UTAH
TELEWORKING
SERIES

PART 2

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THE WAY HOME

The Shift to Telework and its Air Quality Ramifications

JANUARY 2021

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UCAIR

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INTRODUCTION

Shortly after the start of the 2020 pandemic, Utah Foundation released a report on remote work. It provided an overview of the potential benefits and pitfalls of the massive experiment in teleworking prompted by the pandemic.

This report – Part II – focuses on how remote work relates to air quality in Utah, provides new insights gained during 2020, and looks toward the future interplay of telework and air quality.

DRIVING TO WORK IN UTAH

To put the discussion of remote work and air pollution into perspective, it is important to understand just how people get to work and the proportion of work-related travel that affects air quality.

Utahns – like Americans across the nation – use modes of travel to and from work other than just their automobiles. In 2019, Utahns' mode of travel to work and back was similar to the that of the U.S., with 76% driving alone.[1] Americans in general were slightly more likely than Utahns to take public transportation (5% compared to 3% of Utahns) and walk (3% compared to 2% of Utahns). However, in 2019,

KEY FINDINGS OF THIS REPORT

- Travel to and from work may account for nearly one-third of all passenger vehicle miles traveled.

- In Utah, over half of households have seen at least one person shift toward remote work – the largest increase among Mountain States.

- Air quality had initially improved during the 2020 economic shutdown due to a decrease in automobile traffic. However, Utah's traffic has returned. The net impact on air quality remains to be seen.

- The expansion of remote work will remain in place to some degree beyond the end of the pandemic as employers and employees find that the benefits in some work arenas outweigh the drawbacks. However, some employers express concerns around collaboration, creativity and burnout.

- Some employees see telework arrangements as a means of obtaining more affordable housing in less-dense or even rural surroundings.

- Telework would benefit air quality to some degree. However, an increase in non-commute driving might negate some potential air quality improvements.

- A long-term decrease in traffic from remote work could simply entice other drivers to make longer and more frequent trips – re-absorbing capacity on Utah's major roadways. However, remote work could be a cheaper approach to removing traffic from roadways than other strategies.

- A targeted push for periodic remote work – coinciding with periods of poor air quality – would produce improvements in emissions to counter the particulate matter during winter inversions and ozone smog during hot summer days.
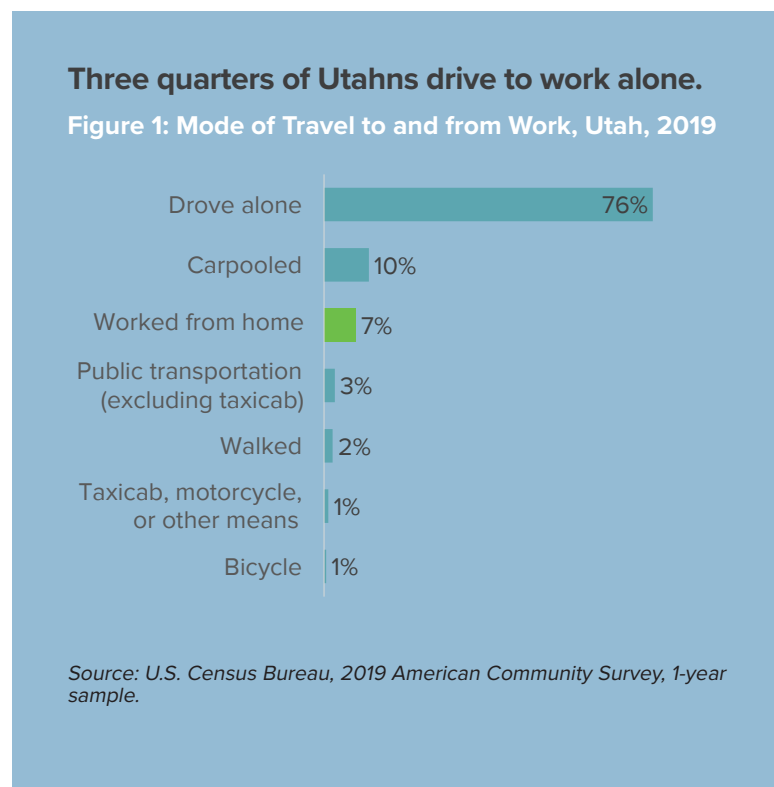
Utahns were slightly more likely to primarily work from home (7% compared to 6% of Americans). (See Figure 1.)

When compared to 2010, Utahns in 2019 were less likely to have driven to work. Those using public transportation for their commute to work increased slightly, and those working from home increased by three percentage points.[2]

Americans' commutes to work (for all types of commuting) are taking longer – the median being 27.6 minutes from 25.3 minutes in 2010.[3] While Utah follows the national trend, Utah's average commute to work is the 12th briefest in the nation at 21.7 minutes.[4] Commute time varies widely

Three quarters of Utahns drive to work alone.

Figure 1: Mode of Travel to and from Work, Utah, 2019

Mode	Percent
Drove alone	76%
Carpooled	10%
Worked from home	7%
Public transportation (excluding taxicab)	3%
Walked	2%
Taxicab, motorcycle, or other means	1%
Bicycle	1%

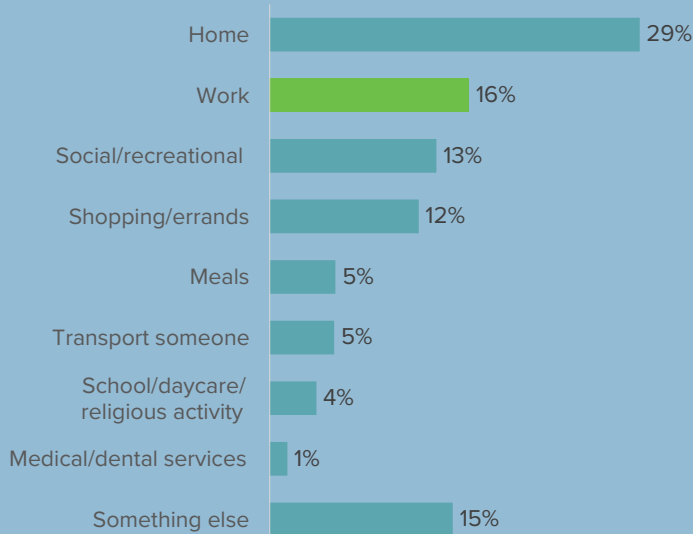Source: U.S. Census Bureau, 2019 American Community Survey, 1-year sample.

Travel to work is about 16%, and the round trip back home constitutes up to one-third of all driving.

Figure 2: Person Miles of Travel, U.S., 2017

Category	Percentage
Home	29%
Work	16%
Social/recreational	13%
Shopping/errands	12%
Meals	5%
Transport someone	5%
School/daycare/religious activity	4%
Medical/dental services	1%
Something else	15%

Note: "Home" includes trip home from work.

Source: National Household Travel Survey.

— from 11.7 minutes in Kane County to 28.8 minutes in Tooele County.[5]

Commute time varies even more by community. It is hard to say which of Utah's communities has the longest commutes because the margin of error is so large for very small communities. For example, Tselakai Dezza near Bluff in San Juan County may be the longest, but since few people live there the margin of error overlaps with many other communities' commute margins of error.[6] But it is fairly certain that among the longest commutes are Apple Valley in Washington County, with an average commute of 38.5 minutes each way, followed by Eagle Mountain at 31.2 minutes and Saratoga Springs at 28.2. The shortest is in Flaming Gorge, at just 2.5 minutes. Of course, commutes look very different for rural workers and urban ones, typically with traffic issues for the latter.

