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Philadelphia residents Wayne and Katy Kach were hoping to move to the Prospect area in rural Maine to escape their cramped surroundings and be closer to family members, but it isn't going to happen in the foreseeable future. Like many urban professionals whose desire for more bucolic surroundings could benefit rural Maine communities, the couple's relocation plan was a nonstarter because both require reliable high-speed internet access to do their jobs. The area where they want to live doesn't offer it. "We were hoping to find a place that would be able to afford us a little bit of land," Wayne Kach said. "We found a few properties in the Prospect area, but it just kind of got shut down because there's just no way for us to work."

Many rural communities in Maine have been waiting decades for the major internet service providers to bring broadband service to their areas, a situation exacerbated by the state having the second slowest internet speeds in the country. The lack of broadband is a deterrent to would-be residents and businesses, and it thwarts local efforts at economic development. It also deprives existing residents of opportunities for entertainment, education, employment and digital health services.

Proponents of broadband expansion in Maine say rural areas have been left behind because internet service providers don't see a financial benefit to upgrading their rural networks, the state lacks strong leadership to push comprehensive broadband initiatives, and many rural residents still don't understand why broadband service is important to their communities. The issue is finally gaining some

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political traction at the statewide level. All four of Maine's gubernatorial candidates have said expanding rural broadband service is a top priority, although their proposed solutions differ.

Maine consistently places at or near the bottom of national rankings for internet connectivity, and the primary reason is the state's poorly connected rural areas. Roughly 15 percent of Maine residents still don't have access to broadband service as defined by the federal standard of at least 25 megabits per second download and 3 Mbps upload, said Peggy Schaffer, who runs the Maine Broadband Coalition, an informal federation of public policy professionals, educational institutions, businesses, nonprofit organizations and private individuals seeking to improve broadband access in the state. At 25 Mbps, a single user can engage in moderate internet usage such as streaming high-definition video, or multiple users can engage in light usage such as streaming music or browsing the internet.

Most of the roughly 200,000 Mainers without broadband access live in rural communities. At least 20,000 of them have no internet access at all. The crisis is real. It affects out-of-work residents who can't search for jobs online, home-based business owners who can't connect digitally with customers, students who can't complete homework assignments from home, and seniors who can't rely on potentially lifesaving online health services.

But a growing number of rural towns are no longer satisfied with waiting for the private sector to bring them up to speed. Despite inadequate help from the state and federal governments, a handful of communities in Maine are working on taxpayer-subsidized broadband infrastructure projects that could serve as a model for the rest of the state. Another 50 or so towns are trying to drum up public support for broadband projects of their own. One innovative project in the St. Croix Valley would create Maine's first publicly owned broadband network with providers competing for customers at gigabit speed, and others would provide a similar level of service through public-private partnerships. "There's a lot of talk about 'We need broadband,' but the issue is how we do it, and that is on many levels," Schaffer said. "One of them is money, and another one is structure: What does the structure look like for us doing broadband? And there's a lot of different opinions about that."

Rural Maine resident David Reed said the internet service in his community is so slow and unreliable that he and his wife are thinking about leaving town. "I envy people who can get a wired service at all, even if it's 'just' DSL," Reed said. "I live on the coast, south of Bangor outside Belfast in Swanville, and I can't get anything at all, not even DSL. We are looking to sell the house and move, if the right opportunity presents itself, because of lack of broadband." Reed said his current internet service, a fixed wireless service provided by UniTel, offers a maximum download speed of about 8 Mbps – when weather conditions are ideal. The rest of the time, download speeds range from 1 to 4 Mbps, he said.

Reed, who works in information technology, said not having reliable internet service has made it more difficult for him to do his job. He said the situation has been even more problematic for his wife, who had tried to start a home-based business involving online education and training but ultimately had to abandon the idea. "It just didn't work –

she would spend all day trying to get through some of the training, and maybe get an hour's worth out of a full eight- or 10-hour day," he said. "Eventually she ended up going back to work for somebody else."

Population density is a big factor in determining whether the big internet service providers such as Spectrum, Xfinity and Consolidated Communications will invest in upgrading a community's communications infrastructure to accommodate wired broadband service, said Julie Jordan, director of Downeast Economic Development. Just because a community is wired for telephone and cable TV service does not mean it has the required infrastructure for broadband internet service. Adding broadband requires a significant investment in additional equipment to boost the signal.

