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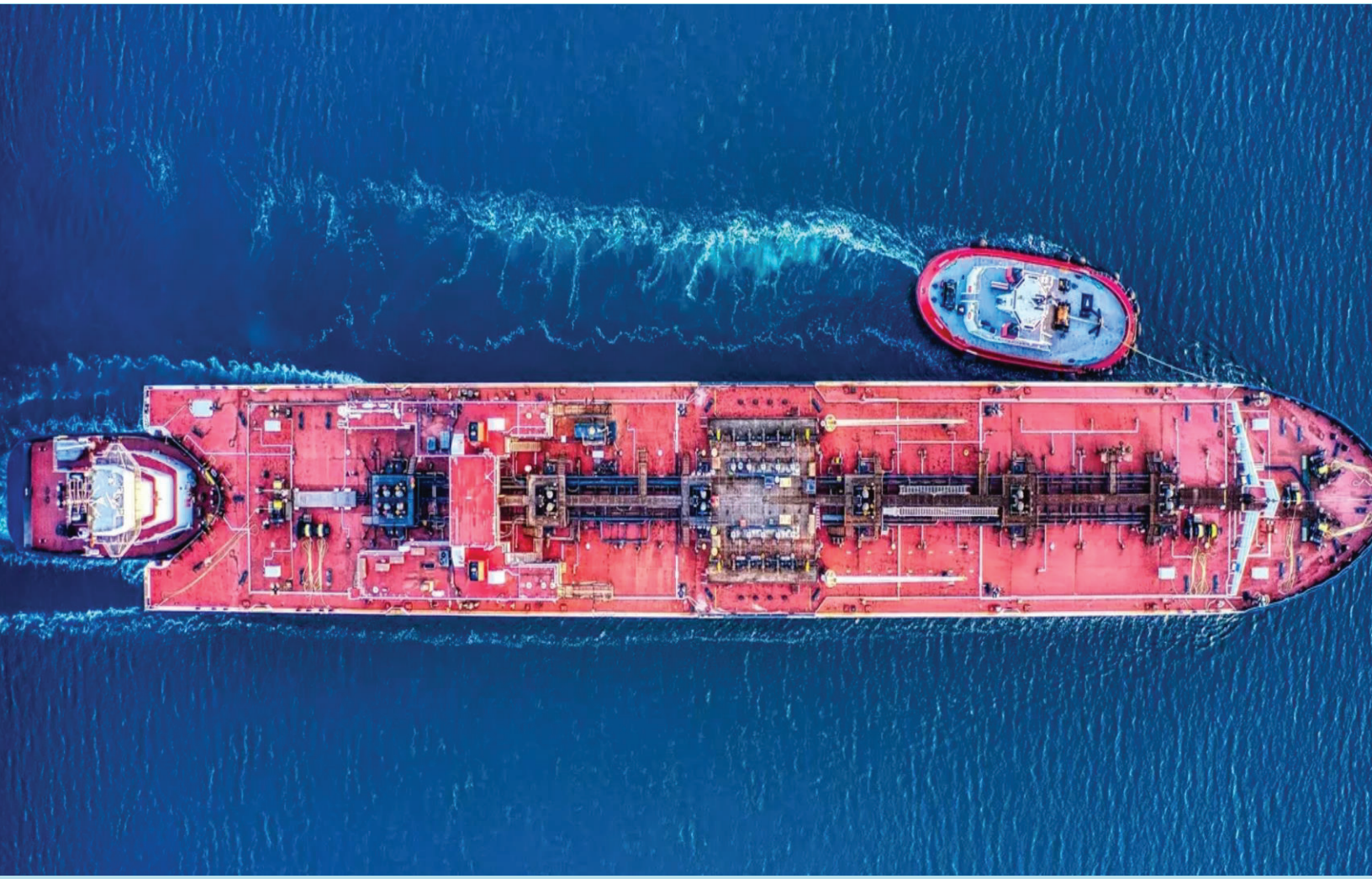
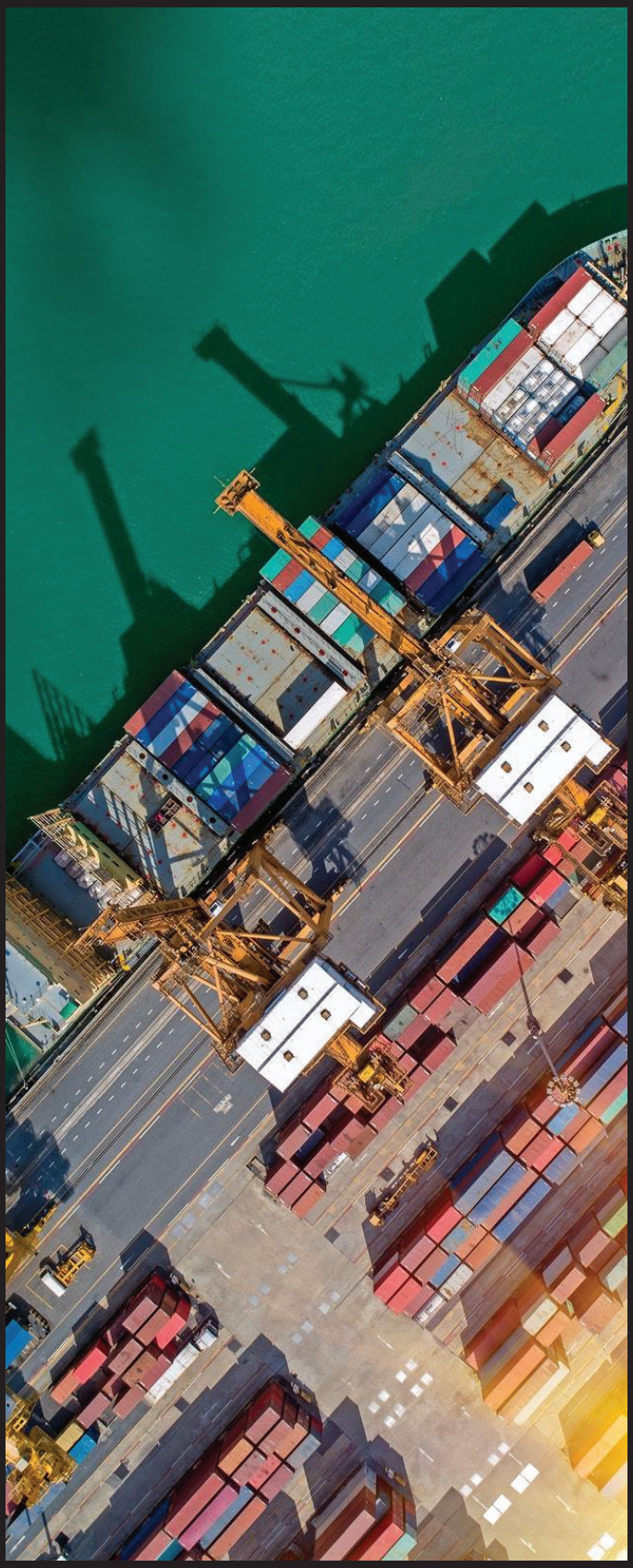


