

Build Once: Future-Proof, Fiber-Ready Residential Buildings

When communities consider how to become fiber-ready, much of their focus will naturally be on removing barriers to construction of the ‘last mile’ of a broadband network in the public right-of-way, underground, or along utility poles.

But, what about the last feet of wiring into a building and within individual units within a multiple dwelling unit (MDU) building? Residential buildings can be made fiber-ready through the installation of state-of-the-art in-unit wiring along with conduits both within the building and from the building to the street. Future-proofing buildings benefits both residents, landlords, and the community as a whole—it reduces the need for costly and disruptive renovation later, improves property values, and encourages new broadband choices.

While the future-proofing of buildings is primarily the responsibility of building developers, cities and other policymakers can also either encourage or require that new buildings and buildings undergoing significant renovation be developed in fiber-ready ways. One can think of this as a ‘build once’ policy -- a complement to the sort of ‘dig once’ policies that reduce the need for streets to be dug up repeatedly by ensuring ample conduit is buried underground. Some cities are already pioneering this approach, and this paper ends with a model ordinance for other cities interested in ensuring new developments are fiber-ready.

Why Future-Proof and Become Fiber-Ready?

Internet access is increasingly shifting from a ‘nice-to-have’ to a ‘must-have’ for residential areas. A survey of students found that Internet access is among the top 3 amenities they look at when deciding whether to rent an apartment.¹ And as people use more and more devices in their home, it’s increasingly important that residents have access to ultrafast Internet access. It’s been estimated that by 2020 the average American household may have as many as 50 connected devices.² That may sound far-fetched, but it isn’t when you consider that we already have smart thermostats, security cameras, smoke alarms, vacuums, refrigerators, washing machines, and even pet food dispensers that can all be connected to the Internet.

While broadband can be provided in a number of ways—via fiber, cable, or copper lines—the fastest, most reliable technology for advanced communications networks today is fiber. Fiber-optic Internet access is significantly faster and more reliable than Internet delivered over cable or copper lines. Fiber is also smaller in size, takes less space in the building, and is safer since it is glass and does not conduct electricity.

Future-proofing a building can also benefit residents by enabling more competition between broadband providers. In areas where new ultrafast broadband entry occurs, communities tend to enjoy both faster and less expensive service from all providers. Providing ample infrastructure for a future entrant can help ensure that residents continue to benefit from technological change over time.

¹ “What Millennials want?,” *J Turner Research*, September 10, 2013, https://www.iturnerresearch.com/hubfs/Docs/4296_JTurner_MFERreport_FINAL.pdf?t=1466523109754.

² Natasha Baker, “Home and health devices controlled by apps on the rise,” *Reuters*, April 22, 2013, <http://www.reuters.com/article/net-us-apps-home-remote-idUSBRE93L0BU20130422>.

Of course, by improving broadband offerings for their residents, property owners can also make an investment that they will benefit from. One recent study found that choice in broadband providers is a top factor for renters, and renters are willing to pay 8 percent more for an apartment with access to fiber.³ Providing access to fiber was also shown to increase resident satisfaction and reduce churn. For property owners, this can add 11 percent in net income per average apartment unit. What's more, future proofing a building can help increase the sale value of individual condos or apartments by 2.8%⁴, and help maintain its aesthetics when a new entrant wants to serve residents, avoiding needless construction and disruption.

What Does it Mean to Future-Proof a Building?

There are two core components of future-proofings: provisioning conduit from the street to the building, and installing ample microduct to every unit, capable of supporting multiple providers.

The savings from conduit outside the building can be substantial. By one estimate, “[a]dding a 200-foot path from a building’s utility room to the property line would cost approximately \$2 per foot for labor and \$2 per foot for materials—or approximately \$1,000 in additional construction costs for the outside plant portion of installing conduit.... In contrast, the cost for new construction of the same route can be \$1,500 to \$10,000 if a network provider needs to create a new entry path.... Constructing a new route into a building may also involve days or weeks of delay for permitting, engineering, design, utility location, and coordination with the building owner.”⁵

When it comes to pathways within the building, it’s preferable to have a building owner install microduct or other robust conduit, as compared to installing ruggedized fiber cable directly. For one thing, microduct is reusable. Cables will have to either be replaced if there is any breakage or they will require some sort of cut and patch on the walls to reconnect the break. In addition, installation of microduct is more flexible and less disruptive for residents; it will minimize the need for invasive construction when a new entrant wants to serve the resident, and it provides flexibility as to the location of the end-user’s equipment.

Along with building pathways to individual units, building owners should also take into account common areas, like recreation rooms. It is important to take into account where else in a building connectivity may be required by installing a spot (generally close to the ceiling) where an access point may be installed.

Building owners might also consider installing structured wiring within each building and to the unit. When it comes to the wiring itself, building owners should ensure that it is ready for future upgrades in technology. Today’s speeds can be met by Cat5e wires, allowing for gigabit connectivity. However, to more effectively future-proof, building owners should consider Cat6, capable of speeds ten times faster.⁶

³ “The Tangible Value of Advanced Broadband to MDUs,” *Fiber to the Home Council*, June 13, 2016, <http://www.ftthcouncil.org/blog/fiber-optic-broadband-boosts-value-of-multifamily-homes>.

⁴ *Ibid.*

⁵ Joanne Hovis, Andrew Afflerbach, “Gigabit Communities: Technical Strategies for Facilitating Public or Private Broadband Construction in Your Community,” *CTC Technology and Energy*, January 14, 2014, <http://www.ctcnet.us/wp-content/uploads/2014/01/GigabitCommunities.pdf>.