The 2017 National Household Travel Survey categorizes driving by destination. Driving to work (but not back home) constituted about 16% of all miles driven – which is probably similar to Utahns' commutes.[7] (See Figure 2.) Trips home from all places equate to 29% of driving – which means that many trips are combined with others, such as those to work, meals, social/recreational activities, or shopping/errands. However, it is a reasonable expectation that the drive home from work could constitute up to another 16% of all miles driven – meaning that nearly one-third of all car travel is to and from work.

TELEWORKING TRENDS

When thinking about remote workers, it is important to differentiate between those who are working remotely full-time, and those who incorporate some remote days into their work weeks.

Nationally, the percentage of full-time teleworkers surpassed the percentage of people taking public transportation in 2017.[8] Still, prior to the pandemic, working remotely had been the norm for only 7% of all commuters.

Of course, these data became obsolete following the pandemic. In fact, the percent-

31% | 49% | 59% | 62% | 62% | 62% | 63%

Mar 13 | Mar 16 | Mar 23 | Mar 30 | Apr 6 | Apr 13 | Apr 20
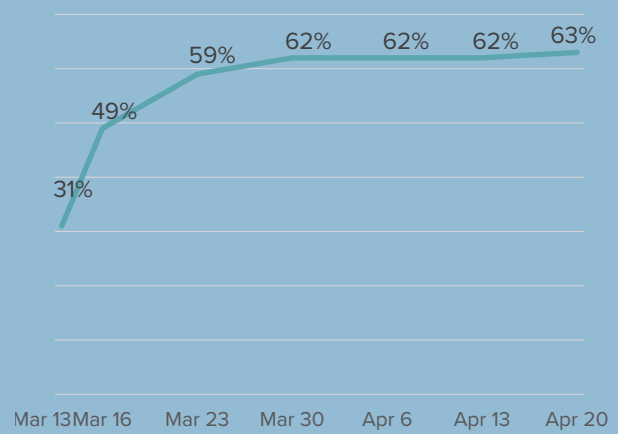
age of people teleworking a portion of the time doubled in just two weeks, from March 13 to March 30, 2020 – from 31% to 62%.[9] (See Figure 3.)

Interestingly, the proportion of workers telecommuting is even larger than the proportion of employees who indicated within the previous few years that they *could* work remotely – between 43% and 45%.[10]

One study put the estimated proportion of American workers who were working remotely some portion of the time as of late spring and early summer at 50%.[11] By late summer 2020, 26% worked exclusively from home.[12] (See Figure 4.) Another 21% spent some portion of their time working from home. Just over half of employed Americans worked entirely away from their homes.

Just half of employed Americans worked entirely away from their homes by late summer 2020.

Figure 4: Question – "Which of the following best describes your work situation in the past few weeks during your normal working hours?" July 30 to August 12, 2020.

Entirely elsewhere — 51%
Mostly elsewhere — 8%
Equally from home and elsewhere — 4%
Mostly from home — 8%
Entirely from home — 26%
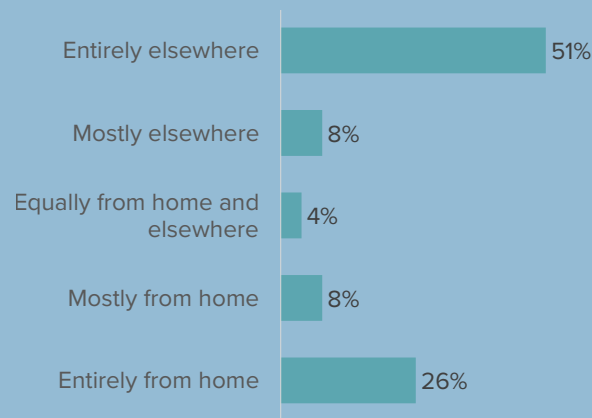
Note: Based on adults employed full- or part-time.

Source: Gallup.

Among employers, just over one-quarter had all employees working on-site in April 2020; that jumped to nearly half by September.

Figure 5: Question — "To what extent are employees currently working on-site at your place of work?"

Source: Gallup.

A survey of employers saw a trend in returning to the workplace between April and September, even as case counts increased (though nowhere near the case count levels seen between October and December 2020).[13] (See Figure 5.)

The most current data available are from the U.S. Census Bureau, looking at that proportion of households in which at least one adult that substituted some or all of their typical in-person work for telework because of the pandemic. Utah households were more likely than all other Mountain States to see a change to teleworking. (S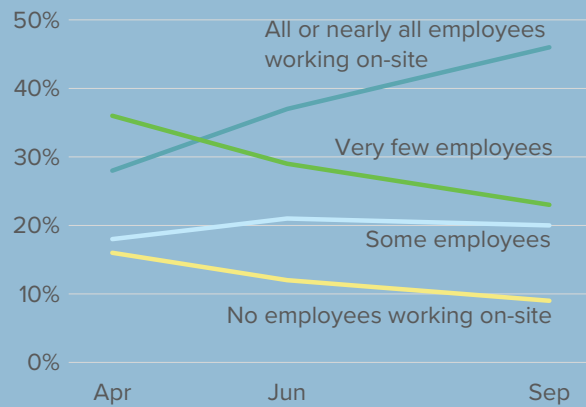ee Figure 6.) Differences across states may reflect workforce composition. States are likely to have fewer remote workers if they have more employment in industries with more essential workers, such as: health care; food and agriculture, and; industrial, commercial, residential, and sheltering facilities and services.[14] For instance, it is easier for an office worker on the Wasatch Front to switch to telework than a hospitality worker in Las Vegas.

Within Utah, the increase in household-level remote work is closely related to education levels.[15] One-third of households include remote workers for those survey respondents with high school attainment or less. This compares to two-thirds of households for those survey respondents with a bachelor's or graduate degree. These differences across education levels reflect the types of jobs held by survey respondents; again, you might see a bachelor's-degree holding office

Utah leads the Mountain States in the increase in teleworking at the household level.

Figure 6: Question — "Some adult in household substituted some or all of their typical in-person work for telework because of the coronavirus pandemic (Yes/No)" in the past week, October 2020.

Source: U.S. Census Bureau, Household Pulse Survey.

State	Percent
Utah	47%
Colorado	46%
Arizona	38%
New Mexico	36%
Montana	34%
Idaho	30%
Wyoming	28%
Nevada	27%
United States	37%
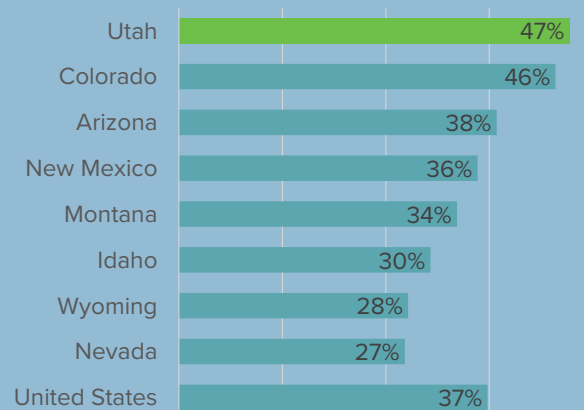
worker with the discretion to work remotely, where a grocery store clerk must work exclusively outside of the home.

TELEWORKING AND UTAH STATE GOVERNMENT

The State of Utah administered a teleworking pilot program for state employees in 2018 and 2019 that required participating employees to telework a minimum of three days per week. The goals were to understand the benefits of teleworking and how to overcome obstacles to its success. The program was led by the Governor's Office of Management and Budget in part to improve air quality.[16]

Given the pandemic, the timing of the pilot program could not have been better.

Program administrators estimated that 39% of state employees – or about 8,500 people – could possibly work remotely.[17] The ramp-up goal sought to have 2,555 employees working remotely by the end of 2020. Under the pandemic, the state was able to quickly ramp up to 8,500 employees working remotely by April 2020.

