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European Electronic Markets Forecast

Global 5G growth amid macroeconomic challenges

About 110 million 5G subscriptions were added globally between July-September 2022, bringing the total to about 870 million, according to the November 2022 edition of the *Ericsson Mobility Report*. As forecast in previous reports, 5G is still expected to reach one billion subscriptions by the end of this year – two years faster than 4G did, following its launch.

The statistic reinforces 5G as the fastest-scaling mobile connectivity generation. Key drivers include the timely availability of devices from multiple vendors, with prices falling faster than for 4G, and China's large early 5G deployments.

North America and North East Asia continue to see strong 5G growth, with 5G subscription penetration in the regions expected to reach about 35% by end of 2022. Globally, almost 230 CSPs have launched 5G services to date, with more than 700 5G smartphone models announced or launched commercially.

By the end of 2028, five billion 5G subscriptions are forecast globally, accounting for 55% of all subscriptions. In that same timeframe, 5G population coverage is projected to reach 85% while 5G networks are expected to carry around 70% of mobile traffic and account for all contemporary traffic growth.

Global 4G subscription numbers also continue to rise, growing by about 41 million between July and September 2022. Global 4G subscriptions are expected to reach a peak of about 5.2 billion around the end of this year.

Overall mobile subscriptions are expected to top 8.4 billion by the end of 2022, and 9.2 billion by the end of 2028. Most subscriptions are associated with smartphones. At the end of 2022, 6.6 billion smartphone subscriptions are estimated, accounting for about 79% of all mobile phone subscriptions.

The report also forecasts global fixed wireless access (FWA) connections to grow faster than previously expected.

FWA – the wireless alternative to wireline broadband connectivity for homes and businesses – is one of the major early 5G use cases, particularly in regions with unserved or underserved broadband markets.

Driven in part by accelerated FWA plans in India, and expected growth in other emerging markets, FWA is forecast to grow at 19% year-on-year through 2022-28, and top 300 million connections by the end of 2028.

More than three-quarters of communications service providers (CSPs) surveyed in more than 100 countries currently offer FWA services. Almost one-third of CSPs are offering FWA over 5G, compared to one-fifth a year ago. Almost 40% of the new 5G FWA launches in the past 12 months have been in emerging markets.

The Massive IoT technologies NB-IoT and Cat-M – supporting wide-area use cases involving large numbers of low-complexity, low-cost devices with long battery life and low-to-medium throughput – continue to be rolled out around the world. Globally, 124 service providers have deployed or commercially launched NB-IoT networks and 57 have launched Cat-M, while 56 have deployed both technologies. The number of devices connected by these technologies grew strongly

IoT Connections (Billion)

IoT	2022	2028	CAGR
Wide-area IoT	2.9	6.0	13%
Of which Cellular IoT	2.7	5.5	12%
Short-range IoT	10.3	28.7	19%
Total	13.2	34.7	18%

Source: Ericsson Mobility Report November 2022

in 2021 and is expected to reach almost 500 million by the end of 2022. The growth of Massive IoT technologies is enhanced by added capabilities in the networks, enabling Massive IoT co-existence with 4G and 5G in FDD bands, via spectrum sharing.

IoT devices connected via 2G and 3G have been in slow decline since 2019, and have a negative annual growth rate of around 15% up to 2028, as the rate of switch-off for both technologies, especially 3G, continues to increase in the coming years.

In 2021, broadband IoT (4G/5G) reached 1 billion connections, overtaking 2G and 3G as the technology that connects the largest share of all cellular IoT devices. This segment mainly includes wide-area use cases that require higher throughput, lower latency and larger data volumes than can be supported by Massive IoT devices. LTE Cat-1 devices, which support 10 Mbps downlink and 5 Mbps uplink speeds are increasingly being used for a variety of use cases. Hence, Ericsson's forecast for the broadband IoT segment has been adjusted upwards. By the end of 2028, almost 60% of cellular IoT connections are forecast to be broadband IoT, with 4G connecting the majority. As 5G New Radio (NR) is being introduced in old and new spectrum, throughput data rates will increase substantially for this segment.

Smart electricity meter penetration rate in Europe to reach 56% at the end of 2022

More than 56% of the electricity customers in EU27+3 had a smart meter at the end of 2022. The market is set for robust growth in the coming years with a total of 106 million smart electricity meters forecasted to be deployed across the region during 2022–2027, according to figures released *by Berg Insight*.

At the end of 2021, the EU27+3 region was home to nearly 163 million smart electricity meters, corresponding to a penetration rate of 53%. Growing at a robust CAGR of 5.8%, the installed base of smart electricity meters is expected to reach a penetration rate of 74% by 2027, driven by large rollouts in the UK, Poland and eventually also Germany and Greece in combination with nationwide rollouts in several small- and mid-sized countries.

The European smart gas metering market will meanwhile increase its installed base of devices from 46 million units in 2021 to 76 million units in 2027.

The composition of annual smart electricity shipment volumes is expected to change significantly over the coming years as rollouts in many markets in Western and Northern Europe are now either well-advanced or largely completed. An ongoing trend that is spreading across Europe is second-generation smart metering deployments in countries such as Italy, the Nordics, Spain and the Netherlands. Replacements of first-generation smart metering equipment are expected to account for nearly a third of the cumulative device shipments until 2027.

In terms of first-generation projects, the 10 fastest growing market during 2022–2027 will meanwhile all be in Central Eastern and South Eastern Europe – a trend that confirms that focus is shifting away from Western European markets that historically have been the centre of attention of the European smart metering market throughout the past decade.

Another ongoing trend is the change related to communications technologies being used for data exchange with the utility back office. Berg Insight estimates that standalone wireless connectivity options will grow their annual share of smart electricity meter shipment volumes from 33% in 2021 to 57% in 2027. Most of the growth will be attributable to the rise of 3GPP-based LPWA connectivity services, which have become available in most European markets in the past couple of years. Annual European shipments of NB-IoT and LTE-M smart electricity meters are forecasted to grow at a CAGR of 18.0% during 2021–2027, from 1.4 million units in 2021 to 3.7 million in 2027.

Market notes

- Western European shipments of hardcopy peripherals declined 6.7% year over year to 3.8 million units in the third quarter of 2022 (3Q22). Shipment value increased 7.2% year over year during the quarter to US$1.935 billion, according to new data *IDC*. Supply-chain issues continue to affect the market and are not likely to be fully rectified until 2023. Some brands are struggling to meet consumer and business demands while others are taking advantage of their misfortune and are seeing their shipments increase. Inkjet shipments declined 13.9% in 3Q22 with consumer devices contracting 13.7% year-on-year while business inkjet devices declined 15.2% year-on-year. Overall laser shipments increased 14.9% year-on-year in 3Q22 as some backorders were fulfilled, but it must be noted that the quarter for the previous year (3Q21) was one of the worst quarters on record.

- The need to alleviate pressure on healthcare professionals and increase patient care time is boosting the demand for medical device connectivity (MDC). According to *Frost & Sullivan* the market for global MDC is expected to hit US$8.96 billion by 2027 from US$2.47 billion in 2022, registering a compound annual growth rate (CAGR) of 29.4%.

- The European smartphone market continued to suffer from a deteriorating economic climate and ongoing

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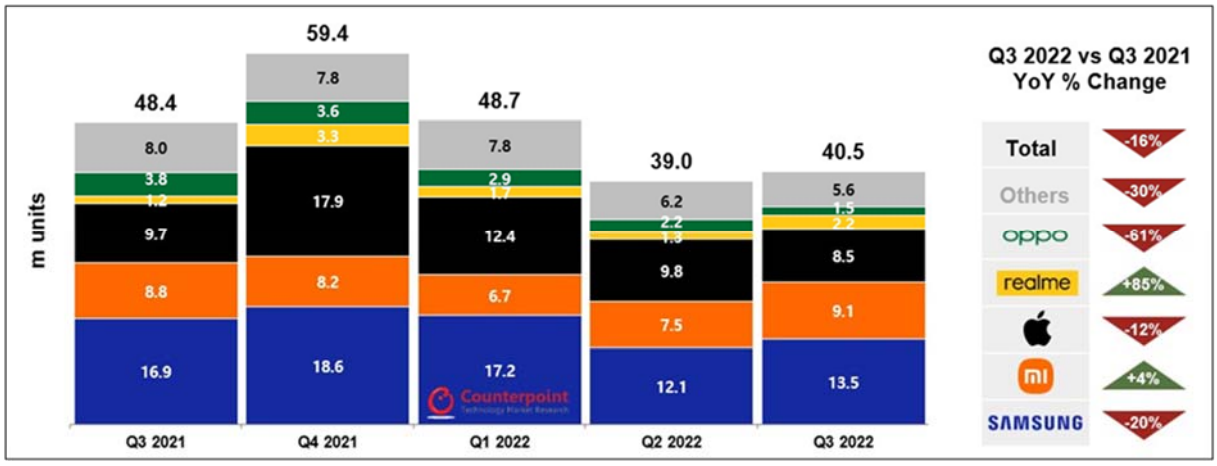


geopolitical uncertainty with shipments declining by 16% year-on-year in Q3 2022, according to the latest research from *Counterpoint Research*. With the full force of the latest iPhone launch being felt in Q4, further improvements in the coming quarter are likely. However, expectations of a tough winter will constrain consumer demand, and with some OEMs facing the challenge of excess inventory, shipments are unlikely to reach last year's levels, let alone pre-pandemic.

- Consumer virtual reality (VR) will be worth US$6.9 billion in 2022, increasing to US$20 billion in 2027, according to new research from *Omdia*. In the face of macroeconomic challenges, the market continues to expand, with 12.5 million headsets expected to be sold in 2022, and US$1.6 billion spent on VR content. With 20 million cumulative Meta Quest headset sales projected by the end of 2022, Quest is the biggest VR ecosystem in the world and the leading VR content platform. Meta is dominating the VR market, with 76% of headset sales in 2022. Despite its best efforts however, mass adoption of VR remains long way off, with just 72 million headsets predicted in use by consumers in 2027 – in contrast to over 6 billion smartphones, nearly 3 billion PC households, and 250 million active gaming consoles.

- The global installed base of active remote tank monitoring (RTM) solutions reached 6.2 million units at the end of 2021, according to a new research report from *Berg Insight*. Growing at a compound annual growth rate (CAGR) of 29.9%, the active installed base is estimated to reach 23.0 million units worldwide in 2026. Berg Insight estimates that the European market accounted for almost 1.5 million active RTM systems at the end of 2021. The North American market is estimated to be larger than the European at around 2.6 million active units. The Asia-Pacific market is moreover estimated to represent an installed base of about 1.4 million RTM systems. South America and Middle East & Africa are smaller markets having installed bases of 310,000 units and 434,000 units respectively.

Mergers & Acquisitions

- Safran Electronics & Defense has completed its acquisition of **Syrlinks**, a French mid-sized firm founded in 2011 that specializes in radiocommunications and radionavigation, primarily for the space sector, and positioning, navigation and timing (PNT). Headquartered in Cesson-Sévigné, near Rennes, and with an office in Toulouse, Syrlinks employs 140 people.

- Safran Electronics & Defense and **MBDA** have completed the acquisition of **ArianeGroup's** 63% majority stake in **CILAS**, a French company specialized in lasers for military applications. The acquisition was carried out through a joint company created for the purpose called **HMS Laser**, equally owned by Safran Electronics & Defense and MBDA. Founded in 1966, CILAS designs, develops, produces and sells laser products and optical solutions for military and civil applications. Safran Electronics & Defense and MBDA will support the growth of CILAS, as well as the development and production of solutions designed to support France's sovereignty and strategic independence, while also facilitating the company's European positioning and export opportunities.

