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MARKETS

GERMANY

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DIVERSIFYING DEUTSCHLAND

Disruption in a variety of areas is leading Germany to seek new solutions and new partners.

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The national government is accelerating investment into domestic renewables and hydrogen technology as Germany seeks secure energy supplies for now – and the future.

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Cleantech Cleans Up

The market for climate technology in Germany is set to double in a decade.

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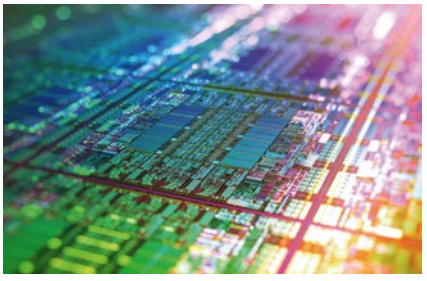

Making Microchips

Semiconductor manufacturers are choosing Germany as a production location.

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Region on the Rise

Germany's east is attracting unprecedented foreign direct investment.

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The Digital Magazine
Online at:
www.marketsgermany.com

Publisher: Germany Trade & Invest Gesellschaft für Außenwirtschaft und Standortmarketing mbH, Friedrichstraße 60, 10117 Berlin, T. +49 30 200 099-0, F. +49 30 200 099-111, office@gtai.com, www.gtai.com

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Design and Layout: Arne Büdts, Verena Matl, Jens Tappe, Manuel Köpp

Print: Kern GmbH, 66450 Bexbach, www.kerndruck.de

Circulation: 5,000

Distribution: *Markets Germany* is distributed solely by the publisher all over the world.

Order number: 21312

Cover: Kammann Rossi/ Multipicture

Federal Ministry for Economic Affairs and Climate Action

on the basis of a decision by the German Bundestag

Photo: Illing & Vossbeck Fotografie

»Diversifying supply and value chains is the watchword in Germany in late 2022.«

Dear Reader,

This issue of *Markets Germany* is very much about eggs and baskets, and why you shouldn't put all of the former into one of the latter. That's the lesson of the past two years for Germany and many other places around the world – from the corona shock to supply chain bottlenecks to the turmoil caused by Russia's war on Ukraine.

Rule number one for private investors is that portfolios should be diverse, and diversifying supply and value chains is the watchword in Germany in late 2022. This is happening for energy, raw materials and essential components like microchips. So does that mean Europe's largest economy is turning away from globalization? Not at all.

Firstly, if anything, Germany's drive to diversify is making it more global, as politicians and businesspeople look for new partners around the globe. As I write these words, Germany's chancellor and economics minister are visiting Canada. Their mission? To deepen trade and business relations with that vast nation, which is a trusted friend and ally and possesses huge supplies of raw materials.

Secondly, even when production is "reshored" – or when it is moved to Germany, as is increasingly the case with semiconductors and batteries – the country doesn't exist in a hermetically sealed national bubble. International companies like Intel and Northvolt think that this is a great time to expand to and within Germany, and the same opportunities exist for SMEs from almost anywhere in the world. In that spirit, as you peruse these pages I hope you will find some ideas that will help you diversify your business.

Dr. Robert Hermann, *CEO*
Email: invest@gtai.com

ONE TO WATCH

ultimate.ai/press

REETU KAINULAINEN, *CEO AND CO-FOUNDER OF ULTIMATE*

Reetu Kainulainen laid the foundation for the virtual agent platform Ultimate at a hackathon in Helsinki in 2016. Fresh out of university, he saw the customer support staff at the event struggling, created a demo for a support chatbot and won first place. This led to Kainulainen cofounding Ultimate, pioneering a multilingual AI in Finnish, an extremely complex language. Industry-leading brands like Finnair naturally became a client due to Ultimate's linguistic capabilities. At the same time, Ultimate attracted the attention of German software giant SAP and moved to Berlin through SAP's Techstars accelerator program. Ultimate soon secured its first ever German customer, Zalando, and now has brands like Gorillas and Trade Republic as customers. It continues to build on its momentum, investing massively in R&D, creating an inclusive team with 40 percent women, and promoting sustainable growth.

"Ultimate is rooted in technological innovation and cutting-edge research. Finland fostered these underlying values, and we then needed a bigger arena to tap into our full potential. Moving to Berlin, with its booming tech scene and fiercely ambitious talent pool, opened massive opportunities for us as a company," Kainulainen says. "Today, we're scaling customer support worldwide: We have a product that's lightyears ahead of old-school chatbots, and we have global hubs in the US, UK and Finland, and a brilliant team with over 40 nationalities."

Quick facts

NAME	Reetu Kainulainen
JOB TITLE	CEO
NATIONALITY	Finland
QUALIFICATION	Master of Science in Technology, Information and Knowledge Management
COMPANY NAME	Ultimate
LINK	www.ultimate.ai
LOCATION	Berlin
INDUSTRY	Virtual agent platform working in 109 languages
BERLIN OFFICE	Community, sales, operations, product and engineering

DIVERSIFYING DEUTSCHLAND

First corona, then the war against Ukraine have underscored the need to avoid one-sided dependencies. Politicians and businesses are placing a new emphasis on diversification – for energy, raw materials, supply and value chains, and more.

In 2021, as many of the world's leading industrial nations learned to cope with the coronavirus and restrictions associated with the pandemic were eased or lifted, many experts predicted a swift, V-shaped economic bounceback to 2019 levels. Alas, things would not be that easy. Disruptions in supply and value chains have hindered recovery and growth. Eighty percent of German companies have reported difficulties of this kind, according to German business think tank ifo. Nowhere has the problem been more apparent than in microchip bottlenecks.

Those difficulties have lent momentum to Europe as a location for semiconductor production (see page 22), as businesses on the continent have seen the value in diversifying suppliers and ensuring that key components are produced where they're actually used. As the geographical heart of the continent, Germany is at the center of this change in orientation, as exemplified by the EUR 17 billion microchip mega-fab facility Intel is building in the city of Magdeburg.

In February 2022, Russia invaded Ukraine, causing horrific casualties, suffering and further disruption to the global economy, perhaps most prominently in the areas of energy and raw materials. Germany, which until recently sourced a comparatively large share of its imported energy from Russia, came under particular pressure.

The government's reaction in the last few months has been swift and decisive. Almost overnight, diversification in the interest of energy security has been added to decarbonization as a main thrust of German policy, with the country formulating strategies to reduce and ultimately break its dependence on Russian natural gas, oil and coal. These have encompassed everything from floating LNG (liquefied natural gas) terminals and hydrogen to solar and wind farms. Within weeks, the German energy economy was repositioned and is now headed in new, far more diverse directions (see page 12).

All this change will not come without sacrifice. At the same time, it will also bring unprecedented opportunities for innovative businesses to help shape a Germany better equipped to deal with whatever further challenges the future may hold. New players are finding new opportunities in the heart of Europe, as the following pages will illustrate.

Banking on renewables:
Firms like Denmark's Ørsted and Britain's Octopus Energy are supplying Germany with green energy.

Rethinking supply chains:
Companies in Germany are finding new sources for components like microchips.

Accelerating green goals:
Germany has increased its 2030 target for offshore wind from 20 GW to 30 GW (from 7.7 GW today). Also solar energy will see expansion rates of 22 GW per year. By 2030, there will be around 215 GW solar capacity installed.

ENERGY SECURITY

To ensure greater energy independence, Germany is investing heavily in wind power, importing liquefied natural gas from Canada and elsewhere, and building a hydrogen economy.

Photo: Multipicture Kammann Rossi
Sources: Ørsted; Ørsted; Octopus Energy

MAKING A VIRTUE OF NECESSITY

Germany's transition to clean energy has been on the political agenda for years, but geopolitical developments have given it an unprecedented urgency. For businesses, this means a flurry of new opportunities, supported by lots of state funding and private investment.

Special "suction bucket jacket" foundations are installed at Ørsted's Borkum Riffgrund wind farm in the North Sea.

The war in Ukraine and the accompanying sanctions against Russia have been a wake-up call, making political and economic decision-makers painfully aware of how dependent the country has been not only on Russia and its oil and gas supplies but also on other critical raw materials, components and goods from other continents.

Sustainability has now taken on a double meaning. "Clean energy and secure energy sources are now understood as two sides of the same coin much more than they were before," says Thomas Grigoleit, director of energy, building and environmental technologies at the German government's international business promotion agency GTAI. "These developments have created a whole new dynamic. While it's true that Germany already had ambitious goals in place for the transition to clean energy and the decarbonization of industry, government action to accelerate these efforts is now proceeding at an unprecedented pace."

"It's clear that we need to speed up this transformation dramatically and that this requires massive investments along the entire value chain in the energy sector and in cleantech industries," Grigoleit adds. Short-, medium- and long-term goals have been compressed, and diversification is the new order of the day, as the issue of natural gas illustrates most vividly.

At the start of February, Germany imported some 55 percent of its natural gas from Russia. With the Nord Stream 2 pipeline between the two countries set to go operational, there was little sign of anything changing in that relationship. But on February 24, Russia launched its invasion of Ukraine. Almost overnight, there was an enormous new imperative to halt imports of Russian gas. Nord Stream 2 was summarily put on ice, and gas supplies for everything from industrial applications to home heating suddenly looked insecure. The search for alternatives was on.

Those alternatives included buying more natural gas from other exporting countries such as Norway and, of course, simply using the gas Germany does import more efficiently. By the end of the summer, before Russia suspended deliveries, Germany had reduced the proportion of imported Russian gas to just 9 percent.

THE BOTTOM LINE

Germany is investing heavily now to diversify its supplies of energy and raw materials in the future. This opens up chances for new players in its new sustainable energy economy.

"Thanks to the intensive efforts of all those involved, we have succeeded in further diversifying supply chains and gradually but significantly reducing our dependence," the German Ministry for Economic Affairs and Climate Action (BMWK) wrote in its "Third Progress Report on Energy Security" on July 20. But there was no way those initial efforts alone could fill the remaining gap. Therefore, the government turned its attention to LNG (liquefied natural gas).

Facilities to accommodate six "floating LNG terminals" on massive ships are being created in record time in four locations: Wilhelmshaven, Brunsbüttel and Stade on or near the North Sea, and Lubmin on the Baltic Sea. The ships are being rented from international companies like Höegh LNG and Dynagas. In addition to five state-sponsored floating storage and regasification units (FSRUs), as the terminals are technically known,


Photo: Ørsted/Press

a private consortium is also setting up its own facility in Lubmin.

"We have to build up new infrastructure to replace Russian gas as quickly as possible," said German Minister for Economic Affairs and Climate Action Robert Habeck. "So it's very good news that a private regasification ship is joining the government vessels." The plan is to have the first of the FSRUs go operational by the end of 2022, with the rest following within 12 months.

LNG a major stopgap

But that's not the end of the story. Belgian investment group AtlasInvest, which specializes in the energy sector, is building an LNG terminal in Wilhelmshaven together with its German subsidiary Tree Energy Solutions (TES). "The German government asked us to integrate an LNG terminal in our planned hydrogen production facility to reduce dependency on Russian imports as quickly as possible," TES Chief Commercial Officer Otto Waterlander told business newspaper *Handelsblatt*.

In May, the import terminal was included in the list of "prioritized projects" promoted by an LNG acceleration law. Construction work could thus begin straightaway. According to the company, the application procedure took just under a month during the project phase – far less than is the norm for infrastructure projects.

At least 7.5 billion cubic meters of liquefied gas will be processed here per year, which corresponds to 8.5 percent of the current German gas demand. "We are of course delighted that the German government has chosen us as a stationary terminal under this new LNG law," says Paul van Poecke, cofounder and director of TES. "It shows the vital role our project will play in ensuring the security of

4 THINGS THE GERMAN GOVERNMENT IS DOING TO SECURE A GREEN FUTURE

1

Subsidized energy efficiency

The state-owned KfW bank and the Federal Office for Economic Affairs and Export Control both offer financial assistance for energy-efficient building renovation and construction projects. The measures have been grouped into the *Bundesförderung für effiziente Gebäude* (Federal Funding for Efficient Buildings), or BEG for short.

2

Carbon dioxide pricing

The price charged for the emission of carbon dioxide (CO2) from heating with oil or gas will gradually increase from EUR 30 to EUR 55 per ton in 2025. This price is paid by both building owners and their tenants. The measure is intended to motivate property owners to renovate their buildings, making them more energy-efficient.

