Successful Telecommuting Programs in the Public and Private Sectors:

A Report to Congress

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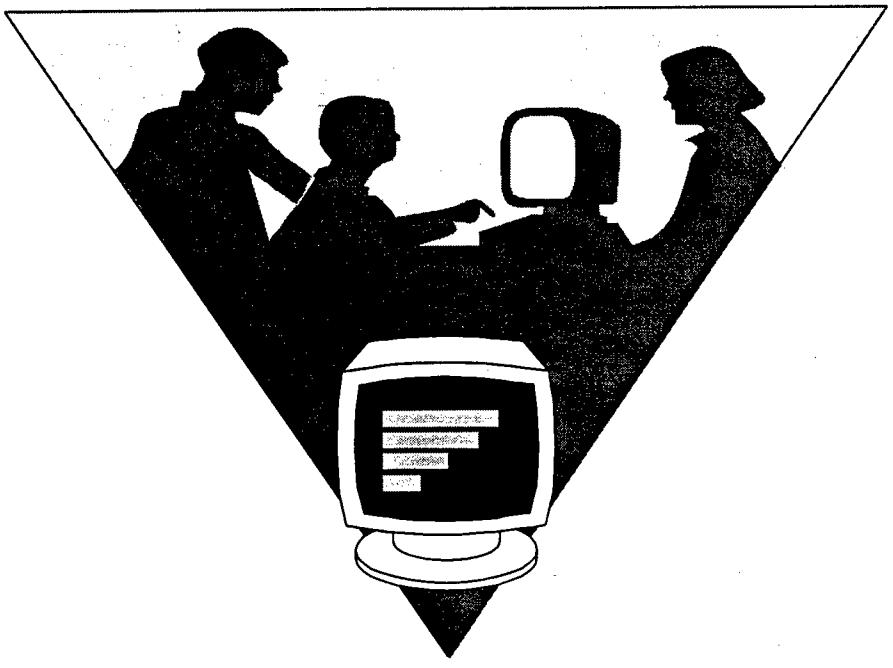

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16. Abstract

This report is base on the research, and studies conducted by the Texas Transportation Institute Department at Texas A&M to study the successful operations of Telecommuting programs. The overall scope was to see how Telecommuting systems have an impact on, productivity, finances, employee moral, and environmental issues. The report highlighted different techniques, and approaches that result in the programs success. They also noted the benefits and costs for the employer, employee, and the community as well. The research detected that they all received benefits, and a reduction in cost. Results from the research showed successful operation of Telecommuting Programs within the public and private sector throughout the United States. The report includes an overview of telecommuting, case studies, keys to successful programs, and activities to encourage telecommuting.

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EXECUTIVE SUMMARY

INTRODUCTION

Telecommuting encompasses a variety of non-traditional work arrangements that move work to people, rather than people to work. Recent interest in telecommuting on the part of businesses, public agencies, employees, and policy makers has been generated by a desire to increase productivity, reduce costs, balance family and work responsibilities, and address traffic congestion and environmental issues. Recent advances in telecommunication and computer technologies have also enhanced the ability to communicate and work at home or from remote sites.

Telecommuting is a relatively new approach to work arrangements. As a result, the extent of telecommuting programs, the various techniques being used, the benefits and limitations of different approaches, the keys to successful programs, and other related issues are just beginning to be documented. Further, the roles federal, state, and local governments can play to encourage telecommuting are not well known.

In 1996, the United States Congress directed that the Department of Transportation, Office of the Secretary, examine these issues. The Department was charged with identifying successful telecommuting programs in the public and private sectors and with disseminating information on these programs and the benefits and costs of telecommuting. The Texas Transportation Institute (TTI), a part of The Texas A&M University System, conducted the research on telecommuting for the Department of Transportation to address this request. The findings from this research are provided in this report.

To accomplish the objectives set forth by Congress, TTI researchers conducted a number of activities. A state-of-the-art literature review was completed to identify available reports, articles, and other information on telecommuting programs in the public and private sectors. Both traditional approaches and on-line search capabilities were used in the literature review. Telephone calls were made and meetings were held with individuals from selected companies, agencies, and organizations to discuss specific telecommuting initiatives and programs.

RESEARCH RESULTS

Approaches to Telecommuting

Telecommuting involves non-traditional forms of working, which eliminate the need for an employee to commute on a daily basis to a central employment location. Telecommuting may involve the use of advanced communications technology, or it may just focus on doing regular work tasks outside the office. Home-based telecommuting is the most familiar form of telecommuting. In this case, a telecommuter works at home and communicates with the organization's main office by telephone, computer modem, or other means. Telecommuting may

also involve mobile workers, home-based business owners, and employees working at satellite, local, or neighborhood centers.

Telecommuting initiatives have been supported by programs and activities at the federal, state, and local levels. At the national level, the Clean Air Act Amendments of 1990, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the President's Council on Management Improvement - National Telecommuting Initiative Action Plan, the Federal Telework Centers, and the President's Global Climate Change Action Plan, all provide support and potential funding for telecommuting activities.

Examples of state and local telecommuting policies and programs also exist. California, Arizona, Minnesota, Oregon, and Washington provide just a few examples of states with telecommuting initiatives underway. Comprehensive programs have also been implemented at the regional and local levels by Metropolitan Planning Organizations (MPOs), transit agencies, communities, and other groups. The Dallas-Fort Worth Metroplex, the Phoenix Metropolitan area, and the Washington, D.C. area provide examples of regional telecommuting programs.

Currently, telecommuting programs are in use in large and small organizations throughout the country. Numerous case study examples of telecommuting programs in the public sector and in private businesses are documented in this report. These include programs focusing primarily on employees working from home one or two days a week, to full-time telecommuters, to the use of satellite or telework centers.

Keys to Successful Programs

The literature review and case study assessments provide insight into the components of successful telecommuting programs. The following elements appear to be important in helping to ensure the success of a telecommuting program and in maximizing the potential benefits to all groups.

- **Top Management Involvement**. Support from the top management in a business or agency is critical to the successful development and implementation of a telecommuting program.

- **Telecommuting Policies and Guidelines**. Clearly defined program policies and guidelines appear to be an important component of most successful telecommuting programs. These guidelines outline the expectations and responsibilities of both management and telecommuters and establish the parameters for the program.

- **Selection of Job Tasks and Job Functions**. Identifying the types of jobs and the job functions that can be accomplished from home or a remote work site is important. Most program guidelines outline the types of jobs, tasks, and functions that will be considered for telecommuting.

- **Selection of Telecommuters**. Not all employees have the skills and personality to be telecommuters. The guidelines and selection processes in most programs focus on employees who are self-motivated and self-starters, can work independently, have extensive experience, and work well without supervision.

- **Selection of Managers and Supervisors**. The selection of managers and supervisors is also important. Characteristics identified for supervisors of telecommuters include managing by objective, trust in employees, and good communication skills.

- **Pilot Tests**. A number of telecommuting programs in both the public and the private sectors started as pilot tests or demonstrations. These efforts allowed the concept to be tested with a small group of employees. In many cases, the development of telecommuting policies, the identification of appropriate jobs and job tasks, the selection of participants, and the monitoring and evaluation program were part of the initial tests. The success of these pilot efforts resulted in ongoing programs.

- **Labor Union Involvement**. Obtaining the support and the active involvement of labor unions or other employee groups is an important element of many telecommuting programs. Involving representatives from these groups early in the planning process and throughout the implementation stage can help ensure successful programs.

- **Establishing Communication Methods.** Establishing regular methods of communication between supervisors and telecommuters is important. Telephone calls, e-mails, and faxes represent just a few of the communication techniques reported in the case studies.

- **Equipment and Support**. Ensuring that telecommuters have the equipment necessary to perform their jobs is an important component of successful programs. The exact type of equipment, possible cost sharing arrangements, and the requirements for use varies by program.

- **Ongoing Monitoring**. Most of the case studies conducted some type of monitoring and evaluation program. These activities can help address and resolve problems which may arise and can assist in documenting the benefits from telecommuting.

Employer Benefits and Costs

The most common benefit cited by organizations with telecommuting programs is an increase in the productivity of their telecommuting workers. Faster completion of assignments, fewer sick and absent days, better time management, and increased morale and commitment to the company or agency were all reported by telecommuters and their supervisors. Other benefits realized by some companies include reduced office space needs and associated costs, enhanced ability to attract and retain quality employees, and improved customer service. The following examples highlight reported benefits to employers from telecommuting programs.

- **Reduced Office Space Needs and Costs,** One of the more significant potential cost savings from telecommuting for businesses and public agencies appears to be in reduced office space needs and related facilities, such as parking. For these benefits to be realized, however, telecommuting programs have to eliminate the need for existing office space or allow additional employees to occupy current spaces. Given the long-term nature of building leases and real estate ownership, savings in these areas may not be realized in the short-term.

- **Increased Employee Productivity, Morale, and Commitment**. One of the most frequently cited benefits by organizations with telecommuting programs is an increase in the productivity of their telecommuting workers. Faster completion of assignments and accomplishing more work due to fewer distractions, better time management, and increased morale and commitment to the organization have been reported.

- **Decreased Sick Leave**. Another benefit from telecommuting programs noted by management personnel at many of the case studies was decreased use of sick leave by telecommuting employees. Although telecommuting is not a substitute for sick leave, the ability to work from home on days when they are not feeling well enough to commute to the office helps contribute to the increased productivity of telecommuters discussed previously.

- **Improved Ability to Attract and Retain Employees**. A number of the case studies indicated that the telecommuting programs have helped retain quality employees, as well as assisted with recruiting new employees. Examples were also provided of using telecommuting to assist and retain valued employees through times of illness or special needs.

- **Address Special Situations and Needs**. Telecommuting programs have also been used to assist and retain valued employees during special situations or in response to specific needs. Examples provided in the case studies included expanding telecommuting programs to assist employees during pregnancies, illnesses, illness in the family, and other special situations. In addition, telecommuting can assist in hiring and retaining employees with handicaps or special needs, and dealing with natural disasters such as the earthquakes in California.

Employee Benefits and Costs

- **Costs Associated with Telecommuting**. The literature review and the case studies indicated a lack of uniformity related to the possible costs for telecommuters. In some of the case studies, the employer assumes all of the costs associated with telecommuting. These may include computers, modems, fax machines, additional telephone lines, and other related equipment. In other cases, the costs of needed equipment is shared between the telecommuter and the organization. In still other instances, the telecommuter is

responsible for providing a computer or other items needed to successfully complete their job.

- **Reduction in Stress, Time, and Costs Associated with Commuting**. Telecommuters in the case studies reported a number of benefits from not commuting to a central office one or two days a week or on a daily basis. Employees reported lower levels of stress and fatigue from not having to drive and deal with traffic congestion on telecommuting days. Telecommuters also reported savings in gasoline and parking costs from not having to drive to and from work every day.

- **Increased Productivity, Morale, Job Satisfaction, and Responsibility**. Telecommuters in many of the case studies reported increased productivity from eliminating commuting time, reducing interruptions, and establishing flexible work schedules. Telecommuters reported increased motivation, job satisfaction, and loyalty to their employer, as well as greater feelings of accomplishment, responsibility, and trust.

- **Balancing Job and Family Responsibilities**. Telecommuters noted a better balance of work and home responsibilities. Positive aspects of telecommuting on home life included spending more time with children, making meal preparations easier and dinner more enjoyable, arranging needed services or home repairs easier, and scheduling other personal appointments. Employees viewed the telecommuting programs as providing additional benefits in special situations. Examples provided included caring for sick children or relatives and individual illnesses.

Community Benefits and Costs

Telecommuting programs may also provide benefits to the community and society as a whole. As discussed in this section, these may include reductions in energy use and pollution associated with commute trips. In addition, telecommuting programs may help enhance the economy and human capital of some areas and neighborhoods.

- **Travel Reduction, Air Quality Enhancement, and Energy Reduction**. Telecommuting programs can benefit the transportation system by reducing commute trips. These benefits can help companies, agencies, and areas meet air quality legislative requirements and other policy directives. Since telecommuting removes work trips from congestion peak-periods, telecommuting programs should have positive impacts on traffic congestion, air quality, and energy consumption. The experience at many of the case studies supports these benefits.

