EIPC SPEeDNEWS

The Weekly On-Line Newsletter from the European Institute of Printed Circuits.
Issue 1 – January 2022

NEWS FROM THE EIPC

Dear Colleagues,

Aspiration, moderation and cancellation

Last year we were optimistic enough to plan a return to normality, and sent out news of a Winter Conference to be held on 10th February 2022. We were hoping that the disruption caused by the coronavirus would have moderated to point where this plan could be put into effect. Alas, it seems not. Present international travelling restrictions within Europe are making it very difficult to plan with any certainty, and the situation can change very rapidly; and not necessarily for the better.

In cancelling our Winter Conference, we have now scheduled a **Technical Snapshot Webinar for 19th January**, details of which are to follow. In addition, we are looking to organise an on-line version of the Conference, and the possibility of postponing it to a one-day event in March or April.

Thank you for your understanding; we will of course be in touch again soon.

With our best regards,

The EIPC Team

The European Institute for the PCB Community

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ELECTRONIC INDUSTRY NEWS

5G gathers steam

By fits and starts, 5G wireless deployments are at last ramping up, bringing with them greater bandwidth, reduced latency and a potential boost for chipmakers, network equipment vendors and security specialists—not to mention consumers.

As we note, the next generation of wireless networking extends well beyond faster video streaming on smartphones or hyper-realistic gaming. Potentially billions of devices could be connected to create a much-hyped network of things. Too, private 5G networks are expected to flourish across factory floors, large fulfillment centers operated by hyper-scale online retailers along with networking applications and services still on the drawing board.

Connecting all those edge devices and services will require far-flung networks transporting massive amounts of data. How will those conduits be secured?

It would be comforting to know that cyber security is being baked into 5G-powered networks, but bitter experience dictates otherwise, as we've reported.

Along with the rest of the emerging 5G technology ecosystem, wireless industry analysts forecast that next-generation network security is poised to become a huge new market, upwards of $11.6 billion by 2026, according to one forecaster.

Investments aimed at bullet-proofing 5G networks will initially focus on network security appliances, predicts market tracker ABI Research. As new 5G infrastructure is deployed, hardware-based security requirements will only grow.

"Communication service providers are buying the solutions required primarily from network equipment providers and pure-play cybersecurity vendors," said Michela Menting, ABI's digital security research director. "In time, other specialized third parties will penetrate the market as CSPs move towards 5G stand-alone." That's a reference to 5G networks that no longer rely on LTE backups, but rather link 5G radios with cloud-native 5G core networks.

Network security is just one of many considerations as deployments accelerate. Our 5G special project examines the often-tortuous rollout of next-generation wireless networks and the opportunities this bandwidth bonanza presents for chipmakers, device manufacturers and the rest of the expanding 5G ecosystem.

John Walko, for example, addresses the question: What has 5G done for the semiconductor industry? It turns out, plenty.

The coming year looks to be the true beginning of a 5G era as marketing hype is replaced by next-generation wireless networks. Those networks will be bulging with data and the hoped-for innovation that comes with it.

DESIGNLINES

A Question of Power

By Rebecca Day

I imagine our two-person Christmas was a microcosm of many in the U.S. this year, sidetracked by a hunt for juice to power our recently opened gizmos. That meant carefully extricating cables from their tiny compartments in cardboard boxes, opening drawers in search of alkaline batteries and yanking cords from power outlets to plug in new gear.

I noticed none of this year's haul included a Micro USB connector, which I'm very thankful for, since I only get the correct orientation for plugging in last generation's connector of choice about half the time. With USB-C, it doesn't matter which way I plug in a cable, a small consideration, but one that saves unnecessary aggravation.

I got the Beats Fit Pro wireless earbuds I asked Santa for, and I was pleased that the fit, as promised, was on target for my smallish ears. I hadn't considered the charging side, and was taken aback when I saw a roughly 6-inch USB-C-to-USB-C cable in the box. I stepped up to the wireless charging case option when I bought my AirPods and expected the same from my Beats. Looking at the Apple website for the stepchild Beats earbuds, I see that's not an option. I guess Apple keeps the best features for its own brand.

The Beats were fully charged when I opened the box, but the charging case was at 43 percent. I wanted to charge the case to be ready for an earbud fill-er-up, which would come in after about six hours of use, according to reviews. I looked at the half-foot USB-C-to-USB-C connector and realized I didn't have everything I needed to power the case: One end had to plug into something else, and that something else had to get power from an AC outlet. A plug would've been nice, Apple, but I see they want me to spend $19 on one at apple.com.

