Sources of Telecom Revenue

Understanding Traditional and Emerging Revenue Streams

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Introduction

- Rural telecommunications companies face unique challenges
  - Low population density, aging infrastructure and increased competition
- Regulated revenue from USF and access charges is declining
- Diversification of services is critical for long-term sustainability
- Nonregulated services are generally not governed by the FCC or state PUCs
  - Internet services beyond basic broadband
  - Smart home, IoT and managed services
  - Media content, OTT partnerships and cellular services
  - Business IT and cybersecurity solutions

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Agenda

- Major telecom revenue categories
- How legacy revenue streams are changing
- Federal support and broadband funding
- Broadband growth opportunities
- Wireless revenue opportunities
- Other lines of business
- Diversification and long-term planning

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Major telecom revenues

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Major telecom revenues
Traditional telecom revenues – end user revenues

- Local exchange service charges and related fees
- Interstate subscriber line charge, access recovery charge, federal universal service charge and a few others
- Charges for DSL voice-data and CBOL services
  - While DSL voice-data is occasionally sold directly to end users, these services are most often sold on a wholesale basis to an ISP, which resells them to end users
  - CBOL internet services can be sold on a tariffed or nontariffed basis
- End user billed special access charges
  - Point-to-point connections billed directly to local businesses, schools or governments when not ordered through a carrier

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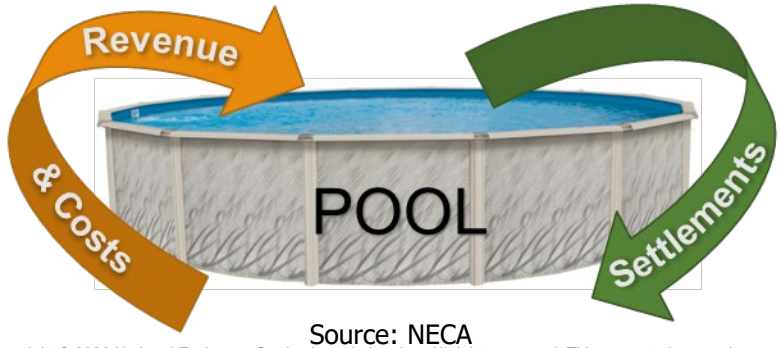
Major telecom revenues
Traditional telecom revenues – intercarrier compensation

- Charges to other carriers that use the ILEC's network for the origination, termination and transport of telecommunications traffic
  - Interstate and intrastate access charges
    - Switched access – voice traffic over the public switched telephone network
    - Special access – dedicated or virtual private connections between designated locations
  - Reciprocal compensation
    - Charges for the exchange of local traffic between LECs within the same local access and transport area and between a LEC and a mobile wireless carrier within the same metropolitan transport area
  - CAF ICC funds for switched access support are declining each year

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Major telecom revenues
NECA pooling and settlements

- The NECA pools are revenue distribution mechanisms designed to produce a more stable stream of interstate settlement revenue for company pool participants
- Each EC receives its share of total pool revenue available to cover its cost of providing interstate access services
- Basis of support for rate-of-return companies
  - Incentivizes companies to build and maintain networks



Source: NECA

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Major telecom revenues
Competitive local exchange carriers

- Rural LECs compete to provide telecommunications services outside their regulated telecommunications study area
  - Usually overbuild existing networks with fiber facilities providing improved service offerings
    - Primarily broadband internet but can include voice and video
    - Managed Wi-Fi for small business, apartment complexes and motels
    - Wholesale transport services including leasing excess fiber capacity to other providers and backhaul services supporting wireless providers and ISPs
    - Lease tower space and conduit facilities
    - Use broadband infrastructure to offer smart city solutions
    - E-Rate and rural healthcare for institutions and USF funding where applicable

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Major telecom revenues
Competitive local exchange carriers

- Rural LECs compete to provide telecommunications services outside their regulated telecommunications study area (cont.)
  - Fixed wireless technologies are also an option
  - Competitive entities include incumbent ILECs, video and wireless entities, local computer companies, municipalities and ISPs

