) will reduce duplicate files stored on shared drives by 70%, slowing the growth in storage costs.

The Data Center and Infrastructure group has implemented a Virtual Desktop Infrastructure that has been used for inauguration support and as a complement to HR staff, who teleworked during their space reconfiguration. This project is in pilot phase and is expected to be further deployed throughout the authority, enabling more efficient management of the extensive desktop environment.

The following information was provided by the Santa Clara Valley Transportation Authority in San Jose, California:

In the last 4 years, the VTA technology group has completed or embarked on a number of deployments and upgrades that had a positive impact on VTA and our customers.

Project 1: Upgraded 149 ticket vending machines (TVMs) to extend the life of the TVMs, add smart card technology, and added credit card capability. Result: Refurbishing the TVMs helped to reduce the number of failures and reduced the amount of cash the TVM has to handle, thus reducing the number of trips to the TVMs. This project also provided the customer the ability to purchase regionwide fare products on the Clipper smart card.

Project 2: Installed high-speed Wi-Fi access on the Light Rail and Express routes. Result: Survey data taken before and after the installation of Wi-Fi showed around an 8% improvement in ridership. We were also able to cover the 4G data cost by selling advertising on the splash page before allowing the user to start surfing the Internet. By installing GPS in the solution, we were able to leverage this installation for our Real-time Arrival solution, thus reducing the cost of installing ACS-Xerox IVR's on our Light Rail vehicles and reducing the cost of the program by $240,000.

Project 3: Upgrade of the business network and meet today's standards for security and disaster recovery.

Result: The VTA network solution was a single flat network design with a mixture of CAT 3 and CAT 5 cabling. Due to the age and reliability of the system, we were seeing less than 99.0% network up time. This would have major impacts in worker productivity across VTA, and the system was highly prone to virus attacks. The firewall, core switches, security appliances, two-thirds of the switches, and security software have already been upgraded, and we are achieving a 99.9% uptime. Wait time for large documents in the field went from 10 to 15 seconds to less than 1 second.

Project 4: Board office paper to electronic board memo solution. Result: Technology deployed a web based application for the creation of board memos, tracking of committee and board work plans, generating committee and board meeting packets, and allowing for electronic distribution of said packets, thus reducing the number of printed documents distributed by VTA. Overall it has reduced the time it takes to generate a board document, standardized the look and feel of the documents, and helped to make sure the documents were ADA compliant.

Project 5: Server upgrade by migration to blade server, and disaster recovery. Result: Technology upgraded 48% of the application servers from older Compaq server to newer quad core blade servers. Prior to this project, only one application was being

backed up in an alternate data center. We took this opportunity to make the new solution fault-tolerant and set up fail-over instances in our backup data center. We replaced the older tape drive backup system, thus eliminating the two off-shift IT staff dedicated to managing the older backup tape system. We improved server uptime from 98.4% to 99.9%, and now all critical applications are fault-tolerant. This project also upgraded the critical BDT servers used by Operations to dispatch vehicles. Upgrading the servers, operating system (OS), and database had a significant impact in system performance. The system is now fault-tolerant and no longer limits the number of user log-ins owing to server limitations.

Project 6: Copier, printer, and copy center replacement program. Result: VTA had a very old and poorly maintained 65 copier solution managed by one department, a copy center with 20-year old equipment, and more than 600 network or office printers. All printing equipment was brought under Technology, and a new printing strategy was developed. Multifunction devices (MFDs) were leased and installed on the VTA network to replace the 65 stand-alone copiers and over half of the network printers. VTA saved more than $500,000 by eliminating the older printers scheduled for replacement. Cost per print is one-third on the new MFDs versus the older printers, or roughly $120,000 per year savings. Service was greatly improved and downtime on the MFDs has been better now that all of the MFDs are under a single contract and managed by the Technology help desk. New copy center equipment was leased and the old equipment sold for parts. Maintenance and support on the older equipment exceeded $210,000 per year and the lease on the new equipment is under $100,000 per year. The cost per copy is 35% less, and the Data Center can turn a job in half the production time because of the reduced set-up time and incremental speed of the equipment.

Project 7: Upgrade all of our business and construction applications to the latest release. Result: Technology was 3 to 8 years behind on upgrading to the new releases of software that we had the rights to upgrade, and in some cases had customized the core application, which kept us from deploying patches. Due to this situation, known bugs in the software were not fixed, and new capabilities in the newer releases were missed opportunities. This situation also limited our ability to upgrade the server OS and the desktop OS. We are now running the current release on more than 90% of our applications, eliminated almost all of the customizations, and have upgrades already in process on the final 10%. This will make upgrading the applications easier and quicker in the future, has made the solution more stable, and has improved the functionality.