3

Hydrogen R&D

Companies getting started with green hydrogen technologies can access numerous support options at regional, national and European Union levels. The German government is supporting the flagship projects "H2Giga," "H2Mare" and "TransHyDE" with EUR 700 million.

4

Climate protection agreements

"Climate protection agreements" are being introduced as a new funding instrument. Investment decisions are now necessary for energy-intensive sectors such as the steel and chemical industries. To provide companies with incentives, the state plans to cover additional costs for more climate-friendly production methods until they pay for themselves.

Sources: Handelsblatt; KfW; DIHK; BMWK; Tagesschau

»The political goals offer a very high level of long-term investment security for companies in the energy and environmental sectors.«

Thomas Grigoleit, director of energy, building and environmental technologies, GTAI Berlin

gas supply, and in the long term, accelerating the energy transition and the import of non-fossil gas."

From LNG to H2

In the medium to long term, however, neither Habeck nor his ministry are great fans of LNG, which is non-sustainable. The ultimate answer to Germany's needs, they argue, will be renewably generated electricity and hydrogen (H2) as an energy carrier (see our Future Hydrogen Clusters article, page 12), and even the short-term LNG projects have been conceived with that in mind.

The AtlasInvest facility in Wilhelmshaven can be easily converted into a hydrogen terminal. The plan is reportedly to have supertankers from the Middle East deliver green energy carriers in the not too distant future. "Technically, it makes no difference to us," explained Waterlander. "We can use the same terminal either for landing LNG made from natural gas or green gas produced from hydrogen."

"Because of the design and scale of the project," wrote *Forbes* magazine, "it has the potential to replace the Nord Stream 1 or 2 pipeline in terms of energy supply."

"Examples like these show that even in the current process of rapidly reconfiguring energy infrastructure in the short term, action is being taken to ensure that long-term plans are also achieved," says GTAI expert Grigoleit.

Targeting 80 percent renewables

A major component of the drive to diversify Germany's energy supplies is thus the transition to clean energy itself – it's the pace, not the ultimate goal, that's changed here.

In July, to stimulate investments in this all-important and indeed all-encompassing area, the German government adopted a comprehensive package of measures. A total of 20 new laws and ordinances are set to trigger a major investment boost in renewables. "We are tripling the speed of the expansion of renewable energy – on water, on land and on the rooftops," Habeck said.

The core aim is to increase the share of renewables in gross electricity consumption, currently around 50 percent, to at least 80 percent by 2030. The level of ambition in Germany's long-term, clean-energy goals is a major reason for international companies to be interested in doing business at the heart of Europe.

"The current political goals of the national government offer a very high level of long-term investment security for companies in the energy and environmental sectors," says Grigoleit. "This makes expansion to the German energy sector very attractive in the short as well as the long term."

Harnessing the wind

This is also the view of Andrew Mack, managing director of Octopus Energy Germany, a subsidiary of the UK-based electricity and gas supplier specializing in sustainable energy. The company, which has so far mainly acted as a green power distributor in Germany, in partnership with electric car manufacturer Tesla, among others, is currently investing in its first wholly owned German wind farm and is thus becoming a local energy producer itself. "The current investment will only be the first of many," Mack emphasizes.

He sees great potential in the German energy market. Now is a very good time for cleantech investments in the country, he explains.

"We have reached a turning point. The government has now understood that renewables are not only the more climate-friendly but also the cheaper alternative to fossil fuels in the long run."

Above all, the government's decision to set aside 2 percent of Germany's land area for wind energy production and at the same time to massively expedite planning procedures for new projects, also in the offshore wind sector and in the expansion of photovoltaic areas, is "exactly the push that the market needs now," Mack says. Previously, site development for the production of renewable energy proceeded too slowly, was costly and fraught with difficulties. "But I am very optimistic that this is now changing."

Octopus Energy Germany has big expansion plans. The company wants to reach one million customers and more than 1 GW of installed capacity in Germany by 2024. By 2030, it hopes to have 1,000 additional employees in Germany. "Now is the time to think big," says Mack. "We want to fundamentally change the market, not just build a few small wind farms here and there," he explains. "It is important in this market to be big and to act on a large scale in order to accelerate the energy transition to the necessary speed."

An onshore turbine built by Octopus Energy. In the past year, the British company's German customer base has increased tenfold to more than 120,000 households.

FDI PERSPECTIVE: OCTOPUS ENERGY EXPANDS IN GERMANY

British energy company Octopus Energy Group has big plans for the German wind energy market.

Octopus Energy Generation's fund management team is targeting 1,200 megawatts of renewable generation projects like wind and solar farms by 2030 in Germany. Its first onshore wind farm, "Gaishecke," with a capacity of 35 megawatts is being built near Frankfurt. Octopus entered the German market in November 2020. Since the end of 2021, it has been supplying German Tesla Powerwall customers with green electricity. In the past year, Octopus's German customer base has increased tenfold to more than 120,000 households. By the end of 2024, the company aims to have one million customers across Germany. According to forecasts, Germany will become Europe's largest wind market in the next five years. "We have ambitious plans and we're looking to invest several billion euros to rapidly scale up renewable energy in the country," says CEO Andrew Mack. "This will help boost the country's energy security and accelerate its transition to a cheaper, greener energy system."

COMPANY:
Octopus Energy Group

LOCATION IN GERMANY:
Munich

PROMINENT INVESTOR:
Former US Vice President Al Gore and his investment fund have put the equivalent of over EUR 500 million into the Octopus Energy Group.

3M
Clients worldwide

120,000
Clients in Germany

Photo: Octopus Energy/Press

JÖRG KUBITZA

Jörg Kubitza is the Danish energy company Ørsted's country manager in Germany. He sees the German government's plans for offshore expansion as a long-term strategy for diversification: "We naturally welcome the increase in expansion targets and absolutely support the political plans and intentions of the German government and the Ministry for Economic Affairs and Climate Action," he says. "It is exactly the right signal that the expansion of offshore wind power will enjoy priority over other forms of utilization. This is an important step toward achieving the climate targets. For us, Germany is a core market in Europe and offers a good, existing logistics structure and a value chain for offshore wind."

Offshore and onshore

The new dynamic in the wind energy market is also illustrated by a recent investment by the Danish energy company Ørsted. The company is building the Borkum Riffgrund wind farm in the North Sea, 50 kilometers off the German coast, with a total capacity of 913 megawatts delivered by 83 wind turbines.

This will make the wind farm the largest in German waters to date, capable of supplying more than one million households with green energy as early as 2024. It is the first large-scale offshore project to be realized in a long time – but only the first in a row of planned new projects.

The political framework conditions for entrepreneurial activity on a grand scale have never been better. This is true not only in energy production but in many related cleantech industries. “Security of supply has now become more of a focus overall as an economic policy goal: This applies not only to energy raw materials but to the supply of critical raw materials and goods as a whole,” explains Manfred Fischedick, scientific director of the German sustainability think tank Wuppertal Institute.

The need for investment is enormous. “In Germany, and also in the whole of Europe, we will have to bring back industrial production that has been offshored,” Fischedick adds. “Also, we will have to manage the conversion to a circular economy that can recycle critical raw materials much more efficiently than before.”

Just as Germany is reducing its dependence on Russian gas, it also wants to become more independent in other areas in the coming years. “We see, for example, that we still have strong dependencies on Chinese manufacturers and raw materials suppliers in the construction of solar plants,” says Fischedick. So the time is also good to establish new solar production sites in Germany and Europe. The technology is currently in the middle of a generational shift, presenting an opportunity for Germany to place itself at the front of the learning curve again in terms of research and development (see our article on climate protection tech, page 14).

The situation is similar in battery production and in the restructuring of basic and heavy industries for more climate-friendly production. New electrolysis plants, factories for the production and recycling of batteries and solar panels, more energy-efficient heating systems for industrial companies and systems for the supply of hydrogen will all need to be built to support the green industrial revolution. “In the coming years and decades, we will see huge investments to keep Germany attractive and competitive as an industrial location,” says Fischedick.

Photo: Ørsted/Press

THE HEATING REVOLUTION

About half the energy consumption in Germany is due to heating and cooling, and most of it still comes from fossil fuels. To meet its climate goals and energy security needs, Germany urgently needs a turnaround. The country has set a target of completely switching to climate-neutral heat by 2045. With heating bills soaring, heat pumps are currently all the rage: Viessmann, Vaillant and Bosch recorded record turnover in heat pumps in 2021, and all indications are that those revenue levels will be shattered in 2022.

80 %

OF GERMANY'S ELECTRICITY SUPPLY MUST COME FROM RENEWABLES BY 2030.

47 %

OF ELECTRICITY IN GERMANY WAS GENERATED FROM RENEWABLE SOURCES IN Q1/2022.

593

PAGES ARE CONTAINED IN THE "ACCELERATION PACKAGE" FOR GERMAN ENERGY INDEPENDENCE.

2 %

OF LAND IN GERMANY IS TO BE RESERVED FOR WIND ENERGY PLANTS.

Source: BMWK

Sources: BMWK; Federal Statistical Office

There is a growing trend for companies to look to supply their energy needs from 100 percent renewables, preferably on site or at least locally. And that could prove a competitive advantage not just for firms already in Germany but for businesses who come to the country.

"It's therefore now attractive for companies to settle in a location like Germany, which is already very far advanced in terms of renewable energy in international comparison," says sustainability expert Fischedick. "In early 2022, we had a monthly renewable power share of almost 60 percent of the total supply. You have to look a long time to find a renewables share in supply that high in other countries."

When it comes to establishing (or re-establishing) production capabilities, decision-makers in business and politics are being careful not to allow any new dependencies to arise. "But this does not mean that international businesses are no longer welcome," says GTAI expert Grigoleit. "On the contrary, we need much more speed now. We have to invest in many places at the same time. International businesses and partners are highly welcome."

So Germany is, and will remain, a very open economy, even if it now plans to reduce some of its dependencies on the global markets by increasing domestic energy capacity and seeking new supply relationships.

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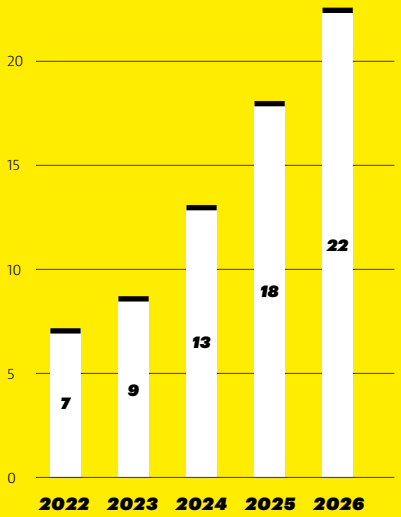
GTAI director of energy, building and environmental technologies

MORE SOLAR, MORE WIND

Expansion paths for wind and photovoltaics in Germany (additions in GW)



Source: BMWK

GERMANY'S Future Hydrogen Clusters

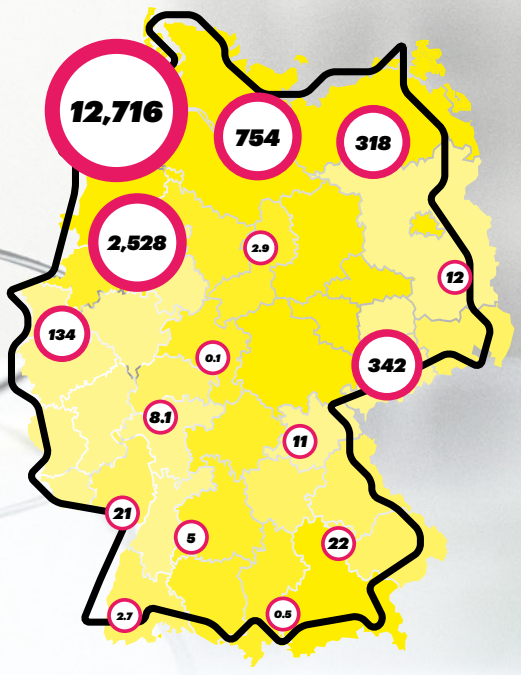
Germany's accelerated transition to renewables has further underscored the importance of green hydrogen, the carrier needed to exploit renewables to their fullest. A national strategy is in place, but how is it being realized on the ground? The town of Leuna provides some answers.

Continued research on hydrogen is vital for Germany's transition to clean energy and energy security.