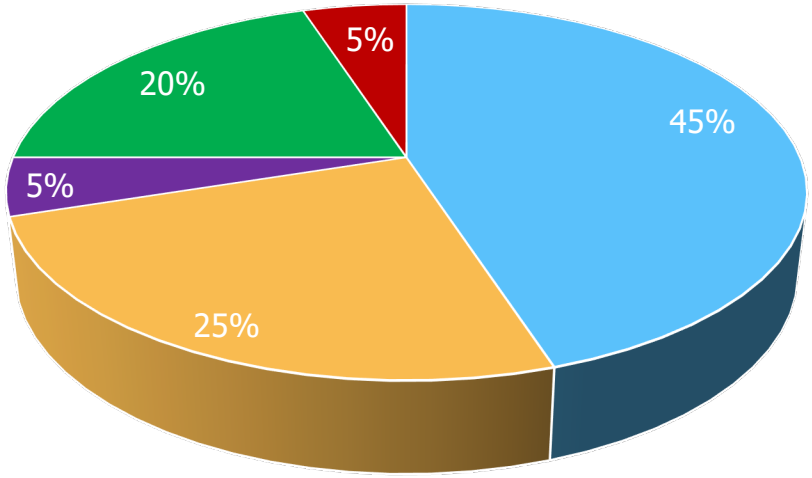
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How legacy revenue streams are changing

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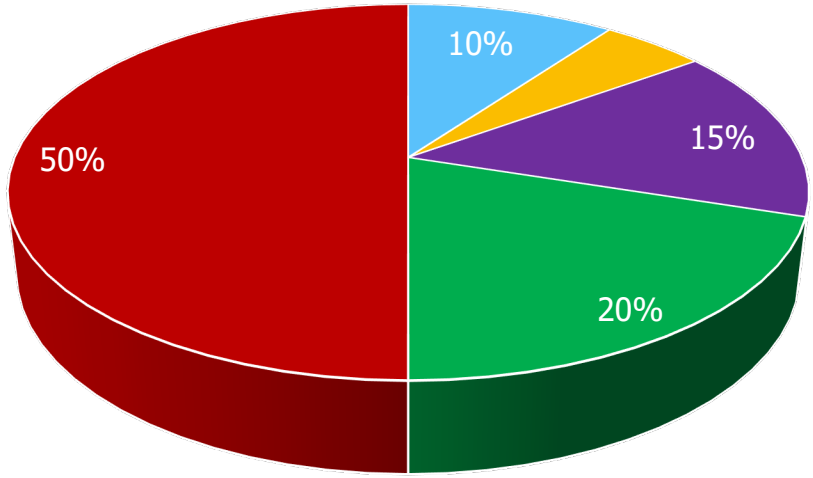
How legacy revenue streams are changing
The new ILEC service mix

Traditional mix of telecom services (2005)



- Voice
- Access charges
- Business and managed services
- USF Support
- Broadband

Modern mix of telecom services (2025)



- Voice
- Access charges
- Business and managed services
- USF support
- Broadband

Source: Publicly Available ILEC Data

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How legacy revenue streams are changing

Trends in traditional revenue

Under pressure ↓	
Local exchange	Declining
Access charges	Significant decline
Long distance	Nearly eliminated
Directory revenue	Minimal today
Voice features	Declining

Holding steady →	
Subscriber line charge	Stable while lines remain
Universal service support	Important but evolving

Bottom line
Legacy streams keep shrinking — growth has to come from broadband and new services

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Federal support and broadband funding

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Federal support and broadband funding
Historically and where it is going

HISTORICALLY

Federal support was designed to

- Ensure affordable local telephone service
- Recover high cost of serving rural areas
- Support universal voice connectivity

Primary programs

- High-Cost Loop Support
- Interstate Common Line Support
- Interstate Access Support
- Safety Net Additive Support

TODAY

The focus has shifted toward

- Broadband deployment
- Fiber investment
- Universal broadband access
- Sustainable rural networks