Power Connection

Rethinking Global Supply Chains for the Energy Transition



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A GUIDE TO IMEA SERVICES

Power Connection Quarterly Safety Tip

Working safely may get old , but so do those who practice it.

POWER CONNECTION

Indiana Municipal Electric Association ISSUE 2 2022

Rethinking the Global Supply Chains for the Energy Transitions

Alarm bells are ringing about the future of the energy transition. These bells are getting loudest just as the world contemplates shifting away from oil—the commodity for which dependence on foreign resources and vulnerable supply routes defined energy insecurity for more than a century.

Many of the same problems that affected global oil markets are already affecting the markets for critical energy transition materials such as lithium, cobalt, copper, and rare materials used to manufacture solar panels, batteries and other clean energy technologies. As with oil, the whole world depends on these materials, but geologically they are concentrated in just a few places.
While logic points to the need for bigger and more diverse suppliers, since the middle of 20th-century governments have often sought security by onshoring and tinkering with supply chains, or restricting import quantities. Neither approach has worked, and fragmenting markets in this way often undermines security.

Building a global market

The real solution comes from treating global commodities as a global market. Transparency of data, stockpiles in case of emergency, and coordination across major users (and, to some degree, suppliers) have made the oil markets a lot more robust. Similarly, it was globalization that helped drive down the cost of solar power technology.

And where globalization has faltered, costs have risen and progress towards the energy transition has slowed.

The same can and should be done for the materials that are critical to the energy transition. For resources that are truly essential and inconveniently allocated around the globe — lithium is the leading example — we need the equivalent of joint market oversight and management.