Project 8: Upgrade the VTA portal, consolidate document management systems, and improve online information access to VTA staff. Result: VTA has been a very paper-intensive company, and we store multiple copies of the same document in multiple locations and systems. A strategy and three projects were developed to move VTA to a more electronic environment while improving our record retention policy, and e-discovery capability. To date VTA has eliminated the use of Kovis ($50,000 per year cost), which was a redundant EDMS system. We are in the process of deploying a new SharePoint internal portal that will allow us to eliminate the use of Share files, and supports workflow of Certified Electronic Digital Signatures and interactive electronic forms. Once completed this year, we'll eliminate the Open Text eDocs application support ($130,000 per year) and the multiple Share file systems. In the next 2 years we'll move paper documents and records into SharePoint's record center, eliminating duplicate copies of the same documents, thus making e-discovery and record destruction easier and more efficient.

The following information was provided by Community Transit in Snohomish County, Washington:

Smart card (ORCA) and CAD/AVL/APC system. Improved data on system performance, revenue generation, and opportunities to control costs and improve efficiency of both paratransit and fixed-route systems. AVL/APC systems allow us to reduce the cost of collecting data in the field.

Smart card (ORCA) and off-board ticket machines on BRT. These systems speed passenger boarding time, which reduces dwell time at stops and makes for more efficient operation.

Trapeze and APTS CAD/AVL. Improved productivity of paratransit service through improved scheduling, automation of driver manifests, and active dispatching.

Transit technologies make Swift work better. ORCA smart card readers at each station make paying the fare fast and easy. Signal priority throughout the corridor can provide a shortened red light or an extended green light to keep Swift moving quickly. Automated stop announcements clearly indicate upcoming stations. Automatic vehicle locating systems provide for consistent bus spacing on the corridor. Automated passenger counters track ridership at each station. Queue jumps are another element of on-street technology that helps buses maintain speed and reliability. Swift buses now get a head start with a queue jump light. All of these technologies contribute to faster running, times allowing us to carry more people per service hour.

Business intelligence. The agency is just now implementing this new data analysis technology that will greatly assist in retrieving large amounts of data created primarily by the APTS, ORCA, and Trapeze OPS systems and allow for intuitive data visualization and easy ad hoc/decision support reporting, including the creation of dashboards.

The Trapeze OPS Sign-in Terminal in Transportation has improved efficiencies in the window dispatchers' work. They no longer spend their time monitoring the sign-in sheet and can focus on covering work and other duties.

Online reporting for our 360 vanpool groups provides time savings and better accuracy on reports for our vanpool fleet coordinators. The time savings allow the coordinators to concentrate on other necessary duties.

In Marketing, Facebook has allowed two-way communication with customers to discuss issues and solutions to transit operations and other questions. Our video programs have allowed us to reach a larger audience and outreach our services. They also save on print material costs. WebEx has allowed us to communicate with our employer audience and helps us save money in travel and the cost of finding a good location. Ning allows us to provide information electronically and allows our customers to share ideas electronically and instantaneously. FlickR allows us to photo share with other staff in the agency. This saves staff time by having all photo resources in one easy-to-access location.

APPENDIX G

Additional Responses to Survey Question #17: "Have You Entered Into Any Partnerships That Have Helped Share the Cost of Providing New or Existing Service?"

Three transit agencies provided extensive descriptions of the various ways they partner with public and private organizations to expand service in their communities.

Washington Area Metropolitan Transportation Authority in Washington, D.C.

Local Government/Agency /Schools Fare Subsidies: WMATA has an agreement with the District of Columbia to provide subsidized travel for DC Public School students. DC students ride WMATA buses and Metrorail trains alongside regular riders, but the students utilize special, subsidized fare media that are available only to DC students. The initial purchase cost of the student fare media is subsidized by the District of Columbia. For example, the student monthly pass costs $64. The student pays $30 toward the overall cost, and the District of Columbia pays the other $34. For each usage of the student monthly pass, the District of Columbia pays an additional $0.95 subsidy to WMATA. DC students can also purchase 10-trip rail and bus passes (at $9.50 and $7.50, respectively), the costs of which are subsidized by the District of Columbia. The student pass products are configured to allow travel within the District of Columbia only and are to be used only for school and school-related travel.

