

**SCAG Report**  
**Transportation Broadband Strategies to Reduce VMT and GHG**

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**Comments**

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## Overview

Broadband is extremely important to society's future – as the enabler of a marketplace, service center, civic center, medical clinic, classroom, movie theatre, news source, global resource center and even more. Access to this electronic space is essential. This study to document the potential of broadband networks to reduce VMT and GHG emissions is a new and valuable contribution to the broadband-for-all initiative developed to address digital equity following the COVID-19 quarantine.

The most significant transformation of the modern society is from *wheels to wires* which will save energy and reduce carbon emissions at a time in history when protection of the human habitat requires exactly those forms of conservation.

All levels of government clearly should leverage their assets that are fundamental elements of broadband networks – rights of way, utility poles, conduits, dark fiber, tall buildings, etc. The vision of broadband networks as basic public infrastructure that facilitates millions of private and public services and transactions in the form of electronic bits is analogous to the street and highway infrastructure that facilitates millions of private and public services and transactions in the form of physical vehicles.

Certainly, broadband should be an eligible cost as a component of all transportation projects. See the Metro Net and Blue Line TeleVillage summary in Addendum 1 for my efforts in that direction dating from the 1990s.

The data assembled and analyzed by SCAG and Magellan reflect extraordinary effort and insight. The draft report is very impressive.

The following are my comments about what is not in the draft, including my recommended additions followed by more detailed explanations of those recommendations.

The work conducted by the telework consultants that guided the many demonstration projects of the late 1980s through the 1990s does not appear to have been integrated in the Draft Report. Those experiments that involved facilities-based telework in particular are missing.

The demonstrations generated rich data grounded in experience including participant productivity, VMT savings after factoring in household vehicle use during the demonstration, and lessons learned. The final project reports are generally more comprehensive and valuable than academic studies.

Answering one of the questions in the Draft Report, those demonstrations did not find many cases of additional household VMT. Not commuting tends to have the effect of more thoughtful auto use for the entire household.

JALA International was the dominant player, especially on the west coast. It was the business formed by Jack Nilles (credited as the “father of telecommuting”) following up his seminal 1976 book, The Telecommunications Transportation Tradeoff: Options for

Tomorrow (in which he coined the term “telecommuting”). He still writes a blog but is mostly retired and lives in Brentwood.

JALA led the demonstrations for the State of California and the City of Los Angeles (where I was the in-house project manager) and many others including outside of the U.S.

Particularly interesting is that he estimates 200 billion VMT have been saved by telecommuting over the years. See JALA's extensive list of publications at: <https://www.jala.com/publicat.php>

Gil Gordon through his firm GGA Consulting was the major player on the east coast. More data from pilot projects and other engagements can be found at [www.gilgordon.com/gga/consulting.htm](http://www.gilgordon.com/gga/consulting.htm)

What it takes to establish and sustain telework as an enterprise-wide strategy is missing from the Draft Report. Broadband Infrastructure is necessary but not sufficient for telework to happen. The VMT and GHG estimates in this report are contingent upon the success of the applications planning and implementation practices and the policies and programs the region puts in place to support or incentivize telework and teleservices.

The draft states that, “prior to the COVID-19 pandemic, about 5% of all workers telecommuted. During the peak of COVID-19, that jumped to around 40%, with some reports much higher. Trips to school, medical, local government, and retail and service destinations also greatly decreased. Approximately 20% of the workforce will continue to telecommute at least one day per week post-COVID-19.”

The assumption appears to be that two factors will cause the post-pandemic remote work to stabilize at about 20% of the workforce, four times the pre-pandemic rate: Induced demand from more and better broadband network access; and a carry-over from what was an enterprise-wide demonstration project during the pandemic.

Induced participation based on the improvement of broadband access seems unlikely. Broadband has been around since the early 2000s, about 18 years before the pandemic. During that period, especially in the last 10 years, there has been plenty of bandwidth available to support telework, particularly for those employees most likely to have jobs that could be worked remotely. The estimated 5% pre-pandemic participation rate does not suggest more and better broadband will induce many more participants, certainly not the factor of four increase from the 5% base line up to 20%

The carry-over effect will probably account for some increase over the pre-Covid baseline of 5%. How much is the question.