Utah modeled its program after the state program in Tennessee, which focused on real estate and office space expenditure savings. The idea is that employees can share workspace if teleworking a majority of the time.

Utah has found space savings beyond that afforded by teleworking. Since state departments set up a teleworking opportunity for some, many of the telework-ready requirements needed to be implemented for everyone, such as paperless systems. This will result in a reduced long-term need for filing cabinets for in-office employees, as well as less office equipment (and smaller equipment such as laptop computers), resulting in less space needed at office workstations overall. The state anticipates a

UCAIR SURVEY

The Utah Clean Air Partnership (UCAIR) engaged with several partners to survey business leaders and employees to understand remote-work organizational policies as well as attitudes and experiences. UCAIR received 7,500 survey responses during June 2020 – 72% of which came from employees and 28% from executives and managers. The survey was not a randomly administered survey; rather, it sought responses through its relationships with public and private partnering organizations.

Almost all (97%) responding organizations were engaging in some type of telework during the pandemic. Of the respondents, over half (55%) were exclusively teleworking by the beginning of the pandemic. Respondents indicated that they had a more positive attitude about teleworking at the time of the survey (86%) than they did before the pandemic (66% of employees and 57% of employers).

Employees reported a number of benefits, such as maintaining or increasing productivity (93%), reducing their commute (92%), saving money (85%), and increased their time with loved ones (72%).

Employers found benefits as well, such as organizational cost savings from utilities, travel, meals, etc. (66%), improved employee attitudes and mental health (61%), and increased productivity (56%).

The survey results were not all positive for remote working, however. Half of respondents said that they had limited connection with co-workers and a decreased sense of team.

These results generally comport with the findings of Utah Foundation's spring 2020 report on telework.

Source: UCAIR Teleworking Study, www.ucair.org/wp-content/uploads/2020/08/10916_UCAIR_TeleworkSurvey_Results-3.pdf.

15% to 30% improved space utilization, which could be an enormous cost savings across its 22,000 state employees.[18] For instance, the Department of Health was able to forego renewing a lease at the end of 2020; it expects to save $220,000 annually through its teleworking program by eliminating workspace requirements.[19]

In addition, the exposure and comfort of using the technology for remote meetings and conferences gained under the pandemic could also lead to longer-term decreases in travel – resulting in a savings of public funds, as well as fewer vehicles on the road. Furthermore, remote work could keep people out of the office when they are ill, reducing the spread of illnesses and associated costs far into the future. All of this could result in an increase in governmental efficiency and a reduced cost for taxpayers.

It could also lead to improved air quality, even beyond the savings from employees' commutes. With less space needed for employees, there are fewer emissions from state office buildings. However, these emissions improvements might be offset to some extent by an increase in heating and cooling emissions at employees' homes.

Private enterprises of various types may realize similar savings, with an overall positive effect on Utah's air quality.

AIR QUALITY CHALLENGES IN UTAH

During Utah's winter-months inversions, air quality is largely defined by the amount of very small particulate matter (less than 2.5 microns – referred to as PM2.5) in the air. These very small particles travel deep into the lungs and cause short- and long-term health impacts.[20] This PM2.5 can be directly emitted from specific sources but is mostly the result of chemical reactions involving nitrogen oxides (NOx) and volatile organic compounds (VOCs). Of the typical inversion, about 13% of the PM2.5 is from large stationary industrial or commercial facilities (such as mines, oil refineries and universities), about 39% is from area sources such as our homes and businesses, and about 48% is from mobile sources such as commercial and passenger automobiles, trains and aircraft (the latter are considered non-road sources which account for about one-quarter of all mobile sources).[21] These inversions are weather-related events seen in Utah's valleys, which often lead to an accumulation of pollution along the Wasatch Front and in Cache County.

During summer months, air quality problems largely stem from elevated ozone levels – as well as intermittent concentrations of smoke in the air from forest fires and fireworks. Ozone (O_3) is a beneficial gas in the upper atmosphere, but when near the ground it is a key component of smog and haze, with detrimental health effects on lungs; it can result in an increase in respiratory illnesses. This ground-level ozone is formed when heat and sunlight (particularly at high altitudes such as those in much of Utah) cause NOx and VOCs to chemically react with one another. NOx emissions are a result of fossil fuel combustion. VOC emissions are from fumes of fuels, paints and household products, as well as naturally occurring from vegetation. This summer ozone is often observed along the Wasatch Front and adjacent higher-elevation areas. Additionally, the Uintah Basin sees elevated ozone levels in winter months, in part from its oil and gas extraction operations.

Passenger cars and trucks account for about one-quarter of PM2.5-related and ozone-related emissions.[22] Accordingly, there are obvious benefits to telecommuting during winter inversions and high-temperature summer days.

EFFECTS OF THE PANDEMIC ON AIR QUALITY

In April, Utah's governor issued an advisory to stay at home when possible, and Salt Lake County issued a public health order that limited permissible economic activity. The Wasatch Front Regional Council (WFRC) estimated that total NOx emissions were reduced by 17% and VOC emissions were reduced by 11% at the beginning of the pandemic due to reduced vehicle activity.[23] Based upon a Utah Department of Transportation estimate of reduced traffic volume of about 40-50% during the peak of the March/April economic lockdown efforts, WFRC estimated a corresponding reduction in pollution: NOx emissions from mobile vehicles decreased by 38% and VOC emissions from vehicles decreased by 37%.

The University of Utah's Department of Atmospheric Sciences released a report on the differences in air quality once the state implemented stay-at-home orders. Two major air quality pollutants were lower than average for March between 2010 and 2019 at the Division of Air Quality's Hawthorn station in Salt Lake City.[24] Nitric oxide (NO) levels were 57% lower and nitrogen dioxide (NO_2) was 36% lower. (See Figure 7.) PM2.5 levels were 41% lower, which may be due to reduced direct particulate matter emissions or from the decrease in other pollutants that are precursors to PM2.5 formation. SO_2 (sulfur dioxide) was near the March average, likely because there are very few sources of SO_2 in the Salt Lake Valley. Further, O_3 (ozone) was about normal, though slightly higher at night; this is likely because of the decrease in NOx emissions, which combine with O_3 to form particulate matter.

Further, researchers in the University of Utah's Department of Chemical Engineering found a 71% decrease from 2019 to 2020 in Salt Lake Valley PM2.5 concentrations between March 11 and April 11. The subsequent month (April 11 and May 11) saw only a small decrease (of 8%) from 2019 to 2020 with the return of all types of traffic on Utah's roadways.[25] It is worth noting, as Utah Foundation has pointed out in the past, that heavy-duty trucks have a strongly disproportionate impact on air quality per vehicle when compared to passenger vehicles. The return of economic activity brings heavy-duty vehicles back on the road.

All that said, Utah's air quality in 2020 had already been remarkably good, with no poor air quality days in January or February; this had not been seen in decades.[26] Air quality has been trending better during since 2000, but the unusually hot summer in 2020 increased the number of bad-air days back near the 10-year average.[27]

Early pandemic pollution decreases were significant along Utah's Wasatch Front.