- Siemens Digital Industries Software has announced that it has signed an agreement to acquire **Avery Design Systems, Inc**., a leading simulation-independent verification IP supplier, headquartered in Tewksbury, MA, USA. Siemens plans to add Avery's technology to the Siemens Xcelerator portfolio as part of its industry-leading suite of electronic design automation (EDA) integrated circuit (IC) verification offerings. Siemens' acquisition of Avery Design Systems is subject to closing conditions and is anticipated to close in the first quarter of fiscal year 2023. Terms of the transaction were not disclosed.

- UK-headquartered **Volex plc**, the global integrated manufacturing specialists has announced the acquisition of **Review Display Systems Ltd.** (RDS). Founded in 1982, RDS is a UK based supplier of

electronic displays, embedded and IOT solutions, with customers in a broad range of market sectors, including medical, military, industrial and smart buildings. The company has extensive in-house engineering expertise and specialises in providing bespoke designs for OEM customers. RDS will be integrated within **GTK UK** and will retain its existing brand identity and management structure and will continue to operate from its offices in the UK and USA. This integration will strengthen the group's engineering capabilities and market opportunities for customised electronic solutions. Both GTK and RDS have a strong presence in the UK display market.

- ScandiNova Systems AB, a leading provider of next generation high-voltage pulsed power systems, has announced the acquisition of fellow Swedish company **Scanditronix Magnet AB**. Scanditronix is a well-recognized producer of magnets and coils for use in medical, industrial and research applications. The company has 30 employees and is located in southern Sweden, near the city of Växjö. Scanditronix products will be included as sub-components in ScandiNova's existing system, as well as broaden ScandiNova's offering to customers. This acquisition represents the latest step by ScandiNova to broaden its offer in pulsed power and RF systems.

- US-based **Curtiss-Wright Corporation** has completed the acquisition of **Keronite Group Limited** for US$35 million in cash. Keronite is a leading provider of Plasma Electrolytic Oxidation (PEO) surface treatment applications offering corrosion protection, wear resistance, thermal protection and electrical insulation for the defence, commercial aerospace and industrial vehicle markets, and also in semiconductor manufacturing. Keronite, which was founded in 2000 and employs nearly 45 people, is based in Cambridge, UK, and also maintains operations in Greenwood, Indiana. Keronite is expected to generate sales of approximately US$9 million in 2022 and will operate within Curtiss-Wright's Aerospace & Industrial segment.

- Leonardo has announced the signing of an agreement for the sale of the Air Traffic Management (ATM ") activities of **Selex ES Inc**., a wholly owned US subsidiary, to Indra Air Traffic, Inc., a wholly owned subsidiary of the Spanish company **Indra Sistemas S.A**. Closing of the transaction, expected in 1Q 2023, is subject to customary regulatory clearances and conditions precedent. The Air Traffic Management business of Selex ES Inc., based in Kansas, US, is a leading developer and manufacturer of en-route navigation, surveillance and precision approach and landing systems. The ATM activities of Selex ES are part of the Electronics Division perimeter but are a stand-alone business with no intra-group synergies.

- Saab has announced the divestment of its Maritime Traffic Management (MTM) operation to funds advised by **Agilitas Private Equity LLP** for an enterprise value of approximately Euro 40 million. MTM is a global provider of management solutions for vessel traffic, ports and terminals. Completion of the divestment is subject to certain conditions that need to be fulfilled before closing, expected to take place no later than March 2023. Saab will remain a minority shareholder, holding between 21 and 28% of preference shares, which will be determined at closing. The divestment is in line with Saab's strategy with increased focus on its core areas: Aeronautics, Sensors, Command & Control, Advanced Weapon Systems and Underwater Systems.

- The Finnish company **Valmet Oyj**, a developer and supplier of process technologies, automation and services for the pulp, paper and energy industries, has entered into an agreement to acquire Quakertown, Pennsylvania-based **NovaTech Automation's** process solutions business. The value of the acquisition will not be disclosed and is estimated to be completed 1 January 2023, at the earliest. NovaTech Automation's process solutions business specializes in process control and optimization solutions for batch, continuous and hybrid processes. The process solutions business has a turnover of around US$18 million and employs more than 90 people in the US and EU.

- GlobalLogic Inc., a **Hitachi Group** company and digital engineering leader, has announced that it has signed a definitive agreement to acquire **Fortech**, a leading software engineering services company based in Romania. Headquartered in Cluj-Napoca, Fortech, with over 1,100 employees, operates out of four cities in Romania to support top-tier clients across a wide range of industries. These achievements and capabilities will help GlobalLogic further expand its customer and talent base, as it aims to address the robust global demand for digital transformation. Terms of the transaction were not disclosed. Under the agreement, Fortech will continue to operate with its existing leadership and staff as a wholly owned subsidiary of GlobalLogic. The transaction is subject to customary regulatory approval and is expected to close by the end of 2022.

- Rheinmetall AG has concluded a purchase contract with **MaxamCorp. Holding S.L**. to acquire the entire share capital of the Spanish ammunitions manufacturer **Expal Systems S.A.** Completion of the transaction, for which a closing date in summer 2023 is sought, is subject to approval by the competition authorities and other regulatory checks. The purchase price agreed between Rheinmetall and MaxamCorp., which is due after closing, is based on an enterprise value of Euro 1.2 billion. In making this acquisition, the Düsseldorf-based technology enterprise is seeking to bolster its core weapon, ammunition and propellant business in a sustained way, with increased spare production

capacity and an expanded product portfolio the prime focal points. Thanks to this acquisition, Rheinmetall is gaining a valuable strategic foothold in Spain, and thus direct access to this important market. Rheinmetall sees maintaining the company's existing technology and staff as essential; all operational locations (Trubia, Burgos, Navalmoral, El Gordo, Albacete and Murcia in Spain as well as Texarkana, Texas in the USA) are therefore to remain open. Expal Systems S.A. expects sales in FY 2022/23 to be around Euro 400 million. The company's total capacity offers scope for potential annual sales of Euro 700 to Euro 800 million.

Automotive

BEVs increase EU market share

In the third quarter of 2022, the market share of battery electric vehicles (BEVs) increased further as sales continued to rise. BEVs now account for 11.9% of total EU passenger car registrations (up from 9.8% in Q3 2021). Hybrid electric vehicles also gained market share –making up 22.6% of all sales (up from 21.2% in the third quarter of 2021). Despite losing market share, diesel- and petrol-powered vehicles still dominate the market, with a combined share of 54.3%.

Registrations of petrol cars in the EU slipped by 3.3%, counting 823,360 units. As a result, the market share of petrol shrank from 39.3% in the third quarter of 2021 to 37.8% this year. Nonetheless, petrol remained the most popular fuel type in the EU.

Similarly, sales of diesel cars decreased by 4.7% to 360,596 units sold across the European Union. Diesel's market share fell by almost 1 percentage point to 16.5% of total sales (down from 17.5% in Q3 2021).

During the third quarter of 2022, battery electric vehicles (BEVs) recorded the strongest growth of all fuel types (+22.0%), with 259,449 units registered across the EU. Registrations of plug-in hybrid electric vehicles (PHEVs), on the other hand, fell by 6.0% in the third quarter of the year, as all the largest markets in the EU posted losses. With 492,011 units sold from July to September, sales of hybrid electric vehicles (HEVs) increased by 6.9%.

Continental announces further expansion in Romania

Continental has completed the expansion of its Romanian site in Timisoara, the third since its opening in 2006. The company will produce e.g., innovative User Experience solutions such as displays at the enlarged site. With an investment of around Euro 40 million, the production area will grow by over 7,000 to 18,000 sq m, which means an increase of more than 60% of the space.

However, establishing a mega factory not only marks an increase in area, but above all focuses on the technological innovation of production. The term "mega" refers to the extent of the production technologies being used and the size of the production area and products themselves. Continental has recently won additional major orders worth more than Euro 2 billion from global vehicle manufacturers for its large display solutions. This brings the awarded lifetime sales for Continental display solutions with SOP after 2022 to over Euro 7 billion.

Stellantis acquires aiMotive

Stellantis N.V. and aiMotive, a leading developer of advanced artificial intelligence and autonomous driving software, have announced that they have entered into an agreement for Stellantis to acquire aiMotive.

This acquisition enhances Stellantis' artificial intelligence and autonomous driving core technology, expands its global talent pool, and boosts the mid-term development of the all-new STLA AutoDrive platform.

aiMotive is based in Budapest, Hungary, with offices in Germany, the United States and Japan, with over 200 highly skilled employees worldwide.

Completion of the acquisition is subject to customary closing conditions, including the satisfaction of antitrust requirements.

Magna expands ADAS engineering capabilities in Romania

As the demand for safety and driver-assistance features in mobility increases, Magna has announced an expansion to its global ADAS engineering capabilities in Timisoara, Romania. Working with an engineering services and recruitment partner, approximately 300 engineers are expected to be hired by the end of 2025.

The team will work on future system, algorithm and software development - delivering next generation ADAS solutions such as automated highway driving, park assist and surround view to the global automotive market.

EMS/PCB

Kitron selected by KONGSBERG

Kitron has entered into a long-term production agreement with an expected value of NOK 750 million with Kongsberg Defense & Aerospace AS for electronic modules that are part of KONGSBERG's remote weapon station system (RWS). The move follows KONGSBERG's new 5-year framework agreement with the US Army for

its version of the Common Remotely Operated Weapon Station (CROWS).

For Kitron's production facilities in the USA and Norway, the CROWS program is expected to generate annual revenues of NOK 150 million over the next five years. The volume will depend on demand and the annual budget process in the US and may therefore be either lower or higher.

Alliance Electronics acquires Elekto and TME

France-based Alliance Electronics has finalised the acquisition EMS providers Elekto and TME. This move is part of Alliance Electronics' organic and external growth strategy to become a European leader in the high mix-low volume segment.

TME and Elekto are based respectively in Gorron and Andouillé, in the Mayenne region of France, and specialise in the manufacture and integration of electronic boards, assemblies and sub-assemblies.

Their high value-added offers range from prototyping to medium-sized production runs, for an international and diversified customer base in the fields of image processing, medical, aeronautics, defence, and industry.

The two companies join the five previous members of Alliance Electronics (ACE Electronics, Altrics France, Altrics Portugal, ATEMS, Proto-Electronics), for a total of approximately 1,000 employees.

Combined with other acquisitions in progress, it will allow Alliance Electronics to reach its objective of Euro 100 million in revenues by 2022, with the support of its financial partner Waterland Private Equity.

Neways signs contract with BAE Systems Hägglunds

Neways has signed a contract with BAE Systems Hägglunds for the mid-life update (MLU) of the CV90 medium armoured vehicle of the Royal Netherlands Army.

A total of 122 CV90s are undergoing a major modernization effort, as part of their mid-life update (MLU). The MLU is needed to keep the vehicle operationally relevant until the end of its service life in 2039. The upgrade greatly increases the capabilities of the CV90 to the latest standards.

The upgrade of the first 4 vehicles will take place in Sweden, after which the MLU for the remaining 118 vehicles will take place in the Netherlands.

Neways will produce, assemble and test high-end cable assemblies, guaranteeing important futureproof upgrades for key applications such as the vehicle's new situational awareness system – which will greatly improve the level of detail available to its operators, yielding substantial safety and reliability benefits.

Production is scheduled to start in 2023 and expected to conclude in 2026. The project guarantees work for about 7 people until 2026.

Cicor strengthens presence in Germany

The Swiss Cicor Group has announced the acquisition of 100% of the shares of Phoenix Mecano Digital Elektronik GmbH (PMDE) with sites in Thuringia, Germany and Phoenix Mecano Digital Tunisie S.a.r.l. located in Borj-Cedria, Tunisia. With this acquisition, the Cicor Group is further expanding its Electronic Manufacturing Services (EMS) business in Europe's largest market for sophisticated electronics.