As I mentioned, there were many demonstration projects in the late 1980s and through the 1990s. They usually involved a small number of participants carefully selected,

managed and evaluated. Virtually none of these universally successful pilots resulted in enterprise-wide adoption.

The pandemic resulted in an estimated 40% participation rate because telework was required for all eligible jobs. However, that pandemic adaptation was really just another demonstration project – though enterprise-wide rather than just a sample -- and history shows demonstrations do not generally lead to adoption.

Additionally, there is a push-pull between management and labor. On one hand, once freed from the office, apparently some employees simply won't return and would rather find a job that permits remote work. On the other, the trend among most employers is to return to physical presence. The dramatic increase in traffic provides evidence that management is winning for now. (See the discussion of the case of San Francisco, below.) Management being forced into a comprehensive experiment without notice, planning or preparation of any kind, has not necessarily left them wanting to continue.

In the real world, the status quo is very hard to change.

The handouts from the January 21, 2022 Advisory Committee meeting included a section named Next Step Working Recommendations: Ubiquitous Deployment - Universal Adoption. This is #3 in that section:

Determine type, kind and level of employer incentives that will provide the most significant outcomes. Assess feasibility of fostering a “tipping point” for telework to be the “new norm” and the extent to which it can be triggered locally or needs to occur at higher levels.”

Broadband is necessary but not sufficient for telework becoming a “new norm.” The following are my recommendations for what else beyond ubiquitous broadband is necessary but not sufficient. It will take both. Funding for the applications planning will be needed in addition to the funding required for ubiquitous broadband deployment.

### **Recommendations for inclusion in the Final Report's Action Steps<sup>1</sup>:**

Expert Advisory Committee agreement on the potential range for reduction of VMT for the Final Report and for incorporation into the RTP/SCS is the current task. My position as Committee member is that the forecast should be based not only on strategies leading to ubiquitous broadband deployment, but also on the additional strategies for applications development that lead directly to VMT reductions

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<sup>1</sup> I offer these comments based on my experience designing, planning, and managing telework programs and as a founding member of the of the International Telework Advisory Council. My experience includes managing the telecommuting pilot project for the City of LA (early 90s), designing and implementing the Telework Facilities Exchange for the League of California Cities (mid-90s), and designing and implementing the Blue Line Televillage for LA Metro (mid-90s). I also developed strategy for the South Bay Fiber Network deployment.

The rate of climate change makes implementation of these new strategies urgently needed.

Part two of the 2021-22 IPCC report entitled [Climate Change 2022: Impacts, Adaptation and Vulnerability](#) (released February 28, 2022) details the destruction already experienced and forecasted for the near future in terms of floods, fires, hurricanes, heat waves, droughts, sea rise, biodiversity loss and the expected impacts if carbon emissions are not reduced by 50% before 2030 – meaning immediately. The situation has been labeled “ecocide.” The UN Secretary-General calls the current inaction a “criminal abdication of leadership.”

Broadband applications like telework, eliminating the longest most frequent household trip, will be required to preserve the human habitat.

These summarized recommendations are concrete action steps for realizing VMT reduction from broadband infrastructure:

1. Establish a regional organization responsible for leading the growth of telework practice. This organization will market the option to employers and generally support the sustained growth of the option to work in or close to home. This could take the form of a government led non-profit. At the least, seed funds will be required with sustaining funding potentially sourced from the commercial beneficiaries of telework.
2. Develop and implement a plan for facility-based telework as an option, regular or occasional, to the home office. Home-based telework is not for every employee and especially not for every manager. Maximizing VMT savings from broadband deployment requires the facility option, and that adds a level of complexity to implementation. Providing facilities will require a plan in each sub-region supported by implementation funding. This task should be directed by the regional telework organization described in #1.
3. Develop resources to sustain large numbers of remote workers. The key is maintaining a high level of productivity by the manager-employee combinations. Excellent performance will require enterprise level planning and training (guidelines, participant selection, evaluation methods) for both employees and their managers. This will be another program planned and implemented by the regional organization in #1. Funding for program development will be needed.
4. Identify the state, region and local policies that will support sustained growth of the telework practice. The Final Report for this Caltrans-funded project will provide the initial list of supportive state and regional policies and incentives that will maximize the number of teleworkers. The Report should also estimate the public sector investment that will be needed.

