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Reimagining Fiber Deployment

Unlocking Efficiency, Scale, and Competitive Advantage

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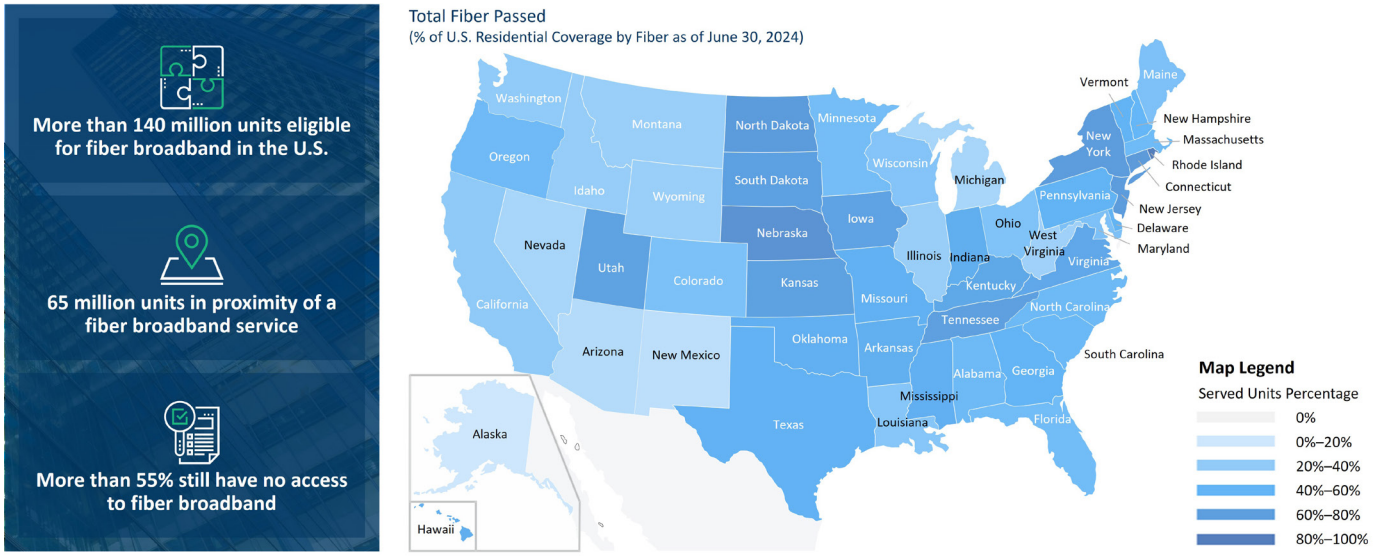
With only 45% of U.S. homes currently equipped with fiber broadband, telecom providers and overbuilders have a significant opportunity to bridge the digital divide. As the demand for high-speed internet continues to surge, major industry players plan to connect over 50 million additional homes within the next three years. However, bringing fiber to rural and low-density areas requires innovative deployment strategies that balance efficiency, cost, and scale. By adopting new technologies, streamlining construction, and leveraging creative financing, the industry can reshape America's connectivity landscape and deliver fiber broadband where it's needed most.

Unlocking Fiber Broadband Expansion Opportunities in the United States

With only 45% of homes in the United States currently equipped with fiber broadband, a substantial opportunity exists for telecom providers and overbuilders to bridge the digital divide.[1] The growing demand for high-speed internet, fueled by digital entertainment, online education, and hybrid work models, has made fiber broadband not just a convenience, but a necessity. Recognizing this need, several major industry players have unveiled ambitious expansion plans, aiming to extend fiber availability to more than 50 million additional homes within the next three years.[2] This rapid expansion has the potential to reshape the connectivity landscape — but it is not without its challenges.

Remaining unconnected homes in the United States have not been prioritized by Telecoms and overbuilders mostly because of lower and less predictable returns on investment. Many of those homes are located in areas with lower density of construction, farther from existing fiber assets, or are expected to have lower take-up rates and commercial attractiveness. The unconnected homes can be found not only in rural, remote or low-density areas but also in some urban areas. These urban areas, where pockets of homes not connected to a fiber network are surrounded by homes that have fiber, are often referred to as the "Swiss cheese" of broadband coverage. Closing these gaps will require telecoms and overbuilders to rethink traditional deployment strategies and adopt innovative, cost-efficient approaches. From streamlining construction processes and leveraging new technologies to adopting creative financing models and strategic partnerships, it is critical to reduce the unit cost of fiber deployment. By addressing these challenges head-on, the industry can unlock the full potential of the fiber broadband revolution to ensure connectivity for millions more Americans.