I ended up unplugging my partner Liz's three-way wireless charger – one of *her* Christmas presents – which didn't seem entirely fair since she spent far more on my Beats than I did on her charger. Then I plugged its USB-C cable – which was plugged into a power adapter that was plugged into a power strip – into my Beats charging case. Lesson learned: I will never again get earbuds that don't come with a wireless charging case that can simply charge while lounging on a Qi pad.

Then again, I may never get any earbuds but AirPods again because when I tried to put the Beats back in the charging case, I couldn't get the lid to close, no matter which way I positioned them. I checked a Reddit thread and found I'm not the only one with charging

case complaints with the Fit Pros. Numerous people cited poor quality construction. One said it feels like a prototype for a case; another compared it to a Fisher-Price toy.

I can try putting a rubber band around the case, but then I might break the buds. The really bad news? When the earbuds worked out of the box, I tossed that very box they came in, the one the retailer would require for return.

My nightstand is a rats' nest of cables with a multi-port USB charger powering an Apple Watch, iPhone, Kindle, over-ear wireless headphones and the occasional electronic guest. I would really like that to change in the future, though Apple's aborted effort with a multi-device wireless charging pad doesn't leave me much hope.

For some devices, the really tiny ones, a wireless charging solution seems essential to be practical. The smaller electronics are, the less you want to futz with cables that inevitably get lost or crimped – or the cases they come in—and some are just too small for batteries. A hearing-aid battery replacement video shows how tedious battery replacement can be for tiny electronics. I'd hate to do that every five days or so; I have enough aggravation stuffing button batteries into my cat's laser toy.

The hearing-aid market is set to explode soon with over-the-counter devices coming, thanks to expected relaxation of Food and Drug Administration requirements that consumers have a medical exam before getting a hearing aid. People who have been priced out of four-figure doctor-prescribed aids, or those who don't think their hearing loss is severe enough to require medical treatment, may dabble in the OTC versions.

They're part of the new wave of "wearables" that have a health focus, including smart rings. A company called Movano is working on a smart ring targeted to women that promises to measure steps, calories, heart rate and blood oxygen levels. Try fitting a battery compartment or USB connector on that baby, let alone all the sensors that need to be powered by the Internet of Things.

The market is begging for alternative charging solutions.

Energous, a wireless charging technology company, recently sent me one of the first products to incorporate its WattUp wireless charging technology. The Primo W, delayed by component shortages, is due on the market soon. The charging dome, which doubles as a sanitizer, has outlines on the base for left and right hearables, though placement didn't seem as critical as it does with a Qi charger that requires wireless charging coils to line up precisely.

Energous says early WattUp designs account "for strict orientation and foreign object detection issues" associated with Qi chargers, though the latter is less of an issue than it used to be.

Energous, Ossia and Wi-Charge are among the companies promising wireless charging solutions for years. I've seen demos of wireless charging bowls, light bulbs and pads, but reality has yet to follow the promises. Regulatory issues and manufacturer willingness to incorporate charging transmitters chips are just some of the hurdles.

I searched recently for wireless charging nightstands. Google brought up several options. One model at Wayfair had a sliding top that would accommodate a charging cable that

plugged in somewhere in the drawer– not exactly what I had in mind. Another had a very large surface for charging that took up most of the tabletop, making me nervous about what else I could place on it without doing damage to a device or the charging mechanism.

At Amazon, a “rustic” nightstand with a charging station showed USB ports on the surface with a cup of coffee nearby, an electrical disaster in the making in my apartment with a freewheeling kitty.

So, it’s back to my mishmash of charging solutions for now. Maybe next Christmas I’ll ask for wired headphones … and books.

Rebecca Day

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NEWS FROM THE UK

Free Webinar - 1 week to go
Wednesday 12 January 2022 at 10:00 (UK Time)

ZeroAMP - Ultra Low Power Logic and Memory for Harsh Environments

By Piers Tremlett, Microchip Technology Inc

The ZeroAMP project is concerned with the development of logic and memory circuits using Nano-Electro-Mechanical (NEM) Switches for harsh environment applications demanding zero standby power, operation at high temperatures and radiation hardness.