SCAG intends to use the estimated VMT reductions from telework and teleservices in the 2024 RTP/SCS as a strategy for meeting CARB's GHG emissions reduction target. Telework at the scale that would contribute to significant reductions of carbon will represent a policy of decentralization likely requiring re-evaluation of existing "priority development areas." The development pattern of the region could change with more housing needed in the existing large central business districts to compensate for office vacancies. This prospect is discussed as part of the details.

Finally, the January 21 "Working Recommendations" referenced above ended with the following:

"Design and implement pilot project (and then expand if demonstrated to be effective) a true stakeholder-driven, collaborative approach to transforming neighborhoods that achieves and accelerates adoption to get online all households. Ideally use investment in middle-mile infrastructure as a catalyst for last-mile deployment and Digital Inclusion?"

5. The SBCCOG has a design for that exact type of demonstration project and has been evaluating sites in our sub-regional DACs for implementation. Finalizing sites has been pending identification of a funding source. The South Bay Fiber Network is a government leased middle mile network that can connect a new anchor institution in a commercial district needing revitalization and extend service to adjacent residential neighborhood through a partnership with a WISP. The expansion is part of the SBFN's Phase 2.

Details about each recommendation follow:

### **1. Regional Telework Organization: *The Exchange* (proposed name)**

Developing and sustaining telework at scale will require an institutional champion. Most formal telework programs fade away over time, most often due to management clinging to traditional practices. The post-COVID "return to the office" movement is an example of the pull of tradition.

Distinct from enterprise resistance, political resistance to telework has also emerged. The issue in this case is economic loss to the Central Business District (employment center) in the form of office vacancies and decline of linked services.

"San Francisco Mayor London Breed is accelerating efforts to lure office workers back to the city, drawing commitments from companies such as Bank of America Corp. and Uber Technologies Inc. to have employees return in some capacity this month. Remote-work policies have taken a toll on the tech hub, which is struggling with the nation's weakest office occupancies, stubbornly low transit [ridership](#) and one of the country's slowest job recoveries.

“By committing to San Francisco, these businesses and many more are investing in this city and what makes it special – the people who live and work here,” Breed said in a [statement](#) Thursday. “We are excited to welcome people back to downtown to work, to dine, and to experience the arts and culture that make this city special.”

[San Francisco Draws Pledges From Firms to Return Workers to City \(msn.com\)](#), Bloomberg, 3/4/22

See comments under 4 below for the land use implications of telework.

Changing the dynamic maintaining central office work stations requires a permanent institutional presence to advocate for decentralization. Its scope of work should include marketing the option to employers; providing links to telework development professionals; maintaining a library of studies, forms, procedures and best practices; planning shared telework facilities and maintaining a list of commercial co-working options; monitoring the participation rate; and calculating VMT saved.

The idea of a central organization advocating for and marketing new behavior is not new. Commuter Transportation Services, Inc. marketed as “Commuter Computer,” a non-profit active in the 1980s, promoted and facilitated ride sharing practice to the public. Today, a modern version with a narrower audience but expanded scope is the LA County Commuter Service Center. It provides information about and references to a variety of mobility options including public transit, Metro Link, car pool, van pool, and guaranteed ride home – for County employees. [Commuter Service Center – Rideshare LA County](#).

Expertise will be needed to design the organizational structure. There will need to be a sub-regional component because of the granularity of the tasks and familiarity with the territory. The sub-regions will need to be coordinated at the regional scale because the housing and job markets integrate regionally.

Those dedicated organizations and specialized services are needed because new behaviors that reduce VMT do not happen on their own. Funding will be needed

## **2. Providing the facilities-based option will increase the number of teleworkers.**

Employee and management preferences as well as some corporate policies and cultures create a niche for facility-based telework.