Figure 7: Difference in NO2, March 15-30, 2019 and 2020.
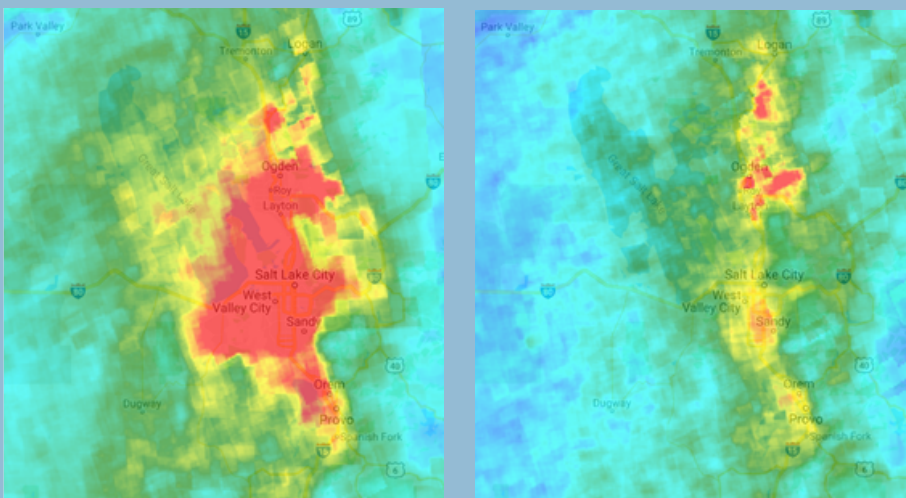
Source: Dr. Logan Mitchell, https://loganmitchell.users.earthengine.app/view/covid-19-and-air-quality-in-utah.

As noted, Utah's traffic (and traffic-driven pollution) woes have largely returned. WFRC leadership has theorized that the return of traffic levels, even with people still working remotely, has to do in part with "induced demand."[28] This is the phenomenon in which urban roadways tend to be used to full capacity – even if lanes are added or removed. In some ways the reduction of commuting Utahns is equivalent to the virtual creation of new lanes and the induced or latent demand has filled the "virtual" new capacity. While this seems to have occurred over a short period of time, this is similar to the much-studied result to adding more lanes of highway to decrease congestion, only to find people moving farther from work centers over the longer term, which ultimately clogs those lanes with more traffic. That said, in the case of telecommuting, remote workers are not driving to work at all, or are driving to work fewer days per week than their non-teleworking peers. WFRC has also suggested that the drop in transit use could also contributed to the quick rebound in traffic levels.

TELECOMMUTING RESEARCH ON AIR QUALITY

Social distancing measures have reached far beyond commutes to decrease air pollution, initially reducing travel such as the social/recreational, shopping/errand, medical/dental services, school/daycare/religious activities shown in Figure 1. In short, teleworking is just one component of a larger suppression of activity that resulted in reduced traffic-related activity.

Nonetheless, teleworking has the possible positive effect of lowering ground-level ozone (O_3), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), the particulate matter less than 10 microns (PM10), and very small particulate matter (PM2.5) since each of these are motor vehicle pollutants.

One important pollution benefit of remote work is a decrease in traffic at peak commuting hours. Traffic congestion increases vehicle emissions. A study in Switzerland of data from 2002 through 2013 found that 8% remote work decreased traffic volume by nearly 2%, with corresponding decreases in NO_2, CO and PM10 of between 3% and 4%, as well as decreases in SO_2 and O_3 of over 2%. The study finds that "teleworking can be a promising tool for urban planning and development, focusing at the traffic volume reduction, and the air quality improvement."[29]

The Wasatch Front Regional Council suggests that telecommuting is an effective strategy in reducing vehicle miles traveled and vehicle emissions – with a low implementation cost.[30] Encouraging people to work remotely, if effective, would be a far less costly way to take automobiles off the road during heavy-traffic commute times than it would be to expand public transportation, construct bike lanes or subsidize transit-oriented development. However, these other measures come with the added benefit of placemaking – which can be a goal in and of itself. Teleworking alone does not directly provide that benefit.

Furthermore, remote work may be one possible strategy in enabling economic growth to continue even while implementing measures to reduce greenhouse gas emissions – and air pollution.[31] In terms of remote work, Utah could see an increased GDP growth but a decrease in absolute or relative CO_2 – and air pollution as remote work takes longer-term hold with a larger proportion of the workforce.

The longer-term effects of telework on air quality depend on how common telework remains in the future.

COMMUTING IN THE FUTURE

The increase in teleworking is certain to last beyond the pandemic to some degree.

Twitter's top human resources official, for instance, announced that "Opening offices will be our decision, when and if our employees come back, will be theirs."[32] Facebook's CEO suggested the same, that about half of its 45,000 employees would be working remotely in the coming years.[33] Numerous other large employers are also making widespread hires on a remote basis. Some employers are finding that prospective hires expect to be able to telework. As the following discussion reveals, this expectation among in-demand professionals may not simply recede once the pandemic has passed.

Benefits

Part I of this series of reports looked closely at the benefits and drawbacks of working remotely from employee and employer standpoints. Since the release of Part I, numerous studies have sought to understand these benefits and drawbacks from first-time remote working employees and their employers.

A new survey from Morning Consult, a market research company, finds that remote workers during the pandemic were more likely to agree with positive impacts than negative ones.[34] It saved them time; in fact, the average part-time remote employee spending three days working from home could save over two hours per week from the time otherwise spent commuting to and from work.[35] It was more comfortable working from home, led to more healthy behaviors and resulted in more focus on families.[36] However, remote workers feel like their work and personal lives have blended together.
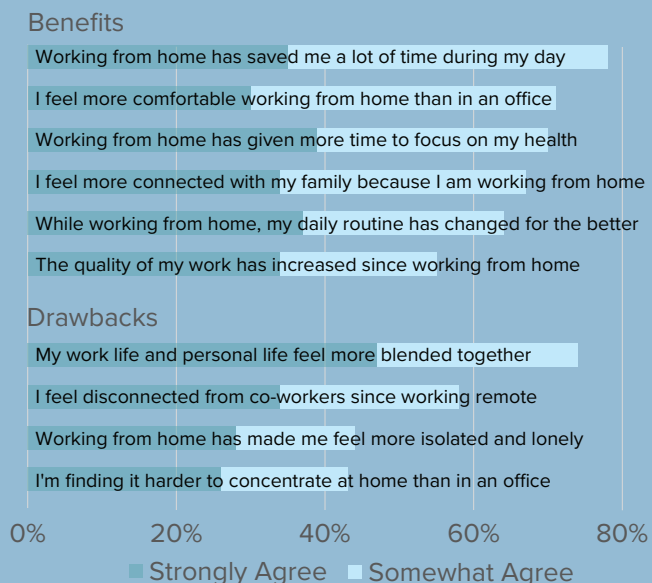
Productivity at home remains high. Three-quarters of respondents say they are just as productive or more productive at home as in the office, including 27% who say they are more or much more productive at home.[37] Only 5% say they are much less productive and 21% said they were less productive. The three top productivity inhibitors were more meetings than usual (26%), no experience working from home (26%) and

Remote workers seem to find more benefits with remote work than they find drawbacks.

Figure 8: Question – "Do you agree or disagree with the following statements?" Asked of Current Remote Workers, 2020

Note: Based on adults employed full- or part-time.

Source: Morning Consult.

Benefits
- Working from home has saved me a lot of time during my day
- I feel more comfortable working from home than in an office
- Working from home has given more time to focus on my health
- I feel more connected with my family because I am working from home
- While working from home, my daily routine has changed for the better
- The quality of my work has increased since working from home

Drawbacks
- My work life and personal life feel more blended together
- I feel disconnected from co-workers since working remote
- Working from home has made me feel more isolated and lonely
- I'm finding it harder to concentrate at home than in an office

0%   20%   40%   60%   80%

■ Strongly Agree   □ Somewhat Agree

children at home (28%). However, for many workers, children at home may cease to be an issue when schools, camps and day care centers return to normal operations.

Further, 70% of survey respondents suggest that virtual meetings are just as effective as – or more effective than – face-to-face for remote and non-remote workers.[38] Fewer than 9% of respondents said that meetings were less effective when conducted virtually. But challenges include interruptions/being talked over (20%), staying focused (18%) and internet speed or connectivity (17%).

