CURRENT BROADBAND ENVIRONMENT AND INFRASTRUCTURE IN EL DORADO COUNTY

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Abstract

This report has been assembled for the County of El Dorado to summarize preliminary activities of the Countywide Broadband Feasibility Study. This paper discusses existing service levels, infrastructure, and planning for the future.

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BROADBAND IN EL DORADO COUNTY

Introduction

NEO Connect has been working with the County of El Dorado on a broadband feasibility study. This report summarizes the preliminary information gathered to evaluate the current broadband environment, including available services, existing assets and infrastructure, and planned future projects. Additional discussion concerning conduit installation policies and ordinances is also included.

Current Environment

Local Research - Providers, Services, & Pricing

Although wireline services are available along the densely populated sections of the Highway 50 Corridor, many of the rural areas in the County rely heavily on fixed wireless and satellite broadband services. Many wireless providers in rural California however, do not deliver even the FCC defined, minimum broadband speeds, according to the National Broadband Map. Moreover, reliability is the larger issue for most wireless and satellite subscribers, as these technologies are heavily impacted by geography and/or weather issues throughout the County.

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Wireline broadband services available in the County consist of DSL and Cable-based services. Existing Fiber Optic services are provisioned by AT&T and Consolidated Communications, and connect less than 5% of the households in the City of El Dorado Hills only. DSL services are delivered by AT&T County-wide, while Cable services are provided by Spectrum/Charter in the Tahoe Basin, and by Xfinity in Placerville and points West. Residential speed tests aggregated by the Tahoe Prosperity Center in 2017 show available wireline services in the County delivering an average of 38.77 Mbps download and 10.09 Mbps upload. Approximately 60% of the speed tests met the FCC definition for broadband – 25 Mbps download/3 Mbps upload. Pricing for internet services starts around $40-50.00/month, with data-caps, and with possible additional installation fees.

Wireless broadband services are available throughout the County in the form of fixed-wireless and satellite services. Compared to wireline broadband services, fixed wireless networks typically provide lower capacity connections, that are much more sensitive to network capacity and geographical constraints such as terrain, buildings, and foliage. Fixed wireless providers include Cal.net, RemotelyLocated.com, and RockyRidge.net. Only two of these providers advertise services that meet the FCC broadband, minimum guidelines. These service packages are priced between $150-200.00/month, with installation charges starting around $200.00 for a basic install, and additional work billed hourly.

Satellite broadband services are offered by Hughes.net and ViaSat, but can be significantly limited by geographical constraints, bad weather, and data caps. Pricing for 25 Mbps/3 Mbps packages start around $65.00/month with modem, and include a 10Gb data allowance. Additional data allowance plans, and overage charges can quickly add costs that become prohibitive for the average household with children, or homeworker.

What do Local Survey Data Show about El Dorado County?

The Tahoe Prosperity Center has conducted a survey of broadband users as part of its Connected Tahoe Project. Survey participants were asked questions concerning service levels, technology, and user experience. Roughly 63% of respondents identified Spectrum/Charter as their ISP (Internet Service Provider), while 23% subscribed to AT&T. In terms of service speeds, participants were asked to identify whether or not they have access to the CPUC-defined, broadband minimum speed of 6 Mbps download, and 1.5 Mbps upload, and over 70% confirmed that they do. It should be noted however, that the FCC defines broadband as 25 Mbps download/3 Mbps upload, roughly 2-4 times the minimum speed used as a benchmark in this survey.

The survey results also provide insight into available technologies and user-experience. 80% of respondents subscribe to either DSL or Cable-based services, while only 9% rely on a wireless service or their cell phone for connection. This aligns closely with the 86% of users subscribing to the Spectrum/Charter and AT&T wireline services (DSL or cable). Nearly 72% of respondents work from home or run their business from home, and 64% use the internet to complete school or job training course work. Predictably, when asked what they would like to do online, that they can't do now, two of the top three responses included, "work from home" and "transmit large data files." The remaining response was "stream movies/television."

Nearly 72% of survey respondents work from home or run their business from home. More than 64% use the internet to complete school or job training course work.