HIGH-GROWTH, HIGH-IMPACT INDUSTRY

Areas in Germany with growth potential for the hydrogen industry (in GWh)

More information: www.wasserstoffatlas.de



Source: ETR, "Wasserstoffpotenziale in den Regionen im Strukturwandel"

Photo: picture alliance/dpa/Martin Schutt

There are big things afoot in Leuna, a town of just 15,000 inhabitants and part of central Germany's "chemical triangle." Ammonia has been processed there since the 1900s and it's one of the most important German locations for mineral oil. But soon it may be better known for hydrogen.

The renowned Fraunhofer Society opened a hydrogen lab in Leuna in 2021, where it has since been testing various electrolyzers for the production of hydrogen (H2) from renewable energy. Gas and engineering multinational Linde is a key partner in the project and buys green H2. But it's also building a massive 24-megawatt electrolyzer of its own. One of the largest in the world, it will be able to produce 3,200 tons of green H2 annually – enough to power 600 fuel cell buses. "Hardly any other site offers such a wide range of hydrogen-related plants and products," explains Thierry Rousson, head of product management Hydrogen & Syngas at Linde.

Leuna is a prime example of how traditional German industrial regions are adapting to profit from the creation of a new hydrogen economy. Economist Michael Bräuninger from the Economic Trends Research institute recently published a study that identified 135 regions with great hydrogen potential. "Especially in the lignite mining areas, which have long provided cheap energy, hydrogen offers great opportunities," says Bräuninger.

Making the hydrogen transition

The researchers grouped the regions with the greatest potential for H2 production into four clusters: Northern Germany, North Rhine-Westphalia, Central Germany and Berlin-Brandenburg-Lausitz to the east. These areas will receive lots of state assistance to transition to H2. "Significant investment in production and distribution infrastructure is needed to build the hydrogen economy," Bräuninger explains.

Jürgen Ude, state secretary for structural change and major investments in Saxony-Anhalt (the region Leuna is part of) describes green H2 as "a true all-rounder" and points out that Saxony-Anhalt, with its mining history, offers "ideal conditions" for nurturing an H2 energy economy. The fossil fuel industry already produces 3.6 billion cubic meters of conventional (grey) H2 per year, which is consumed by regional companies. "The region already has large industrial production capacities for hydrogen, but it's still mainly produced from natural gas," says Ude.

Furthermore, a 157-kilometer-long H2 pipeline connects production sites and storage facilities, and an even longer pipeline linking to the Baltic Sea and western Germany is under construction. When finished, this will form part of a "European backbone" for green hydrogen.

Different strokes

The various regions all offer specific advantages. Berlin-Brandenburg-Lausitz, for example, benefits from the high demand for eco-friendly heating and mobility concepts from the capital city, Berlin. Brandenburg, which is sparsely populated, has also had ample land to build the required infrastructure. By contrast, property comes at a premium in highly populated North Rhine-Westphalia, but there is huge industrial demand, great expertise, a highly qualified workforce and a well-established industry.

Thus, the German government is pursuing different approaches to strengthen the H2 potential of different places. "Individual concepts must be customized for each region," Bräuninger says. Cooperation and knowledge transfer is the key to success – the regions must network with the important players in R&D and with investors. "This way, they accelerate the transfer of research into practice and maximize the impact of their projects," he adds.

In April, Minister for Economic Affairs and Climate Action Robert Habeck pledged to greatly expand green H2 supply chains. In June, the funding program H2Global Foundation also invited tenders for various green H2 derivatives – the national government is funding it with EUR 900 million. The *Atlas of Hydrogen Networks in Germany* also provides invaluable advice and support for hydrogen SMEs.

THREE FACTS ABOUT H2:

135
Number of regions with high hydrogen potential in Germany
Source: Economic Trends Research

800 TWh
Potential demand for green hydrogen in Germany by the year 2050
Source: Fraunhofer ISI

10 GW
Planned hydrogen generation capacity in Germany by the year 2030
Source: BMWK

THE BOTTOM LINE

Germany has accelerated its efforts to establish a hydrogen economy in the interests of energy security as well as climate protection. This has created business opportunities all over the country.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GTAI experts for green hydrogen

CLIMATE PROTECTION »MADE IN GERMANY«

Germany's high level of innovation, large domestic market and rapidly growing renewable energy capacity are attracting international cleantech businesses. Solar parks, wind farms and hydrogen plants are popping up all over the country, accompanied by an electromobility boom.

Much of what needs to be done for Germany and Europe to reach their energy goals is known, but a lot still needs to be discovered. This is where cleantech comes in. Take the Swedish company Svea Solar, which recently expanded its operations across Europe, including to Cologne. It connects its customers to a grid that is shared, efficient and 100 percent renewable. "We are exploding in our various markets, and we will be growing 100 percent this year," Erik Martinson, cofounder and CEO, told EME Outlook. "In order to make a positive impact on the climate we need this growth, and alongside this, ensuring our positive customer experience and bringing in the most talented people in the space are all paramount."

Germany is a natural fit not only because of its huge market and eco-conscious society, but for its repository of scientific and research excellence. This May, the Fraunhofer Institute for Solar Energy Systems achieved a major breakthrough, engineering a solar cell with a record 47.6 percent efficiency. "In our research, we aim to make concentrating photovoltaics even more efficient and competitive, as we believe that this is the most sustainable form of renewable electricity," says head of department Frank Dimroth. This combination of entrepreneurial ambition and technological acumen is driving growth in this exciting new sector.

Northvolt is one of many companies attracted by clean energy and cleantech in Germany.

A quantum leap

The market for German environmental technology and resource efficiency was around EUR 400 billion in 2020. But the total volume is predicted to more than double by 2030, reaching EUR 856 billion. "Germany has a pioneering role: A huge market for sustainable technologies is emerging here," says Thomas Grigoleit (see focus story, pages 4 ff.). The rise of German cleantech means that investments in innovative technologies are in demand here earlier than in some other countries. "The demand for green hydrogen for industrial applications, for example, is already very acute in Germany," says Manfred Fischedick, scientific director of the sustainability think tank Wuppertal Institute. Technologies such as "direct air capture," the direct extraction of CO2 from the atmosphere, are also in great demand, he adds.

This is one of the reasons why the Swiss company Climeworks, which specializes in this innovative technology, has also come to Cologne. "Germany has been a pacesetter when it comes to renewable fuels and materials made from CO2, which is known as Power-to-X," says Jan Wurzbacher, joint CEO of Climeworks. "We plan to establish ourselves as key partners and suppliers of CO2 from air for the emerging Power-to-X sector." The company has raised almost USD 784 million for its pilot projects.

THE BOTTOM LINE

Cleantech is taking off big-time in Germany, as innovative companies, large and small, are flocking to the heart of Europe.

Sun, wind and mobility

A strong argument for Germany as a cleantech location is the easy availability of renewably generated electricity, in particular solar and wind. Renewable energy sources play a key role in any cleantech company's choice of location. "The more domestic renewables produce cheap

Photo: Northvolt, press photo, Svea Solar/Press

Erik Martinson, CEO and cofounder of Sweden's Svea Solar, which has expanded to Cologne

Photo: Svea Solar

FDI PERSPECTIVE: SWEDISH COMPANY SHINES BRIGHTLY IN SOLAR

Svea Solar, founded in Stockholm in 2014, is one of the largest solar solution providers in Europe. In 2020, the Swedish company expanded into other European countries, including Germany, Belgium, Spain and the Netherlands.

Decisive factors for the German location included the high local demand for solar solutions, as well as falling prices of photovoltaic systems and increasing awareness of climate change. What distinguished Germany from other European locations, says David Gibson, managing director of Svea Solar's German office, was the large number of funding opportunities. "In particular, transfer initiatives that ensure innovative technologies succeed in entering the market, that link science and industry, and that are supported with public funds." Another advantage was the tightened regulatory environment for climate protection, which clearly benefits cleantech companies.

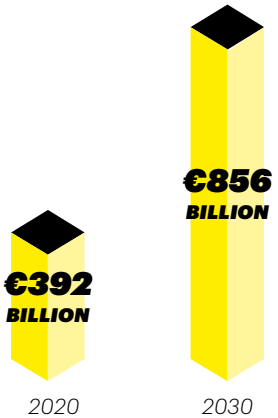
and clean electricity, as well as heat and hydrogen, the more attractive Germany becomes for companies that already make green energy a prerequisite for their location decision," explains Simone Peter, president of the German Renewable Energy Federation.

This helps explain the boom in innovative, electromobility companies in the northeastern state of Brandenburg: US carmaker Tesla with its first European gigafactory; German–Canadian cleantech company Rock Tech Lithium with the world's first closed-loop lithium hydroxide production site; and German chemical giant BASF with a factory for battery parts and a pilot plant for advanced battery recycling.

Brandenburg is seeing a boom in gigantic solar parks. In late 2020, power company EnBW began operating the Weesow-Willmersdorf Solar Park, at the time the largest (187 MW) such facility in Germany. And in March 2022, it completed another XXL (150 MW) park in Gottesgabe. Further north, Schleswig-Holstein is attracting companies with its powerful winds – the region fed a total of 24.4 terawatt hours of wind electricity into the power grid in 2020. That attracted Sweden's Northvolt, which manufactures environmentally friendly battery cells, to the town of Heide. "Our philosophy is that new energy-intensive industries like battery manufacturing should be located in close geographic proximity to where the clean energy is generated," explains Peter Carlsson, cofounder and CEO of Northvolt.

GERMAN CLEANTECH MARKET TO DOUBLE IN A DECADE

Market volume of environmental technology and resource efficiency in Germany



Source: Roland Berger

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IN BRIEF

People around the world admire the spirit of invention that drives the German economy. Here we spotlight some of the trends and research projects coming from Germany's east.

Photo: ZEISS press photo

SMART GLASS THAT CAN TRACK, MEASURE AND FILTER

An award-winning glass from ZEISS integrates microtechnologies

The winner of the 2021 Thuringia Innovation Prize in the category "Light & Life" was ZEISS Microoptics from Jena for its highly specialized, multifunctional "smart glass." The new technology utilizes an invisible microstructural lens integrated into the surface of the material for protection, detection, illumination and filtering – without significantly reducing its transparency. The smart glass is capable of facial recognition and eye tracking without visible optical systems. It can be used in smart homes, for instance, to filter sunlight, measure temperatures and display information.

"You can introduce multifaceted functions into surfaces of whatever size you want," explains the head of Zeiss Microoptics, Roman Kleindienst, in a company statement. "It's an absolute innovation that should elicit great interest in areas like augmented reality and in the automobile industry."

www.zeiss.com/corporate/int/innovation-and-technology/zeiss-ventures/portfolio.html

CYBER SECURITY COMPETITION

Government agency starts program providing defense against cyberattacks

Last July, the German government's Cyber Agency in the city of Halle in Saxony-Anhalt launched its largest-ever competition, worth EUR 30 million. The topic is "Existential Threats from the Cyber and IT Realm," focusing on areas of national security and defense. The program is scheduled to run for five years. Successful projects will be oriented around the pillars of "prevention," "detection," "reaction" and "attribution." The competition announcement specifically mentions artificial intelligence as a tool for identifying and minimizing weak spots and rapid detection and response to cyberattacks.