FIGURE 1: SIGNIFICANT WHITE SPACE REMAINS IN THE UNITED STATES FOR FIBER OVERBUILDERS

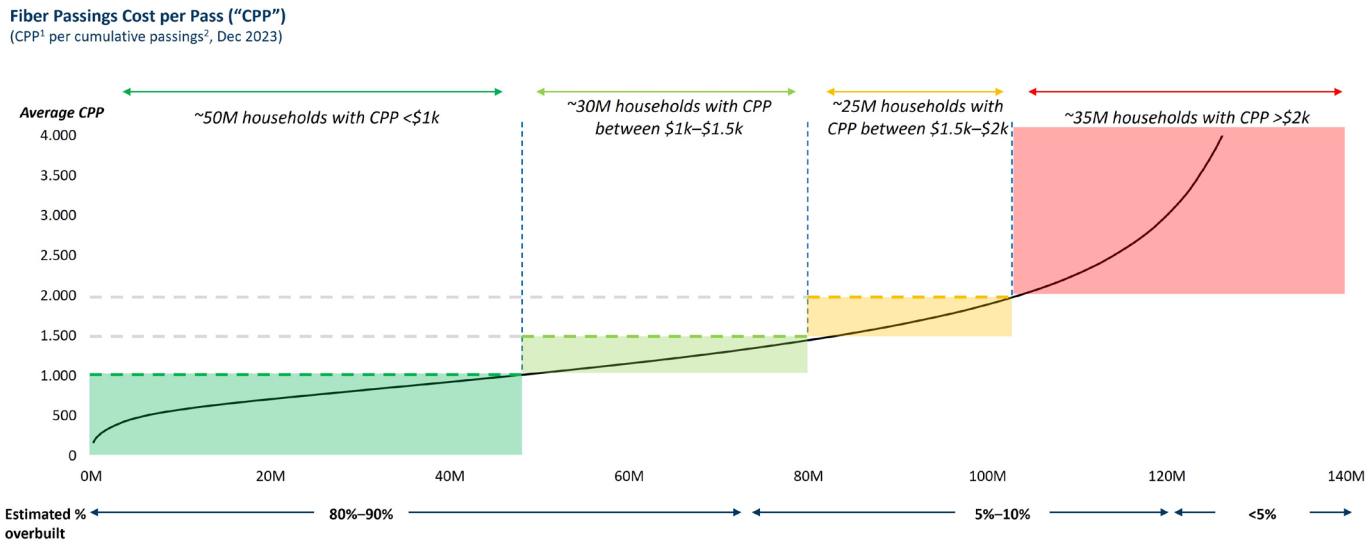


Sources: FCC National Broadband Map, Dec, 2024, www.broadbandmap.fcc.gov. , FTI Delta analysis

[1] FCC National Broadband Map, Dec, 2024, www.broadbandmap.fcc.gov. 2) Brad Randall, "AT&T outlines strategy to enhance fiber, 5G presence," Broadband communities, Dec 10, 2024, https://bbcmag.com/att-outlines-strategy-to-enhance-fiber-5g-presence/#:~:text=Coupled%20with%20those%20plans%2C%20the,in%20America%2C%E2%80%9D%20Stankey%20said

[2] Brad Randall, "AT&T outlines strategy to enhance fiber, 5G presence," Broadband communities, Dec 10, 2024, https://bbcmag.com/att-outlines-strategy-to-enhance-fiber-5g-presence/#:~:text=Coupled%20with%20those%20plans%2C%20the,in%20America%2C%E2%80%9D%20Stankey%20said

FIGURE 2: CAPTURING THE REMAINING FOOTPRINT REQUIRES MORE COST-EFFICIENT FIBER DEPLOYMENT APPROACH



Notes: (1) The CPP is calculated at the "block group" level, with penetration assumptions based on the competitive profile of each block group, derived from industry benchmarks. Operating costs are based on industry benchmarks, and CAPEX is estimated according to the number of HPs [see Note 2] and the simulated footage of fiber required to cover each block group; (2) HPs are defined as Housing Units by the U.S. Census Bureau; (3) the curve is an average of ILECs and overbuilders. Sources: FCC National Broadband Map, Dec, 2024, www.broadbandmap.fcc.gov. FTI Delta analysis