Concerning user satisfaction, the results were clear. Participants were asked questions relating directly to satisfaction including, "Are you satisfied with your current internet service?" Thirty-

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nine percent (39%) of respondents were either very dissatisfied (lowest satisfaction), or quite dissatisfied. On the other end of the range, only 14% described their feelings as quite satisfied or very satisfied (highest satisfaction). And the largest group of respondents 46% responded simply 'It's okay.' when describing their broadband service. A second question asked respondents to address their satisfaction level with particular aspects of their broadband including, the quality of speed, quality of technical support, quality of service, provider choice, and monthly costs. Across all responses for quality of speed, 38% were either very, or quite dissatisfied. 45% described their service as "Okay", and only 17% reported a positive level of satisfaction.

The greatest levels of dissatisfaction surrounded the lack of choice when choosing an ISP. Less than 8% of all respondents reported that they are satisfied with available choices, and fully 80% indicated that they are dissatisfied with current service offerings in El Dorado County. This question is closely connected with the inquiry as to whether respondents would be willing to pay more for higher quality services. Sixteen percent (16%) agreed that they would pay more.

Existing Assets & Infrastructure

NEO's team has been evaluating existing assets and infrastructure throughout the County and its municipalities, including:

- Fiber and conduit
- Communications towers and water tanks.
- Utilities service districts pole data
- Existing private networks

Maps of the existing assets within the County are being mapped by NEO's team.

Planned Capital Improvement Projects and New Developments

NEO's team is currently working with the County's Transportation Department to identify planned capital improvement projects and new real estate developments. Andrew Gaber with the County and his team are compiling this information and NEO will identify key routes for consideration of placing conduit while work is being done.

What Level of Investment from the County?

The appetite for broadband investment varies between municipalities, counties and local governments. Below is a list of possible and typical levels of investment and strategies.

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1) Facilitation through Broadband Friendly Policies and Ordinances, Tax Incentives and Use of Existing Assets

2) Smart Conduit Construction to Gain Assets and Attract Partners

3) Connecting Community Anchor Institutions and "Smart City" Applications

4) Connecting Community Anchor Institutions & Key Business Locations

5) Connecting Homes and Businesses, Fiber to the Premise

Below is a detailed description of the investment level and examples of communities that have deployed these strategies.

1) Facilitation through Broadband Friendly Policies and Ordinances, Tax Incentives and Use of Existing Assets

Often a local government does not have the capital to invest in a comprehensive broadband network, but it will have the ability to provide in-kind contributions, tax and other economic incentives, use of existing assets, and to enact policies and ordinances that are broadband-friendly. All of these strategies have the effect of lowering the cost for a private carrier to deploy a fiber or wireless network within a community, with little to no investment directly from the local government.

Broadband friendly policies and ordinances. Municipalities have the power to significantly reduce the capital costs of broadband infrastructure deployment by implementing policies and ordinances that are broadband-friendly. NEO has provided a white paper describing in detail these recommended policies as a supplement to this summary. These recommendations include implementation of a Dig Once Policy, Shadow Conduit Requirements, Joint Trench and Joint Build Agreements, Abandoned Fiber and Conduit Policy, Land Use Policies for New Developments, Streamlined Permitting Processes, and One-Touch Make Ready Requirements.

These policies can be implemented to facilitate investment from the private sector and can also be used to gain substantial assets owned by the County that can be leveraged for future broadband deployment.

Other County facilitation to encourage and support investment could include removing roadblocks and creating efficiencies that a private company cannot achieve on its own.

Use of Existing Assets. Existing assets can include tower facilities, water towers, land, rights of way, existing conduit and existing fiber. Sixty to eighty percent of a fiber optic network's capital costs are in opening a trench or in burying conduit that will house fiber optic cable. Using existing conduit therefore, substantially reduces the capital costs of network deployment. If a municipality has existing conduit or fiber, these assets can be leveraged to entice further deployment of investment by the private sector. New networks can and are built on the foundation a community's already existing fiber and/or conduit as well as available land.

Economic Incentives. Economic incentives as well as logistic assistance from the County can help pave the way for more powerful broadband service. Most tax incentives are implemented at the State-level, but the County could influence the State's consideration of providing tax incentives in the form of accelerated depreciation, reduced property taxes and reduced sales taxes.