The Cyber Agency was founded in 2018 as the Agency for Innovation in Cybersecurity in the wake of a series of hacks and data breaches worldwide and in Germany. It has EUR 230 million at its disposal. The majority of these funds are earmarked for external research projects.

www.cyberagentur.de/ (German only)

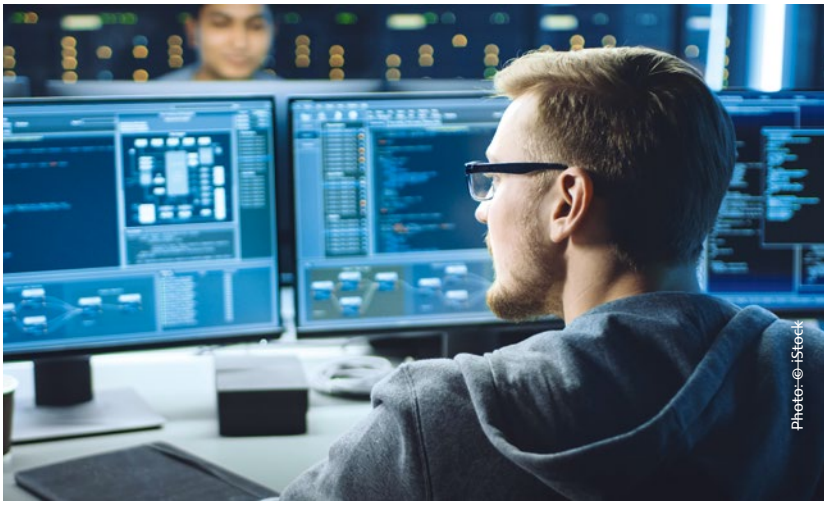


Photo: © iStock

"NEWCYCLING" OF PLASTICS

New technology can make "virgin" granules from waste plastics

Photo: VAUDE press photo

One challenge with recycling plastics is material degradation. A recycled plastic bag, for example, may not be of the same quality as a new one. To address this issue, the company APK AG from Merseburg in Saxony-Anhalt has a solution it calls "Newcycling." According to APK's website, the technology is capable of producing "pure granulates with properties similar to virgin plastics" from mixed plastic waste. Unlike chemical recycling, plastic is retained and re-polymerizing is unnecessary. In contrast to conventional mechanical recycling, there is no material downgrade, also known as downcycling. The company, which was founded in 2008, has used the Newcycling process to produce recycled material on an industrial scale since 2016. Its customers include VAUDE, makers of fashionable plastic handbags and luggage.

www.apk-ag.de/en/

LUTHER PROMOTES LITHIUM

Research center will promote lithium-based technologies

»We need at least 10, maybe 15, lithium factories here in Europe.«

ITEL head Ralf Wehrspohn

The Martin Luther University of Halle-Wittenberg has inaugurated the Institute for Technology and Economics of Lithium (ITEL), a new interdisciplinary research center to promote lithium-based, CO2-neutral circular economies in Germany. It's also promoting a dramatic increase in lithium production in the EU.

"We need at least 10, maybe 15, lithium factories here in Europe," ITEL head Ralf Wehrspohn told regional broadcaster MDR. "That entails investments of up to EUR 10 billion. They will of course also create jobs requiring skills that are a lot like those people currently employed in the coal industry have."

The initiators of the institute are three companies: Papenburg Waste Management, Knauf Plaster and Rock Tech Lithium. As a collaboration between academia and industry, the institute is, in Wehrspohn's words, "unique in Germany" and presents "great chances for a technological advantage."

www.lithiuminstitut.com/

A STROLL DOWN SILICON ALLEE

Start-ups are booming thanks to a supportive ecosystem

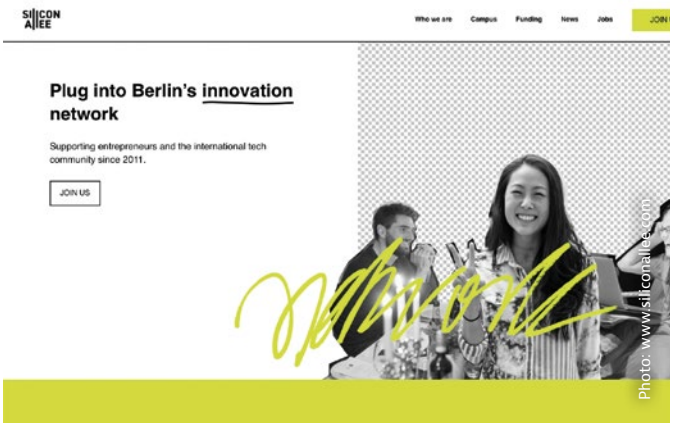


Photo: www.siliconallee.com

Berlin may have a long way to go to compete with Silicon Valley, but VC investments in the German capital are increasing exponentially – thanks in part to an innovative infrastructure that includes initiatives like Silicon Allee.

Its 7,500-square-meter campus offers both office and living space and promises a "first point of entry to Berlin's tech scene." It provides a range of services including start-up funding, trend reports, consulting and space for events. Companies currently or formerly on campus include Klarny, Point Nine, Drivy, zenloop and Klara.

More information about getting involved is available on Silicon Allee's website.

www.siliconallee.com

BACK TO THE FUTURE?

GDR-era technology makes a comeback in hydrogen storage

Hydrogen technology start-up AMBARtec from the Saxon city of Dresden has developed an approach to hydrogen energy storage that's both old and new. Instead of putting H2 in containers for transport, the firm's HyCS technology stores it in iron. The hydrogen is then released at the destination using steam.

The process is a modified and refined version of a technology first developed in the Communist German Democratic Republic (GDR) but largely forgotten after German reunification. The advantage is extremely high storage density. "Our HyCS storage systems are the most compact H2 storage systems known today," asserts the company's website.

www.ambartec.de/en/

Photo: AMBARTEC press photo

The Dresden start-up AMBARtec has revitalized a technology for storing hydrogen in iron containers that dates back to the GDR era.

Germany's LATE BLOOMER

The east of Germany is catching up, attracting a series of high-profile, big-ticket international business expansions. The region is finally delivering on a 30-year-old promise.

Eastern Germany has excellent higher education opportunities and a world-class research landscape, as well as greater gender equality in the workplace.

Photo: Stokkete, Adobe Stock

RECENT FOREIGN DIRECT INVESTMENTS IN EASTERN GERMANY

COMPANY	ORIGIN	LOCATION	PROJECT	VOLUME *in million EUR (minimum)*
Intel	United States	Magdeburg, Saxony-Anhalt	Construction of two semiconductor factories	17,000
Tesla	United States	Grünheide, Brandenburg	Construction of an electric car factory	6,000
Iberdrola	Spain	Mukran, Mecklenburg-Vorpommern	Construction of two offshore wind parks by 2024 and 2026	800
Rock Tech Lithium	Canada	Guben, Brandenburg	Europe's first lithium converter to build batteries for e-cars	170
Kedali	China	Arnstadt, Thuringia	Production site for ca. 60 million battery components	290
Vodafone Research	United Kingdom	Dresden, Saxony	Global center for research, development and innovation	200
UPM Group	Finland	Leuna, Saxony-Anhalt	Bio-refinery, for sustainable basic chemicals produced from wood in the region	550

Source: GTAI

Blossoming landscapes – that was the flowery phrase West German Chancellor Helmut Kohl used in 1990 to describe the future of the former Communist east when it was being incorporated into the Federal Republic. But the regional economy did not immediately flourish after reunification, despite Germans paying a special "solidarity surcharge" in their taxes. In fact, over the three decades that followed, many worried that Germany's east would be forever left behind.

Those concerns have dissipated in the past few years, as companies like Intel, Tesla, CATL and others have expanded east. While GDP in western Germany was almost three times as high as in the east in 1991, today it is only 1.4 times. Of course, one source of eastern attraction is access to what is known as the "GRW" cash incentives program ("Joint Task for the Improvement of Regional Economic Structures"). Another advantage is that labor and labor costs are lower than in the west.

But there's more to it than that. "Silicon Saxony," as the populous eastern state is now known, is home to numerous microelectronics, semiconductor and software companies. One of them is the US manufacturer GlobalFoundries. The company has been producing chips in Dresden since 2009. "Dresden has a large network of suppliers and service providers," says Jens Drews, director of government relations at GlobalFoundries. The German outpost plans to increase production capacities by 250 percent.

Saxony was the leading hub for microelectronics in Communist East Germany. That solid basis, combined with a host of economic reconstruction programs in the eastern states, has yielded a sensational catch-up process.

Other regions have developed new areas of specialization. Brandenburg, for instance, is increasingly becoming synonymous with batteries. Canadian cleantech company Rock Tech Lithium is expanding to the town of Guben, not far from Tesla's massive gigafactory in Grünheide. It will begin producing climate-neutral lithium from 2024. "A state-of-the-art cluster for electromobility is currently being created in Brandenburg," says Markus Brügmann, CEO of Rock Tech Lithium. "From our lithium processing to battery and cell production to e-car construction, everything that is important to us and for which we are important will be here."

One big selling point for the eastern states is their flexibility and willingness to meet businesses' needs and ability to fast-track development plans. "Intel went to Magdeburg in Saxony-Anhalt because they wanted them the most," says Holtemöller. It was a similar story with Elon Musk and Tesla in Brandenburg. Jörg Steinbach, the region's minister for economics, took a personal interest in the project, and now – just two years after construction began – cars are already rolling off assembly lines.

"In general, the population is very positive toward industry," says Silke Poppe, the GTAI division director for eastern Germany. That openness to change extends to renewable energy facilities. Some 40 new onshore wind turbines were built in Brandenburg in 2021 – more than four times the number than in Bavaria, which is bigger and more populous. "Especially in terms of climate protection, the eastern states sometimes outstrip the western ones," says Poppe. According to a survey by Deutsche WindGuard consultancy, Brandenburg now has the second-most onshore wind turbines among the regional states. "The availability of renewable energy is an enormous advantage when it comes to climate-neutral production, which is important to environmentally conscious companies," explains Poppe. "Plus the infrastructure is newer, from rail networks to schools and universities. And we have a state-of-the-art research landscape here." The faculty–student ratio in Thuringia, for example, is one teacher for every 43 students – the best in Germany. These factors, as well as the lower overall cost of living, affordable property prices, greater gender equality in the workplace (a legacy from the Communist era when women shared the work) and affordable, quality childcare have a positive impact on attracting professionals to settle in the region."

All in all, there has never been a better time for international businesses to come to eastern Germany – before it catches up with the west.

GENDER EQUALITY IN THE WORKPLACE

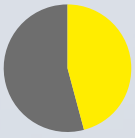
Share of women at the first and second management level in companies in western and eastern Germany in 2018

1ST MANAGEMENT LEVEL:

31%
IN EASTERN GERMANY

25%
IN WESTERN GERMANY

2ND MANAGEMENT LEVEL:



46%
IN EASTERN GERMANY

40%
IN WESTERN GERMANY

Source: Institut für Arbeitsmarkt- und Berufsforschung

THE BOTTOM LINE

The unique qualities of Germany's east offer competitive advantages to international businesses that choose to expand there. Numerous subsidies from local and national governments are still available.

CONTACT

structural-change@gtai.com
Germany Trade & Invest's division for eastern Germany and structural change

Photo: Adobe Stock

»WE'RE REDRAWING THE ECONOMIC MAP IN GERMANY«

For years, economic development in eastern Germany has lagged behind the rest of the country, but a series of massive business expansion projects is turning the tide. The national government's commissioner for eastern Germany, Carsten Schneider, discusses the growing momentum in those regions.

Former German Chancellor Helmut Kohl famously promised blossoming landscapes for the east after German reunification in 1989-90. How well do you think that promise has stood up?

CARSTEN SCHNEIDER: Right now we're witnessing the redrawing of the economic map in Germany. Eastern Germany is profiting from companies in key technologies investing billions in new locations and creating new industrial jobs. Tesla's factory in Grünheide near Berlin is already up and running. Great progress has been made on the CATL battery production facility in Thuringia. And Intel has decided to come to Magdeburg – there's still a lot to do, but the perspective is more than rosy. Politicians at the national and regional level have created the conditions necessary to make eastern Germany a leading economic area, for example, in hydrogen technology.

Germany needs international companies to expand to and within the country – that's especially true for key technologies like electric mobility, robotics and biotechnology. Why should international companies set up shop in the east?

CS: Eastern Germany has advantages that have played a central role in companies' decisions to locate subsidiaries there. They include the availability of land, a headstart in terms of renewables and a central location at the heart of Europe. Moreover, eastern Germans are very positively disposed toward industry. And there's a modern infrastructure and very good universities at the forefront of research and innovation in key technologies.

»Eastern Germany is very attractive – there are more and more returnees.«

Carsten Schneider

How does the government encourage international companies to come to the region?

CS: For starters, there's Germany Trade & Invest, which – along with the economic promotion agencies of the Federal Republic of Germany's sixteen regional states – markets eastern Germany and has performed well in the past. Of course, marketing isn't everything. Sometimes financial incentives have to be offered, as was the case with Intel in Magdeburg. For Intel, the national government has taken on most of those incentives, in part because we want to become more independent from global semiconductor supply chains. Another factor is the complete determination of the eastern regional states that large projects succeed there. A good example is Tesla. The regional government of Brandenburg, and in particular its Minister for Economic Affairs, Labor and Energy Jörg Steinbach, put a lot of effort and professional expertise into successfully concluding a complicated permits process. Many people doubted that this would be possible. Brandenburg showed that it is.

Some parts of the east have a reputation for being rather skeptical about foreigners. How do you overcome that challenge?