Same mission — new technology

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Federal support and broadband funding
USF support

- About $8.5 billion disbursed in 2025
- High cost – supports ETCs that offer service in rural, insular and high-cost areas (over $4.5 billion)
  - Includes HCL, CAF BLS, CAF ICC and model-based support
- Schools and libraries (aka E-Rate) – helps providers offer reduced rates for eligible schools and libraries (over $2.4 billion)
- Lifeline – provides voice and broadband discounts for eligible low-income consumers (about $924 million)
- Rural healthcare – provides reduced rates for eligible healthcare providers making telehealth services affordable in rural areas (about $601 million)

Source: USAC_2025_Annual_Report.pdf

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Federal funding programs
Broadband Equity, Access and Deployment Program

- BEAD created by the Infrastructure and Investment Jobs Act in 2021
  - $42.45 billion NTIA grant fund targeting low-speed rural areas
  - Recent policy shifts include Secretary Lutnick rewriting BEAD as technology-neutral (NTIA, BEAD Restructuring Policy Notice)
    - Potential to steer funding toward fixed wireless and satellite providers
- In May 2025, President Trump announced he was cancelling the Digital Equity Act grant programs (Truth Social post, May 8, 2025)
  - In late June 2025, 20 states filed a federal lawsuit concerning the termination
  - As of August 2026, the lawsuit is partially ongoing but some of the funding and grants have been restored

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Federal funding programs
Rural Digital Opportunity Fund

- Rural Digital Opportunity Fund was created as the successor to the CAF Phase II auction and uses a reverse auction to award support to providers willing to serve unserved locations
- The goal of RDOF is to:
  - Expand broadband access to rural homes and businesses
  - Close the digital divide in areas where it is not economically feasible for providers to build networks without support
  - Encourage long-term investment in modern broadband infrastructure, particularly fiber
- RDOF is focused on broadband deployment

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Federal funding programs
How does RDOF work?

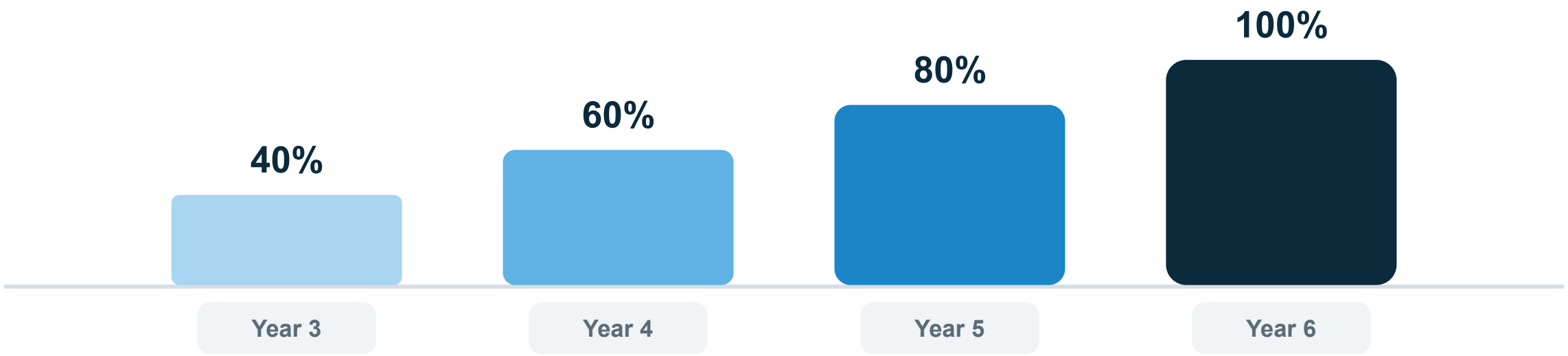
- The FCC identifies eligible RDOF areas
  - The FCC identifies census blocks considered unserved or underserved based on broadband availability data
- Reverse auction
  - Rather than providers bidding how much they will pay, they bid how little support they need to serve an area
- Winning providers receive support
  - Winning bidders receive monthly support payments over 10 years
  - In exchange, they will have buildout, speed and latency requirements