(Continued, Page 3)

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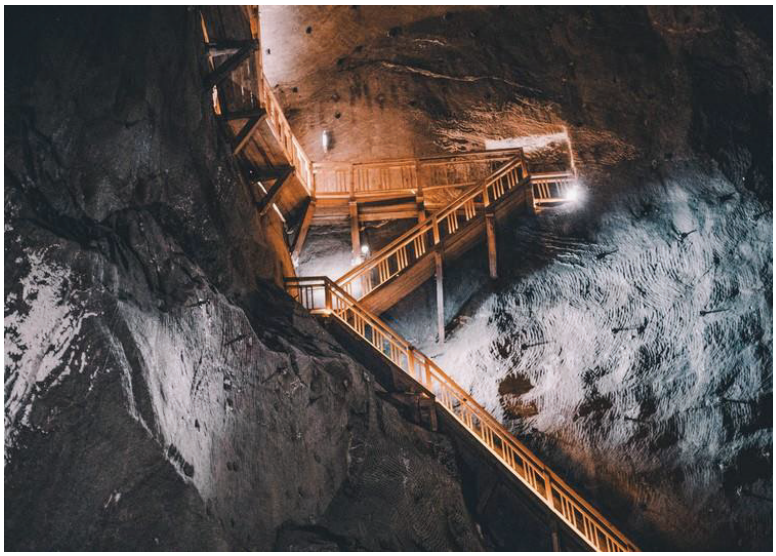

Growing attention is being paid to the role of government policy in creating new markets and technologies. That same logic can apply to policy innovation that can help create new supplies for materials that are critical to the energy revolution such as polysilicon, for which supply is currently tight.

Another lesson from oil is that the biggest dangers of dependence on overseas suppliers hinge on the methods of production. If suppliers harm the environment or human rights, they harm everyone and undermine social justice for the sake of the energy transition. An especially pernicious problem is that vast revenues earned from mining can be channeled to nefarious purposes, including corruption.

> "For resources that are truly essential and inconveniently allocated around the globe — lithium is the leading example — we need the equivalent of joint market oversight and management."
>
> *—Joisa Saraiva, Fundação Getulio Vargas & David Victor, UCSD*

Setting standards for markets

The solutions to these problems depend on the development of clear long-term standards by importers — the actors that are most motivated to develop remedies and that are in the strongest position to demand change. This means implementing extraterritorial pollution standards (e.g. carbon regulation and border adjustments) and red lines for intolerable activities such as human rights abuses.

When those standards are clear, markets can perform better. For example, western abhorrence to cobalt mining practices has put pressure on innovators to find ways to make clean energy batteries without cobalt.

Here, too, oil offers a lesson: data reporting systems such as the Extractive Industries Transparency Initiative (EITI) are having measurable impacts on how money from mineral supplies gets spent. EITI is not perfect, but marrying that programme with globalized commodity markets, rather than fragmented onshored systems, gives buyers more leverage. Other programmes are working with the same goal: more just, less corrupt markets built on greater transparency and oversight.