The sites acquired from Phoenix Mecano AG have been able to win some of the leading companies in Cicor's target market of medical technology as customers in recent years and expect revenues of more than Euro 30 million in the 2022 financial year. The EBITDA margin is expected to be at a level comparable to that of the Cicor Group. The German sites will be integrated into the organizational unit "Cicor Germany" of the Electronic Manufacturing Services (EMS) Division. The Tunisian site will also become part of the global production network of the EMS Division.

The acquisition will provide PMDE's customers with access to the extensive range of competencies in the areas of development, manufacturing and supply chain management, the global presence and synergies in material procurement. Cicor will benefit from PMDE's location in Tunisia, which is attractive due to its geographic proximity, availability of employees and competitive cost structures.

The closing of the transaction is expected to be completed within the next 2 - 4 months and is subject to customary closing conditions. The transaction will be financed by funds from the issued mandatory convertible bond (MCB).

Neways and Magnetec expand partnership

Neways and Magnetec have announced they will expand their partnership in smart mobility for the design, development, and production of residual current devices. Such RCD devices offer unique and proven technology for measuring current leakages when charging electric vehicles.

Time to market and the ability to rapidly ramp-up production is critical in meeting the roll out of global charging infrastructure. With its global supply chain and approach to value engineering in manufacturability, component availability, series production and testing. Neways is also developing fully integrated EV charging controller modules that allow its customers to quickly ramp up their production with a ready-to-use product, by leveraging its EV charging expertise, without the need for extended and capital-intensive development efforts of their own.

Through this partnership, Neways and Magnetec combine their extensive experience of producing to the highest of automotive standards with the expertise needed for the design & development of robust safety modules. The RCD can be integrated into any charging solution as a standard and affordable off-the-shelf solution.

The RCD sensor consistently verifies potential current leakages in the charging process. Its smart software enables it to interrupt the power supply. Over the years, Neways and Magnetec have delivered over 1.000,000 electronic controls for emergency charging cables that feature this capability. The partnership is a logical next step in the development of robust safety modules that can be seamlessly integrated in any charging solution.

CGD and Neways sign GaN-based clean energy deal

Cambridge GaN Devices (CGD), the UK fabless semiconductor focused on energy-efficient GaN-based power devices and Neways Electronics have signed an agreement to develop high efficiency, photovoltaic solar inverter products based on gallium nitride technology.

The partnership, which was forged after the two companies met while collaborating on the European-funded GaNext project, has already resulted in a jointly developed 3kW photovoltaic inverter. Using eight CGD65A055S2 GaN transistors, this transformer-less, ultra-compact design achieves a power density of 1kW/L. With a Vin of 150-350VDC, a Vout of 230VAC and a switching frequency 350kHz the design has a maximum efficiency of 99.22%.

Incap invests in UK

Incap UK, a subsidiary of the Finnish EMS provider Incap, is upgrading its machinery at the factory in Newcastle-under-Lyme and adding an automated optical inspection machine with increased maximum PCB load size, angled cameras, Z-axis and full 3D capability. The investment in the new machinery will support the company in its growth and will increase the quality of service provided to its customers. The MV -3U OMNI Desktop 3D AOI machine purchased by Incap provides 100% compatibility across the 3D AOI product line.

Jabil opens Polish design centre

Jabil Inc. has officially opened a new 10,000 sq ft design centre in Wroclaw, Poland, that will develop leading-edge technologies for multiple industries including the automotive and healthcare sectors. The new design centre in Wroclaw has a range of capabilities that include electronic power design, industrialization support, mechanical design, printed circuit board design, project management and value add/value engineering.

Along with the centre, Jabil will also co-locate its European Human Resources Employee Services (HRES) team in Wroclaw. The HRES team will support 21 of Jabil's sites across Europe with HR tasks, working across 10 European countries and eight languages.

Currently Jabil employs over 17,500 people in Europe including close to eighty employees at its European Corporate Hub in Livingston, Scotland.

éolane invests in France

Supported by the regional council of Auvergne-Rhône-Alpes and the Territoires d'Industrie – France Relance program of the Government, the French EMS provider éolane plans to invest Euro 3.5 million to increase manufacturing efficiency and capacity and develop the digitalization of the company. The development of the Saint-Agrève site, which includes increasing the size by 600 sq m, should extend until the end of 2023 with the installation of the first new automated machines in January 2023 and the start of construction in March.

Offshore Electronics expands PCB assembly capabilities

UK EMS provider Offshore Electronics has added the Yamaha Z:LEX YSM20R modular pick and place machine to the production floor at its manufacturing facility in Guernsey. Over the course of a month, the investment will effectively double the number of parts placed, rising from two million to four million.

Alongside this investment, Offshore Electronics has also added the Yamaha YSM10 mounter and Heller 1707 MKiii reflow oven to its production line. Together these three units replace the older Philips Topaz placement machine, a Blundell forced air reflow soldering unit and a Philips Emerald placement machine.

Scanfil reports on US expansion

In response to growing business and opportunities in the US, Scanfil has invested in a significant expansion of its US capabilities. The US operations supports global customers with their demands for production closer to the needed end customer market to reduce lead times, remove risk of supply chains, improve communication, support circular economy, and more.

As part of the investment, Scanfil has expanded it logistics and systems integration footprint five minutes from the main facility in Buford, GA. This new space provides increased area for a few growing existing customers as well as space for new customers. The main facility will stay as the primary business, the company transferring most non-ESD required manufacturing to the new space to make space for growth in ESD sensitive products. The new operation brings on about twenty additional employees to three or four manufacturing lines with room for further growth.

Scanfil Atlanta's primary operations include high-level assembly and finished product assembly, systems integration, distribution and warehousing, and a repair as a service organization with around twenty-five technicians.

Next Gen technical communication for prototypes

BMK has launched the BMKyourproto portal a platform that enables instant digital communication between the company and its customers. The new portal is designed to prevent time-consuming feedback loops in the clarification phase, enabling the lead time for prototype production to be significantly reduced through efficient preparation of order data and at the same time, optimize pricing. Working together in a common database also ensures accuracy and transparency of the data.

Sellectronics invests in 3D AOI

Working closely with the Altus Group, the UK EMS provider Sellectronics, has invested in Koh Young's 3D AOI inspection equipment to further enhance production. The new Zenith Alpha HS+ machine improves process yields by removing the need for manual inspection. In addition, the technology incorporates AI to deliver the accuracy required for ultra-fine pitch and solder joint interreflection challenges to enhance production. It also features KSMART, a measurement-based process analysis solution that allows for Industry 4.0 implementation with reliable full 3D measurement data.

KATEK acquires Nextek

KATEK SE has concluded a purchase agreement with the owners of Nextek Inc. in Madison, Alabama to acquire all shares in the US company. The purchase agreement includes the acquisition of 100% of the shares in Nextek. This is already the second transaction in North America this year; the acquisition of the Canadian SigmaPoint Technologies Inc. took place only in August 2022. The transaction is subject to the necessary regulatory approvals and closing is expected in the first quarter of 2023 at the latest.

The acquisition not only expands KATEK's site presence in North America, but also strengthens its access in the fast-growing Homeland Security & Defense, Medical, energy, high-end Industrial and aerospace sectors, which are new to KATEK. Nextek generated profitable annual sales of US$37 million last fiscal year with approximately 170 employees. Nextek is successful in the field of highly complex products for critical applications with a focus on prototyping and small to medium volume production.

In addition to quick turn prototyping, Nextek offers sophisticated electronic assembly manufacturing, complete device manufacturing (box built) as well as analytical engineering, product engineering and comprehensive test services for well-known customers in the high-tech sector.

KATEK announces capital increase

KATEK management has announced it will increase the company's capital in order to take advantage of the exceptional growth opportunities in the current market. The company plans to use the proceeds from the offering for its M&A activities with the focus on geographic expansion, especially in North America and Scandinavia, strategic outsourcing projects as well as strengthening the solar/renewables (YTD sales plus 132%) and tele-care (plus 170%) businesses, as well as the ramp-up of the AC white label EV charging solution ghost ONE of its subsidiary eSystems.

Jaltek Joins the Silverstone Technology Cluster

UK EMS provider Jaltek has announced it has joined the Silverstone Technology Cluster, founded to help like-minded companies, working in advanced engineering, electronics and software expand their horizons and grow their business. STC is an integral part of the Oxford - Milton Keynes - Cambridge Super Cluster.

Bringing like-minded companies together and encouraging them to collaborate is very much at the heart of what the STC does, and as a not-for-profit

organisation their primary focus is to support the growth of the high-tech cluster and attract investment to the region.

PCB Technologies acquires Galil Microwaves & Microelectronics

PCB Technologies Ltd has announced it has acquired the technology and the business activity of Galil Microwaves & Microelectronics Ltd, an Israeli-based company providing sub-contracting services including highly sophisticated assemblies of microelectronic, microwave and optic components. Following the acquisition Galil's production, employees, and engineering activities will be transferred to PCB Technologies brand-new facility in Migdal Ha'emek, Israel.

ALL Circuits looking to expand in Europe

In an interview with *Evertiq*, the French EMS provider ALL Circuits announced it was looking for room to grow its operations by purchasing a new plant, preferably in France, or elsewhere in Europe to supply the local market. The company opened a 6,000 sq m expansion at its production facility in Meung-sur-Loire, in southern France, earlier this year, and that expansion is already at full capacity. The new facility would have a turnover of around Euro 100-200 million.

The company is also, within the next two or three years, looking to establish a facility in China again to serve the local market.

NOTE expands in Sweden

To meet increased demand, NOTE has signed an agreement to expand its plant in Norrtälje, Sweden. Along with other investments, both for increased capacity and efficiency improvements, the total production area of the plant will be increased by approximately 1,100 sq m. The decision is a continuation of NOTE's expansion plan where NOTE expanded the plant in Torsby during the previous year, which increased the production area in the plant by approximately 2,200 sq m. In addition, NOTE completed the acquisition of the plant in Herrljunga in July this year, which added a production area of 4,000 sq m.

Sweden is NOTE's largest market and during the year the company has seen growth of 35% excluding acquisitions. The continued expansion of the plant in Norrtälje comes from expanded collaborations with existing customers as well as collaborations with new customers.

Unimicron Germany invests Euro 12 million

Unimicron Germany has invested a further Euro 12 million in 2022 and includes a new building adjacent to the inner layer production – which was set up in 2018. The investment includes the new building, infrastructure and equipment for desmearing process, chemical and galvanic copper plating, the latest fire protection systems, as well as a new groundwater decontamination facility.

NCAB Group acquires Bare Board Consultants

The Swedish NCAB Group has signed an agreement to acquire 100% of the shares in Bare Board Consultants Srl based in Codogno south of Milano in Italy. The transaction is estimated to close in January 2023.

Bare Board Consultants, founded in 1990, serves customers in Italy and expects to reach net sales of about SEK 90 million in 2022 with an estimated EBITA of SEK 9 million. The company provides customers with PCB-solutions in the HMLV (High-Mix-Low-Volume) segment, mainly in the industrial and medical sectors. Their suppliers are located in China.

The company's employees will relocate to NCABs existing office in the area.

EMS/PCB financial round up

- Swedish EMS provider HANZA AB has fulfilled the strategy from 2018, "HANZA 2022", during which the company has more than doubled its sales and increased profits fivefold. Now the strategy for the coming years, "HANZA 2025" is launched, including new financial targets with the aim of growing sales to over SEK 5 billion, and doubling its profits. HANZA are setting aggressive growth targets partly due to a good historical performance and partly to a successful business model that encompasses advisory services, product development and a wide range of manufacturing technologies. The company is also seeing a structural tailwind for its concept as the manufacturing landscape is increasingly changing towards regional manufacturing, back-sourcing, i.e., manufacturing closer to the end customer.

- At the beginning of November, **Orbit One**, the Swedish contract manufacturer of electronics and electromechanics, passed SEK 1 billion in sales, which equates to an increase of more than 25% compared to the same period last year. As a result, the company will set a new sales record in 2022 and with strong order levels the outlook for 2023 is looking extremely positive.