Gaining a Competitive Edge Through Construction Efficiency

Achieving a step-change improvement in fiber broadband construction isn't just a cost-saving measure — it's a strategic advantage. Providers who can deploy fiber more efficiently gain access to locations where competitors cannot justify entry, effectively locking in these under-served markets. Additionally, cost-efficient deployment enables overbuilding in larger, neighboring clusters, which offers a cascade of benefits. These larger clusters not only lower operational costs by leveraging economies of scale but also enhance sales effectiveness by creating concentrated service areas with higher customer density. Fewer footprint gaps reduce leakage in sales and marketing spend, enabling lower marginal costs for customer growth through digital campaigns and sales partners such as door-to-door vendors. Furthermore, overbuilding neighboring areas fosters stronger relationships with local regulators and authorities, simplifying the often complex and time-consuming permitting process that can delay projects such as securing rights-of-way ("ROW").

The urgency to improve efficiency stems from the reality that most economically attractive footprints have already been enabled with fiber. Telecoms and overbuilders are now racing to innovate and deploy at unprecedented speed and cost-effectiveness to secure the remaining markets. Those who succeed in achieving first-mover advantage stand to gain significantly, capturing untapped demand and positioning themselves as leaders in the space. The opportunity is amplified by the pivot toward convergence plays by the largest telecoms, which are bundling fiber broadband with mobile and other value-added services. For telecom companies, this approach facilitates rapid and efficient expansion into new geographies. Fiber overbuilders can leverage improved efficiency to secure stronger positions in negotiations for alliances or potential mergers and acquisitions. The race to redefine deployment efficiency is more than a tactical challenge — it's the key to unlocking substantial long-term growth and market dominance.

Reimagining the Fiber Construction Process for Cost Efficiency and Productivity

To achieve the necessary step-change improvement in productivity and significantly reduce unit costs, telecom providers must rethink the entire fiber broadband construction process from end to end, as discussed more fully below.

By addressing inefficiencies at every stage — from targeting to installation — telecoms can drive transformative changes that lower costs and reduce the percentage of homes rejected at each stage, enabling scalable, sustainable growth in fiber deployment.

Leverage AI and advanced algorithms to identify and prioritize locations

The journey begins with a more strategic approach to identifying units eligible for overbuild. This requires access to high-quality data sources and advanced data remediation and in-fill algorithms to minimize the risks of overlooking potentially eligible units. With the abundance of data available, these algorithms have become indispensable for high-quality market opportunity identification and prioritization, and enable providers to make informed decisions about where to invest their resources.

Best practices for location identification and prioritization leverage complex models that integrate multiple spatial data sources, overlaying information on competition, current broadband speeds, demographics and more. These models incorporate advanced data remediation techniques to close gaps, correct errors, and provide an accurate picture of market potential. Beyond identifying opportunities, leading telecoms develop and deploy AI models trained on the data from past projects to estimate construction costs with higher precision. These models use data on demographics, geodesic characteristics of the considered areas, soil types, and other parameters to deliver accurate cost predictions, reducing financial risk and improving planning efficiency.

The most advanced telecoms and overbuilders already leverage these tools to gain a competitive edge. They maintain real-time estimates of construction costs and visibility into the entire U.S. footprint, allowing them to update and refine their strategies dynamically. This integration of cutting-edge data analytics and AI-powered insights empowers providers to optimize every stage of the construction process, from opportunity identification to execution, ensuring scalable and efficient fiber deployment.

Streamline the planning phase for seamless fiber deployment

Once cost estimates are completed and locations are prioritized, the planning phase — where telecom providers group locations into contiguous areas for overbuild — becomes a more straightforward process. However, from this point onward, maintaining end-to-end ownership of the construction process for a specific location is critical. This holistic oversight helps reduce the risks of delays, unexpected cost increases, and additional funding requests. Leading telecom providers are leveraging advanced geoanalytical tools during this phase to produce a high-level design of the fiber network layout, compile a comprehensive bill of materials and refine cost-to-build estimates.

