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Evaluation of Telecommuting Pilot Projects in the Greater Houston Metropolitan Area

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16. Abstract

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It was found that the telecommuter's home energy usage barely increased by one percent. The telecommuting programs, that were the focus of this study were still in the pilot phase, although the company representatives indicated that the successes thus far have encouraged company officials to continue the program beyond the pilot phase indefinitely. Information contained in this study will be useful to any company who may be considering telecommuting, as either a business or congestion mitigating strategy, who need additional policy guidelines in establishing their individual programs. While telecommuting will not solve all the congestion problems alone, used in conjunction with other measures, such as carpools and subsidized transit, positive results will be seen in high pollution areas.

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An Evaluation Of Telecommuting Pilot Projects In The Greater Houston Metropolitan Area

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ABSTRACT

Many companies have implemented successful telecommuting programs designed to reduce congestion and comply with federal mandates, such as the Clean Air Act Amendments, and have found that telecommuting may also be beneficial in reducing energy usage and its associated costs. This study has been designed to evaluate three telecommuting pilot programs by companies located in the Houston area, and more specifically, determine if energy costs increase for the telecommuter and if that potential increase outweighs the other benefits.

It was found that the telecommuter's home energy usage barely increased by one percent. The telecommuting programs that were the focus of this study were still in the pilot phase, although the company representatives indicated that the successes thus far have encouraged company officials to continue the program beyond the pilot phase indefinitely. Information contained in this study will be useful to any company who may be considering telecommuting, as either a business or congestion mitigating strategy, who need additional policy guidelines in establishing their individual programs. While telecommuting will not solve all the congestion problems alone, used in conjunction with other measures, such as carpools and subsidized transit, positive results will be seen in high pollution areas.

EXECUTIVE SUMMARY

The concept of telecommuting has been prophesied to be the work arrangement of the future. While many companies have implemented successful telecommuting programs designed to reduce congestion and comply with federal mandates, such as the Clean Air Act Amendments, telecommuting may also be beneficial in reducing energy usage and its associated costs. Recent literature has focused on the usefulness of telecommuting as a congestion mitigating strategy, but there has been little research into the energy costs related to implementing successful programs.

When contemplating beginning a telecommuting program, companies are faced with several questions. Which employee will be a successful telecommuter? What are my (the companies') expenses to implement the program? How will production be measured? This study has been designed to evaluate three telecommuting pilot programs by companies located in the Houston area, and more specifically, determine if energy costs increase for the telecommuter and if that potential increase outweighs the other benefits.

The success of any telecommuting program depends not only on the telecommuter, but also the support given by the company. Therefore, two surveys were designed and administered, one to company representatives, and one to the telecommuters. The results from these surveys should prove useful to proponents of telecommuting who desire to move the idea from the fringes of business ideology, where radical ideas get minimal attention, to a mainstream philosophy that has the acceptance of CEOs, government officials, and the working public.

Regarding the potential for increased energy costs by having an employee work at home

while telecommuting, it was found that the telecommuters home energy usage barely increased by one percent. Forty-one percent indicated that they telecommute one day a week and 56 percent incurred no out-of-pocket expenses while participating in the program. The employers have found that they require less office space, resulting in a real estate cost saving, and have been pleasantly surprised to find increased morale and higher productivity among telecommuters. The stigma attached to telecommuters is that they will make some type of automobile trip during the telecommuting day, thus triggering a cold start and negating the purpose of telecommuting, which is not to start the automobile at all. However, when we asked the telecommuters in our study about non-work related trips during the day, 85 percent responded that they make *no* non-work related trips. The telecommuting programs that were the focus of this study were still in the pilot phase, although the company representatives indicated that the successes thus far have encouraged company officials to continue the program beyond the pilot phase indefinitely.

Information contained in this study will be useful to any company who may be considering telecommuting, as either a business or congestion mitigating strategy, who need additional policy guidelines in establishing their individual programs. While telecommuting will not solve all the congestion problems alone, used in conjunction with other measures, such as carpools and subsidized transit, positive results will be seen in high pollution areas. Companies will also find that successful telecommuting programs, those that are supported by upper management, may be favorable recruiting and retention tools for employees with extreme family circumstances.

The idea of telecommuting has not progressed beyond "fad of the moment" status as

experts previously anticipated, and this may be due to the comfort zone employees have concerning their automobiles and work habits. But as environmental concerns continue to dominate the agendas of Vice President Al Gore and the Environmental Protection Agency's Carol Browner, it may be time for the American worker to expand beyond that comfort zone.

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Introduction

As Californians were struggling to rebuild after the earthquake that destroyed miles of freeways in 1993, the call went out for a contingency plan. Many business and civic leaders believed that a contingency plan already existed, and the technology was in place, but that it was not being widely suggested. That contingency plan was telecommuting. The commute in post-earthquake Southern California was unbelievable, even for a region already reputed to have some of the worst congestion problems in the country, costing commuters millions of dollars annually. In his editorial to the Washington Post, Michael Schrage of the Los Angeles Times suggested that the federal dollars being spent to rebuild the region's highways be tied to implementing successful telecommuting programs in Southern California. Furthermore, Shrage stated: "When you've got a lemon, make lemonade."

The concept of encouraging diversity, efficiency, and safety in the nation's transportation systems began as one of the major goals of the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act Amendments of 1990. ISTEA will be legislatively replaced by a new reauthorized bill in the fall of 1997, and should enhance many of the original goals and programs that were established under ISTEA. The Clean Air Act Amendments of 1990 specifically identified the particular cities and regions (nonattainment areas) within the United States that have severe air pollution problems. For Texas, this legislation also resulted in the requirement that companies with over 100 employees must develop an employee trip reduction program (ETR) and designate an employee trip coordinator (ETC). The ETC was to encourage employees to carpool,

vanpool, or any other means to reduce the amount of miles traveled, thus creating rideshare programs mandated by law. Employees were also encouraged to walk, bicycle, use transit, and telecommute. Some of the work trip reducing strategies under ETR have not been fully implemented, specifically telecommuting. However, the ETR programs have recently come under severe scrutiny by several states who view the measures as unconstitutional. In Texas, for example, after much debate in the state legislature, the ETR programs are no longer mandatory, only voluntary.

Telecommuting allows an employee to work at an alternate work site, or at their home, instead of making a full commute trip to work, resulting in savings of vehicle miles traveled by the employee. Telecommuting is practiced by approximately 2 million people, and that number could reach at least 7 million by the turn of the century (US DOT, 1993). The future impacts of telecommuting cannot be estimated, but both the congestion and levels of air pollution can be reduced to "attainable" standards.

Businesses and their employees can realize tangible benefits from telecommuting programs that extend beyond a reduction in congestion. A successful telecommuting program can provide the employee a cost savings in time, fuel, vehicle depreciation, and parking fees. The employer can gain employee loyalty, a reduction in the number of sick days used and a reduction in amount of office space needed. Overall, both the employee and employer can experience an enhanced work relationship.

Previous studies have shown that the majority of employees are as productive when telecommuting as if they were in the office (Schneier 1992, Cosgrove 1992, and US Department of Commerce, 1991). An unjustified assumption of telecommuting can be the

need for excessive office equipment like computers, fax machines, copy machines, and telephones. Previous studies and their findings tend to challenge this assumption. Many different types of employees of different employment backgrounds can telecommute. Professions can range from administrative assistants and managers to lawyers and social service officers (Mokhtarian 1992).

Problem Statement

The abuse on the environment from rush-hour congestion has caused the nation to seek alternate travel demand strategies during the peak congestion periods, generally accepted to be from 6:00 to 9:00 a.m. and 3:00 to 6:00 p.m., although this may vary by region. Besides ridesharing and transit use, both of which are widely used alternatives, telecommuting is beginning to emerge as another travel demand strategy that can reduce the number of vehicles and miles traveled during the congestion periods. In the past, telecommuting has been practiced by a few people, however, telecommuting is recently emerging as a productive alternative method for reducing congestion during the peak periods.

If telecommuting is implemented properly, a decrease in emissions could be realized because of the reductions in the number of cold starts made daily/weekly by the automobiles of commuters during congestion periods (a "cold start" occurs every time the car engine is started, and is also when the concentration of pollutants emitted by cars is the greatest). The nationwide use of telecommuting should be promoted if it proves to have a positive impact in improving the environment, and contributing to cost efficiency and energy saving alternatives.

The majority of the telecommuting projects have compared or measured the productivity of the person telecommuting to the productivity at the workplace. If the telecommuter does decide to take non-work related trips while telecommuting, then this will cause the same abuse on the environment, by initiating a cold start, that existed prior to telecommuting.

The efficiency of telecommuting programs, and the energy cost savings during the at-home work day, may be the most ignored characteristics of research in telecommuting. The impact on household energy may increase due to the additional use of office equipment, lights, air conditioners, heating units, and other appliances. Before telecommuting can be promoted as a positive strategy to reducing air pollution, additional attention must be focused on the energy consumption by those who telecommute. The reductions in fuel usage for the commute compared to the household (kilowatt) energy consumption should also be addressed. The changes in commuting patterns of employees who telecommute and their families must also be determined. It is very possible that telecommuting can assist in meeting federal mandates for those regions with severe pollution problems. If telecommuting proves to have a positive effect in the reduction of energy consumption by commuters, its acceptance as a mainstream traffic reduction strategy should be encouraged.