EMS/PCB financial round up

The following table provides summary financial information for the leading listed EMS providers with European operations. More detailed financial information is provided in the accompanying Excel spreadsheet.

Company	Reporting Period	Sales 2022	Sales 2021	% Growth
KATEK, Germany	Nine Months 2022	Euro 495.7 million	Euro 402.6 million	23.1%
Growth in the third quarter further accelerated to 37.3% in comparison to Q3 2021, resulting in an accumulated plus of 23.1% for the first nine months of the year. Strongest growth during the third quarter was again in Solar/ Renewables (plus 131.8%) and TeleCare (plus 170.6%). The weakest performance was in Automotive (excluding eMobility/Charging) which was only at the prior year level. All indications point to a continued strong organic growth with a book-to-bill ratio of 1.1 and an order backlog for the next twelve months already at the level of current annual sales.				
Sanmina, USA	Q4 Fiscal 2022 Fiscal 2022	US$2,202.6 million US$7,890.5 million	US$1,644.0 million US$6,756.6 million	34.0% 16.8%
Sales for the Integrated Manufacturing Solutions division increased by 37.2% YoY to US$1,788.3 million (Q4 Fiscal 2021: US$1,303.0 million) and by 21.5% for the Components, Products and Services division to US$414.3 million (Q4 Fiscal 2021: US$341.0 million). By end market sales to the Industrial, Medical, Automotive & Defence markets increased by 40.0% YoY while Communications Networks and Cloud Infrastructure increased by 26.3%. For the first quarter of Fiscal 2023 Sanmina expects revenues of between US$2.1 billion and US$2.2 billion				
GPV, Denmark	Q3 2022	DKK 1,156 million	DKK 799 million	44.7%
Growth during the quarter was attributable to an increase in demand from a large number of customers as well as continuing high prices of components and materials, which boosted revenue, but also adversely affected margins. GPV expects the healthy demand from customers to continue throughout 2022 with a resulting high-capacity utilisation. However, the challenging situation with long lead times for electronic components and high component prices is also expected to persist for the remainder of 2022. As a result of the strong business activity and the high prices of materials, GPV has raised FY 2022 revenue guidance for the former GPV activities to the DKK 4.1-4.3 billion range from the previous estimate of DKK 3.9-4.1 billion. The EBITDA guidance is also raised, to the DKK 350-370 million range from the previous estimate of DKK 330-360 million. As a result of the combination of GPV and Enics, Enics will be consolidated from the start of the fourth quarter, which is expected to increase the Group's consolidated revenue for 2022 by DKK 1.1-1.3 billion.				
IMI, Philippines	Q3 2022	US$351.2 million	US$326.4 million	7.6%
The operations in Bulgaria/Serbia reported revenues of US$67.7 million during the quarter an increase of 12.3% compared to the US$60.3 million reported in the same period a year earlier while revenues for the Czech operations increased by 84.6% at US$16.8 million (Q3 2021: US$9.1million). During the first nine months of 2022, the company reported US$165 million in Group program wins (Nine Months 2021: US$287 million) of which 20% were from the operations in Eastern Europe while STI in the UK accounted for 23%.				
LACROIX Electronics, France	Q3 2022	Euro 135.4 million	Euro 70.5 million	92.1%
Sales rose sharply by 92.1% to Euro 135.4 million in the third quarter, driven by the integration of Firstronic on the one hand, and solid growth of 29.2% at constant scope on the other. The latter notably benefited from the excellent performance of the Automotive, Home & Building and Industry sectors, as well as the continuing impact of the transfer of additional costs related to components (Euro 8.2 million in Q3 2022, vs. Euro 5.2 million in Q3 2021). In total, the Electronics Activity recorded a revenue of Euro 383.5 million in the first nine months of 2022, compared with Euro 238.3 million in the previous year – a strong increase both in consolidated data (+61.0%) and at constant scope (+11.3%).				
Kimball Electronics, USA	Q1 Fiscal 2023	US$405.9 million	US$292.7 million	38.7%
For the third consecutive quarter, net sales surged to a record-breaking level, setting another all-time high for the company. Sales were in line with the company estimates as it ramped-up production on new and existing programs, and leveraged facility expansions in Thailand and Mexico. Foreign currency had a 5% unfavourable impact on net sales compared to the first quarter of fiscal 2022. Net sales for fiscal 2023 are expected to be in the range of US$1.6 - US$1.7 billion, a 19% - 26% increase year-over-year.				

Company	Reporting Period	Sales 2022	Sales 2021	% Growth
HANZA, Sweden	Q3 2022	SEK 838.4 million	SEK 597.4 million	40.3%
Sales increased as a result of new customers, increased volumes with existing customers, acquisitions and increased prices for energy and materials. The global material shortage had a negative impact on sales. Changes in currency exchange rates affected Group's sales positively by approximately SEK 24.0 million while acquisitions had a positive impact of SEK 58.9 million. Excluding currency and acquisitions, the organic growth amounted to approximately 26% during the quarter.				
Inission, Sweden	Q3 2022	SEK 438.0 million	SEK 226.4 million	93.5%
Net sales in the third quarter excluding acquired companies (Enedo SEK 122.6 million and MLB with SEK 23.1 million) and currency effects (+ SEK 6.9 million) increased by +26% YoY. The increase in sales was driven by deliveries to completely new customers beginning to reach substantial volumes. Following the acquisition of Enedo, Inission will manage the company through two business areas, Inission focused on electronic manufacturing services and Enedo on power supplies. The two operations have many points of contact and there are clear synergies both on the revenue side and the cost side.				
Norbit, Norway	Q3 2022	NOK 96.0 million	NOK 68.8 million	39.5%
The increase in revenue was due to higher activity within contract manufacturing and higher sales of R&D products and services. Prices of certain components have increased significantly due to low availability. To compensate for this cost increase, NORBIT invoices the additional cost directly to certain customers without margin. NORBIT recognised NOK 21.3 million in revenues from spot-buy invoicing in the quarter, compared to NOK 19.6 million in the corresponding quarter of last year. Adjusted for this effect, revenues grew by 52% year over year. While the underlying demand for contract manufacturing is strong, PIR's volume growth was negatively impacted by component shortages, leading to delays in production.				

-Net sales for the Swedish PCB group **NCAB** increased 35% in Q3 2022 to SEK 1,168.3 million (Q2 2021: SEK 863.6 million). In US dollars net sales increased 10%. For comparable units, net sales increased 23%, and in US dollars the decrease was 2%. Order intake increased 8% to SEK 1,011.0 million (Q2 2022: SEK 1,935.2 million). In US dollars the order intake decreased 12%, but adjusted for the elevated order intake in 2021, linked to longer lead times, order intake for the third quarter is estimated to have increased approximately 16% in SEK. For comparable units, the decrease for order intake was 4% in SEK, and 22% in US dollars. As lead times improved in the supply chain, the company delivered some of its earlier order book. Combined with certain inventory adjustments by customers, this resulted in a negative book to bill (order intake compared with invoicing) for the second consecutive quarter. However, the company expects this situation to normalise already during the next quarter. NCAB have minimal exposure to the market segments that are up till today affected by the economic downturn, such as consumer goods.

- Despite a challenging market environment, new orders for the German PCB group **SCHWEIZER ELECTRONIC** rose by +18.7% in the first nine months of 2022 compared to the volume of the same period the previous year and amounted to Euro 152.7 million (Nine Months 2021: Euro 128.6 million). In the same period, sales increased by 10.5% to Euro 99.8 million (Nine Months 2021: Euro 90.3 million). Sales to automotive customers increased by 6.1% to Euro 69.0 million (Nine Months 2021: Euro 65.1 million) while sales to industrial and other customers increased by +22.0% to Euro 30.8 million (Nine Months 2021: Euro 25.2 million).

Production

BAE Systems opens new US facility

BAE Systems has officially opened its facility in Cedar Rapids, USA. The company has invested more than US$100 million to build the state-of-the-art facility.

The site is home to BAE Systems' Navigation and Sensor Systems (NSS) business, a leader in advanced Global Positioning System (GPS) technology that provides trusted navigation and guidance for a range of missions.

The purpose-built 278,000 sq ft facility brings together the company's design and production employees into a single centre of excellence with modern manufacturing, engineering, and office space. Its design will provide flexible product flow to optimize efficiency, with room for growth.

More than 800 BAE Systems employees will work at the Cedar Rapids site as the company continues to expand its workforce to accommodate business growth.

Jenoptik further expands photonics manufacturing capacity

Jenoptik, an industry leader in high performance optical and photonic systems, has announced it is expanding its manufacturing operations in Florida, USA. The additional 7,110 sq ft expansion will be home to both open and modular cleanroom manufacturing operations, bringing the total production, engineering and administrative footprint of the facility to 77,985 sq ft.

Construction on the new assembly building will be completed in January 2023.

Verkor receives financing

Verkor has received support of over Euro 250 million, including from the European Investment Bank (Euro 49 million) and bpifrance (Euro 51 million) to secure the financing of its innovation centre (VIC) in Grenoble, which is coming to completion. This latest mechanism mobilises Verkor's solid financial ecosystem of industrial partners in the battery sector, commercial banks, investment funds, and public banks.

Located in Grenoble, the VIC is Verkor's technological and innovation centre: a 15,000 sq m building comprising an R&D lab for designing high-performance batteries, an intelligent pilot line with a capacity of 150 MWh/year, and a training centre to meet the battery sector's growing need for a specialised workforce. Construction is already well underway, with delivery set for the first half of 2023.

FREYR Battery announces plans for US gigafactory

Norway's FREYR Battery, a developer of clean, next-generation battery cell production capacity, has announced the selection and purchase of a site in Coweta County, Georgia for its planned Giga America battery plant. The initial phase of Giga America is planned to be a cell production module of approximately 34 GWh based on the next-generation of 24M's US-based SemiSolidTM production platform at an initial projected capital cost of US$1.7 billion. The company is also evaluating value accretive upstream and downstream modules as well as additional cell production lines that are expected to bring total capital investments to more than US$2.6 billion through 2029. Upon completion of all the contemplated construction phases, the Giga America complex is expected to be one of the largest battery cell manufacturing developments globally.

BSH expands in Poland

The German household appliance manufacturer BSH is adding two more production lines for its washing machine plant in Łódź. The investment project has a value of around PLN 400 million (approximately Euro 84 million). This should enable the production of new models and increase production capacity by 10%. Start -up of the new production lines is scheduled for next year.

EU to provide Euro 2.4 billion funding for satellite internet system

The Council and the European Parliament has reached a provisional agreement on a regulation establishing the EU's secure connectivity programme for the period 2023-2027. The multi-orbital constellation of hundreds of satellites is expected to provide resilient services covering critical infrastructure protection, situational awareness, crisis management, but also enables the provision of commercial services by the private sector, thereby contributing to the competitiveness of European industry. The satellite constellation is set to receive Euro 2.4 billion from the EU budget, plus a contribution from the European Space Agency (ESA) as well as private investments in the coming years.

The programme builds on the GOVSATCOM component of the EU space programme. It will take into account synergies with the other components of the EU space programme, including Galileo (satellite navigation) and Copernicus (Earth observation) systems. As well as space situational awareness capacities.

The infrastructure will be procured by the Commission through a public-private partnership via competitively awarded contracts to industry. These selected contractors will develop, validate, build and deploy the EU-owned governmental infrastructure. In addition, commercial infrastructure would also be used to provide governmental services as well as commercial services.

Filtronic opens additional UK design centre

Filtronic has announced the opening of a new design centre in Manchester, UK, focused on developing mmWave technology for satellite communications applications.