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Federal funding programs
RDOF requirements

INTERIM BUILDOUT MILESTONES

Share of locations served



ALSO REQUIRED

- Perform speed and latency testing
- Certify compliance annually
- Meet network performance and reasonable pricing standards

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Latest in federal funding programs
What's on the horizon? Current NPRMs

Current themes shaping the next round of high-cost support

1

High-cost modernization NPRM

CAF-BLS, HCLS and legacy A-CAM under review for an all-IP world

2

Transition to all-IP

Should support still pay for copper, voice-only and TDM networks?

3

Competitive overbuild

Should support continue where multiple providers already serve?

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Competitive overbuild and support eligibility
Should support continue where competitors already serve?

QUESTIONS THE FCC IS ASKING

OPEN QUESTIONS

- Should support be reduced in competitive areas?
- Should funding be more narrowly targeted?
- How should served areas be defined?

OVERLAP IS GROWING FROM

- Cable operators
- Electric cooperatives
- Fixed wireless and satellite providers
- BEAD-funded competitors

Carriers facing increasing competitive overlap could see the largest changes in eligibility

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Broadband growth opportunities

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Broadband growth opportunities
Fiber ring and transport

- Wholesale backhaul transport services
  - Wireless carriers, other ISPs and enterprises
- Enterprise connectivity and dedicated internet access
  - Sell high-capacity symmetrical gigabit speeds, SLAs and managed services
    - Hospitals, school districts, government buildings, banks and data centers
- Fiber ring connections to larger regional carrier hotels
  - Transport to internet exchange points
  - Cross connecting with content and cloud providers
  - Peering relationships for OTT and CDN traffic

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Broadband growth opportunities
Fiber ring and transport

- Value-added managed services
  - VoIP, security, video surveillance, virtual desktop and cloud backup services
- Lease excess capacity fiber or wavelengths
  - Lease fiber to regional providers, utilities or wireless carriers
  - Offer lit wavelength services on the ring
    - Optical wavelength service is now available in an ILEC regulated study area as an interstate NECA Tariff FCC No. 5 offering with speeds of 100 Gbps, 200 Gbps, 400 Gbps and 800 Gbps



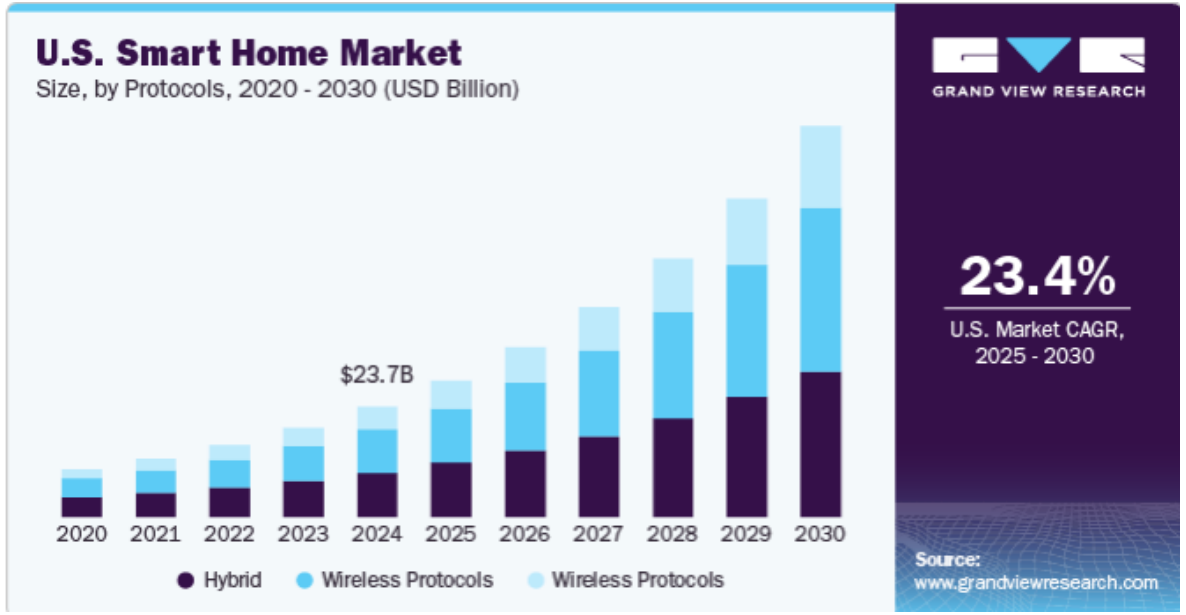
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Broadband growth opportunities
Smart home communities

