## CYIENT

# **GREEN TRANSITION**

Harnessing RPA for Copper Reclamation



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#### Abstract

Copper reclamation, the process of removing and recycling unused copper cable networks, is gaining increased relevance in underground, aerial, and buried environments. This initiative not only reduces maintenance burdens and operational costs but also generates revenue from the sale of reclaimed copper. With copper's high salvage value, network decommissioning becomes an appealing strategy.

This whitepaper outlines the challenges and opportunities associated with reclaiming legacy copper cables for telecommunications companies (telcos), especially in North America. It examines regulatory, technological, and financial factors while proposing a structured approach to support this crucial transition.

Discover how Cyient's methodology enables a 40% ROI and delivers cost savings of \$1 million for every 350,000 feet of reclaimed cable. Begin your journey towards optimized maintenance and reduced operational expenditure through this comprehensive guide.

#### Introduction

Telecommunications providers are responding to evolving technology and growing bandwidth needs by overhauling their infrastructure, most notably by deploying fiber optics. This strategic move is reshaping the industry. As modern solutions like fiber, upgraded cable systems, and fixed wireless gain ground, phasing out aging copper networks has become essential. With fewer customers relying on copper, these networks see reduced usage, leading to rising maintenance costs for the remaining subscribers.

The momentum behind copper reclamation reflects this shift. These initiatives are gaining traction alongside broader modernization

efforts. As copper infrastructure becomes less viable, recovering and repurposing these assets offers a practical and strategic advantage.

Copper reclamation is set to become a key enabler of telecom's evolution. It not only supports cost control and sustainability but also opens pathways for reinvestment into next-generation services. Organizations that approach this proactively can reduce expenses, generate new capital, and enhance service delivery, positioning themselves to compete effectively and grow within an increasingly digital and bandwidth-driven market.



#### **Copper is Giving Way to Fiber**

Across the United States, there exists an estimated 3 to 4.5 million miles of copperbased telecommunications cables laid beneath soil and water. A large portion of these cables are aged, underutilized, and considered obsolete. Maintaining such infrastructure is costly and often introduces environmental and safety risks. Removing these legacy copper networks offers not only ecological advantages but also tangible financial returns for Communications Service Providers (CSPs), reclamation firms, and supporting stakeholders.

A 2023 analysis by Kearney indicates that a 9,000-foot F1 copper cable with a 2400-pair count can deliver between \$100,000 and \$150,000 in net salvage value after deducting costs for planning, network engineering, and extraction. Based on this model, the total addressable market for telecom-related copper reclamation in the U.S. is projected to range between \$1.5 billion and \$3 billion. Historically, copper has been hailed as the backbone of connectivity, praised for its durability, reliability, and cost-efficiency.

Yet, in today's evolving telecom landscape shaped by fiber-optic dominance, DOCSIS network upgrades, and the advent of fixed wireless technologies—copper is rapidly becoming obsolete. With the high salvage value of these assets, telcos must act decisively to retire copper infrastructure when market conditions are favorable.

However, when accurate and timely data about copper networks isn't available just as salvage values peak, telcos risk missing out on significant financial returns. It's a critical window of opportunity—and without the right data in hand, that window can easily close. With proactive planning and improved visibility into copper assets, organizations can act quickly and make the most of favorable market conditions.

#### **Drivers of Copper Network Decommissioning**

The need to retire traditional copper networks stems from more than just financial incentives. These legacy systems are built on outdated, energy-intensive technologies that are increasingly inefficient to operate. While the global telecom industry is collectively moving toward decommissioning copper infrastructure, North America has already seen significant momentum over the past decade (2013–2023). This shift is expected to accelerate further throughout the next decade (2024–2034) as operators intensify efforts to modernize and optimize their networks.



#### **Market Trends in Broadband Adoption**

#### **United States of America**

- The total number of fixed broadband subscribers in the U.S. grew from 96 million in 2013 to 132 million in 2023, reflecting a CAGR of 3.25%, signaling a growing demand for high-speed and reliable Internet access.
- During the same period, fiber-optic (FTTx) broadband subscriptions increased significantly, from 7.7 million to 29.5 million, achieving a CAGR of 14.32%. This demonstrates fiber's increasing strategic value in the digital age.
- Meanwhile, xDSL broadband subscriptions, which rely on copper infrastructure, declined from 30.8 million to 12.6 million, with a negative CAGR of -8.55%, highlighting the industry's ongoing move away from copper.
- Between 2024 and 2034, FTTx broadband subscriptions are projected to grow at a CAGR of 10%.
- xDSL subscriptions are expected to continue their decline with a projected negative CAGR of 9.86%.