This presentation will cover:

- Novel Zero-Leakage NEM Switches
- 3D Stacked Integration
- Wafer Level Hermetic Packaging
- Non-Volatile Memory and FPGA Demonstrators

Registration for the **Webinar is Free** and is open below

Register Here

CARI Electronic Launches Industry 4.0 Journey with FactoryLogix

Aegis' IIoT-based MES platform toimprove speed, quality, and traceability

Bicester, Oxford UK (January5, 2022) – Aegis Software, a global provider of IIoT-based Manufacturing Execution Software (MES), today announces thatCARI Electronic, EMS partner in Valence near to Lyon, France, has chosen FactoryLogix as a key part of their MES Industry 4.0 journey.

For 35 years, CARI Electronic has been providing electronic services, from the design of electronic systems to the production of electronic cardsand integration of complex systems, with the constant goal to provide their customers with accelerated turn-around times and a high standard of quality.

As a member of the innovative French Tech organization and EN9100 certified, CARIElectronic satisfiesexactingcustomer needsacrossseveral industries, including aerospace, medical, energy,industrial IoT applications,and audio, applyingstringent IPC manufacturing standards.

"CARI has been looking to start ourIndustry 4.0 journey,continuing our Lean efforts,with keyobjectives toimprove the speed of product development, manufacturing and delivery,further increase quality levels, while providingexacttraceability", explains Sylvain ROLLET, CEO of CARIElectronic. "We chose FactoryLogix because of Aegis'state of the art singular MES solution, which doesn't require any third-party dependenciesor hardware to connect to machines, and their established track-record of digital manufacturing innovation for electronic cards."

Dan Walls, Managing Director EMEA at Aegis Software, comments,"We are excited and proud to participate inCARI Electronics' journey,as they further progress their value through innovationwithFactoryLogix and Industry 4.0, an impressive role-model for the industry."

FactoryLogix is a holistic and modular platform that delivers leading-edge technology with easily configurable modules to support and execute a manufacturer's strategy towards Industry 4.0. FactoryLogix manages the entire manufacturing lifecycle: from product launch to material logistics, through manufacturing execution and quality management to powerful analytics and real-time dashboards. This end-to-end platform helps companies accelerate

product introductions, streamline processes, improve quality and traceability, reduce costs, and gain greater visibility for competitive advantage and profitability.

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About CARI electronic

CARI Electronic was founded in 1986 to address the new local customer need for electronic cables, while building proximity relationships.Since then, the company has expanded and provides electronic services such as researchand design of electronic systems, manufacturing and integration of complete systems. The company kept intact the wish to adjust to their evolving customer needs (Innovation, Delays, Quality…) by nurturing sustainablerelationships with their customers, no matter where those are situated. To learn more, visit their Website: https://www.cari-electronic.com/

About Aegis Software

Founded in 1997, Aegis Software uniquely delivers a comprehensive and flexible end-to-end manufacturing execution system (MES) platform giving manufacturers the speed, control, and visibility they require. Aegis has international sales and support offices in Germany, UK, and China, and partners with more than 37 manufacturing equipment suppliers. Since its inception, Aegis has been helping more than 2,200 factories across the military, aerospace, electronics, medical, and automotive industries, drive rapid and continuous innovation with the highest quality while reducing operational costs. Learn more by visiting https://www.aiscorp.com. Speed, Control and Visibility for Manufacturing.

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CLIMATE CHANGE NEWS

The rare spots of good news on climate change

James Temple - MIT

The deadly consequences of climate change only grew clearer this year, as record-shattering heat waves, floods, and wildfires killed thousands and strained the limits of our disaster responders.

In the closing days of 2021, scientists warned that the eastern edge of a Florida-size glacier is about to snap off of Antarctica and US legislators found they may have flubbed their best chance in a decade to enact sweeping climate policies.

But amid these stark signs, there were also indications that momentum is beginning to build behind climate action. Indeed, there's good reason now to believe that the world could at least sidestep the worst dangers of global warming.

Princeton energy researcher Jesse Jenkins accurately, and colourfully, pinpointed the weird moment we've arrived at in a recent tweet: "We're no longer totally f$%@ed. But we're also far from totally unf$@%*ed!"

To be sure, the limited progress isn't nearly enough. We've taken far too long to begin making real changes. World events and politics could still slow or reverse the trends. And we can't allow a tiny bit of progress in the face of a generational challenge to ease the pressures for greater action.

