

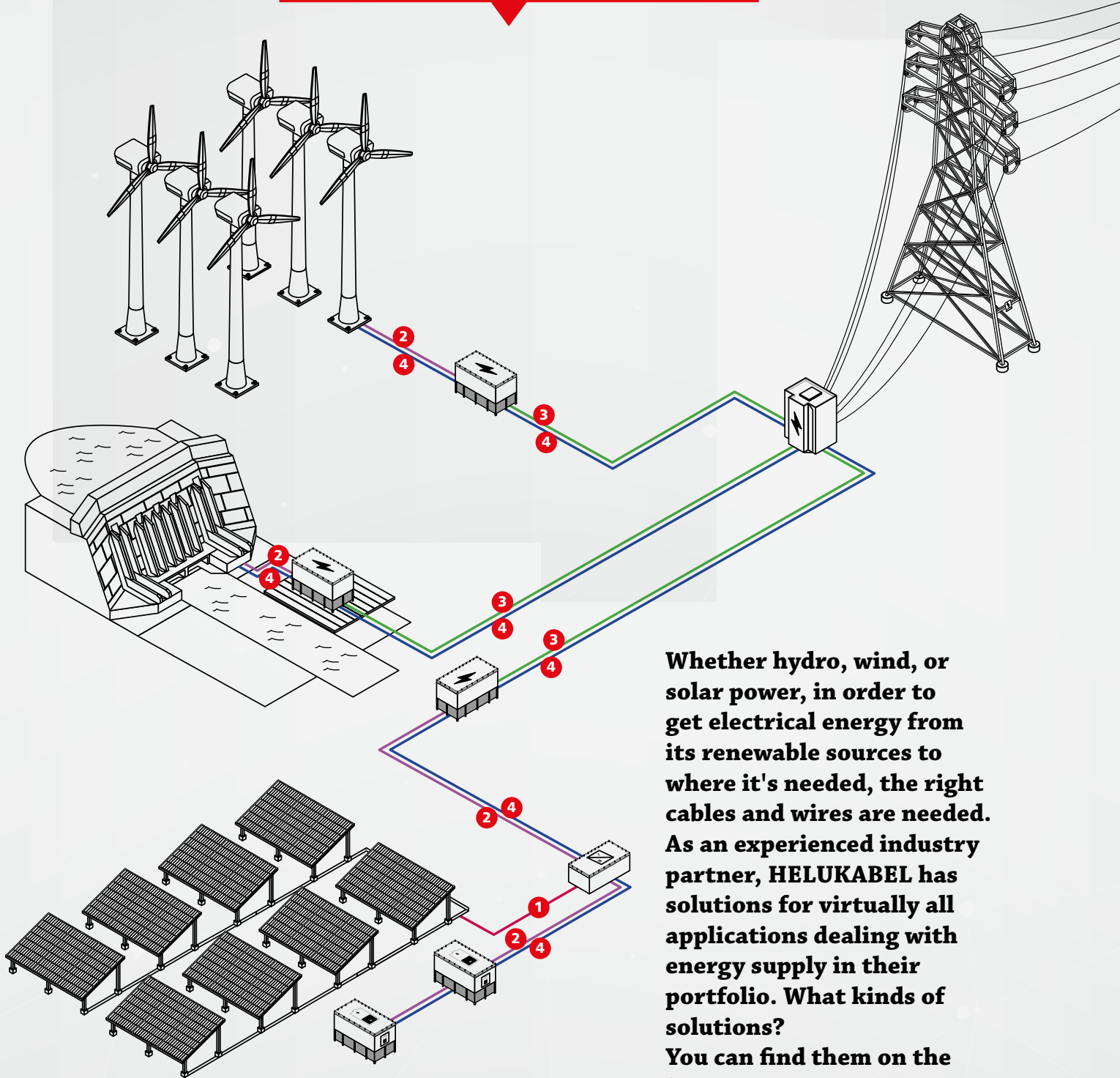
POWER

#15

Energy Supply in a Confined Space

**Siltronic equips new wafer production plant in Singapore
with connecting cables from HELUKABEL** page 28

Renewable Energy: Right where you need it.