ABB E-mobility raises approximately CHF 200 million

ABB E-mobility, a global leader in electric vehicle (EV) charging solutions, has announced that it has signed a pre-IPO private placement of approximately CHF200

million for newly issued shares, led by new minority investors. The transaction will close during the fourth quarter 2022. ABB E-mobility will use the proceeds to continue the execution of its growth strategy, driven by both organic and M&A investments in hardware and software.

The private placement includes participation from the long-term equity strategy fund of Interogo Holding, a foundation-owned international investment group based in Switzerland. moyreal holding ag ("moyreal"), a Swiss single-family office with a long-standing history in the automotive industry and advised by Helvetic Trust AG, and ABB E-mobility Chairman, Michael Halbherr, are also participating in the private placement. Interogo Holding and moyreal believe that ABB E-mobility will play an important role in the transformation towards a more sustainable society. ABB remains a committed partner to ABB E-mobility with a shareholding of approximately 92%, providing continued access to funding and supporting its future growth journey.

Thales and Knorr-Bremse to cooperate on freight train automation

Knorr-Bremse, the global market leader for braking systems and other mission-critical systems for rail and commercial vehicles, and Thales, a global leader in advanced technologies have signed a Memorandum of Understanding to cooperate on the development of Automatic Train Operation (ATO) solutions for locomotive-hauled freight and passenger trains.

Henkel and LAIIER® partner to drive smart building applications based on printed electronics

Henkel and LAIIER® have announced a partnership to scale novel printed electronics solutions for smart building applications. Jointly the companies aim to drive the implementation of LAIIER´s Severn Water Leak Detector for commercial and industrial buildings and to combine their unique technology and innovation capabilities to further develop the solution. The novel sensor system solution aims to detect water leakages in buildings at a much earlier stage to minimize the high repair costs resulting from a water leak.

LAIIER created the world's first smart tape by combining printed carbon and dielectric inks from Henkel with electronic hardware and digital services.

Nokia to open new 5G and 6G R&D centre

Nokia has announced the opening of a new R&D centre focused on 5G and future 6G mobile network technology at its Portuguese campus in Amadora. The centre will create employment across several different disciplines and advance research in technologies that are vital components of current 5G and future 6G networks.

The research and development centre will create multiple highly skilled jobs focusing on the advanced development of software to support mobile networks. The centre will oversee the full cycle of embedded and real-time software development from early analysis to final delivery.

Thales Alenia Space and the European Space Agency φ-Lab collaborate

Thales Alenia Space and the European Space Agency (ESA) have signed a letter of intent to collaborate in supporting the creation of future disruptive space-based solutions in the Earth Observation domain.

Thales Alenia Space will cooperate with the ESA Φ-lab to explore innovative technologies based on Artificial Intelligence (AI) and their applications to use cases of significant interest to both entities.

Artificial Intelligence and new computing paradigms like neuromorphic, quantum, and edge computing, applied to both optical and radar Earth Observation data, are a strategic area of interest for both Φ-lab and Thales Alenia Space. Key topics of the collaboration include end-to-end learning for Synthetic-Aperture Radar (SAR) data, physically-based Artificial Intelligence to extract information from SAR data and enable object detection, recognition and classification, collective intelligence and federated learning at the edge, and the use of AI and Earth Observation in immersive-reality scenarios such as Augmented and Virtual reality for satellite and mission data management.

Leonardo receives Euro 260 million "Sustainability-Linked" financing from EIB

Leonardo and the European Investment Bank (EIB) have signed a loan agreement for Euro 260 million. The "Sustainability-Linked" financing has the purpose of supporting the Research, Development and Innovation (RDI) activities in the fields of helicopter, security, defence electronics and space, as well as the research activities at Leonardo Labs, contributing also to the fight against climate change.

The loan, which has a maximum life of 12 years and a grace period of up to four years, carries a margin adjustment mechanism based on Leonardo's achievement of specific indicators (KPIs) linked to ESG objectives.

Airbus and Renault Group to advance research on electrification

Airbus and Renault Group, worldwide leaders in the aerospace and automotive industries, have signed a research and development agreement which aims at enhancing transversalities and synergies to accelerate both companies' electrification roadmaps, improving their respective range of products.

As part of this partnership, Airbus' and Renault Group's engineering teams will join forces to mature technologies related to energy storage, which remains one of the main roadblocks for the development of long-range electric vehicles. The cooperation agreement will notably cover technology bricks related to energy management optimisation and battery weight improvement, and will look for the best pathways to move from current cell chemistries (advanced lithium-ion) to all solid-state designs which could double the energy density of batteries in the 2030 timeframe.

The joint work will also study the full lifecycle of future batteries, from production to recyclability, in order to prepare the industrialisation of these future battery designs while assessing their carbon footprint across their entire lifecycle.

SE Ventures announces Euro 500 million Fund II to accelerate climate and industrial tech start-ups

SE ventures has announced a Euro 500 million Fund II establishing the firm as one of the largest VCs focusing on climate and industrial technology. Backed by Schneider Electric, the global leader in the digitalization of industrial automation and energy management, this move builds upon a 2018 Fund I to bring SE Ventures to Euro 1 billion of committed capital. Fund II will begin deployment in January 2023, doubling down on SE Ventures' track record of success as an accelerant for category-defining companies in climate-tech, industrial AI, mobility, prop-tech and cybersecurity.

Fujitsu establishes new centre in Israel to strengthen data and security technologies

Fujitsu Limited has revealed plans to open a new centre for research and development in Tel Aviv. From April 2023, the newly established location in Tel Aviv will allow Fujitsu to further enhance its presence in Israel with a team composed of experts recruited from Israel alongside researchers from Japan and Europe. This team will be dedicated to strengthening security technology for communications networks as part of Fujitsu's global strategy for data and security, one of 5 key technology areas under the company's global R&D strategy.

amsOSRAM unveils Global Partner Network

amsOSRAM, a global leader in optical solutions, has launched a new Global Partner Network of design consultancies, module suppliers and supporting component manufacturers to accelerate customers' time to market and facilitate new business opportunities, while taking advantage of the latest optical and sensor technologies.

Partners are selected based on their technical expertise, solution offering and track record of working with customers to co-create new products. The Global Partner Network encompasses the hardware, software, tools, services and know-how required to quickly capitalize on today's megatrends without huge investment. The new ams OSRAM Partner Network is designed to give customers multiple options to procure the support that best fits their business model with the integration of advanced optical and sensor systems into end product designs.

MilDef establishes new production facility in Wales

The Swedish company MilDef has opened a new manufacturing facility at the Bro Tathan business park near Cardiff, Wales. The new facility manufactures MilDef's tactical IT platform for the £25 million RBSL contract won in 2020, as well as providing a non-EU platform for global sales of MilDef's products. The new production and office building comprises covers approximately 500 sq m.

Mekoprint opens new plant in Ukraine

To meet demand, the Danish industrial concern Mekoprint through it cables division is opening a new 3,600 sq m plant in the north-western part of Ukraine. The new factory is located next to the current production facilities in the small town of Chernyakhiv 160 km. west of Kiev. Mekoprint closed its factory for six weeks earlier this year and moved parts of the production from Ukraine to the company's factory in Poland, but now production in Ukraine is back to normal levels and capacity will increase shortly when the new factory is put into operation.

Philips-Medisize invests in Poland

To address growing production demands from customers in continental Europe Philips-Medisize, a Molex company and leader in the design and

manufacture of drug delivery, diagnostic and MedTech devices, is building a state-of-the-art medical manufacturing facility in Katowice, Poland.

Slated to open in 2022, the site will complement production sites and innovation centres in Asia, Europe, India, Mexico and North America. Phillips-Medisize also is expanding production capacity in Suzhou, China to serve both global and regional pharmaceutical and MedTech customers. Additionally, the transformation of an existing Molex production facility in Little Rock, Ark., is underway, enabling Phillips-Medisize to keep pace with ever-increasing requirements in the US for high-volume, diagnostic device manufacturing.

Semiconductors

Infineon Austria cooperates with University of Zagreb

Infineon Austria and the Faculty of Electrical Engineering and Computing (FER) at the University of Zagreb have launched an academic cooperation in power electronics. The collaboration will advance the further development of energy-efficient technologies for decarbonization as well as strengthen one of the key areas of European microelectronics expertise. The cooperation focuses on research and development of microelectronic solutions that systematically reduce energy consumption as well as on training for these research fields.

Zeiss to expand in Germany

ZEISS' Semiconductor Manufacturing Technology (SMT) segment is building a new multifunction factory in Dillfeld, Wetzlar, in addition to the existing SMT site.

The construction start is currently planned for spring 2023. With a production area of more than 12,000 sq m, the extension building will provide space for around 150 employees, who will manufacture state-of-the-art DUV lithography systems (deep ultraviolet light), among other things.

ZEISS is receiving substantial support from the city of Wetzlar in the development of the project.

Semiconductor Manufacturing Technology is headquartered in Oberkochen. Other sites include Jena, Rossdorf and Wetzlar in Germany, as well as Bar Lev (Israel) and Dublin, CA and Peabody, MA (USA).

Infineon announces plans for Euro 5 billion, 300 mm wafer fab

Infineon is planning to continue expanding its 300 mm manufacturing capacity, to enable the expected acceleration in growth of analog/mixed-signal and power semiconductors. The intended location is Dresden, Germany. Adequate public funding is required for the investment decision. With a planned total investment of Euro 5 billion, this would be the largest single investment in Infineon's history.

The move would strengthen Infineon's position as a global semiconductor leader in power systems. When operating at full capacity, the planned factory would have the potential to generate annual revenue equal to the level of the investment. The new factory is expected to create up to 1,000 new highly qualified jobs and according to planning could be ready to start production in autumn of 2026.

Cambridge GaN Devices secures new funding

Cambridge GaN Devices (CGD) the UK fabless semiconductor company that was spun out of the renowned power device group at the Engineering Department of the University of Cambridge in 2016, has raised US$19 million in Series B funding. The investment was led by Parkwalk Advisors and BGF, with participation from IQ Capital, CIC, Foresight Williams Technology and Market Capital. The investment will enable CGD to begin mass production of its range of GaN transistors for power applications.

Sale of the Elmos wafer fab to Silex prohibited

The German Federal Cabinet has prohibited the sale of the Elmos wafer fab to Silex Microsystems AB. Silex was acquired by the Hong Kong investment holding company GAE Ltd in 2015

UK government orders Nexperia to divest stake in NWK

Nexperia, headquartered in The Netherlands, has said it is shocked by the UK Government's decision to order the divestment of 86% of its semiconductor wafer factory in South Wales, known as Newport Wafer Fab (NWF), despite the acquisition being cleared by two previous security reviews.

Nexperia does not accept the national security concerns raised, stating that the far-reaching remedies which it offered to fully address the Government's concerns have been entirely ignored.

Nexperia will challenge the order and will do everything possible to keep the factory and protect its employees in South Wales.

Global semiconductor to decline 4.1% in 2023

Following a strong growth of 26.2% in the year 2021, *World Semiconductor Trade Statistics (WSTS)* revised its forecast down to a single digit growth for the worldwide semiconductor market in 2022 with a total size of US$580 billion, up 4.4%. WSTS forecast lowered growth estimation as inflation rises and end markets seeing weaker demand, especially those exposed to consumer spending.