- **Enhance the Economy and Human Capital of Neighborhoods and Areas**. Telework centers and telecommuting programs may have secondary benefits related to enhancing the local economy and providing resources for local residents. For example, one of the objectives of the Minnesota Department of Transportation Cambridge Telework Center was to enhance the economy and human capital in the Cambridge area. The location of

telework centers may help stimulate the economy in the area. Further, facilities such as the Metro Blue Line TeleVillage in Los Angeles provides resources for the local community to use. Another potential secondary benefit is the added presence of telecommuters in their neighborhood during the day.

ACTIVITIES TO ENCOURAGE TELECOMMUTING

The results of this study indicate that telecommuting programs offer numerous benefits to employers, employees, the transportation system, and the general public. For these benefits to be fully realized, telecommuting will need to become more widespread. A number of policies and activities can be undertaken to support and promote telecommuting. Potential policies and activities for use by federal, state, and local agencies, MPOs, transit agencies, private businesses, and other groups to further encourage telecommuting are highlighted here.

- **Federal, State, and Local Legislation and Policies**. Legislative mandates or policies that encourage telecommuting can be enacted at the federal, state, and local levels. At the federal level, the 1990 Clean Air Act Amendments and the ISTEA both provide support for telecommuting programs. Although the Employer Trip Reduction (ETR) program is now voluntary, telecommuting was being considered in many air quality non-attainment areas to help meet the requirements. State and local legislative actions, administrative support, and agency policies can all help encourage telecommuting efforts. Some states, MPOs, and other agencies have developed policies and programs supporting telecommuting activities. The headquarters and regional offices of federal agencies could take a lead role in promoting many of these activities.

- **Regional and Local Policies and Programs**. Regional agencies, MPO's, transit authorities, and local governments can play important roles in promoting telecommuting. The Dallas-Fort Worth, Phoenix, and Washington, D.C. area case studies provide just a few examples of comprehensive regional programs. Similar activities could be undertaken in other metropolitan areas throughout the country.

- **Labor Union Support**. Support for telecommuting activities from labor unions and other employee groups at the national level could assist in dealing with these organizations at the state and local levels. Initiating discussions at the national level could enhance support for telecommuting programs at public agencies and private businesses throughout the country.

Technical Assistance and Public Information

Agencies at all levels can continue to promote telecommuting through a number of methods. Public information campaigns and targeted marketing efforts can be used to communicate the benefits of telecommuting to all groups. The *Home Office 2000* contest in the Dallas/Fort Worth area represents just one example of possible informational and promotional activities. Ensuring that all groups are aware of the benefits of telecommuting and continuing to promote

telecommuting programs on an ongoing basis can encourage more widespread use. The following approaches provide a few examples that may be appropriate for consideration by public agencies.

- **Videos**
- **Workshops or Training Courses**
- **Peer-to-Peer Networks**
- **National and Regional Conferences and Symposiums**
- **Educational Outreach Programs**
- **Technical Assistance**
- **Use of Advanced Technologies**

Provide Incentives for Telecommuting Programs.

Providing financial or other incentives to companies or agencies to implement telecommuting programs represents another potential strategy. Possible incentives could include tax breaks, reductions in parking requirements, zoning bonuses, and other benefits to public and private sector groups.

Encourage Telecommuting Within Public Sector Agencies

Leading by example, through the implementation of telecommuting programs, represents another approach public agencies may wish to pursue to encourage more widespread use of telecommuting. The federal initiatives, as well as those underway in some states and local areas, provide instances of public agencies leading by example. More wide-spread public sector use of telecommuting programs can show a commitment that may encourage private businesses, as well as other public agencies, to follow.

CHAPTER ONE—INTRODUCTION

Interest in telecommuting, which encompasses a wide range of non-traditional work arrangements that move work to people rather than people to work, is being driven by a number of factors. Businesses and government agencies continue to pursue ways to enhance productivity, reduce costs, and remain competitive in the local, national, and international market place. Employees are concerned about accomplishing work requirements in a timely and quality fashion, while balancing job and family responsibilities. Finally, issues relating to traffic congestion, air quality, the environment, and quality of life continue to be concerns throughout the country. At the same time, rapid advancements in telecommunication and computer technologies have greatly enhanced the ability to communicate and work across long distances.

Telecommuting is one potential technique to address these issues and to help accomplish these objectives. Telecommuting includes a variety of non-standard employment arrangements allowing employees to work at home or at other nearby locations. Telecommuting programs offer benefits to employers and employees through reducing office space needs, improving productivity, and allowing greater flexibility for individual workers. By removing vehicles from the roadway system during the peak-periods, telecommuting helps reduce congestion levels and accidents, improve air quality, and decrease energy consumption.

Telecommuting is a relatively new approach to work arrangements. As a result, the extent of telecommuting programs, the various techniques being used, the benefits and limitations of different approaches, the keys to successful programs, and other related issues are just beginning to be documented. Further, the roles federal, state, and local governments can play to encourage telecommuting are not well known.

To better address these needs, the United States Congress directed the Department of Transportation, Office of the Secretary, to "carry out research to identify successful telecommuting programs in the public and private sectors and provide for the dissemination to the public of information regarding the establishment of successful telecommuting programs and the benefits and costs of telecommuting" (1).

Congress further directed the Department of Transportation to report the findings, conclusions, and recommendations from this study to Congress. This report is presented to Congress by the Department of Transportation in response to this mandate. The research was conducted by the Texas Transportation Institute (TTI), a part of The Texas A&M University System, and administered through the Texas Department of Transportation (TxDOT).

RESEARCH ACTIVITIES

A number of activities were conducted to accomplish the objectives set forth by Congress. Researchers were able to build on a recent telecommuting study sponsored by TxDOT in

completing many of these activities (2, 3). For example, the case study methodology developed for the TxDOT study was used in this project, as was the Texas experience with telecommuting.

First, a state-of-the-art literature review was completed to identify available reports, articles, and other information on telecommuting programs in the public and private sectors. Both traditional approaches and on-line search capabilities were used in the literature review. Previous reports published by the Department of Transportation, other federal agencies, state and local groups, and other organizations were examined. Electronic databases such as First Search, Dialog, Lexus/Nexus, TRIS, NTIS, and Compedex, as well as Internet search engines, were used to obtain more current information on the status of various telecommuting programs.

Second, telephone calls were made and meetings were held with individuals from selected companies, agencies, and organizations to discuss specific telecommuting initiatives and programs. For example, meetings were held with representatives from various agencies, organizations, and companies in the Washington, D.C. area to obtain information on federal, regional, and private sector programs. Additional telephone calls were made to obtain current information on selected projects.

ORGANIZATION OF REPORT

This report is divided into five chapters following the introduction. Chapter Two provides an overview of telecommuting, discusses the various approaches to telecommuting, and summarizes recent federal initiatives to encourage telecommuting. The best practice case studies are presented in Chapter Three. Examples of regional and state-wide activities, public and private sector telecommuting programs, and satellite telework centers are provided. Chapter Four identifies the keys to successful telecommuting programs. Chapter Five discusses the benefits and costs that have been documented through the telecommuting case studies. The report concludes with the identification of strategies and activities that could be used at the federal, state, and local levels, and by the private sector, to encourage telecommuting.

CHAPTER TWO—OVERVIEW OF TELECOMMUTING

BACKGROUND—DEFINITION AND SCOPE OF TELECOMMUTING

Telecommuting encompasses a wide range of approaches involving non-traditional work arrangements. Rather than moving people to work, telecommuting focuses on moving work to people. Telecommuting is most commonly thought of as employees working full-time or part-time at home. It may also include employees working at a satellite center, conducting sales or services from home or personal vehicles, and working in clients' offices.

Current estimates by the U.S. Department of Transportation and other groups indicate that approximately 30 percent of the American labor force now works at home at least part of the time. While these may not all be telecommuters, some two to seven million workers are estimated to be full-time employees who would otherwise be commuting daily to work (4). Initial telecommuting demonstration projects have been implemented in Hawaii (5), California (6), and the Seattle area (7). Telework centers have also been developed in the Washington, D.C. area (8), Southern California (9), and other parts of the country (10). Further, private companies and public agencies in different areas have initiated telecommuting programs for various reasons.

The potential for telecommuting has been estimated to reach as many as 15 million workers in the next decade (4). A number of factors will influence the widespread use of telecommuting and the ability to reach this target. These include the nature of businesses, specific work tasks, management structures, employee characteristics, costs, legal issues, traffic congestion levels, air quality concerns, and advances in technologies. This chapter summarizes the various approaches to telecommuting and discusses recent federal initiatives supporting telecommuting.

APPROACHES TO TELECOMMUTING

Telecommuting involves non-traditional forms of working which eliminate the need for an employee to commute on a daily basis to a central employment location. Telecommuting may involve the use of advanced communications technology, or it may simply focus on doing regular work tasks outside the office. Home-based telecommuting is the most familiar form of telecommuting. Telecommuting may also involve mobile workers and employees working at satellite, local, or neighborhood centers. Examples of the various approaches to telecommuting are summarized below.

- **Telecommuting—Working at Home**. The most common form of telecommuting involves an employee working full-time or part-time at home. Under this approach, an employee may work on a daily basis from home, or may work one or more days a week from home. This approach may include the use of advanced technologies—such as equipping a home office with a computer, fax, and modem—or it may simply involve conducting work tasks—such as reading reports or reviewing plan specifications—at home.

- **Telecommuting—Satellite or Telework Centers**. Satellite or telework centers are offices located closer to an employee's residence than the company's main office. Telework centers may house only employees from one company or agency, or space may be available for use by personnel from multiple firms and agencies. Satellite or telework centers may vary in size from smaller neighborhood facilities, to mid-size local centers, to larger regional facilities. Most telework centers provide computers, modem connections, fax machines, and other services.

- **Telecommuting—Hoteling or Free Addressing**. These are terms used to describe employees who spend most of their time in a client's office. They may have temporary work space, usually in the form of cubicles or offices that are shared with others, at their own office. Accountants or auditors who spend most of their time in a client's office provide an example of this form of telecommuting.

- **Telecommuting—Mobile Workers or Virtual Offices**. Sales and marketing staff often use these approaches. Using notebook computers, faxes, modems, and cellular telephones, sales personnel may spend most of their time working from home or their automobile, with only periodic trips to their main office for meetings and other business.

FEDERAL PROGRAMS AND INITIATIVES

A number of programs and initiatives supporting the greater usage of telecommuting are underway at the national level. These include legislative actions, administrative directives, and federal agency programs. The major national programs and initiatives related to telecommuting are summarized below.

- **Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)**. The ISTEA provides funding and policy support for surface transportation programs including highways, highway safety, and mass transportation. The ISTEA also implements the transportation provisions of the Clean Air Act Amendments of 1990. The Clean Air Act Amendments include requirements and schedules for urban areas not meeting the air quality standards. Transportation control measures, including telecommuting, can be used to help these areas meet the attainment requirements, as well as reduce traffic congestion and energy consumption. The ISTEA also provides greater flexibility for state and local agencies in the use of federal transportation funds to address specific issues and priorities. It has also created new programs, including the Congestion Mitigation and Air Quality (CMAQ) Program. This program provides funding for projects to help regions designated as air quality non-attainment areas meet the requirements contained in the 1990 Clean Air Act Amendments. Telecommuting programs and related activities may be eligible for funding through the CMAQ, as well as through the Surface Transportation Program (STP) and other programs.

- **The President's Council on Management Improvement**. In 1990, the President's Council on Management Improvement initiated the Federal Flexible Workplace Pilot Project, called Flexiplace. The Flexiplace program included allowing federal workers to telecommute and to use telecenters. The initial effort involved approximately 1,000 participants with 15 federal agencies across the country. More detailed information on the pilot program is provided in Chapter Three (11).

- **Federal Telework Centers**. Legislation approved by Congress in 1992 and 1993 authorized the General Services Administration (GSA) to develop and operate telework centers for federal employees in the greater Washington, D.C. Metropolitan area. Ten telework centers are currently in operation and more are in the planning stage. More information on the development and use of these centers is provided in Chapter Three.