Purpose and Objectives

The objectives of this project were to produce information on the efficiency of telecommuting projects in the greater Houston metropolitan area and identify travel patterns, and energy uses of employees who worked at home during the telecommuting process. In addition, the initial costs for establishing a home office or external work location were investigated. The results will benefit five different market audiences: the transportation community, government agencies, private firms, current and potential commuters, potential and current telecommuters, and the general public. To achieve these objectives it was necessary to identify the following:

- Travel characteristics of telecommuters when not required to work at the main location

- Employer and employees additional out-of-pocket expenses incurred as a result of telecommuting

- Employer and employee evaluation of telecommuting program

- Employee assessment of the household energy consumption before and after enrolling in a telecommuting program

Methodology

This research included a complete review of existing literature on the practice of telecommuting. It was imperative to identify the current policies and forecast any changes

that were anticipated that will ease telecommuting into the mainstream of society's conscience. The survey questionnaires were designed to identify the perceived energy savings experienced by telecommuters and determine if those savings vary significantly by participants or by company. The work plan necessary to complete this project consisted of several phases, each designed to complete the project in a logical fashion:

Task 1: Conduct a state-of-the-art literature review

Task 2: Develop a database on the various companies with telecommuting programs

Task 3: Develop surveys for the employers and employees

Task 4: Distribute the surveys to the participating firms

Task 5: Conduct an analysis of the survey results

Task 6: Evaluate the telecommuting options (home versus work center locations)

Task 7: Prepare the preliminary findings

Task 8: Prepare the final report

Firm Selection

A search of available companies involved in telecommuting programs was performed for the states of California and Texas. When the search was completed, only three chose to participate in this project. The first company was a communications company (firm 1), the second was a computer company (firm 2), and the third was a local government agency (firm 3). The names of the firms will not be revealed as requested by the representatives of each organization.

Survey Instruments

The survey instruments were designed to be lucid and concise in order to encourage the completion of the surveys. Two different surveys were written, one for the actual employees involved in telecommuting, and the other for the employers. The two different surveys will attempt to find the similarities and differences between the employers and the employees responses.

The _employees_ survey will attempt to identify the following factors:

1. Length of time involved in the program.

2. Opinion of the program.

3. If the employee telecommutes at the home or a satellite location.

4. The additional equipment needed to telecommute, such as a computer or furniture.

5. Number of work and non-work related trips taken during the telecommuting days.

6. General demographics of employees: salary, education, sex, and position or job title at work.

7. Home energy utilization before and during participation in the telecommuting program (if telecommuting at home).

The _employers_ survey will attempt to identify the following factors:

1. Length of time the firm has been involved in the current telecommuting program.

2. If the present telecommuting project is a pilot project or a fully implemented project.

3. The total number of employees telecommuting.

4. The benefits and costs since the current telecommuting project has been implemented.

5. If telecommuting could possibly benefit when recruiting for new employee.

6. The general occupation of the employees currently telecommuting.

Background and Review of Related Literature

As the 21st century approaches, severe air pollution problems are presently facing our society. One of the most important issues facing America involves clean air and energy savings. With a number of cities in the United States subject to the requirements of the Clean Air Act Amendments of 1990, telecommuting is seen as one effective method to reduce the air pollution, traffic congestion, fuel, energy, and time used to travel to work. Although transit use and ridesharing are two widely used congestion-reducing strategies in the United States, telecommuting can also become a commonly accepted method for reducing congestion during the peak periods.

One disadvantage of telecommuting may be that participating employees may go on a series of non-work related trips during telecommuting days. Although the destinations for these trips would be near the home, the energy that would be saved from not making a work trip, in the form of a cold start, would still be expended. The result would be a negation of two of the primary reasons for telecommuting: the reduction in congestion and pollution. The following is a review of studies relating to telecommuting, its uses and benefits, and the anticipated impacts on energy savings, pollution, and congestion.

Studies on the practice of telecommuting were investigated by: Addams (1995), Armstrong (1993), Koch (1995), Cosgrove (1992), Currid (1992), Kraut (1989), Lamb (1994), Macrae (1989), Mokhtarian (1992), and Nash (1991). Addams (1995) investigates the practice and use of telecommuting within the Houston, Texas area. It was found that employers and employees benefit from telecommuting and believe it to reduce stress and

congestion while increasing or maintaining productivity. Koch (1995) performed a study on 130 telecommuters from several different companies, and discusses how the participants felt isolated and feared their chances of promotion would not be as great as their peers' who work daily in the office. After the initial period of joy, the relations between telecommuters and their supervisors can suffer dramatically if conscious efforts are not made to support both. The study by Cosgrove (1992) found that the larger corporations that have experimented with telecommuting have received good reviews from participating employees. The study by Currid (1992) discovered that the concept of telecommuting offers real benefits for corporations, specifically lower facility-management costs. Establishing home-to-network computer links are becoming feasible and convenient. Kraut (1989) also adds that employees that favor telecommuting may have to establish a balance between income and employment flexibility. Lamb (1994) states that the workplaces of the future could range from an office at home to a large corporate campus that offers amenities like health clubs or restaurants. Finally, it was recommended for the work centers to offer some type of interaction between employees.

Macrae (1989) outlined the future impacts of telecommuting, stating that its use will solve many congestion and productivity problems facing society in the years to come. Mokhtarian (1992) assumed telecommuters are computer-based employees who might be expected to work at home, but results found many telecommuters come from a wide array of positions, not all of which involved computers. For example, Los Angeles' welfare fraud investigators and social service workers telecommute. Nash (1991) examines the quasi-public remote worksites that have been opened by the city of Los Angeles. They are located

in San Bernardino and Riverside counties, and the average employee will save about an average of 41 gridlocked miles of commuting every time telecommuting occurs.

Studies reflecting on the efficiency of telecommuting indicated the time and stress of the telecommuters can be eliminated on telecommuting days. DBR and Associates (1993) outlined that self-motivated individuals will usually have a successful telecommuting experience. Findings indicate that telecommuting has a favorable net effect on travel, and is a low cost method to significantly reduce the vehicle miles traveled (VMT) in a region. The study further discusses why the anticipated increases in non-work related trips did not occur. The study of Gillian (1995) found that 75% of the respondents of a survey, given by the Georgetown School of Business for Bell Atlantic, reported that their work was more productive when telecommuting, and 83% further indicated that their home lives had "changed for the better."

Rittershaus (1994) added that with the home life improvements and consistent efforts when telecommuting, telecommuters should become more productive at home or at a remote site. Furthermore, Schneier (1992) elaborates on the productivity enhancements offered by telecommuting. This article also states that employees can work at home thus reducing a company's attrition rate due to family illness or maternity leave absences. Consistent guidance from upper-level management will be necessary to outline explicit expectations so that telecommuters do not lose sight of deadlines and project duties. Other issues including equipment acquisition and security maintenance are also important and discussed.

Alexander (1990), Boghani (1993), Levin (1994), McNerney (1994), Niles (1988), Rose and Parker (1994), Zelenko (1992), and Zelinsky (May 1994) outlined the effects of

telecommuting on air quality standards. Alexander (1990) reports that the use of telecommuting will be factored mainly by traffic congestion and air quality. Due to the high cost of office space, parking facilities and suburban residential location, combined with inexpensive technology, working mothers are finding that it is a perfect option to maintaining and balancing professional aspirations and family responsibilities. Boghani (1993) also found that the average one-way commute for those who work inside the Standard Statistical Metropolitan Areas (SMSA) is 22.8 minutes, while the average round-trip urban commute is 45 minutes. The study predicts over 800 million hours in savings of the commuter time annually due to lessened congestion, and a reduction of 696 million vehicle hours in congestion due to the practice of telecommuting.

The study written by Levin (1994) reports on the impacts of telecommuting in recent years. Managers are recognizing the benefits of telecommuting in reducing congestion and the stress of employees. McNerney (1994) adds that telecommuting can influence the emissions in a given area by reducing air pollution and traffic congestion. Niles (1991) examined the potential urban sprawl of telecommuters. A focus group of telecommuters was monitored in California for two years, and in that short period of time the participants did not exacerbate urban sprawl.

Rose and Parker (1994) also discuss the benefits of telecommuting on the environment. Zelenko (1992) found that satellite offices and telecommuting are some of the alternatives open to companies for alleviating the ill effects of air pollution on their employees and the environment. Pilot programs had begun for firms such as IBM, Xerox, and Southern California Edison in Los Angeles, California, and Seattle, Washington.

Employees were shown to be receptive to both the work-at-home and satellite office concepts because they serve as a respite from traffic and the chronic exhaustion of long drives to work in congestion. Zelinsky (May 1994) elaborates on the requirements of the 1990 Clean Air Act Amendments detailing how it will contribute to reduced vehicle related pollution.