	Amount in US$ million			Year on Year Growth (%)		
	2021	**2022**	**2023**	**2021**	**2022**	**2023**
Americas	121,481	142,138	143,278	27.4	17.0	0.8
Europe	47,757	53,774	54,006	27.3	12.6	0.4
Japan	43,687	48,064	48,290	19.8	10.0	0.4
Asia Pacific	342,967	336,151	311,005	26.5	-2.0	-7.5
Total World	**555,893**	**580,126**	**556,568**	**26.2**	**4.4**	**-4.1**
Discrete	30,337	34,098	35,060	27.4	12.4	2.8
Optolectronics	43,404	43,777	45,381	7.4	0.9	3.7
Sensors	19,149	22,262	23,086	28.0	16.3	3.7
ICs	463,002	479,988	453,041	28.2	3.7	-5.6
Analog	74,105	89,554	90,952	33.1	20.8	1.6
Micro	80,221	78,790	75,273	15.1	-1.8	-4.5
Logic	154,837	177,238	175,191	30.8	14.5	-1.2
Memory	153,838	134,407	111,624	30.9	-12.6	-17.0
Total Products	**555,893**	**580,126**	**556,568**	**26.2**	**4.4**	**-4.1**

While some major categories are still expected to see double-digit year-over-year growth in 2022, led by Analog with 20.8%, Sensors with 16.3%, and Logic with 14.5% growth. Memory is expected to turn negative in the forecast and decline 12.6% year over year.

In 2022, all geographical regions are seen to show double-digit growth except Asia Pacific. The largest region, Asia Pacific, is expected to decline 2.0%. The Americas region is expected to show growth of 17.0%, Europe 12.6%, and Japan 10.0%.

For 2023, the global semiconductor market is projected to decline by 4.1% to US$557 billion, driven by the Memory segment. In this latest forecast, this category is projected to fall to US$112 billion in 2023, dropping by 17% compared with the previous year. Some other major categories showing single digit growth like Optoelectronics, Sensors, Discrete and Analog. All regions are expected to remain flat in 2023, only Asia Pacific is estimated to decline with 7.5% year over year.

The WSTS outlook is in-line with recently released forecasts made by *Gartner* and *IC Insights*.

Gartner expects global semiconductor revenue to decline 3.6% in 2023 to US$596 billion down from US$618 billion in 2022, when the market increased by 4.0% and the 26.3% growth reported in 2021 which pushed the market to US$595 billion.

IC Insights expects IC sales to decline -6% in while combined sales of O-S-D devices are forecast to nudge slightly higher, the overall semiconductor market declining by 5%. Following the cyclical down year in 2023, IC Insights forecasts semiconductor sales will rebound with three years of much stronger growth. By the end of 2026, semiconductor sales are forecast to climb to US$843.6 billion, representing a CAGR of 6.5%.

News

Sensor sales benefit from sharp rise in average selling prices

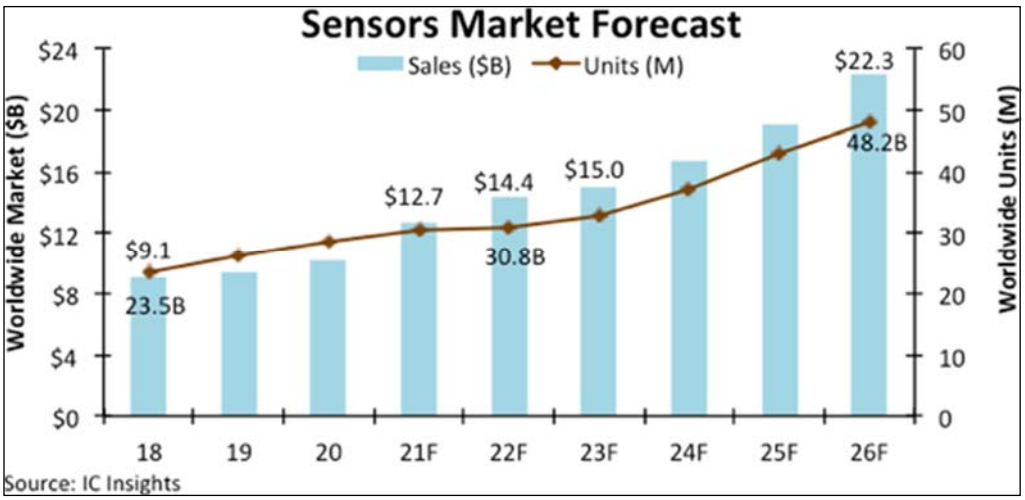
Sensor unit shipments are forecast to grow just 1% in 2022, but will nudge up to a record-high 30.8 billion devices compared to 30.4 billion in 2021. Total sensor sales in the fourth quarter were on an annual pace to grow 13% in 2022 to an all-time high of US$14.4 billion from US$12.7 billion last year, according to *IC Insights.*

Tight supplies and shortages of sensors for automotive systems, industrial equipment, and other embedded-control applications have significantly increased the average selling price (ASP) of these semiconductors.

IC Insights expects the 2022 ASP for total sensors will be 11% higher than in 2021, representing the largest one-year price percentage increase in more than two decades. Sales in two major sensor categories are expected to finish this year with double-digit percentage increases: +15% for acceleration/yaw sensors; and +20% for magnetic-field sensors (including electronic compass chips often found in navigation applications). Meanwhile, sales of pressure sensing devices (including microphone chips) are forecast to only grow 5% in 2022 due to constraints in automotive production and a drop off in smartphone shipments this year.

Pressure sensor sales are projected to increase to US$4.8 billion this year with shipments rising just 0.4% to 8.5 billion units. Revenues in the acceleration/yaw category, which contain accelerometers and gyroscope designs for inertial sensing, are expected to reach US$5.5 billion in 2022 with unit shipments rising a little less than 0.5% to 7.1 billion this year. The report also shows magnetic-field sensor sales hitting US$3.3 in 2022 with unit shipments growing 1% to 12.7 billion.

Nearly three quarters of annual semiconductor sensor sales are generated by products made with microelectromechanical systems (MEMS) technology. Tiny MEMS structures, in built silicon, detect and measure changes in pressure sensors, microphone chips, and acceleration/yaw sensors. MEMS-based devices now account for 54% of total sensor unit shipments worldwide. Sales of sensors containing MEMS technology are expected to grow 5% this year to a record-high US$10.8 billion while shipments of these devices are projected to increase 7% to an all-time annual peak of 16.7 billion in 2022.



IQE announces multi-year supply agreement with AWSC

IQE plc, a leading supplier of compound semiconductor wafer products and advanced material solutions to the global semiconductor industry, has announced the signing of a multi-year agreement with Advanced Wireless Semiconductor Company, for the supply of epiwafers for wireless applications.

AWSC, a leader in the field of compound semiconductor wafer fabrication, has been a partner of IQE for over twenty years. This three-year supply agreement covers epitaxial wafers spanning a range of AWSC's wireless products, including those which enable 4G and 5G mobile handsets and WiFi products. The agreement provides IQE with diversification opportunities into mass market power amplifier products. IQE and AWSC will also partner in the design and development of solutions for next-generation wireless applications.

Nexperia invests in sustainable alternatives to batteries

The Dutch-headquartered semiconductor company Nexperia has announced a broadening to its portfolio of power management products to include energy harvesting solutions. Energy can be harvested from light, vibrations, radio waves or temperature gradients and can therefore be used to replace batteries in low-power applications like smart wearables and autonomous wireless sensor nodes.

The expansion of Nexperia's expertise comes through the acquisition of Netherlands-based Nowi, founded in 2016. Nowi's PMICs combine the smallest PCB footprint with the

lowest BOM cost and the best average harvesting performance. The manufacturing capacity and capability of Nexperia as well as its global infrastructure will ensure that together, Nowi will be able to speed the production of these solutions enabling higher volume production and shipping by the end of 2022 and early 2023.

Infineon sign MoU to supply SiC chips to Stellantis

Infineon Technologies AG and the global automaker Stellantis have signed a non-binding Memorandum of Understanding (MoU) as a first step towards a potential multi-year supply cooperation for silicon carbide (SiC) semiconductors. Infineon would reserve manufacturing capacity and supply CoolSiC™ "bare die" chips in the second half of the decade to the direct Tier 1 suppliers of Stellantis. The potential sourcing volume and capacity reservation have a value of significantly more than Euro 1 billion.

Infineon has a market-leading role as a high-quality and high-volume supplier to the automotive industry. Infineon is preparing for the accelerated demand of the industry with significant investments. In 2024, for example, Infineon's new fab for SiC technologies will start manufacturing in Kulim, Malaysia. It will complement existing manufacturing capacities in Villach, Austria, following Infineon's multi-site strategy.

Lam Research acquires SEMSYCO

Lam Research Corp. has completed the acquisition of SEMSYSCO GmbH, a global provider of wet processing semiconductor equipment from Gruenwald Equity and other investors. With the addition of SEMSYSCO, Lam gains capabilities in advanced packaging, ideal for leading-edge logic chips and chiplet-based solutions for high-performance computing (HPC), artificial intelligence (AI) and other data-intensive applications. Financial terms of the agreement were not disclosed.

With the acquisition of SEMSYSCO, Lam also gains a state-of-the-art R&D facility in Austria focused on next -generation substrates and heterogeneous packaging, broadening the company's strong development capabilities in Europe and adding a sixth lab in Lam's global network. In addition, it brings to Lam new and expanded relationships with chipmakers and fabless customers.

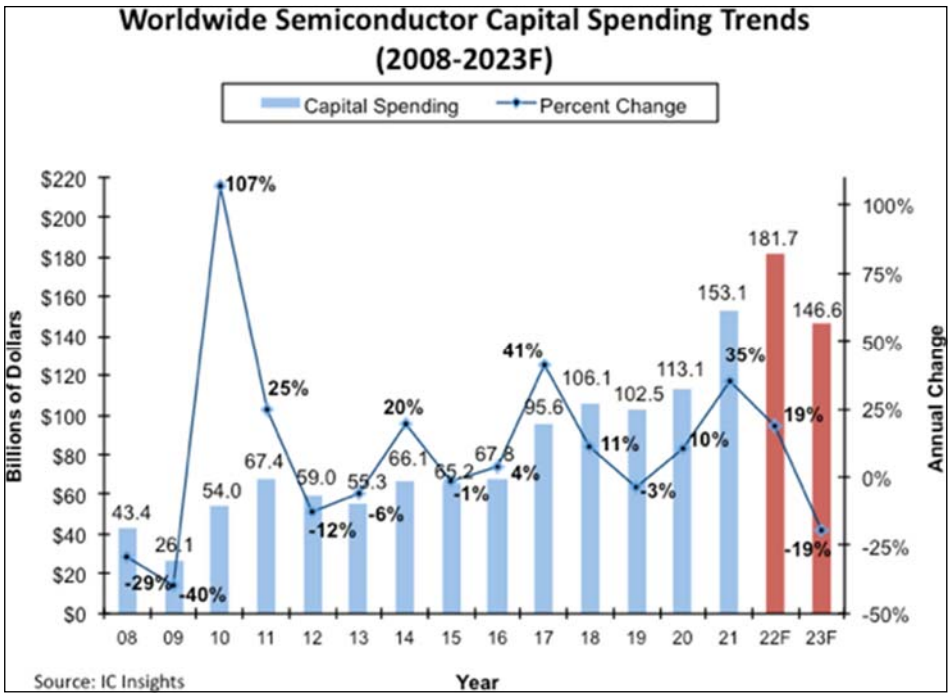
2023 semi capex forecast sees largest decline since 2008-09

At the start of this year, semiconductor suppliers were enjoying a strong influx of orders due to robust post-Covid-19 economic activity. Booming demand pushed most wafer fab utilization rates well above 90%. Many semiconductor foundries operated at 100% utilization. Capital spending budgets for 2022 were set in place to reflect the strong ongoing demand.

Halfway into the year, however, that outlook abruptly changed. Soaring inflation quickly slowed the global economy, forcing many semiconductor manufacturers to reduce their aggressive expansion plans.

As a result, *IC Insights* has revised its 2022 worldwide semiconductor capital spending forecast to show a 19% increase this year to US$181.7 billion. The revision represents a decrease from US$190.4 billion and 24% growth that was initially forecast. Though lowered from the initial outlook, the revised capex forecast will still amount to a new record high level of spending.