But it's worth highlighting and reflecting on the advances the world has made, because it demonstrates that it can be done—and could provide a template for achieving more.

Momentum

So what are the signs of progress amid the climate gloom?

The grimmest scenarios that many fretted about just a few years ago look increasingly unlikely. That includes the 4 or 5 °C of warming this century that I and others previously highlighted as a possibility.

The UN climate panel's earlier high-end emissions scenario, known as RCP 8.5, had found that global temperatures could rise more than 5 °C by 2100. Those assumptions have been frequently included in studies assessing the risks of climate change, delivering the eye-catching top-end results often cited in the press. (Guilty.)

Some argue that it wasn't all that plausible in the first place. And the scenario seems increasingly far-fetched given the rapid shift away from coal-fired power plants, initially to lower-emitting natural gas but increasingly toward carbon-free wind and solar.

Global emissions may have already flattened when taking into account recent revisions to land-use changes, meaning updated tallies of the forests, farmlands, and grasslands the world is gaining and losing.

Today, if you layer in all the climate policies already in place around the world, we're now on track for 2.7 °C of warming this century as a middle estimate, according to Climate Action Tracker. (Similarly, the UN's latest report found that the planet is likely to warm between 2.1 and 3.5 °C under its "intermediate" emissions scenario.)

If you assume that nations will meet their emissions pledges under the Paris agreement, including the new commitments timed around the recent UN summit in Glasgow, the figure goes down to 2.4 °C. And if every country pulls off its net-zero emissions targets by around the middle of the century, it drops to 1.8 °C.

Given the increasingly strict climate policies and the plummeting costs of solar and wind, we're about to witness an absolute boom in renewables development. The International Energy Agency, well known for underestimating the growth of renewables in the past, now says that global capacity will rise more than 60% by 2026. At that point, solar, wind, hydroelectric dams, and other renewables facilities will rival the worldwide capacity of fossil-fuel and nuclear plants.

Sales of new electric vehicles, bumping along in the low single digits for years, are also taking off. They'll reach around 5.6 million this year, leaping more than 80% over 2020 figures, as automakers release more models and governments enact increasingly aggressive policies, according to Bloomberg NEF.

Electric vehicles climbed from 2.8% of new sales in the first half of 2019 to 7% during the first half of 2021, with particularly large gains in China and Europe. Zero-emissions vehicles will make up nearly 30% of all new purchases by 2030, the research firm projects.

Progress

Meanwhile, there are plenty of signs of technological progress. Researchers and companies are figuring out ways to produce carbon-free steel and cement. Plant-based meat alternatives are getting tastier and more popular faster than anyone expected. Businesses are building increasingly large plants to suck carbon dioxide out of the air. Venture capital investments into climate and clean-tech start-ups have risen to levels never before seen, totalling more than $30 billion through the third quarter, according to Pitch Book.

And here's an important and counterintuitive finding: While dangerous, extreme weather events are becoming increasingly common or severe; the world seems to be getting a lot better at keeping people safer from them. The average number of deaths from natural disasters has generally dropped sharply in recent decades.

"We have better technologies to predict storms, wildfires, and floods; infrastructure to protect ourselves; and networks to cooperate and recover when a disaster does strike," noted Hannah Ritchie, head of research at Our World of Data, in an recent Wired UK essay, citing her own research.

This provides additional hope that with the right investments into climate adaption measures like seawalls and community cooling centers, we'll be able to manage some of the increased risks we'll face. Rich nations that have emitted the most greenhouse gases, however, must provide financial assistance to help poor countries bolster their defences.

A realistic baseline

Some folks have seized on these improving signs to argue that climate change isn't going to be all that bad. That's nonsense. The world is, by any measure, still dramatically under reacting to the rising risks.

A planet that's nearly 3 °C hotter would be a far more dangerous and unpredictable place. Those temperatures threaten to wipe out coral reefs, sink major parts of our coastal cities and low-lying islands, and subject millions of people to far greater risks of extreme heat waves, droughts, famines, and floods.

In addition, we could still be underestimating how sensitive the atmosphere is to greenhouse gases, as well as the spiralling impacts of climate tipping points and the dangers that these higher temperatures bring. And there's no guarantee that nations won't backtrack on their policies and commitments amid economic shocks, conflicts, and other unpredictable events.