CS: The biggest obstacle to the economic development of the east is the shortage of specialists and labor in general. We have to come together to address these structural impediments to growth, and part of that is being open to immigration. In some sectors, it's barely possible to fill open positions. The 2021 Employment Office survey of eastern Germany commissioned by the Ministry for Economic Affairs and Climate Action showed that, even in the second year of the coronavirus pandemic, more than a third of eastern German companies were searching for highly qualified employees. Extrapolated, that meant 550,000 specialists were needed in the first half of 2021 alone. Skilled foreign workers aren't competition. They're a necessary supplement. And that message is slowly but surely getting through. We have to vigorously oppose xenophobic tendencies.

The stereotype is that people in the east speak little to no English. Is that true?

CS: I'd say that idea is obsolete. Maybe that was true in 1990 after many years in which school curricula in Communist East Germany had other priorities. But I'm sure that for the last 20 years or so, graduates in eastern Germany have spoken English just as well as elsewhere in Germany. In fact, the eastern German states generally do well in educational rankings.

Eastern Germany is still quite rural. Many young people move to the cities, some in the west. How are you trying to make the region a more attractive place to live?

THE INTERVIEWEE

Carsten Schneider has been a member of the German Bundestag since 1998. The 46-year-old is a member of Chancellor Olaf Scholz's SPD party. Schneider's constituency is in Erfurt in the German regional state of Thuringia. He has been the national government's commissioner for eastern Germany since 2021.

CS: Eastern Germany is very attractive, and there are more and more returnees. There are lots of reasons for that. The cost of living is lower than in the west, as most property markets aren't as badly overheated, schools are good and childcare is traditionally better than in many places in the west. Nonetheless, we have to keep at it and expand infrastructure in order to better connect rural regions. This is something we're constantly working on.

Some demographic forecasts predict that the working population in eastern Germany will decline 10 percent by 2040. One solution is immigration. How do you cultivate a welcoming environment for international employees?

CS: I continually emphasize that we need an influx of both highly skilled and other kinds of labor. The national government is currently working on a strategy to attract skilled workers, and this issue will play a major role in it. I'm always arguing that we need to be more open to immigration both in society and in the economy. This will require a change of mentality in some regards. But I'm confident we'll succeed if we all pull together.

In the wake of Intel's decision to build its microchip "mega fab" facility in Magdeburg, the city announced plans to establish an International House with a welcome service. Is that just window dressing?

CS: There are similar welcome centers in other cities, for instance Berlin and Hamburg. These are eminently sensible institutions and have been very well received. Anyone who has ever lived abroad for some time knows the bureaucratic challenges that can entail. The welcome service is intended to support new arrivals in their early days in Germany.

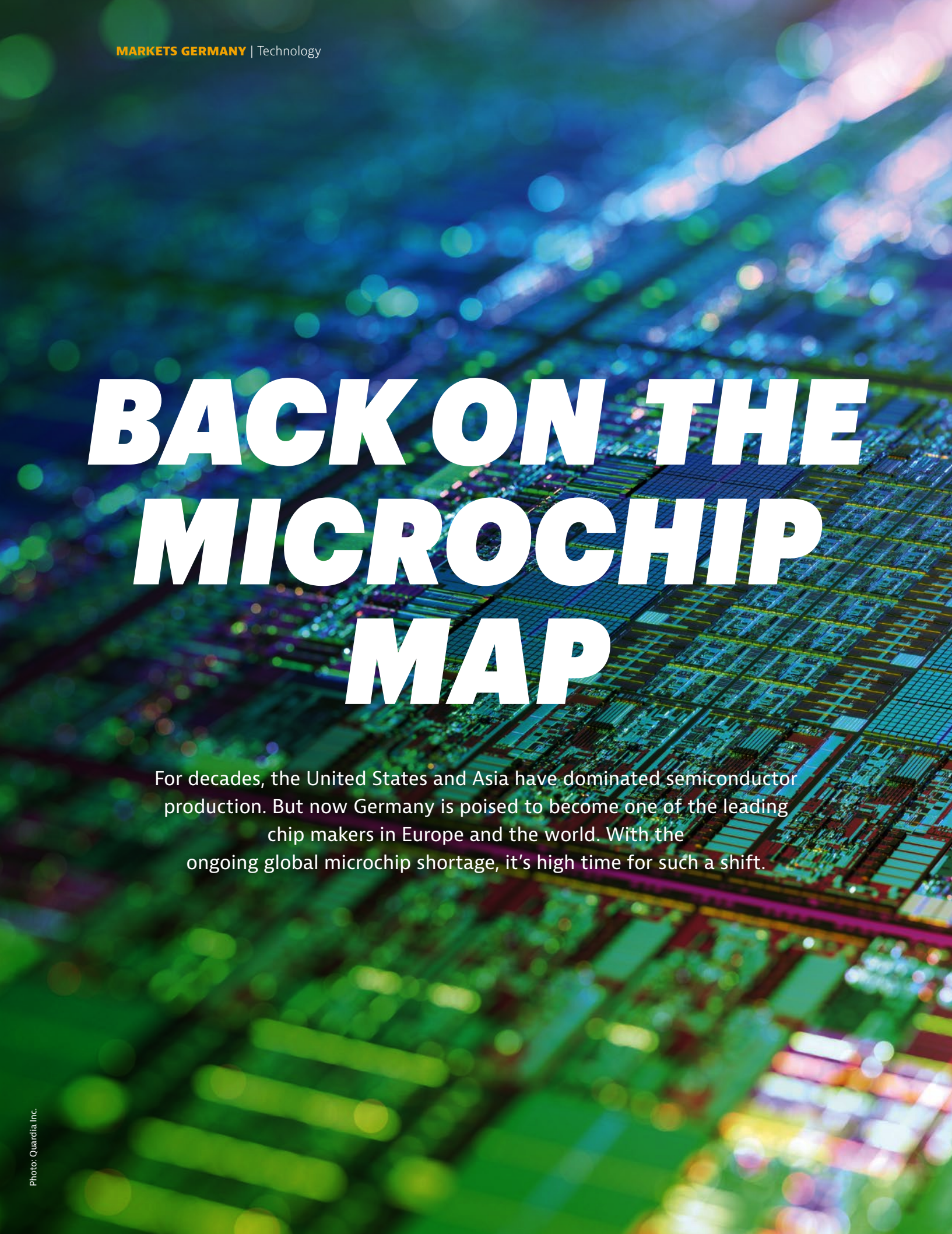
Eastern Germany often has development projects and programs that cross regional state boundaries. The Leipzig/Halle Airport and the Lusatia Investor Center are two examples. How does that work?

CS: Economic promotion doesn't begin and end on regional borders. Naturally, the states are friendly competitors, but in the case of those examples, they are also linked with one another. And states can pool their resources. The eastern German states have just decided to do this for a joint hydrogen interest group to make progress in this area together. I think that's the right path to go down.

Where do you see the east in ten years' time?

CS: The potential is enormous. The transformations we are facing are a chance for the east to set the pace for the entire country. People in these regions are used to change. They're well educated, and eastern German infrastructure has widely and very skillfully been expanded. Those are factors that will play a role in years to come. If we continue to strengthen research and keep working at the forefront of key technologies, we can redraw Germany's economic map in the long term to the benefit of companies and people living in the east.

Photo: picture alliance/dpa/Carsten Koall



BACK ON THE MICROCHIP MAP

For decades, the United States and Asia have dominated semiconductor production. But now Germany is poised to become one of the leading chip makers in Europe and the world. With the ongoing global microchip shortage, it's high time for such a shift.

Photo: Quardia Inc.

Up close and personal with a microchip: The domestic manufacturing market for chips is growing strongly in Germany.

Your cell phone. Your laptop. Your flatscreen TV. Your car. All of your essential devices rely on microchips. And if you tried to upgrade any of those items in the past year, you may have noticed shipping delays, increased prices or lack of stock. The global microchip supply chain problems are to blame. Average wait times for orders more than doubled between 2020 and 2022, according to business news agency Bloomberg.

This is bad news for a country like Germany that specializes in manufacturing sophisticated technological products. The solution? Diversifying supply and value chains, which includes the strategy of relocating production to Europe and the continent's economic heartland.

That's the background to a number of international tech firms' decisions to expand to and within Germany – most prominently, the US giant Intel with its record-setting, 17-billion-euro, new semiconductor production facility in Magdeburg in the eastern state of Saxony-Anhalt. It's the largest foreign direct business investment ever on German soil.

"The past years have shown how delicate supply chains are and what sweeping consequences their collapse can have," says Christin Eisenschmid, managing director of Intel Germany (for an extensive interview with her, see *Markets Germany* 2/2022).

"Europe, and especially Germany, is back on the map," says semiconductor expert Max Milbredt, who was the project leader for the Intel site selection process. So how did the sector get to the point where it needed to shift its geographical configuration?

A pain in the bottleneck

The ongoing semiconductor shortages were initially spurred by shutdowns during the coronavirus pandemic. But they've been exacerbated by other factors, including trade wars and actual wars.

Tensions between the US and China have created concerns about global over-reliance on chip manufacturing in Taiwan. And the sanctions on Russia after its invasion of Ukraine have made it more difficult to obtain raw materials such as palladium, used in manufacturing semiconductors. Moreover, Ukraine is a major supplier of neon gas, which is also crucial in the semiconductor manufacturing process.

Across the board, industries that depend on chips – from automobiles and personal electronics to telecommunications and the Internet of Things – have been held back by the squeeze. And it's not clear when the bottlenecks will cease.

KPMG's Global Semiconductor Industry Outlook 2022 found that, as of the fourth quarter of 2021, 56 percent of industry insiders expected the chip shortage to be resolved in 2023, while another 3 percent thought it would persist until at least 2024. A further survey from the second quarter of 2022 showed that 65 percent of insiders expected the chip shortage to be resolved in 2023, and 18 percent thought it would last until at least 2024.

€50 BN

Expected government support for semiconductor industry in Germany

THE BOTTOM LINE

Diversified supply chains and more microchip production in Europe and its commercial heartland Germany offer long-term opportunities for international companies.

European and German response

The EU and Germany have reacted with rapid measures to boost domestic chip production capacity and develop supply and value chain resilience. The European Semiconductor Act,

announced in February 2022, sets the target of increasing EU production capacity to 20 percent of the global market by 2030. That would require quadrupling current capacity. The European Commission has earmarked EUR 43 billion for that purpose.

The European Union also declared microelectronics an Important Project of Common European Interest (IPCEI), which opens the door to public funding in 20 countries, including Germany. Meanwhile, the German government is investing EUR 14 billion in companies working on 32 projects in energy-efficient chips, power semiconductors, smart sensors, advanced optical equipment and new compound materials. All told, Germany has pledged to spend up to EUR 50 billion and is striving to become the undisputed heart of Europe's semiconductor industry.

That makes Germany even more attractive as an expansion location for multinational tech companies. And advantages like a highly skilled labor pool outweigh factors like the cost of labor. "Semiconductor manufacturing requires well-educated people," says Michael Pritzer, partner and COO Audit at KPMG Germany. "Labor costs are increasing in Germany, as they are in the US, due to the competition for qualified talent, but I believe Germany is still attractive."

Benefits for Magdeburg and beyond

Magdeburg and Saxony-Anhalt now stand to reap big rewards. Intel estimates its "Silicon Junction" site there will create 3,000 permanent high-tech jobs for producing next-generation, two-nanometer-wide chips. The "mega fab" facility is scheduled to start operations in 2027.

The eastern German location is the keystone of Intel's plans to spend a total of EUR 80 billion on its European operations over the next decade. "Together with the Magdeburg fab, our investments in France, Ireland, Italy, Poland and Spain play a crucial role in building a state-of-the-art semiconductor ecosystem in Europe," says Intel's Eisenschmid.

6

FACTORS THAT ATTRACT SEMICONDUCTOR PRODUCERS TO GERMANY

1

Domestic demand
Europe uses 9 percent of all microchips produced worldwide, and 37 percent of them go toward auto manufacturing, according to ZVEI. As Europe's largest economy, Germany's appetite for chips is only expected to grow. In 2021, the market for power semiconductors in Europe's auto industry was USD 9 billion; by 2030, it's expected to reach USD 36 billion.

2

The qualified workforce
Of Germany's roughly 43 million employed people, 83 percent have completed apprenticeships, vocational training or university courses.

3

Political stability and EU access
Germany ranks highly for political and economic stability. Its central location in the European Economic Area provides fast access to the rest of the continent via road, rail and ship.

4

Research institutions
Germany's R&D landscape is a unique tripartite constellation of the private sector, universities and research organizations. Companies in Germany invested EUR 22.7 billion in third-party R&D in 2019.

