Municipal Fiber in Sweden

In Sweden, municipal broadband is the rule rather than the exception. That changes everything.

By Masha Zager / *Broadband Communities*

When communities debate building fiber broadband networks, they often study other U.S. cities that have experimented with municipal fiber to learn about their successes and failures. But the United States isn't the only country whose local governments provide broadband to residents. Municipal networks are fairly common in Europe, and they are especially prevalent in Sweden, where 200 of the 290 municipalities, including Stockholm, operate fiber networks.

Swedish municipalities began building fiber to municipal offices, and in some cases to their electric utility facilities, in the mid-1990s. Within a few years, they began extending fiber to multifamily housing, a substantial portion of which is municipally owned. The networks gradually grew to cover entire communities. In addition to serving homes and businesses, they lease dark fiber to private carriers and connect cell towers. These networks haven't displaced private operators; rather, they offer effective competition that exerts pressure on the private operators' prices and service levels.

By any measure, the Swedish experiment has succeeded. More than three-quarters of Swedish households and businesses now have fiber available to the building or living unit; for more than half those households, the fiber comes from a municipal network. Forty-four percent of Swedish households subscribe to fiber broadband, and three-quarters of all broadband customers receive 100 Mbps download speeds or higher. Subscribers to municipal networks (and to some privately owned networks) have a choice of broadband providers and services, including some innovative and unusual services.

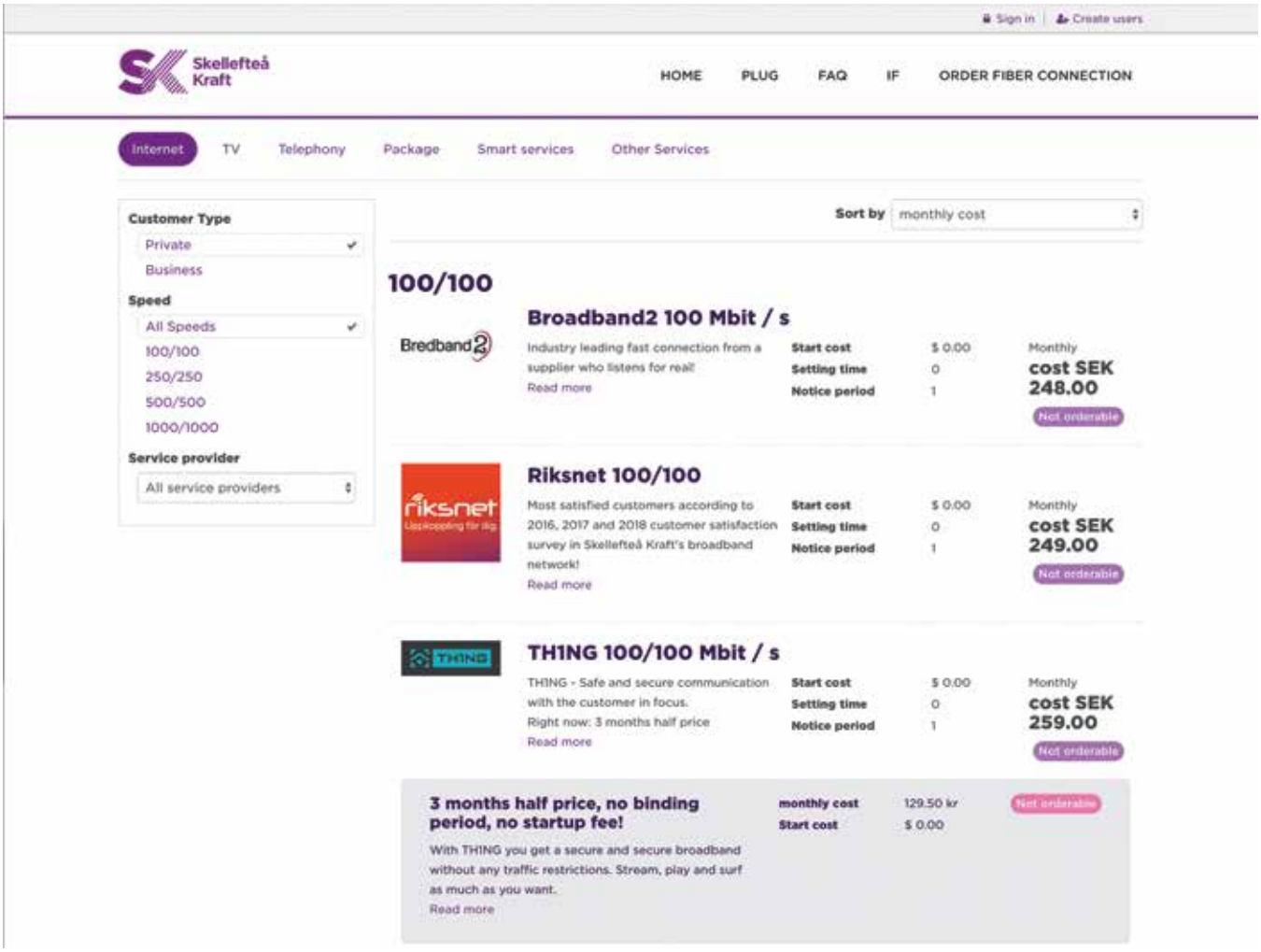
Prices for municipal internet service are affordable, and customer service is good. In spite of low prices, the municipal networks are financially self-sustaining or even profitable. The average return on investment is between 6 and 7 percent. The networks also yield off-balance-sheet benefits in terms of economic activity and quality of life.