Whether hydro, wind, or solar power, in order to get electrical energy from its renewable sources to where it's needed, the right cables and wires are needed. As an experienced industry partner, HELUKABEL has solutions for virtually all applications dealing with energy supply in their portfolio. What kinds of solutions? You can find them on the last page.

Take a look!



Dear Reader,

The consequences of climate change present significant challenges for humanity as a whole. Transitioning to renewable energies is one of the most important measures we can take to, at a minimum, slow global warming and afford future generations a livable future.

In this issue of our customer magazine, we wish to draw special attention to this exceedingly important topic. To this end, we brought experts from different subsectors of the renewable energy industry together for a roundtable discussion on the technical, political, and societal challenges presented by the transition to renewable energies. You can read the highlights of this fascinating discussion on page 8.

Innovative ideas are especially desirable when it comes to tackling the climate crisis, and we at HELUKABEL are proud of the direct contributions our products have made to these future-oriented solutions. For example, our customers TESVOLT and Reverion are working to make renewable energies more economical and accessible by making them storable using their advanced battery and fuel cell systems. Find out more about these exciting new technologies on pages 14 and 22.

Nevertheless, in this issue of POWER, we have much to share about other parts of the world of HELUKABEL, as well as other industrial sectors. No matter the scope of your project, it is ultimately our goal to support you with our high-quality, custom-made electrical connection technologies, especially if your project is to save the planet.

I hope you find your read through this issue of POWER enjoyable and informative!

Kind regards,

Marc Luksch, Managing Director, HELUKABEL GmbH



POWER #15

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In Brief

New Services & Resources

LONGER SERVICE LIFE IN DRAG CHAIN SYSTEMS

With the HELUCHAIN MULTISPEED 522-TPE UL/CSA, HELUKABEL is launching a new version of its tried-and-tested drag chain cables. The completely redesigned cable offers users a whole range of advantages that are particularly useful in demanding environments: from outdoor crane systems that are exposed to fluctuating temperatures and weather conditions to pick-and-place applications with high dynamics and small installation spaces. It can be ordered now, including in the HELUKABEL online shop.

APPROVED FOR PROLONGED USAGE IN POTABLE WATER

HELUKABEL is improving its HELUPOWER AQUATIC-750-BLUE with important new features. The most recent iteration of this water-resistant cable, initially introduced in 2021, now carries multiple new approvals for use with drinking water. This expansion ensures its seamless application in various sectors, such as the food and beverage industry. Its durable sheath, made from a special, cross-linked compound, is engineered for prolonged use in drinking, salt, and chlorinated water at depths of up to 600 metres.

NEW WHITE PAPER "THREADLESS CABLE GLANDS"

In addition to traditional cable glands with locknuts or threaded holes, threadless variants are now available on the market. You can find out what advantages they offer in HELUKABEL's new white paper "Threadless Cable Glands," which is now available to download free of charge. Have a look!

HELUKABEL starts manufacturing in Changzhou



Production has started: At the beginning of the year, just one and a half years after the groundbreaking ceremony, HELUKABEL's new production facility in Changzhou, China, went into operation. With the ultra-modern production and logistics facility, which covers an area of around 25,000 square metres, the connection technology specialist is significantly expanding its capacities in the People's Republic of China. From now on, cables for the Asian market will mainly be manufactured here according to European quality standards.