- **National Performance Review**. The U. S. Department of Transportation (DOT) was designated in the National Performance Review as the lead federal agency to evaluate the potential for telecommuting, to implement a telecommuting program for Department employees, and to encourage, monitor, and evaluate state, local, and private sector telecommuting efforts. In 1994, the Department developed and issued a telecommuting policy and initiated a telecommuting program.

- **Global Climate Change Action Plan**. The President's Global Climate Change Action Plan identified telecommuting as one technique to help meet environmental goals and enhance the quality of life in areas throughout the country. The DOT was identified in this plan as the lead federal agency to promote telecommuting. The plan also recommended that the GSA and the Office of Personnel Management (OPM) develop legislative proposals to allow telecommuting by federal employees.

- **President's Management Council — National Telecommuting Initiative Action Plan**. This initiative, which was approved by the President's Management Council in 1996, includes a five-phased plan for increasing the number of federal personnel telecommuting to 60,000 by the end of FY 98. The five phases of the program include benchmarking the status quo, preparing a comprehensive and coordinated telecommuting program, promoting the initiative, implementing the program, and evaluating the program (12).

CHAPTER THREE—BEST PRACTICE CASE STUDIES

This chapter provides examples of telecommuting programs in use throughout the country. The chapter is divided into four sections. Examples of regional and state-wide telecommuting programs are presented first. Public sector telecommuting case studies are then highlighted, followed by private sector examples. The chapter concludes with an overview of satellite or telework centers.

There are numerous examples of telecommuting programs and related activities underway throughout the country. The case studies highlighted in this chapter were selected to provide a mix of public and private sector experiences, company or agency size, and geographical distribution.

REGIONAL AND STATE-WIDE TELECOMMUTING PROGRAMS

Regional, metropolitan, and state-wide telecommuting programs are being implemented in many parts of the country. In some cases these efforts are being led by the MPO, while in other instances the state or regional transit agency has headed the effort. These programs often contain a mix of elements and activities including the adoption of goals and objectives supporting telecommuting, production and distribution of videos and brochures, marketing and public education efforts, establishment and operation of telework centers, and implementation of telecommuting programs within the agency.

Comprehensive programs encompassing multiple elements have been developed by MPOs, state agencies, transit authorities, and other groups in many areas. Case study examples from the Dallas-Fort Worth Metroplex, the Metropolitan Washington area, the Regional Public Transit Authority in Phoenix, and the State of Minnesota are highlighted in this section.

Dallas-Fort Worth Metroplex

The North Central Texas Council of Governments (NCTCOG) is the MPO for the Dallas-Fort Worth Metropolitan area. Working with other agencies and groups, including Dallas Area Rapid Transit (DART), the North Texas Clean Air Coalition, and the Fort Worth Transportation Authority (The T), NCTCOG is conducting a number of activities to promote telecommuting and alternative commute modes. Many of these efforts are focusing on the summer months, when the potential for ozone alert days is especially high. Elements of the comprehensive approach being taken in the area include encouraging commuters to take the bus or light rail transit (LRT), carpool, vanpool, telecommute, travel outside the peak-periods, and other strategies.

The NCTCOG produced a telecommuting brochure that explains the various telecommuting approaches, outlines the basic elements to be considered in developing a telecommuting program, and provides suggestions on common issues that may be encountered in implementing a program

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(13). This brochure and other information on telecommuting has been distributed to public agencies and private businesses in the Dallas-Fort Worth area.

In addition, NCTCOG and other agencies have used a variety of public information and marketing techniques to promote telecommuting and the use of transit and ridesharing. For example, a series of Home Office 2000 contests were held during the summer of 1996 ozone season. These included the *Wannabe Telecommuter*, the *Messiest Home Office*, and the *Ultimate Home Office*. Prizes and copies of telecommuting guides and reports were awarded to the winning contestants.

Metropolitan Washington Telework Resource Center (MWTRC).

The Metropolitan Washington Telework Resource Center (MWTRC) was established in 1996 by the Metropolitan Washington Council of Governments (MWCOG) as part of its Commuter Connection program. The goal of the MWTRC is to increase the number of people working at home or at telework centers in the Washington, D. C. metropolitan area. More specifically, the MWTRC is undertaking the following activities (14, 15).

- Educate employers and employees on the benefits of telecommuting and telework.
- Encourage public and private sector employers to establish telecommuting programs.
- Provide planning assistance and technical expertise to support the successful implementation of telecommuting programs and telework centers.
- Coordinate local, state, and federal telecommuting and telework activities and initiatives.
- Facilitate the national and international exchanges of information on telecommuting and teleworking, and transfer the best practices to the Metropolitan Washington area.
- Identify potential legislative measures, financial incentives, and other initiatives needed to promote telecommuting and telework in the area.
- Assist with the establishment of a non-profit telework corporation to develop and manage new and existing telework centers in the region, including five new telework centers by 1999 and the addition of private businesses to existing public sector centers.

The MWTRC program is being carried out by staff at the MWCOG. As a first step in the process, a survey was conducted of 1,025 randomly selected households in September of 1996, and six focus groups were conducted with senior managers from regional employers in January of 1997. Three of the focus groups included representatives from employers with some form of organized telecommuting program, while three involved managers from firms without current programs. The results from the focus groups are being used to develop an outreach program to

promote and encourage telecommuting among both the public and the private sectors. The following points highlight the major findings from the focus groups (16).

- The concept of telecommuting and telework seems to be acceptable to employers as a logical extension to alternate work schedules, such as flexible work hours and compressed work weeks.

- Telecommuting seems to be most frequently considered in response to the needs of an employee or group of employees, rather than a top-down management initiated action.

- Technology appears to play an important role in the interest in telecommuting. For example, employers with older computer systems indicated limited telecommuting potentials for telecommuters until more advanced computer capabilities were in place.

- The major issues voiced by participants about telecommuting related to client acceptance, adequate technology, inability to measure job performance, possible loss of team spirit, and potential liability and legal problems. Consulting firms and government contractors in the area were especially concerned about the reaction of federal contracting agencies to telecommuting.

- Advantages of telecommuting identified by participants included employee productivity, cost savings on real estate and parking, and enhanced employee morale.

- Support from both top management and from employees is needed to promote telecommuting in the region.

- Information about telecommuting programs at firms or agencies of similar size and scope is needed. A peer-to-peer network would help enhance this communication.

- Employers are not willing to spend a good deal of effort to obtain information on telecommuting before they have identified the potential benefits to their firm. Once a decision has been made that telecommuting should be pursued, more willingness was expressed in devoting staff and financial resources towards developing programs.

- More support was voiced for telecommuting from home than from the use of regional telework centers.

Regional Public Transit Authority — Phoenix

The Regional Public Transit Authority (RPTA) in the Phoenix Metropolitan area has developed and implemented a multi-faceted program to encourage telecommuting in the area. This effort has been coordinated with the activities of the state, which are discussed later in this chapter, as well as those underway at other public agencies and private firms. Interest in telecommuting grew out of the mandated employee trip reduction requirements and other efforts

to reduce commute travel and enhance the environment. The following elements are included in the activities and services provided through the RPTA's telecommuting program (17).

- **Public Information and Marketing**. The RPTA has developed information on telecommuting for the general public. Billboards, advertisements, and other media have been used to educate the public on the scope and benefits of telecommuting. Other activities, like the Telecommute America Week and a home page on the Internet, have been used to promote telecommuting and raise public awareness.

- **Public Agency and Private Business Support**. The RPTA provides interested agencies, firms, and groups with more detailed information on telecommuting programs. Presentations by RPTA staff are given on a regular basis and round table discussions with top management personnel have been hosted. These include general telecommuting guidelines, tips for developing telecommuting programs, and examples of telecommuter agreements.

- **Training**. The RPTA has developed two training courses on telecommuting. One is a two hour session that provides a general overview of telecommuting and is intended for managers and top agency personnel. The second is a half day session that provides more detailed training for individuals responsible for developing telecommuting programs within a company. A training manual has also been prepared for use with the courses. The manual contains sample policies, telecommuter agreements, surveys, and other information. These courses are offered on a regular basis.

- **Ongoing Technical Assistance**. Staff from the RPTA provide ongoing technical assistance to agencies and businesses interested in developing and maintaining a telecommuting program.

These efforts have been successful in raising the awareness about telecommuting in the Phoenix area and in developing telecommuting programs in public agencies and private businesses. The RPTA reports that numerous agencies and businesses in the Phoenix area currently have some type of telecommuting program.

State of Minnesota

In 1993, the Minnesota State Legislature requested that the Minnesota Department of Transportation (Mn/DOT) conduct a study of telecommuting in the Minneapolis-St. Paul Metropolitan area. The Legislature further required that the study assess the current extent of telecommuting, the potential for telecommuting to substitute for vehicle commuting, present legal and policy obstacles to telecommuting, and legal and policy alternatives to expand the use of telecommuting (18).

Mn/DOT examined these items and presented a report to the Legislature in 1994. To assist with the required tasks, Mn/DOT sponsored a survey of 800 households in the seven county metropolitan area, reviewed available literature on telecommuting in the area and on a nation-wide basis, and examined potential legal and policy issues related to telecommuting. The report identified the following public policy initiatives that the State could undertake to encourage telecommuting (18).

- Establish and encourage partnerships among public, non-profit, and private sector groups to engage in educational, promotional, research, pilot studies, and other efforts to encourage telecommuting.

- Encourage MPOs to include telecommuting in their transportation planning process and congestion management systems.

- Establish and evaluate telecommuting pilot projects.

- Establish and encourage initiatives within government agencies and the private sector to establish and monitor telecommuting programs and document the results.

This report, as well as other efforts underway at the time, resulted in a number of follow-up activities and actions. As highlighted below, these included efforts by the Legislature, the Governor, state agencies, and other groups.

- In 1994, the State Legislature passed a law requiring the preparation of a telecommuting program by any state agency intending to request office space, such as a new building, renovation or remodeling, or relocation. The plan must be approved by the Department of Administration's Information Policy Office and reviewed by the Government Information Access Council (19).

- The Governor declared the week of July 22, 1996, as Telecommuting Week to heighten awareness about telecommuting. A variety of information was provided through media channels and numerous activities focused on explaining and promoting telecommuting.

- Personnel from state agencies worked together to develop a *State of Minnesota Telecommuting Policy and Telecommuting Program*. The purpose of the policy is to encourage telecommuting among state agencies and to help ensure statewide consistency. The program further provides guidelines and examples of employee surveys, agreements, home office requirements, evaluations, and plans that can be used in establishing telecommuting programs at individual agencies (20).

- In 1996, Mn/DOT established the Cambridge Telework Center, for use by Mn/DOT and other state employees. More information on this center is provided later in this chapter.

- In 1995 and 1996, the Department of Administration sponsored a one-year pilot telecommuting program, which involved 60 employees in 15 divisions. More information on this pilot program is provided later in this chapter.

WORKING AT HOME—PUBLIC SECTOR

City of Los Angeles

The City of Los Angeles employs almost 38,000 workers. The telecommuting program at the City was initiated for a number of reasons. These included retaining and attracting qualified personnel, addressing traffic congestion and air pollution concerns, improving productivity, and managing costs. A Telecommuting Pilot Project was initiated in 1989.

Employees were selected to participate in the pilot through surveys and recommendations. Signed formal telecommuting agreements, which addressed performance standards, worker compensation, liability, and evaluation activities were required. In addition, the telecommuters and their supervisors went through numerous training sessions before starting the program. During the pilot, the 235 telecommuting employees worked from home one or more days a week. Telecommuters were required to provide any necessary equipment, although the City did allocate some resources to support the pilot program (21).

The evaluation of the pilot program identified a number of benefits to the City and to the telecommuters. Documented benefits included a $6,100 annual cost-benefit to the City per telecommuter, increased effectiveness of telecommuters over other workers, enhanced communication between the employees and their supervisors, extra time with their family by not commuting to work on certain days, and a reduction of approximately 276 pounds of carbon monoxide annually by each telecommuter. Training and formal guidelines were noted as two of the key program elements. The guidelines and signed agreement helped ensure that employees realize telecommuting at the City is a management option, not an entitlement (21).