Of course, Sweden differs from the United States in many important ways. But it's worth considering the aspects of Sweden's municipal broadband system that might be applied in the United States.

THE SWEDISH SYSTEM

Municipalities can choose between operating for-profit broadband companies – about 40 percent of the networks use this form of organization – or operating their broadband networks as divisions of local government, a choice made by about 20 percent. Municipally owned utility companies operate the rest of the municipal networks.

Even though municipal networks are permitted – and encouraged – everywhere in the country, the legal framework limits their scope. Networks may not extend beyond municipal boundaries, and, with a few exceptions, they may not provide retail services; rather, they contract with retail service providers. Dozens of service providers have entered this market. Some are local, some regional and some national. Some offer triple-play residential services, and others serve only businesses or offer specialized



The customer portal for Skellefteå Kraft Fibernät, a small network that serves a largely rural community in Northern Sweden, allows customers to select services from 12 retail providers.

services of various kinds. A large fiber network, such as Gothenburg's network, has about 30 service providers; even a smaller network, such as Skellefteå Kraft Fibernät, which serves a largely rural community in Northern Sweden, has 12 service providers. These providers pay the networks to distribute their services.

Because the municipalities usually own all the local fiber and networking equipment, service providers have very low costs of entry. An internet service provider, for example, has to invest only in internet backhaul and a connection to the local network. Providers don't even have to do much marketing – Kim Liljegren, chief marketing officer and co-founder of the new service provider Th1ng, says that a press release to local papers is about all that's necessary to alert potential customers when Th1ng enters a new market.

An unusual feature of the Swedish system is that single-family homeowners pay for their own connections to the network – typically about $2,500, which is often bank financed. Though customer connection fees aren't unknown in the United States, where businesses and multifamily communities often pay for their own connections, as do residents who live outside an agreed-upon franchise territory, they are rarely standard practice for residential service.

WHAT MAKES THE SYSTEM WORK

The success of Swedish municipal broadband depends on several factors.

- **Consensus on the role of municipal governments**. The role and authority of municipal governments is extensive, and it is uniform across Sweden. (Sweden has no unincorporated places; all municipalities include the rural areas surrounding cities and towns.) Municipalities are responsible for a wide range of services, including social services, child care, education, consumer and environmental protection, public safety, public housing, and various types of infrastructure. As a result, there is a public consensus that building and operating broadband is an appropriate function for municipalities and that municipalities are competent to perform this function. This consensus extends to the municipal governments, which have been very engaged in broadband projects, and even to the incumbent telco, Telia, which never tried to prevent municipalities from building broadband networks.

- **Urbanization**. About 94 percent of households are in urban areas, where broadband networks can be built at reasonable cost. Fifty percent of households (compared with about 27 percent in the United States) live in multifamily housing, one-third of which is publicly owned.
- **Digital literacy**. State subsidies of personal computers began in the 1990s, so that Swedish residents were among the first in the world to adopt digital music, gaming and other applications that required internet bandwidth. In the last five years or so, "fiber fever" has gripped the Swedish public, according to Mikael Ek, CEO of the Swedish Local Fiber Alliance, which represents the country's municipal fiber networks.
- **High standard of living**. Sweden has a very low poverty rate, generous welfare benefits, and one of the lowest measures of income inequality in the world. The fact that the general standard of living is high means that single-family households can be expected to pay network connection fees. This reduces the investment required by municipalities and puts more of the burden of network costs on those who actually use the networks.
- **Market maturity**. When the open-access model was new, Ek says, some operators had problems managing financially unstable providers. As they consolidated and gained experience, the market stabilized. New providers continue to enter the market at a rate sufficient to keep competition fierce and prices low.
- **Standardized contracts**. The Swedish Local Fiber Alliance, in addition to lobbying for members and tracking industry statistics, develops standard contracts for members to use with service providers. These agreements create stability and predictability for all parties – for example, 12-month terms are standard – and make it easier for service providers to enter multiple markets. The alliance also helps the networks enforce responsible behavior by providers. (On the whole, Ek says, "they behave quite well.")
- **Systems to support open access**. Without appropriate software, managing an open-access network can be challenging. When Skellefteå Kraft Fibernät became an open-access network in 2009, it lost money until it installed COS Business Engine, a back-office system that automates the administration of open-access networks. (Several vendors in addition to COS offer B/OSS solutions tailored to open-access networks.) Today, the network has operating profits greater than $4 million on annual revenues of $12 million. Open-access solutions may include portals that allow customers to switch providers easily and demand aggregation software that, by registering the interest of potential customers, helps networks decide where and how to expand. "It's rather painful to change the business," says Anders Pettersson, CEO of Skellefteå Kraft Fibernät, "but if you start with open access from the beginning, you have the possibility to build a very efficient network with rather few employees."
- **Patient capital**. Even with appropriate software, networks can take years to break even. Pettersson advises planning for the long term and investing in a network that will be reliable for many years to come rather than trying to turn a profit quickly. Skellefteå Kraft Fibernät was voted the best municipal network in Sweden in 2017 largely because it insisted on a long time horizon. Some networks that cut corners in terms of equipment, he says, have problems with reliability today.