What is a smart home community?

- A network of homes integrated with IoT devices
- Centralized technology and data management
- Focus on convenience, efficiency and sustainability
- May use edge computing delivered by last mile providers
- Rural LECs already own the last mile, local sites and the customer relationship



$29B
U.S. smart home market in 2025

$120.66
Average revenue per installed home

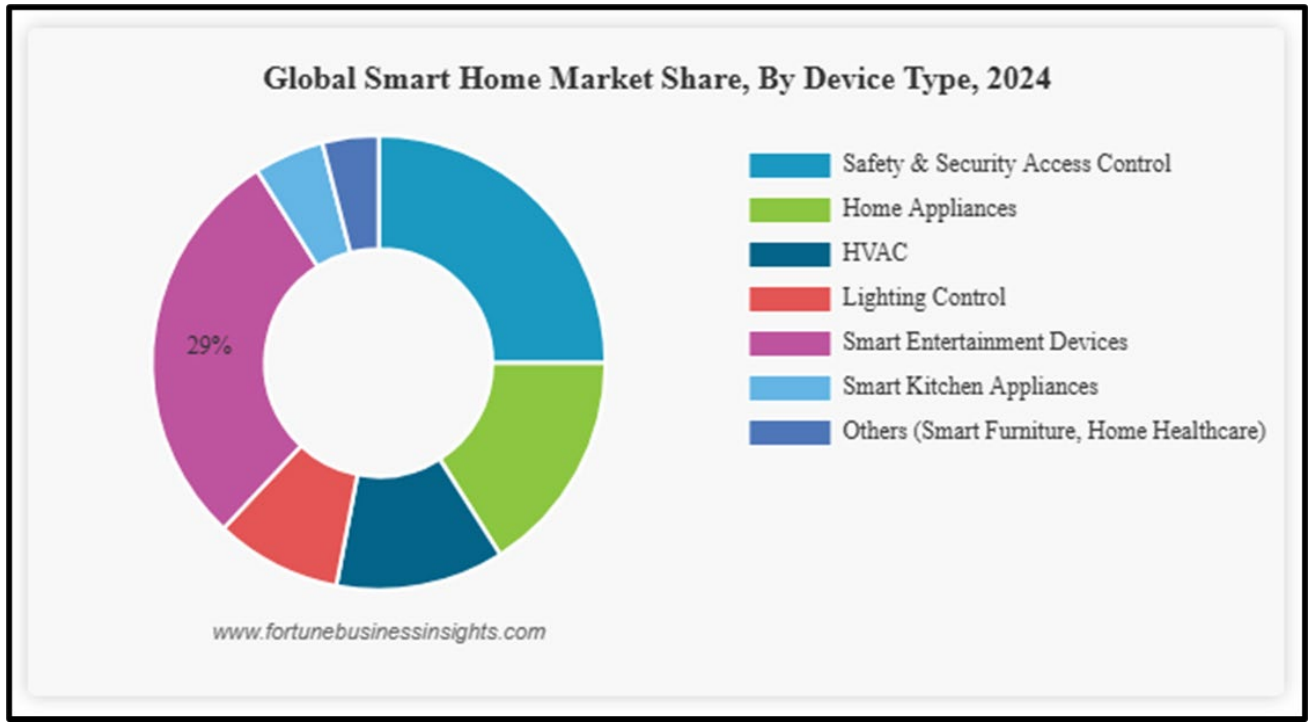
81.3%
Household penetration this year

23.4%
Projected CAGR over five years

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Broadband growth opportunities
Smart home communities