HELUKABEL has been producing in China since 2014 at its previous location in Taicang. With a sum of around 30 million US dollars, the new building is the largest single investment outside Germany in the company's history. "China and the Asia-Pacific countries are an important growth market for us," explains Managing Director Marc Luksch. "We are very pleased to be able to strengthen our position in the region with another location and offer our customers in and around China even faster and more comprehensive service in the future." Changzhou is located about 200 kilometres west of the metropolis of Shanghai, in the middle of one of the country's most important economic and industrial centres. ◀

270,319 kilometres of single cores

were produced at the HELUKABEL plant in Windsbach in 2023. Strung together, they could wrap around the entire earth almost seven times. ▶

HELUKABEL Poland Turns 25

This year, HELUKABEL Poland is celebrating its 25th anniversary. In 1999, the subsidiary was founded with five employees at their location just outside of Warsaw. Now, they are 109-employees strong. An additional 50 employees are hard at work at the HELUKABEL ELTRON production facility near Krakow producing premium stranded copper wires and copper strips, thermocouple and compensating cables, as well as heat-resistant cables suitable for permanent installation at temperatures up to 400 degrees Celsius.

Even their warehouse capacities have grown continuously over the years. Their impressive 6,000 square metre warehouse features 8,500 pallet spaces. Customers in both Poland and in surrounding countries can count on quick and reliable deliv-

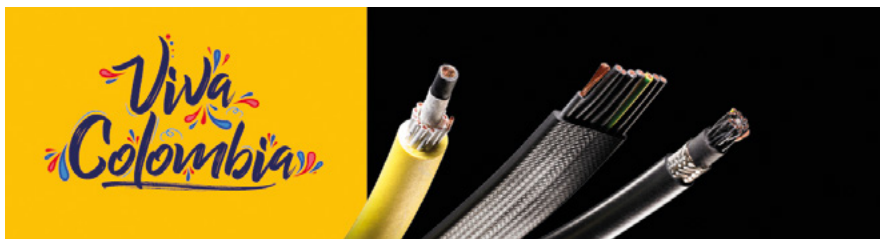
eries of products, which, since 2016, can be ordered via their own online shop. To celebrate this occasion, HELUKABEL Poland is planning online and social media activities, as well as in-person events with their customers. The entire HELUKABEL group wishes them all the best! ◀



Honoured as Technology Leader



Our colleagues from HELUKABEL USA were recently recognized by the technical journal Design World. The American subsidiary was awarded the renowned "Leadership in Engineering" award for the second year in a row after being voted for by readers. HELUKABEL came out on top in the category "Electrical" amongst a number of notable competitors. Join us in congratulating them on this achievement! ◀



New Subsidiary in Colombia

The HELUKABEL Group is expanding further in South America. The specialist for electrical connection technology has founded a new subsidiary in Colombia. After Brazil and Mexico, HELUKABEL is now

represented in the continent's third-largest economy with their own local subsidiary and expands their global presence to over 40 locations worldwide.

The new HELUKABEL subsidiary is located in the Colombian capital of Bogotá. The company now has warehouse capacities in a free trade area at its disposal, which will make receiving international imports significantly easier. HELUKABEL Colombia will

initially be supported by our colleagues in Mexico, which have successfully represented the group in Latin America for several years.

"Colombia is a very interesting market for us. Many international companies have their South American headquarters here," explains Gerardo Montenegro Aznar, Commercial Director LATAM with HELUKABEL and managing director of the new subsidiary. "Our customers come from very different industries such as the oil and gas industry, the food and beverage industry, electronics, or cement manufacturing." Until now, these were all handled by distributors. A local presence should help strengthen these relationships and cooperation and unlock new business potentials. ◀

More Development and Less Bureaucracy

The comprehensive transition to renewable energy sources is one of the greatest challenges of our time. Along the way, however, many technical, political, and societal hurdles must be overcome. What these hurdles look like, what solutions are necessary to overcome them, and why renewable energy is vital for our future - these are the topics covered in our latest expert roundtable.

Sun, wind, water, biomass - renewable energy can be created from many different sources. What pros and cons do each of these energy sources offer and how are they best utilised for energy production?