DC DOT provides specific payment for an increased bus-rail transfer discount for riders at Anacostia and Congress Heights stations.

Montgomery County, Maryland, has fare reduction programs for students and seniors in Montgomery County. The county reimburses WMATA for the revenue equivalent.

WMATA has partnerships for a prepaid fare program with other agencies, but they are sponsored by a Compact member as a backstop against nonpayment. These include:

- Environmental Protection Agency (Arlington) reimburses for employee/visitor riders on specific bus routes.
- Department of Defense (Alexandria/Fairfax) reimburses for employee/visitor riders on specific bus routes.
- WMATA previously had an arrangement with the Metropolitan apartment community in Arlington for resident riders on a specific bus route. That route was replaced by jurisdictional bus service. but the arrangement continues.

The Department of Defense contributes to costs of operation and capital to support service on the 7M (sponsored by Alexandria) and 28X (sponsored by Fairfax County). These contributions enabled an expansion of capacity, frequency, and coverage for these routes.

An agreement with the United States Coast Guard is being negotiated to support relocation of its headquarters staff to the St. Elizabeth's campus. This agreement would include contributions to operating and capital costs and a prepaid fare program.

Downtown business interests—Business Improvement Districts. WMATA has reached out to Business Improvement Districts (BIDs) in the Washington region to identify opportunities to partner with such organizations. Ideas being contemplated included interactive kiosks at stations to communicate to Metrorail customers the services and businesses located around the stations and how to reach those businesses. Such services will provide a revenue stream to WMATA while also helping to better connect businesses to transit.

Local governments—Public-Private Partnerships. In the past, WMATA has formed partnerships with local governments toward the financing of system expansion. A very successful example is Noma-Gallauadet station, which was funded by means of a unique public–private partnership of WMATA, the local DC government, the federal government, and private landowners. WMATA is currently exploring similar partnership approaches for the funding of another infill station in the Potomac Yards area of the city of Alexandria.

Local governments—Tax Increment Financing Districts: WMATA is working with Prince George's County, Maryland, to explore the creation of Tax Increment Financing Districts at Metrorail stations. Such districts would enable the local jurisdiction

to capture value from new development at the stations and use those new revenues to reinvest in transit-supporting amenities and infrastructure (such as parking structures, roads, and bus loops) that serve to drive new ridership and also facilitate transit-oriented development.

San Joaquin Regional Transit District in Stockton, California

- *Stockton Unified School District (SUSD)*—RTD sells discounted student passes to the SUSD. SUSD distributes the passes to students qualified for school bus service and no longer provides school bus transportation to its students. Students can use passes to ride to and from school, work, entertainment, etc. The cost of increased service capacity is offset by revenue from passes sold to SUSD.
- *San Joaquin Delta Community College.* SJRTD is promoting a similar program to encourage students to shift from cars to public transportation.
- *Stockton Police District.* SJRTD contracted for one officer to provide regular police service at transit facilities and onboard the buses.
- *SUSD Police.* SJRTD contracted for one officer to provide regular police service at transit facilities and onboard the buses.
- *City of Stockton.* Provides support for various transit projects (e.g., signal prioritization for BRT routes, bus bench and shelter installation).
- *United Cerebral Palsy and American Logistics, Inc.* These agencies provide paratransit services at a lower cost.
- *Downtown Stockton Alliance.* SJRTD has a marketing partnership with the alliance that includes cost-sharing to promote downtown establishments and the use of public transit to get around downtown.
- *Stuff the Bus food drive partners (food banks, city of Lodi, city of Escalon, and city of Manteca).* There is an annual food drive spearheaded by San Joaquin RTD to help collect food for those in need within the community, reinforcing the positive image of the transit agency in the community.
- *Proterra, Inc.* Through this partnership, San Joaquin RTD was awarded a California Energy Commission grant in the amount of $2.56 million toward an electric bus demonstration project valued at more than $4 million. Two electric buses are scheduled to be launched in 2013. This effort supports SJRTD's strategic initiatives by reducing energy consumption, waste, and pollution while fostering vendor innovation and new technologies.

Nashville Metropolitan Transit Authority in Nashville, Tennessee

For almost 10 years, the Nashville Metropolitan Transit Authority (MTA) has stressed the importance of its employer-based fare programs under the commuter benefits program known as EasyRide. The EasyRide program is a flexible program that is tailored to the needs of employers and employees. The success and growth of this program, which is administered by 1.5 FTEs, has helped increase overall system ridership since its inception.