In most of rural Maine, the big providers simply don't think there is any financial upside to providing broadband service, Jordan said, and they are not legally required to do so. Jordan's organization serves the St. Croix Valley area, which includes Calais, Baileyville and surrounding communities. She said the average residential internet download speed in her community is about 3 Mbps, and the maximum is about 10 Mbps. Jordan said one of the problems for rural communities is that it is difficult to convince private companies to upgrade their infrastructure when the area already has internet service, even though the existing service isn't very good. There are multiple internet providers in the St. Croix Valley, she said, but all of them provide service that is slow and unreliable. "But because we did have service, we were overlooked as far as getting any kind of grant money or encouraging providers that were here to offer better broadband," Jordan said. "You kind of get the same old story: 'Be happy with what you have.'"

Ellsworth resident and small-business owner Emily Shaffer said she loves her rural community and has no intention of leaving, but Shaffer said the lack of broadband service has made it more difficult for her to conduct business. Shaffer, who designs and sells custom jewelry, said it is a slow and tedious process to do certain things such as uploading images of new designs to her website. "It's a pain, but it doesn't stop me from doing business," she said. "It's just time and aggravation with things that I would otherwise be able to just click and go."

The reluctance of big internet providers isn't the only obstacle preventing rural Maine from joining the modern communications age, said Carla Dickstein, senior vice president of research and policy development at Brunswick-based community development financial institution Coastal Enterprises Inc., one of the founders of the Maine Broadband Coalition. Some small communities in Maine don't even push for broadband because they don't see the value in it, she said. "Part of the problem is that the communities aren't seeing what the future is," Dickstein said. "I don't think everyone is seeing why it (broadband) is so important, and if you don't see that, then it's hard to get your town mobilized and to make it a priority."

In order to receive broadband service, small municipalities need to put "skin in the game" by helping to fund local infrastructure projects through bond sales and other means, even if it's a small amount to begin with, she said. Funding is a challenge, Dickstein said, but there is actually quite a bit of financial assistance available through state and federal grants that many rural communities aren't even trying to tap

into. "I think the challenge is the lack of understanding of the future even more so than the lack of money," she said.

In some communities, getting broadband service will require a team of local leaders who are willing to go door to door and sell individual residents on the value of broadband service and why they should agree to spend some of their tax dollars on infrastructure, Dickstein said. Another obstacle is a lack of strong leadership at the statewide level to promote rural broadband expansion, said Nick Battista, policy officer at the Island Institute, an economic and community development organization based in Rockland that has been assisting small island and coastal communities with local broadband projects. "(State broadband authority) ConnectME is doing what they can with a limited amount of funds, but we need to be investing closer to \$50 million to \$100 million a year on rural broadband, rather than \$1 million a year, in public funds to solve this problem," Battista said. "Communities are recognizing that it's an economic and social imperative – they need it for health care, for telemedicine, for education. You have kids who are going to the library after the library closes and sitting outside in the parking lot just to do their homework. That's not how we build a strong state."

There is hope on the horizon, but significant progress is going to require buy-in from Maine's rural residents, said Fletcher Kittredge, CEO of GWI in Biddeford, one of the Maine-based internet service providers that have been working with rural communities on local broadband projects. The number of rural towns where a majority of residents favor investing in broadband infrastructure is increasing, he said, and there are already a handful of municipal broadband projects in various stages of completion.

One example is Islesboro, an island community where the residents voted overwhelmingly in 2016 to invest in a \$3.8 million broadband network that connects via an underwater fiber-optic cable to the statewide Three Ring Binder fiber-optic network. Kittredge said the project took some convincing at first, but now more than 80 percent of Islesboro residents use the service, operated by GWI, which offers a 1 gigabit download speed for just \$35 a month. "It was an incredibly interesting project and we knew we were going to sink a lot of time into it ... because it was the first one," he said. "We're incredibly pleased with the way it turned out because it could be a model for (success). I think it's made an enormous difference for that community."

The project required Islesboro to issue bonds to pay for the network's construction, and then it contracted with GWI to build, own and operate the service. It's a model that GWI and other small internet service providers are trying to replicate in other parts of the state. "Right now, we're looking at doing the towns of New Sharon, Dixfield and Blue Hill, and we're desperately trying to go around getting people in those towns to affirmatively say, 'If you build this, we would be interested,'" Kittredge said. "Because that's a condition of applying for subsidized federal loans."

An even more ambitious project is the Downeast Broadband Utility, a regional effort in the St. Croix Valley that, if successful, would create Maine's first independent, publicly owned broadband network. In partnership with Calais and Baileyville, Downeast Economic Development is working on a project to connect about 3,000 area

households with gigabit fiber-optic internet service, said Jordan, the economic development group's director.