In a survey of workers, 92% find at least some savings, and for 44% savings are "moderate" or "significant."[39] As noted in Part I, Global Workplace Analytics estimates that employees would save between $2,500 and $4,000 per year if they worked from home half of the time.[40] Indeed, during the pandemic, survey respondents suggest that, on average, they are saving $479 per month.[41] These savings estimates are from reduced costs for travel, parking and food, even when taking into account additional home energy costs and home food costs.

Drawbacks

As noted in Part I of this series, numerous larger firms have previously experimented with, but ultimately reduced or eliminated, remote work arrangements. These include Aetna, Best Buy, Honeywell, HP, IBM, Reddit and Yahoo.[42] A study published in the Harvard Business Review that included 2,000 employees found that "two-thirds of remote workers aren't engaged and over a third never get any face-time with their team."[43] While many experts suggest that employees get a lot more solo work done when working at home uninterrupted, collaboration suffers.[44]

And burnout seems to be higher for employees who work from home all the time – at least during the pandemic.[45] (See Figure 9.) This may be related to the pandemic and economic crisis, or just that many people are working from home who are not as suited to it as are their counterparts who had been working remotely beforehand. It may also be the case that some who worked in the office before the pandemic also felt burnout in that environment.

The burnout rate could be related to remote workers blending of their work and personal lives (as noted in Figure 8), as well as employees' extended workdays. A

Burnout is higher for remote workers during the pandemic.

Figure 9: Percentage of Employees Who Feel Burned Out at Work "Very Often" or "Always"

Note: Pre-COVID-19 data are from September 2019; during COVID-19 data are from April-September 2020.

Source: Gallup.
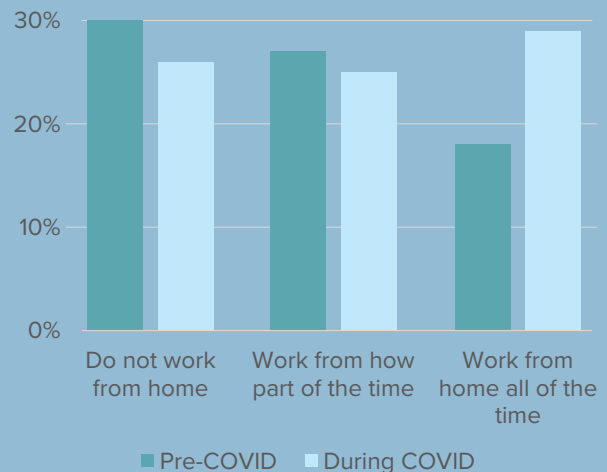
wide-ranging international study of work in large cities[46] found that the pandemic resulted in an increase in the workday of more than 8% – or 49 minutes.[47]

But Gallup suggests that there are things good managers can do: "supporting remote employees with individualization, flexibility, and time throughout the day to deal with stress and disruptions and tend to personal well-being."[48]

Employees are also concerned about that remote work might reduce their career progress.[49] This fear is greatest among younger workers.[50] When asked how worried they are that working remotely would impede their career and/or salary progression, most people said that they were not worried (57%). However, 32% said that they were somewhat worried and 11% said that they were very worried – though employees 35 years old and younger were almost twice as likely to be very worried.

Lastly, JPMorgan Chase's CEO has expressed concern about remote work's lack of "creative combustion." In response, the firm is bringing people back to the office. Further, a Stanford University professor who co-authored a Chinese remote work study on productivity (discussed in Part I of this series) also has concerns related to creativity. He suggests that video calls cannot emulate the spontaneity needed for creative processes.[51]

Even with these drawbacks, many employers and employees find that the benefits in some work arenas outweigh the drawbacks. However, with respect to an office/home comparison of work performance during the pandemic, it is more of a mixed bag. (See Figure 10.) This suggests that – as noted in Part I of this series – some combination of in-office and remote work may be ideal.[52]

The current balance of benefits and drawbacks may not hold. After more time regularly teleworking, employee – and employer – opinions may change significantly. However, research during the pandemic provides some glimpse into the future.

Employees see significant differences in working at home versus the office.

Figure 10: Satisfaction with Work Activity Performance, May 2020
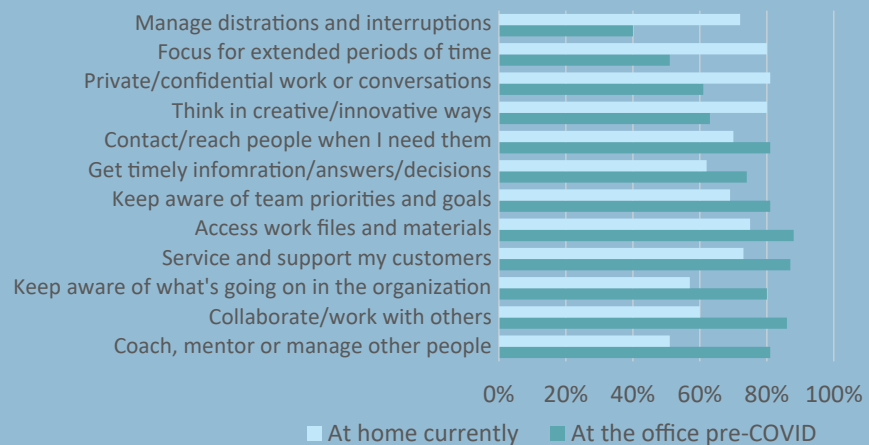
Source: Iometrics and Global Workplace Analytics.

Employees' future interest in remote work has held steady during the pandemic.

Figure 11: Question – "Once restrictions on business-es and school closures are lifted, if your employer left it up to you, would you prefer to return to working at your office or workplace as much as you previous did or work remotely as much as possible," 2020.

Note: Numbers may not total to 100% due to rounding.

Source: Gallup.
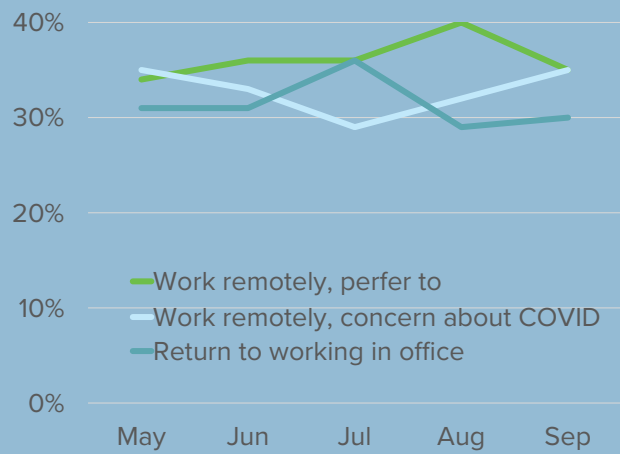
Looking Ahead

Employees seem interested in continuing to work remotely. In the near term, two-thirds of employees suggest that they would like to work remotely.[53] (See Figure 11.)

Eight in 10 remote workers during the pandemic agreed or strongly agreed that being able to continue working remotely at least a portion of the time post-pandemic would make them feel like their employers cared about them.[54] It would also make them happier (72%), better able to manage work-life conflict (71%), less likely to leave and feel more trusted (69%), feel less stressed (67%) and more likely to recommend their employer (66%).