Keenan (1991), Salomon (1991), and Handy (1993), and the US Department of Energy-Office of Policy, Planning, and Program Evaluation (1992) studied the various energy characteristics of telecommuting. Their findings suggest that the intense gasoline usage coupled with the increasing desire to lower emissions has resulted in several companies beginning to discover the advantages of telecommuting. The Bay Area Air Quality Management District would like to reduce single-occupancy commute trips by at least 40% within five years and anticipate that successful telecommuting programs would assist in meeting that goal. Salomon (1991) studied the relationship between telecommuting and typical travel costs as they relate to the attendance of business meetings throughout the United States, and found that the further the distance to attend a meeting, the more favorable the alternative of telecommuting becomes for business travelers.

Handy (1993) reported on eight studies representing 382 telecommuters: six on the west coast, one on the east coast, and one in the Netherlands. The study spanned a six year period between 1986 and 1992, and discussed the difficulties found in the evaluation of the actual miles traveled by a telecommuter. The paper also presented evidence that the household energy used during telecommuting is much less than the energy used during work commutes, and much less harmful to the environment. Also documented was an average of

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39.8 miles saved per employee once the telecommuting project began. Furthermore, a reduction of approximately 75% in vehicle miles traveled (VMTs) was realized on telecommuting days.

The US Department of Energy, Office of Policy, Planning, and Program Evaluation (1992) demonstrated that increased levels of telecommuting can produce significant benefits in the form of reduced delays, fuel consumption, needs for highway capacity expansion, and emissions. Telecommuting cannot solve all of the emission problems, but it can help with other solutions. Thus, policies that facilitate telecommuting not only should lead to direct and indirect transportation benefits, but also may provide synergistic beneficial effects with other transportation strategies that are implemented to cope with growing traffic congestion, urban air pollution, and a national petroleum dependence.

Betts (1993), Bleaker (1994), Ditlea (1995), Firpo (1994), Radding (1995), and the United States Department of Commerce (1991) have produced similar studies on the effects of technology on telecommuting. Betts (1993) reports on a study by the United States Department of Transportation which presents evidence of potential urban sprawl and the encouragement of commuters to switch from public transportation to private cars as they see highway congestion decrease. The study further states that the nation's present telecommunications network is adequate for most telecommuters, but high-band width networks will be a necessity for tomorrow's telecommuters.

Bleaker (1994) examined the actual electronic link between telecommuters and found the network to be efficient and effective with new software and hardware applications being released to increase the features of the telecommuting link-up. Ditlea (1995) estimated the

number of telecommuters, who spend at least part of their week working from home, is expected to reach 11 million by the year 2000. New and improved technologies such as remote customer service centers, e-mail, and telework centers are allowing companies of virtually any size to offer telecommuting to its employees.

Firpo (1994) found excellent employees resigning to take care of children and elderly relatives. She and her company decided to try out a pilot project, which soon developed into a full-fledged program. Computers, flexible work schedules, and remote work sites were used to assist with the telecommuting program. Radding (1995) offered specific examples demonstrating how telecommuting is a viable alternative for intelligent systems (IS) personnel. Employees in such an arena hardly have any restraints regarding telecommuting, and have the capability to run land area networks from their home and perform some other technological functions without coming to work. Furthermore, advanced technological advantages allowed the United States Department of Commerce to encourage successful telecommuting programs at IBM and Blue Cross-Blue Shield, which resulted in increased productivity levels by at least 50%.

Hotch (1995), McKee (1989), Mokhtarian and Handy (1995), Pendyala (1991), Salomon and Mokhtarian (1994), Sraeel (1994), and the United States Department of Transportation (1993) have various reports on the equipment and planning needed for telecommuting purposes. Hotch (1995) indicates the various questions of expired employees or employees that no longer telecommute with the advent of equipment retention. Businesses offering a work-at-home option should make out a formal telecommuting contract that covers such areas as liability and equipment maintenance. Other issues that

should be addressed include zoning, taxes, insurance, labor laws, ergonomics, and lighting. McKee (1989) estimated the total cost needed to set up a home system, if a computer, printer, copy machine, and additional furniture are needed, to be between $2,000 and $4,000.

Mokhtarian and Handy (1995) estimated the number of telecommuters in California to be approximately 1.41% on any given day. Participation in telecommuting programs varies by states and companies, but in several locations a combination of transit use and telecommuting is already increasing. Given the rising interest in telecommuting, its use and practice is certain to increase, but it remains to be seen just how quickly these changes will be accepted into our social conscience. Pendyala and Kitamura (1991) studied the spatial and temporal analysis of a travel diary collected during the California Telecommuting Project during 1988-1989. The authors indicate that the sample size is small and possible selectivity bias may be present. On telecommuting days, the telecommuters made virtually no non-work related trips, and reduced total distance traveled by 90%, or an average decrease of 40 miles.

Sraeel (1994) interviewed Joseph Flock of Automatic Data Processing Inc. (ADP) who is the director of facilities and responsible for space allocation for offices, interior design, and project management for 5.5 million square feet of space in 250 owned and leased facilities across the United States. Sraeel indicates that a telecommuting program would reduce the need for extensive office space resulting in real dollar savings for the company.

The United States Department of Transportation (1993) reported the potential cost and benefits of telecommuting. The focus was on the future impacts of telecommuting on transportation, environment, and planning. With telecommuting still in its infancy, and any

future impacts can only be estimated, some type of uniform guidelines and tangible data should be available within the next 10 years.

Baig (1995), Sullivan and Lussier (1995) investigated telecommuting as a benefit during the recruitment process. Baig (1995) estimated that 8.4 million telecommuters are active and represent the fastest-growing segment of the work-at-home set. The push for telecommuting has gained support through federal incentives to reduce air pollution and for employees to hire key talent. Sullivan and Lussier (1995) found many supervisors are receiving an increased number of employee requests for additional flexibility in their work schedules. Understanding the flexible options and using them as a management tool to maintain, recruit, and in several cases to increase the productivity of employees, is the key to effective flexible work arrangements.

Betts (1993), Mokhtarian (1991), and Niles (1991) discussed the negative impacts of telecommuting. Betts (1993) investigated a report by the United States Department of Transportation which document the initial benefits of telecommuting, however, uncertainties exist as telecommuting may contribute to suburban sprawl and encourage commuters to switch from public transportation to private cars on non-telecommuting days. Mokhtarian (1991) anticipated that work trips would decrease while non-work related trips would increase. However, findings show that not to be the case, as non-work related trips did not automatically increase.

In summary, most of the authors conclude that telecommuting can make positive contributions to reducing pollution and congestion, and saving energy, as well as provide a benefit for the companies and employees. Baig (1995) investigated the use of

telecommuting in large companies and found advantages in higher morale, productivity, and reduced stress. However, some authors did discuss some negative aspects associated with telecommuting. Betts (1995) found that some employees feel "left out" of the office environment which eventually ruined their chances for promotion. Niles (1991), investigated the relationship between telecommuting and urban sprawl, causing movement even further from the central business district (CBD). Although there was no positive relationship proven in this study, however, the potential still exists, but telecommuting will be only one of many factors contributing to urban sprawl.

Employer Survey Findings

A point of contact was identified from each firm and was provided copies of the two surveys to be distributed to applicable telecommuting personnel. In each company this point of contact was a key component in the overall supervision of the telecommuting program in addition to being qualified to answer the questionnaire specifically for their respective employers.

Each of the three representatives returned the employer surveys providing a general overview of each firm's operating procedures and their particular telecommuting programs. The total number of completed and usable employee surveys was 71. The percentage of the total number of employees involved in a telecommuting program compared with the total number of employee survey respondents of each firm is shown in Table 1. The percentage of returned surveys was at least 50% for each firm, while Firm 1 had the most employees involved in telecommuting project. Each of the firm's telecommuting projects are pilot projects, and it is anticipated that once the pilot projects are completed each firm intends to proceed with fully developed telecommuting programs. The end of the pilot project denotes that a firm had the opportunity to comprehensively analyze the benefits, and costs, associated with its long-term implementation. Firms 2 and 3 have been participating in their current telecommuting projects for at least 1 year, while Firm 1 has been involved for at least 4-6 months.

Table 1: Distribution of Surveys

	Reported Number of Telecommuters	Total Number of Employee Surveys Returned	Surveys Returned as Percentage of Mean Telecommuters
Firm 1 (The Communications Company)	80-89	43	50%
Firm 2 (The Computer Company)	20-29	15	60%
Firm 3 (The Local Government)	20-29	13	52%

The employers of each organization did not keep a set schedule on the number of days an employee was allowed to telecommute. That decision, and the employee's participation in telecommuting, was made jointly by the employer and employee.