Andreas Kulke: Currently, for us, solar and wind energy have the highest potential. However, they are very volatile in their production. This means that the amount produced fluctuates depending on the time of day or season. To use this energy as efficiently as possible, it needs to be stored with the help of storage devices or pumped storage power stations, which are currently being built in the Alps. Biomass, on the other hand, is constantly available and can be turned into electricity and heat in combined heat and power plants (CHP). This is especially useful since heat and power can be used simultaneously in the food service, hotel, and agricultural industries, as well as in swimming pools. Generally speaking, storability is the key to increasing our usage of renewable energy and reducing our dependence on fossil fuels.

Hendrik Becker: In my view, biomass is the ideal comple-

ment to wind and solar energy. When it comes to gas input or fuel production, biogas plants are flexible, versatile, and sustainable in conjunction with a CHP. Furthermore, energy is able to be stored seasonally in the form of biomass. In the summer, when plenty of wind and sun are available, energy is stored to be used in winter when other providers fall behind on energy production. Even large natural gas caverns are suited for the storage of biogas. The only drawback is that every method of storage costs money.

Jürgen Scheurer: All forms of renewable energy have their value. Even if they aren't very prominent in public debate, wood-based energy and hydro-power shouldn't be ignored. Individual energy sources also shouldn't be pitted against one another; they should be considered and elaborated upon in unison - preferably as quickly and at the largest scale possible.

"Individual energy sources shouldn't be pitted against one another; they should be considered and elaborated upon in unison."

Jürgen Scheurer, Executive Director, Plattform Erneuerbare Energien Baden-Württemberg

In Germany, the expansion of renewable energy is heavily dependent on political decisions. What kind of effects does this have on the market?



Photovoltaic Wind Energy

Biogas

Becker: For better or for worse, the market is heavily influenced by funding. If the government offers financial incentives for the development of a certain energy source, the demand usually increases accordingly. If these incentives expire, demand decreases just as quickly. Producers and installers break off their contracts and jobs are threatened.

Scheurer: A good example of this would be the Ministry of Transport's subsidy program for photovoltaic systems last year. There were 300 million euros in funding, and it was all gone in four hours. Many contracts were delayed waiting on this financial support. This was a big problem for companies that had already hired and trained new employees and stocked their warehouses. These measures are well intentioned, but short-sighted.

Kulke: E-mobility experienced something similar. In 2021 and 2022, the construction of charging stations was being supported financially and the contract conditions were relatively good. Then, the funding stopped and the demand crashed. This caused some manufacturers to go bankrupt.

With such volatility in demand, how can businesses in the industry even plan effectively?

Anton Wissing: Planning is, as a matter of fact, an immense challenge. Between 2012 and 2014, when sales of all renewable energies collapsed, our company, B&W Energy, was forced to reduce its workforce from 150 to 40 employees. This can't be the proper way to do things. In that timeframe, the industry lost a total of 80,000 jobs. Meanwhile, jobs are always used as an argument in preservation of the fossil fuel industry. In my opinion, there is often a double standard here.

Uwe Schenk: The lack of security in planning is also difficult for us vendors. We may

be able to secure availability through our large warehouse inventory of cables and wires, but it is very difficult for us to accurately predict demand.

Ali Gökdoğan: The current demand for photovoltaics is relatively low because the manufacturers' and installers' warehouses are full. We are, however, expecting demand to increase due to the number of large solar parks whose approval proceedings are nearing completion.

Wissing: It's clear that we need more reliability from the government. We're currently receiving many positive signals, but this needs to happen far more often. And what happens if the next election results in politics changing gears? Our industry is clearly too reliant on these decisions.

Alongside political uncertainty, high bureaucratic hurdles need to be overcome to expand renewable energy. What challenges do you foresee here, and how do you see them being overcome?

Scheurer: Companies are hoping primarily for a reduction in bureaucracy, resulting in better security in planning. Plant certifications take too long, but so do approvals from network operators and the actual connections. In Germany, there are around 800 different network operators and each has their own registration forms and online platforms. This needs to be harmonised and simplified.

