

ISE

ICT SOLUTIONS
& EDUCATION

APRIL 2022



Exclusive: 2022 ICT Visionaries Revealed!



ALSO INSIDE

Green Power Partnership Top 30
Tech & Telecom

Telco/ICT Sector Can Change the
Sustainability Game

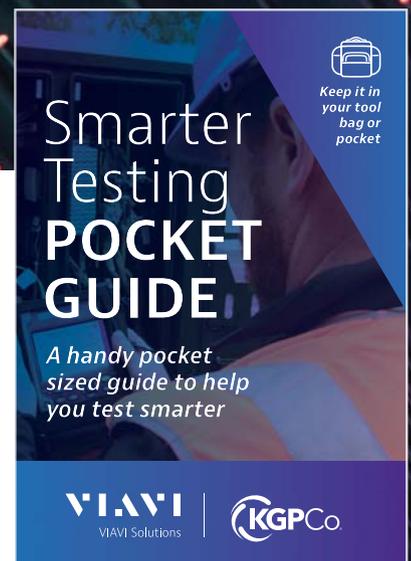
It's More Complicated Than You Think

AI Turbo-Charges Sustainability
Development

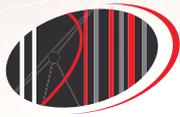
Ready for NextGen Anything

KGPCo takes your network to the next level with VIAVI Solutions' Smarter Testing Pocket Guide. This all-in-one guide has vital OTDR information and a checklist for FTTH/PON lifecycle testing. Get your guide and elevate your network today.

Visit us today at www.kgpcoco.com



 **KGPCo**. The Network Never Sleeps.™



MILLENNIUM®

BUILD MORE NETWORKS. CONNECT MORE COMMUNITIES.

Connecting communities across America since 2004, Millennium is the national distributor of fiber optic materials for broadband networks. By focusing on client-driven inventory, flexible financing options, and a personalized approach to service, we partner with our clients to build fiber networks. Millennium offers dedicated support for your projects to the very last mile.

CONTACT US TODAY!

info@mtpllc.us | 866.287.7830

www.mymillennium.us

**SCAN THE QR CODE TO HEAD
OVER TO OUR WEBSITE.** →



Geospatial Design
& Engineering

Infrastructure Fund &
Flexible Financing

Materials &
Material Management

Capital Equipment &
Leasing Options

FEATURES

Welcome 2022 ICT Visionaries



By Sharon Vollman

Meet the network transformation insiders who inspire with their values, beliefs, and best practices. Follow them in the April, July, and October issues and on ISE's social media channels.

30. Green Power Partnership Top 30 Tech & Telecom

Is your company feeling powerful because it's part of the solution? Why not?

32. Telco/ICT Sector Can Change the Sustainability Game

By Roman Friedrich
Learn why the telco sector will continue to face increased scrutiny for its environmental impact.



36. AI Turbo-Charges Sustainability Development

New Tool for Telecom/ICT Sustainability Goals and More
Learn about the ITU's new program: *AI for Good*.



39. It's More Complicated Than You Think

How TMT Industries Can Tackle ESG
By Duncan Stewart and Ariane Bucaille
Feeling the need for some real ESG solutions? You're not alone.



SAVE THE DATES
August 24 – August 25, 2022
Denver, Colorado, USA



WEB EXCLUSIVES

Speed: The New Love Language
Are Your Customers Feeling the Network-Love Yet?

By Moe Long
Are your customers feeling the love with network speed increases?

Know Your Data Center Deets
The Devil's in 7 Details

By Edward Rafter
If you're evaluating which data center to use, be sure it has these 7 things before signing on the dotted line.

Safety or Sustainability? Survey Says...

By Christine Hogge
What do EHS professionals say about their priorities and culture challenges?

COLUMNISTS

6. EDITOR'S NOTE

By Sharon Vollman
Food for Thought From Our 2022 ICT Visionaries

8. COPPER EXPERT

By Don McCarty
How come?

IN EVERY ISSUE

- 7. Earthy Factoids
- 42. Human Network
- 42. Advertiser Index

DISCLAIMER: The views expressed in *ISE* magazine are those of the authors; they do not reflect the views of *ISE* magazine, the publisher, or its employees.

ISE MAGAZINE April 2022 • Volume 40 • Issue 3.
ISE magazine (ISSN 2470-0517, print; 2470-0525, online). ISE magazine is published monthly, except for combined January/February and November/December issues. ISE magazine is published by Endeavor Business Media, LLC, 1233 Janesville Avenue, Fort Atkinson, WI 53538. Periodicals Postage Paid at Schaumburg Post Office, Schaumburg, IL 60194, and additional mailing offices. POSTMASTER: Send address changes to ISE magazine, PO Box 3257, Northbrook, IL 60065-3257.

ISE magazine is free to professionals in the ICT industry and related contractors. Rates outside this audience are: \$32.00 for one year, \$56.00 for two years, \$73.00 for three years. Shipping and handling is required for all international subscriptions: Canada \$50.00 per year, all other international \$115 per year. Single copies available; cost varies depending on shipping fees. All fees are payable in advance in U.S. funds. Executive, Editorial, Circulation and Advertising offices: 1233 Janesville Avenue, Fort Atkinson, WI 53538. No material may be reproduced in any form without publisher's written permission. Endeavor Business Media, LLC, also sponsors and manages the annual ISE EXPO.





EDITOR'S NOTE
by Sharon Vollman

@svollman

@SharonVollman

svollman@isemag.com

Follow Sharon on Twitter and LinkedIn for further conversation and insights.

Visit www.isemag.com/contribute for more information on submitting an article to ISE magazine in print, digital, and online.



Food for Thought From Our 2022 ICT Visionaries

Our 2022 ICT Visionaries will share insights throughout the year to help you and your teams crush your 2022 goals. Check out a few of their interesting quotes below. Then, dive deeper into their responses starting on page 10.

Topic: Earth-Friendly Network

“By taking the lead in introducing next-generation routing silicon, open optics, and open line systems, we found ways to reduce power consumption of 80-90% per bit with 80% success within our IP domain transition. We have set an ambitious migration plan that will retire 8 different platforms by 2025.” **Johan Ottosson, Vice President Strategy, Arelion**

Topic: The Great Resignation and 5G Labor Needs

“The labor elasticity of developers coding in common “modules” and “platforms” fundamentally is becoming a double-edged sword. It will be critical to establish robust and ongoing training, pipelines into the colleges/universities, and public policy initiatives that incentivize skills pivots to maintain and grow the labor pipeline.” **Brooks Fitzsimmons, Assistant Vice President, Transportation, AT&T Technology Services**

Topic: Fiber Frenzy

“Operators will need to move quickly to hire or contract personnel and work with them to provide the training necessary to perform efficiently. But the days of lengthy training periods over a diverse collection of products and processes are gone. Focused training on specific materials and related processes needs to be developed.” **Kevin Tusing, Application Engineer, Clearfield**

Topic: Earth-Friendly Network

“Many of us were taught an important principal by our parents at an early age: turn the lights off when you leave the room. Our approach is no different in that all our compute equipment, when not in use by our customers, is fully powered down until requested. This adds time to the delivery for compute resources as the power-on checks need to occur before we can deliver to our customers.” **Ryan Korte, Senior Director, Edge Computing, Lumen**

Topic: Smart Cities and Communications Service Providers/Telecom Providers

“Transforming communities does not come without disruption and coordination. Many local jurisdictions do not have staff to handle permitting, locating, and inspection tasks in support of builds thus slowing progress. While our goal is not to build entire smart networks, we often forge strategic partnerships with local communities, helping each other build networks in support of respective goals.” **Wade Soczka, Director of Network Construction, TDS Telecom**

Topic: The Satellite Elephant in the Room

“Satellite services still rely on telcos for ground stations and transport, and operators regularly face barriers to market entry. These issues are often best addressed through mutually beneficial partnerships with telcos. Regardless of which technology is delivered to the end user, there will always be a need for collaboration. Embracing this reality rather than fighting it is the more logical path to long-term success.” **Noah Drake, VP, Customer Solutions and Architecture, Americas, Telstra**

Topic: Earth-Friendly Network

“Our focus is on renewable energy, energy efficiency, green buildings, sustainable water management, and biodiversity and conservation designed to positively impact the environment and advance U.N. Sustainable Development Goals. As of September 2021, Verizon settled our third green bond of \$1 billion. In the span of 2 years, Verizon has become one of the leading corporate buyers of renewable energy in the US.” **Mary Nolan, Executive Director - Network Assurance, Verizon**

EARTHY FACTOIDS

Environmental Edgy-ness

Scope 3 emissions are indirect emissions from assets an organization doesn't directly own or control. In 2022, sustainability-related services for energy efficiency and resource management will continue to grow and be powered by the Edge and IoT. High-demand use cases will include environmental monitoring, resource management, and supply chain processes.

Source: <https://www.forrester.com/blogs/predictions-2022-sustainability-digital-divide-shape-edge-iot-and-network-trends/>

YOU CAN'T TRACK WHAT YOU DON'T MEASURE

Sustainability plays a significant role in new-business building: more than

9 in 10 respondents

say they'll build new businesses

at least in part to meet demand for sustainable products and services.

42% expect to put sustainability at the center of their new businesses' value proposition. However, nearly

80% of respondents

say their new businesses don't track sustainability targets relating to carbon footprint or other environmental impacts.

Source: McKinsey & Company 2021 Global Report: The state of new-business building. December 2021. <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/2021-global-report-the-state-of-new-business-building>

DATA CENTER = ENERGY HOGS

Boston Consulting Group forecasts the growth of data centers is a clear signal of the growing impact of the ICT sector. BCG predicts data centers alone will use **8% of global electricity by 2030.**

Source: <https://www.bcg.com/press/24june2021-telco-sector-game-changer-sustainability-shrinking-carbon-footprints>



ICT SOLUTIONS
& EDUCATION

Publisher

Janice Oliva
joliva@isemag.com

Editorial Director

Sharon Vollman
svollman@isemag.com

Managing Editor

Karen Adolphson

Art Director

Julie Whitty

Multimedia Account Executives

Robin Queenan
rqueenan@isemag.com

Mark Horn

mhorn@isemag.com

Production Director

Lisa Weimer
lweimer@isemag.com

Director of Custom Events & Education

Amy Mullally
amullally@isemag.com

Circulation Manager

Laura Moulton
circulation@isemag.com



Endeavor Business Media, LLC

CEO

Chris Ferrell

President

June Griffin

CFO

Mark Zadell

COO

Patrick Rains

Chief Administrative and Legal Officer

Tracy Kane

EVP - Advanced Technology Group

Lester Craft



COPPER EXPERT

by Don McCarty

For more information, call or text: 831.818.3930 or email dmccarty@mccartyinc.com

Don McCarty is the Copper Expert columnist for ISE magazine, discussing the issues around provisioning, testing, and maintaining copper for all services from POTS to IPTV. Don is also President of and the Lead Trainer for McCarty Products, a technical training and products company training field technicians, cable maintenance, installation repair, and Central Office technicians and managers.