Some remote workers have reasons to prefer a work station not in the home but nearby.

- Some employees want to keep work out of home life; risk of after-hours compulsive work in a home office is minimized with an external but nearby work station.
- Some housing situations make home-work difficult. Noise from family members and lack of space are common problems.

- The COVID quarantine put a great deal of pressure on the home by requiring it to function as an office, school room, meeting room, and health clinic in addition to normal family business, food preparation/meals, and entertainment. Broadband applications designed to reduce VMT will replicate those conditions.
- A recent survey of ADUs in CA found that a portion of them, although promoted for providing affordable housing, were actually used as remote offices during COVID. This practice illustrates the interest in remote work stations not in the primary residence.
- Some remote workers dislike isolation and prefer some social context during the work day. Working in a private space amongst neighbors can provide that context.
- This article expresses another reason for a facility-option: “Hybrid Working Enters a Third Dimension: Bored with WFH? Try the ‘third space’: not the office, not the home but somewhere in-between.” Financial Times, February 19, 2022, Janina Canboye, <https://on.ft.com/3p4rqY5>

#### Manager and institutional issues:

- In my projects, many managers were more willing to supervise remote workers when the remote work-station was in a professional office environment rather than the home.
- LA County pre-COVID required the HR Department to inspect the home office before authorizing telework for that employee. The sheer number of required home inspections made home-based telework impossible. Such policies suppress the number of actual teleworkers.

#### Network Quality

Dedicated gig/sec network that delivers connect speeds far faster than what will be available in the home office provides another incentive for facility-based telework.

#### Previous Experience with Telework Facilities

While not common knowledge, the SCAG region has a rich experience with telework facilities. A number of demonstration projects were funded during the late 1980s through the middle 1990s, including by the SCAQMD and LA Metro. Those institutions have not maintained their project archives so those facilities-based experiences have



been lost and their lessons learned are not available. (See Addendum 2 for my recollections about telework facilities.)

The estimate of VMT reduction in the final report should specify the assumptions about the facility option, as well as a budget for providing those facilities.

The good news is that the same facility used for telework can also provide technology and office/meeting space for home-based businesses and other small business in the area. The South Bay has several cities where, according to Dunn and Bradstreet, there are more businesses registered in residential zones than those zoned for commercial. This proposed telework facility, located in a neighborhood commercial center, can save total VMT through shorter trips and reduce carbon generating VMT by compatibility with short range zero emission devices.

A facility with more than a single activity will ensure no wasted capacity plus more return on investment from economic stimulus and additional carbon reduction than telework-alone. The same infrastructure and organization will also be able to incorporate the broader needs of the adjacent neighborhood by providing access to digital tools and training for all adjacent residents and business as well as host teleservices provided by health practitioners, post-secondary education institutions, federal government agencies, and so forth. In Disadvantaged communities (DACs), this type of facility will also address digital equity.

### **3. Successful telework requires an enterprise-wide planning process**

Working remotely and managing remote workers requires different practices and skills than when all teams are located in a central office.

- Before COVID 19 telework programs development included a selection process. This involved application to the program and approval was based on traits like work habits, communicability, and personality. Manager approval was required for each participant. For example, in the LA City pilot, we had applicants to work at home that management simply did not trust even though the job did not require onsite presence. Successful outcomes for both management and labor, supervisor and employee, require a development process.

Successful permanent telework in most firms won't happen by "turning a switch." Yet that is what happened when the COVID emergency forced 100% telework for those who could do it and neither supervisor nor employee were prepared for the sudden change in management style. There was no time for the normal telework program development process.

Some of the return to the office movement is likely related to the lack of complete satisfaction due to the forced change and lack of preparation. Training for employer and manager covers work assignments, reporting, collaboration, evaluation.

Distance education faces the same situation. Teaching to distributed classes from a remote location involves much more than delivering a lecture in front of a camera instead of a live audience in the classroom. In some cases, the style of presentation and participation must change and in other cases the lesson plan and curriculum may need to be redesigned.