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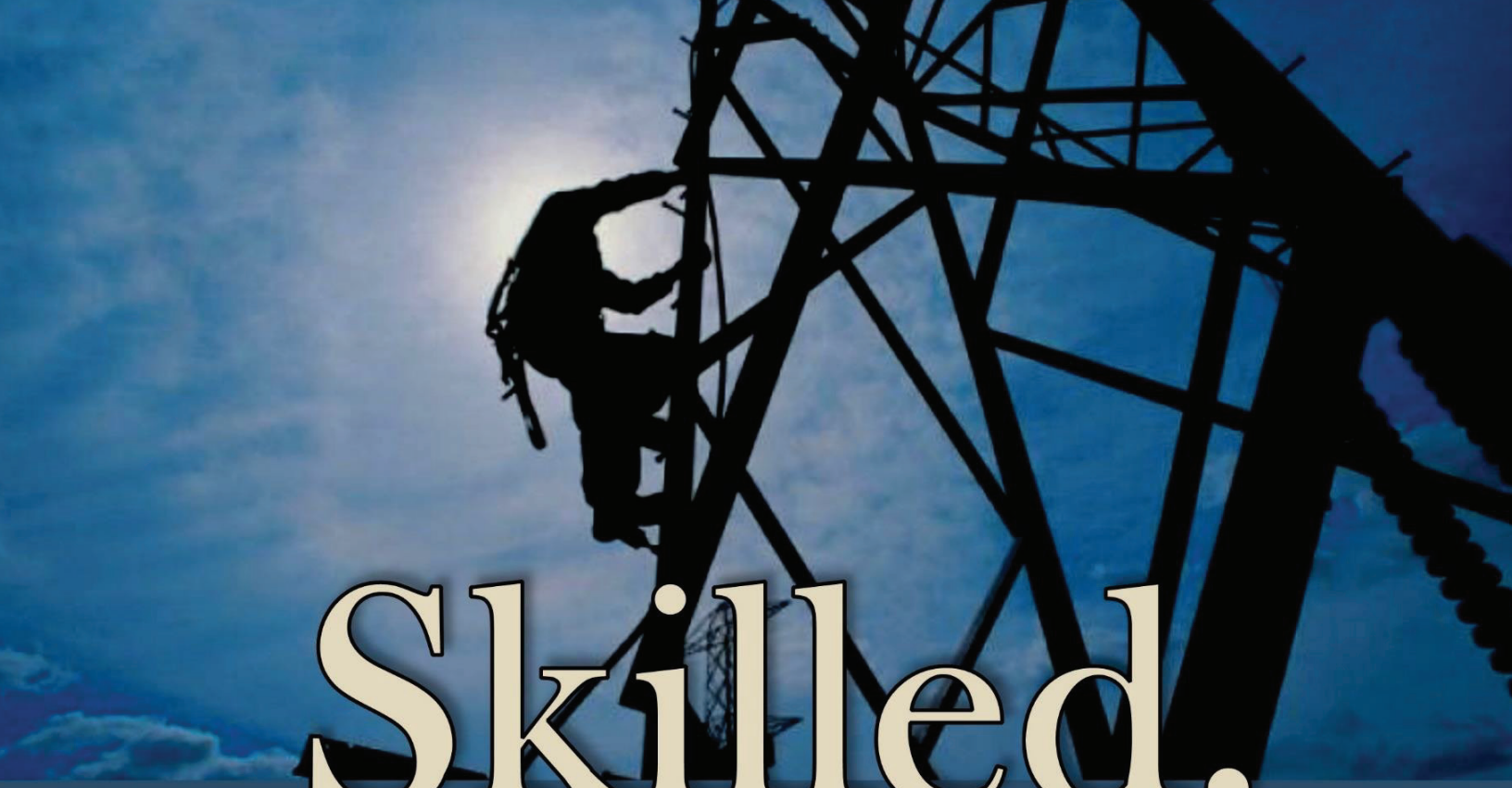

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(Continued)

Innovating to boost diversity

The big difference between oil and the new mineral dependencies is the potential for radical, rapid innovation in supply and demand. For all the talk about moving past oil, by some measures the world's dependence on oil hasn't budged. This is because it is so hard to find cost effective and reliable alternatives even when there are strong incentives to switch. Innovations in supply such as shale oil have reinforced demand for the commodity, for example.

When it comes to cobalt or lithium, however, if supplies run short or buyers get worried about poor production methods, recycling or switching to rival materials is an option. Innovation in mining can also turn abundant occurrences into reserves. The world is actually awash in lithium; today's dependencies reflect the lack of much incentive to open mines in places where it is harder (but not impossible) to do business. Rising prices for critical minerals are a powerful motivator for innovation, but cost must be kept in perspective. New research has shown that extraction of non-renewable mineral resources such as lithium and copper has risen by a factor of 6,000 since 1700. In the same period, global real GDP has increased by a factor of 190, while average per capita real GDP grew by a factor of 15. Prices have bounced around—better oil-like commodity management can dampen the most harmful price shocks—but stayed roughly flat (see figure 1).

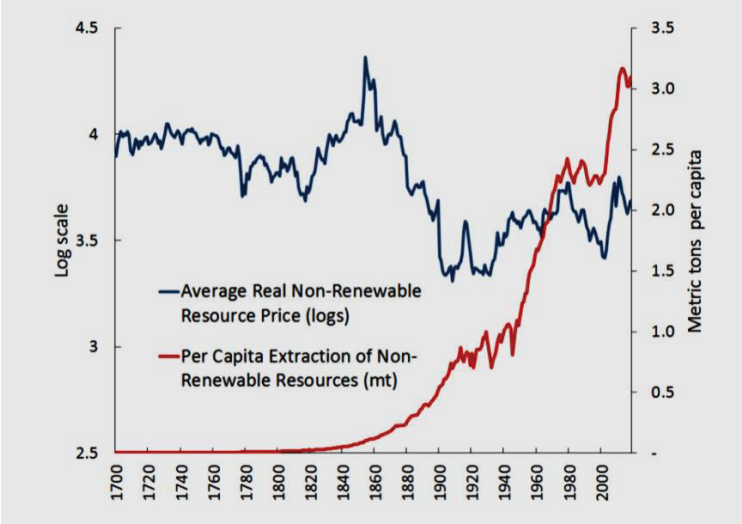

Figure 1: Per capita primary production and average real prices (log) of non-renewable resources, 1700-2018.
Image: Schwerhoff & Stuermer, May 2019

Former British Prime Minister Winston Churchill said of oil security that the solution was diversity and diversity alone. The same is true today for lithium and other essential energy transition minerals. We must encourage supply diversity — more globalization, greater flexibility, production standards where essential and powerful incentives for innovation — for the materials that are truly critical to the energy transition.