The question as to whether the firms would participate in other energy and congestion reducing strategies was also posed, and indicates the other measures used by each to comply with federal guidelines and standards (Table 2). Each organization participates in at least one other congestion reducing strategy besides telecommuting. For example, Firm 3 sponsored a ridesharing program, along with encouraging city transit, walking, and bicycling. This information tends to generally show the consistent efforts of the organizations to reduce the energy and vehicle miles used daily by employees commuting to the work place and adhere to voluntary sanctions.

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Table 2: Other Congestion Reducing Strategies

	Carpool	Vanpool	City Transit	Walking	Bicycling
Firm 1	√	√			
Firm 2			√		
Firm 3	√	√	√	√	√

Each of the firms incurred some "out-of-pocket" cost during their respective telecommuting programs. Firm 1 found it necessary to spend between $100-199 on surge protectors and first aid kits for all of its participants, while Firm 2 spent $1,000 or more on the following: office supplies, fax machines, furniture, computer equipment/accessories, and additional literature on telecommuting. Firm 3 spent $1,000 or more on phone systems, office supplies, and computer equipment for its employees. Additionally, all three firms incurred other costs in the initial establishment and implementation of the telecommuting programs. However, the initial costs may have been offset by the significant impacts telecommuting has, not only on the employees who telecommute, but on the organization as a whole. Table 3 details the specific areas in each firm where perceived improvements were experienced as a result of instituting telecommuting programs. Each firm indicated that employee morale has been positively affected, and an increase in productivity has been

realized since the development of telecommuting within the organizations. Interestingly, Firm 1 even experienced less absenteeism, while Firm 2 experienced a higher quality of work along with increased productivity.

Table 3: Areas Influenced by Telecommuting

	Energy/ Light	Less Office Space Needed	Higher Productivity	Higher Morale	Other
Firm 1			√	√	
Firm 2		√	√	√	
Firm 3			√	√	Employee Usage

While each firm did experience increases in productivity and in morale, Firm 1 and Firm 3 experienced factors unique to each organization. Firm 1 has had its current telecommuting program the shortest amount of time (4-6 months), and noted that it was too early to tell if a cost savings existed in reference to the category of "energy/light." However, Firm 3 stated that as a direct result of telecommuting, it has been able to utilize its employees in a more efficient manner.

Firms 1 and 2 indicated that the existence of a telecommuting program could be considered an additional benefit when recruiting new employees. Although Firm 3 felt that

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the option of telecommuting was definitely an added bonus, it was too early in the pilot program to evaluate if new employees were influenced by the potential of participation in the program. Previous studies indicate the companies offering new employees the option to telecommute, regardless of work experience, may be the deciding factor when highly qualified individuals seek employment in certain career fields. Most employees may consider telecommuting an enormous benefit when seeking employment, especially if they have children and/or elderly relatives.

Overall, the employers did experience cost savings and benefits. What should also be noted is the amount of funds dedicated by each organization for continued telecommuting implementation; two spent over $1,000 and one spent between $100-199. In light of this difference, all three organizations attained similar results. The findings indicate that the cost savings and benefits experienced within these companies warrant further development of telecommuting programs, and such programs should continue to be encouraged and supported by upper level management.

Employee Survey Findings

The employees were asked questions similar to those posed to the employer, as well as questions about their positions and duties at work, highest level of education completed, household income, gender, and the number of automobiles owned and available for daily use. Figure 1 shows that most of the telecommuters hold a managerial position (63%), and only four percent of the telecommuters are clerical. This finding is consistent with other studies where the primary users of telecommuting are managers whose responsibilities do

not require constant attendance in the office. The education levels of participating employees is shown in Figure 2 and indicates that at least 53.8% of the telecommuters have attained some college education, while 35.8% have completed only high school. There appears to be a positive relationship between education, job responsibilities, and participation in the telecommuting programs.

Figure 3 represents the income levels of the telecommuters. Similar to the education levels, the income levels are also well rounded for the most part. The lowest household income represented fell in the $50,000-59,000 range. This substantiates the fact that most of the telecommuters surveyed at each firm held managerial positions, and/or the employees with a substantial amount of responsibility are the employees telecommuting.

Figure 1
"What is your position at work?"

CTTR, 1996

25
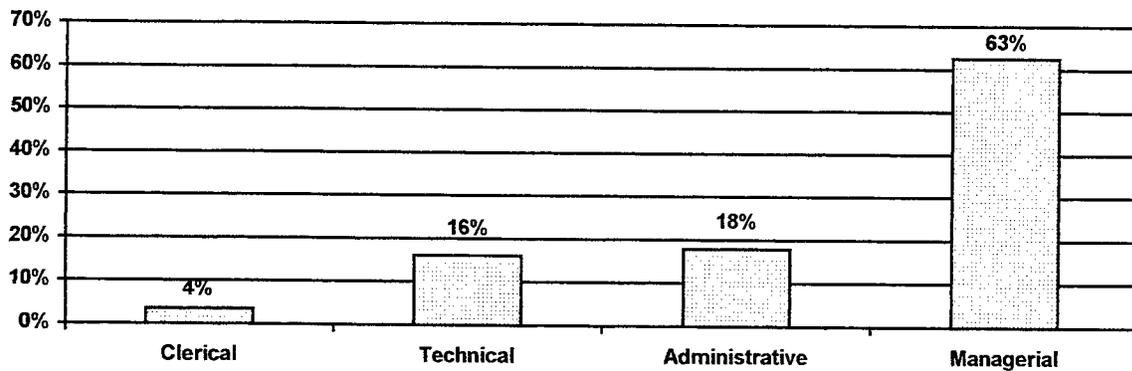
Figure 2
"What category best reflects your level of education?"

High School ~ 35%
College/University ~ 53%
Post Graduate ~ 26%
Technical School ~ 10%

(Axis: 0% 10% 20% 30% 40% 50% 60%)
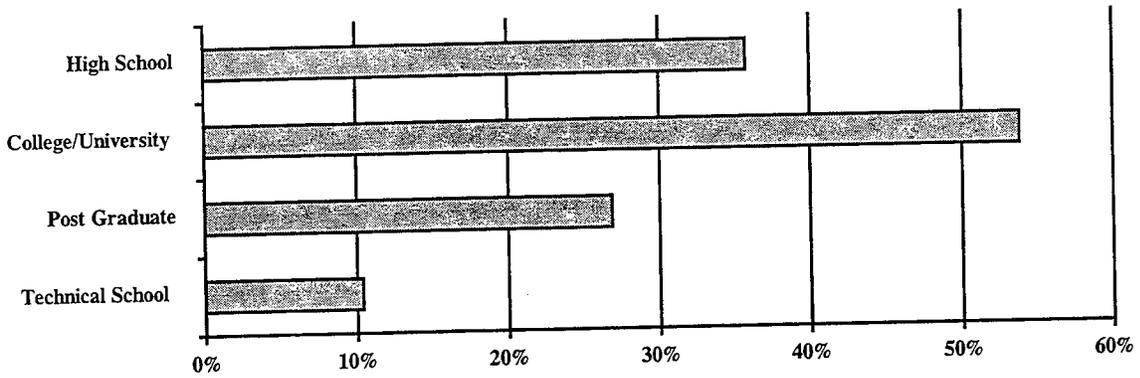
CTTR, 1996

Figure 3
"What category represents your household's total income?"

Over $80,000 ~ 32%
$70,000-$79,999 ~ 22%
$60,000-$69,999 ~ 18%
$50,000-$59,999 ~ 15%
$40,000-$49,999 ~ 19%

(Axis: 0% 5% 10% 15% 20% 25% 30% 35%)
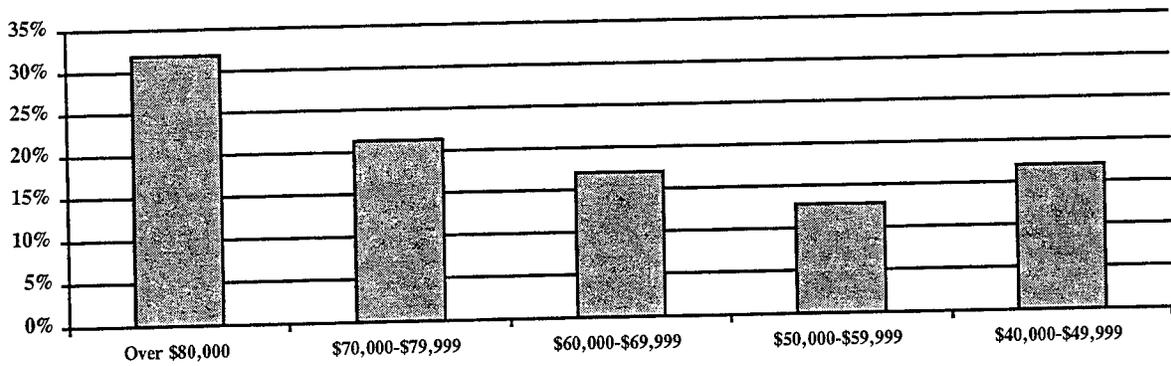
CTTR, 1996

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Figure 4 indicates the gender characteristic, in percentages, of the telecommuters who are participating in the pilot programs. The data indicate that 52 percent of the participants are female, however, only 78 percent of the respondents answered this question. Apparently, gender bias does not exist with regards to participation in telecommuting. Every telecommuter indicated that at least one automobile was available per household. The total percentage of automobiles owned by the participants is represented in Figure 5.