How come?

Field technicians call or send emails or texts to me asking questions about a problem they are encountering when provisioning and maintaining the copper infrastructure. These questions may involve anything the technician deals with on a daily basis or sometimes that oddball problem that rarely occurs. Following are a few examples.

EXAMPLE #1. Recently, a field tech told me that when measuring tip-to-ground or ring-to-ground with a multimeter in DC volts or ohms, now and then the numbers roll. How come?

If the numbers roll when measuring DC volts, unknown voltage from another cable pair is the root cause. If the rolling happens when measuring ohms, the internal battery from the multimeter is the cause.

EXAMPLE #2. A tech whose full-time job is locating cable path and depth stated that occasionally, when locating and marking the path of the cable and then turning around to check his work, he finds that his marks are a foot or so off. How come?

When locating cable path using a higher frequency your body capacitance interferes with the locate. To reduce the interference, use a lower transmitter frequency.

EXAMPLE #3. A field tech stated that when measuring the distance to a fault using the Resistive Fault Locate (RFL) feature on his multi-function test set shows different footage measurements to the fault even though the trouble is all at one spot such as a wet cable splice. How come?

When fault locating with a multi-function test set to find the distance to a fault, we measure cable pair footage using the RFL,

opens, and the TDR function. The goal is to find the sheath footage to the failure. In the manufacture of PIC cables there are 25 different twists in any 25-pair sub-unit, ranging from 2 inches per twist on the white-blue pair to 4.7 inches per twist on the red-slate pair. All other pair twists in the sub-unit fall somewhere in between.

Cable pairs are 1% to 3% longer than the cable sheath. To compensate for this, subtract 2%, when converting from ohms to feet. If you are using a multi-function test set, this is done automatically for you.

EXAMPLE #4. A field tech asked how much temperature impacts the result when converting ohms to feet. How come?

When someone asks me that question, I always say that it depends on who is digging. As the temperature of a conductor increases, the resistance increases and when the temperature of a conductor decreases the resistance decreases. It is about .018 feet per degree. If you were 10 degrees wrong in calculating temperature in 1,000 feet of cable, then there would be about 18 feet wrong. When converting ohms to feet using your multi-function test set, this is done automatically.

The question always comes up “How do I know what the temperature is?” Early in my fault locating career wherever I was training, I would go down to the hardware store and buy an indoor/outdoor thermometer. I would find a convenient place in the telco yard and set a pedestal and mount the thermometer on it. I would then use a rod and make a hole inside the pedestal at 30 inches, which is about the depth of most buried distribution cables. I would place the outdoor probe in that hole at 30 inches. Then, any time a field tech needed to know the temperature to input, all he had to do is look in the pedestal.

If you use the RFL function in your area, I suggest that you do the same as I do.

For aerial cables, place the indoor thermometer in a black ready access terminal.

I was surprised that when the outside temperature was 90 degrees in the air the internal cable temperature was 130 degrees.

Over a long period of time I have installed my makeshift temperature probes into telco cable yards in every state in the union.

EXAMPLE #5. A field tech stated that he liked the resistance fault locate (RFL) feature on his multi-function test set, but sometimes when he retests he gets a different answer. How come?

There may be more than one answer to the problem, so I offered a step-by-step process to find the root cause of multiple measurements. Most resistance bridges in the field today use very similar principles to locate trouble. Some steps on the latest sets are done internally by microprocessors, but the result is the same. When operating any resistance bridge use the following procedure.

Easy Procedure for Using the RFL

- Identify the faulted conductor.
- Use a VOM to identify any crossed battery or resistance tip to ground, ring to ground or tip to ring. Any resistance must be more solid than 20 megohms.
- Test the good pair. The good pair must be free of faults; this is one reason you get different answers when you retest. Any fault on the good pair will cause an accurate fault measurement.
- Attach the far end strap; use only an approved connector. Do not skin the insulation and twist the bare wires together; that is not a good strap and you will get different answers when you retest.
- Set the gauge and temperature, and measure the distance to fault.
- If you get different measurements, then there is more than 1 fault on that conductor. ■

Signing off

I really enjoy hearing about any problems you are having. Please don't be uncomfortable about asking or thinking it's probably a dumb question. (There is no such thing as a dumb question!) Or maybe it's such a strange problem that you think it's something you've done wrong. There are some really bizarre cases of trouble that I've come across. I like being challenged, so please send in your questions, concerns, or tips, you can share to make your fellow technician's job easier. Reach out to me at dmccarty@mccartyinc.com. Or you can call or text 831.818.3930.

PRODUCT SHOWCASE



Making Small Cell Deployment Easy

EasyStreet Systems™ provides superior small cell infrastructure for less time and money. Ultra-lightweight, strong as steel, better looking and longer lasting, this is the small cell tower of the future. Each site installation takes only two hours with just a two-person crew. The towers can be installed as an all-in-one integrated solution including RF/power/backhaul & foundation, or as a stand-alone option. They offer easier permitting, less site disturbance, and lower transportation costs with reduced CO2 emissions. All leading to easier, faster, longer-lasting small cell installation. EasyStreet Systems is ready to deploy in your network.

EasyStreet Systems

Easystreetsystems.com

Welcome 2022

By Sharon Vollman

Visionary leaders are individuals who guide a team toward positive change. They may not be c-level execs or SMEs or professionals with many acronyms behind their names. In fact, they may be quiet thinkers, makers and doers who deliver on their promises without fanfare.

That's why we are pleased to announce the 2022 ICT Visionaries who were eagerly nominated by their leaders and colleagues. They embody the important characteristics of true Visionaries and will share insights throughout the year to help you and your teams crush your 2022 goals.



ICT Visionaries

Topic: Network-as-a-Service

IDC expects global enterprise network infrastructure spending to hit \$45 billion by 2025, with about a third of that—\$15 billion—NaaS-related. IDC comments, “Communications service providers (CSPs) are ideally positioned to deliver it but they need to act fast and be smart if they want a piece of the \$15 billion NaaS opportunity.”

What network-related strategies or tools are needed to do this?

Topic: Earth-Friendly Network

The Internet’s data may be invisible, but it requires physical data centers across the world that must be powered on, cooled, and protected 24 hours a day, 7 days a week. Similarly, the magic of 5G is impossible without base stations that can consume a lot of energy.

For businesses committed to Environmental, Social and Governance (ESG) goals, reducing their carbon footprint will be key in achieving company-wide emissions targets.

Share 2 of your favorite earth-friendly network-related strategies your company is instituting to help the ICT industry do more for the environment.

Topic: The Great Resignation and 5G Labor Needs

It hit in 2021. It continues in 2022.

What can providers do to keep and attract great talent to fill 5G network-related job positions?

Topic: Fiber Frenzy

The global optical communication and network equipment market is expected to generate \$23.6 billion by 2028. While fiber supply may not be a problem, there may be other factors that have potential to threaten this.

Share your thoughts about this predicament and what it means for your company.

Source: <https://www.marketstudyreport.com/reports/global-optical-communication-and-network-equipment-market-2021-2028>

Topic: Smart Cities and Communications Service Providers/Telecom Providers

The smart city market is expected to grow 29% annually from 2021 to 2028. The future smart city will be driven by strategic collaboration between public and private organizations.

What is your company doing in terms of network evolution in this area?

Source: <https://datacenterfrontier.com/flexentials-top-tech-predictions-for-2022/>

Topic: The Elephant in the Room

Forrester predicts that 85% of satellite users will be in rural locations, with remote worker initiatives and remote facilities benefiting significantly from satellite Internet in 2022.

Some believe delivering 5G to the masses is a bit more challenging than providers are letting on—most of them relating to the infrastructure required for it.

What are your thoughts about the “5G versus satellite elephant” in the room? How can telecom providers “win” this competition?

Source: <https://www.zdnet.com/article/digital-divide-shape-edge-iot-and-networking-in-2022/>



**Johan
Ottosson**
Vice President
Strategy
Arelion

“By taking the lead in introducing next-generation routing silicon, open optics, and open line systems, we found ways to reduce power consumption of 80-90% per bit with 80% success within our IP domain transition. We have set an ambitious migration plan that will retire 8 different platforms by 2025.”

Topic: **Earth-Friendly Network**

Short term, we minimize the impact of the energy we consume running our network. In regions such as the US, where we deploy our PoPs in large carrier-neutral data centers, we partner with those that share our goal and mission for sustainability. When we research and source colocation capacity, we select facilities that make efficient use of sustainable power, providing acceptable latency limits while sourcing low-cost electricity with a low carbon footprint. However, we also need to change the game itself. Relying on the builds of the past—with legacy platforms, operational paradigms, and tools—will fall short not only meeting in bandwidth requirements, but also lead to unacceptable power consumption. By taking the lead in introducing next generation routing silicon, open optics, and open line systems, we found ways to reduce power consumption of 80-90% per bit with 80% success within our IP domain transition. We have set an ambitious migration plan that will retire 8 different platforms by 2025.

Topic: **Network-as-a-Service**

Service providers need to start with the right commercial model, offering commercial flexibility and transparency for network buyers to understand expected charges. Unlike the Cloud, where costs can quickly spiral out of control, most network buyers prefer predictability and control. Beyond the assets and tools to secure sufficient capacity for unexpected surges in demand, service providers need to excel at customer experience way beyond the initial purchase. They need to put network managers one step ahead of their stakeholders by providing access to critical data, intuitive analytics, and continuous

support, that also integrates their insights of their networks and ecosystems and the capabilities of its existing service assurance organizations. As this requires auto-provisioning systems based on real-time accurate inventory data, and sophisticated portals or API-able network functions or datasets, service providers need to keep NaaS simple. We believe that basic things, like prices that unbundle access charges from services, software-driven service activation, and a great API-based portal, goes a long way.