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Crossroads

2022 Global Supply Chains: Four Trends That Will Shape The Future

Over the past 2 years, the risks and shortfalls in our global supply chains have been front and center in presidential briefing rooms, company boardrooms, and even family dining rooms. Supply chains are now recognized as central to business survival, success, and growth, rather than an opportunity to just reduce costs. As we head into to 2022, with rampant uncertainty and rapid change due to the Covid-19 variants and other market issues, what can we expect for the next 12 months?
For me, it comes down to 4 main themes. Resiliency, Sustainability, Visibility and Technology.

Resiliency – As supply chain risks continue to flare up

For the past 20 months, the word that *everybody* is using to describe what is needed has been resiliency.
Experts predict continued disruptions in the short term, with challenges around cargo ships, labor shortages, and supply and demand imbalances. According to a survey from the Wall Street Journal, about 45% of economists believed that it would take until the second half of 2022 for there to be improvement.
To increase resiliency across global supply chains companies will need to rebalance on-shore, near-shore and off-shore strategies for manufacturing locations. As they've been doing for the past two years, they'll have to keep identifying alternate sourcing strategies to reduce dependencies on individual suppliers in low-cost regions.

Inventory optimization strategies will continue to be crucial, helping decision-makers identify key materials, intermediates, and products, and determine how much and where to store them across the supply chain. Organizations will also need to improve collaboration and increase visibility with suppliers, logistics service providers, contract manufacturers and other key trading partners.

Sustainability is the challenge of the 2020s

Climate change, circular economy, ESG and sustainability have all become business priorities over the past few years, and our global supply chains sit right in the middle of these challenges, both as a major contributor to the problems, and as a great area of focus where we can take action to address the problems. However, there's a gap between sustainable mission statements and the ability to carry them out. This was a major finding from an Oxford Economics survey of worldwide supply chain decision makers across industries: 88% have either created a clear mission statement around sustainability or they're in the process of writing one, but only 52% have put those words into action and reduced their shipping miles.

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What's more, less than half of those respondents said they had significant visibility into their own sourcing of sustainable products. And only 21% had complete visibility into their supplier sourcing of sustainable products.

As environmental, social and governance (ESG) initiatives continue to be a corporate priority in 2022, companies will look to their supply chains for answers, and increase pressure on their partners to become more socially responsible.

Visibility drives resiliency and sustainability

The old saying goes, "you can't manage what you can't measure". How can we become more resilient to changes across the supply chain, or meet sustainability goals, if we do not have the information to make informed decisions?

In 2022 there will be a major focus on improving visibility to collect, consolidate and consume data and insights in real time from across the supply chain.

As we design, manufacture, and deliver smarter products, we are generating unparalleled amounts of data. Using this data, people can determine how products, equipment or vehicles are performing, measure carbon emissions, see if they require maintenance, and so much more. Add to this the improved demand and customer data available from sentiment analysis, and social media, and environmental data such as traffic and weather patterns, and we have a real-time, 360-degree view of the supply chain.

Technology provides the data and tools

Industry 4.0 is expected to ramp up in 2022 as machine learning and AI use volumes of IoT-based and social media data from people, devices, assets, products, and vehicles across the supply chain to automate decisions and processes.

Meantime, predictive analytics will empower employees to make more informed, real-time decisions, and drive new business models.
From smart factories featuring 5G, greater connectivity and enhanced AI solutions, to smart products and assets across the supply chain, Industry 4.0 has a lot to offer companies who have invested in these technologies.

The coming year will bring greater focus on companies using Industry 4.0 within their factories, across the supply chain of smart assets, and into the hands of consumers and customers leveraging the smart products and devices it enables.

Technology will also help alleviate worker shortages and improve retention by improving the productivity and decision making of existing employees and attracting new talent with state-of-the-art tools.