City of San Antonio—Information Services Department

The Information Services Department at the City of San Antonio initiated a six-month pilot telecommuting program in 1992. The pilot program was the result of a year long study by City staff assessing the potential for telecommuting and designing a possible program. A Telecommuting Advisory Committee (TAC) was established to oversee the study, develop recommendations to senior management, and monitor and evaluate the pilot program.

In developing their recommendations, the TAC examined literature on telecommuting and reviewed programs in other areas. The Committee developed a *Telecommuting Guide*, which included a set of telecommuting standards, for use with the pilot program (22). Twelve employees were selected by the Committee to participate in the six-month pilot program. The individuals represented a mix of programmers, project managers, and clerical staff. The participating employees were allowed to telecommute one or two days a week, with management approval.

An evaluation of the pilot program was conducted by the TAC (23). Based on the success of the initial test, the telecommuting program was formalized and expanded to include additional employees. Currently, approximately 50 employees are participating in the program.

The *Telecommuting Guide* developed for the pilot program continues to govern the telecommuting program in the Information Services Department. The *Guide* contains the seven policies governing the program, outlines the expectations and the responsibilities of telecommuters, provides suggestions on organizing and managing work, and contains suggestions for managers of telecommuters. It also includes a listing of potential benefits of telecommuting for the Department, employees, and the community at large, along with adjustments that may need to be made by the various groups.

The experience with telecommuting at the Information Services Department was examined based on the evaluation of the six-month pilot program conducted by the Department (23), interviews conducted by TTI researchers of managers and telecommuters in the Department, and surveys completed by seventeen telecommuters. The following points highlight the experience with telecommuting at the Information Services Department (3, 23).

- The telecommuting program has been well received by both supervisors and employees in the Department. No major problems have been experienced and numerous benefits have been documented for the agency, employees, and the environment.

- The productivity of employees and the Department as a whole has improved with the telecommuting program. The Information Services Department supports other city departments. These departments were surveyed before and after the pilot program to measure their satisfaction with the work in the Information Services Department. The other departments noted improvements in responsiveness and faster turnaround time on data processing requests during the telecommuting pilot program. One example of the improved responsiveness, which involved an emergency request from another department, was provided during the interviews. The responsible Department employee, who was telecommuting that day, was able to provide the needed information within the hour. This experience helped establish the seamless nature of telecommuting for the Department's customers.

- The productivity of telecommuters has been high and no problems have been reported with poor performance. In addition, with the computer links, telecommuters can respond to emergencies after regular work hours and on weekends, expanding the coverage of the Department and providing standby services over extended hours.

- Telecommuters identified numerous benefits from the program. These included saving money from reduced commuting and parking costs, reduced stress and more time for other activities from not commuting, improved productivity from fewer distractions and interruptions, more time with family and enhanced home life, better balance of work and family responsibilities, and improved morale.

- The evaluation of the pilot program reported an average savings of 37 kilometers per telecommuter per week from not commuting one or two days per week. The 17 surveys completed for the case study indicated similar savings. Commute distances on in-office work days ranged from two kilometers to 88 kilometers, with corresponding travel times of five minutes to over an hour. The average commute distance for the 17 survey respondents was 29 kilometers. Fourteen of the respondents regularly drive alone, while two take the bus, and one carpools. Only one participant reported making regular stops to and from work for day care needs, while seven employees noted periodically stopping on the way home for errands and other activities. None of the 17 respondents make regular trips in the morning of the days they telecommute and only two reported periodic trips after work.

County of Los Angeles

With approximately 80,000 employees, the County of Los Angeles is one of the largest public sector employers in the nation. The County has an extensive telecommuting program, which was initiated in 1989. The program was started to help reduce operating costs, increase worker productivity, and address severe traffic and air quality problems in Southern California. These continue to be the primary objectives of the program.

Currently some 4,000 employees participate in the telecommuting program, which has evolved over time, and an additional 25,000 employees are eligible. The program involves three basic telecommuting work arrangements. These are working from home, working at a Telebusiness Center or a Telework Office, and emergency or short-term telecommuting (24). In addition, one of the unique features of the County's program is the partnership with local municipalities. The County has established arrangements with 14 cities to allow County employees to work in local offices at no cost.

Similar procedures are used with all three telecommuting arrangements. Interested employees make a request to their supervisor to participate in the program, and, if approved, a second request is made to the Department Telecommuting Manager. The telework location and the exact arrangement are agreed upon by all parties and the employee participates in the County's training program. The nature and extent of equipment provided to the telecommuter is a department decision.

Evaluations of the telecommuting program have been conducted by different departments. For example, the County Assessor's Office has documented a 42 percent increase in productivity with the telecommuting program over time. Telecommuting employees in the Children's Services, Probation, and Public Services Departments all have reported lower stress levels and increased productivity (24).

Federal Flexible Workplace Pilot Project

The Federal Flexible Workplace Pilot Project, called Flexiplace, was initiated in 1990. The pilot was developed to enhance the ability of federal agencies to recruit and retain a skilled workforce, to improve employee's quality of life, and to reduce federal operating costs. The pilot program involved approximately 1,000 employees from 15 agencies throughout the country. Three types of telecommuting options were tested. These were telecommuting from home, using a telework center, and flexible accommodation for disabled employees (25).

An evaluation of the pilot program was conducted by the OPM and GSA. The evaluation included surveys of telecommuters, supervisors, co-workers, and customers, focus groups of telecommuters and supervisors, and observations by the Flexiplace Management Team. Initial surveys were completed to provide a baseline prior to the initiation of the pilot. Additional surveys were conducted at six months and one year to measure changes over the course of the pilot program. The following highlight the major findings from the evaluation (25).

- Most of the participants were mid to senior level staff with very high performance ratings.
- The high performance ratings continued or improved during the telecommuting pilot.
- Telecommuters indicated enhanced work productivity and greater flexibility in work arrangements.
- Approximately 43 percent of the participants reported their most productive work periods were outside normal business hours.
- Communication among telecommuters and their supervisors and co-workers remained strong.
- Telecommuters reported positive impacts on the quality of their personal life, reduced stress levels, reduced time spent commuting, and other related benefits.
- A majority of telecommuters reported reduction in work-related transportation costs. These savings were somewhat off-set by increases in home utilities and other expenses. Approximately half of the participants reported no change in total job-related expenses, while almost a third indicated a reduction.
- The majority of telecommuters and supervisors supported continuing the Flexiplace option.
- Overcoming management reluctance was noted as a major challenge in implementing Flexiplace in many agencies and offices.

After this demonstration, the GSA and the Department of Transportation developed two guides to help other agencies and organizations implement telecommuting programs. One of the guides provides an overview of telecommuting (26), while the other reports include a trainer's guide and participant workbook (27).

Minnesota Department of Administration

The Minnesota Department of Administration initiated a pilot telecommuting program in late 1995. The one-year demonstration grew out of legislative and general interest in the state in exploring the use of telecommuting to address traffic and environmental concerns. Working with other state agencies, the Department developed a telecommuting program for the state. The program includes the state policy and guidelines on telecommuting, and provides examples of telecommuting expectations, surveys, home office requirements, evaluation measures, work plans, and training information that can be used by individual state agencies (20).

The pilot program at the Department of Administration was guided by a Telecommuting Advisory Committee. One of the first activities of this group was to develop the goals for the pilot program. The following four goals were used to focus the demonstration (28).

- To encourage telecommuting solutions that seek to provide savings in state-occupied space and other operating costs.
- To use telecommuting as a tool to increase productivity with available resources.
- To take a leadership role in using telecommuting to improve the quality of the environment, community, and family.
- To encourage the use of telecommuting to accomplish flexibility and innovation in meeting customers, management, and employee needs.

The pilot program involved 60 employees from 15 division within the Department. The telecommuters were selected to provide a mix of job functions and experience within the Department. Training was provided for telecommuters and their supervisors, and a formal evaluation was conducted of the pilot program. The following points highlight some of the major findings from the evaluation related to the four goals of the pilot program (29).

- No major changes or savings in office space were realized during the demonstration. The number of telecommuters and the number of days spent telecommuting would need to be increased before significant savings in office space would be realized.
- Telecommuters reported a greater quantity and quality of work completed on telecommuting days and indicated that this productivity increase was due primarily to fewer interruptions.

- Data from the pilot program indicated that telecommuting has a positive and measurable effect on the environment, the community, and the family. Each telecommuter saved approximately 800 kilometers in commute travel during the year, for a total savings of 48,300 kilometers for all participants.

- The results also indicated that community leaders recognized that telecommuters who are working from home have a positive impact on the community and neighborhood. Further, telecommuters responded that they were able to increase the amount of time devoted to their personal life by reduced commuting requirements.

- Most telecommuters and supervisors reported no change in customer contact or other innovations during the pilot. The potential for enhancements in these areas were expressed by a number of participants, however.

The overall results from the pilot program were positive and the Department plans to expand the telecommuting program and make it a permanent part of work arrangements available to employees. A number of ways to enhance the program were also identified during the evaluation and recommendations were made on incorporating these into the ongoing program.

Puget Sound Telecommuting Demonstration Project

The Puget Sound Telecommuting Demonstration was initiated in 1990 by the Washington State Energy Office (WSEO). The demonstration included 25 public agencies and private firms in the Seattle area. Although the demonstration was motivated primarily to explore potential energy and environmental benefits from telecommuting, organizational and personal issues were also explored. The demonstration focused primarily on telecommuting from home. One telework center was established, however, and 24 employees from nine groups used this facility (7).

The demonstration was developed and operated to provide a comprehensive assessment of the potential for telecommuting in the area. A conference on telecommuting in 1989 was used to recruit agencies and businesses to participate in the demonstration. These groups signed a memorandum of understanding with WSEO, which outlined the policies and procedures that would be used to oversee the demonstration and the evaluation.

WSEO staff provided assistance to the participating groups in establishing and operating individual telecommuting programs. Help was provided in establishing policies and procedures, selecting the telecommuters and supervisors, training, and ongoing trouble shooting. The actual demonstration lasted from 1990 to 1992.

A number of techniques were used to evaluate the demonstration. These included surveys, travel logs, focus groups, case studies, informal observations, and follow-up interviews. The results of the demonstration are briefly summarized below (7).

- Most participants telecommuted an average of one day a week.

- Telecommuters used a mix of equipment at home. In some cases, new or surplus computers were provided to telecommuters, while in other cases, personal equipment was used. Equipment concerns did not appear to be a major problem for most of the participants.

- Benefits of the demonstration reported by telecommuters included increased levels of job satisfaction, enhanced performance, and greater flexibility. Some concerns were raised over job security, however.

- Reasons cited by telecommuters who discounted participation in the demonstration included not liking it, concerns about being less visible in the office, job changes, problems in the office, and lack of adequate equipment.

- Factors identified by participants that contribute to a successful telecommuter included supporting family, computer skills, adequate space at home, supportive organization and management, nature of the job tasks, and self-motivation.

- Supervisors generally rated telecommuter's performance the same or better as those days spent in the office. A few cases of declining performances were noted, however.

- Reduction in the number of commute trips were realized by telecommuters in the demonstration. An average of 26 fewer commute trips per year were estimated for each telecommuter. Approximately 61 percent of the participants drove alone to work, while 18 percent carpooled, and 17 percent took the bus. These results were used to estimate that each telecommuter reduced their work travel by some 1,900 annual kilometers Corresponding savings in gasoline and travel time were also estimated.

State of Arizona Telecommuting Program

Telecommuting was first introduced at state agencies in Arizona in 1989. The program, which started as a pilot effort, has grown steadily over the years. The initial pilot program allowed selected employees to telecommute from home one or two days a week. It was initiated to help address concerns over growing levels of traffic congestion and declining air quality standards, as well as enhancing worker productivity (30).

The success of the pilot effort led to the second phase of the program, which started in 1993. This effort focused on the development of a telecommuting program and information and materials to promote the use of telecommuting within all state agencies. The preparation of these materials have been coordinated with the states of Washington and Oregon.