Topic: Fiber Frenzy

In 2021, the global semiconductor crunch impacted network equipment vendors worldwide, leading to fulfillment issues and long lead times across the telecom industry. While this crisis is set to ease in the coming year, there is a more long-term threat, as the US fiber market is becoming increasingly consolidated, particularly on the long-haul. This situation is starkly different from Europe, where multiple providers compete across all major markets. By lighting new fiber routes and bringing more data centers on net, we have brought more competition into the US market, helping customers secure their needs for capacity, diversity, and cost-efficiency. Further consolidation of fiber assets from the remaining independent dark fiber providers would work in the opposite direction, to the detriment of enterprises, consumers, and digital service providers.

BIOGRAPHY

Johan's career is founded on two things: curiosity and exploration. As an experienced strategist and manager, he led the development of growth strategies, M&A, and long-term corporate strategic planning across various industries, before zeroing in on communications and technology. He believes that a firm commitment to innovation is the key to staying competitive. Experience has taught him that innovation is not defined by organizational charts and that many of the best ideas come from those working with customers or engineering the network. <https://www.linkedin.com/in/jottosson/>



Connecting a brighter future

We've helped the Internet grow for more than 30 years and our global IP backbone, AS1299, is ranked number one. Our network spans Europe, North America and Asia with 70,000 km of optical fiber, and we're proud that the world's largest operators, content providers and enterprises trust us to keep them connected.

Discover more at arelion.com



Brooks Fitzsimmons
Assistant Vice President, Transformation, AT&T Technology Services AT&T

“The labor elasticity of developers coding in common “modules” and “platforms” fundamentally is becoming a double-edged sword. It will be critical to establish robust and ongoing training, pipelines into the colleges/universities, and public policy initiatives that incentivize skills pivots to maintain and grow the labor pipeline.”

Topic: Network-as-a-Service

AT&T started their journey to network-as-a-service by encouraging the supplier community to separate the software from the hardware layer. The industry has seen a remarkable growth in white box solutions wherein distinct network functions can be service chained together in new/novel approaches. Meanwhile, the scaled cloud community has realized the benefit of low latency, 5G connectivity and have engaged with the CSPs to push computing to the edge. These 2 complementary capabilities will let the joint community create new/novel products and services that can be turned on/off based upon network conditions, user demands, and device capabilities (e.g., AR/VR).

Topic: The Great Resignation and 5G Labor Needs

ICT companies are facing an existential crisis with human capital that includes the “Great Resignation” but is actually amplified by the fundamental shift away from custom/bespoke applications and hardware to common, consistent software-configurable network assets and software as a service platforms. Companies are realizing the benefits of SaaS and software-centric network elements: total cost of ownership savings, work center efficiencies, end-consumer experience improvements, and business risk management. However, this comes at a cost of labor/technology stack “homogenization”. The labor elasticity of developers coding in common “modules” and “platforms” fundamentally is becoming a double-edged sword. It will be critical to establish robust and ongoing training, pipelines into the colleges/universities, and public policy initiatives that incentivize skills pivots to maintain

and grow the labor pipeline. Lastly, it will be critical for software platform providers to evolve low-code/no-code and AI/ML-driven software development to reduce the manpower involved in operating and developing on these capabilities.

Topic: The Elephant in the Room

Programs like the FCC’s Universal Service have played a critical role in helping millions of Americans get access to and make the communication tools they need more affordable. Policymakers must ensure that these programs, which include the Connect America Fund (CAF), Lifeline, Schools and Libraries (E-rate) and Rural Health Care, are continually updated to reflect the ever-changing marketplace and needs of consumers. As such, we should not consider the notion of “5G vs. satellite”, an either/or scenario. At the most basic level, we should look at radio technologies (terrestrial, LOE, or geostationary) as the access “on-ramp” that most expeditiously leads customers to their end-state connection point. That is ultimately achieved by either pushing services as close to that edge as possible, (e.g., edge compute technology) or pushing fiber as close to the edge of that radio connection to maximize fiber’s dense and fast physical properties.

BIOGRAPHY

Brooks Fitzsimmons manages the division responsible for the ServiceNow Platform strategy, standards, and Operations for AT&T. By shifting dozens of individual inventory systems into a consolidated configuration management database, the ServiceNow team will deliver one of the largest, horizontal “single sources of truth” for AT&T. This consolidation will enable lower TCO, improved operating efficiency, better end-customer cycle times, and improvements into the risk management (cyber and business continuity) posture of AT&T. Follow Brooks on LinkedIn: <https://www.linkedin.com/in/tbfitzsimmons>.

See You in Denver



ISE EXPO

ICT SOLUTIONS & EDUCATION

August 24 – August 25
Colorado Convention Center
Denver, Colorado, USA

2022

www.iseexpo.com



Kevin Tusing
Application Engineer
 Clearfield

“Operators will need to move quickly to hire or contract personnel and work with them to provide the training necessary to perform efficiently. But the days of lengthy training periods over a diverse collection of products and processes are gone. Focused training on specific materials and related processes needs to be developed.”

Topic: Network-as-a-Service

When considering NaaS, focus on the priority to better support remote work from home employees as a networking strategy. Fiber is the most effective way to provide customers with an efficient work from home network. The most time-consuming and expensive part of the network to build is from the OLT to the ONT. But Clearfield’s YOURx® platform is focused on driving down network turn up time and labor costs while easing the design for those looking to engineer and build the infrastructure. Rapid planning with focus on the future will need to be balanced with short term opportunities.

Topic: Fiber Frenzy

This is a dynamic challenge. There are shortages in materials and qualified labor—a problem exacerbated by the pandemic. Operators will need to move quickly to hire or contract personnel and work with them to provide the training necessary to perform efficiently. But the days of lengthy training periods over a diverse collection of products and processes are gone. Focused training on specific materials and related processes needs to be developed.

On the materials front, operators will need to develop closer partnerships with distributors and suppliers. Operators will need to make some compromises based on materials and products available. This will also affect some of the processes required to engineer and install these products. There are many qualified

suppliers out there and one of the biggest factors to consider is the lead time for products to be on site and ready for deployment. Customized solutions will not be an option in many cases. Engineering needs to be focused on applications for available products and not engineering new products to fit the application. These compromises and shortages will also drive the labor training requirements mentioned above. Detailed planning is especially important. Clearfield has been able to satisfy many operators’ needs by offering fiber network products and training. Clearfield product lead-times have kept up with demand better than most, and as such, we have gained new customers.

Topic: Smart Cities and Communications Service Providers/Telecom Provider

Clearfield has a history of working closely with providers and customers to fulfill their needs. Clearfield is already providing many innovative fiber optic connection products related to Smart City strategies. We intentionally listen to these customers to keep up with the fiber needs for both the public and private sector.

BIOGRAPHY

As a Clearfield application engineer, Kevin Tusing leverages his extensive experience in network design, OSP engineering, communication technology, fiber optic systems and field operations. Prior to joining Clearfield, he spent over 2 decades in the US Air Force and ANG as a Senior Non-Commissioned Officer leading teams in various telecommunication engineering and installations around the world. Kevin also spent 15 years at Cincinnati Bell telephone working as a cable splicer and then manager.

Enabling the Lifestyle that Better Broadband Provides



DOUBLING Your Rate of Fiber Homes Passed is a Matter of TIME

Surpassing your deployment milestones by doubling the rate of your PON cabinet deployments is possible. Clearfield® customers do it every day with modular, building block architectures using in-cassette splicing.

No Splice Case. No Vault. No Inventory Management.

Splicing inside the Clearview® Cassette will:

- Cut in half the time to place a cabinet
- Minimize your labor costs
- Reduce operational/maintenance costs

Accelerating deployments means accelerated subscriber revenues and improved service turn-up time. Clearfield can show you how.

Ask us today.



Removing Barriers to Fiber Deployment

Learn how to simplify your deployments at www.SeeClearfield.com or call 800-422-2537



Ryan Korte
Senior Director,
Edge Computing
Lumen

“Many of us were taught an important principal by our parents at an early age: turn the lights off when you leave the room. Our approach is no different in that all our compute equipment, when not in use by our customers, is fully powered down until requested. This adds time to the delivery for compute resources as the power-on checks need to occur before we can deliver to our customers.”

Topic: **Earth-Friendly Network**

As Lumen designed and implemented our Edge Compute infrastructure, which in some cases includes smaller facilities where power and cooling are often a luxury, we focused heavily on power consumption and equipment cooling.

Many of us were taught an important principal by our parents at an early age: turn the lights off when you leave the room. Our approach is no different in that all our compute equipment, when not in use by our customers, is fully powered down until requested. This adds time to the delivery for compute resources as the power-on checks need to occur before we can deliver to our customers. We know it is good practice and needs to occur.

Also, we are working with our hardware manufacturers to optimize and utilize all power saving options available with no impact on customer performance. Within our compute network, this can include reducing processors, reducing processor speeds, shutting down drives when not in use, and many other options. We continue to provide input to our vendor partners to improve and expand on these capabilities.

Topic: **Fiber Frenzy**

Not all fiber is created equal. The market for optical hardware and the capabilities for new hardware to drive higher speeds and more wavelengths on a single fiber will continue to advance. As we continue to build global fiber networks and entire systems, we need to think about 2 major areas.

First, the physical plant. There are some areas like rain forests, mountain regions, and subsea, where we need to determine how to maximize in place assets that may be less capable than newer systems. We need to continue to build new fiber where we can, but we can't strand these hard to replace assets until we've built new ones, and that will take some time.

Second, we need to continue to think about how we fully utilize these assets. In all cases, we need to automate the provisioning, but we should first use that automation to optimize fiber assets in constrained locations and eventually replicate that to less constrained areas to ensure we have a path to keep up with the growing market demand.

Topic: **Smart Cities and Communications Service Providers/ Telecom Providers**

Lumen has made and continues to make a big investment in our Edge Compute platform, which includes pushing this infrastructure within 5 milliseconds of our end customers. Smart cities will need to be local, and we believe the combination of compute and network in these cities is critical to building smart infrastructures that support real-time, low-latency data communication between all organizations and individuals in that local market.

BIOGRAPHY

Ryan Korte has more than 26 years of experience in developing and managing advanced fiber-optic network and systems architecture for both Fortune 500 enterprise companies and nationwide telecommunications carriers. In Ryan's current position, he and his team are responsible for the Lumen Cloud Connect product with connections to all major cloud service providers, 2,200+ public and private data centers, and over 160,000 fiber-enabled on-net buildings.