Unlike any other broadband network in Maine, the Downeast Broadband infrastructure would be owned by the community, and internet service providers would pay to lease bandwidth on the network. A handful of providers have expressed interest, she said, but so far none have made binding commitments. If successful, the rural community would have the only fiber-optic broadband network in Maine with multiple providers competing for business. If it fails, the community will have spent up to \$3.1 million of taxpayer money building a network that no provider wants to use. It's a risk area residents were willing to take. "We're rural, and we want to stay competitive and vibrant and become part of the rest of the world," Jordan said. – **Portland (ME) Press Herald**

Three years ago, the U.S. government decided to offer airwave licenses for small areas so factories, ports, and power plants could set up their own wireless networks without relying on commercial carriers. This week, the Obama-era experiment is likely to end before the licenses had even been auctioned.

The Federal Communications Commission is expected to vote Tuesday to abandon its novel small-area plan and instead offer larger licenses covering a minimum of a county. The vote came after carriers such as AT&T Inc. and Verizon Communications Inc., who can afford to wire larger areas, persuaded the regulators to reconsider.

Supporters of the Obama initiative say the change will squeeze out smaller players who could find innovative uses for very local networks covering an area as small as a single building. "Imagine being at the dawn of the Uber age and doubling down on taxicab medallions," Commissioner Jessica Rosenworcel, a Democrat, said in an email. "That's what this agency is doing."

The FCC's Republican majority says change helps make the airwaves available for next-generation, ultrafast 5G networks that are a focus of commercial development and U.S. technology policy under President Trump. "The commission needs to evolve with the ever-changing marketplace," FCC Commissioner Michael O'Rielly, a member of the agency's Republican majority who drew up the revised plan for the airwaves, said in an Oct. 2 speech. The need for 5G networks to use the airwaves has become apparent since the FCC's previous decision, O'Rielly said.

The new plan "does not favor any one use or favor any class of user, which was a flaw in the last administration's rules," O'Rielly said in an email. "Everyone will be able to bid in an auction that will ensure that the spectrum goes to its best use." O'Rielly noted support for the change to county-size licenses from industries including cable providers, which increasingly are offering wireless connections to their subscribers.

The change follows a request last year from the largest U.S. mobile providers, including a petition by the CTIA trade group with members including AT&T and Verizon, and a separate request by T-Mobile U.S. Inc. The big carriers argued that small license areas were cumbersome to administer and the thousands of users operating wireless systems

near boundaries threatened to interfere with other users of airwaves. Supporters of the small-area licenses said the interference risk was small, since many systems would operate at low power and indoors. Under the FCC's 2015 order, access would be sold in each of 74,000 census tracts. That number compares with about 3,200 U.S. counties, according to the FCC.

General Electric Co., in a filing with the FCC, said opening up the airwaves to small-area licenses could lead to a world of intelligent industrial operations, in fields including power generation and distribution, oil and gas, manufacturing, health care, rail, and aviation. Automated inspection and sensor technologies — including aerial drones, terrestrial crawlers, and robots — could use the systems to provide real-time video and monitoring, GE said. "We're disappointed in the expected decision," a GE representative said in an email. "It's a missed opportunity for U.S. manufacturers, but we are committed to finding ways to provide our customers with the technology and support they need regardless."

The planned revision is another instance of Republican FCC Chairman Ajit Pai changing rules set under earlier Democratic control. Large telephone providers have benefited, with Pai's FCC arguing that regulations being shed have damped investment by forcing unnecessary expenditures, or posed needless barriers to deploying fast networks using new technology. In the dispute over the 3.5 GHz airwaves, a variety of industries have argued for the smaller, census-tract license areas. For instance, GE said it wouldn't make sense to buy licenses covering territory that extends far beyond a site, and that it can't count on major wireless carriers offering access to airwaves. Buying licenses covering counties would cost "well beyond what GE's industrial and critical-infrastructure customers are willing to spend," the manufacturer said in a December 2017 filing.

O'Rielly has long cited problems with assigning use in small chunks. Under the plan adopted by the FCC in 2015, each census tract could be home to as many as seven overlapping licenses. "Obviously, auctioning half a million licenses could be administratively burdensome," O'Rielly said in February remarks at an AT&T conference center in Washington. "While FCC rules should not favor nationwide wireless providers, it must not penalize them either." —

Bloomberg