#### Canada

- Between 2013 and 2023, the number of fixed broadband subscribers in Canada increased from 12 million to 16 million, achieving a CAGR of 3.33%. This reflects a growing demand for high-speed, reliable Internet services.
- During the same period, FTTx broadband subscriptions surged from 0.6 million to 5.34 million, demonstrating an impressive CAGR of 23.88%. This underscores the increasing importance of fiber-optic networks in the country's digital infrastructure.
- In contrast, xDSL broadband subscriptions—dependent on aging copper infrastructure—declined from 4.5 million to 2 million. This trend highlights a strategic industry move away from outdated copper-based systems.
- Looking ahead to the 2024–2034 period, FTTx subscriptions in Canada are projected to grow at a modest CAGR of 2%.
- Meanwhile, xDSL subscriptions are expected to continue their downward trajectory, declining further at a projected CAGR of 5.46%.

These trends mark a shift from copper-based to high-speed, resilient fiber networks.



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#### **Challenges of Copper Reclamation**

Telcos face various challenges during copper reclamation, they include:



#### Cyient's End-to-End Copper Reclamation Services

To address these challenges, Cyient provides tailored, cost-effective solutions covering the entire copper network lifecycle, including planning, design, support for construction, as well as ongoing management and optimization.





#### i) Assessment/analysis

The goal is to thoroughly analyze existing copper network data across legacy systems and identify copper cables that lack active circuits, specifically those whose removal or recovery can deliver a return on investment by reducing costs or reclaiming valuable materials.

- Copper cables longer than approximately 5,000 feet and with sizes greater than 900 pairs are recommended as prime candidates, as they offer potential salvage value that can outweigh the cost of removal.
- Digital record verification
- Field visits/survey to review and confirm
- Ticketing system, checks to confirm disuse

#### ii) Network Consolidation (AI/RPAenabled)

In some cases, network efficiency can be improved by strategically planning the allocation of copper pairs or cables to distribution points. This includes optimizing pair transfers, which helps identify inactive or unused copper cables that may be eligible for removal.

Due to the extensive copper pair connectivity records, planning and executing these transfers manually is both time-consuming and complex. To overcome this, we introduced semiautomated solutions using AI and RPA. These tools significantly streamlined the workflow, reducing manual effort while delivering accurate outcomes. The semiautomated approach allows for analyzing large datasets, determining the most effective transfer plans, and executing them with speed and precision.

#### iii) Support for cost analysis

We develop and deploy Copper Salvage Calculators to accurately estimate removal costs and potential ROI from copper recovery. These tools are tailored to telcospecific needs, streamlining the evaluation process and supporting informed decisions through customer-defined workflows or tools.

#### iv) Reclamation design

Our reclamation designs align with the telco's specific requirements and adhere to local regulatory standards.

#### Key steps involved in this process:

- Developing work packages based on cables identified and approved for copper reclamation through assessment and analysis
- Creating designs and permit plans within the customer's network inventory system
- Conducting design reviews and securing necessary approvals



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#### v) Construction Support

We offer comprehensive support to construction teams for the removal of identified and approved copper cables. Our responsibilities include:

- Preparing construction packages in accordance with regulatory requirements
- Developing Traffic Control Plans (TCP) as needed to ensure safe and compliant execution

#### vi) As-built updates

Accurate documentation of network infrastructure through as-built updates is essential for supporting future maintenance and expansion efforts. Once copper cables are physically removed from the field, updating the inventory based on field records is critical to maintaining data integrity and consistency with construction notes.

To support this, we offer comprehensive as-built update services that capture all changes made during the copper removal process. Upon successful extraction, updates are entered into the customerspecific inventory system to ensure they accurately reflect the network's current state.

#### vii) Development & Deployment of bespoke program management tools

We develop and deploy tailored web-based project management tools designed to support end-to-end project execution. These applications serve as centralized platforms for managing workflows, tracking progress, and enabling real-time collaboration across teams.

Our tools are built to drive efficiency. They feature integrated dashboards, reporting functions, and resource tracking to ensure transparency and alignment with strategic goals. They help optimize resource utilization, monitor key metrics, and streamline communication throughout the project lifecycle.