Students need to be instructed on how to learn from mediated lesson plans; same for parents who were forced to become teacher's assistants when home-based education was the only option. Remote classrooms need to be identified from some form of facility with high bandwidth service to complement the individual home, which was the default during the pandemic quarantine.

Evidence of two years of home quarantine with children relegated to distance education at home is exposing the lost years of socialization that is as important to school attendance as curriculum. Plans for future primary and secondary distance education classes would benefit from delivery through a neighborhood center where small numbers of student can congregate and meet with a remote mentor, possibly in "pods" in case of another quarantine.

Telemedicine shares some of the same problems. The institutions must develop the most effective way of interacting with patients who are in a wide range of conditions. Similarly, patients must learn how to get the most out of their online consultation; and how to access the new communication platforms increasingly used by service providers like Kaiser, UCLA and Cedars Sinai in the Los Angeles market.

Some believe that the best privacy is in the home. This neglects the fact that many homes, especially in DACs, are small, often with siblings, sometimes multi-generational and even with multiple families. Internet access facilities will have rooms that afford privacy.

#### **4. Transition to sustained high volume of remote work will require new public policies and practices as well as substantial government funding support.**

Telework, like other strategies, exists as part of a complex network of interconnected systems, as in an ecosystem. The ecosystem supporting telework has many components such as public policy, corporate cultures, work force mobility systems, the built environment and so forth.

The potential range for VMT reduction depends on the success of implementing many of the components of the telework ecosystem. Recommendations 1-3 are essential. Each component should reinforce the others in a virtuous cycle.

More broadly, the ecosystem supporting the transformation of the SCAG region from wheels to wires is also in play. Ubiquitous broadband network deployment is an essential component of that larger ecosystem.

The final report to Caltrans should identify other significant components. These are examples of state and regional policies:

#### State government

Offering tax incentives to employers with telework programs has been mentioned in the materials provided to the Advisory Committee.

The state could offer strong incentives to employers over a size threshold to provide a work station within 3 miles of every eligible employee's residence (which includes a home office for those who prefer it). Participation in the program could be contingent on the employee using some form of zero emission device/vehicle or public transit to travel to that work station.

State could establish a program whereby local governments would receive compensation for providing work stations to residents who work for private employers where the central office is at least 5 miles away and who commit to using some form of zero emission device/vehicle or public transit to travel to that government work station.

#### Regional Government

The SCAQMD has mobile source rules that can be amended for telework credits.

Rule 2202 applies to employers with 250 or more employees and addresses mobile source emissions, with AVR as a central metric.

“Average Vehicle Ridership (AVR) is defined as the current number of employees scheduled to report to work during the window for calculating AVR, divided by the number of vehicles arriving at the worksite during the same window.”

This rule as written supports public transit, cycling and walking to work; the only modes for travelling to work without a vehicle. It could be amended to support telework by defining the AVR numerator as the number of employees scheduled to work at least two days per week at a given facility. The threshold for that hybrid arrangement could be lowered to 150 employees or less per employer.

Examples of other components of the telework ecosystem:

- Regional leadership in the form of high-profile government officials and private sector owners and managers publicly advocating telework by delivering testimonials of their own experience.
- The organization proposed in my first recommendation could be charged with negotiating technology and furniture discounts for home, satellite or shared offices. Arrangements with commercial co-working centers could be part of their charter.

- Furniture manufacturers can design work-pods that deliver privacy in a small footprint in order to increase the density of work stations in co-working spaces or for use in a compact home office. (Steelcase had such a produce in the 1990s).
- Mobility systems are part of the ecosystem. The SBCCOG has designed a local travel network (LTN) for those zero emission devices/vehicles specialized in use for trips 5 miles or less.

### Land Use Pattern and the Built Environment

The genie is out of the bottle. Ubiquitous broadband and its VMT reducing applications of telework and tele-services will be transformative; and that is exactly what accelerating carbon reductions requires.

The SCAG region must de-carbonize its mobility system and re-imagine the complex ecosystem that supports it. The era of oil dependence must end because it has led society to the edge of a cliff facing catastrophe defined by several toxic conditions:

- Carbon driven climate change
- Toxic levels of combustion pollutants
- Escalating crude oil prices with peak oil lurking
- Global insecurity – as foreign autocrats tend to monopolize oil extraction and sale

As the organizing principle of spatial organization shifts from wheels to wires, the land use pattern and built environment can help accelerate or slow the inevitable. The urgency to de-carbonize favors acceleration.