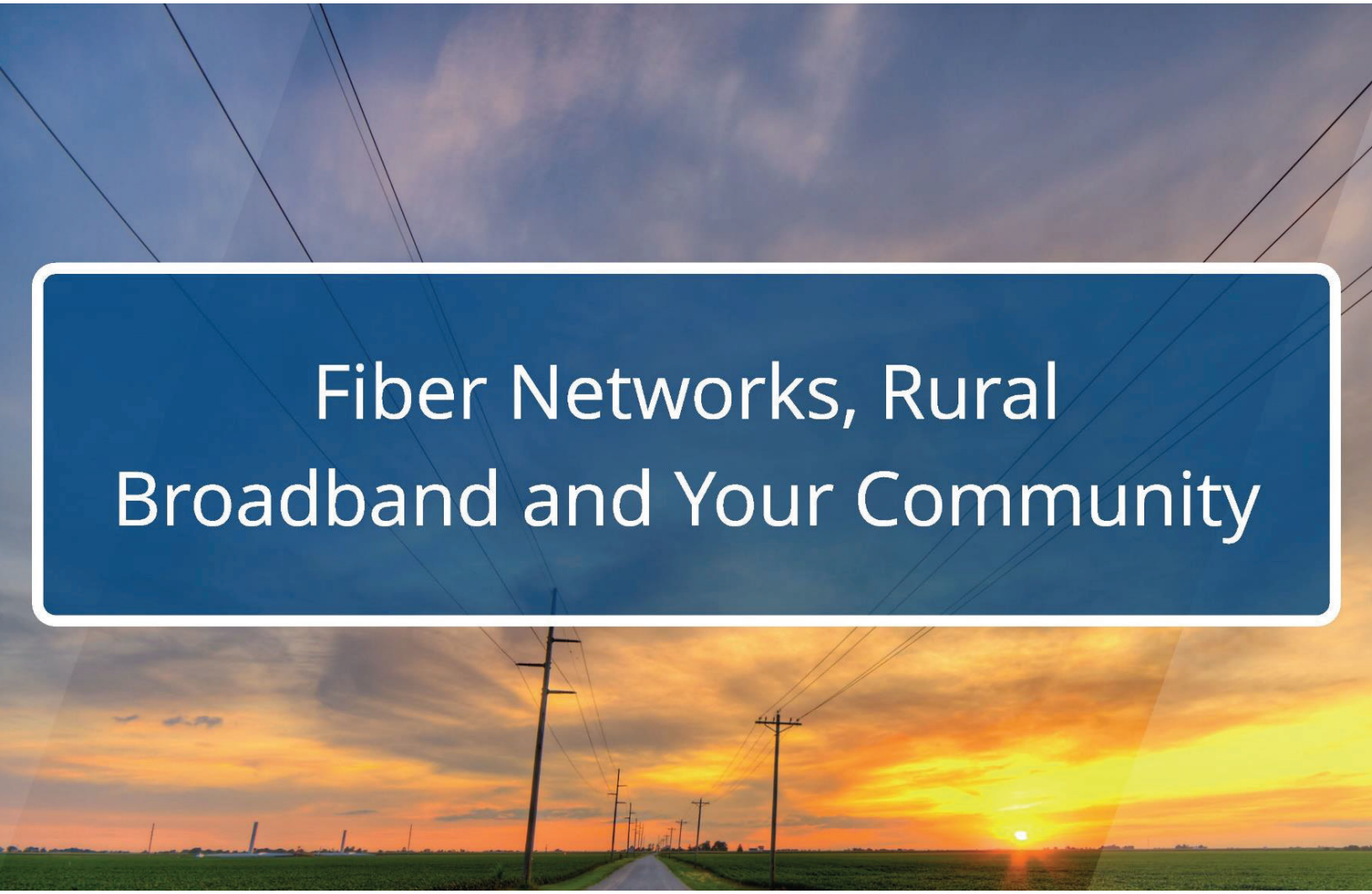
And as the degree of automation increases, it frees up the workforce from repetitive tasks, and allows them to focus on more complexity problems and decisions that required human interactions.

One thing is clear. Supply chains have had major challenges and been in the spotlight for the past 20 months, and they will continue to do so well into 2022.

Here is to a happy (and less eventful) new year.

To learn more about how organizations can drive resilient and sustainable supply chains in times of disruption, check out this recent Oxford Economics research: www.sap.com/cmp/dg/sustainable-supply-chain/index.html.