5

Sufficient space
There is ample land available at competitive costs for major industrial projects in Germany's east and other areas undergoing structural change. For instance, the site of Intel's Magdeburg mega fab facility has an area of 380 hectares and borders on the Autobahn.

6

State assistance
The EU and Germany offer generous subsidies to chipmakers expanding to or within the bloc. State funding programs help companies to set up in areas of the country undergoing structural transformation.

And the sector in neighboring Saxony will benefit as well. "Intel's investment will bring the companies in the region even closer together," said Dirk Röhrborn, head of the Silicon Saxony industry association, on the group's website. "Above all, the big winners will be the SMEs right on their doorstep which will support Intel in getting production up and running. Our member Intel is enabling new perspectives for cooperation in the field of research and development. The Silicon Saxony region will also benefit and continue to grow in terms of international skilled workers."

A growing tech trend

Other global tech leaders are also expanding their presences in Germany. In May, US tech company Qualcomm won a major order for system-on-a-chip (SoC) wafers from Volkswagen to power its future autonomous driving solutions. CARIAD, the Volkswagen Group's software company, is collaborating with Qualcomm to design Snapdragon Ride SoCs tailored to the automaker's needs.

"Germany in particular is the heart of our European operations and home to around half of our European workforce," says Enrico Salvatori, president of Qualcomm Europe/MEA. "Our expansion in Germany has, in part, been driven by our close working relationship with the big car brands and tier-one suppliers. The opening of the automotive office in Berlin was part of our expansion to work with, and provide services to, the German automotive industry."

Qualcomm has also collaborated with BMW and Audi in the automotive sector, as well as Bosch and Siemens on manufacturing automation. "Germany has a rich and deep pool of R&D, engineering and automotive talent," Salvatori says.

American electronics manufacturer Vishay Intertechnology is investing at least EUR 320 million in the first phase of a new chip factory in Itzehoe in northern Germany. "Geopolitically, it is important to have a European location to strengthen independence

→

An architectural rendering of the new Intel plant currently being built in Magdeburg, eastern Germany

Intel | press photo

HOW INTEL CAME TO MAGDEBURG

In December 2020, Intel reached out to the German Chancellery and contacted Germany Trade & Invest in early 2021. Finding a suitable site for such a huge project was a major task, and Germany wasn't the only country the company was considering for its European expansion.

"After our initial meeting and learning about the very demanding requirements, I immediately called up all of our partners in all 16 German states," recalls Max Milbredt, former GTAI expert. He was able to provide a list of potential sites within three business days. Magdeburg featured from the very beginning because the site was so close to the city center. But there was a snag: "The initial plot under discussion was too small to meet the requirements," Milbredt says. "And to be honest, Magdeburg was a bit of an underdog because they don't have a long history of semiconductor design or manufacturing as other places did."So he went back to the city and asked if there was a way to expand the proposed plot of land. The solution was the neighboring municipalities of Wanzleben and Sülzetal offering more space. "I had never seen a single site of this size in ten years in this job," Milbredt says.

Magdeburg managed to propel itself to the top of the list of contenders. "The city's deputy mayor and her team responded incredibly quickly and efficiently to all the issues that came up over the many months," Milbredt recalls. For example, the city ensured the supply of electricity and water needed to run a state-of-the-art semiconductor fab. And it prepared the fab sites' potential future neighbors while still operating with confidentiality – all this in the midst of a global pandemic.

"I never imagined how much work it would be for me to personally drive Intel VPs across almost all of Germany to look at sites with masks on the whole time," he remembers. "I am not a professional chauffeur, so that was a new experience for me. We basically did whatever it took."

→

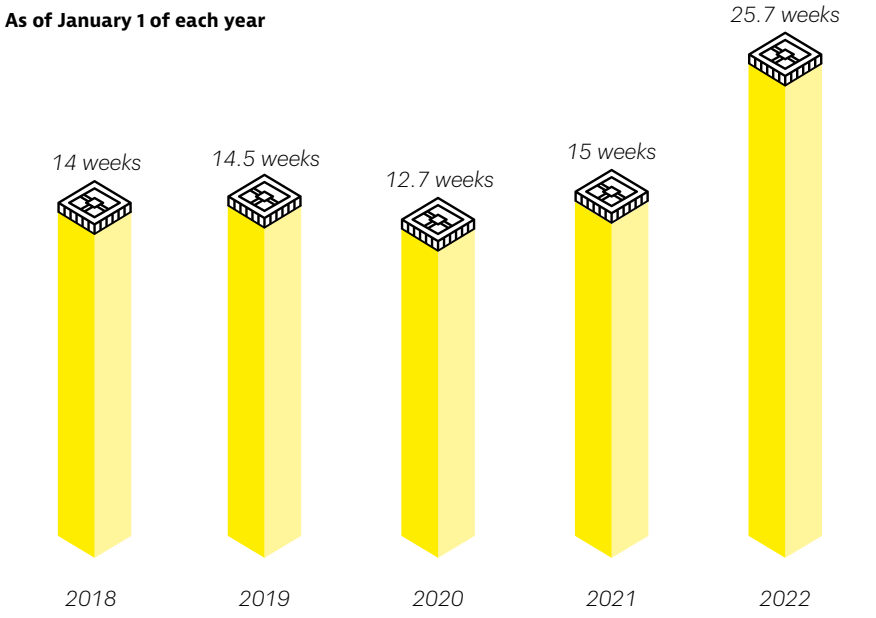
from China," says Dr. Gerald Paul, Vishay's president and CEO. "Germany is an important automotive market. The new 12-inch-chip manufacturing facility in Itzehoe is clearly focused on the automotive business."

Vishay's existing 8-inch-wafer production facility in Itzehoe was a major factor in the location of the new project, as was having good neighbors. "Itzehoe provides stability and all the infrastructure needed to support expansion. The semiconductor industry pool with the Fraunhofer Institute offers the right environment," Paul says.

Meanwhile, Apple is investing more than EUR 1 billion in its European Silicon Design Center in Munich. The 30,000-square-meter facility, which will focus on mobile wireless semiconductors, should be operational by the end of 2022. Finally, Bosch has put EUR 1 billion in a state-of-the-art production facility in Dresden that opened in 2021. The plant is Europe's first fully digitalized semiconductor production facility, making chips and sensors for the auto industry. Bosch received EUR 140 million in IPCEI funding for the project, which has created 700 new jobs in the eastern state of Saxony.

AVERAGE WAIT TIME FOR CHIP ORDERS

As of January 1 of each year



Source: Data from Susquehanna Financial Group/Bloomberg

Long-term solutions

No one is under any illusions that these projects will solve the semiconductor problem at the drop of a hat. Production facilities, after all, take time to construct and go operational. The protagonists in Germany and elsewhere in Europe are in it for the long haul. "It will be interesting to see these large investments continue," says Milbredt, who notes that some of the companies now expanding into Germany are doing so even without government subsidies. "But there will still be a strain on the system since the factories being built will take about three years to come online."

Milbredt is also keen to see how capacity develops in conventional models of semiconductors. "There isn't sufficient investment into these 'older' chip types, but that's what the automotive industry mostly needs," Milbredt says. "The new sub-10-nanometer fabs are most relevant for smartphone and PC manufacturers." Demand for microchips and nanochips will grow exponentially as the transition to green energy and electric mobility progresses and as big data and artificial intelligence become increasingly important. That's true for Germany and for many global economies.

"The semiconductor industry is international," says KPMG's Pritzer. "Any individual chip in a product could probably qualify for frequent flier status with Lufthansa, considering how many times it goes around the world."

Many companies are diversifying their suppliers to become more resilient where semiconductors are concerned. Flexibility and adaptability are key to remaining competitive despite disruptions. Pritzer cites the example of automakers, whose overall volume was down during the pandemic but whose profits were up because they focused on higher-value, technologically advanced vehicles. "Despite the huge global financial problems, these companies are all doing very well."

»Semiconductor manufacturing requires well-educated people.«

Michael Pritzer, partner KPMG Germany

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Made in Germany: A technician holds up a 12-inch silicon wafer, the kind used in auto manufacturing.

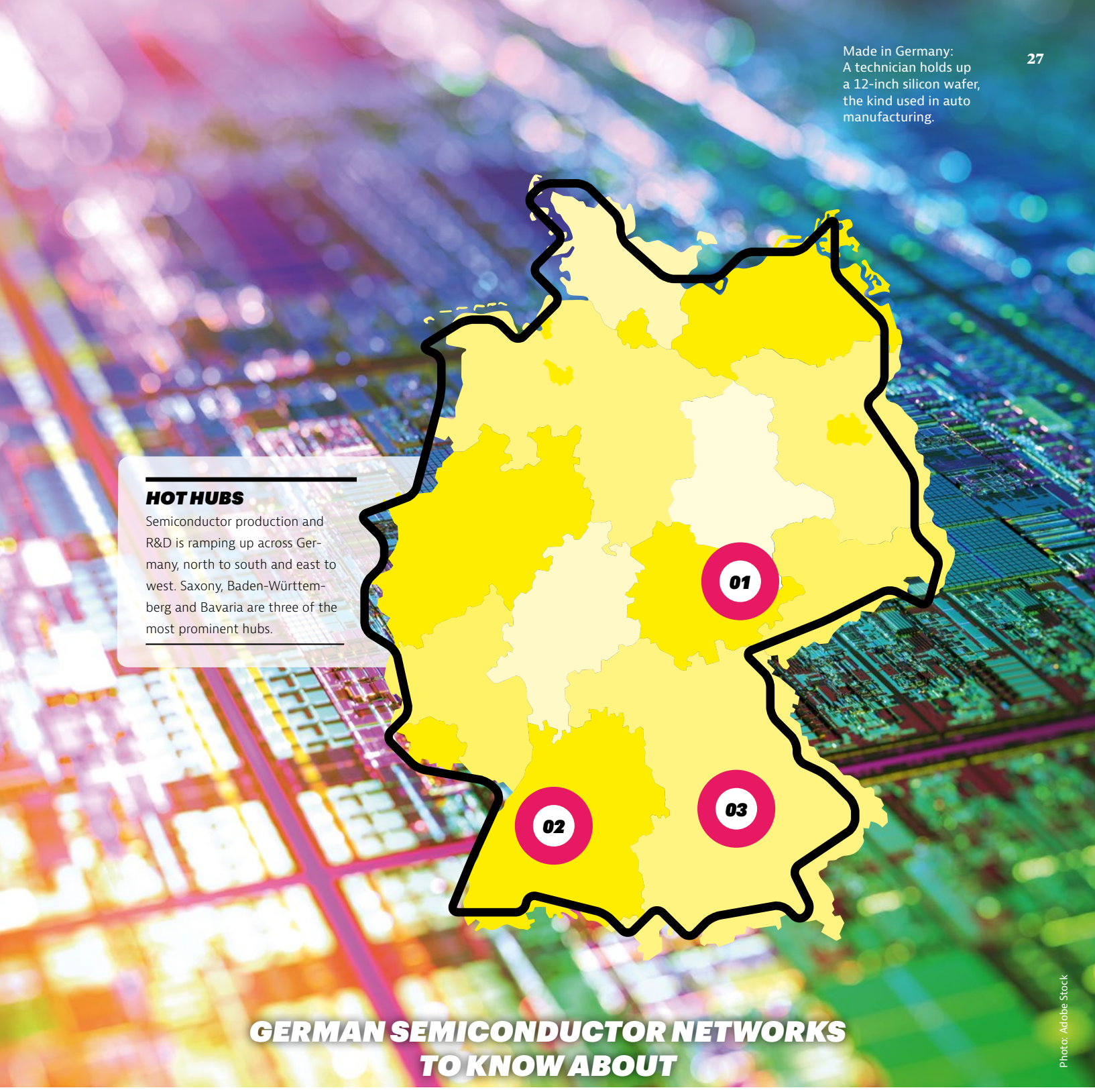

Photo: Adobe Stock

HOT HUBS

Semiconductor production and R&D is ramping up across Germany, north to south and east to west. Saxony, Baden-Württemberg and Bavaria are three of the most prominent hubs.

GERMAN SEMICONDUCTOR NETWORKS TO KNOW ABOUT

01 - SILICON SAXONY

Silicon Saxony is a network for the microelectronics, smart systems, photovoltaic and software sectors. The Cool Silicon cluster focuses on developing energy-efficient solutions in computing, broadband wireless and sensor networks. Saxony is Europe's biggest microelectronics location, home to companies including GlobalFoundries, Infineon and Bosch.