The genie let loose is the realization that proximity between origins and many destinations can be produced through applications that run on broadband networks. Physical travel will always be necessary, but the length and frequency of trips can be drastically reduced. Making that happen is at the core of this work linking broadband to VMT reduction.

The “law of unintended consequences” will also accelerate the outmigration from dense metropolitan areas. The extraordinary government investment in bringing quality broadband service to rural and tribal communities can reasonably be expected to attract more professionals tired of paying premium prices to live in small close-in units. The three most important factors in real estate are transitioning from location-location-location, to space-amenities-location. That’s the magic of broadband.

Because of ubiquitous broadband delivering telework and teleservice applications, regions, sub-regions and cities can now be organized around small scale, semi-autonomous neighborhoods with very low need for even electric-mobility. Walking and cycling to nearby destinations will become feasible for many, and small battery zero emission devices and vehicles will be available for those trips requiring electricity. Rural, suburban, and exurban settlement can all be structured in that way. It’s the end of

“sprawl.” Every place can be compact regardless of location. That’s also due to the magic of broadband networks.

That choice of a walking/cycling land use pattern stands in stark contrast to the status quo which will sacrifice carbon reduction in order to retain its viability. That contrast is evident in San Francisco Mayor’s call to large employers to terminate remote work because of weak office demand and decline of related services (described above).

The problem is that carbon reduction should trump every other issue given the dire consequences of failure. Also worth mentioning is that the large scale central business district faces other threats including another pandemic, that artificial intelligence will eventually reduce the work force the large CBD (and large campuses for tech companies) was designed to office, and the unlikely but real threat after 9/11 of it becoming a target for terrorists. The San Francisco CBD also depends on large public subsidies for transit services which are currently struggling with operations and maintenance issues.

One possible strategy for large CBDs like San Francisco would involve converting vacant office space to housing, difficult as that may be cost-effectively. There may not be good alternatives. Picture the spatial impacts of very robust success implementing telework and teleservices.

Broadband applications offer the region a way to implement a new model of land use pattern that is gaining traction in various metropolitan areas here and abroad. That is the concept of the complete neighborhood or 15 minute city (from Portland to Paris).

This article from [Forbes](#) offers a useful characterization: “COVID-19 is not the Death of the City – It’s the Rise of the Neighborhood Center, Tiffany Chu. Perhaps it will be both.

The land use patterns consistent with ubiquitous broadband deployment and VMT reducing applications will hopefully lead to serious consideration in the 2024 RTP/SCS.

**5. Implement a pilot project of a stakeholder-driven collaborative approach by using broadband-for-all to transform neighborhoods** (from January 21 “Working Recommendations” #5)

The SBCCOG has assembled the components of a pilot project to demonstrate the transformation of DACs into complete neighborhoods based on access to a high-quality broadband network. This project is shelf-ready.

The South Bay Fiber Network is a middle-mile open access network with extensions to all 15 civic centers in the South Bay plus 7 other locations – Beach Cities Health District, South Bay Workforce Investment Board (7 locations), West Basin Municipal Water District, Lundquist Institute (adjacent to Harbor General Hospital), and the Regional Communications Center. It has been operating since August, 2020. It can deliver up to 10 MPS speed.

We are now entering Phase 2 with an agreement with a WISP to deliver service to two business areas still operating with DSL. Conversations are ongoing with other WISPs and fiber-based internet providers for additional service extensions into residential neighborhoods.

The pilot is planned to include a public internet-access facility providing technology, training, furniture and work space for neighborhood residents and businesses, dedicated to leading community transformation into its self-determined digital future. This facility will also serve as the hub for extending the network so all households and businesses are online.

We have a community planning process designed and are ready to proceed. The project will build on the prototype telework-teleservice facility, the Blue Line TeleVillage piloted in Compton in the mid-1990s (see Addendum 1).