Author / Publications : **Richard Howells**



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IMEA Workshop Calendar

2022

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January

12 Supervisory Development Series: Session One (Mishawaka)
26 Excavation Competent Person (Lebanon)

February

8 & 9 Supervisor Safety (Lebanon)
16 Supervisory Development Series: Session two (Mishawaka)

March

9 – 11 Apprentice Top-Out Exam #031918 (Scottsburg)
16 Supervisory Development Series: Session Three (Mishawaka)
21 – 25 IMEA 612 Intermediate Workshop #032320 (Scottsburg)

April

4 - 8 IMEA 613 Advanced Workshop #031819 (Scottsburg)
12 - 13 Line Clearance Arborist Certification (Frankfort)
25 -29 IMEA 611 Basic Workshop #041921 (Scottsburg)

May

2 - 13 IMEA 610 Wood Pole Climbing Workshop #050222 (Scottsburg)
24 - 26 IMEA 212 Transformer Theory & Connections (Scottsburg)

June

7 - 8 Working it Hot - Insulate / Isolate (Scottsburg)

August

22 - 9/2 IMEA 610 Wood Pole Climbing Workshop #082222 (Scottsburg)

September

12 - 16 IMEA 613 Advanced Workshop #093019 (Scottsburg)
21 - 23 Apprentice Top-Out Exam #100118 (Scottsburg)
26 - 30 611 Basic Workshop #092721 (Scottsburg)

October

11 - 13 IMEA Annual Meeting (TBD)
25 - 27 IMEA 212 Transformer Theory & Connections (Scottsburg)

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Benefits of Municipal Utilities

Indiana is home to municipal utilities of many shapes and sizes. Indiana is one of 49 states with public power systems. Public Power has close to a 125-year tradition of service in Indiana. Of the state's 568 municipalities, 72 own and/or operate their electric utility. The majority of Indiana's public power systems have celebrated their centennial. More than 500,000 Hoosiers own, control and are serviced by their municipal electric utility.

There are over 2,000 public power communities across the nation. One out of seven Americans are served by a public power community. Public power utilities are public service institutions whose primary focus is to serve their customers. Their common purpose is to provide reliable and safe not-for-provide electricity at a reasonable price while protecting the environment. The hallmark of public power is local control where citizens have a direct and powerful voice in utility decisions and policies.

Indiana has a long history of municipal utility operation. When private business would not or could not serve the utility needs of its citizens, city governments stepped up to provide essential utility needs – electric, gas, water, wastewater, stormwater and telecommunication services.

These community-owned utilities are municipal by choice.

The benefits of municipal utility ownership are numerous. From small, rural towns to large cities, municipal utilities are the culture of that particular American vision of local communities working together to meet the needs of their local citizens.

Community Ownership

A municipal utility is owned by the city or town it serves. It exists to provide a public service to the citizens, businesses and industries of the community. Service, not profit, is the utility's mission / priority goal.

Community Values

Decisions about the operation of a municipal utility are made locally, by members of the community, at open, public meetings. Because all decisions are made locally, a municipal utility is uniquely able to respond to the community's needs, build on the community's strengths, and reflect and advance the community's values.

The IMEA Indiana Lineworkers' Rodeo hosted by the City of Lawrenceburg & Lawrenceburg Municipal Utility is the state's most energizing safety and training event. The only one of its kind for public power lineworkers in the state, the interactive, competitive event is designed to showcase the skills and knowledge of a lineworker in a fun and safe environment. The event is open to anyone who is a practicing lineworker in a municipally owned and operated electric utility and/or rural cooperative in Indiana and surrounding states.

The rodeo features two levels of competition: journeyman team, and apprentice. There are four events for apprentices, and four in the team category. Three of the four will be provided as Mystery events with the fourth as Pole Top Rescue. We hope you will join us for our two-day event on Friday, September 23 & Saturday, September 24 with a cookout and awards following the conclusion of the event.

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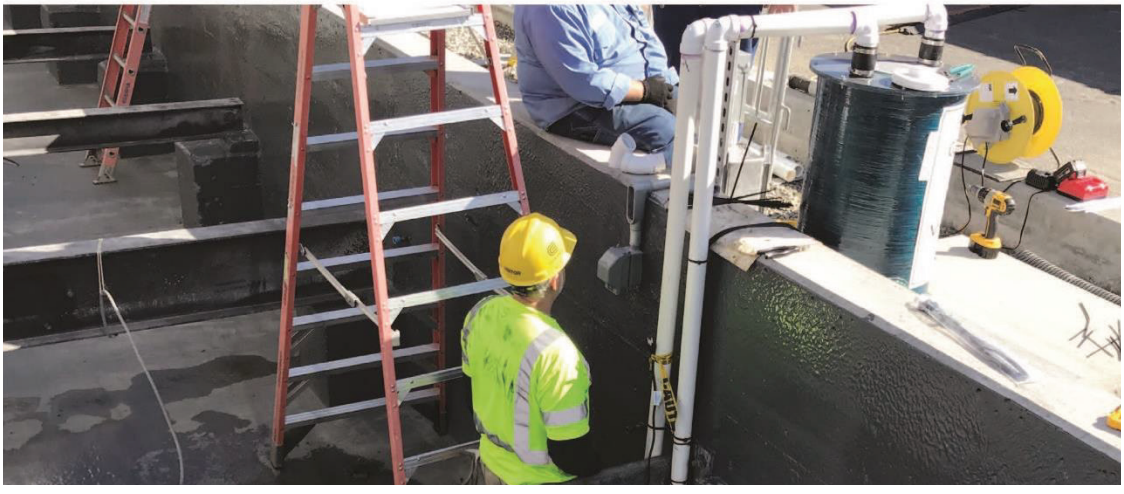