What is driving adoption

- Smart entertainment devices lead the market and show the highest device growth rate
- Safety, security and access control follow, driven by cameras, video doorbells and smart locks
- Energy management and HVAC gain from efficiency incentives and volatile energy costs
- AI voice assistants tie the devices together into one ecosystem
- Every category depends on reliable broadband, which is the rural LEC advantage

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Broadband growth opportunities
Smart home communities

Bundled smart home services
Security, automation, voice and elderly care monitoring added to broadband and phone packages

$20 to $60 per month

Installation and support
Onsite installation, configuration, managed Wi-Fi and ongoing technical support

$75 to $250 per install

Security and monitoring
24/7 monitored alarms, smoke and CO alerts and emergency call buttons

$30 to $50 per month

Energy management
Smart thermostats, energy dashboards and load control with local co-ops

Hardware plus savings as a service

Aging in place
Passive monitoring, telehealth-ready networks and medication check-ins

$25 to $75 per month

OEM partnerships
Reseller or certified installer for leading smart home brands

10% to 40% hardware margin

Managed smart home Wi-Fi
Mesh systems, parental controls, device prioritization and router leasing

$10 to $15 per month

Data and insights
Anonymized, aggregated data for utility, insurance and smart city partners

B2B data sharing deals

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Broadband growth opportunities
Telemedicine and aging in place

The opportunity

- Specialized data packages for telemedicine, including HD video conferencing and remote patient monitoring
- Rural areas often lack local access to care, so reliable connectivity carries a substantial value proposition
- Partnering with local health care providers expands the customer base for both sides, and aging populations make the home the primary point of care
- Government grants and subsidies may be available to help fund telehealth deployment



Source: Rural Health Information Hub

Aging population

Rural households are older and increasingly want to stay at home

Care access gap

Long distances to clinics make virtual visits the practical option

Funding support

Telehealth grants and subsidies can offset deployment costs

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Broadband growth opportunities
Telemedicine and aging in place

Senior tech support membership
Monthly subscription for in-home or remote help with Wi-Fi, tablets, smart TVs and telehealth devices

Recurring membership fee

Managed smart home
Install and support smart doorbells, motion sensors, leak detectors and connected thermostats so seniors can live safely at home

Install plus monthly support

Remote caregiver connectivity
Secure networking and video tools that let adult children help monitor aging parents from a distance

Add-on subscription

Telehealth ready certification
An in-home assessment that optimizes Wi-Fi coverage, device setup and video quality for telehealth visits

One-time assessment fee

Healthcare network services
Managed fiber, cybersecurity and redundant connectivity for clinics, home health agencies and senior care providers

Business contracts

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Broadband growth opportunities
Over-the-top services

The opportunity

- LECs can leverage their existing infrastructure, customer relationships and bundling strategies
- Streaming drives demand for higher speeds, which helps justify fiber upgrades and network expansion
- Bundled subscriptions increase customer stickiness and reduce churn
- Privacy rules such as CPNI limit how usage data may be used, so partnerships must stay compliant



Bundle stickiness
Bundling streaming with broadband reduces churn

Bandwidth demand
4K viewing makes speed tiers a natural upsell

Local advantage
Local content national platforms cannot match

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Broadband growth opportunities
Over-the-top services

Reselling and bundling
Partner with platforms like Netflix, Hulu and YouTube TV, or offer a white-labeled streaming portal

Revenue share on subscriptions

Tiered broadband plans
Premium tiers optimized for streaming, upsold on bandwidth needs such as 4K without buffering

Higher speed tier revenue

Data and smart advertising
Anonymized usage data for localized marketing and viewing patterns that target upsells

Partner and advertising revenue

Hardware resale
Streaming devices and Wi-Fi mesh systems bundled with setup and tech support