Becker: Even heating contractors have difficulties with bureaucracy. The regulations for oil-fired heating systems are defined and understood. An installer can plan and install an oil tank for a private residence in a few weeks. Whereas with heat pumps or geothermal heating, the application process can take months, which, of course, makes these unattractive for installers. For biogas plants, it can take up to two years to connect to the net-

"We need more reliability from the government. We're currently receiving many positive signals, but this needs to happen far more often."

Anton Wissing, Managing Director, B&W Energy



The experts all agreed: The expansion of renewable energies must be accelerated and simplified.

"Expanding the network is a bottleneck for all renewable energy."

*Hendrik Becker,
Partner, PlanET Biogas Group*



This HELUKABEL expert roundtable centered around the technical, political, and societal challenges posed by the transition to renewable energies.

work. It's because the network operators used to be worried about disruptions and competition. This is also why the infeed of hydrogen was made so difficult. Luckily, people have gotten past that. Doing away with old rules, however, is a long and difficult process.

Wissing: The combination of wind and solar parks is just as complicated of an endeavour. This combination has the advantage of being able to utilise existing infrastructure twice as effectively. These kinds of plans often fail to be approved because areas zoned for wind farms are not allowed to have solar plants built on them. Unfortunately, people don't understand that the two can function together.

Network infrastructure plays a critical role in the success of the transition to renewable energy. What shape is the energy transition currently in, and what needs to be done to improve this in the future?

Gökdoğan: The network infrastructure in Germany has a lot of bureaucracy and is sometimes poorly constructed. In my opinion, it will be a while until it's stable enough that new plants can be approved and connected to the network quickly and straightforwardly. We must also consider that some components are difficult to come by, which is why some plants take longer to be completed.

Wissing: There are also problems with the construction of transformer stations. Every time, these need to be planned and designed from the ground up because every network operator has their own requirements. This comes at great cost. Why are there no uniform standards?

Becker: Expanding the network is a bottleneck for all renewable energy. Because this topic is so complex, it makes lobbying for it just as complex. For example, with the expansion of power plants, gas-burn-

ing power plants intended to utilise hydrogen are the first to be lobbied for and built. At the same time, biogas plants, which are cheaper and more flexible, are going offline in droves. In my opinion, the government doesn't consider the potential of this ever-developing technology quite enough.

Scheurer: Biogas plants are also an attractive solution for local heating grids and, in rural areas, could replace oil and gas heating. Large network operators normally have little interest in expanding heating networks in rural areas. Local initiatives could remedy this.

Becker: Absolutely. The transition to renewable energy must also be viewed from a societal perspective. Renewable energy is usually produced in rural areas, and then used in industrial, urban areas. Rural areas must be able to produce multiple times more energy than they use in order to also supply cities. The electrical grid needs to be altogether more decentralised.

Wissing: Rural energy production also has an economical use in communities. By building civic wind parks, local structures are also built, which are good for the entire community.

Germany wants to reduce its CO₂ emissions by at least 65 percent by 2030 and be completely greenhouse-gas-neutral by 2045. In regard to this, are we on the right track?

Scheurer: I wouldn't say so. The problem is: Germany switched off nuclear power plants and agreed to phase out coal without having an adequate replacement ready. Recent studies show that climate goals will be difficult to achieve. Here, in Baden-Württemberg, we needed to increase photovoltaic expansion by a factor of seven, which we're doing well with. The situation with wind energy is more dramatic. We would need to build 1,000 plants in five years. So far, we've built just 50.

Wissing: One of our goals needs to be to notably reduce our energy consumption. In

"Storability is the key to increasing our usage of renewable energy and reducing our dependence on fossil fuels."

*Andreas Kulke,
Executive Director,alcona Automation Ltd.*



"Electric car batteries will become lighter and cheaper with greater ranges."