But to be sure, a 3 °C warmer world is a much more liveable place than a 5 °C warmer one, and a far more promising starting line for getting to 2 °C.

"The point isn't to say that that's a good outcome," says Zeke Hausfather, director of climate and energy at the Breakthrough Institute. "The point is, that's the baseline

we're working with now. And it's easier to imagine much more rapid declines from there."

In some ways, it's especially notable that the world has made this much progress without sweeping climate policies in many nations, and despite all the poisoned, partisan politics surrounding climate change.

The shifts to natural gas, then solar and wind, and increasingly EVs were all aided by government support, including loans, subsidies, and other policies that pushed the underlying technologies into the marketplace. And the business-driven scale-up process rapidly cut the costs of those technologies, helping them become ever more attractive.

Increasingly competitive and business-friendly clean alternatives promise to simplify the politics of further climate action. If more and more nations enact increasingly aggressive policies—carbon taxes, clean-energy standards, or far more funding for research and demonstration projects—we'll drive down emissions ever faster.

The world isn't ending

There are other reasons to take note of the modest progress we are making.

Progressive US politicians now casually repeat the claim that climate change is an "existential threat," suggesting it will wipe out all of humanity. After a 2018 UN report noted that global warming could reach 1.5 °C between 2030 and 2052, climate activists and media outlets contorted that finding into versions of "We have 12 years to save the planet!"

If so, it would now be down to nine. But 1.5 °C isn't some scientifically determined threshold of societal collapse. Though the world will miss that goal, it remains crucial to fight for every additional half-degree of warming beyond it, each of which brings steadily higher risks.

Meanwhile, climate research does not suggest that the 3 °C of warming we're now roughly on target for would transform the entire planet into some uninhabitable hellscape.

So no, climate change is not an existential threat.

But that sentiment has certainly taken hold. Earlier this year, researchers at the University of Bath surveyed 10,000 young people, aged 16 to 25, in 10 countries to assess the levels of "climate anxiety." More than half, 56%, agreed with the statement "Humanity is doomed."

It's standard stuff for politicians and activists to overstate dangers and demands, in the hopes of pushing toward some compromise solution. And the growing climate fears and the increasingly influential climate activist movement have undoubtedly put greater pressures on politicians and business to take these issues more seriously,

helping to drive some the policy changes we've seen. They deserve real credit for that.

But insisting that the world is at the edge of collapse, when it's not, is a terrible message for young people and carries some real risks as well. It clearly undermines credibility. It could lead some people to simply lose hope. And it could compel others to demand extreme and often counterproductive responses.

"It's time to stop telling our children that they're going to die from climate change," Ritchie wrote. "It's not only cruel, it might actually make it more likely to come true."

When people don't see a "reasonable path forward," they begin to rationalize unreasonable ones.

Among those I hear with surprising frequency: We must shut down all fossil-fuel infrastructure, and end oil and gas extraction now. We must fix everything with today's technologies and reject the "predatory delay" tactic of continued investment in clean-energy innovation. We have to halt consumption, construction, and economic development. Or even: We must smash the global capitalist system that caused all the problems!

Balancing the trade-offs

None of that strikes me as somehow more politically feasible than fixing our energy systems.

We do have to shut down fossil-fuel plants, replace vehicles, and switch to new methods of producing food, cement, steel, and other goods—and relatively quickly. But we have to do it by developing alternatives that don't pump greenhouse gases into the atmosphere.

If we adjust the goalpost back to 2 °C, which is regrettable but only realistic at this point, we have several decades yet to carry out the transformation required. Under a modest emissions scenario, the world won't exceed that threshold until around 2052 as a middle estimate, Hausfather's analysis of latest UN climate report suggests.

What we can't do is just shut down the infrastructure that drives the global economy—not without massive damage to jobs, food, health care, and safety. We'd sacrifice the economic resources we need to develop a more sustainable economy, as well as to make our communities more resilient to the coming climate dangers.

Those in rich countries, especially, have no business telling poor countries that they must halt development, perpetually locking billions of people in economic and energy poverty.

If we're worried about climate change because of the suffering it will impose on people, then we have to care about the human trade-offs entailed in how we address it as well. Weighting those properly requires dealing honestly what with the science does and doesn't say, recognizing the limited progress we are making, and not resorting to hyperbole simply because we think it will spur the actions we hope to see.