Hardware margin plus setup fees

Local content hosting
Local sports, events and government meetings as paid or ad-supported channels in a community app

Subscription or ad revenue

Technical support services
App setup help, network optimization for streaming and premium support packages

Support package fees

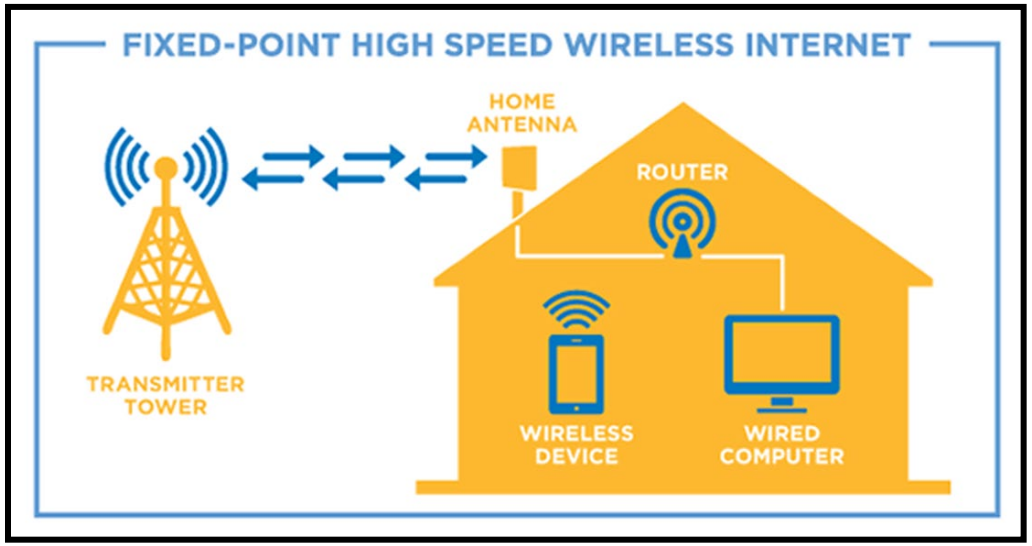
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Wireless revenue opportunities

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Wireless revenue opportunities
Fixed wireless internet and mobile data services



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Fixed wireless access

High-speed broadband delivered over wireless signals, reaching homes beyond the wireline footprint

No trenching required

Tiered internet plans

Offer tiered internet plans outside the regulated study area

New unregulated revenue

Lower cost to build

Lower upfront costs paired with long-term revenue generation

Faster payback on deployment

Expanded mobile coverage

Improve mobile coverage for internet needs via small cells, macro towers or distributed antenna systems

Tiered prepaid and postpaid data packages

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Wireless revenue opportunities
Rural cellular and IoT solutions

Mobile voice via MVNO
Mobile voice offering for NTCA members utilizing NRTC's Mobile Virtual Network Operator platform

LEC brands its own cellular voice service

Smart farming tools
IoT-enabled agriculture tools including soil moisture sensors and weather stations

Equipment and subscription revenue

Environmental monitoring
Sensing for water, weather and land conditions across rural service areas

Recurring monitoring revenue

Smart home devices
Security systems, energy management and environmental monitoring devices

Device sales plus monitoring plans

Connectivity and storage
IoT connectivity plans and data storage supporting member deployments

Recurring connectivity revenue

Analytics services
Turn sensor data into analytics for farms, utilities and communities

Value-added service fees

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Wireless revenue opportunities
Public safety networks and rural Wi-Fi hotspots

Public safety infrastructure
Partner with local governments to provide critical communications for first responders and emergency services

Funded government contract revenue

Community Wi-Fi hotspots
Set up hotspots in community centers, libraries, parks and other public spaces

Expanded service footprint

Paid hotspot access
Charge for hotspot access or offer ongoing subscription plans

Access and subscription revenue

Municipal sponsorships
Collaborate with municipalities to provide free access in exchange for sponsorship or advertising