02 - MICROTEC SÜDWEST

The microTEC Südwest cluster in the southwestern regional state of Baden-Württemberg is a major European expertise and cooperation network for intelligent microsystem technology solutions in manufacturing and health. With its Dutch partner ASML, Oberkochen-based Zeiss is the world's only manufacturer of extreme ultraviolet lithography machines for chip production.

03 - BAVARIAN CHIPS ALLIANCE

Bavaria is home to some of the world's leading semiconductor producers, including Infineon Technologies and Siltronic, as well as the Bavarian Chips Alliance. As the site of many leading actors in electrical engineering and electronics, the southern state plays a big role in the development of technologies for the digital networking of industry, big data solutions and the Internet of Things.


CLOUD&HEAT:
The company develops and produces integrated IT infrastructure solutions. The hardware basis is the Datacenter in a Box (DiaB). This is a combination of powerful server components including energy-efficient water cooling and software virtualization – which guarantees fast and effective resource provision.
CLOUD&HEAT
FRANKFURT LEADS GERMANY'S DATA REVOLUTION
IT performance of Germany's most important data center locations
HAMBURG 33 MW
BERLIN 37 MW
MUNICH 50 MW
FRANKFURT 459 MW
Photo: Cloud&Heat, press photo

DECARBONIZING the Data Industry

Germany's data center sector is expanding like never before and simultaneously undergoing a quiet revolution in energy efficiency. International companies are helping make the physical act of processing information better for the environment.

The invisible infrastructure underpinning the Internet is in the midst of great change. Firstly, data center companies are increasingly administering their business off premise. Secondly, Germany has put a premium on business solutions that focus on climate action and maximal efficient use of resources.

Britain's Telehouse, a firm that specializes in colocation data centers, has seized the moment. Béla Waldhauser, CEO of Telehouse Germany, is seeing growth rates of 10 to 15 percent per year. "Honestly speaking, we can't build new data centers fast enough," he says. "Our vacancy rate in Q1/2022 is down to 9 percent, which is an all-time low."

More and more German start-ups are developing innovative waste-heat solutions. Dresden-based Cloud&Heat offers some of the most resourceful data centers in the world. Windcloud, from the town of Enge-Sande near the North Sea, has built Germany's first carbon-absorbing data center that is powered by 100 percent wind, while its waste heat is used to raise CO2-absorbing algae. Then there's the Eurotheum skyscraper in Frankfurt, which uses its in-house data center to provide heat to the offices, hotel, and restaurant under the same roof.

This flurry of innovation in the data sector has attracted the attention of major players. Telekom is working together with the Fraunhofer Institute to create several new technologies that make data more energy-efficient. Telehouse is at the forefront of that initiative with the Westville residential project in Frankfurt-Gallus. Due to be completed in 2025, the development will include 1,300 apartments.

"It's a real beacon project in Germany," says Waldhauser. The CEO is also the spokesperson for the Alliance for the Strengthening of Digital Infrastructures in Germany and a board member of the Climate Neutral Data Centre Pact.

»We can't build new data centers fast enough. Our vacancy rate is down to 9 percent – an all-time low.«

Béla Waldhauser, CEO of Telehouse Germany

"The most attractive market in Europe"

Europe is dominated by four data-center markets – Frankfurt, London, Amsterdam and Paris – but there are signs that the hierarchy is shifting. Waldhauser is among many observers who believe Frankfurt is currently "the most attractive market in Europe." Despite the fact that German energy prices are relatively high. There is a variety of reasons why the city has become such a coveted location, explains Isabel da Silva Matos, digital economy specialist at GTAI. For one thing, Frankfurt has the world's largest Internet node, DE-CIX, where around one thousand primarily European networks converge. It's also a well-known hub of European finance and home to the German Stock Exchange and the European Central Bank – huge institutions that need to ensure they can transfer data quickly and securely. But other German cities such as Berlin, Munich or Hamburg are also becoming important data nodes. "Proximity to the customer plays an important role too, not just speed," Matos says. "And clients want to be sure that their data doesn't just end up being stored anywhere. Germany is the biggest economy in the EU and is considered very secure."

Ambitious government plans

The escalating climate emergency and Russia's war on Ukraine mean that data center companies need to be more than just well located: They must also lower carbon emissions. Major players in Germany have signed on to the EU's goal of climate neutrality by 2030. But Olaf Scholz's government wants to move faster, pledging to make new data centers CO2-neutral by 2027. It has provided funded programs for developing new environmentally friendly technologies.

THE BOTTOM LINE

Germany's data center sector is not only one of the biggest in Europe but also increasingly at the forefront of innovative energy efficiency solutions.

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BUSINESS INCORPORATION GOES DIGITAL

Setting up shop in Germany has never been easier thanks to recent technological improvements. Germany Trade & Invest expert *Christina Schön* walks us through the new possibilities.

Photo: AdriaVidal

CHRISTINA SCHÖN,
senior manager tax & legal at Germany Trade & Invest

Christina assists international companies seeking to enter the German market with investment projects and specializes in all legal matters purtaining to founding a business.

What is a GmbH?
The GmbH (German private limited liability company) is the most popular company form in Germany – there were more than 550,000 GmbHs with a turnover above EUR 22,000 in 2020. The incorporation of a GmbH requires a German notary, and until recently it was necessary to meet with them in person. Since August 2022, it's been possible to form a GmbH online purely by cash contribution. From August 2023, the scope of online GmbH formation will be extended to include non-cash contributions. An exemption to this is the contribution of assets whose transfer is subject to notarization (e.g. real estate or shares in a limited liability company). Additionally, online procedures of commercial register applications have been implemented for all legal entities.

How does online incorporation work?
The online notarization takes place in a video conference between the notary and the parties involved. For this purpose, the German Federal Chamber of Notaries provides a video communication system with a two-step identification procedure that requires an electronic proof of identity – called an eID. To access the procedure, you have to register with the eID function of the identity card and extract the photo from the chip of the ID card. Information and documents are exchanged online with the notary, and the notarization takes place in a video conference. The signatures required for the incorporation are obtained by means of a qualified electronic signature. The Federal Chamber of Notaries has published an FAQ.

What about the rest of the process?
The other steps that don't need to be performed in front of the notary, such as setting up a bank account and making the required capital contribution, remain unchanged and are still required for applying to the commercial register.

Who stands to benefit from the new digital formation proceedure?
Nowadays many identity cards offer the required eID function. German nationals can use eID verification on national ID cards issued as of 2017. However, third-country nationals (citizens that originate from a country that is not a member of the EU or the EEA) with a German electronic residence permit can also use the function. Since 2021, all other EU or EEA citizens who are 16 years or older can apply for an eID card in Germany. This card is intended only for the use of digital services. The website personalausweis.de gives the full details on different identity cards and their eID function.

Can non-German eIDs be used as well?
Electronic identification programs of other EU or EEA member states may also meet the requirements if they comply with the EU eIDAS regulation and correspond to the requirements for the Level of Assurance "high." Entrepreneurs unsure about whether their eID is valid should discuss this individually with the notary performing the service.

What advantages does the online process offer?
Incorporated businesses can, for instance, already benefit from the new online procedures for commercial register applications. For new GmbHs, it enables remote and faster incorporation. There is also a new rule that incorporations must be registered in the Commercial Register within ten working days from the initial date of the application. This period can be reduced to five working days where certain model documents are used.

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UNLEASH FUTURE BOATS

Autonomous cars have been a hot-button topic for years. But can the technology be brought to the oceans and rivers of the world? A team of entrepreneurs and engineers with experience in the German car industry is hoping their self-driving ship will come in.

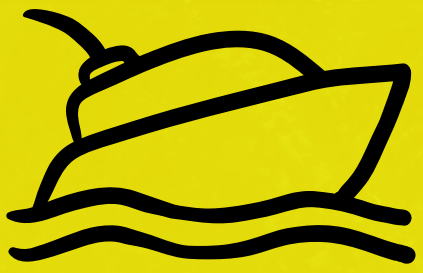
Ships with no captains or crew? A Schleswig-based start-up called Unleash Future Boats imagines just such a future. It has invested heavily in the concept of autonomous vessels for ferrying people and cargo and saving money, at the same time reducing the environmental impact of the maritime sector. The company's ambitious projects include autonomous water taxis, capable of carrying a dozen passengers, that aim to make urban water travel more efficient. Founded in 2020 by Lars and Stefanie Engelhard, two German engineers with top-level experience in electromobility and autonomous systems, Unleash Future Boats (UFB) is also working on fleets of cargo ships and tugboats for container ships UFB vessels are powered by electric motors and hydrogen fuel cells, thereby reducing emissions and noise pollution along heavily populated river routes. "There are so many possibilities for innovation in the maritime sector," says co-founder Stefanie Engelhard. "We are rewriting the rules of maritime transportation."

A sandbox on the water

And that has attracted attention in high places. This year, UFB received permission from the German Ministry for Economic Affairs and Climate Action (BMWK) to explore what kind of changes to laws and regulations would be needed to make autonomous watercraft a reality. On the 42-kilometer Schlei Inlet, north of Hamburg, the usual rules governing watercraft were temporarily suspended to allow experimentation. "We're able to modify the regulations just for this area and see what's possible," Engelhard says. "It's small and perfect for developing our technology."

The project is one of the ministry's regulatory "sandboxes" – real environment tests of innovative technologies, products, services and approaches. They're part of a larger push to slash red tape in industries with big potential for reducing greenhouse gas emissions. "They allow new digital and sustainable technologies to be tested in the real world, even if the general regulatory framework does not yet permit this," says a spokesperson for the ministry, Robert Säverin.

SANDBOXES TO SUPPORT INNOVATION



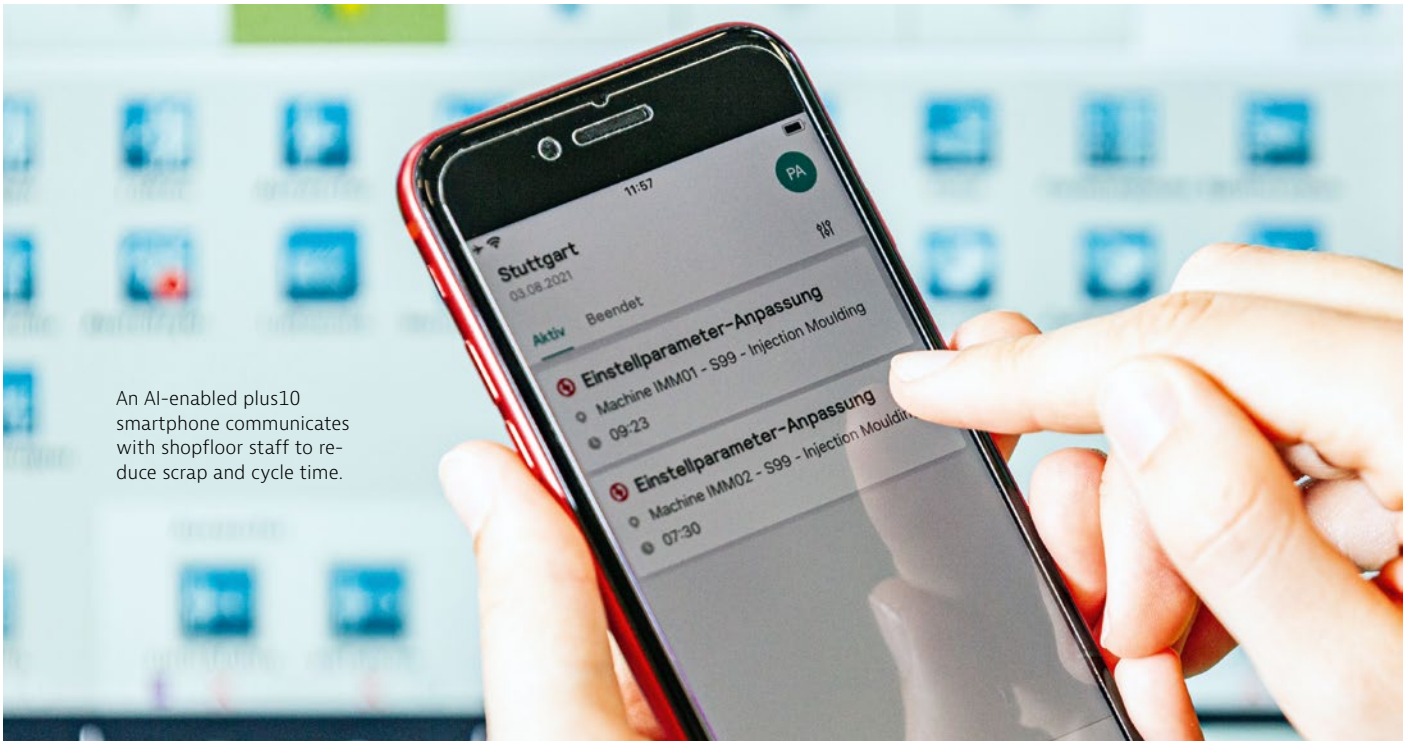
Germany's "regulatory sandboxes" support business innovation by providing opportunities to test regulations for experimental new applications, including ***AUTONOMOUS MACHINES, AI AND CLIMATETECH***. "Along the way, we learn about the impact of innovations on the economy, society and the environment, as well as the necessary legal framework," says BMWK spokesman Robert Säverin. "This allows for more innovation-friendly laws and faster transitions from research to market."