⁶ Of course, it’s also essential that such wiring be made available to different service providers. In some cases, cable providers have worked with landlords to secure exclusive licenses to in-unit wiring, see: “Exclusive Use of Inside Wiring Clauses in Cable ROE Agreements,” *Carl Kandutsch Law Office*, May 2, 2014, <http://www.kandutsch.com/blog/exclusive-use-of-inside-wiring-clauses-in-cable-roe-agreements>.

Paths To Future-Proofing -- Roles of Industry and Policymakers

Future-proofing buildings is something that building owners can take on themselves. For this to be maximally effective, it is important for the industry as a whole, both building owners and service providers, to work together on appropriate standards and incorporate such standards directly into building codes as appropriate. After all, future-proofing without an agreed upon standard could lead to sunk costs or unusable assets.

Some in the industry are already beginning to work together to define and highlight best practices. For instance, WiredScore is a company that evaluates the broadband-readiness of a building and then assigns a rating, much like LEED certification for a building's environmental impacts. Organizations that craft model codes, furthermore, have the expertise to handle complex inside wiring standards, and can do it with optimal safety and quality considerations in mind.

Policymakers should consider how they can encourage buildings to adopt best practices. Just as incentives have been provided for LEED certified buildings due to the positive externalities on the environment, economic incentives could be provided to ensure buildings are fiber-ready given the positive economic and social impact on the rest of the community. In fact, the U.S. National Broadband Plan recommends creating "incentives for developers to put more high-speed connections in new buildings, to upgrade existing structures and to encourage better internal wiring of all buildings, much in the same way that the Leadership in Energy and Environmental Design (LEED) certification program has encouraged developers to incorporate more environmental features into new buildings."⁷

Policymakers could also require buildings be fiber-ready. States and municipalities usually adopt building codes that are developed by one of several regional model code groups, creating a condition for the approval of a new development. These commonly used building codes do not (yet) have fiber-ready requirements in them generally, but cities can and should take the initiative to develop their own standards and incorporate them into the existing city building code. Cities may enact these laws by ordinance into the municipal code. However, particularly for inside wiring requirements, which are quite detailed, the city may consider creating separate specification documents and incorporating the specification documents by reference into the municipal code.

Loma Linda, CA is among the pioneers in this area. In 2003-4, the city implemented an ordinance that requires "builders of new residential or commercial structures work with the City from the design phase through to post-construction inspection to ensure compliance and high-availability of the agreed-on communications structure as outlined in the Building Codes," including structured wiring.⁸ What's more, "[e]ach element of the communications from end to end, are covered by relevant standards," making their

⁷ "Connecting America: The National Broadband Plan," *Federal Communications Commission*, March 17, 2010, <https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf>

⁸ Loma Linda, Cal., Mun. Code, § 15.54.010
http://qcode.us/codes/lomalinda/view.php?topic=15-15_54-15_54_010&frames=on.

Building Code a useful reference point for other cities as well. Developers in the community have seen great benefits from this policy, including improving the value of properties.⁹

Meanwhile, Brentwood, CA has implemented an ordinance requiring installation of conduit from streets to the unit during construction.¹⁰ Similarly, Sandy, OR has implemented an ordinance requiring developers to put conduit all the way into a home, and to deed that conduit to the city.¹¹

Draft Ordinance

Fiber-Ready New Buildings

Section XX.XX

(1) Scope of Applicability

- (a) Developers that receive construction permits for new residential multiple dwelling unit buildings.
- (b) Developers that receive a construction permit for existing residential multiple dwelling unit buildings and seek to make additions or replacements that exceed more than fifty percent of the original structure.

(2) Obligations

- (a) The Developer shall, as a condition of the permit, design, install, test, and dedicate to the property owner conduit, inside wiring, and other necessary or appropriate Communications Infrastructure, as determined by the department and according to specifications that the department adopts, to run from a connection point in such building to the lot line adjacent to a public right-of-way where there exists or may exist in the future a fiber optic broadband network.
- (b) The Developer shall, as a condition of the permit, connect individual units of the residential building to microduct sufficient to support multiple broadband providers that exists or may exist in the future in the public right-of-way adjacent to the building.

⁹ Steven S. Ross, "It's the Law in Loma Linda: Mandatory Fiber and In-House Networks," *Broadband Properties*, May 2005, http://www.broadbandproperties.com/2005issues/may05issues/Steven_Ross_It_s_the_Law_In_Loma_Linda.pdf.

¹⁰ Brentwood, Cal., Mun. Code, § 16.120.120
http://qcode.us/codes/brentwood/view.php?topic=16-16_120-16_120_120&highlightWords=16.120.120.

¹¹ Hovis, Afflerbach, "Gigabit Communities."

(3) Ownership of Communications Infrastructure

- (a) No Developer shall transfer ownership of any parcel, building, or residential housing unit subject to this Section without also transferring ownership of the installed Communications Infrastructure on such parcel, building or in such unit to the purchaser of such parcel, building or unit. The Developer shall transfer ownership of the installed Communications Infrastructure in any shared or common space in a condominium or like development to the homeowner's association of such condominium or development. The Developer shall transfer ownership of the installed Communications Infrastructure in the public rights-of-way to the GOVERNMENT ENTITY.

(4) Costs and Enforcement

- (a) The Developer shall bear all design, construction, inspection, and testing costs associated with installation of Communications Infrastructure mandated by subsections (2)(a) and (b).
- (b) Failure to comply with the requirements herein this section may lead to a denial of a certificate of occupancy.