During calendar year 2012, the program saw a 9.6% increase in ridership among the program's top five participants over the same period in 2011, representing more than 1.1 million passenger trips. Funding contracts with EasyRide partners are often issued on an annual basis and have proved to be a helpful additional revenue source for MTA. The program growth has required the addition of a full-time employee to administer it, but it is believed to be a necessary and good investment based upon the size and scope of the program. Currently, there are more than 30 program participants and various levels of participation and ridership.

Though a good portion of the EasyRide passengers are using available capacity, some trips have experienced crowding as a result of the level of participation by the employees. The MTA has made adjustments in equipment assignments accordingly. A few examples of successful types of partnerships are included in the following:.

1. U-Pass Program. MTA worked with a large local university to develop a university pass (U-Pass) program that targeted employees and graduate students. This cooperative effort grew out of a relationship with an MTA board member. The university was interested because of serious parking issues. The university had encouraged carpools and vanpools by providing preferential parking but not under a broader umbrella with transit benefits.

The U-pass program uses existing employer identification cards that have been tested for compatibility with MTA's fareboxes. MTA does issue EasyRide cards for its other programs, but here the university controls the cards. The benefits of this arrangement are that MTA does not have to issue separate fare cards to the employees, and the university does not have to share any personal data on its employees with MTA. The university receives a single bill each month from MTA based on a negotiated per-swipe rate. The U-pass program has expanded to include medical center employees, faculty, and graduate students. Because payment is on a

per-swipe basis, the university reviews usage and reports any unauthorized use to MTA, which can then program its fareboxes not to accept an unauthorized ID.

Monthly ridership in the U-pass program began at 14,000 in 2004. In 2008, ridership reached 56,000 in one month when gasoline prices were near their peak. Today, ridership averages around 40,000 passenger trips each month. As one of the region's major employers, the university set an example that other public employers soon followed, including other area universities. MTA emphasizes the importance of the U-pass program in generating interest among other major employers, including the state and the city.

2. State Employees. The second EasyRide program described by MTA is with the state of Tennessee. The state is the biggest employer in Nashville, with several state agencies located downtown, and the state had been providing an employee shuttle between its offices and parking lots across downtown. State officials saw and read media reports on the university program and asked, "How do we get this deal for our employees?"

This interest led MTA to consider how to price the EasyRide program. MTA mirrored the state program on the approach taken with the university program, realizing that the EasyRide program needed to be flexible because each employer is different. MTA sets prices based on proximity to transit, origin-destination patterns, and transfer rates, with higher prices associated with greater proximity, more origin and destination patterns that can be served by transit, and lower transfer rates.

Transit was generally a convenient option for state employees, because most state agencies are downtown and MTA's route network has its primary hub downtown, with few transfers required. As a free benefit for participating in the EasyRide program, MTA maps employee residences by ZIP code for the employer to estimate participation levels for employer budgeting.

As is the case with the universities, the state receives a single monthly bill from MTA based on the negotiated per-swipe rate. A major difference is that MTA issues EasyRide cards for all state employees. The state is responsible for distribution. In the event of a lost card, MTA will produce a new card on its existing production schedule. Cards for newly hired employees are also produced on this schedule. MTA will bill $10 to replace a lost card. An employee who leaves the state turns in his/her EasyRide pass before leaving employment with the state. The cards expire in 999 days (related to farebox technology), but it only takes approximately a minute to reprogram an expired card. A protocol was developed and implemented to reissue expiring cards.

The Tennessee Department of Transportation (TDOT) is MTA's point of contact. TDOT enters the data on state employees and sends it to MTA. MTA prints and tests the EasyRide passes. TDOT then distributes the passes through individual departments to the employees. TDOT uses a portion of one staff member's time to oversee the program and analyze monthly reports.

Through its fareboxes, MTA obtains and provides data on employee use of the program to employers. Employers differ in their interest in analyzing employee use. The state of Tennessee established this program for work commute trips only, not for general use. Thus, the state monitors the details of employee use and calls in employees who ride in noncommute times to clarify the program's intent. The state warns the employee the first time, but repeat offenders can lose their pass privilege.

This is an example of MTA's guiding philosophy for the EasyRide program: the employers decide the rules, including how employees can use the pass. Employers pay on a per-swipe basis, not a per-employee basis, and have a greater incentive to control costs by controlling usage. Under this philosophy, card design is based on employer specifications. The state design features a striking photograph.