With the memory market collapsing in the second half of this year, and weakness expected to continue through the first half of 2023, capital spending for memory is forecast to decline at least 25% next year. Moreover, the newly enacted US sanctions on Chinese

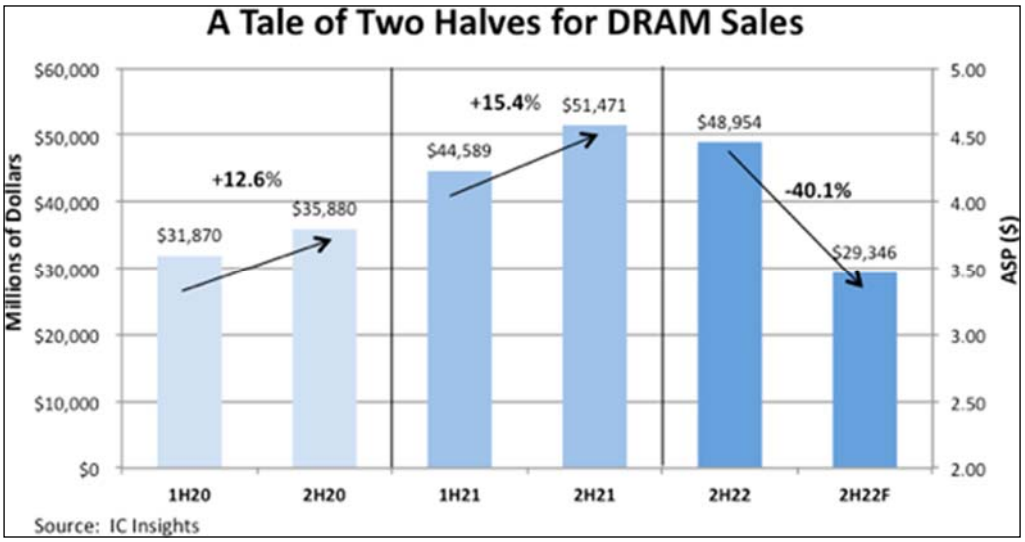


semiconductor producers, especially those regarding semiconductor production equipment acquisitions from US companies, are expected to lead to Chinese company semiconductor industry capital outlays being cut by 30% or more in 2023. Overall, these two factors are the driving force behind the forecasted -19% drop in total worldwide semiconductor industry spending in 2023 and the steepest decline since the global financial meltdown in 2008-2009.

Semi market notes

- The compound semiconductor (CS) substrate market is strongly driven by power and photonics applications and will be worth close to US$2.4 billion by 2027 with a 16% CAGR. CS has been adopted in various applications over the past decades; recently, however, SiC and GaN in power, GaN and GaAs in RF, GaAs and InP in Photonics, and LED and µLED in display, have all gained momentum. As a result, the substrate and epiwafer markets are also expected to grow.

- Weakening economic conditions and high inflation rates have slowed global demand for PCs, mainstream smartphones, and other consumer electronics. As a result, DRAM demand has spiralled downward and sales are now forecast to fall -40% to US$29.3 billion in the second half of 2022 compared to US$49.0 billion in 1H22, according to figures from *IC Insights*. For 2022 as a whole, the DRAM market is forecast to fall -18%.
- The automotive semiconductor market is showing continuous growth, which is inevitable as the penetration of semiconductor-based applications, such as higher levels of ADAS and electrification, increases. According to *Yole*, despite a relatively flat light vehicle market, the market for semiconductor chips is expected to increase from US$44 billion in 2021 to US$80.7 billion in 2027 at a CAGR of 11.1%. This represents a semiconductor chip value of ~US$550/car, growing to ~US$912 in 2027. It is also an increase in the number of chips implemented in cars, from ~820 chips today to ~1,100 chips per car in 2027.



Renewable Energy/CleanTech

Megasol and Saint-Gobain enter partnership for solar facades

Saint-Gobain and the PV manufacturer Megasol, a European provider of building-integrated photovoltaics (BIPV), have announced a strategic partnership.

As part of this, flat glass producer Saint-Gobain has acquired a minority stake in Megasol's business unit that develops and manufactures building integrated photovoltaics (BIPV) solutions at its site in Deitingen in Switzerland.

The partnership enables Saint-Gobain to extend its sustainable solutions offer for facades and to become a provider of BIPV facade solutions in Europe, one of the fastest growing segments of facade construction. At the same time, it gives Megasol access to Saint-Gobain's customer base.

Hitachi Energy and Equinor sign a strategic collaboration

Hitachi Energy, a global technology leader that is advancing a sustainable energy future for all, has announced it has signed a strategic collaboration agreement with Equinor, one of the world's largest energy companies, to collaborate within electrification, renewable power generation and low-carbon initiatives worldwide.

Initial areas of focus for the collaboration include developing standardized base designs to be applied for high-voltage direct current (DC) and alternating current (AC) transmission systems to connect offshore wind farms and Equinor production facilities to mainland power grids.

Fenecon to build new factory for large-scale energy storage

German battery system manufacturer Fenecon has laid the foundation stone for a new production site in Iggensbach, Bavaria. The newly named Carbattery Refactory will cost around Euro 22 million in the first stage of expansion.

Fenecon has already been producing large container storage units from used electric vehicle batteries since 2017. Small series production is currently still taking place at the plant in Künzing. From the end of 2023, the new large-scale production is to start in Iggensbach. The company will receive Euro 1.7 million of the investment from the Bavarian Economic Development Agency and Euro 4.5 million from the EU Innovation Fund.

Asia Pacific Electronics

Equipment/Manufacturing

- The Indian engineering services company **Quest Global** has acquired **Adept**, a product design house with capabilities in the semiconductor, automotive, and hi-tech markets. With locations in Bengaluru, Hyderabad and Vizag and clients across India, China and the United States, the acquisition of Adept expands Quest Global's footprint in India and strengthens its global presence. In particular, the company brings strong capabilities that will enable Quest Global to add significant capacity to its semiconductor offerings.

- With sales growth of more than 21% in 2022 (YtD), the French EMS provider group **éolane** has decided to increase its production capacity by building a new 4,000 sq m factory, equipped with a brand-new machine park, in Suzhou, China. Located in the same industrial park as the first plant, the new premises, which brings the éolane's total plant area in China to 11,500 sq m, are intended to accommodate éolane China customers, from the Industrial, Medical and Rail sectors, in particular CRRC, one of the world leaders in rail, and a long-standing partner. The construction of this new site, adapted to current industrial challenges, is part of the group's transformation plan, the Alizés plan, which began in 2021.

- Edwards, part of the Swedish **Atlas Copco Group**, is building a new manufacturing facility for vacuum and abatement systems used in the global manufacture of semiconductors. The new factory will be situated in Asan City, located in the Chungcheongnam-do province. The 15,000 sq m factory will join existing Edwards' facilities in Cheonan, South Korea, including the new factory which opened in June to manufacture dry vacuum pumps for the semiconductor industry. Construction of the new Asan City facility recently started and should be complete by the end of July 2023, with the factory expected to be fully operational during Q3 of 2023.

- LITEON Technology has officially inaugurated the second phase of its manufacturing facility in Haiphong, Vietnam. The facility will be highly automated, digitalized and combined with advanced technologies such as big data, artificial intelligence, and the Internet of Things, playing a key role to manufacture networking and consumer electronics products.

Automotive

- The US power semiconductor company **Navitas Semiconductor** and electric powertrain supplier **VREMT**, a subsidiary of the Chinese **Geely Group**, have announced the opening of an advanced, joint R&D power semiconductor laboratory in Ningbo, China. The new centre will focus on EV power-system developments using Navitas' GaNFast (gallium nitride, GaN) power ICs and GeneSiC (silicon carbide, SiC) power MOSFETs and diodes.

- Vingroup company, **VinES Energy Solutions**, and **Gotion** have broken ground on their joint LFP battery cell factory in Vung Ang Economic Zone (Ha Tinh) in Vietnam. The project has a total investment of more than US$275 million with a design capacity of 5GWh/year, which the companies say is the equivalent of approximately 30 million battery cells per year. The joint venture LFP battery cell factory, funded by VinES and Gotion, will produce rechargeable LFP (Lithium Iron Phosphate) battery cells, mainly used for EV batteries and energy storage systems (ESS).

- German technology company **Continental** has inaugurated its Rs 1000-Crore (approximately Euro 119 million) campus for its Technical Centre India (TCI). The one million sq ft state-of-the-art campus, is located at Electronic City Phase II, Bengaluru. The facility can house over 6,500 employees. The new campus houses hi-tech software, hardware, and vehicle test facilities for R&D as well as a number training centres. TCI is a Global Software Centre for Excellence and continues to develop competencies in areas like Artificial Intelligence, Cloud, Machine Learning, and Cyber Security preparedness for the future of mobility. The Centre is also the headquarters of the Global Software Academy whose charter is skilling, re-skilling, and upskilling employees to manage the transformation of the automotive industry into a software-centric one. In addition to these, TCI has also established itself as the Centre of Competence for developing technologies for markets and is fast emerging as a Centre of Competence for 2-Wheeler markets.

Components & Materials

- KYOCERA AVX, a leading global manufacturer of advanced electronic components has announced the opening of its US$300 million advanced manufacturing facility for ceramic and tantalum capacitors in Nakhon Ratchasima, Thailand. The new facility features 1.2 million square feet of state-of-the-art manufacturing and warehousing space. The new facility will expand KYOCERA AVX's global presence as a leading manufacturer of high-performance, high-reliability ceramic and tantalum capacitors designed to satisfy an extensive range of challenging electronics applications in the automotive, military, aerospace, defence, telecommunications, renewable energy, industrial, medical, consumer electronics, networking, and transportation industries.

- Advanced Semiconductor Engineering, Inc. has broken ground on the construction of a new semiconductor assembly and testing facility in Penang, Malaysia. The new facility at ASE Malaysia (ASEM) will comprise 2 buildings (Plants 4 and 5) with a built-up area of 982,000 sq ft, located in the Bayan Lepas Free Industrial Zone. ASEM will be investing US$300 million over a period of 5 years to expand its production floor space, procure advanced equipment, and train and develop more engineering talent. The new facility is scheduled to be completed in 2025 and will create 2,700 additional job opportunities for the local market. Together with Plants 4 and 5, ASEM will have a total of 2 million sq ft of floor space, representing a two-fold increase from the current floor space. High demand packaging product types including copper clip and image sensors will be the core focus of the new facility.

- Ennostar's subsidiary **Epistar** and **PlayNitride's** wholly-owned subsidiary **PlayNitride Display** have announced that they have teamed up to build a production line for 6-inch Micro LED epi-wafers.

- UL Solutions, a global leader in applied safety science, has announced the opening of its new state-of-the-art automotive electromagnetic compatibility (EMC) laboratory in Hsinchu, Taiwan. This new laboratory localizes services and technology to provide EMC testing to international standards and original equipment manufacturer (OEM) requirements for automotive electronic components. With advanced technologies, equipment, and the company's safety science expertise and service capabilities, the new facility helps US-headquartered UL Solutions meet the testing needs of Taiwan's automotive components industry.

- The Chinese company **HG Semiconductor** has recently started manufacturing its own 6-inch gallium nitride (GaN) power electronics epitaxial wafers.

- Shenzhen BASiC Semiconductor and **ROHM** have entered into a strategic partnership agreement on SiC power devices for automotive applications. Under this agreement, the two companies will leverage their respective strengths to innovate and improve the performance of SiC power devices and develop higher performing, more efficient and reliable SiC solutions for new energy vehicles. The first step involves supplying onboard power modules that leverage the combined technologies to several major automakers for use in electric vehicle powertrains. And going forward, both ROHM and BASiC Semiconductor will contribute to technological innovation in the automotive sector by accelerating the development of innovative power solutions centred on SiC.