In fact, two-thirds of survey respondents suggest that, if they were no longer allowed to work remotely, they would be less likely to "go the extra mile" in their work-places, and nearly half would expect pay increases to make up for their additional costs.[55] Over half would stay with their employers but would be less happy, while nearly half would look for employment elsewhere.
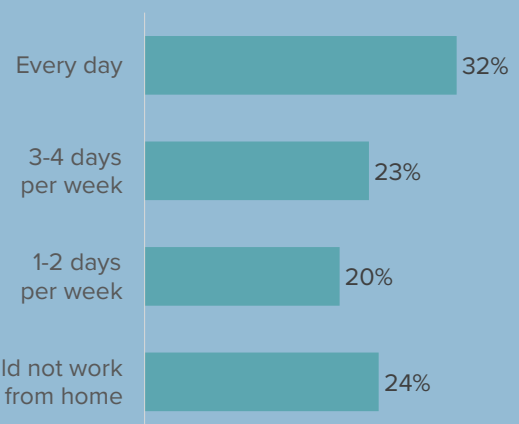
And employees want to work remotely more often: Post-pandemic, about one-third of employees would like to work from home every day, and another 43% would like to work at least a portion of their week from home.[56] (See Figure 12.)

And there is generally a positive attitude toward re-mote work since employees have been experiencing it under the pandemic. Only 12% of employees feel more negatively about it than they did before.[57]

As of April, about 58% of managers in the U.S. allowed employees to work remotely. Of those "few managers (7%) say the experience will result in them allowing their employees to work [remotely] less often, while a slight majority (52%) say they will allow

Only one-quarter of employees suggest that they would not like to work from home at all.

Figure 12: "After working from home measures have ended and the COVID-19 pandemic is under control, how many days a week would you ideally like to work from home?" 2020

Source: Morning Consult.

their employees to work remotely more often as the result of the experience."[58] The remaining 41% expect that they will not change their remote work policy.

Nonetheless, managers are very concerned about remote work impact on teams, engagement, communications, IT issues, and focus.[59] About one-in-five managers are concerned about remote working and its potential effects on employee satisfaction, the lack of engagement with co-workers, IT support issues, reduced employee engagement, reduced team cohesiveness, team communication and whether their people are actually working.

REMOTE WORK FROM ANYWHERE – AIR QUALITY RAMIFICATIONS

Working remotely full-time – and permanently – allows employees more options in where they decide to live. Over one-quarter suggest that it is likely that they would move to a new city or state if their remote work become indefinite.[60] (See Figure 13.)

In fact, some remote workers are already planning to move – about one-in-10.[61] People in major cities or the suburbs of major cities are more likely to be moving than those in smaller cities and towns. Most movers are relocating more than two hours from their current residence.

There are dangers of people moving farther away from their workplaces, but then seeing their employers' remote-work policies change – finding themselves needing to commute to work again, b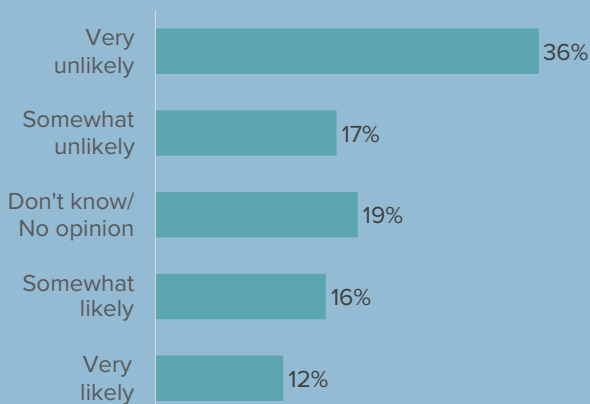ut at a longer distance. And if remote workers are moving toward more remote area with lower densities, they might need to drive even farther for amenities. This could actually provide some benefit in PM2.5 emissions along populated metro areas if people live or move off of the Wasatch Front or Cache County, but could result nonetheless in increased ozone and greenhouse gas emissions. This also presents economic opportunity in rural Utah; see the *Rural Strategy* sidebar.

Lastly, it is possible that induced demand would be an issue with remote work, as savings in traffic on the roadways results in an increase in non-commute trips. To the degree that other vehicle use replaces commute vehicle use, air quality improvements could be limited.

Nevertheless, telecommuting translates into increased roadway capacity, particularly during peak hours; that capacity allows room for additional economic growth, even if the air quality benefits are offset to some extent by that new growth. But the growth is likely coming regardless, and remote work is a means of meeting the demand for that growth and reducing the impacts.

Over one-quarter of remote workers suggest that it is likely that they would move to a new city or state if their remote work became indefinite.

Figure 13: "If your work becomes remote indefinitely or you choose to switch to working remotely indefinitely, how likely is it you would move to a new city or state?" 2020

Very unlikely	36%
Somewhat unlikely	17%
Don't know/ No opinion	19%
Somewhat likely	16%
Very likely	12%

Source: Morning Consult.

AIR QUALITY MEASURES AROUND TELEWORK

State and local governments have been dabbling in telework for over a decade, in part through supporting and participating in the Clear the Air Challenge. The Challenge looks to inspire participants to carpool, use mass transit, use active transportation options, trip chain, skip trips altogether, and telework. Participants in the February 2020 Challenge reported over 97,000 trips eliminated, saving nearly 1.60 million miles on the road and over 476 tons of carbon dioxide.[62] This greenhouse gas emission reduction is accompanied by a commensurate decrease in air pollution.

During the 2019 General Session, the Utah Legislature provided $6,253,000 in one-time funds for "teleworking expenses for state employees, with opportunities for more rural Utah employment." As part of this effort, the University of Utah's Kem C. Gardner Policy Institute published the *Utah Roadmap: Positive Solutions on Climate and Air Quality,* released in early 2020. Included in the report was a recommendation that the state complement the Utah Legislature's 2019 teleworking investments by establishing state agency lead-by-example telework targets and encouraging teleworking in non-governmental sectors.[63]

A 2020 bill looked toward providing a tax credit of $50 per each full-time employee who works remotely for an average of three or more days per week of at least 45 weeks per year. An estimated total of over $5.5 million from the Education Fund.[64] Tax credits could help with air quality, at least to an extent. However, the question is whether $50 per employee would be sufficient to drive more robust telework programming within Utah's companies. Furthermore, there is a limited air quality benefit to working remotely in March, April or May, for instance, because an inversion during those months is unlikely. And September, October or November are very unlikely to see high-temperature-related ozone spikes. Nonetheless, as noted, remote work certainly provides other

RURAL STRATEGY

As noted, full-time remote working provides employees with increased options for where they might live. Of those urban teleworking residents considering a move, about one-quarter would opt for a rural setting.

Some firms have considered adjusting teleworking employee pay based upon cost-of-living. A survey shows that most remote workers think that would be unfair and would not move from an urban to rural area if their employer required them to take a cost-of-living pay cut.

Utah as already seen a focus of efforts to bolster rural economies through teleworking. The Rural Workforce Network is a partnership between the Salt Lake Chamber, Utah Department of Workforce Services and Economic Development Corporation of Utah to match workforce demands of metro companies with available workforce in rural areas, in part through remote-work employment. Further, the Governor's Office of Economic Development Rural Economic Development Incentive program offers financial grants to companies for new high-paying jobs in many rural Utah counties – including remote jobs. Some governments around the United States are even paying remote workers to live in their areas. And the Rural Online Initiative program is offered by Utah State University to help employers learn the latest techniques and tools to manage and develop a remote team. USU offers a leadership program and a course to certify workers as "remote-ready."

Given the massive exposure to remote working during 2020, these moves toward a rural expansion of Utah's metropolitan workforce may be within closer reach than ever before.

Sources:

Global Workplace Analytics and Owl Labs, State of Remote Work, 2020, www.owllabs.com/state-of-remote-work/2020.

Utah Governor's Office of Economic Development, Rural Development, https://business.utah.gov/rural/.

See also https://tulsaremote.com/ and www.thinkvermont.com/remote-worker-grant-program-2019/.

benefits – particularly related to easing peak-hour commuter transportation pressures.