Figure 4
The percentage of male and female participants
in the telecommuting programs

CTTR, 1996

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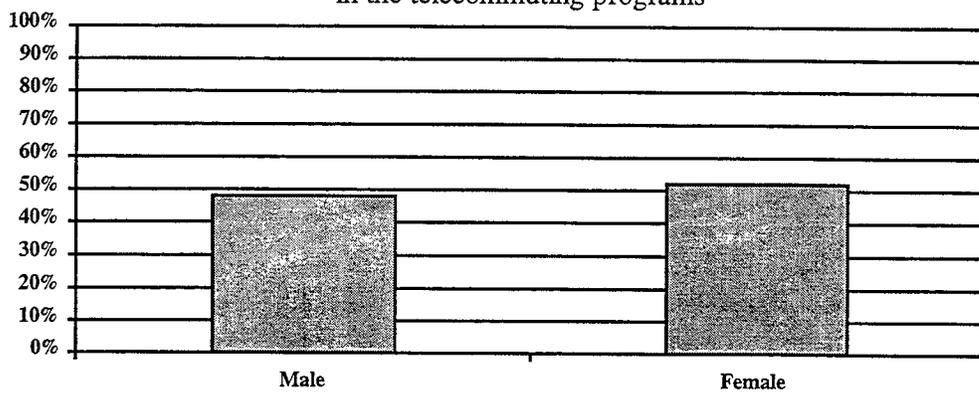
Figure 5
"How many automobiles do you have at your household?"

One 21%
Two 56%
Three 16%
Four or more 7%

0%   10%   20%   30%   40%   50%   60%
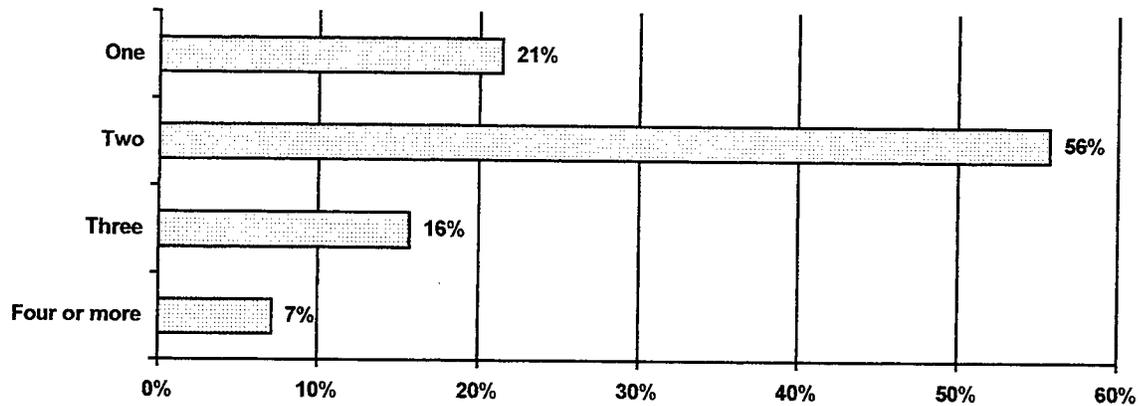
CTTR, 1996

The next section of the survey was designed to obtain additional characteristics of the participating telecommuters. Specifically, the length of time in the program, whether the employee telecommutes to a satellite location or remains in their home, the number of days per week telecommuted, and the distance of the work trip in miles from home. Figure 6 shows the percentage of telecommuter's length of involvement in the telecommuting program. A majority of the respondents (37%) have been telecommuting between four and six months, while 24 percent have been telecommuting more than one year.

When asked if the telecommuting site was at home or a nearby location, the overwhelming response (84.5%) indicates that employees telecommute from home, 10 percent from a satellite office, and nearly six percent would alternate between both options.

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Figure 7 shows that nearly 41 percent of the respondents telecommute once a week, while 20 percent indicate that their telecommuting schedule varies every week. The employees also indicated that when telecommuting 46.5 percent of them work on a fixed schedule, 27 percent work on a flexible work schedule, and another 27 percent utilize both flexible and fixed work schedules. Thus, the work schedules of the telecommuters do not play a role in determining the limits of employees who wish to telecommute.

Figure 6
"How long have you been involved in the telecommuting program?"

CTTR, 1996

Figure 7
"How many days per week do you usually telecommute?"

Days	Percentage
1 day	41%
2 days	13%
3 days	4%
4 days	6%
5 days	17%
Varies weekly	20%
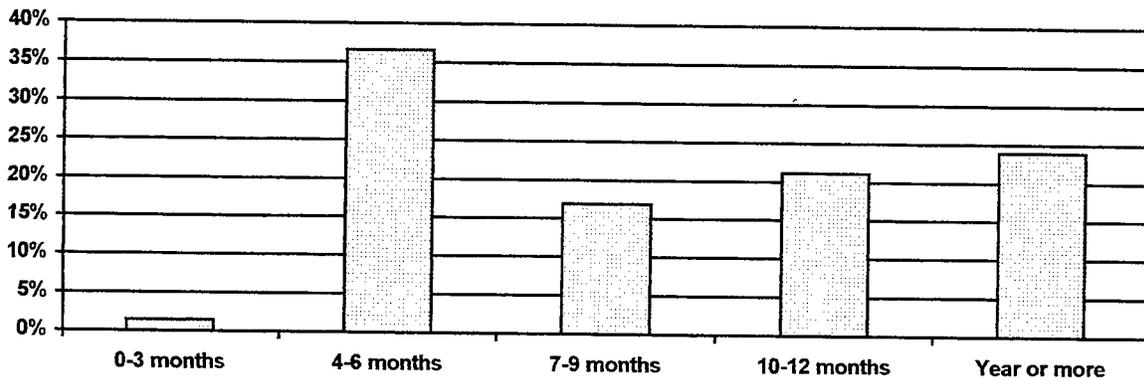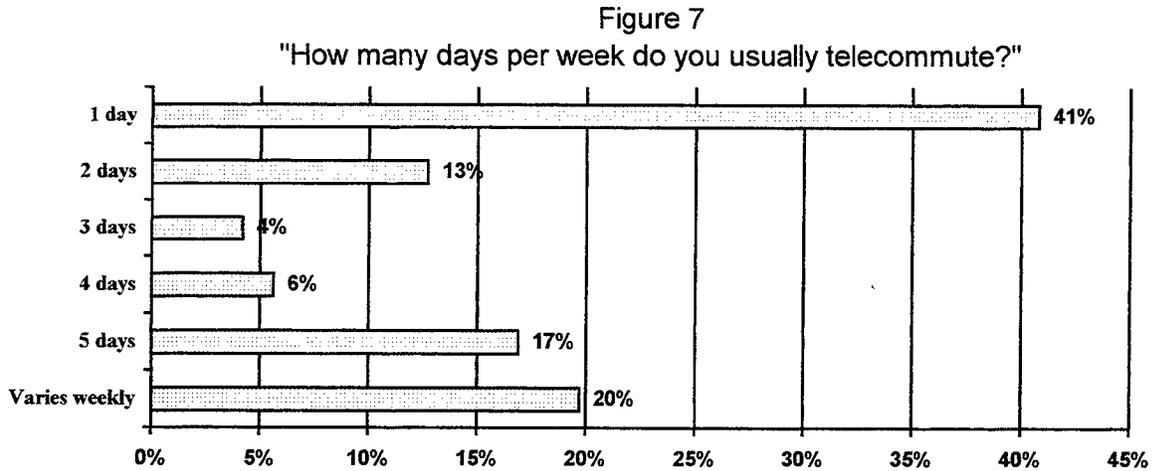
CTTR, 1996

The section of the survey that discussed traveling characteristics was divided into two parts: "*work related*" trips and "*non-work related*" trips. When the workers were asked for the number of "work related" trips taken during the day, 77 percent responded that *no* work related trips were taken (Figure 8). For the 23 percent that did make some type of work related trip on telecommuting days, 79 percent indicated that those trips were generally less than nine miles (Figure 9), and 16 percent were destined for other work sites (Figure 10).

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Figure 8
"On telecommuting days, what is your average number of "work related" trips?"
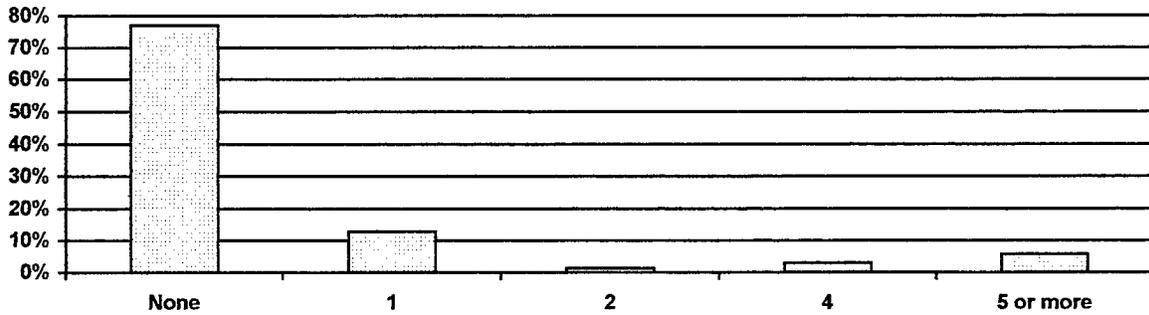
CTTR, 1996

Figure 9
"How many total miles do these trips average?"