This pilot is the next step implementing the Land Use – Transportation Chapter of the SBCCOG’s sub-regional Climate Action Plan,

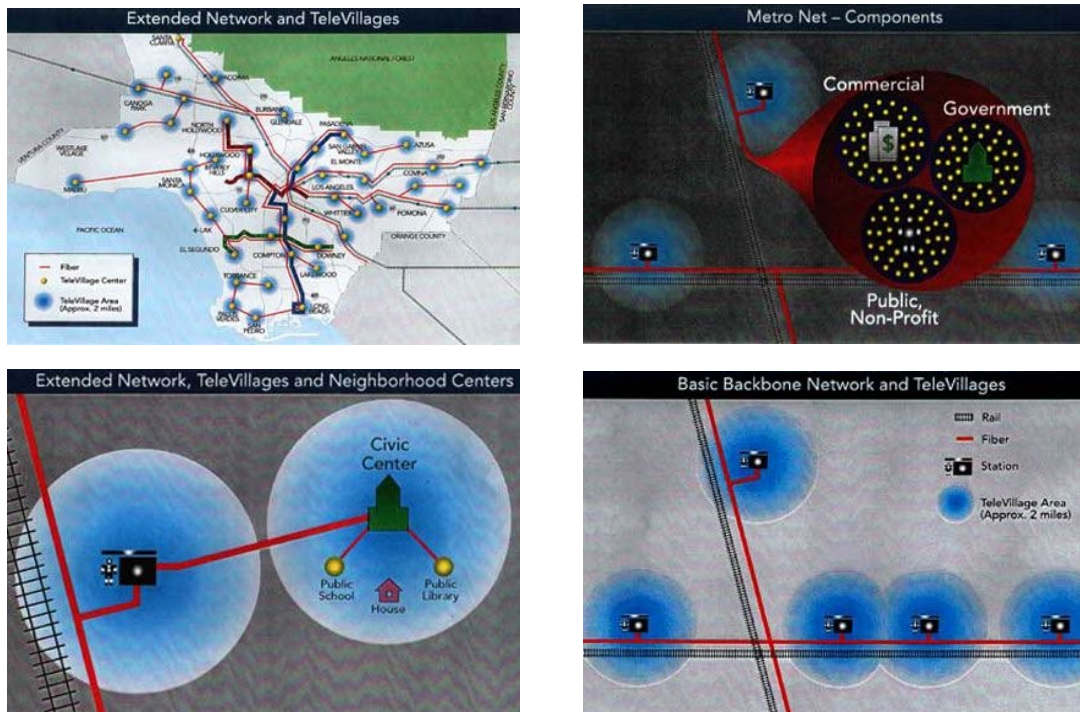
The SBCCOG has been evaluating up to three sites in DACs and further progress is on hold pending identification of a funding source. Between \$2-\$3 million per site depending on rent will be needed to establish and sustain operations for a 3 year demonstration period. A business plan for the pilot to transition to self-sustaining would be developed during that period.

The facility will be located in a small-scale business district experiencing disinvestment as part of a re-vitalization strategy. A mobility hub for access to zero emission mobility for addressing the “mobility divide” would be will also be developed in what will become a prototype “neighborhood business district” (NBD) served by zero emission travel options.

It will be possible to address digital equity and carbon reduction simultaneously because those divergent policy areas share the same infrastructure with overlapping applications. Given the closing window to reduce carbon emissions to avoid catastrophic impacts on the human habitat, several similar projects should be funded in other land use patterns elsewhere in the state. The South Bay project should be a priority based on our state of preparation.

## Addendum 1: Summary of the Blue Line TeleVillage A Middle Mile Network for Neighborhood Transformation

I advised Los Angeles County Metropolitan Transportation Authority back in 1992 to form a public-private partnership with new network market entrants looking for rights of way to develop regional backbones from fiber optics adjacent to rail, to create what I named the Metro Net. The recommendation is illustrated in these 4 drawings.



It consisted of three bundles of fiber strands allocated to government (including for Metro’s internal uses), commercial (owned by the network developer) and public (to be offered to a newly formed non-profit).