WELCOME TO EDGE COMPUTING FOR THE 4TH INDUSTRIAL REVOLUTION

Near-zero latency for next-gen apps.
Available to 95% of U.S. businesses this year.

LUMEN[®]

THE PLATFORM FOR AMAZING THINGS

lumen.com

Services not available everywhere. ©2022 Lumen Technologies. All Rights Reserved.

Adaptive Networking • Edge Cloud • Connected Security • Collaboration



Wade Soczka
 Director of Network
 Construction
 TDS Telecom

“Transforming communities does not come without disruption and coordination. Many local jurisdictions do not have staff to handle permitting, locating, and inspection tasks in support of builds thus slowing progress. While our goal is not to build entire smart networks, we often forge strategic partnerships with local communities, helping each other build networks in support of respective goals.”

Topic: Fiber Frenzy

One could argue that availability of fiber optic cable is of concern right now. The industry is seeing longer lead times with fiber and other critical materials such as aboveground pedestals, below-grade vaults, and splicing enclosures. To mitigate this risk, our company provides long-term material forecasting to supply chain partners to maintain a level of available stock for contractors to place incremental orders as needed. In addition, there is a nationwide shortage of resources to construct and splice fiber optic networks. Subcontractors tend to be nomadic and pivot to a master contractor willing to pay higher per unit pricing. Incumbent providers over lashing fiber on existing copper/coax networks and new entrants' attachments introduce risk of pole loads issues. If there is makeready required by the pole owner, it may increase costs and slow progress. To mitigate, a pole viability protocol is used during fielding to identify possible issues and pivot to underground to avoid delays.

Topic: Smart Cities and Communications Service Providers/ Telecom Providers

TDS Telecom's focus is overbuilding chosen communities with a robust and future-proof fiber optic network. Active nodes are strategically placed on transport rings for survivability along with dual/redundant feeds from the market to the outside network. Transforming communities does not come without disruption and coordination. Many local jurisdictions do not have staff to handle permitting, locating, and inspection tasks in support of builds thus slowing progress. While our goal is not to build entire smart networks, we often forge strategic partnerships

with local communities, helping each other build networks in support of respective goals.

Our fiber-based product offerings may be desirable to a community partner when attempting to connect locations on an internal network and/or high-capacity broadband services. In some cases, the opportunity presents itself to exchange fiber and/or conduit or work together on joint trench opportunities. Communities can then achieve needed fiber connectivity to substations, satellite building locations, well sites, etc. In exchange, it provides our company opportunity paths in existing community-owned facilities, mitigating the need for burdensome construction.

Topic: The Elephant in the Room

While not an area of expertise for our organization, we keep a finger on the pulse of 5G and satellite providers as legitimate competitive threats. Rural areas pose a challenge for 5G as a certain amount of physical infrastructure is required to support small cell sites. The cost of building such networks in a rural area with lower density may prove uneconomical in some cases. And, while satellite can mitigate that risk, there are still latency and disruption impacts to their level of service. A fiber optic cable between core network gear and the home is still the tried-and-true method of mitigating wireless and satellite throughput challenges.

BIOGRAPHY

Wade has been with TDS Telecom for nearly 30 years, beginning as a network technician. He currently oversees the successful deployment of fiber-to-the-home in out-of-territory markets. He provides leadership to internal outside plant construction, route acquisition, and colocation teams, as well as 4,000+ external contracted resources supporting builds in 40+ municipalities across 5 states. He earned a Bachelor of Business Management and an MBA from Herzing College and his associate degree from the Wisconsin School of Electronics.

Say Hello to Better



TDS® is a premier provider of fast, reliable Internet

In 1969, LeRoy T. Carlson began TDS with a vision: connecting a group of small, rural telephone companies and their customers to the world by investing in advanced technology and providing an exceptional customer experience.

Today, our business model has expanded to include high-speed Internet, fiber Internet, and advanced TV services, with more than 1.2 million connections nationwide. We're also constantly evolving our company culture to become a leader in diversity and inclusion.

Join us!

TDS is looking for fellow visionaries to join our dynamic team! See if TDS is the right fit for you at tdstelecom.com/visionaries



Internet | TV | Phone



Noah Drake
*Vice President,
 Customer Solutions
 and Architecture,
 Americas*
 Telstra

“Satellite services still rely on telcos for ground stations and transport, and operators regularly face barriers to market entry. These issues are often best addressed through mutually beneficial partnerships with telcos. Regardless of which technology is delivered to the end user, there will always be a need for collaboration. Embracing this reality rather than fighting it is the more logical path to long-term success.”

Topic:
The Elephant in the Room

The best approach is to view this “competition” as potential opportunities. More connectivity benefits everyone—especially as worldwide demand for connectivity is surging to the point where on some key routes, there’s a genuine capacity shortage. It’s critical that service providers such as Telstra continually invest in new types of infrastructure. Satellite operators are seizing opportunities to expand their global footprint; however, satellite services still rely on telcos for ground stations and transport, and operators regularly face barriers to market entry. These issues are often best addressed through mutually beneficial partnerships with telcos.

Topic: The Great Resignation and 5G Labor Needs

As a telecommunications company, we are constantly focused on investing in our networks to grow revenue. But it’s equally important to ensure we continually invest in our people, too. We can’t begin to talk about attracting and retaining top talent without first addressing workplace culture. Employees want to know they are doing work that makes a difference and truly has an impact on people’s lives. That opportunity not only creates an incredible sense of empowerment, but it’s also a powerful recruiting tool. Candidates now have more say in deciding where and how they want to work, so the onus is on organizations to reevaluate the type of workplace they want to offer.

It’s up to our entire team, starting with leadership, to commit to ongoing learning, training, and professional development. That’s how you keep your business relevant, dynamic, and thriving.

Topic:
Network-as-a-Service

We’re all used to online subscription models, whether it’s for a streaming service or food delivery. We enjoy the control and ability to manage them according to our needs. It’s getting to be the same with enterprise network infrastructure and bandwidth.

Thanks to new software-based technologies more suited to today’s adaptive networking needs, organizations are no longer limited to inflexible, costly, and time-consuming options involving monthly service provider contracts and large IT support teams. It’s now possible to meet users’ modern technology expectations and create network infrastructures enabling flexibility, efficiency, lower unit cost and scalability—all while being simple enough for users to manage themselves. They easily scale bandwidth up or down, or for certain time periods, on a customized network designed to integrate with open-source cloud environments and also built with the latest and most popular applications in mind.

But this all begins with a shift in mindset and an open attitude to change. The technology world is evolving, and we all need to either adapt or risk becoming irrelevant.

BIOGRAPHY

Noah leads the company’s Customer Solutions and Architecture group for the Americas region. He oversees a specialized team that works with customers to create value by bringing together the full capabilities of Telstra’s products and services. Based in Denver, Noah is also a member of the company’s Americas leadership team. He has more than a decade of experience in the international communications space, building best-in-class performing teams and aggressively scaling in high growth environments.



Think Asia, Think Telstra.

**Connecting the world to Asia,
and Asia to the world.**

Looking to expand into Asia? We're here to make your plans a reality. Whether you're looking for an extensive and reliable network for existing global operations or to support customers' growth into APAC, Telstra has been connecting businesses worldwide to major APAC economies for over 70 years.

Telstra owns and operates the largest subsea cable network in Asia Pacific, which carries up to one-third of the region's Internet traffic. Our deep technology expertise, world-class network and access to local support staff enable us to help companies reach new growth markets. That's why when you Think Asia, Think Telstra.

Explore your business potentials at
telstra.com/global





Mary Nolan
*Executive Director -
 Network Assurance*
 Verizon

“Our focus is on renewable energy, energy efficiency, green buildings, sustainable water management, and biodiversity and conservation designed to positively impact the environment and advance U.N. Sustainable Development Goals. As of September 2021, Verizon settled our third green bond of \$1 billion. In the span of 2 years, Verizon has become one of the leading corporate buyers of renewable energy in the US.”

Topic: The Great Resignation and 5G Labor Needs

Verizon is offering a new program called Verizon Skill Forward for both internal employees and individuals looking to gain knowledge that would help catapult their career in IT. It is a free virtual bootcamp that provides technical and soft skills training for high-demand technology careers.

In addition, Verizon has the distinguished honor of being a 2021 Military Friendly® top company for our commitment to recruiting, supporting, and developing military talent. With our competitive benefits, commitment to upskilling our workforce and our increasing use of automation, we are well positioned to attract and keep great talent.

We also launched the Moment to Movement initiative within our technology organization to reevaluate how we attract, recruit, develop and retain talent, specifically focusing on black and POC individuals as well as those from non-traditional backgrounds. Part of that program has included reevaluating the language and requirements of our job descriptions, focusing more on finding candidates with the applicable skills who might not otherwise apply.

Topic: Earth-Friendly Network

In February 2019, Verizon announced the close of the US telecommunications industry’s first Green Bond. This bond will be used to fund a variety of new and existing green initiatives supporting Verizon’s long-term commitment to minimize its environmental impact, drive operating efficiencies and benefit the communities it serves.

Our focus is on renewable energy, energy efficiency, green buildings,

sustainable water management, and biodiversity and conservation designed to positively impact the environment and advance U.N. Sustainable Development Goals. In addition to the focus on reducing our environmental footprint, we also made a commitment to plant 2 million trees by 2030.

As of September 2021, Verizon settled our third green bond of \$1 billion. In the span of 2 years, Verizon has become one of the leading corporate buyers of renewable energy in the US, entering into 14 virtual power purchase agreements for nearly 1.9 gigawatts of renewable energy capacity.

Topic: Smart Cities and Communications Service Providers/ Telecom Providers

Verizon has been building out fiber optics in cities around the United States to support the technology that will be used in the next generation of connected cities.

Our deployment of 5G Ultra Wide Band complemented by our C Band spectrum will enable cities to leverage more possibilities for enhanced services within their communities.

We are providing faster speeds, more capacity and reduced latency which will be critical as cities transform into high-tech smart cities.