Currently, the third phase of the program is under way to implement telecommuting efforts at all state agencies in Maricopa County as mandated by the Governor. The goal of the third phase is to have 15 percent of state agency personnel participating in some type of telecommuting program by the end of 1998 (30).

The Arizona Department of Administration conducted an extensive evaluation of the telecommuting program in 1996. The evaluation focused on the following elements.

- Assess current perceptions, attitudes, and level of support for telecommuting at different levels within the participating agencies.

- Estimate the current level and potential for telecommuting within these agencies.

- Determine what the purposes of telecommuting are and should be within state agencies.

- Explore middle management's perceptions of the potential barriers and possible incentives to telecommuting.

A number of components were included in the evaluation to answer these questions. Interviews with senior management, focus groups with supervisors, research on other telecommuting programs, surveys of employees, members of the state legislature, and the public were all conducted as part of the evaluation. The following highlight some of the main findings from the evaluation (30).

- Senior managers tended to be positive toward telecommuting whether their organization had a program or not. The most frequently cited benefits of telecommuting by this group was increased work efficiency and productivity.

- Supervisors were also supportive of telecommuting. Supervisors noted that telecommuters have fewer disruptions and are better able to work during their peak performance times. Improved staff morale among telecommuters was noted as a benefit. Positive experiences with managing telecommuters were expressed by a number of participants.

- The survey of state employees, which included both telecommuters and non-participants, indicated support for telecommuting among both groups. Benefits of telecommuting noted by state employees included increased productivity, reduced absenteeism and job turnover, improved job satisfaction, and more time with family. Telecommuters reported reduced stress levels and increased ability to meet work objectives.

- Although not all of the legislators responding to the survey were aware of the demonstration program, most supported allowing state employees to telecommute. Potential benefits of telecommuting noted by the legislators included greater flexibility in balancing home and work requirements.

- The results of the survey of the general public was generally favorable toward telecommuting and the state demonstration.

The Department of Administration provided assistance to participating groups during the pilot program and is continuing to help during the full scale deployment. Videos, brochures, guidelines, and other informative material have been provided to public agencies and private firms. These efforts are being coordinated with the activities being pursued by the Regional Public Transit Authority described previously.

State of Texas—Texas Workforce Commission-Commission of Appeals Department

Telecommuting at the Commission of Appeals Department within the Texas Workforce Commission began on an informal basis in 1991 when a part-time attorney was allowed to work from home in response to family demands. The positive experience with this initial effort led to the development of a formal telecommuting program at the Commission. Currently, 14 attorneys, representing approximately 74 percent of the legal staff, and three stenographers are full-time telecommuters.

A set of formal guidelines, which are outlined in the *Telecommuter's Handbook*, govern the program at the Commission (31). The *Handbook* establishes the telecommuting program as a management option, not an employee entitlement. Participation in the program is voluntary and can be terminated without cause. To be eligible for consideration to telecommute an employee must have been with the agency for one year, be self-motivated, and possess a good understanding of their job and the operations of the department.

The employee must provide a safe and adequate work space at home. Agency or personal equipment may be used at home, but agency equipment and software may not be used for personal purposes and other family members and individuals must not have access to equipment, documents, or information. Telecommuters are covered by the Agency Worker's Compensation Insurance, provided the work location and schedule has been approved. Telecommuting is not viewed as a substitute for child care or dependant care on a regular basis. Suggestions are provided to telecommuters on planning their work space, organizing their work day, managing their time, and developing good work habits.

A formal agreement, which is signed by the supervisor and the telecommuter, governs participation in the program (32). The agreement contains many of the items covered in the guidelines. The responsibilities of the telecommuter and the Commission are outlined relating to work schedules, equipment, supplies, use of software, and communications with the office. The expectations relating to a telecommuter's work production and work quality are outlined. Telecommuters are required to maintain a tracking log of work assignments and completion dates. Telecommuters and supervisors agree to participate in studies, surveys, and other evaluations of the program.

The Commission of Appeals Department conducted an assessment of the telecommuting program in 1996. The progress report completed on this assessment documents a number of benefits for both the agency and for employees from the telecommuting program (33). Researchers obtained additional information on the experience with the program through

interviews with telecommuters and supervisors in the Department. The following points summarize the highlights from the assessment and the interviews.

- The telecommuting program has had a measurable improvement in the productivity and work output of participating employees. Measuring changes in productivity is easier in this case because the attorneys have weekly assignments of cases, hearing tapes, and case quotas. As a result, employee performance—at home or in the office—is easy to monitor. In 1996, the Department set a new record in the timely processing of caseloads.

- The Department was also able to better manage existing office space and realized cost savings as a result of the telecommuting program. Between 1991 and 1996, the number of attorneys working for the Department increased from 18 to 20. The office space needs during this same time period were reduced through the telecommuting program. The Department has also been able to realize savings in the costs associated with providing parking spaces, telephones, and other items to telecommuters.

- Benefits of the program identified by telecommuters include greater work productivity, a better balance between work and home demands, reduced stress from daily commuting, and improved job satisfaction. Telecommuters appreciate the program and feel it has enhanced employee morale and loyalty.

- Telecommuters noted that their work productivity has improved through elimination of time spent commuting and parking, fewer interruptions, and flexibility in work schedules. For example, some 60 percent of the Department telecommuters report doing half their work outside the standard 8 a.m. to 5 p.m. workday.

- The Department also perceives that the program provides a unique recruiting tool and helps in retaining good employees.

- Key elements to the success of the program that were identified by both supervisors and the telecommuters included establishing clear guidelines and expectations, maintaining regular communication, and ensuring strong support for the program from top management. Telecommuters stressed the need to establish regular work routines, to maintain an organized work area, to limit distractions, and to maintain ongoing communication with supervisors and co-workers. Managers identified regular communication and focusing supervision on measurable work accomplishments as two key elements to a successful program.

Wisconsin Department of Transportation-District Two

District Two of the Wisconsin Department of Transportation (WisDOT) conducted an Alternative Worksite (Telecommuting) Demonstration Project in 1994 and 1995. District Two

encompasses the Milwaukee Metropolitan area in Southeastern Wisconsin. The project was undertaken to accomplish the following objectives (34).

- To provide guidance to managers receiving requests from employees to telecommute.
- To determine the potential for telecommuting to help achieve the District Two employee commute option goals.
- To allow District Two staff responsible for the travel demand management program to gain experience with telecommuting programs.
- To share information on telecommuting with public and private sector employers in the area.

The demonstration included two phases. The procedures and evaluation methods were established during the first phase and the actual demonstration was conducted in phase two. From April 1994 to June 1995, a total of 15 employees and 14 supervisors participated in a demonstration which allowed telecommuters to work from home one or two days a week. Daily work logs, surveys, and group meetings were used to monitor and evaluate the test. The following points highlight a few of the major findings from the demonstration.

- Overall, participation in the telecommuting demonstration was lower than originally anticipated. Most participants averaged telecommuting one day a month, rather than the one day a week that was initially envisioned.
- The telecommuting demonstration appeared to have a positive impact on the effectiveness of both the work unit and the telecommuters. Approximately 50 percent of the supervisors indicated that telecommuter's work quantity increased on telecommuting days and 40 percent indicated that participant's overall work performance increased on telecommuting days.
- There was no reported decrease in the overall effectiveness of the work unit because of telecommuting.
- Co-workers were supportive of the telecommuting program and the overall impact of telecommuting on the performance of the work unit was viewed as positive.
- Telecommuters reported positive reactions from co-workers and other employees to their participation in the program.
- The type of work found most conducive on telecommuting days was project analysis, reading and writing reports, data entry, receiving reports and paperwork, and software testing.

As a result of the demonstration, the District recommended that the Department adopt a policy that at a minimum would allow telecommuting at worksites impacted by mandated employee trip reduction programs. It was further suggested that telecommuting programs be structured to maintain employee accountability, and that it be limited to situations where the supervisor is comfortable that the job tasks and the employees are suited (34).

WORKING AT HOME--PRIVATE SECTOR

First Interstate Bank

First Interstate Bank employs approximately 3,500 people in the Los Angeles area, including many in the downtown headquarters office. A telecommuting program was initiated in 1991. The objectives of the program focused on increasing worker productivity, while at the same time providing more flexibility for employees (35).

Employees must be with the bank for at least one year before they will be considered for the program. An employee submits a formal request to participate in the telecommuting program, as well as an equipment checklist. A signed agreement is used to ensure all parties understand the policies, procedures, and expectations of the telecommuting program. Most telecommuters work from home, although a few use telework centers. Some equipment is provided by the bank, and business-related telephone calls are reimbursed.

Response to the program has been positive for managers and telecommuters. Benefits noted by supervisors include increased productivity and less time off. Telecommuters reported fewer distractions and greater flexibility in balancing home and family responsibilities (35).

Georgia Power

Georgia Power, located in Atlanta, first implemented a pilot telecommuting program in 1992. The program was initiated primarily to assist with reducing peak hour commuting and related air pollution by company employees. During the pilot, 14 employees telecommuted from home. The benefits of the pilot program, which included savings of approximately $100,000 in leased office space, resulted in an ongoing telecommuting program.

Currently, some 80 employees telecommute from home or work at a telecenter on a regular basis. Georgia Power does pay for the installation of a second telephone line at telecommuter's homes. The company feels modest costs are offset by the benefits of reduced office space needs, sick leave use, parking requirements, and employee turnover (36).

Health Net

Health Net is one of the largest Health Maintenance Organizations (HMOs) in California, with some 1,700 employees. Interest in telecommuting at Health Net grew out of a concern relating to office space needed to accommodate additional staff. A pilot telecommuting program,

which allowed selected staff from the customer service and claims processing departments to use the Antelope Valley Telebusiness Center, was initiated in 1993.

The pilot program started with 10 telecommuters sharing five work stations at the Center and two more departments. The success of the pilot program resulted in the addition of five workstations at the Center and two more departments. Health Net also installed additional computer equipment at the Center to provide enhanced links to the main office.

Based on the success of the initial efforts, the telecommuting program at Health Net continues to expand. The ability to work from home was added, and approximately 10 employees are currently telecommuting from home on one or more days a week. The use of the Antelope Valley Telebusiness Center has grown to 36 work stations. Benefits identified from the program include reduced overhead costs, improved productivity, enhanced employee retention, and better ability to respond to the 1994 Northridge earthquake and other natural disasters. Factors contributing to the success of the program include top management support including the Chief Executive Officer, and the active participation of supervisors (37).

IBM

IBM uses a number of different telecommuting programs in its offices throughout the United States and Canada. The telecommuting programs focus primarily on sales and service personnel, as well as administrative and management staff. IBM estimates that as many as 20,000 employees use some form of telecommuting on a regular basis (38).

The telecommuting programs at IBM were developed in response to multiple needs. These included enhancing customer sales and services, reducing real estate costs, increasing productivity, and responding to employee needs. Telecommuting options available to IBM employees include working at home, working "on the road" with customers, and working in a customer's place of business. The time spent telecommuting and in an office varies among employees depending on the nature and requirements of the job. All telecommuters periodically visit their base office for meetings and other activities.

IBM reports positive results with the various telecommuting programs. Documented benefits include significant savings in real estate costs, increases in customer satisfaction, improvements in employee productivity, and enhanced abilities to attract new and retain existing workers. The support of top management has been noted as an important key to the success of the program (38).

Mobil Oil Corporation

Telecommuting at Mobil Oil Corporation in Dallas was initiated in 1994, with a 90-day pilot program in the Exploration and Producing Division. The pilot program involved five employees who telecommuted one or two days a week during the three-month test period. The success of this initial effort resulted in company support for telecommuting at the discretion of the

individual operating divisions. Rather than a company-wide program, each division is responsible for determining if telecommuting is appropriate and for establishing specific guidelines and procedures.