Metro Net would be developed throughout the rail system complemented by network access facilities at each rail stop, that would address digital equity and encourage use of the rail system. Those facilities, referred to as “televillages,” were to serve as public telework centers, offer a range of digital tools like a computer lab, and access to the virtual presence of classrooms, library services, and small business development lectures all through live, interactive video conferencing. Each televillage was to become a programmable building designed by community stakeholders to address community needs and interests.

Extensions from the Metro right of way into every civic center and from there into other public facilities essentially formed what today is a middle mile open access network. It was to be developed by a joint powers authority formed by Metro and the 88 cities of LA County. Ironically, LA County is today in the early stages of developing what would essentially become the Metro Net. Extension of service to neighborhoods and individual households was to be completed by private final mile carriers. The project did not progress to that point before funding was exhausted.

Regarding cost, my estimate in 1992 for a 300 mile network with 1,000 dark fiber strands was \$200 million, about the cost at the time of ½ mile of underground rail construction.

Five years following completion of the Metro Net report and a complicated procurement process, I submitted a report on the Blue Line TeleVillage Demonstration Project. The report documented the experience developing and operating a prototype network node using 2,500 square feet located in the Martin Luther King Transit Center adjacent to the Metro Blue Line at the mid-way between Long Beach CBD and LA CBD. In its one year operation, there were over 6,500 visits, 1,500 paying "members," 2,000 trained in computer skills, 32 participating organizations 112 somewhere in the pipeline.

Neither Metro Net nor the televillages were adopted by Metro or included in long range strategy.



## **Addendum 2: Brief History of Telework Facilities**

The following are my reflections from that early telework era:

- During that period the County of LA acquired and operated a satellite facility in the Antelope Valley, meaning access was limited to County employees. It was successfully operated for some years. Not clear why program was terminated.
- Cities typically were awarded the grants and used the funds to rent offices in commercial buildings, equipping them for shared space by individuals from various private firms, often technology companies. There were few commercial shared work space turn-key operations at the time. Most cities were ill-equipped to usher in this new way of working and by the late 1990s the demonstrations began to close because of the expense and limited marketing as it was assumed the benefits would attract participants on their own; and the funding agencies stopped investing.
  - Renting space, furnishing it, installing basic equipment like photocopy machines, providing amenities like coffee makers, and paying for cleaning services, electricity and so forth made the experiment more expensive than necessary.
- That insight led to my project, the Telework Facilities Exchange, which recruited government agencies with a spare desk or office to host a government employee from a different public agency whose manager authorized that person to be a teleworker guest. This practice leveraged existing space, furniture and services reducing the cost of facilities-based telework to the cost of administration. This project was sponsored by the Institute for Local Self Government, the education arm of the League of California Cities, and funded by the SCAQMD.
  - The task was to match the residential location of approved guests to a nearby office of a participating host. In one case the match reduced the commute from 70 minute in a single occupant ICE vehicle to 5 minutes walking. It was like ride share matching but without the ride, matching the employee directly to a nearby work station.
- Pre-COVID (2019) the Internal Service Department of the County of LA designed and implemented a multi-site facilities pilot project by renting work-stations from commercial on-demand office providers (including We Work and several others). The pilot produced substantial VMT reductions and experienced a high level of participant satisfaction. An excellent report summarizing the findings is available from ISD General Manager, Selwyn Hollins. The Report provides cost and benefit data that could be used to plan a region-wide network of facilities.

One weakness of this experiment was that the journeys to work were reduced but remained relatively long, Between 40 and 60% of the VMT were reduced depending on the site. This result led to discussions with the County for a pilot project in the South Bay Cities for an updated version of the Telework Facilities

Exchange limited to County employees living in the South Bay. COVID disrupted those discussions.

However, I understand that ISD is planning in 2022 to return to facilities-based telework based on the Telework Facilities Exchange model, but county-wide involving only county buildings as hosts and county employees as guests. I plan to return to our previous discussions with Selwyn Hollins about a pilot in the South Bay where city and state buildings and employees would be added in an attempt to make the distances to work as short as possible, probably including zero emission devices as the mobility requirement.