BIOGRAPHY

The Network Assurance team is accountable for the reliability, performance, and security of Verizon’s Wireless network. Mary’s team of experts monitor and manage the various networks and applications that are the foundation for Verizon Wireless’s consumer and business services. More specifically, the team is responsible for managing the Verizon Wireless radio access, transport / IP networks and customer experience. Contact Mary at Mary.Nolan@VerizonWireless.com and follow her on LinkedIn: <https://www.linkedin.com/in/maryfiocco>.

verizon^v

5G^U_W

Whoa

**America's most reliable
5G network is going Ultra.**

Ultra-fast, ultra-powerful 5G Ultra Wideband is now
in more and more places.

5G Ultra Wideband available in select areas. Most reliable: based on more first place rankings in RootMetrics' 5G data reliability assessments of 125 metro markets: 2H 2021. Tested on 3 national mobile networks, excluding C-band. Experiences may vary. Not an endorsement of Verizon.

*Arelion

Formerly Telia Carrier, Arelion is a leading light in global connectivity services. We've been keeping the world connected since 1993 and today our global IP backbone, AS1299, is ranked number one in the world. Our network spans Europe, North America, and Asia with 70,000 km of optical fiber and 1,700 MPLS endpoints. Our award-winning customer service team supports our expansive customer base, who rely on us for their business-critical services. Follow us on LinkedIn: <https://www.linkedin.com/company/arelion> and Twitter: <https://twitter.com/ArelionCompany>. www.arelion.com



AT&T

AT&T Inc. (NYSE:T) is a diversified, global leader in telecommunications, media and entertainment, and technology. AT&T Communications provides more than 100 million US consumers with communications and entertainment experiences across mobile and broadband. Plus, it serves high-speed, highly secure connectivity and smart solutions to nearly 3 million business customers. Warner Media is a leading media and entertainment company that creates and distributes premium and popular content to global audiences through its consumer brands, including HBO, HBO Max, Warner Bros., TNT, TBS, truTV, CNN, DC Entertainment, New Line, Cartoon Network, Adult Swim and Turner Classic Movies. AT&T Latin America provides wireless services to consumers and businesses in Mexico. www.att.com



CLEARFIELD

Clearfield is Enabling the Lifestyle that Better Broadband Provides by removing the barriers to rapid fiber deployments.

When it comes to distribution, consolidation, management and protection of fiber, nothing comes close to Clearfield's streamlined, practical approach. With labor lite technologies and products designed for scalable deployment, craft-friendly operation and unsurpassed performance, Clearfield innovates to reduce your pre-engineering and skilled labor requirements while delivering the lowest total cost of ownership.

Whether you're delivering fiber-to-the-business, home, or cell site, Clearfield has the flexibility to deploy the product platform for your entire range of applications. www.SeeClearfield.com

LUMEN®

Lumen is guided by our belief that humanity is at its best when technology advances the way we live and work. With approximately 450,000 route fiber miles and serving customers in more than 60 countries, we deliver the fastest, most secure platform for applications and data to help businesses, government and communities deliver amazing experiences.

Learn more about Lumen's network, edge cloud, security, communication and collaboration solutions and our purpose to further human progress through technology at news.lumen.com, LinkedIn: [/lumentechco](https://www.linkedin.com/company/lumentechco), Twitter: [@lumentechco](https://twitter.com/lumentechco), Facebook: [/lumentechco](https://www.facebook.com/lumentechco), Instagram: [/lumentechco](https://www.instagram.com/lumentechco) and YouTube: [/lumentechco](https://www.youtube.com/lumentechco). Lumen and Lumen Technologies are registered trademarks of Lumen Technologies, LLC in the United States. Lumen Technologies, LLC is a wholly-owned affiliate of CenturyLink, Inc. www.lumen.com



TDS Telecommunications, LLC (TDS Telecom/TDS®) delivers high-speed Internet, TV entertainment, and phone services to more than 1,000 rural, suburban, and metropolitan communities across the US. With 1.2 million connections, TDS is a rapidly growing technology company. Powered by fiber optics and new industry-leading technologies, TDS delivers up to 2 Gigabit Internet speeds and offers Internet protocol-based TV entertainment solutions along with traditional phone services. TDS also offers businesses VoIP advanced communications solutions, dedicated Internet service, data networking, and hosted-managed services.

TDS Telecom, headquartered in Madison, Wisconsin, employs 3,000 people and is a subsidiary of Telephone and Data Systems, Inc. (NYSE: TDS), a Fortune 1000® company. Founded in 1969, Telephone and Data Systems provides wireless, broadband, video, and voice, as well as hosted and managed services to approximately 6 million connections nationwide through its businesses: UScellular, TDS Telecom, and OneNeck IT Solutions.

www.tdsinc.com and www.tdstelecom.com



Telstra is your partner to connect purposefully to new growth in Asia and beyond. Today, they have approximately 1,600 employees based in more than 20 countries outside of Australia, providing services to thousands of customers. They offer those customers the largest and most diverse intra-Asia subsea network system, established over several decades and which delivers approximately a third of Asian IP traffic. These services are underpinned by their extensive cable network, with licenses in Asia, Europe and the Americas and access to more than

2,000 Points of Presence (PoPs) in more than 200 countries and territories.

Telstra's heritage is proudly Australian with over 70 years' experience of helping international businesses connect. They operate in every major market and have an unparalleled network and presence in Australia and Asia Pacific. Follow Telstra on LinkedIn: <https://www.linkedin.com/showcase/telstra-enterprise> and Twitter: <https://twitter.com/TelstraEnt>.

www.telstra.com/americas



Verizon Communications, Inc. was formed on June 30, 2000, and is one of the world's leading providers of technology and communications services. Headquartered in New York City, and with a presence around the world, Verizon generated revenues of \$128.3 billion in 2020. The company offers data, video and voice services and solutions on its award-winning networks and platforms, delivering on customers' demand for mobility, reliable network connectivity, security, and control. www.verizon.com

QUALITY PRODUCTS. SIMPLIFIED INSTALLATION.

During the planning process, what are the most important qualities you look for in an Uninterruptible Power Supply (UPS) before deploying it to your network?

If you pose this question to any plant manager or field technician, both ease of installation and product quality generally tends to be near the top of their list. Why? They are busy.

It is imperative to finish the job quickly and move on to the next, without having to return for any follow-up repairs.

Cutting down the duration of time technicians spend on site and reducing the amount of future truck rolls is a measurable goal for any telco operation. **The implementation of quality, longer life UPS equipment that is both easy to install and improves network resiliency are all viable ways to achieve that goal.**

During the design and build phase, the network designers should consider the overall long-term costs once the system is deployed. When reviewing costs, it is tempting to eliminate UPS units from the network design or choose a cheap one.



Mega TITAN (above)
NEO Indoor UPS (right)

However, this will inevitably lead to increased truck rolls and time on site. Making the “cheap” solution turn into the “cost a fortune” solution in the long run.

In past years, a 30-minute disruption in service may have been acceptable. But in today's world, **making compromises on the equipment powering your network has the potential of affecting your customer's livelihood.** Thus, the utilization of reliable, easy to install back-up power equipment to the residence or business is equally important.

For solutions to your UPS needs and input during the design stage go to www.espicorp.com. You will find a number of solutions, alternatives and contact information for sales and production engineers.

ESPi
espicorp.com

Your Next Generation UPS

ESPi
espicorp.com

**ARE YOU
PREPARED?**

in

f



**Indoor & Outdoor
Solutions**



Solar Solutions



Power Supplies

PLAN FOR THE UNEXPECTED

Stay connected using backup power solutions from ESPi.

- *Fast, easy, low-priced installation*
- *Longer battery life*
- *Reduced truck rolls*

espicorp.com

[877-799-3774](tel:877-799-3774)

sales@espicorp.com

Green Power Partnership

TOP 30 TECH & TELECOM

The combined annual green power use of EPA's Top 30 Tech & Telecom Partners amounts to nearly 36 billion kilowatt-hours of green power, which is equivalent to the annual electricity use of more than 3.3 million average American homes.

193387392 © Korn Vittayakarn | Dreamstime.com

Partner Name	Annual Green Power Usage (kWh)	GP % of Total Electricity Use	Green Power Resources
1. Google LLC	7,914,747,101	93%	Solar, Wind
2. Microsoft Corporation	6,684,879,000	100%	Small-hydro, Solar, Wind
3. Intel Corporation	5,022,773,872	100%	Various
4. Equinix, Inc.	2,484,616,951	106%	Biomass, Geothermal, Small-hydro, Solar, Wind
5. AT&T	2,360,337,220	18%	Wind
6. Apple, Inc.	2,202,581,271	101%	Biogas, Biomass, Small-hydro, Solar, Wind
7. T-Mobile	1,757,017,000	25%	Solar, Wind
8. Samsung Electronics	1,339,124,850	100%	Biogas, Solar, Wind
9. Cisco Systems, Inc.	1,063,237,505	100%	Solar, Wind
10. Switch	810,841,737	100%	Solar
11. Digital Realty	709,761,327	11%	Solar, Wind
12. Iron Mountain Information Management, LLC	587,166,331	90%	Various
13. QTS Realty Trust	430,090,000	32%	Solar, Wind
14. Dell Technologies	404,054,000	61%	Solar, Wind

That's the powerful effect of the EPA's Green Power Partnership. The goal of the partnership is to increase demand for green power by working with organizations and communities across the US to access, choose, and use, green power. By using green power, EPA Partners can help reduce the effects of air pollution and emissions associated with conventional electricity use while supporting the domestic development of clean energy resources.

There Are 2 Types of Partners: Organizations, and Communities

Telecom/ICT service providers fall into the category of Organizations, of course. The top 30 of those

participating companies in the Tech and Telecom category are recognized each quarter and are listed below:¹

EPA invites your organization to join the hundreds of other organizations that are improving their environmental performance and reducing the risks associated with climate change by switching to green power. ■

RESOURCES AND NOTES

1. As of October 25, 2021

These rankings are updated on a quarterly schedule. The data in this article is based on the most recent list available at publish date of the April 2022 issue of ISE Magazine. October 25, 2021.

Current and past Top Partners lists are available at this link: <https://www.epa.gov/greenpower/green-power-partnership-top-30-tech-telecom-pdfs>

For additional information on how your organization can join these Top Partners as Green Power Partners, learn how to become a Green Power Partner at this link: <https://www.epa.gov/greenpower/join-green-power-partnership>.



The goal of the partnership is to increase demand for green power by working with organizations and communities across the US to access, choose, and use, green power.