CHOICE AND INNOVATION

Two benefits of the Swedish system deserve particular attention. One is the extraordinary degree of consumer choice. Municipal operators exist alongside the incumbent carrier and private competitive providers. Some cities have multiple fiber networks, and some even have multiple open-access networks.

In an open-access network, consumers can usually switch providers with the click of a mouse, using a customer portal. Choosing a new service provider doesn't require either the network operator or the provider to do any work – the process is automated and frictionless. With no ability to "lock in" their customers, providers on open-access networks exist in a true competitive environment. In many cases, the competition is at the service level – a consumer can choose internet access from one provider, video from another and smart-home services from a third.

The second important benefit of the system is that it encourages innovation. Although Americans would find most Swedish broadband offerings familiar – internet, voice, video, business services – there is room for many unusual services as well. Netflix is a service provider on some networks, giving it a degree of control over service quality that it doesn't have when it depends on a provider that may be competing with it. The Gothenburg city network offers a range of smart-building services for property owners, personal security services, telehealth services and smart-home services.

The service provider Th1ng entered the market in 2018 with a standard triple-play offering and a smart alarm and home-security service, and it has plans for much more extensive IoT offerings. Through a separate business, it developed an IoT platform that can connect and control any kind of sensors and, as Liljegren says, "will build anything from a smart home to a smart city." Customers can choose whether to buy their own sensors or rely on Th1ng to deliver a turnkey solution. The company is planning smart-city services such as environmental monitoring and smart trash bins that alert the sanitation department when they need to be emptied. These smart-city services may be offered by a municipality or by Th1ng.

In a very short time, Th1ng connected to most of the open-access networks in Sweden and now serves about 6,000 customers. Connecting at the Layer 3 level is technically straightforward, and from a business standpoint, most of the networks use the same standard agreement. "We know all the agreements, so we don't have to go through 200 agreements," Liljegren says.

Without open-access networks, Th1ng would have found launching services difficult or impossible; it would have had to develop an entire infrastructure first. Even if it had somehow managed to build an urban network, Liljegren says, "we would not have built to the countryside. Now, we're serving places where you wouldn't have had fiber."

FUTURE GOALS

Even if Swedish broadband is a success story, there are still remote areas where residents depend on 4G mobile networks or ADSL. Getting fiber to the remaining municipalities will be challenging. Sweden is less densely populated but more urbanized than the United States, so its rural areas are even more rural. The cold, snowy winters mandate burying fiber underground, and the long distances between buildings in rural areas call for active Ethernet architectures – both expensive propositions.

The Swedish government has ambitious goals for the remaining fiber buildout: 95 percent of households and businesses should have 100 Mbps access by 2020, and 98 percent should have gigabit connections at home and in the workplace by 2025. The need to complete the fiber buildout is urgent because Telia is shutting down its ADSL network. In addition, municipal governments need fiber networks for efficient delivery of social services, including health care for older residents.

Over the last decade, the national government has subsidized fiber in remote areas – Skellefteå Kraft Fibernät is taking advantage of this program to build fiber to 40 rural villages – but more remains to be done. Ek says the smallest municipalities are too small to operate networks at scale, and the Swedish Local Fiber Alliance is lobbying to allow them to join forces and build combined networks. (This is already permitted for electric and gas networks.) Even if this change is made, he estimates that another $2 billion in state aid will be needed to meet the national broadband goals – and that money isn't forthcoming at present. "It's reachable by 2028, maybe," he says hopefully. ❖

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