CTTR, 1996

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Figure 10
"Where do these work related trips usually lead?"

Another work site	16%
Office supply store	3%
other	12%
Does not apply	69%

0% 10% 20% 30% 40% 50% 60% 70%
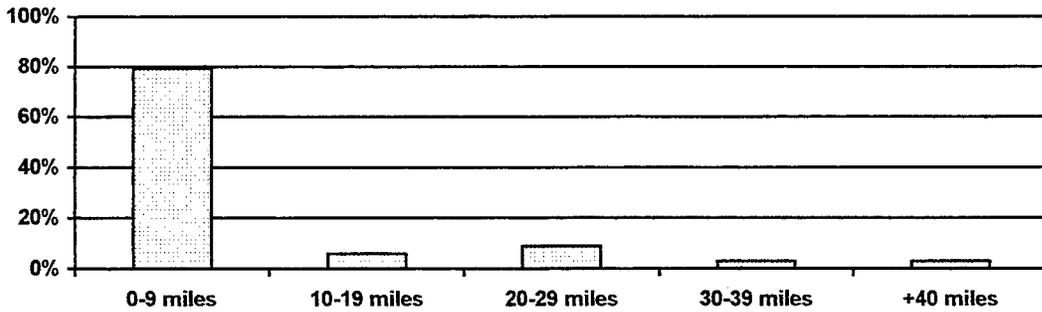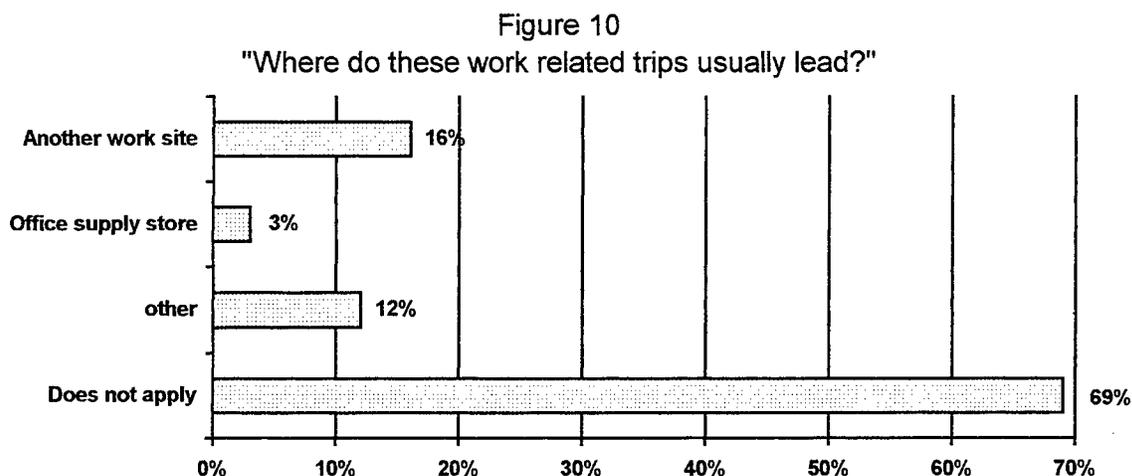
CTTR, 1996

A majority of the telecommuters (80%) indicated that they did not make any non-work related trips on telecommuting days (Figure 11). Of the remaining 20 percent that stated non-work related trips were made, nearly 93 percent indicated that the total miles driven were between zero and nine miles. When asked about the destinations of any non-work related trips, 16 percent responded to *other* and provided no specific destinations on the survey (Figure 12).

The respondents were asked about their monthly energy bill before and during the telecommuting process. The responses were averaged and the percentage increase is

displayed in Table 4. The energy bills of the telecommuters barely rose by 1 percent, indicating that the employees, on average, hardly experienced any increases in their home energy usage as a result of working at home.

Figure 11
"What is your average number of non-work related trips?"
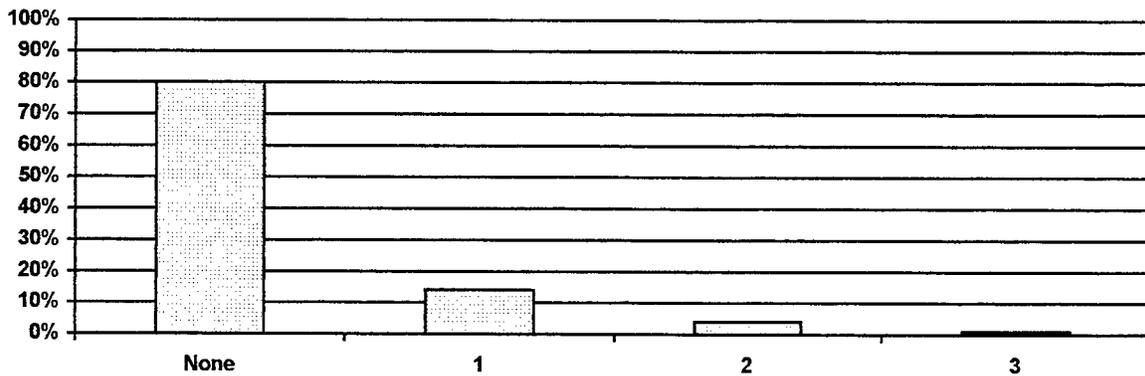
CTTR, 1996

Figure 12
"Where do the non-work related trips usually lead?"
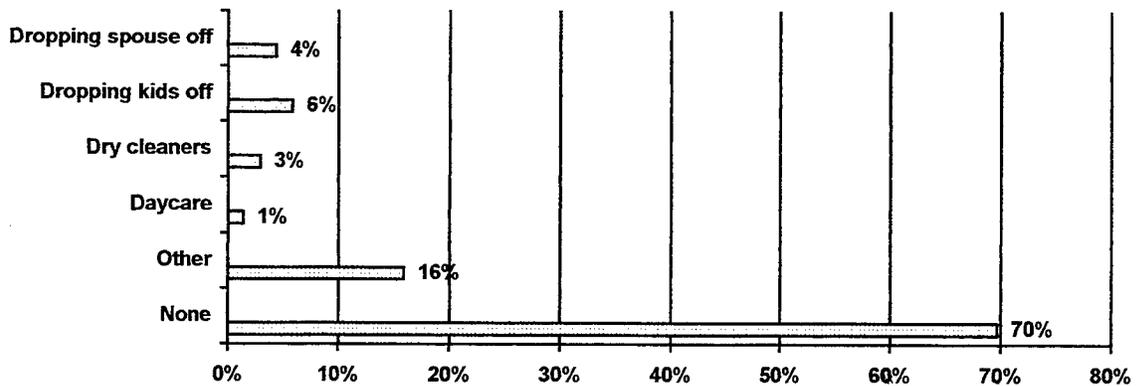
CTTR, 1996

Table 4: Home Energy Bill

Average Energy Bill Prior to Telecommuting	Average Energy Bill During Telecommuting	Percentage Increase/(Decrease)
$121.11	$122.13	.8%

When asked what out of pocket expenses were made in order to successfully telecommute, 56 percent replied that they had incurred no extra expenses (Figure 13). Ten percent of the telecommuters spent between $1 and $49, and another 10% spent between $100 and $199. Figure 14 represents what some of the additional expenses may have been. When asked their opinion of their telecommuting program, 64.3 percent of the respondents found their respective telecommuting programs to be "excellent," and another 26.8 percent indicated their telecommuting programs are "good". Another 7.1 percent found their programs to be "fair", while nearly two percent felt that it was still "too early to tell" to make a concrete opinion. This is another positive indication that many of the participating employees are not only more productive when telecommuting, but enjoy having the flexibility inherent in telecommuting.

Figure 13
"Were there any out-of-pocket expenses to telecommute?"