As part of our copper reclamation programs, we go beyond planning and design by providing purpose-built Web applications that enable accurate process tracking and performance monitoring. This ensures projects are executed effectively, with improved visibility, reduced risk, and measurable outcomes.





#### **Business Benefits and Best Practices**

Key benefits of removing copper cables from network:



#### **Best Practices**

Cyient has developed AI-powered Technology Accelerators to enhance the quality and efficiency of copper reclamation and removal processes. By harnessing advanced technologies such as Robotic Process Automation (RPA), cognitive computing, and the Internet of Things (IoT), we help transform enterprise operations—improving productivity, optimizing workflows, and elevating customer experience. These innovations also support cost reduction by lowering capital expenditure and accelerating delivery timelines.

Our specialized RPA team plays a pivotal role in implementing intelligent tools and streamlined processes that ensure accuracy, efficiency, and compliance. These automation-driven solutions support consistent adherence to SLAs and regulatory requirements, making copper reclamation programs more scalable and reliable.



In parallel, our global experience working with major Communication Service Providers (CSPs) and Engineering, Procurement, and Construction (EPC) firms has equipped our engineering teams with deep expertise in the planning and design of copper, fiber, and HFC networks. This includes a full range of services—from building permits and site surveys to network planning, detailed design, and As-built/DBoRs/redline updates—executed using platforms such as Smallworld, SpatialNet, MicroStation, QGIS, G/Tech, Network Engineer, 3GIS, AutoCAD, and others.

#### **Success Stories**

With over three decades of deep industry expertise, Cyient has built a strong legacy of innovation, supporting global Communication Service Providers (CSPs) and Engineering, Procurement, and Construction (EPC) firms. Our journey began with pioneering Geographic Information Systems (GIS) and large-scale data transformation programs, and we continue to evolve to meet the dynamic needs of the telecommunications sector.

A recent focus area is Copper Reclamation, an emerging domain centered on sustainable resource utilization and environmental responsibility. Drawing on our long-standing experience and strategic insights, we partnered with a leading telecom operator in the U.S. to design and implement efficient copper recovery strategies from decommissioned networks. This initiative reflects our agility in adopting forward-looking solutions and our continued dedication to driving impactful change in the industry.

The following flagship case studies highlight our global success in delivering end-to-end solutions across the entire network lifecycle.

Empowering Tier 1 US Telco's copper reclamation, enhancing value extraction from decommissioned cables

Cyient Successfully Analyzed and identified **over 60 Mn. Ft.** Copper for Reclamation from multiple US states with **45% ROI** and **Cost savings of 29%**.

The service offering included the scope, research and design. Created required Permits and Traffic Control Plans (TCP) enabling the removal process thereby clearing the pathways for fiber Efficient copper decommissioning resulting in space and energy savings with innovation

Cyient's innovative approach in central office consolidation, facilitates a seamless migration from Asymmetric Digital Subscriber Line (ADSL) to Broadband, resulting in substantial space savings and **3 Mwatts** (26,300 MWh) in power consumption per annum.

Successful decommissioning activities were carried out for approximately 3000 roadside devices and 2000 PSTN connections

#### Conclusion

The telco's role in copper reclamation is pivotal to advancing sustainability and improving resource efficiency. By leveraging skilled expertise in copper networks, applying advanced research and analysis techniques, and integrating AI and automation, CSPs can implement cost-effective design strategies. This approach enables more effective planning and execution aligned with their long-term strategic goals for copper removal.

#### **About the Author**



**Srinivas** boasts 25 years of extensive experience spanning operations, business development, partner management, pre-sales, and practice marketing. His expertise includes technical pre-sales consulting for telcos, particularly in copper engineering and fiber engineering, focusing on FTTx technologies. Srinivas has played a pivotal role in co-authoring frameworks related to data migration and data conflation & Smart FTTx Plan and Design areas. As the Head of Pre-Sales for North America in the Communications Business Unit, he is tasked with identifying, defining, and launching new service offerings align with Cyient's customers' strategic ambitions to solve problems that matter.

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#### About Cyient

Cyient (Estd: 1991, NSE: CYIENT) delivers intelligent engineering solutions across products, plants, and networks for over 300 global customers, including 30% of the top 100 global innovators. As a company, Cyient is committed to designing a culturally inclusive, socially responsible, and environmentally sustainable tomorrow together with our stakeholders.

For more information, please visit www.cyient.com



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