Industry Outlook

Eurozone

Latest PMI data signals some welcome moderation in the intensity of the eurozone manufacturing downturn in November, which will support hopes that the region may not be facing a winter downturn as severe as previously anticipated by many. However, the survey's production index is continuing to run at one of the lowest levels recorded over the past decade. At these levels the survey is indicative of a marked annualised rate of contraction of approximately 4%. While official manufacturing data have been more buoyant – and more volatile – in recent months, such weak PMI readings have always been followed by commensurate steep declines in the official statistics.

The *S&P Global Eurozone Manufacturing Purchasing Managers' Index (PMI)* moved slightly higher in November to 47.1, from 46.4 in October. However, by posting another sub-50.0 reading – the fifth in as many months – the headline index signalled a further deterioration in the health of the manufacturing sector. Manufacturing output levels fell in November for a sixth straight month, with deteriorating order books a key reason for lower production. New orders fell at a much quicker pace than output, freeing up resources at eurozone manufacturers to clear work pending completion. Despite this, eurozone manufacturers still saw their stocks of unsold goods rise, and at a slightly faster rate. The November survey also highlighted that some customers had reportedly postponed orders.

A consequence of the recent inventory build-up and softening of demand there has been a major pull-back in purchases of inputs by manufacturers, which has in turn taken pressure off supply chains. Supplier delivery times lengthened in November to the smallest extent since August 2020. This improvement in supply is an important signal of a shift from a sellers to a buyers' market, and is hence being accompanied by a significant cooling of industrial price pressures.

Looking ahead future output expectations have picked up slightly on improved supply chain and energy market signals, the latter buoyed by warmer than usual autumn weather, but confidence remains amongst the lowest seen over the past decade. How manufacturers fare over the winter months will of course be conditional to a large extent on the weather, with any cold snaps likely to fuel concerns over energy resources and potentially hitting production and supply chains further.

Germany

The German manufacturing sector remained in contraction in November with the headline seasonally adjusted *S&P Global/BME Germany PMI* registering 46.2, the fifth straight month below 50. However, it was up from October's near two-and-a-half year low of 45.1.

November's survey showed another sharp drop in new orders across the German manufacturing sector, indicating a sustained weakening of underlying demand for goods. The rate of contraction eased since October, when it had shown the most marked decline for almost two-and-a half years but was still the second-fastest since May 2020. High energy costs, soaring inflation and an uncertain economic outlook each acted as headwinds to demand, according to surveyed businesses. Furthermore, goods producers noted a further sharp fall in new export orders, with lower sales to Asia and across Europe

Output levels likewise fell during November, although the rate of decline eased and was much slower than that of new orders. Improved material availability helped support production, according to a number of surveyed businesses, as did the clearing of backlogs of work, which fell sharply and the sixth month in a row.

Reports of improved material availability coincided with a shortening of average lead time on inputs, the first time this has been the case since July 2020. Manufacturers reported less pressure on suppliers due to lower demand for materials and components. Indeed, the quantity of purchases made by German goods producers fell for the fourth month running and to the greatest extent for two-and-a-half years. Stocks of purchases rose at the slowest rate for eight months, whereas post-production inventories increased more quickly.

The easing of supply-chain pressures in turn contributed to a further slowdown in the rate of input cost inflation, which registered one of its steepest monthly drops on record to take it to its lowest since December 2020. It was still above its historical series average, however, largely reflecting the influence of still elevated energy costs.

German manufacturers remained pessimistic about the year ahead outlook for output in November, citing concerns about energy security, high inflation, tightening financial conditions and growth prospects both domestically and abroad. Expectations did, however, improve from October's two-and-a-half year low, with easing supply-chain constraints cited as a factor.

France

France's manufacturing sector remained rooted in a downturn midway through the last quarter of 2022. The seasonally adjusted *S&P Global France Manufacturing PMI* posted 48.3 in November. Although this was up from 47.2 in October and its highest reading for three months, it remained below the crucial 50.0 threshold and therefore signalled another month of deteriorating business conditions for France's manufacturers.

The level of incoming new orders placed with French goods producers fell sharply once again in November, primarily because of generally weak demand conditions. Sufficient stock levels at clients also contributed to the downturn in new business, as did high prices charged. A slower reduction in total new orders masked a worsening trend in export performance, the latest survey data highlighting the sharpest decrease in overseas demand since June 2020.

Due to falling levels of new work, French manufacturers reduced their production in November for a sixth month in a row. Although the reduction was the weakest in three months, it was strong overall.

To prepare for lower demand, input purchasing was reduced again in November. Surveyed companies also noted their efforts to preserve cashflows and keep stock levels lean. Pre-production inventories declined for a second month in succession midway through the final quarter. with the decline in output lagging behind that seen for new orders, stocks of finished goods increased during November. Lower new business intakes allowed French manufacturers to clear outstanding orders. Backlogs of work fell for a third consecutive month during November.

Meanwhile, inflationary pressures across France's manufacturing sector eased further in November. The rate of input price inflation was the slowest in almost two years as the cost for certain items reportedly fell. That said, high energy costs and more aggressive price setting by suppliers kept cost pressures elevated. The rate of output charge inflation also slowed in November and was at its weakest since March 2021.

French manufacturers foresee the current downturn extending into the next 12 months. Survey respondents were at their most downbeat since May 2020, citing concerns regarding the European energy crisis, high inflation and persistent weakness in demand.

Italy

Italy's manufacturing sector remained mired in a downturn during the penultimate month of the year. The seasonally adjusted *S&P Global Italy Manufacturing PMI* registered 48.4 in November, to signal a fifth successive monthly deterioration in the health of the manufacturing sector. Up from 46.5 in October, however, the latest reading pointed to a slower pace of decline that was only mild overall.

November data highlighted further contractions in factory production. Although the rate of decline was the slowest in the current five-month sequence, it was still solid. Panellists linked the fall to poor demand conditions, though there were also mentions that shortages of some materials had hindered production efforts.

The latest data also pointed to a sustained downturn in client demand, as indicated by a seventh straight monthly reduction in new orders. According to anecdotal evidence, weak demand was the result of a combination of heightened uncertainty amongst clients and higher prices. Albeit the weakest since May, the latest decline in new orders was still sharp overall. Export order book volumes also fell markedly in November.

Inventories stabilised in November, with both pre-production inventories and stocks of finished goods unchanged on the month. Notably, this ended a five-month sequence of increase for the latter.

Expectations towards output in 12-months' time remain muted by historical standards, with firms citing concerns around the near-term economic outlook and inflationary pressures. Indeed, the latest PMI data point to ongoing challenges in the manufacturing sector as the year draws to a close.

Spain

Against the backdrop of elevated inflation, rising interest rates and geopolitical uncertainties, the Spanish manufacturing economy continued to suffer in the face of sharply falling levels of output and new orders during November. The headline *S&P Global Spain Manufacturing PMI* remained below the 50.0 no-change mark during November for a fifth successive month. Posting 45.7, up from 44.7 in October, the headline index pointed to a slower rate of deterioration, but a marked one, nonetheless.

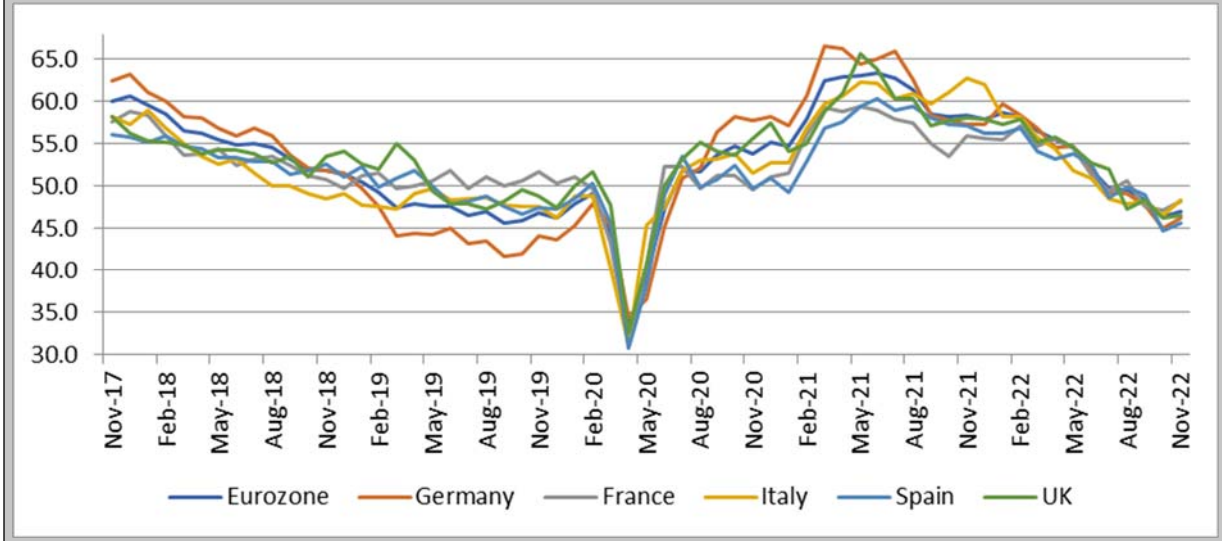
Underpinning the historically weak PMI reading was a further decline in manufacturing output, the third month in a row that production has fallen. The latest contraction was again closely linked to a decline in new order volumes, which were down for a sixth successive month. There were again widespread reports of market instability, as high inflation eroded purchasing capabilities and led to another fall in demand. This was common across both domestic and international markets: new export business fell at a similarly sharp rate to overall new orders, and for the ninth month in a row.

The difficult market environment and uncertain prospects for the coming 12 months ahead led firms to make cuts to their purchasing activity during November. It was the sixth successive month that buying had been reduced, with the rate of contraction the sharpest in two-and-a-half years. Companies signalled little need to purchase new inputs and indicated a desire to utilise stocks of inputs wherever possible, which subsequently fell for a third month in succession. Warehouses stocks of finished goods were also cut in November and for a second survey in a row.

There remain concerns amongst Spanish manufacturers that such challenging economic conditions will continue for the coming months. Confidence in the future subsequently was again subdued, and well below its historical norm. High inflation remains a factor undermining sentiment, although there was some relatively good news on this front during November as input costs rose at their slowest pace for two years. Vendors were reported to be coming under pressure to pass on reduced commodity prices from higher up the supply chain, although it must be noted that costs related to energy, electricity and transportation were reported to have remained elevated. Output prices subsequently continued to be increased markedly by Spanish manufacturing firms.

UK

The seasonally adjusted *S&P Global/CIPS UK Manufacturing PMI* edged up to 46.5 in November, from 46.2 in October. The PMI remained below the neutral 50.0 mark for the fourth month running and posted one of its lowest levels during the past 14 years.



PMI Data for Selected European Countries (Source: IHS Markit)

Manufacturing production contracted for the fifth successive month, linked to reduced inflows of new business, supply chain disruptions and ongoing shortages of numerous components on international markets. The rate of contraction was slightly sharper than in October.

November also saw the total intake of new work decline, as manufacturers experienced weaker demand in both domestic and overseas markets. Subdued client confidence and high-cost inflation continued to stymie efforts to raise sales volumes.

New export business contacted at the quickest pace in two-and-a-half years, as demand from several trading partners – including the EU, China and the US – deteriorated. Exporters reported that client hesitancy and subdued global market conditions had contributed to the decrease. Some also noted that the impact was exacerbated by issues relating to Brexit and supply chain stresses.

Purchasing activity was cut back sharply during November, reflecting elevated cost pressures, weak demand and still high stock holdings at some firms. Reduced demand for inputs also lessened the pressure on suppliers. Although vendor lead times rose for the forty-first month in a row, it was to the least extent since January 2020.

The deteriorating outlook for output and new orders reined in manufacturers' optimism during November. Confidence dipped to its lowest level since April 2020, amid reports of recession fears, weak consumer spending and subdued client confidence. Manufacturers still expect production will grow over the coming year, with 44% forecasting expansion compared to only 18% anticipating a contraction.

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