The guidelines (39) developed during the pilot program continue to be used by the various departments with telecommuting programs. Most departments are organized into work teams, and the decision to allow telecommuting is left to the individual teams. The telecommuting guidelines used in the Exploration and Producing Division establish telecommuting as a cooperative arrangement among a supervisor, an employee, and the work group. Telecommuting is viewed as a management tool allowing flexibility in work options and is a voluntary agreement between a supervisor and an employee which can be terminated at any time. Jobs identified as suitable for telecommuting are characterized by clearly defined tasks and deliverables that can be measured. The telecommuter eligibility criteria focuses on employees who are responsible, self-motivated, results oriented, independent, effective communicators, adaptable, familiar and comfortable with job tasks and procedures, and committed to making telecommuting work.

A checklist is included to help rate employee and work characteristics for individual telecommuting requests. Telecommuters must have designated work space at home, and telecommuting is not to be used as a substitute for day care or other dependant care. Telecommuters must be accessible during agreed upon work schedules and must take all precautions to secure any proprietary information. The telecommuter is responsible for all equipment in the home, including providing a second telephone line if necessary. Mobil makes outdated computer equipment available to employees at no cost, so most telecommuters have computers at home. Mobil also provides appropriate software to link to the local area network (LAN) and an analog telephone line at the employee's on-site computer if needed.

Information on the experience with telecommuting at Mobil was obtained from an assessment of the 90-day pilot program conducted by the Exploration and Producing Division (40), interviews with management personnel, and surveys completed by two employees in the Oil and Gas Account Group. The following points highlight the experience with telecommuting at Mobil (3, 40).

- Overall, experience with telecommuting has been very positive. The results from the pilot program and current programs indicate that telecommuting is a feasible and effective work arrangement.

- Telecommuting has been transparent. This means customers, peers, and management perceive no differences in an employee working at home or in the office.

- The pilot program documented increases in productivity related to a number of performance targets. Experience since the initial test has supported the productivity of telecommuters.

- Telecommuters identified a number of benefits with the pilot program and subsequent efforts. These included reduced stress, increased job satisfaction, reduced travel time commuting to work, savings in gasoline and parking costs, enhanced independence and flexibility, and a greater feeling of accomplishment, responsibility, and trust.

- Both management and employees view telecommuting as a positive way of dealing with potential conflicts between work and family responsibilities. Telecommuting helps ease the strain and stress of trying to balance priorities at work and at home.

- The two employees completing surveys identified travel time savings of 40 and 75 minutes on their normal one-way commute trips of 24 and 58 kilometers, respectively, on telecommuting days. No regular trips were reported on telecommuting days.

- Other potential benefits from telecommuting identified by both managers and employees were the enhanced ability to recruit new employees and retain existing staff, as well as show corporate and individual support for air quality and transportation concerns.

- Keys to successful telecommuting identified by supervisors and employees included planning and flexibility. Telecommuters, supervisors, and the work group should all have a common understanding of the requirements of the program, the days that individuals will telecommute, and the mechanism for ensuring ongoing communication. Telecommuters need to be well organized to ensure they have the right materials and enough work on telecommute days. Telecommuters also need to be flexible in order to respond to meetings and other activities that may require them to be in the office on days they are scheduled to work at home.

Movo Media

Most of the private sector telecommuting program case studies focus on larger employers. Movo Media provides an example of how telecommuting is being used successfully to enhance the operation and productivity of a small company. Movo Media, located in West Hollywood, employs about 30 people in the entertainment and telecommunication business. Telecommuting was implemented at Movo Media in response to limited office space to accommodate a growing staff (41).

Employees frequently work at home one or two days a week and three employees telecommute from other cities in California and the east coast. Currently, telecommuting arrangements are made informally among employees and managers. More formal guidelines and policies are being developed, however.

Benefits realized to date from the program include greater flexibility and improved productivity for the employees, better balancing of professional and personal needs, enhanced ability to recruit employees, and improved ability to address office space needs and costs. For

example, the company estimates that it has saved approximately $30,000 per year in reduced overhead expenses through the telecommuting efforts (41).

Paddock Swimming Pool Company

Paddock Swimming Pool Company is a small business specializing in building pools for commercial water parks located in Rockville, Maryland. In 1993, the Chief Executive Officer (CEO) began working from home on a part-time basis. Based on the success of his initial trial, the CEO continued to work from home one or two days per week, and has extended the same option to most of the firms 50 headquarter employees. Currently, between 8 and 16 employees may telecommute once or twice a week.

The telecommuting program has allowed the firm to keep valued employees, to enhance productivity through reduced time spent commuting, and to improve employee morale. For example, a key employee recently married and relocated a longer distance away from the main headquarters. The individual is now telecommuting two days a week, allowing the company to retain a valued employee for an investment of $150 for a high-speed modem connection (42).

TRW

TRW uses various forms of telecommuting throughout its international offices and plants, including the Company's Information and Services Division, located in the City of Orange, California. This Division, which has approximately 1,000 employees, has been using telecommuting for a number of years to enhance interaction with customers and to provide better service to clients.

The telecommuting program is governed by a series of guidelines, which identify the responsibilities of all groups and establish the ground rules for participation in the program. One of the issues for TRW, which does a good deal of defense and aerospace work, was the security of information and access for telecommuters. To address these concerns, TRW provided enhanced local area network (LAN) connections for telecommuter's homes and built in security access for persons linking in from home (43).

The telecommuting program at TRW has been well received by staff and management. Benefits noted to date include reducing stressful work levels for employees, which has enhanced productivity, and reducing commuter trips and related emissions and air pollution (43).

UNISYS Corporation

The Mission Viejo, California, Office of UNISYS has had a telecommuting program since 1991. The telecommuting program focuses primarily on the software engineering group within the 1,000 employee office. Formal policies and guidelines govern the program, and all managers and telecommuters go through a training and orientation process. Most telecommuters work at home between one and three days a week.

Although the telecommuting program was developed partly in response to air quality regulations, the ability to attract and retain skilled software engineers was also a driving force. The program has accomplished both of these objectives. Reduced commute trips by company employees has helped address air quality concerns, and many employees from the closed Pasadena Office remained with UNISYS based on the ability to telecommute (44).

United Airlines

United Airlines uses a number of telecommuting approaches in its offices throughout the country. These include working at home, working at telework centers, and the use of "virtual offices." In 1992, the Airlines Information Services Department in Los Angeles implemented a telecommuting program partially in response to trip-reduction requirements. The program has been expanded to include the use of the Moreno Valley Telework Center, as well as allowing account executives to work primarily on the road or with their major customers (45).

Formal guidelines govern the telecommuting program at United Airlines. Employees interested in participating in the program complete an initial survey. An agreement is developed and signed by the employee and their supervisor. Telecommuters complete work plans prior to their telecommuting days and a list of accomplishments the day after. Most employees using the telework center do so on a full-time basis. The account executives, who are provided with laptop computers and cellular telephone, spend most of their time in client's offices.

Benefits documented to date include an approximate 30 percent increase in productivity during the first year of the program. Using the telework center has reduced employee commute trips by some 6,400 daily kilometers. Improved employee morale and enhanced customer service has also been noted (45).

SATELLITE TELEWORK CENTERS

Hawaii Telework Center

A combination of public and private sector groups sponsor the Hawaii Telework Center Demonstrations Project. The project involves employees from the Bank of Hawaii, IBM Corporation, Inter-Island Legal Services, Hawaii Medical Services Association, and Title Guarantee of Hawaii, as well as a number of state employees. The telework facility is located in the suburb of Mililani, Oahu, approximately 32 kilometers from downtown Honolulu. The companies lease office space and provide computer equipment, telecommunications services, and other related equipment. The Hawaii State Legislature provided $125,000 to help initiate the project. Employees report reductions in trips, travel time and fuel consumption and an increase in productivity and job satisfaction (5).

Los Angeles Telework Centers

A number of telework centers are in operation in the Los Angeles Metropolitan area. These centers have been developed by a variety of federal, state, and local groups. Examples of the implementation and operation of telework centers in the Los Angeles area are highlighted here.

In response to the Northridge Earthquake in 1994, the GSA established three telework centers for federal employees. The development of these centers, which were located in Valencia, Westlake, and Sherman Oaks, was funded through special authority of the Federal Buildings Fund. The centers were well utilized during the aftermath of the earthquake. Occupancy rates ranged from 87 percent at the Valencia center to 34 percent at the Sherman Oaks facility. Use levels dropped off as the transportation system in the area returned to normal. As a result, the Sherman Oaks and Westlake Centers were closed at the end of 1994 (8).

After the earthquake, the California Department of Transportation (Caltrans), local communities, and other groups also began developing telework centers. Currently, at least six telework centers are in operation in the Los Angeles area, and additional facilities are being planned. Telecenters are also in operation in the San Diego and San Francisco areas.

The Metro Blue Line TeleVillage is one of the newest telework centers in the Los Angeles area. The TeleVillage, which was developed by the Metropolitan Transportation Authority (MTA), is located at the Compton Transit Center adjacent to the Metro Blue LRT Line. The TeleVillage is a state-of-the-art community center that provides space for telecommuters, as well as access to computers, distance education, video conferencing, and other services to local residents. The facility is being operated by a non-profit community development corporation (46).

Minnesota Department of Transportation Cambridge Telecenter

The Minnesota Department of Transportation (Mn/DOT) developed the Cambridge Telecommunications Center, which opened in the Fall of 1996. Cambridge is located approximately 45 miles north of the Minneapolis-St. Paul Metropolitan area. A number of Mn/DOT employees, as well as personnel from other state agencies, live in the Cambridge area and commute on a daily basis into the Twin Cities. The Mn/DOT Cambridge Telecommunications Center was established to reduce commute trips, with accompanying reduction in energy consumption and accidents, to improve employee performance and satisfaction, and to enhance the economy and human capital of the Cambridge area (10).

Currently, approximately 20 Mn/DOT employees work in the Center once or twice a week, rather than commuting into the Twin Cities. Under Mn/DOT sponsorship, an evaluation of the Center is being conducted by the Center for Transportation Studies (CTS) at the University of Minnesota. U. S. West is also co-funding the evaluation. The evaluation was initiated in October, 1996. Components of the evaluation include surveying employees, supervisors, and local businesses in Cambridge; examining community tax, fee, and site cost records; assessing site-usage data; and monitoring changes in telephone usage in the area. The evaluation results will be

used by Mn/DOT and other state agencies to enhance the existing Telecommunications Center and to develop new facilities in other parts of the Metropolitan area (10).

Washington, D.C., Northern Virginia, and Southern Maryland Telecenters

In September of 1992, Congress appropriated $5 million for the development of telecommuting centers by the General Services Administration (GSA) in Southern Maryland, the Eastern Shore of Maryland, and Northern Virginia. In 1993, Congress increased the appropriation by $6 million and amended the legislation to include Hagerstown, Maryland, and Fredericksburg, Virginia, and to delete the Eastern Shore of Maryland (8).

The major objectives in developing the telework centers are to help enhance the work environment for federal employees and increase their job performance by reducing stress, providing greater flexibility, and enhancing family life. Other objectives included recruiting and retaining skilled personnel, accommodating employees with disabilities, generating environmental benefits and energy savings, reducing traffic congestion, improving customer service, responding to special situations, reducing office space costs, and supporting local communities (8).

To date, 10 telework centers have been established through this program or in partnership with this program, and additional facilities are scheduled to be opened over the next few years. As noted below, five existing facilities are in Maryland and five are in Virginia.

- Maryland
  - Frederick Telework Center
  - Hagerstown Telework Center
  - Prince Frederick Telecenter
  - San Souci Telecenter (California, Maryland)
  - Waldorf InTeleWork Center

- Virginia
  - Fairfax Telecommuting Center
  - Fredericksburg Telecommuting Center
  - Stafford Telework Center
  - Manassas Telecommuting Center
  - Shenandoah Valley Telecommuting Center

The GSA is working with local governments, developers, and other groups in developing and operating these centers. A variety of arrangements have been used with existing facilities. Further, although the centers were started for government employees, some are leasing space to private firms. Operating in a self-sufficient mode is one of the goals of the facilities.

The GSA conducted a preliminary assessment of the centers in 1995 (8) and a more detailed evaluation is being completed. The interim report documented the following benefits from the initial four centers (8).