To minimize the risks of escalating costs in subsequent phases, embedding a virtual site walk step into the planning process is essential. This step allows an efficient yet thorough assessment of potential challenges and anomalies using a combination of satellite imagery, lidar scans, and Geographic Information System ("GIS") data to ensure a more accurate understanding of on-ground conditions. During this phase, it is also essential to follow a playbook composed of clear rulesets that are standardized yet flexible enough to cover most

build cases. These rulesets help identify and realize potential economies of scale, such as optimizing the placement of network assets or standardizing material usage across contiguous areas.

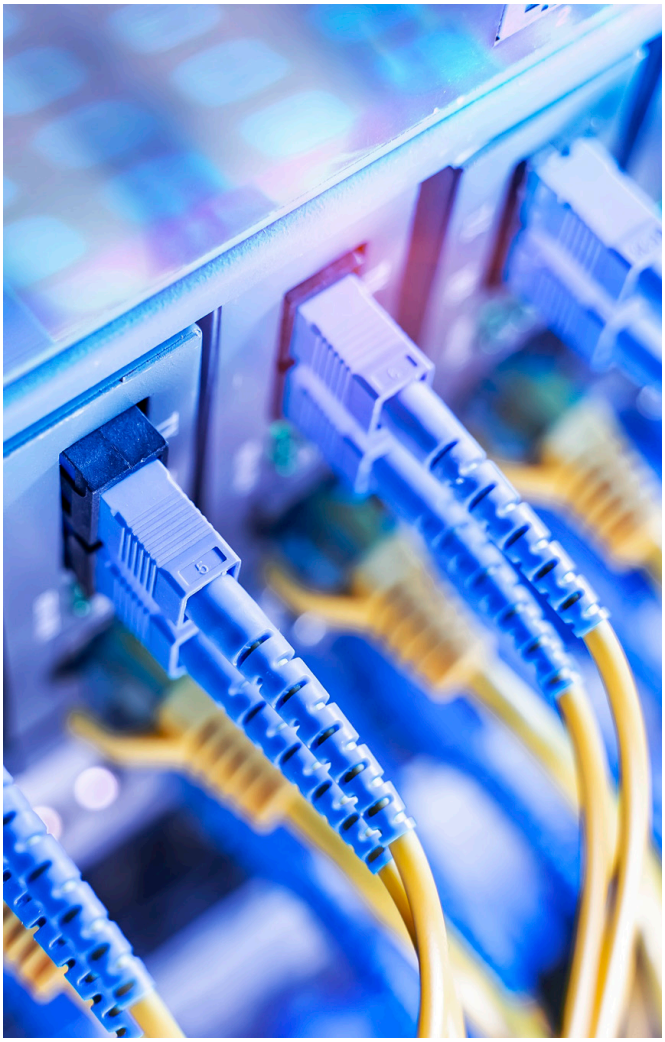
Another critical aspect of this phase is effectively assigning low-level design tasks to unlock economies of scale. This allocation must align closely with the provider's sourcing strategy to balance cost efficiency, quality, and speed. By establishing strong communication channels and clear expectations with subcontractors, telecoms can ensure that the design phase supports seamless transitions to construction while maintaining control over costs and timelines. The combination of advanced tools, data-driven insights, and structured processes in this phase lays a solid foundation for efficient and cost-effective fiber deployment.

Optimize the low-level design phase to unlock uneconomical units

Reducing cycle times and improving the quality of low-level designs requires an iterative approach during the planning and engineering process. At the core of this approach is the assignment of a chief engineer responsible for a specific location, who oversees all work performed during the planning, low-level design, and construction phases. This role is crucial for driving effective decision-making, facilitating cross-functional collaboration with teams from engineering, finance, sales and marketing, and ensuring alignment throughout the process. For top-priority locations, we recommend forming dedicated working teams comprising representatives from all necessary functions. These teams should operate with high autonomy and decision-making power to address challenges and keep the process moving efficiently.

The low-level design phase often produces the highest rate of location rejections due to uneconomical overbuild costs. Investing efforts into this phase helps create transparency around the key reasons for rejection and identify actionable levers to improve unit economics, including assessing potential options, evaluating trade-offs, modeling outcomes, and structuring decision-making processes to identify ways to recover previously uneconomical locations and reintroduce them into the construction pipeline.