Partner Name	Annual Green Power Usage (kWh)	GP % of Total Electricity Use	Green Power Resources
15. salesforce.com	397,799,050	60%	Solar, Wind
16. eBay, Inc.	275,608,040	82%	Solar, Wind
17. HP, Inc.	182,033,624	100%	Various
18. IBM	174,191,810	12%	Solar, Wind
19. SAP America	150,000,000	100%	Wind
20. Applied Materials, Inc.	113,897,687	41%	Biogas, Biomass, Geothermal, Small-hydro, Solar, Wind
21. Workday	97,430,730	100%	Solar, Wind
22. Zayo Group, LLC	96,145,743	28%	Wind
23. VMware, Inc.	66,815,973	59%	Solar, Wind
24. Adobe, Inc.	56,716,715	53%	Various
25. Sony Corporation of America	45,931,548	59%	Various
26. Lenovo	26,600,000	100%	Solar, Wind
27. AMD	24,178,000	37%	Wind
28. 1&1 IONOS, Inc.	19,600,000	152%	Various
29. Advantest America, Inc.	17,734,040	117%	Solar, Wind
30. LG Electronics USA, Inc.	17,469,702	73%	Solar, Wind



182673964 © Edgars Sermulis | Dreamstime.com

Telco/ICT Sector Can Change the Sustainability Game

By Roman Friedrich

The ICT sector is now responsible for 3% to 4% of global CO₂ emissions, about twice the level of the much more heavily scrutinized aviation sector. Given that global data use was estimated to grow 60% in 2021 alone, the industry could be responsible for up to 14% of global CO₂ emissions by 2040. That is unless significant steps are taken to lower the environmental impact of telco and communication technology companies.

Within the ICT sector, telcos are responsible for 1.6% of total global CO₂ emissions. Up to 90% of emissions from telco companies come from upstream and downstream activities, such as the energy consumption of their suppliers.

In the past, telco CEOs have been reluctant to make sustainability a top strategic priority, seeing it as a cost topic best left to internal sustainability departments. But in fact, sustainability is a strategic

topic with substantial potential returns in terms of savings and new product offerings that CEOs need to own. To gain insight into these issues, BCG launched its Telco Sustainability Index, which zeroes in on how to measure sustainability and what steps are necessary to implement a sustainability approach for the entire business. (See Figure 1.)

As a specific segment within the ICT industry, telco operators have a sizeable impact on both CO2 emissions and waste. To assess the CO2 impact, companies need to consider all 3 scopes of emissions.

- **Scope 1 emissions:** Telcos generate few of these as they don't directly burn fossil fuels.
- **Scope 2 emissions** result from purchasing energy and heat. This infers what is in scope 2 for a telco is in scope 1 for the energy supplier as a vendor of the telco.
- **Scope 3 emissions** are caused by downstream and upstream activities, such as the energy consumption of suppliers. This is by far the biggest impact area, typically making up more than two-thirds of a telco's total carbon emissions, and sometimes more than 90%. In the past few years, most telcos have begun to acknowledge that they should assume responsibility for their scope 3 emissions, for example by demanding transparency into their suppliers' footprints, engaging with them to improve, and factoring this into the selection process.

In addition to lowering their own end-to-end emissions, telcos have a historic opportunity to help

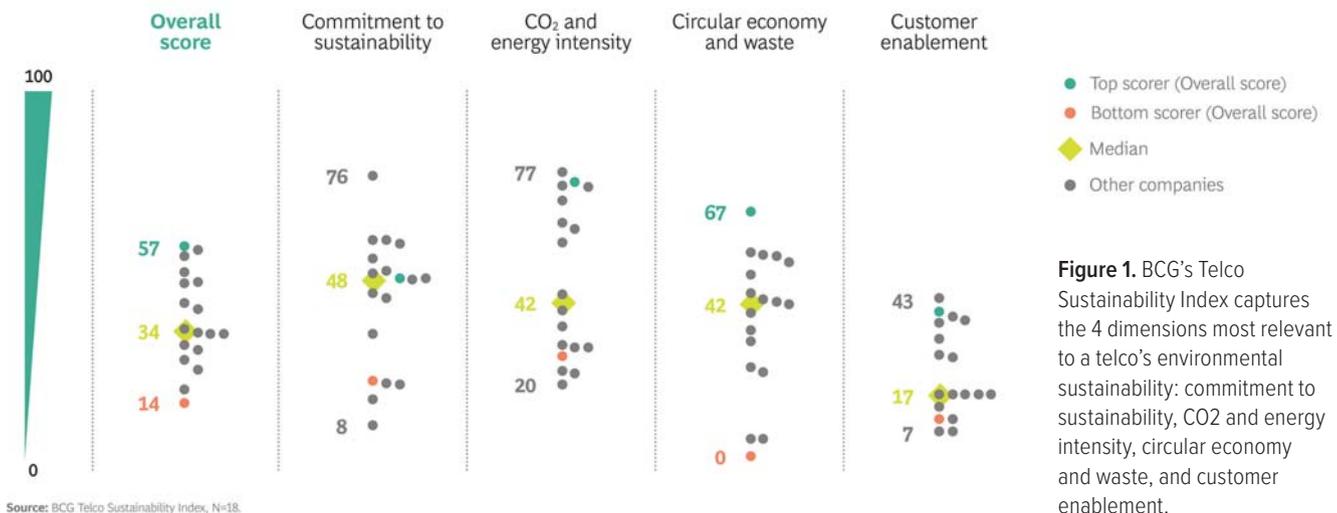
“ Skyrocketing global data usage is drawing attention to the ICT industry's CO2 emissions which are currently twice those of the aviation industry. ”

other industries become more energy efficient. Smart products and solutions from telcos (e.g., smart agriculture and smart logistics) are already available that can help other industries reduce their carbon emissions by an amount up to 10 times the telco industry's own emissions. This *customer enablement* is becoming a key measure of a telco's environmental performance and a major avenue for boosting its B2B business.

Besides energy efficiency, telcos could help companies save energy by replacing high carbon physical products and activities with virtual low carbon equivalents (a.k.a. *dematerialization*).

Also, telcos with IT activities could play a big role in helping companies use so-called digital twins to simulate the performance of physical assets, processes, people, places, systems, and devices. For example, a company could create a digital simulation of an aircraft engine and feed in data so that the simulation behaves like the real thing. This way a company can learn how the engine performs in various circumstances, and also discover opportunities for reducing emission intensity.

Environmental Sustainability Not Yet Sufficiently Operationalized—Even Leaders >40% Off Target



Climate Leaders Gain Competitive Advantage

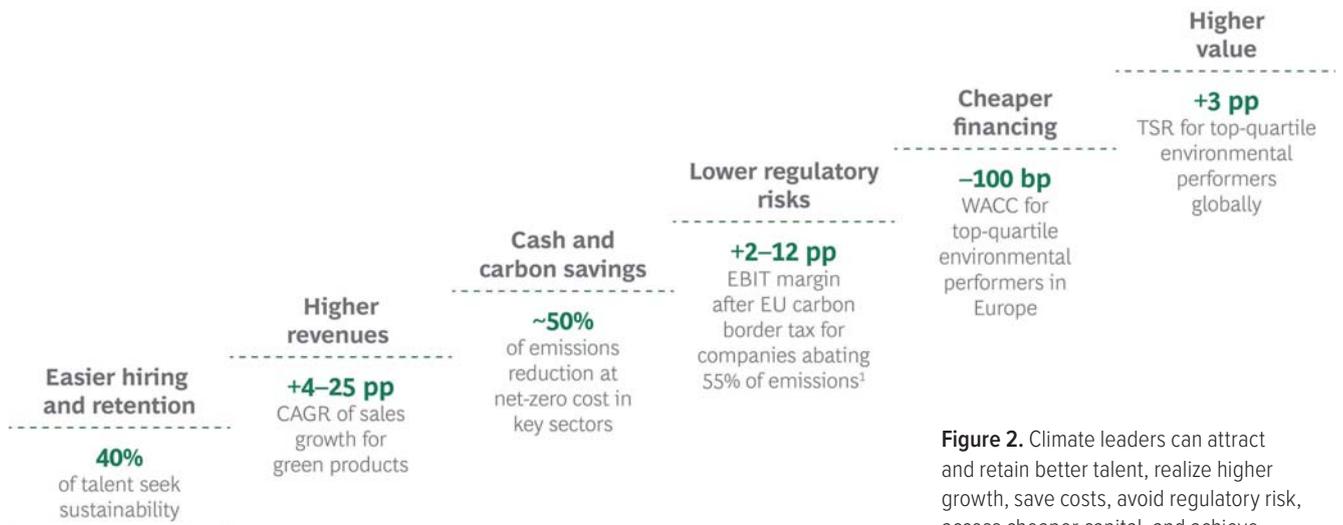


Figure 2. Climate leaders can attract and retain better talent, realize higher growth, save costs, avoid regulatory risk, access cheaper capital, and achieve higher shareholder returns.

Sources: EU announcements; BCG analysis.
Note: bp = basis points; pp = percentage points; WACC = weighted average cost of capital.
¹Based on a €75/tCO₂ carbon price assumption for 2030.

“ Finally, scope 3 emissions are caused by downstream and upstream activities, such as the energy consumption of suppliers. This is by far the biggest impact area, typically making up more than two-thirds of a telco’s total carbon emissions, and sometimes more than 90%. ”

The Green Bottom Line

For companies willing to think broadly about how to advance their sustainability initiatives, technology can act as a major accelerant. We call this mindset *technology eco-advantage*—using advanced technologies and ways of working to enable profitable solutions that also have a positive impact on net zero and other environmental, social, and governance goals.

Climate leaders can attract and retain better talent, realize higher growth, save costs, avoid regulatory risk, access cheaper capital, and achieve higher shareholder returns. (See Figure 2.)

Up to this point in time, the telco sector hasn’t been subjected to the same level of scrutiny and criticism as other high-emitting sectors of the economy. We believe that situation will quickly change. Those telcos that anticipate this shift and put in place meaningful and actionable strategies will reduce their environmental impacts, save costs, and win customers.

Thankfully, the ICT/Telco industry is increasingly serious about reducing its direct and indirect carbon footprint, the BCG report notes. Most major telcos have signed up to reduce the energy needed per unit of traffic by about 70% by the end of this decade.