- Based on surveys of workers using the telecenters, telecommuters save an estimated 6,000 miles of travel annually by using the centers one or two days a week. The corresponding time savings for a telecommuter is some 160 hours a year and $500 a year in transportation costs.

- Although benefits to the federal agencies were not examined in detail, anticipated advantages included maintaining or enhancing worker productivity, and improved customer services.

- No agencies reported office space reconfigurations or cost savings from the initial use of the satellite centers, due to the small number of participants.

The more detailed analysis of the telecommuting centers being completed by GSA is exploring many more factors related to their use, the benefits to telecommuters and employers, and the elements that seem to influence the success of a facility.

CHAPTER FOUR – KEYS TO SUCCESSFUL TELECOMMUTING PROGRAMS

The information examined for this report provides insight into the components of successful telecommuting programs. Although not present in every case study, a number of elements occurred frequently enough to indicate that they should be considered in developing a telecommuting program. The following elements appear to be important in maximizing the potential benefits of telecommuting to all groups.

GOVERNMENTAL POLICIES AND AGENCY SUPPORT

Legislative directives, administrative actions, and agency policies helped promote telecommuting in many of the case studies. At the national level, the directions provided in the Clean Air Act Amendments, the ISTEA, funding of the telework centers in the Washington, D.C. area, Presidential actions, and other policies all supported the implementation of telecommuting programs. State activities, such as those underway in Arizona, California, Minnesota, Oregon, and Washington have also helped foster interest in telecommuting. Multifaceted programs at the regional and local levels, such as those underway in Dallas, Phoenix, and the Washington, D.C. area, have also played important roles in fostering greater use of telecommuting.

TOP MANAGEMENT SUPPORT

Support from top management in a business or agency is critical to the development and implementation of a telecommuting program. Management must be willing to provide any necessary financial support, as well as any changes in policies and procedures for telecommuting. Examples of the support from management or senior personnel are evident throughout the case studies. In some instances, such as Paddock Swimming Pool Company, the CEO was actually the first to test telecommuting. In other cases, the CEO and top management actively sponsored the pilot programs and full scale implementation.

EMPLOYEE INTEREST AND SUPPORT

While support from senior management is critical to the success of telecommuting programs, so is interest from employees. In many of the case studies, telecommuting was promoted at the staff level. In some instances, employee groups conducted background research, developed draft policies and programs, and pursued pilot tests within their agency or firm. The early involvement and support of labor unions and other employee groups was noted as important is some of the case studies. Thus, as noted by the focus groups conducted with employers in the Washington, D.C. area, both bottom-up and top-down support is needed for successful telecommuting programs (16).

TELECOMMUTING POLICIES, GUIDELINES, AND HUMAN RESOURCE SUPPORT

Clearly articulating the agency or company policies and guidelines relating to telecommuting appears to be an important aspect of successful telecommuting programs. Most, but not all of the case studies have some type of formal guidelines governing the telecommuting program. In most cases, these policies identify the expectations of both employees and management. The policies should outline the specific requirements for telecommuters, such as a home work area, work hours, communications with the main office, dress, and other items. Support from the human resource or personnel department is also important to ensure that both supervisors and employees are able to obtain assistance during the implementation of a telecommuting program, as well as on an ongoing basis.

SELECTION OF JOB TASKS

The guidelines used in many of the case studies identify the types of jobs or job tasks and functions appropriate for telecommuting. The following characteristics summarize the main factors used to help identify jobs that may be appropriate candidates for telecommuting.

- Can work tasks be done at home or at a remote work site?
- Can work tasks be done without on-site or face-to-face interaction with customers or co-workers?
- Is the equipment necessary to conduct the work tasks available at home or a remote work site?
- Can the job objectives be identified and measured?

Certain jobs may be better suited to telecommuting than others. Examples of job tasks and functions that are good candidates for telecommuting include research, data analysis, communications, writing, and programming.

SELECTION OF TELECOMMUTERS

Once the general jobs and work tasks appropriate for telecommuting have been identified, the next step is to select the employees to participate in the program. The guidelines used at many of the case studies include criteria for identifying and selecting telecommuters. The case studies and the general literature review indicated that an employee's work habits should be considered in the selection process. Employees who complete tasks successfully and reliably, enjoy working independently, and like to assume responsibility may be good candidates. The following questions can be used to help identify potential telecommuters.

- Are you self-motivated and a self-starter?

- Do you like to work independently?
- Do you work well without supervision?
- Do you have a home office or area where you can work at home without interruption?

SELECTION OF MANAGERS AND SUPERVISORS

The selection of managers and supervisors of telecommuters appears to be as important as identifying telecommuters. Selecting supervisors should be done with care to ensure a successful program. Telecommuting may require managers to adopt new or to modify existing management styles and procedures. Employee productivity must be measured by factors other than direct oversight. The lack of interaction with an employee on a daily basis must also be considered. Making sure that both managers and employees are comfortable with the telecommuting arrangement and have established a good working relationship is important. In many of the case studies, signed agreements help establish the expectations of both supervisors and telecommuters.

ESTABLISHING REGULAR AND ONGOING COMMUNICATION METHODS

The importance of establishing regular communication methods was stressed by supervisors and telecommuters in the Texas case studies and noted in the literature. Techniques reported from all of the case studies included calling superiors at the start of work on telecommuting days, establishing regular times for phone calls, using e-mail and home pages, and making special arrangements in the case of an emergency.

ONGOING MONITORING AND EVALUATION

Most of the pilot or demonstration programs included some type of monitoring and evaluation component. These evaluations were used to gauge costs and benefits of the tests, and the results were used in determining the future of the programs. An ongoing monitoring program should be considered to ensure that a telecommuting program continues to provide the desired benefits for all groups. A monitoring program can help identify problems so that appropriate actions can be taken, and can document the benefits to all groups, which may be important in justifying the program.

EQUIPMENT AND SUPPORT

Ensuring that telecommuters have the necessary equipment to perform their jobs is another important factor with successful programs. Although extensive equipment may not be necessary, the case studies indicate that home computers, links into the office computer, a second telephone line, a fax machine, and a pager are often used by telecommuters. These items may be provided by the employee, the employer or the costs may be shared between the employee and the employer. Providing telecommuters with access to ongoing computer support services and other assistance is also important.

CHAPTER FIVE — IDENTIFICATION OF BENEFITS AND COSTS OF TELECOMMUTING PROGRAMS

This chapter examines the benefits that may be realized from telecommuting, as well as the costs that may be associated with implementing and operating telecommuting programs. Employers, employees, and society in general may all benefit from telecommuting. At the same time, some costs may be associated with telecommuting. Information on the benefits and costs associated with telecommuting obtained through the literature review and the case studies is highlighted here. Although evaluations have been conducted of many of the case studies, detailed information on the costs of developing and operating telecommuting programs is not always available.

EMPLOYER BENEFITS AND COSTS

The most common benefit cited by organizations with telecommuting programs is an increase in the productivity of their telecommuting workers. Faster completion of assignments, fewer sick and absent days, better time management, and increased morale and commitment to the company or agency were all reported by telecommuters. Other benefits realized by some companies include reduced office space needs and associated costs, enhanced ability to attract and retain high quality employees, and improved customer service. Examples of reported benefits to employers from telecommuting programs are summarized in this section.

Reduced Office Space Needs and Costs

One of the more significant potential cost savings from telecommuting for businesses and public agencies appears to be in reduced office space needs and related facilities, such as parking. For these benefits to be realized, however, telecommuting programs have to eliminate the need for existing office space or allow additional employees to occupy current spaces. Given the long-term nature of building leases and real estate ownership, savings in these areas may not be realized in the short-term. In the longer range, however, telecommuting provides a viable option to reduce or better manage office space and real estate needs. The following case studies highlight a few examples of office space cost savings or resource management as a result of telecommuting programs.

- Savings in office space and associated costs were reported at the Texas Employment Commission, Commission of Appeals Department, which was able to increase staff and decrease office space as a result of telecommuting (33).

- Pacific Bell reported savings of at least $50,000 in office space costs through telecommuting (47).

- Georgia Power has realized reduced office space and parking requirements from their telecommuting program (36).

- IBM has documented a 55 percent reduction in real estate at its Midwest Division, a 75 percent reduction in the Cranford, New Jersey Office, and a 10 percent reduction in the firm's offices in Canada from telecommuting programs (38).

- The telecommuting program at Movo Media in Los Angeles has allowed the company to add needed employees without increasing office space (41).

Increased Employee Productivity, Morale, and Commitment

One of the most frequently cited benefits by organizations with telecommuting programs is an increase in the productivity of their telecommuting workers. Faster completion of assignments and accomplishing more work due to fewer distractions, better time management, and increased morale and commitment to the organization have been reported. Although these benefits are sometimes hard to measure and quantify, the following examples from the case studies provide an indication of increases in the productivity of telecommuting workers.

- Results from the Texas case studies include a number of examples of increased productivity from telecommuters. Supporting evidence for enhanced productivity ranged from documented improvements in the processing of caseloads at the Texas Employment Commission, Commission of Appeals Department (33) to reports from supervisors and telecommuters of increased work output.

- The City of San Antonio Information Services Department reported improved customer satisfaction and more timely response to customer needs from the telecommuting program. Specific examples were provided of telecommuters responding quickly to provide information needed by other departments, which helped to establish telecommuting as a seamless or transparent program (23).

- The pilot telecommuting program at the City of Los Angeles indicated increased effectiveness of telecommuters over other workers, an annual $6,100 cost-benefit per telecommuter to the City, and improved communication among telecommuters and their supervisors (21).

- The County of Los Angeles documented a 42 percent increase in productivity over time with the telecommuting program (24).

- IBM has reported increased customer satisfaction and improved employee productivity from its telecommuting program (38).

- United Airlines reported an approximate 30 percent increase in the productivity of the Airlines Information Services Department in Los Angeles during the first year of the telecommuting program (45).

Decreased Sick Leave

Another benefit from telecommuting programs noted by management personnel at many of the case studies was decreased use of sick leave by telecommuting employees. Although telecommuting is not a substitute for sick leave, the ability to work from home on days when they are not feeling well enough to commute to the office helps contribute to the increased productivity of telecommuters discussed previously. Examples of agencies and businesses noting decreases in the use of sick leave by telecommuters were noted in the case studies.

Improved Ability to Attract and Retain Employees

A number of the case studies indicated that the telecommuting programs have helped retain quality employees, as well as assisted with recruiting new employees. Examples were also provided of using telecommuting to assist and retain valued employees through times of illness or special needs.

- The manager of the City of San Antonio Information Services Department indicated the telecommuting program has allowed them to be more competitive with private sector firms seeking the same employees. The telecommuting program has helped attract new workers, as well as retaining existing staff (3).

- The Texas Workforce Commission representative indicated that the telecommuting program provides a unique recruiting tool and provides options to help retain existing employees (3).

- Movo Media in Los Angeles has been able to hire skilled employees living in other cities through the telecommuting program (41).

- The telecommuting program allowed Paddock Swimming Pool Company to retain a key employee who married and relocated further away from the main office (42).

- The telecommuting program at UNISYS Corporation contributed to retaining many skilled employees when the Pasadena, California office was closed and employees had to be relocated to the Mission Viejo facility (44).

Address Special Situations and Needs

Telecommuting programs have also been used to assist and retain valued employees during special situations or in response to specific needs. Examples provided in the case studies included expanding telecommuting programs to assist employees during pregnancies, illnesses, illness in the family, and other special situations. In addition, telecommuting can assist in hiring and retaining employees with special needs.

Telecommuting can also help manage responses to natural disasters or other emergency situations. The San Francisco earthquake in October 1989 provided an unusual test case for telecommuting programs, as companies in the San Francisco Bay Area searched for ways to continue operating in spite of destroyed roadways that stranded employees at home. Telecommuting programs were also used after the 1993 Los Angeles earthquake to help manage demand on the transportation system (8, 48).

EMPLOYEE BENEFITS AND COSTS

The literature and case studies provide a good deal of information on the benefits of telecommuting to employees. Frequently cited benefits include time savings from fewer commute trips, increased productivity and job satisfaction, and better balancing of work and family responsibilities. Less well documented are the costs associated with telecommuting for employees. Examples of the costs and benefits to telecommuters are highlighted in this section.