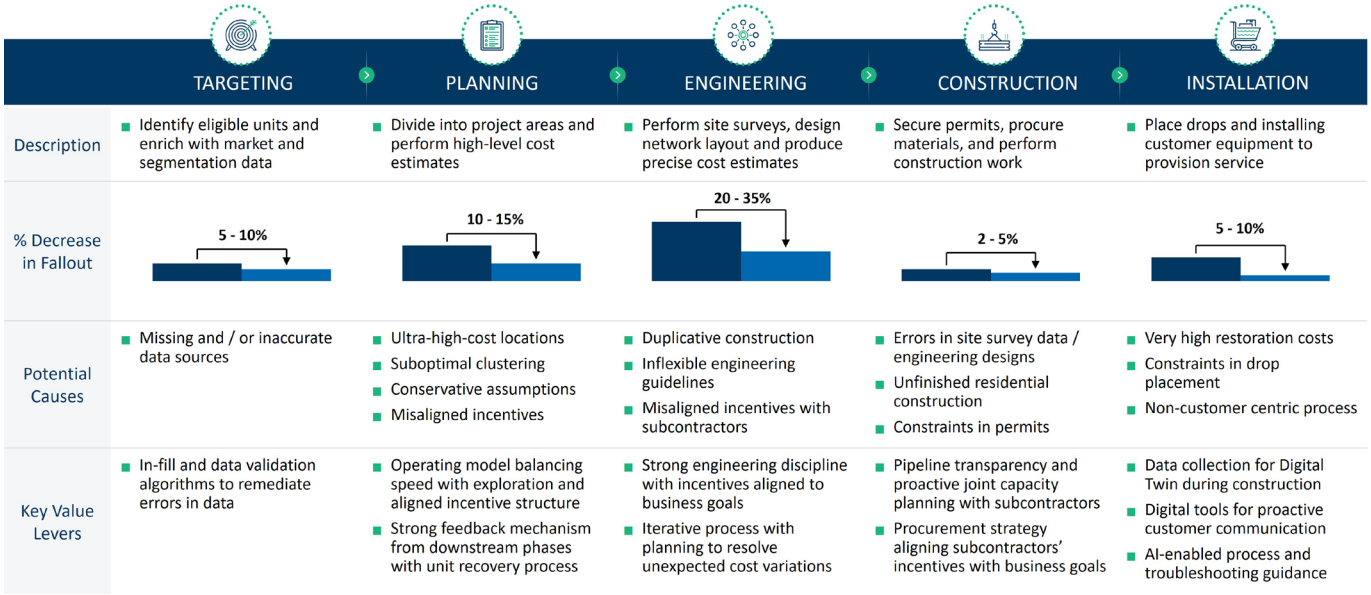
As variance in characteristics of locations increases, pure standardization of engineering guidelines no longer yields desired outcomes. To gain a competitive advantage, Telecoms should establish and continuously



update a set of guidelines and rulesets that account for the variety of cases and offer the engineering team a systematized way to evaluate trade-offs and come up with an optimal solution. Developing such guidelines and rulesets requires effort to identify, structure, model, and codify various cases but we have observed it to reduce substantial costs and rejected units. By applying this methodology, our project experience suggests that over 30% of units initially deemed uneconomical can be recovered and successfully reintroduced into deployment plans. This effort also reduces the likelihood of unit fallout in future projects, further enhancing the efficiency of the overall process.

Additionally, the insights gained from recovering rejected units should be continuously codified in the revised guidelines and rulesets, enabling teams to replicate successes and refine strategies over time. By continuously learning and applying these disciplined principles, telecom providers can unlock additional value from their construction efforts and ensure the long-term feasibility of fiber expansion projects.

FIGURE 3: ADDRESSING INEFFICIENCIES REDUCES UNIT FALLOUT BY UP TO 35%



Sources: Example approach based on FTI Delta project experience

Manage the construction and installation processes

Execution in the construction phase demands tight management and transparent progress reporting to ensure that every home planned for overbuild is successfully connected. This requires real-time oversight, robust communication with contractors, and leveraging innovative tools such as automated project tracking and digital-twin technology to enhance precision and efficiency.