Any growing community – and Utah has the past decade's highest growth in the nation – faces challenges. A big challenge is roadway capacity. As noted, it is likely far less expensive to take cars off the road through remote working policies than it is by expanding public transportation, building bike lanes and encouraging transit-oriented development – though these and other similar measures could provide the added benefit of developing vibrant, walkable communities. Teleworking should be considered as a significant part of this mix of strategies.

However, there are several major uncertainties. It is not clear whether these improvements hold under any increase in induced demand for Utah's major roadways, whether the growth enabled by telework would simply cancel out the environmental gains, or whether that growth would come even if telework enabled greater capacity. There would probably be some improvements, but any improvements under telework – just like any other measures to reduce traffic – would be one strategy in an ongoing battle to manage growth.

AFFORDABLE HOUSING AND SPRAWL

About three-quarters of urban teleworking residents considering a move put relocating to suburban areas at the top of their list. In general, those actively moving are more likely to seek less density and more affordable housing.

As cities have focused their efforts on making population centers more appealing, the housing real estate within those cities has lost appeal to some by becoming less affordable, particularly for first-time homebuyers. This is certainly the case across Utah. Governments have implemented measures to slow the suburban sprawl that has been the norm since the middle of the last century – sprawl brought on in part due to the desire for larger plots of land that convenient automobile travel and suburban neighborhoods have allowed. Remote working provides more flexibility for urban employees to seek out more affordable housing on larger lots without the commensurate burdens of a long commute.

Macroeconomic theory surrounding urban development hints that broad teleworking trends may increase urban sprawl. Historically, much of the urban development has occurred on a "fried egg model" with a dense urban core and sprawling suburbs. Macroeconomic theory argues this is the case in part because it was easier to move people to the work centers than to move goods and products to where people lived. More recent innovations such as inter-city trucks and containerization has made the relative costs more equal. However, teleworking allows the "virtual" movement for many employees at a fraction of the cost. To the degree a region's economy is made up of jobs that can be performed via teleworking, urban sprawl may become more likely.

However, the Wasatch Front Regional Council suggests that not only does remote work reduce cold starts, vehicle miles traveled, congestion and refueling emissions, but it presents an opportunity to develop new community centers, with shorter trips more conducive to non-automobile transportation in meeting the needs for goods and services.

Policymakers will need to examine whether an increase in the ubiquity of full-time, permanent teleworking adds to existing sprawl, with developments reaching farther and farther from urban centers. The outlook may vary from one community to the next.

Sources:

Global Workplace Analytics and Owl Labs, State of Remote Work, 2020, www.owllabs.com/state-of-remote-work/2020.

Upwork, www.upwork.com/press/releases/economist-report-remote-workers-on-the-move.

Arthur O'Sullivan, Urban Economics, 7th Edition, 2009.

Kip Billings, Wasatch Front Regional Council, from an email dated January 4, 2021.

An overwhelming takeaway from the pandemic experience is that many employees desire – and may have even come to expect – some portion of telework in their work week. The research currently suggests that the positive aspects of it probably outweigh the negative. And organizations across the world now have the experience to maintain a certain level of remote work, or ramp it back up quickly if desired.

A 2021 bill that garnered unanimous committee support during a 2020 Interim Legislative Session would direct the Department of Human Resource Management to identify and distribute remote working best practices to all of Utah's governmental agencies for the purpose of increasing teleworking during poor air quality days. The bill would also require the Department to provide the Economic Development and Workforce Services Interim Committee with an annual report that includes "the number of employees and the percentage of employees from each agency that are able to telework… and the percentage of employees from each agency that have teleworked during red air quality days, purple air quality days, and maroon air quality days during the previous fiscal year."[65]

This bill is directed only at public employees. However, the UCAIR survey noted in the sidebar on page 6 found that 94% of management and 93% of employees would be willing to work remotely in the future, specifically on poor air quality days. And many companies will have little excuse not to follow the lead of the Clear the Air Challenge, allowing remote work for some employees during these poor air quality days, because they have already established the capacity to carry it out. In fact, this effort could be expanded beyond one month per year to include any periods of poor air quality.

There may be some role for the public sector to play during bad air days, beyond prompting public employees to remotely work at those times. Whether these are cost-effective financial incentives or other approaches, the matter deserves further exploration.

CONCLUSION

Utahns, like Americans in general, tend to drive to work by themselves. These appear to account for up to one-third of vehicle miles traveled. Automobile commuting, of course, has real implications for air quality, given that passenger vehicles are responsible for about one-quarter of all the particulate matter in the air during winter inversions and most of the ozone during hot summer days. Remote working appears to be one significant means of taking cars off the road, thereby reducing air pollution.

The pandemic has showed many public and private entities the extent to which remote work is possible. This experience has provided many with a close look at the benefits and drawbacks of remote work. More people feel positively about remote work, and employees are likely to demand it into the future. However, while employers may enjoy cost savings and increases in productivity, some express concerns around collaboration, creativity and burnout.

Any effort toward permanent remote work might relieve pressure on governmental and private sector budgets, ameliorate some of Utah's growth challenges, and improve air quality to some extent. However, even as employers and employees return to more traditional work arrangements, a targeted move toward periodic remote working – focused on periods of poor air quality– could help to diminish the length and severity of Utah's periodic poor air quality.

ENDNOTES

1 U.S. Census Bureau, 2019 American Community Survey, 1-year sample.

2 U.S. Census Bureau, 2010 and 2019 American Community Survey, 1-year sample.

3 U.S. Census Bureau, 2010 and 2019 American Community Survey, 1-year sample.

4 U.S. Census Bureau, 2014-2018 American Community Survey 5-year estimates. Note: Mean travel time to work (minutes), workers age 16 years and older.

5 U.S. Census Bureau, 2019 American Community Survey, 1-year sample.

6 U.S. Census Bureau, 2014-2018 American Community Survey 5-year estimates. Note: Mean travel time to work (minutes), workers age 16 years and older.

7 National Household Travel Survey, https://nhts.ornl.gov/person-miles.

8 U.S. Census Bureau, 2010-2019 American Community Survey, 1-year sample.

9 Gallup Panel, 2020, https://news.gallup.com/poll/311375/reviewing-remote-work-covid.aspx.

10 U.S. Bureau of Labor Statistics, *Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic*, June 2020, www.bls.gov/opub/mlr/2020/article/ability-to-work-from-home.htm

11 Erik Brynjolfsson, John J. Horton, Adam Ozimek, Daniel Rock, Garima Sharma, Hong-Yi TuYe, *COVID-19 and Remote Work: An Early Look at US Data*, NBER Working Paper Series number 27344, www.nber.org/papers/w27344.pdf.

12 Gallup, 2020, https://news.gallup.com/poll/1720/work-work-place.aspx.

13 Gallup, 2020, https://news.gallup.com/poll/321800/covid-remote-work-update.aspx.

14 Economic Policy Institute, *Who are essential workers? A comprehensive look at their wages, demographics, and unionization rates*, May 19, 2020, www.epi.org/blog/who-are-essential-workers-a-comprehensive-look-at-their-wages-demographics-and-unionization-rates/.

15 U.S. Census Bureau, Household Pulse Survey, week 16. Utah Foundation calculations.

16 Utah Governor's Office of Management and Budget, *A New Workplace: Modernizing Where, How, and When Utah Works, Managing Performance Over Presence, Utah Works Pilot Report*, https://gomb.utah.gov/wp-content/uploads/2019/07/Utah-Works-Pilot-Report.pdf.

17 Utah Foundation, Utah Thrives podcast discussion with Jeff Mottishaw, senior consultant with the Operational Excellence Team in the Governor's Office of Management and Budget, https://utahfoundation.org/2020/05/utah-thrives-podcast-the-state-of-utah-embraces-teleworking/.