Costs Associated with Telecommuting

The literature review and the case studies indicated a lack of uniformity related to the possible costs for telecommuters. In some of the case studies, the employer assumes all of the costs associated with telecommuting. These may include computers, modems, fax machines, additional telephone lines, and other related equipment. In other cases, the costs of needed equipment is shared between the telecommuter and the organization. In still other instances, the telecommuter is responsible for providing a computer or other items needed to successfully complete their job.

Given these differences in approaches, the cost of participating in a telecommuting program will vary. At the low end of the scale, there may be little or no costs to the employee. At the high end, a telecommuter may have to make an investment in a home computer, if he/she does not already have one, and may need to pay other related costs.

Reduction in Stress, Time, and Costs Associated with Commuting

Telecommuters in the case studies reported a number of benefits from not commuting to a central office one or two days a week or on a daily basis. Employees reported lower levels of stress and fatigue from not having to drive and deal with traffic congestion on telecommuting days. Telecommuters also reported savings in gasoline and parking costs from not having to drive to and from work every day.

Increased Productivity, Morale, Job Satisfaction, and Responsibility

Telecommuters in many of the case studies reported increased productivity from eliminating commuting time, reducing interruptions, and establishing flexible work schedules. Telecommuters reported increased motivation, job satisfaction, and loyalty to their employer, as well as greater feelings of accomplishment, responsibility, and trust.

Balancing Job and Family Responsibilities

Telecommuters noted a better balance of work and home responsibilities. Positive aspects of telecommuting on home life included spending more time with children, making meal preparations easier and dinner more enjoyable, arranging needed services or home repairs easier, and scheduling other personal appointments. Employees viewed the telecommuting programs as providing additional benefits in special situations. Examples provided included caring for sick children or relatives and individual illnesses.

COMMUNITY BENEFITS AND COSTS

Telecommuting programs may also provide benefits to the community and society as a whole. As discussed in this section, these may include reductions in energy use and pollution associated with commute trips. In addition, telecommuting programs may help enhance the economy and human capital of some areas and neighborhoods.

Travel Reduction, Air Quality Enhancement, and Energy Reduction

Telecommuting programs can benefit the transportation system by reducing commute trips. These benefits can help companies, agencies, and areas meet air quality legislative requirements and other policy directives. Since telecommuting removes work trips from congested peak-periods, telecommuting programs should have positive impacts on traffic congestion, air quality, and energy consumption. As summarized below, the experience at many of the case studies supports these benefits.

- The 21 telecommuters from the Texas case study sites who completed surveys averaged savings of approximately 61 kilometers per one-way trip or 122 kilometers round trip, on the days they telecommuted. Only two of the survey respondents reported making regular trips on telecommuting days. Both of these individuals made trips to and from day care. These trips were less than five kilometers compared to their normal commute trips of 52 and 61 kilometers (3).

- The State of California Telecommuting Pilot Project, which included 22 state agencies, reported significant savings in vehicle kilometers of travel (VKT). Travel diaries kept by program participants indicated that they made virtually no work-related trips on telecommuting days. The majority of participants also reduced the number of non-work trips on telecommuting days. Overall, on days they worked at home, telecommuters reduced their peak-period trips by an average of 60 percent, their total vehicle kilometers by 80 percent, and their freeway use by 40 percent. The telecommuting program prompted many participants to seek out shopping, recreation, and other non-work destinations that were closer to their homes, both on telecommuting and non-telecommuting days (49).

- Travel diaries completed by telecommuters and other workers provided a model for trip and emissions reductions during the Puget Sound Telecommuting Demonstration Project. On telecommuting days, telecommuting workers averaged 30 percent fewer trips, 63 percent fewer kilometers traveled, and 44 percent fewer cold starts. These factors resulted in a 50 to 60 percent decrease in individual vehicle emissions per telecommuting day (50).

- Telecommuting employees at the state of Hawaii's telework center in Mililani, Oahu, saw a gasoline savings averaging 29 percent, as well as a 7.4 hour reduction in travel time per week (51). An average of 50 vehicle kilometers of travel was saved per employee for each telecommuting occasion in a telecommuting test conducted by the Southern California Association of Governments (SCAG). Most participating employees worked from their homes, with one employee working at a satellite center. The reduced number of work and non-work trips resulted in approximately 60 percent fewer automobile cold starts for each telecommuter in the program, along with similar decreases in emissions of organic gases, carbon monoxide, and nitric oxides. Travel energy saved averaged 80 kilowatt-hours (52).

- Travel reductions in peak hour travel from employees using telework centers in the Seattle and Los Angeles areas have been recorded. Reductions in vehicle kilometers of travel, and resulting savings in gasoline and reductions in emissions, were reported at all the telework centers (53).

Enhance the Economy and Human Capital of Neighborhoods and Areas

Telework centers and telecommuting programs may have secondary benefits related to enhancing the local economy and providing resources for local residents. For example, one of the objectives of the Mn/DOT Cambridge Telework Center was to enhance the economy and human capital in the Cambridge area. The location of telework centers may help stimulate the economy in the area. Further, facilities such as the Metro Blue Line TeleVillage in Los Angeles provide resources for the local community to use. In addition, the presence of telecommuters may enhance the vitality and security of neighborhoods during the day.

CHAPTER SIX — ACTIVITIES TO ENCOURAGE TELECOMMUTING

This report provides an overview of the national experience with telecommuting. The characteristics of case study telecommuting programs were described. The key elements of successful programs were highlighted and the benefits and costs of telecommuting programs were summarized.

The results of this study indicate that telecommuting programs offer numerous benefits to employers, employees, the transportation system, and the general public. For these benefits to be fully realized, telecommuting will need to become more widespread. A number of policies and activities can be undertaken to support and promote telecommuting. This chapter presents potential policies and activities for use by federal, state, and local groups, MPOs, transit agencies, private businesses, and other groups to further encourage telecommuting.

FEDERAL, STATE, AND LOCAL LEGISLATION AND POLICY

Legislative mandates or policies that encourage telecommuting can be enacted at the federal, state, and local levels. At the federal level, the 1990 Clean Air Act Amendments, and the ISTEA both provide support for telecommuting programs. Although the Employer Trip Reduction (ETR) program is now voluntary, telecommuting was being considered in many air quality non-attainment areas to help meet the requirements. State and local legislative actions, administrative support, and agency policies can all help support telecommuting efforts. As discussed next, governmental agencies at all levels can also provide a wide-range of technical assistance and support to organizations interested in developing telecommuting programs.

- **Federal Legislation and Initiatives**. Legislation at the federal level, including the Clean Air Act Amendments of 1990 and the ISTEA of 1991, have helped promote and support telecommuting. The requirements of the Clean Air Act Amendments, especially those in air quality non-attainment areas, help focus on commute alternatives, including telecommuting. The ISTEA implements many of the transportation provisions of the Clean Air Act Amendments and provides funding to support telecommuting activities through a number of programs. Further, the efforts of the President's Council on Management Improvement, the President's Global Climate Change Action Plan, and the Federal Telework Centers funded by Congress and implemented by the GSA all indicate the strong national commitment to telecommuting. Continuing these types of legislative, Presidential, and administrative initiatives, including the reauthorization of the ISTEA, can provide ongoing federal leadership and support for telecommuting.

- **State Legislation and Initiatives**. A number of states have implemented legislation, administrative policies, or other actions supporting and encouraging telecommuting. The Minnesota legislation requiring state agencies to consider telecommuting as an option to office expansion, the Governor of Arizona's action setting goals for telecommuting programs in the Phoenix Metropolitan area, and programs underway in

California, Oregon, and Washington represent just a few examples of the types of activities that can be taken at the state level to encourage greater use of telecommuting.

- **Regional and Local Policies and Programs**. Regional agencies, MPOs, transit authorities, and local governments can play important roles in supporting telecommuting. The Dallas-Fort Worth, Phoenix, and Washington, D.C. area case studies provide just a few examples of comprehensive programs. Similar activities could be undertaken in other metropolitan areas throughout the country.

- **Labor Union Support**. Support for telecommuting activities from labor unions and other employee groups at the national level could assist in dealing with these organizations at the state and local levels. Initiating discussions at the national level could enhance support for telecommuting programs at public agencies and private businesses throughout the country.

TECHNICAL ASSISTANCE AND PUBLIC INFORMATION

Agencies at all levels can continue to promote telecommuting through a number of methods. Public information campaigns and targeted marketing efforts can be used to communicate the benefits of telecommuting to all groups. The *Home Office 2000* contest in the Dallas/Fort Worth area represents just one example of possible informational and promotional activities. Ensuring that all groups are aware of the benefits of telecommuting and continuing to promote telecommuting programs on an ongoing basis can encourage more widespread use. The following approaches provide a few examples that may be appropriate for consideration by public agencies.

- **Videos**. A few videos are currently available explaining telecommuting options and outlining the key elements to be considered in establishing telecommuting programs. Additional videos could be produced to tailor messages to specific markets. These could highlight the keys to successful programs and the benefits of telecommuting and other information.

- **Workshops or Training Courses**. The training provided by the RPTA in Phoenix provides one example of this approach. Workshops, training courses, or seminars on telecommuting could be developed and offered by a wide range of groups and organizations. These courses could summarize the various approaches, identify techniques to develop a successful telecommuting program, highlight the benefits from telecommuting, and present other information. Similar to Phoenix, providing a general overview seminar for policy and management level personnel and a more detailed course for the staff members responsible for developing and implementing telecommuting programs may be appropriate.

- **Establish Peer-to-Peer Network**. It appears that management personnel in many businesses and agencies are still hesitant to pursue telecommuting programs due to fears

related to supervising employees at home. The results of the focus groups in the Washington, D.C. area highlighted the need for peer-to-peer networks to help encourage telecommuting. These networks need to be established among similar types and sizes of firms and agencies. Establishing a peer-to-peer network to provide opportunities for managers to talk to their counterparts may alleviate many of these concerns.

- **National Conferences and Symposiums**. A number of national conferences and trade shows have been held on telecommuting. Continuing these efforts can help maintain the visibility of telecommuting, allow for the sharing of experiences, and provide ongoing support for telecommuting activities. Additional conferences focusing on representatives from states, MPOs, and local jurisdictions should be considered. These conferences or workshops could address the development of regional policies to support telecommuting, techniques to estimate the impact of telecommuting on the transportation system, the incorporation of telecommuting into short-range and long-range transportation plans, and the types of programs and technical assistance these organizations should provide to help encourage telecommuting programs.

- **Educational Outreach Programs**. States, MPOs, and other groups could develop and implement a state or regional educational outreach program. Such an effort would be aimed at the employers, employees, and general public. The case studies from Phoenix and Dallas provide two examples of the types of educational outreach efforts that may be appropriate for consideration.

- **Technical Assistance**. Providing technical assistance and ongoing support to private businesses, public agencies, and groups interested in implementing telecommuting programs is an appropriate role for federal, state, regional, and local agencies. These programs could be developed and funded at the metropolitan level or at the state level.

- **Use of Advanced Technologies**. Electronic mail, a Home Page on the World Wide Web, and video and telephone conferencing can all be used to provide ongoing assistance, education, and outreach efforts to promote telecommuting. Information on telecommuting is currently available through all of these methods.

PROVIDE INCENTIVES FOR TELECOMMUTING PROGRAMS

Providing financial or other incentives to companies or agencies to implement telecommuting programs represent another potential strategy. Possible incentives could include tax breaks, reductions in parking requirements, zoning bonuses, and other benefits to public and private sector groups.

ENCOURAGE TELECOMMUTING WITHIN PUBLIC SECTOR AGENCIES

Leading by example, through the implementation of telecommuting programs, represents another approach public agencies may wish to pursue to encourage more widespread use of telecommuting. The federal initiatives, as well as those underway in some states and local areas, provide examples of public agencies leading by example. More wide-spread public sector use of telecommuting programs can show a commitment that may encourage private businesses, as well as other public agencies to follow.

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