Finally, improvements in customer experience and operational productivity during the installation phase are essential to minimize cancellations and enhance overall satisfaction. From the moment a customer digitally submits a request for service, the process must be effortless, secure, and fast, culminating in the delivery of fiber broadband that provides outstanding and reliable speeds.

Measure performance using a supply-chain approach to fiber construction

As with any improvement effort, establishing a baseline and measuring progress are essential for driving meaningful results. In our experience, adopting a supply-chain approach that solves for minimizing the amount of work in progress ("WIP"), increasing throughput and maximizing yield, and then monitoring those metrics, will bring better transparency, a sharper focus on business outcomes and significantly improved results. A single eligible unit serves as the key unit of measurement, allowing providers to track its journey through the construction pipeline. Each unit progresses through clearly defined steps, from identification to being ready for sale, with designated points for capturing and analyzing rejected units along the way.

To enable this tracking, it is critical to design and implement robust data collection, correlation, and error remediation processes. These steps help establish a reliable baseline and ensure that performance is accurately measured across all phases of the pipeline. As in any supply chain, work in progress is monitored across steps, with metrics like WIP age, throughput and other key parameters providing a detailed view of the process. The overall throughput — measuring the ability to consistently push the required number of units from identification to ready-for-sale status — and the yield, which represents the percentage of units that successfully complete all steps, become the primary indicators of pipeline health.

These metrics facilitate straightforward productivity and efficiency evaluation, bottleneck detection and unit recovery. By systematically analyzing the causes of rejection and feeding those insights back into the process, providers can continuously reduce unit costs and enhance overall efficiency. This approach not only improves outcomes in the short term but also creates a framework for sustainable, long-term optimization, ensuring that fiber deployment remains both cost-effective and scalable.

Transforming Fiber Construction: A Disciplined, Scalable Approach

Successfully transforming the fiber broadband construction process demands a highly disciplined and orchestrated effort that draws on expertise in data analytics, performance management, change management and deep knowledge of fiber broadband. Successful transformations commonly begin with an opportunity value assessment, followed by a proof of unit recovery value in a pilot region, and conclude with documentation and codification of the processes that can drive scaled unit recovery across the enterprise.

An effective opportunity value assessment requires building a robust baseline to measure current performance and quantify the potential upside. This foundational step often reveals significant opportunities to unlock value by reimagining the fiber deployment approach. With clear insights into the magnitude of improvement possible, teams can next prove this value in a pilot region, identifying actionable levers for recovering rejected units, addressing inefficiencies and implementing process changes. This value proof not only provides valuable knowledge but also starts delivering tangible benefits as recovered units in the pilot region contribute to the bottom line.

Alongside a successful proof of value, scaling the steps and guidelines that drive this success requires process documentation and codification within comprehensive engineering guidelines, detailed playbooks, and a robust change management process. Conducting this documentation in parallel with the ongoing effort to recover units ensures continuous improvement and early returns.

Gradually, the new methodology is scaled across the entire footprint, empowering teams with the knowledge and systems needed for sustainable transformation. Additionally, mechanisms for continuous improvement reduce unit costs and enhance deployment efficiency long after the initial transformation is complete. This disciplined, step-by-step process ensures that the transformation is both impactful and enduring.

The Transformative Benefits of Rethinking Fiber Deployment

The need to improve fiber deployment processes is inevitable, and the sooner telecom providers take action, the better positioned they will be for future success. Our previous telecom clients that have reimagined their construction processes have achieved remarkable results, reducing unit costs by 25%–30% and recovering over 30% of previously uneconomical units. This ability to capture an additional 30% of the footprint offers a substantial competitive advantage in a fast-paced industry where each enabled home directly contributes to a company's market capitalization.

Beyond the immediate financial benefits, expanding the fiber broadband footprint delivers far-reaching societal and economic impacts. It can enhance the productivity and well-being of Americans by enabling greater access to remote work, education and telehealth services. It also strengthens the United States' position as a leader in the modern digital economy, laying the groundwork for the next wave of technological innovations such as AI, robotics and augmented reality. By accelerating broadband deployment, telecom providers not only secure their place at the forefront of industry innovation but also contribute to a more connected, competitive, and prosperous future. The time to act is now, and those who embrace this transformation will define the industry's trajectory in the years to come.

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