18 Utah Foundation, Utah Thrives podcast discussion with Jeff Mottishaw, senior consultant with the Operational Excellence Team in the Governor's Office of Management and Budget, https://utahfoundation.org/2020/05/utah-thrives-podcast-the-state-of-utah-embraces-teleworking/.

19 Utah Foundation, Utah Thrives podcast discussion with Jeff Mottishaw, senior consultant with the Operational Excellence Team in the Governor's Office of Management and Budget, https://utahfoundation.org/2020/05/utah-thrives-podcast-the-state-of-utah-embraces-teleworking/.

20 See Utah Foundation's report *The Air We Breathe: A Broad Analysis of Utah's Air Quality and Policy Solutions* and the Utah Department of Air Quality.

21 Bo Call, *Understanding Utah's Air Quality*, https://deq.utah.gov/communication/news/featured/understanding-utahs-air-quality.

22 Utah Foundation calculations from Utah Division of Air Quality data.

23 Ted Knowlton, Deputy Director at WFRC, from UCAIR's August 14, 2020, Partners Meeting. Kip Billings, Transportation Engineer at WFRC, by email exchange.

24 Dr. Logan Mitchell, *Air quality improvements during the March-April Covid-19 lockdown*, May 5, 2020, https://atmos.utah.edu/air-quality/covid-19_air_quality.php.

25 Ember Chadwick, Katrina Le, Zheyuan Pei, Tofigh Sayahi, Anthony Butterfield, and Kerry Kelly, *Using a Low-cost Sensor Network to Understand the Effect of COVID-19 on Particle Pollution.*

26 Bryce Bird, Director of Utah Division of Air Quality, from UCAIR's August 14, 2020, Partners Meeting. Note: The Wasatch Front's air quality was good after the start of the pandemic, but already good in January and February 2020, with no poor air quality days (above 150 on the Air Quality Index) in 2020 until July 4.

27 Note: Salt Lake County had 15 summer ozone days above 0.07ppm in 2020, near the 10-year average of 17.9, as compared to 2000-2010 average of 25.3 (while Utah County had only three high-ozone days in 2020); U.S. EPA AirData, www.epa.gov/air-data.

28 Ted Knowlton, Deputy Director of WFRC, from UCAIR's August 14, 2020, Partners Meeting.

29 Eleftherios Giovannis, *Teleworking Effect on Traffic and Air Pollution*, May 26, 2017, www. preprints.org/manuscript/201705.0198/v1. Also see Andrew Hook, Victor Court, Benjamin K Sovacool and Steve Sorrell, *A systematic review of the energy and climate impacts of teleworking*, August 19, 2020, https://iopscience.iop.org/article/10.1088/1748-9326/ab8a84.

30 Ted Knowlton, Deputy Director of WFRC, from UCAIR's August 14, 2020, Partners Meeting.

31 U.K. Office of National Statistics, *The decoupling of economic growth from carbon emissions: UK evidence*, October 21, 2019, www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/ compendium/economicreview/october2019/thedecouplingofeconomicgrowthfromcarbonemissionsukevidence#:~:text=Decoupling%20can%20be%20either%20absolute,head%20(Ruffing%2C%202007).

32 Jennifer Christie, *Keeping our employees and partners safe during #coronavirus*, May 12, 2020, https://blog.twitter.com/en_us/topics/company/2020/keeping-our-employees-and-partners-safe-during-coronavirus.html

33 Mark Zuckerberg, weekly staff Q&A, May 21, 2020, www.facebook.com/zuck/videos/10111936118050541/.

34 Morning Consult, https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20 Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf. Note: Survey of 2,200 U.S. adults, 1,066 workers, 482 of whom were current remote workers.

35 Based on a 40-minute round-trip commute.

36 Morning Consult, https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20 Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf. Note: Survey of 2,200 U.S. adults, 1,066 workers, 482 of whom were current remote workers.

37 Global Workplace Analytics and Owl Labs, State of Remote Work, 2020, www.owllabs.com/ state-of-remote-work/2020. Owl Labs is a collaborative technology company dedicated to creating a better workplace and learning experience for today's hybrid workforce and virtual classroom. Surveyed 2,025 full-time workers in the United States between the ages 21 to 65 at companies with 10 or more employees (not including freelancers). This survey data was collected in June-July of 2020.

38 Global Workplace Analytics and Owl Labs, op. cit.

39 Global Workplace Analytics and Owl Labs, op. cit.

40 Gallup, Remote Work; and Global Workplace Analytics, GlobalWorkplaceAnalytics.com.

41 Global Workplace Analytics and Owl Labs, op. cit.

42 Society of Human Resource Management, www.shrm.org/resourcesandtools/hr-topics/employee-relations/pages/drawbacks-to-working-at-home-.aspx; and Dan Schawbel, "Survey: Remote Workers Are More Disengaged and More Likely to Quit," Harvard Business Review, November 15, 2018, https://hbr.org/2018/11/survey-remote-workers-are-more-disengagedand-more-likely-to-quit.

43 Schawbel, op. cit.

44 Society of Human Resource Management, op. cit.

45 Gallup, *Remote Workers Facing High Burnout: How to Turn It Around*, October 30, 2020, www.gallup.com/workplace/323228/remote-workers-facing-high-burnout-turn-around.aspx.

46 The U.S. cities were Chicago, Los Angeles, New York, San Francisco, San Jose, and Washington D.C.

47 Evan DeFilippis, Stephen Michael Impink, Madison Singell, Jeffrey T. Polzer & Raffaella Sadun Collaborating *During Coronavirus: The Impact of COVID-19 on the Nature of Work,* www.nber.org/papers/w27612

48 Gallup, *Remote Workers Facing High Burnout: How to Turn It Around*, October 30, 2020, www.gallup.com/workplace/323228/remote-workers-facing-high-burnout-turn-around.aspx.

49 Global Workplace Analytics and Owl Labs, op. cit.

50 Global Workplace Analytics and Owl Labs, op. cit.

51 Jim Zarolli, *When Everybody's Working At Home And The Magic Is Gone*, September 24, 2020, www.npr.org/2020/09/24/916211900/as-more-americans-work-from-home-some-ceos-re-open-offices-to-find-that-missing-s.

52 Iometrics and Global Workplace Analytics, Global Work-From-Home Experience Study, May 2020.

53 Gallup, https://news.gallup.com/poll/321800/covid-remote-work-update.aspx.

54 Global Workplace Analytics and Owl Labs, op. cit.

55 Global Workplace Analytics and Owl Labs, op. cit.

56 Morning Consult, https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf

57 Morning Consult, https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf

58 Gallup, *How Coronavirus Will Change the 'Next Normal' Workplace*, May 1, 2020, www.gallup.com/workplace/309620/coronavirus-change-next-normal-workplace.aspx.

59 Global Workplace Analytics and Owl Labs, op. cit.

60 Morning Consult, https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf

61 Upwork, www.upwork.com/press/releases/economist-report-remote-workers-on-the-move.

62 Clear the Air Challenge, *2020 Clear the Air Challenge Results Announced, Fidelity Investments and Dell Technologies Take Top Awards*, May 22, 2020, https://cleartheairchallenge.org/2020-clear-the-air-challenge-results-announced/

63 University of Utah's Kem C. Gardner Policy Institute for the Utah Roadmap: Positive Solutions on Climate and Air Quality https://gardner.utah.edu/wp-content/uploads/Utah-Roadmap-Public-Draft.pdf

64 Jacob Anderegg, S.B. 226 Tax Credit for Telecommuting, https://le.utah.gov/~2020/bills/static/SB0226.html.

65 Daniel McCay, S.B. 15 Workforce Solutions for Air Quality Amendments, https://le.utah.gov/~2021/bills/static/SB0015.html.

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T H E   W A Y   H O M E
The Shift to Telework and its Air Quality Ramifications