2) Smart Conduit Construction to Gain Assets and Attract Partners

Giving access to existing conduit owned by the County can be leveraged to attract potential partners that may be willing to deploy an all-fiber network. The County does not have conduit already installed within the region, but given the interest in new construction within the County, the County should implement a shadow conduit policy that requires installation of additional conduit whenever work is being done within the County's right of way. By creating and implanting a shadow conduit policy, the County will gain additional conduit that can be used to leverage further investment. Information regarding examples of other counties implementing this policy and the impact of such are included in the supplemental white paper.

3) Connecting Community Anchor Institutions, Smart City Applications

Local governments and state agencies have been connecting their community anchor institutions with fiber optic networks for over twenty years. Community anchor institutions are state, county and local government offices and buildings, schools and libraries, hospitals, medical facilities and first responders. In fact, in the U.S., thousands of schools, libraries, community centers, and public health and safety providers obtain their broadband connectivity from local government and state non-profit networks, including state research and education networks. CENIC has built fiber to many of the anchor institutions within the State; this study will look to expand connectivity to all of the anchor institutions within the County.

Connecting these anchor institutions with fiber allows each location to receive very high-speed Internet and data connectivity while eliminating or drastically reducing the monthly lease or access costs paid to the private sector service providers. Anchor institutions often cannot afford to purchase high-capacity circuits from the private sector service providers and therefore,

simply cap their bandwidth purchased. Capping their bandwidth requires the anchor institutions to choose which applications to deploy and limits their ability to use applications that require high bandwidth. Building a County-owned fiber network to anchor institutions allows these critical key facilities to have the bandwidth they need to support all of their applications and once these networks are in place, additional bandwidth needs can easily be met without additional capital cost for construction.

The County could consider connecting their community anchor institutions with fiber to ensure that they have the highest-quality broadband connectivity. This could be done in collaboration with the other agencies to share in the cost of construction. Then, once these networks are built, the County could also consider leasing excess capacity of conduit or of fiber to the private sector for last mile build out and use. Once a network is built that serves schools, government offices, fire districts and the like, generally, this network reaches deep into neighborhoods and past business parks. These networks can then serve as an opportunity to allow the private sector to lease excess capacity and in turn serve homes and businesses with high-speed fiber. This trend is fast accelerating as hundreds of municipalities make available spare fiber optic capacity to private sector companies at rates designed to incentivize new private sector investment and opportunity.

Anchor Institutions may include Smart City Applications
An additional benefit of building a community anchor institution network is it will be equipped to support "smart city" applications when the time comes for government service innovation. Smart city applications may include connecting traffic lights, traffic management, and smart journey planning. Smart journey planning systems use open city data in order to recommend how individuals can best navigate from one place to the next. The systems are becoming sophisticated enough to take into consideration personal preferences such as cost, safety concerns and CO_2 footprint, as well as real-time traffic congestion and traffic patterns.

Other smart city applications may include connecting smart parking meters, automated meter reading and utilities management. Street lights are often connected with fiber and applications are emerging that allow active safety; increasing light levels in city centers when the light system detects individuals or motion, at bus stops or along walkways.

Another top smart city application is environmental monitoring, where a city that uses monitoring stations for pollution or weather conditions can now connect and use these systems for real time data collection and can pinpoint potential sources of pollution or weather issues and quickly react and efficiently deal with potential problems.

Other smart city applications are emerging around transport sharing, whether it is sharing bikes or cars or rideshare. Smart cars and electric cars will be a key enabler for wider adoption of city center car sharing, providing information to individuals about location and availability of shared cars and up-to-date information of pick up times for rideshare applications.

4) Connecting Community Anchor Institutions & Key Business Locations

A community anchor institution network could be expanded to also connect key business locations, industrial parks, incubators or co-working spaces. This enables a community to target key industries and geographies for economic advancement. Having access to very high-speed Internet is the number one criteria for a business looking to relocate. The County could place various business locations on a priority list for fiber connectivity and connect these locations while building to key anchor institutions.

5) Connecting Homes and Businesses, Fiber to the Premise and Gigabit Broadband

The most ambitious strategy for a local government to consider is the opportunity to connect all homes and businesses with fiber. More challenging geographies are sometimes forced to utilize wireless technologies to deliver service with a hybrid fiber/wireless network. Cities are building or facilitating Fiber to the Premise networks or "Gigabit-enabled" networks, allowing for Internet speeds of 1,000 Mbps or 1 Gbps in both upload and download speeds for all homes and businesses within a city's boundary.