Category	Percentage
$0	56%
$1-$49	10%
$50-$99	1%
$100-$199	10%
$200-$499	9%
$500-$999	3%
$1,000 +	6%
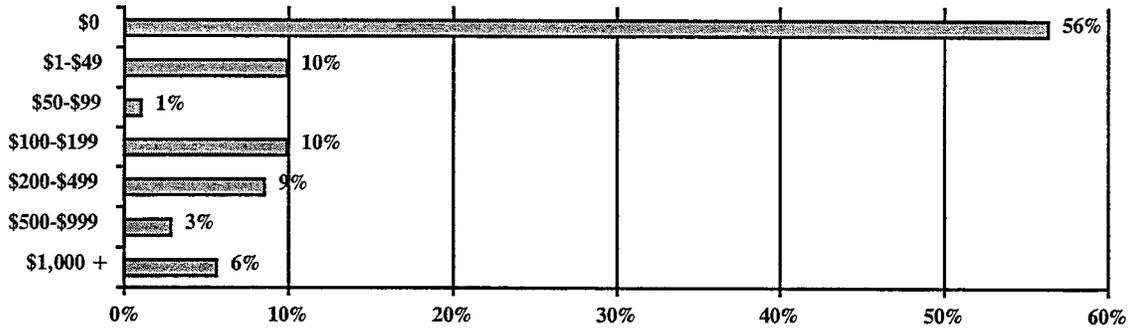
CTTR, 1996

Figure 14
"What was purchased"

Category	Percentage
Computer equipment	11%
Furniture	17%
Fax machine	4%
Office supplies	17%
Nothing	46%
Other	5%

CTTR, 1996

35
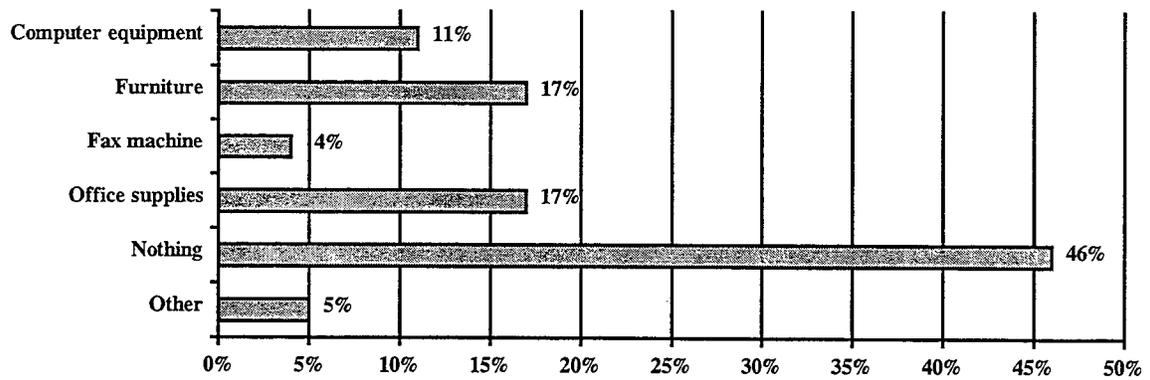
Summary, Implications, and Guidelines for Policy

This case study was designed to compare potential energy cost savings for telecommuters and document the successfulness of these pilot programs. It was found that all three firms anticipate initiating fully implemented programs upon completion of the pilot phase. The administered surveys were a key element to this research and key findings are presented followed by suggested policy guidelines:

- Employers indicate that reduced office space was required, and productivity and morale increased.

- The average increase in home energy usage is barely one percent.

- Thirty-six percent of the respondents have participated in their pilot project at least four to six months.

- Nearly 85 percent telecommute from home, while 10 percent telecommute from a satellite location.

- Forty-one percent usually telecommute one day a week.

- Fifty-six percent of the respondents incurred no out-of-pocket expenses associated with telecommuting.

- When questioned about non-work related trips made during telecommuting days, 80 percent responded that they made no non-work related trips.

- Sixty-three percent of the telecommuters held management positions, and nearly 32 percent have annual family incomes exceeding $80,000.

- Twenty-four percent of the telecommuters carpool to work on non-telecommuting days.

When analyzing the benefits of telecommuting to the employer and employee, it should be done relative to long-term versus immediate impacts. The employers, over the duration of the telecommuting program, would realize a cost savings because it is anticipated that employee productivity would increase in the long term, and the amount of office space required would decrease. On those occasions when employee attendance is required at the office, other modes of transportation could be utilized to augment telecommuting. The three firms surveyed also have programs encouraging either ridesharing (carpools or vanpools), city transit, or both. If the potential of merging telecommuting with ridesharing and city transit actually proves cost effective, savings from man-hours, reduced congestion, and minimal home energy expenditures should be enough to warrant serious consideration by companies to develop individual policies and guidelines for the workplace.

Several guidelines already exist to assist companies in the proper implementation of telecommuting programs. One such guideline recommends that the employer examine all the potential liability factors involved when an employee works at a location other than the office, where personal health and the issue of compensation may arise. Personal health plans may need to be revised to account for the possibility of any work-related injuries occurring away from the central work place.

Educating employees and managers has proven to be a crucial element in the successfulness of telecommuting, and must be considered when developing company directives regarding telecommuting. When employees understand and embrace the concepts of reducing pollution and congestion, and begin to realize the added benefits of cost savings and increased flexibility, they will want to insure any telecommuting program will succeed. The only potential expense, for either the employees or the employer, is the initial cost associated with computer hardware and related equipment.

Telecommuting policies could also be designed for use as a strategic recruiting tool. If, or when, telecommuting becomes as commonplace as the internet, telecommuting may prove to be the edge necessary to recruit the next generation of high achievers, where flexibility is just as important as salaries and benefits. The same strategies could also be applied to employee retention, when family considerations require increased attention by the employee.

Policy guidelines should be developed to direct the acquisition of equipment, whether that equipment is purchased by the employee or the company, to provide for proper liability and accountability. If the firm buys, or assists in any manner with the purchasing of any equipment, then the firm may insist upon periodic equipment inspections to insure their investment is being adequately protected.

Telecommuting programs must be monitored and analyzed, but when studied solely for its cost savings benefits, then that type of analysis should occur after data are received covering several months, or even years. However, periodic evaluation of employee behavior should be accomplished to provide him/her the option to expand their telecommuting

schedule or discontinue it. Also, any trips requiring the use of a car when telecommuting, as well as energy and phone usage, must be monitored for increases or decreases.

Recent studies have shown that telecommuting has not progressed as previously anticipated at the beginning of this decade. Experts previously predicted that there would be 25 million telecommuters in the US by the year 2000. However, the current levels of telecommuters are only 8 to 9 million, and it appears unlikely to triple over the next two years (Salomon and Mokhtarian, 1997). What happened? While telecommuting has proven to provide cost savings, reduced man-hours lost on congested roadways, and a decrease in environmental pollutants, many in this country are still uncomfortable with telecommuting and have resigned themselves to participating in other congestion management strategies that still enables them to be at their place of business. The practice of telecommuting does carry with it several unknown variables resulting in employee concerns like promotion capabilities, work assignments, and being ostracized from the work environment and culture. Salomon and Mokhtarian (1997) believe there is a complacency among US employees, and in order for telecommuting to work, as an energy or congestion reducing strategy, that complacency must be "shook up". The authors go on to state: "It's necessary that persons be motivated to change their work behavior, employees who are content with their situation have little incentive to change." (Salomon and Mokhtarian, 1997)

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Appendix I - The Employers Survey and Results

Telecommuting Survey for the Employer
The Purpose of this survey is to compare the total energy consumed during the telecommuting days to the energy consumed during the commute to the office. These responses are confidential and will be used only for transportation research.

1. How long have you been involved in this telecommuting program?
   0-3 months __ 4-6 months __ 7-9 months __ 10-12 months __ a year or more __

2. Is the present telecommuting program that you sponsoring a:
   pilot project __ a fully implemented project __

3. How many total employees do you have telecommuting?
   0-5 __ 6-9 __ 10-19 __ 20-29 __ 30-39 __ 40-49 __ 50-59 __ 60-69 __ 70-79 __
   80-89 __ over 90 __

4. On average, how many days per week do you usually allow for your employees to telecommute?

5. Where is the location of the telecommuters' home office?
   downtown in the city __ in the city, but not downtown __ suburbs __ does not apply __

6. Besides telecommuting are you also a sponsor in either of the following:
   vanpool __ carpool __ city transit __ walking __ bicycling __ not a sponsor __

7. Were there any out-of-the-pocket costs on your part to start telecommuting, if so how much?
   $0 __ $1-49 __ $50-99 __ $100-199 __ $200-499 __ $500-999 __ $1,000 or more __

8. What was purchased? Please check all that may apply?
   I answered "$0" to question 8 __ office supplies __ fax machine __ furniture __
   Literature on telecommuting __ computer equipment __ other, specify _____

9. Have you experienced a <u>cost savings</u> since the beginning of the telecommuting program, if so please check all that apply?

energy/light __ reduced need of office space __ higher productivity __ higher morale __
too early to tell __ we have not experienced a cost savings __ other, specify_____

10. Have you experienced any benefits since telecommuting, if so please check what may apply?

reduced need of office space __ higher productivity __ increased morale __
less absenteeism __ increased employee unity __ too early to tell __
we have not experienced any benefits __ other, specify_____

11. Would you consider telecommuting a benefit when recruiting new employees?

Yes __ No __ Too Early To Tell __

12. What are the occupations of your telecommuters?

managerial __ technical __ clerical__ administrative __ other, specify _____
_____