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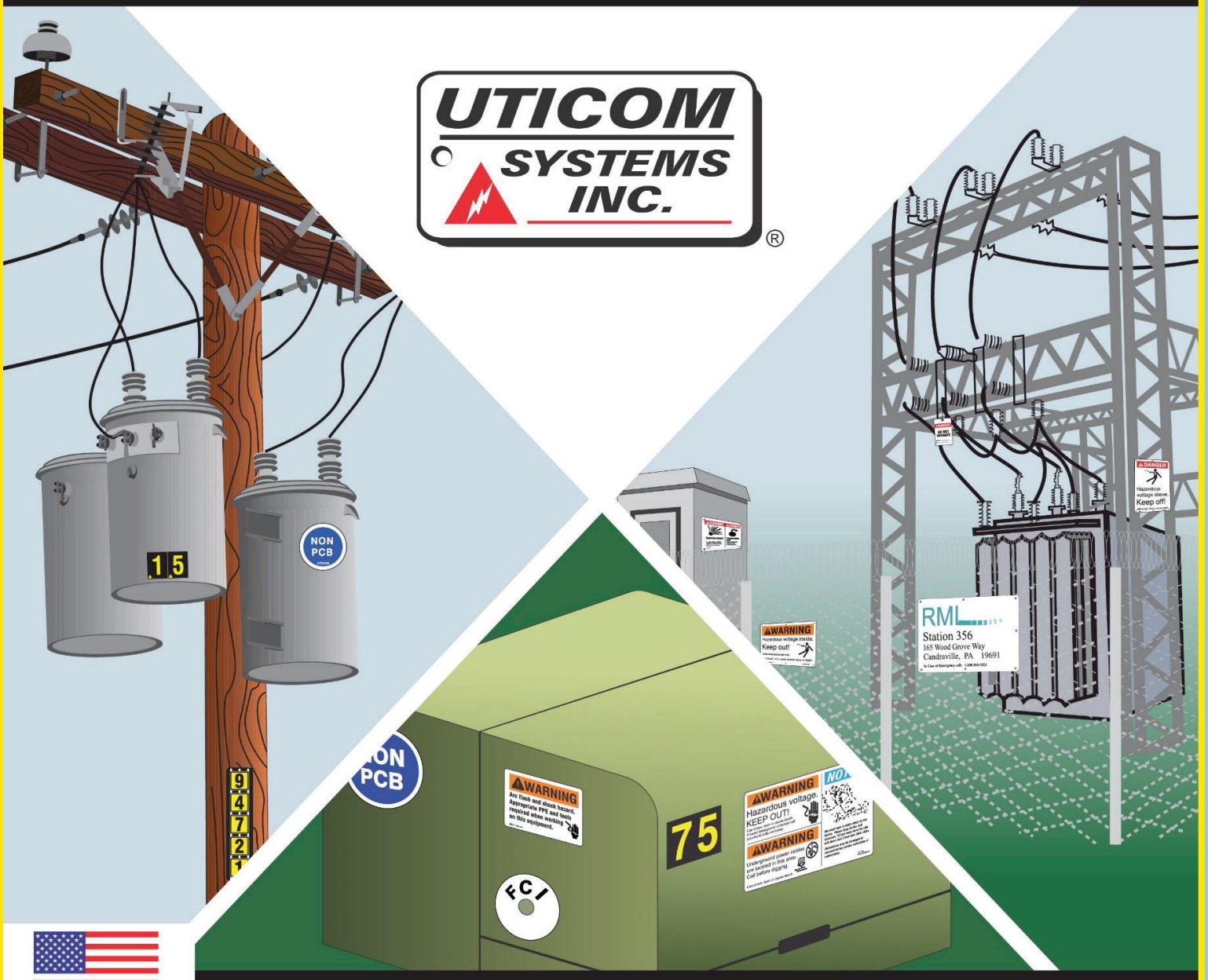

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