Sponsorship and advertising revenue

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Wireless revenue opportunities
Wholesale wireless infrastructure and agricultural drones

Tower and spectrum leasing
Lease towers, spectrum and backhaul to wireless operators and businesses

Recurring lease revenue

Wholesale network access
Lease space to companies that do not want to build their own network

Wholesale contracts

Agricultural drone connectivity
Drones monitor crops, livestock, soil and fields with precision spraying

Wireless data or drone-as-a-service packages

Data and analytics services
Charge for data storage, analysis and real-time communications

Recurring service fees



Source: Bearing Tips

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Other lines of business

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Other lines of business
Call centers and telemarketing

- Leverage broadband infrastructure that provides diversified income sources
  - Inbound/outbound sales and telemarketing, help desk and tech support, appointment setting, surveys and polls, billing and collections, and 24/7 answering services
  - Provides local employment and work from home remote employment through decentralized call centers



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Other lines of business
Data centers

- Data centers provide hosting and colocation service for local banks, hospitals, government agencies, ISPs and content providers
  - Revenues include rack and space leasing, cloud hosting and virtual services, backup and disaster recovery and managed IT services



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Other lines of business
Network operations centers

- Ensure network reliability and uptime for increasingly complex networks
  - Monitor network health in real time and detect outages, security threats
  - Support advance services
    - FTTH networks, VoIP and IPTV as well as IoT and smart agriculture
  - Centralized multinetwork management for LECs
    - CLEC networks, wireless services and middle mile or data center assets
  - Position for growth and outsourcing
    - Support neighboring carriers, offer bandwidth and backhaul wholesale service



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Other lines of business

- Supporting local businesses that rural communities need
  - Coffee shops, cafés, gas stations and grocery stores
  - Ranching and farming partnerships utilizing advanced IoT services
  - Retirement homes in rural communities
  - Partnerships with other utility entities for services including gas, water, sewer and electric
- Creating video show with a national TV channel for which the LEC gets paid for content

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Diversification and long-term planning

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Diversification and long-term planning

Building a balanced revenue portfolio

TRADITIONAL	GROWTH	EMERGING
Today's base	Scaling now	Next horizon
Local exchange	Broadband	Managed IT
ICC	Fiber transport	Cybersecurity
CAF BLS	Business services	Smart home
Legacy/model support	Hosted voice	Data services

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Summary

- Long-term success for rural LECs is dependent on diversification of service offerings
- Infrastructure investment needs to address future technology and service capacity needs
- Broadband connectivity provides a multitude of revenue opportunities for rural LECs
- Revenue opportunities can also be obtained through infrastructure sharing, leasing facilities, reselling services, network interconnections and strategic partnerships

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Acronyms

ACP	Affordable Connectivity Program
B2B	Business to Business
BEAD	Broadband Equity Access and Deployment
CAF BLS	Connect American Fund Broadband Loop Support
CAF ICC	Connect America Fund Intercarrier Compensation
CAGR	Compound Annual Growth Rate
CBOL	Consumer Broadband-only Loop
CDN	Content Delivery Network
CLEC	Competitive Local Exchange Carrier
DSL	Digital Subscriber Line
ETC	Eligible Telecommunications Carrier
FCC	Federal Communications Commission
FTTH	Fiber to the Home
HCL	High-cost Loop

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Acronyms

HVAC	Heating Ventilation and Air Conditioning
ILEC	Incumbent Local Exchange Carrier
IoT	Internet of Things
ISP	Internet Service Provider
IT	Information Technology
LEC	Local Exchange Carrier
NECA	National Exchange Carrier Association
NOFO	Notice of Funding Opportunity
NTIA	National Telecommunications and Infrastructure Administration
OEM	Original Equipment Manufacturer
OTT	Over-the-Top
PUC	Public Utility Commission
UCaaS	Unified Communications as a Service
USF	Universal Service Fund

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Acronyms

- VoIP — Voice over Internet Protocol
- Wi-Fi — Wireless Fidelity

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