It's a cruel and dangerous fantasy that we'll ever halt climate change by counting on or forcing people to live impoverished lives, forgoing food, medicine, heating, or air conditioning in an increasingly erratic and menacing world.

We need more activist pressure and more aggressive climate policies to confront the threats of climate change. But ultimately, we must invent and build our way out of the problem. And the rare bright spot of good news is that we're beginning to see evidence that we can.

News from
WECC members

WECC
World Electronic Circuits Council

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NEWS FROM THE IPC

Rising Material and Labour Costs Continue to Plague Global Electronics Manufacturing Supply Chain

Ease of recruitment and profit margins declining, along with inventories

IPC's January 2022 global electronics manufacturing supply chain sentiment report found that materials and labor costs continue to be the largest issue facing the electronics supply chain, with nine in 10 electronics manufacturers reporting rising materials costs and more than three-fourths reporting rising labour costs. Though order flows continue to be strong, and both capacity utilisation and shipments are expanding, survey respondents reported growing backlogs and shrinking profit margins.

Among other conclusions, the survey results found that:

- Material costs are currently rising at a higher rate in North American than APAC: 96% of North American manufacturers report rising material costs, a significantly lower 74% report material costs are up in APAC.
- Inventory available to customers is declining at a higher rate in North America compared to both Europe and APAC: 49% of firms in North America reported declining inventory, while only 21% of firms in Europe and 16% of firms in APAC are experiencing declines.
- Manufacturers indicate the current semiconductor shortage is driving longer lead times, delayed deliveries, declining orders, increased inventories, rising costs and lost production. Combined, these impacts are affecting manufacturers' ability to complete orders, ultimately reducing profitability.

"Manufacturers expect to see continued increase in material and labour costs," said IPC Chief Economist and report author Shawn DuBravac. "Escalating costs are in turn compressing profit margins. Ease of recruiting and finding skilled talent is expected to remain challenging and inventory levels are expected to remain tight for at least the next six months."

IPC surveyed hundreds of companies from around the world, including a wide range of company sized and representing the full electronics manufacturing value chain. Survey respondents were from North America (44%), Asia (20%) and Europe (17%).

View full report: The Current Sentiment of the Global Electronics Manufacturing Supply Chain.

Supply Chain Challenges Continue to Hamper Electronics Production

IPC releases economic outlook for January 2022

IPC's January 2022 Economic Outlook report finds that supply chain challenges remain acute and have improved little from the previous month. Shortages continue to hamper production levels and lead-times remain long. Supply chain challenges will linger well into 2022, and in some instances, into 2023.

Among other data, IPC's economic outlook report shows:

- Economic growth will be severely muted at the start of the year as Omicron slows economic activity – gross domestic product (GDP) growth in the United States could drop to as low as 2.5 percent in the first quarter of the year.
- Inflation in Europe shot-up to 4.9 percent in November, the highest level since records began in 1997, two years before the euro was launched.
- Consumer sentiment improved marginally in December, but the gains might be short-lived thanks to rising cases of COVID. Consumer sentiment reached lows in November not seen since 2011.
- The reemergence of COVID had stymied Europe's recovery early in the year, but Europe is quickly getting growth back on track. Growth in the third quarter was 3.7 percent higher than a year ago.
- The number of employed persons increased by 0.9 percent in both the Euro area and in the European Union during the third quarter, but the unemployment rate has declined slowly during the recovery.

"It has been a tumultuous year and many of the risk factors that are prevalent today will continue through at least the first half of 2022, said IPC Chief Economist and report author Shawn DuBravac. "COVID continues to be a major deterrent to economic growth and while the impact of the current outbreak remains unclear, the uncertainty it has created will hinder the recovery in the early months of the new year. While my expectations for growth for 2021 and 2022 are muted from prior months, I still expect the U.S. economy to grow four percent next year."

View full report: January 2022 Economic Outlook Report.

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International Diary

2022

14th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
19 January

EIPC@ IPC APEX EXPO
25-27 January
San Diego, USA

EIPC @ SMT Connect
10-12 May
Nuremberg, Germany

EIPC @ CPCA
18-20 May
Shanghai, China

EIPC Summer Conference
Visit Ericsson 5G centre
14 & 15 June
Stockholm, Sweden

EIPC @ Electronica
15-18 November
Munich, Germany