Employers Survey Results

Q.1

Value Label	Valid Percent
4-6 months	33.3
a year or more	66.7

Q.2

Value Label	Valid Percent
Pilot Project	100.0

Q.3

Value Label	Valid Percent
0-5	33.3
20-29	33.3
80-89	33.3

Q.4

Value Label	Valid Percent
1 Day	33.3
It Varies Every Week	66.7

Q.5

Value Label	Valid Percent
Downtown in the city	66.7
In the city, but not downtown	33.3

Q.6A Vanpool

Value Label	Valid Percent
Yes	66.7
No	33.3

Q.6B Carpool

Value Label	Valid Percent
Yes	66.7
No	33.3

Q.6C City Transit

Value Label	Valid Percent
Yes	66.7
No	33.3

Q.6D Walking

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.6E Bicycling

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.6F Not a Sponsor

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.7

Value Label	Valid Percent
$1-49	100.0

Q.8A I answered No to question 8

Value Label	Valid Percent
Yes	66.7
No	33.3

Q.8B Office Supplies

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.8C Fax Machines

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.8D Furniture

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.8E Literature on telecommuting

Value Label ·	Valid Percent
Yes	66.7
No	33.3

Q.8F Computer equipment

Value Label	Valid Percent
Yes	66.7
No	33.3

Q.8G Other

Value Label	Valid Percent
No	100.0

Q.9A Energy/Light

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.9B Reduced need for office space

Value Label	Valid Percent
Yes	100.0

Q.9C Higher Productivity

Value Label	Valid Percent
Yes	100.0

Q.9D Higher Morale

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.9F We have not experienced a cost savings

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.10A Reduced need for office space

Value Label	Valid Percent
Yes	100.0

Q.10B Higher Productivity

Value Label	Valid Percent
Yes	100.0

Q.10C Increased Morale

Value Label	Valid Percent
Yes	100.0

Q.10D Less Absenteeism

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.10E Increased Employee Unity

Value Label	Valid Percent
No	100.0

Q.10F Too Early To Tell

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.10.G We have not experienced any benefits

Value Label	Valid Percent
No	100.0

Q.10H Other, specify

Value Label	Valid Percent
Yes	33.3
No	66.7

Q.11

Value Label	Valid Percent
Yes	66.7
To Early To Tell	33.3

Appendix II -The Employee Survey and Results

Telecommuting Survey for the Employees
The purpose of this survey is to determine the total energy consumed during the telecommuting days. These responses are confidential and will be used only for transportation research.

1. How long have you been involved in this telecommuting program?
   0-3 months __ 4-6 months __ 7-9 months __ 10-12 months __ a year or more __

2. Do you telecommute to...
   your home __ a satellite location __ both __

3. Is the present telecommuting program that you are in a:
   pilot project __ a fully implemented project __

4. How many days per week do you usually telecommute?
   1 day __ 2 days __ 3 days __ 4 days __ 5 days __ It varies every week __

5. When telecommuting, do you work on a:
   flexible schedule __ fixed work schedule __ both __ other, specify _____

6. What is your round-trip distance to work from your home (in miles)?
   0-9 __ 10-19 __ 20-29 __ 30-39 __ 40-49 __
   50-59 __ 60-69 __ 70-79 __ over 80 __

7. Besides telecommuting, are you also a participant in either of the following in your commute to work?
   vanpool __ carpool __ city transit __ walking __ bicycling __ not a participant __

8. Were there any out-of-the-pocket costs on your part to telecommute, if so how much?
   $0 __ $1-49 __ $50-99 __ $100-199 __ $200-499 __ $500-999 __ $1,000 or more __

9. What was purchased? Please check all that may apply?
   I answered "$0" to question 8 __ office supplies __ fax machine __ furniture __
   computer equipment __ other, specify_____

10. If you telecommute at home, what is/what was your average light bill before
    telecommuting?
    $_____   I telecommute to a satellite location __

11. What was/is your light bill while participating in the telecommuting program?
    $_____   I telecommute to a satellite location__

12. On telecommuting days, what is your average number of *work related* trips?
    none __   1 __ 2 __ 3 __ 4 __ 5 or more __

13. How many total miles do these trips average?
    0-9 __   10-19 __ 20-29 __ 30-39 __ 40-49 __ 50-59 __ 60-69 __ 70-79 __ 80-89 __

14. Where do these trips usually lead?
    office supply store __ post office __ another work site __ other, specify_____

15. On telecommuting days, what is your average number of non-work related trips (i.e. trips
    that would not have been made had you been at the office)?
    none __   1 __ 2 __ 3 __ 4 __ 5 or more __

16. How may total miles do these trips average?
    0-9__ 10-19__ 20-29__ 30-39__ 40-49__ 50-59__60-69__ 70-79__ over 80__

17. Where do these trips usually lead?
    daycare __ dry cleaners __ dropping the kids off at school __ dropping husband/wife
    off to work __   other _____

18. How may automobiles do you have in your household?
    none __ one __ two __ three __ four or more __

20. What is your opinion of the program? excellent __ good __ fair __ poor __ too early
    to tell __

21. Gender: male __ female __

22. What is your position at work?
managerial __ administrative __ technical __ clerical __

23. Which category represents your households total income?
under $10,000 __ $10,000-19,999 __ $20,000-29,999 __ $30,000-39,999 __
$40,000-49,000 __ $50,000-59,000 __ $60,000-69,999 __ $70,000-79,999 __
over $80,000 __

Employee Survey Results

Q.1

Value Label	Valid Percent
0-3 months	1.4
4-6 months	36.6
7-9 months	16.9
10-12 months	21.1
A year or more	23.9

Q.2

Value Label	Valid Percent
Your Home	84.5
A Satellite Location	9.9
Both	5.6

Q.3

Value Label	Valid Percent
Pilot Project	78.9
Fully Implemented program	19.7

Q.4

Value Label	Valid Percent
1 day	40.8
2 days	12.7
3 days	4.2
4 days	5.6
5 days	16.9
it varies every week	19.7

Q.5

Value Label	Valid Percent
Flexible Schedule	26.8
Fixed Work Schedule	46.5
Both	26.8

Q.6

Value Label	Valid Percent
0-9	11.3
10-19	19.7
20-29	32.4
30-39	12.7
40-49	9.9
50-59	5.6
60-69	1.4
70-79	4.2

Q.7A Vanpool

Value Label	Valid Percent
No	100.0

Q.7B Carpool

Value Label	Valid Percent
Yes	5.6
No	94.4

Q.7C City Transit

Value Label	Valid Percent
Yes	1.4
No	98.6

Q.7D Walking

Value Label	Valid Percent
No	100.0

Q.7E Bicycling

Value Label	Valid Percent
No	100.0

Q.7F Not a Participant

Value Label	Valid Percent
Yes	94.4
No	5.6

Q.8

Value Label		Valid Percent
$0		56.3
$1-49		9.9
$50-99	7.0	
$100-199		9.9
$200-499		8.5
$500-599		2.8
$1,000 or more		5.6

Q.9A - I answered *no* to question 8

Value Label	Valid Percent
Yes	54.3
No	45.7

Q.9C - Fax Machine

Value Label	Valid Percent
Yes	4.3
No	95.7

Q.9D - Furniture

Value Label	Valid Percent
Yes	20.0
No	80.0

Q.9E - Computer Equipment

Value Label	Valid Percent
Yes	12.9
No	87.1

Q.9F - Other

Value Label	Valid Percent
Yes	5.7
No	94.3

Q.12

Value Label	Valid Percent
None	77.1
1	12.9
2	1.4
4	2.9
5 or more	5.7

Q.13

Value Label	Valid Percent
0-9	79.4
10-19	5.9
20-29	8.8
30-39	2.9
50-59	1.5
over 80	1.5

Q.14

Value Label	Valid Percent
Office Supply Store	2.9
Another Work Site	16.2
Other Specify	11.8
Does Not Apply	69.1

Q.15

Value Label	Valid Percent
None	80.0
1	14.3
2	4.3
3	1.4

Q.16

Value Label	Valid Percent
0-9	92.8
10-19	2.9
20-29	2.9
None	1.4

Q.17

Value Label	Valid Percent
Daycare	1.4
Dry Cleaners	2.9
Dropping Kids Off at	2.9
Dropping Husband/Wife	4.3
Other	15.9
none	69.6

Q.18

Value Label	Valid Percent
One	21.4
Two	55.7
Three	15.7
Four	7.1

Q.19

Value Label	Valid Percent
High School	35.8
College Graduate	26.9
Post Graduate	26.9
Technical School	10.4

Q.20

Value Label	Valid Percent
Excellent	64.3
Good	26.8
Fair	7.1
To Early To Tell	1.8

Q.21

Value Label	Valid Percent
Male	48.2
Female	51.8

Q.22

Value Label	Valid Percent
Managerial	62.5
Administrative	17.9
Technical	16.1
Clerical	3.6

Q.23

Value Label	Valid Percent
$40,000-49,999	17.0
$50,000-59,999	12.8
$60,000-69,999	17.0
$70,000-79,999	21.3
over $80,000	31.9