BCG estimates that action by the ICT industry could eliminate up to 15% of all global emissions by 2030, more than a third of the total emissions reductions needed to meet global sustainability targets. In total, 12.1 gigatons of CO₂ could be saved, which equates to \$6.5 trillion. ■

RESOURCES AND NOTES

<https://www.bcg.com/industries/energy/oil-gas/upstream-oil-gas>

<https://www.bcg.com/about/net-zero>

<https://www.bcg.com/capabilities/social-impact-sustainability/how-sustainable-finance-is-shifting-future-of-investing>

This information can be found in BHG’s Telco Sustainability Index, designed to capture the 4 dimensions most relevant to a telco’s environmental strategy. The index tracks the company’s commitment to sustainability, its emissions intensity and that of its upstream and downstream partners, its elimination of waste, and its customer enablement. <https://www.slideshare.net/TheBostonConsultingGroup/bcg-telco-sustainability-index/secret/5hQOpMZnMJP5ha>.

This article was adapted from the BCG reports “Putting Sustainability at the Top of the Telco Agenda” (<https://www.bcg.com/publications/2021/building-sustainable-telecommunications-companies>) and <https://www.bcg.com/en-us/about/partner-ecosystem/world-economic-forum/ceo-guide-net-zero>.

ABOUT THE AUTHOR

Roman Friedrich is a BCG managing director and partner. He has more than 27 years of experience in the telecommunications sector, and is an expert in sustainability for telco operators. For more information, please email gregoire.eric@bcg.com or visit www.bcg.com. Roman’s LinkedIn Handle: /in/romanfriedrich1. You can also follow us on Twitter @BCG.

LET'S PARTNER FOR A **SUSTAINABLE FUTURE**

SUSTIANABILITY ISN'T A ONE-DAY EVENT.
IT'S A COMMITMENT TO RESPECT THE EARTH TODAY AND ITS PEOPLE TOMORROW.

7

YEARS ZERO
WASTE TO
LANDFILL IN OUR
HOISINGTON, KS
FACILITY

22.5

MILLION POUNDS
OF WASTE
DIVERTED FROM
LANDFILLS

3

NEW RED LIST
FREE CABLE
PRODUCTS
ADDED

50+

SUSTAINABLE
PRODUCT
FAMILIES
MANUFACTURED

THIS EARTH DAY, WE ENCOURAGE
EVERYONE IN THE ICT INDUSTRY
TO TAKE A STEP TOWARD A
SUSTAINABLE FUTURE.

OUR CABLES CAN HELP
YOUR NEXT BUILDING
PROJECT DO THAT.





Turbo-Charges SUSTAINABILITY DEVELOPMENT

New Tool for
Telecom/ICT
Sustainability
Goals and More

A new community platform powered by artificial intelligence (AI), launched in February by the International Telecommunication Union (ITU), aims to step up global collaboration on the use of AI to drive sustainable development.

The AI for Good Neural Network is designed to accelerate exchanges among government and industry, as well as to foster partnerships to achieve the Sustainable Development Goals (SDGs) set by the United Nations for 2030.

108523558 © Leowolfert | Dreamstime.com



AI and ML are gaining ground in ITU's standardization work, with research, analysis and stakeholder discussions focusing on network orchestration and management, multimedia coding, service quality assessment, and various aspects of telecom management, operation and services, as well as cable networks, all supporting accelerated digital transformation in key industry verticals.

— ITU's Secretary-General, Houlin Zhao

The new networking tool features AI-enabled smart-matching to help users build connections with innovators and experts, to link innovative ideas with social impact opportunities, and to bring the community together to discuss AI applications for social good.

AI for Good, organized by ITU in partnership with 40 organizations across the UN system and co-convened with Switzerland, provides the leading action-oriented, global, inclusive platform promoting AI to advance health, climate, gender, inclusive prosperity, sustainable infrastructure, and other global development priorities.

"This new cutting-edge tool brings AI for Good to the service of the United Nations and our global community in ways that were not possible just a few years ago," said ITU's Secretary-General, Houlin Zhao. "With the ongoing pandemic shifting our work and learning environments largely online, the Neural Network now leverages the power of AI to stimulate meaningful action, bring more partners aboard, and ramp up AI in pursuit of sustainable development."

Expanding on ITU's AI for Good program, the Neural Network offers content and collaboration opportunities aligned to each of the United Nation's 17 SDGs, to help transform our world. (See Figure 1.)

"Artificial intelligence (AI) and machine learning (ML) offer some highly practical applications across multiple industries and sectors—applications with considerable potential to serve as a force for good," explained Chaesub Lee, Director of ITU's standardization bureau. "AI and

ML are gaining ground in ITU's standardization work, with research, analysis and stakeholder discussions focusing on network orchestration and management, multimedia coding, service quality assessment, and various aspects of telecom management, operation and services, as well as cable networks, all supporting accelerated digital transformation in key industry verticals."

A few examples below show how action-oriented initiatives and programs are creating the building blocks needed to bring about real change:

- Several ITU pre-standardization initiatives have turned to AI to find solutions and help set standards for better health care, autonomous and assisted driving, environmental efficiency, natural disaster management, ML in 5G networks and most recently, digital agriculture.
- The United Nations Activities on Artificial Intelligence Report released in December 2021 highlights over 200 AI projects and initiatives from 40 UN organizations applying AI technologies for social good—largely reflecting the scope of ITU's AI for Good.
- At the AI for Good Innovation Factory, start-ups pitch AI innovations addressing key socio-economic challenges. In the AI/ML in 5G Challenge, students and experts compete to solve real-world ML puzzles in 5G networks.

These action-oriented initiatives and programs are effectively creating the building blocks needed to deploy AI for Good at scale.

Figure 1.



Several ITU pre-standardization initiatives have turned to AI to find solutions and help set standards for better health care, autonomous and assisted driving, environmental efficiency, natural disaster management, ML in 5G networks and most recently, digital agriculture.

<https://aiforgood.itu.int/about/innovation-factory/>
<https://aiforgood.itu.int/about/aiml-in-5g-challenge/>
<https://www.itu.int/en/ITU-T/extcoop/ai-data-commons/Pages/default.aspx>



The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies (ICTs), driving innovation in ICTs together with 193 Member States and a membership of over 900 companies, universities, and international and regional organizations. ITU is the intergovernmental body responsible for coordinating the shared global use of the radio spectrum, promoting international cooperation in assigning satellite orbits, improving communication infrastructure in the developing world, and establishing the worldwide standards that foster seamless interconnection of a vast range of communications systems. <https://www.itu.int/hub/2022/02/artificial-intelligence-ai-for-good-neural-network/>

For more information, visit www.itu.int and <https://aiforgood.itu.int/neural-network/>. You can also follow us on Twitter: <https://twitter.com/ITU>, LinkedIn: <https://www.linkedin.com/company/international-telecommunication-union/>, and Instagram: <https://instagram.com/ituofficial>.

Through the Neural Network, community members can connect to each other, receive personalized content, and pursue engagement aligned to their profiles, goals, and needs. Since no 2 human interactions are the same, the inclusive platform reflects both community and individual needs.

The smart matching mechanism—designed according to the principles of the Global Initiative in AI and Data Commons—will connect AI innovators to anyone with an AI-related problem, as a step towards globally scaled AI

solutions. For example, it can generate matches for open data and AI algorithms, cloud storage and computing power, problem statements and expertise, funding and mentorships, domain transfer, SDG alignment, and more.

The AI for Good Neural Network is open to all with an interest in how AI can positively impact the future of humankind. ■

RESOURCES AND NOTES

<https://aiforgood.itu.int/neural-network/>
<https://aiforgood.itu.int/about/ai-ml-pre-standardization/>
<https://aiforgood.itu.int/about/un-ai-actions/>



It's More

COMPLICATED

Than You Think

How TMT Industries Can Tackle ESG

By Duncan Stewart and Ariane Bucaille

When it comes

to Environmental, Social, and Governance (ESG), environmental risk typically gets most of the attention. But the social risks of Technology, Media and Telecom

(TMT) companies could matter even more to investors in the long run.

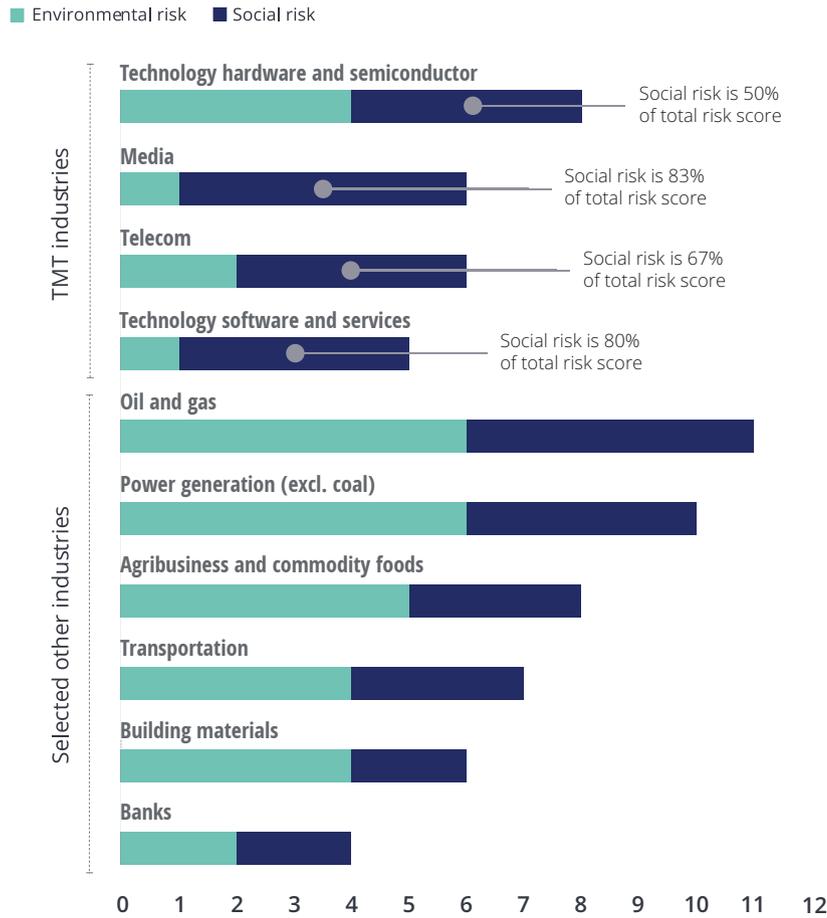
Companies are working hard on ESG issues because it's the right thing to do. Their efforts in

this area can act as core growth drivers. They're also increasingly important to investors.