Lars and Stefanie Engelhard from Unleash Future Boats with Minister for Economic Affairs and Climate Action Robert Habeck. The company received special permission to change water rules to test zero-emission autonomous mobility and logistics.

Photo: Unleash Future Boats, press photo

DARWIN'S SOLUTION for Complex Plastics

International companies that come to Germany get direct access not only to Europe's biggest market but to a unique R&D landscape. The Japanese–German conglomerate behind the DarWIN tool is a prime example.



An AI-enabled plus10 smartphone communicates with shopfloor staff to reduce scrap and cycle time.

Photo: plus10 GmbH, press photo

Like many companies dealing in plastics, Sumitomo (SHI) Demag faced a problem. Environmentally conscious consumers are deeply skeptical of the material that is causing so much damage to ecosystems in our oceans and on land. But the core business of this medical instruments manufacturer, formed in 2008 after the merger of Japan's Sumitomo Heavy Industries and Demag Plastics Group from Schwaig in Bavaria, depended on it.

THE BOTTOM LINE

Research institutes, clusters and their spin-offs help the private sector solve complex technical problems and are a major advantage for international companies with a presence in Germany.

Artificial intelligence (AI) offered a possible way forward for optimizing plastics-processing machinery by making it more efficient and sustainable. There was just one problem. "Being a classic machine builder, AI is obviously not our home turf," says Dr. Thorsten Thümen, Sumitomo (SHI) Demag's senior director of technology. That made the firm "very keen to connect to Germany's network of AI-related start-ups." It didn't have to search long for a solution.

Survival of the fittest

Meet DarWIN, a new research project from the start-up plus10, an AI spin-off of the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA). The project's focus was to develop an intelligent optimization tool for the sort of injection-molding machines Sumitomo (SHI) Demag needs to make its products for medical and electronics customers.

"Injection molding is a very complex industrial field with many influencing factors, and we hope that the results of DarWIN will help us understand for which processes AI may provide feasible future solutions," says Thümen.

Aside from speeding up injection molding and reducing plastics wastage during the process, DarWIN's AI can also be programmed to facilitate the separation of heterogeneous plastics – such as post-consumer scrap – in an economically viable manner. If successful, it would represent an evolutionary step for the plastics recycling industry.

DarWIN allows machines to teach one another, so that computing behavior patterns do not have to be learned from scratch by another device every time a new product is adopted. Smart machines only need a short calibration phase: This involves algorithms proposing optimized process parameters for the next production cycle under given conditions, such as raw material characteristics and the shopfloor climate.

In January this year, DarWIN saw its final testing series on machinery provided by Sumitomo (SHI) Demag. Through its contribution to DarWIN, which also included funding a real test environment, the Japanese–German company is directly supporting innovation for the next generation of machines, as well as safeguarding its own future.

Top notch R&D clusters

The Sumitomo (SHI) Demag machines used in DarWIN are fully electric – a capability added by the company in recent years when it dedicated one of its two German plants entirely to building machines that have full electric control. According to the company's CEO, Gerd Liebig, the change initially resulted in a reduction of orders but has since proven rewarding. "Our forecast that the markets will shift toward sustainability has been met, and our timely decision has translated into a major competitive advantage," Liebig says.

That advantage is directly related to Germany's one-of-a-kind, multivalent R&D landscape. Plus10, for instance, is part of the Cyber Valley research cluster in the southwestern regional state of Baden-Württemberg, which has become a go-to destination for companies seeking to enhance their products through basic AI research. Plus10 has an intense research exchange with Germany's renowned Max Planck Institute and the Fraunhofer Institute, which also maintains an office in Japan. In the case of DarWIN, the start-up worked with Germany's largest plastics research institute SKZ in Würzburg, Bavaria. SKZ covers the whole range of plastics research, including materials, machinery and processes.

"The good cluster networking as well as our own interdisciplinary academic backgrounds, spanning control technology, AI software development and production engineering, enables us to always bring our AI research fully into the industrial context," explains Felix Müller, chief executive and cofounder of plus10.

In Japan, Hiroshi Iwamura, director of the Tokyo office of Germany's international business promotion agency GTAI, spends a lot of time talking to Japanese small and medium-sized businesses in the manufacturing systems engineering sector, especially in automatization and robotics. He says that Japanese companies like Sumitomo are interested not only in Germany's huge market but also in its excellent research and supportive cluster landscape. "International companies can link up with the top-notch research infrastructure and use the know-how of research institutions to develop their products," Iwamura says.

FRAUNHOFER: BRIDGING R&D BETWEEN JAPAN & GERMANY

Interview with Kazuhiro Hayashida, assistant manager, Fraunhofer Representative Office Japan

How does the Fraunhofer Representative Office Japan facilitate cooperation between Fraunhofer and Japanese science and industry?

We act as a bridge between Fraunhofer's 76 institutes and Japanese customers from industry, academia and other sectors. In 2021, we achieved contract research revenue of EUR 15.2 million from Japanese industrial customers and we receive around 300 inquiries from companies here every year. Those research projects relate to a wide variety of fields including microelectronics, surface and production technology, IT, materials and innovation research and life sciences. We are happy to support and coordinate R&D projects and play our part in building a win-win situation between Germany and Japan.

What makes the German R&D landscape interesting for Japanese industry?

With its cutting-edge research facilities and technologies, Fraunhofer provides R&D services near the customer. We often receive inquiries from customers who had tried to find appropriate research institutes for their technological challenges and then finally find the right solutions at Fraunhofer. There is also a lot of interest here in the collaboration between industry and academia – collaboration which characterizes Fraunhofer. Reflecting this, Japan's Minister for Reconstruction, Kosaburo Nishime, visited three Fraunhofer institutes in Stuttgart in May 2022.

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»THERE IS HUGE POTENTIAL FOR EXCHANGE, JOINT DEVELOPMENT AND CONVERGENCE OF INTERESTS.«

Grisha Alroi-Arloser, CEO of the German-Israeli Chamber of Industry and Commerce (AHK Israel), looks back on how Israel weathered the corona pandemic and considers what the future holds for the long-established international partnership between his nation and Germany.

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Photo: Grisha Alroi-Arloser/private

Israel recovered from the pandemic shock more quickly than other countries, mainly thanks to its well-organized vaccine campaign. What impact did that have on the economy?

GRISHA ALROI-ARLOSER: Israel did get through the first year of the pandemic decently but at the cost of 26 percent unemployment, lengthy lockdowns and grave downturns in the tourism, restaurant, event and retail sectors. But because the high-tech sector was able to adapt to the new world of work extremely quickly, GDP as a whole only declined 2.2 percent. In 2021, Israel began the first vaccine program worldwide and achieved 8.1 percent growth, the highest rate in the OECD. Unemployment fell back down below 4 percent, and exports set a new record of USD 140 billion, creating a trade surplus in the tens of billions.

How do Israelis view Germany as a business location? How does your cooperation with Germany Trade & Invest help when you talk to Israeli companies about Germany?

Germany is Israel's most important business partner in Europe and is seen by the public as a reliable friend. More and more Israeli tech companies are looking to Germany as a target market for strategic partnerships or as a gateway to the EU. GTAI advises our companies comprehensively, answering questions about employment, transport connections, the respective ecosystem, and funding opportunities. It also closely accompanies the process.

What kinds of Israeli companies are attracted to Germany? What industry expertise from GTAI is particularly helpful?

With its many languages and cultures, the European continent is naturally a difficult market to crack. Israeli start-ups in the areas of cybersecurity, digital networking of industry, smart cities, mobility, e-health, and fintech and insurtech have a growing interest in German partners – not just the corporate giants but also increasingly SMEs. GTAI's expertise is of great help to us, since we are of course never as deeply involved in the local industries as the customers expect. The division of labor between AHK and GTAI therefore makes a lot of sense.

Which sectors are ripe for collaboration?

Israel's many companies offering data- and cybersecurity solutions have a vested interest in finding partners, investors and customers among manufacturers, governmental institutions, banks, insurance companies and critical infrastructure in Europe. The e-health and mobility sectors are also keenly interested in Germany because of its location, the size of the market and the high level of technology there, combined with the country's need to close the digital gap.

The new German government has prioritized climate action and digitalization. How has that been received in Israel?

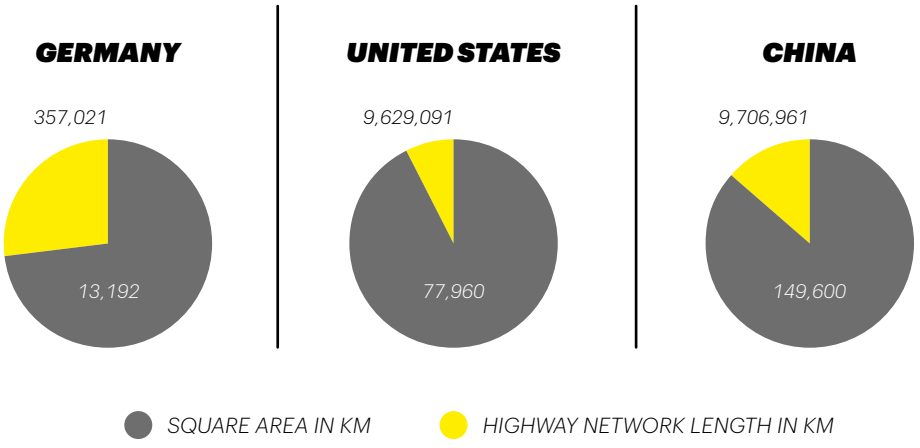
The message has gotten through, and the Israeli government has put the same goals on its agenda. Rapprochement with our Arab neighbors has also opened up the path toward contributing to global solutions. The newly ratified German-Israeli Energy Partnership is a clear sign. German delegations from politics and business are coming to Israel to learn about the role of digitalization here in public administration, production processes and business models. There is huge potential for exchange and joint development and a convergence of interests.

How Germany Works
THE AUTOBAHN

Germany's Autobahn is one of the best-known highway systems in the world. It was first conceived in the 1920s and a prototype was finished the following year – Berlin's Avus racing stretch. Operations on the first true Autobahn began in 1932 on what is now the A555 between Cologne and Bonn. Germany connects up western and eastern Europe: Some 1.3 million trucks use its 13,000 kilometers of roads every day, giving the country a major logistical advantage. It's also one of the densest controlled-access highway systems anywhere. These days, a recommended speed limit of 130 km/h is in place (unless otherwise signposted), and since 2005, a toll system has been in place for HGVs (average charge EUR 0.15 per km). The Autobahn GmbH is a government-owned company overseen by the Ministry for Digital and Transport. It plans to invest EUR 5.7 billion in German highways by 2026. That will include construction work on new roads and many of the network's roughly 40,000 bridges, as well as digitalization. Mobility is changing rapidly in Germany and the highways must adapt with it.

HIGHWAY HIGH ROLLERS

Countries' highway network lengths compared to their size (square area)

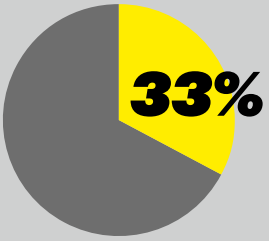


CENTRAL EUROPE'S INTERCHANGE

Germany's highways give it a logistical advantage

1.3 M

trucks drive on the Autobahn every day



of them are from outside Germany

THE AUTOBAHN INCLUDES

39,500
bridges

17,000
emergency phones

350
attended rest stops

430
gas stations

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Our extensive range of services for foreign businesspeople, free of charge, include:

- Market and industry analyses
- Market entry strategy support
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- Recommendations concerning financing & funding opportunities
- Project partner identification and contact (location and financial)
- Site identification, site visit support

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