3. Municipal Employees. MTA found that other public-sector employees began asking for a similar program once the state program was implemented. The metropolitan Nashville government worked to establish its own EasyRide program with MTA. Metro Nashville established a pretax program under which Metro Nashville employees purchased an EasyRide 31-day card. Other municipal employees became aware of this (the employees are the major impetus for this program) and again wanted cards of their own similar to what they knew other area employers offered. With support from the metro government, the program became available to all general service employees (GSEs). Program use is limited solely for work commutes. MTA issues the EasyRide cards for GSE employees. Part of the challenge in the Metro Nashville program is that city employment sites are less centralized.

Other employers not in the EasyRide program can purchase individual passes and take advantage of pretax benefits. MTA prints and issues Mobility Checks, which serve as transit currency within the Nashville region. With the recent increase in the federal transportation benefit cap to $240 per month, the most expensive pass on the commuter rail system now falls within the cap.

The MTA has also developed a close working relationship with the Metro Nashville Public Schools. Under agreement with MTA, transit cards are issued to public school students who financially qualify for transit support. With a number of charter and magnet

schools located across the county, MTA service fills in the gap. Traditional yellow school buses focus on transporting students between an area school and a nearby neighborhood. MTA offers the ability to go crosstown or to other areas of the city, opening up additional learning opportunities and school choice for students and their families. The majority of the cards are issued in the fall during the new school year and are valid through the end of the month when the school year is complete. Nearly 4,800 cards were issued this school year.

Often a simple Memorandum of Understanding (MOU) is used as the agreement between MTA and its EasyRide partners; however, traditional boilerplate contracts have been used between the two entities to run the program.

Factors Contributing to Success

Several factors have contributed to the success of the MTA EasyRide program:

- Role of the media. Several well-placed stories created a buzz and led to other employers calling MTA. The state became interested as a result of publicity surrounding the university program, and Metro Nashville became interested as a result of publicity surrounding the state program.
- Changed perceptions about transit. The EasyRide program cuts across socioeconomic lines and helps MTA promote its services to a broader market.
- Public employer perceptions. Public employers view EasyRide as a cost-effective benefit to provide to their employers.
- Program flexibility. Employers can tailor the program to meet their needs. An emergency ride home program is also helpful in this regard.
- A proactive approach. MTA organized a half-day symposium to introduce the EasyRide concept to university personnel. MTA staff worked extensively with the state before they decided that it was ready. MTA continues to take an aggressive approach to seeking new employer partners in both the public and private sectors.
- Program champions. MTA CEO Paul J. Ballard has championed the program for the agency, as have Nashville Mayor Karl Dean, area university leaders, and the Secretary of the Tennessee Department of Transportation.

Resistance can arise with a decision maker who has no experience with transit. Positive stories in the news media once the initial program was up and running and program champions at public agencies helped to overcome this resistance in Nashville. A willingness to design the program with flexibility built in is helpful with employers who are not familiar with transit.

Lessons Learned

MTA is an excellent example of a successful program for both public as well as for private-sector employers. Lessons learned include:

- Find a champion and a corporate leader that will pave the way.
- Design a flexible program that the employer can tailor to meet its needs.
- Start wherever you can and build on successes. The announcement of the first participant helped secure the participation of subsequent partners.

Operation of the EasyRide program does entail the engagement of a number of departments and the employment of 1.5 FTE. The program is overseen by a program manager who is a point of contact for the program and conducts outside sales. A full-time employee in the Planning Department oversees the data base, issuing of cards, reporting, bill coordination, and point-of-contact between the EasyRide employer coordinators. The CFO helps establish pricing along with the Planning Director. The Finance Department coordinates billing and ridership with the Scheduling and Planning departments. Procurement manages contracts and MOUs. IT is the point of contact for farebox-related issues and farebox data storage, as well as for ordering card stock. The Communications Department helps promote the program and Operations ensures that all program policies are followed by drivers and supervisors. Customer Care answers some policy questions but more often schedule and route information.

Program savings have only come through regrouping internally and discussing policies or procedures that have either been effective or ineffective. Processes have been developed and altered to help streamline a number of routine activities. A tracking system has been developed to track when replacement cards have been issued and money has been either received or a bill is issued to recoup the appropriate fee. Billing and ridership reporting has been refined (and has gone paperless) to ensure accuracy the first time. Though a dollar figure can't be clearly measured, savings have come through better time management by all staff.

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation

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