Funds invested according to ESG guidelines have doubled in 2021, growing 3 times faster

Environmental and social risk scores for TMT and selected industries, 2019

Exposure to environmental and social risk by industry, scored from 1-6 by S&P



Note: Have adapted the source Risk Atlas, which had 33 industry categories

Source: S&P Global ESG Risk Atlas, May 13, 2019.

Deloitte Insights | deloitte.com/insights

Figure 1. Environmental and social risk scores for TMT and selected industries.

than non-ESG assets. They are predicted to grow to US\$53 trillion by 2025, or almost 40% of all investments globally.

But investors are focusing more on environmental considerations than social. According to a 2020 survey of CFA Institute members, more were taking environmental risk into account for investment analysis or decisions than social, and that percentage was rising faster compared to a similar survey in 2017.

There are many groups

that provide ESG risk scores for investors. Figure 1 shares one from the S&P that illustrates which industries have significant exposure to environmental and social risks according to a 2019 S&P Global ESG Risk Atlas report. (While the data is from 2019, industry-level risks have not altered materially since then.)

S&P Global’s environmental risks include greenhouse gas emissions; sensitivity to extreme weather events; sensitivity to

water scarcity; waste, pollution, and toxicity; and land use and biodiversity.

Thankfully, many TMT companies have recently improved their environmental risks in the following ways:

- Hyperscale cloud companies are focusing on decarbonization.
- Chip companies are designing semiconductor fabs that are more energy efficient and use less water.
- Tech devices at the end of their lives are increasingly being recycled.
- Media companies are reducing the carbon footprint of video streaming.

Funds invested according to ESG guidelines have doubled in 2021, growing

3 times faster

than non-ESG assets. They are predicted to grow to US\$53 trillion by 2025, or almost 40% of all investments globally.

The industries’ efforts around reducing environmental risks are paying off. A 2021 academic study on the sector by Jonathan Koomey and Eric Masanet showed that tech and telecom companies are much more efficient in their power use than is generally believed.

Indeed, TMT companies have more to do. But given the relative size of social scores, TMT companies should think about how to do even better on social risks that include: human capital management, changing consumer or user preference, demographic changes, safety management, and social cohesion.

According to S&P Global, social factors present a host of risks for TMT industry subsectors.

- **Tech Software and Service:** Social risks include privacy and data security concerns, but also risk of increased regulation, and lack of gender equality and diversity in the workforce.
- **Hardware and Semiconductors:** Social risks are led by concerns over labor practices, but the industry's supply chain is another source of risk, as it relies on resources mined in geopolitically unstable areas, and the concentration of manufacturing in East Asia exposes it to risk from geopolitical concerns and trade disputes.
- **Media:** Social risks are data privacy and security, regulation, social media activism, IP theft, and key person risk (media companies often rely on a single star actor, singer, or director).
- **Telecoms:** Social risks tend to come from demographic trends, but also include fears of overuse, misinformation, data security and network reliability, as well as issues around labor forces.

3 Suggestions

What does all this mean for telecom providers? Below are 3

“ But investors are focusing more on environmental considerations than social. According to a 2020 survey of CFA Institute members, more were taking environmental risk into account for investment analysis or decisions than social... ”

—Duncan Stewart and Ariane Bucaille, Deloitte

suggestions for leaders across the industry:

1. Take it piecemeal and start now:

Some social risk scores are relatively harder for an industry to improve on, but others are easier. Every improvement helps reduce risk: For example, telecom companies could invest more on data security and privacy, which would benefit customers and lower their social risk score at the same time.

2. Diversity will move the needle:

More diverse workforces and/or having more diverse content can be some of the fastest and most controllable levers TMT can use to reduce risk scores.

3. Winning the war for talent:

Every industry is struggling to attract and retain the right talent. Reducing social (and environmental) risks make industries and companies more attractive to employees, especially those critical younger employees, for whom ESG issues matter more than other demographics.

The best guidance for companies is to continue striving to improve both areas at the same time. Although social risk scores for the industry are as large or larger than environmental risk scores, companies don't

need to choose one or the other. Investors, stakeholders, shareholders, regulators, and journalists, all pay attention—perhaps even more attention—to environmental issues and risks.

Remember, improving social risk scores cannot come at the cost of a reduced focus on the environment. ■

ABOUT THE AUTHORS



Duncan Stewart is Director of Research for the Technology, Media, and Telecommunications (TMT) industry for Deloitte Canada. He presents regularly at conferences and to companies on marketing, technology, consumer trends, and the longer-term TMT outlook. For more information, visit www.deloitte.com, and follow Duncan on Twitter @dunstewart.



Ariane Bucaille is the Global Technology, Media, and Telecommunications (TMT) industry leader. In addition, she is a partner in Deloitte France, where she leads the TMT practice. She has 20+ years of experience and is a chartered and certified public accountant. For more information, please email abucaille@deloitte.fr, or visit www.deloitte.com, and follow Ariane on LinkedIn: <https://www.linkedin.com/in/ariane-bucaille-8016a73>.

Think You Have Network Challenges?

Ignore the **HUMAN NETWORK** and you'll have more on your plate than you can handle. That's why ISE devotes a special section of www.isemag.com to articles that motivate, inspire, and help you prioritize what truly matters during network evolution: **YOUR TEAMS!**

Read, share, and take to heart, what these experts in motivation say in the **HUMAN NETWORK** section on www.isemag.com/category/human-network.

Long-Distance Leadership: Managing a Remote or Hybrid Workforce the Right Way

By Kate Zabriskie

With a few smart moves, anyone can learn to manage a remote workforce effectively.

Revolutionizing Assistive Technology for the Elderly and Disabled

PLUS: Solution Offers Individuals With Dementia the Ability to Stay Connected With Family During the Pandemic

By AARP and RAZ Mobility

A recent survey from AARP found that older adults increased technology purchases during the COVID-19 pandemic, but more than half said they needed a better grasp of the devices they purchased. 37% admitted they weren't confident about even using the technology. A RAZ Mobility survey results illustrate

challenges individuals with memory loss encounter when trying to use their phone for communication.



91480514 © Kiosea39 | Dreamstime.com

Think Wireless Technology is Safe? Read the Fine-Print Warnings

By the Environmental Health Trust
The EHT advises consumers to pay attention to the fine-print warnings on wireless devices and toys which say that devices should not be touching the body. Wireless devices expose people to a type of radiation called radiofrequency, or RF.



The Know How Network
By Michelle LaBrosse

Be a Tight Ship

Qualified professionals who can deliver consistent results, run a tight ship with a "just enough" proven project management approach.



The Un-Comfort Zone
by Robert Wilson

Here's the Real Difference Between Amateurs and Professionals

These tips will help you with your fear of success.

Be an Industry Disruptor

5 Keys to Making Positive Change
By Shelley Armato

Industry leaders are the ones who transform the world—who disrupt their industry and launch massive and positive change. Learn how to shift your mindset so you can be the disruptor others react to.

ADVERTISER INDEX

DISPLAY	PG	URL	DISPLAY	PG	URL
Arelion	13	arelion.com	Millennium	3	mymillennium.us
Clearfield	17, 44	SeeClearfield.com	SENKO	43	senko.com
EasyStreet Systems	9	easystreetsystems.com	Superior Essex	35	superioressex.com
ESPI	28, 29	espicorp.com	TDS Telecom	21	tdstelecom.com/visionaries
ISE EXPO 2022	15	iseexpo.com	Telstra	23	telstra.com/global
KGPCo	2	kgpco.com	Verizon	25	verizon.com
Lumen	19	lumen.com			

Simplifying network cabling

SN[®] EZ-FLIP CONNECTOR

A new duplex connector, optimized for 400G with allows the polarity to be switched without connector re-termination

40% HIGHER DENSITY compared to LC Connector

UP TO 2.0 mm ruggedized cable

PUSH-PULL on boot design

SWITCH POLARITY

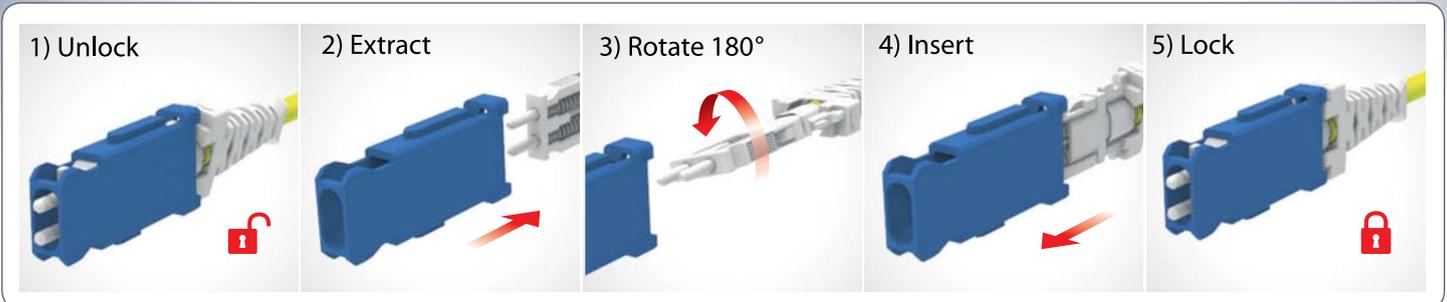
APC OPTION AVAILABLE

PREASSEMBLED KIT

2x LC STYLE FERRULE for increased reliability

Watch the video scan the QR code

Push-pull design allows for easy insertion or extraction of connector from transceiver or adapter. When holding boot you can push or pull to insert or extract. Boot is flexible to allow for adjacent connectors to flex out of the way allowing you to extract intended connector.



Enabling the Lifestyle that Better Broadband Provides

DOUBLING Your Rate of Fiber Homes Passed is a Matter of TIME

Surpassing your deployment milestones by doubling the rate of your PON cabinet deployments is possible. Clearfield® customers do it every day with modular, building block architectures using in-cassette splicing.

No Splice Case. No Vault. No Inventory Management.

Splicing inside the Clearview® Cassette will:

- Cut in half the time to place a cabinet
- Minimize your labor costs
- Reduce operational/maintenance costs

Accelerating deployments means accelerated subscriber revenues and improved service turn-up time. Clearfield can show you how.

Ask us today.



Removing Barriers to Fiber Deployment

Learn how to simplify your deployments at www.SeeClearfield.com or call 800-422-2537