*Uwe Schenk,
Global Segment Manager eMobility &
Renewable Energy, HELUKABEL*

many areas, we're already on the right track. For example, e-mobility is proving to be far more efficient than combustion options. The same can be seen in the heating sector with heat pumps. It's worth it to keep pursuing these.

Becker: Aside from reducing CO₂ emissions, I'm interested in the question of what we can do to pull existing CO₂ out of the atmosphere. Biomass is capable of storing CO₂ which can simultaneously be intercepted and liquefied for use in beverage manufacturing or other industrial processes. CO₂ can also be stored in caverns or in even deeper ground layers. I am, however, skeptical of its stability. There is also technology capable of separating carbon and oxygen atoms from one another. The pure carbon can then be used to make concrete or fertiliser.

Scheurer: One approach would be to modernise existing plants. New wind plants are often much more productive and efficient than older models. All in all, this is a question of innovative strength. Companies in the industry need to do research and be open to new ideas. I have a good feeling about German inventiveness, especially in Baden-Württemberg. I see a lot of potential for new business models.

Speaking of innovative strength, in the renewable energy sector, which technologies are currently being intensively researched, and what trends do you expect in the future?

Becker: PlanET, for instance, is very interested in the interconnectedness of sectors. That is to connect the individual electricity, heat, and mobility sub-sectors with one another to use the energy generated as efficiently as possible. The different ways of storing energy play a significant role, specifically in meeting demand in sparser seasons such as winter.

Kulke: In electric mobility, bidirectional charging is a very promising advancement. The idea behind it is that the car battery doesn't just provide the car itself with electricity, but other recipients, too. In practice, this could be a car that is charged with solar

energy during the day and then fuels the heat pump at home during the night. This could result in huge potential savings. The problem is that there aren't any uniform standards or regulations for bidirectional charging yet, causing the risks for manufacturers to be very high. Prices, so far, have also not been attractive enough.

Schenk: I would bet that there is still much to be done when it comes to electric car batteries. In the future, they'll become lighter and cheaper with greater ranges. I can also imagine alternative technologies such as a combination of fuel cell and battery.

Gökdoğan: In photovoltaics, a current dominant trend is the Agri-PV. This is the simultaneous utilisation of space for agriculture and solar energy production. Different technologies already exist for this, as well as for vertical arrays and for horizontal roofing. Some even feature transparent PV modules. Studies show that with these, in some cases, an even higher yield is possible. Even floating PV-plants are becoming more and more common. This year, we're introducing a special solar cable onto the market that has all of the necessary certifications for this application.

Scheurer: For me, geothermal energy is an exciting and promising means to generate electricity and heat. However, there are often problems with public acceptance, especially with special interest groups specifically campaigning against it. Near bodies of water, it's possible to utilise the heat from rivers via large heat pumps. These could also provide much-needed cooling in the

summer months. I think it wise to bring the topics of energy production and environmental protection closer together, as well as educate the public better. This would lead to greater public acceptance for such projects.

Even hydrogen has many uses in energy and heat production, as well as in mobility. What potential do you see here?

Kulke: Hydrogen will play an important role in the transition to renewable energy. Surplus electricity from renewable sources can be converted into hydrogen via electrolysis, which can then be stored, distributed,

"In photovoltaics, Agri-PV and floating farms are gaining in popularity."

*Ali Gökdoğan,
Global Segment Manager Photovoltaics,
HELUKABEL*


and made available for users. If the hydrogen is turned back into electrical energy with a fuel cell, the entire cycle remains CO₂-neutral. However, with each transformation process, around 40 percent of the energy is lost. This is why I think the fuel cells are too inefficient to offer the auto industry an alternative to electric motors. In other applications, such as in lorries or construction and agriculture machines, utilising hydrogen can be worthwhile. Hydrogen is also promising in extracting process heat for industrial uses, such as in the steel and cement industries.

Scheurer: I agree. Hydrogen as a heat carrier for private customers or in the automobile industry is unrealistic. That's why I don't agree with requiring gas heaters to be H₂-ready. Hydrogen is better-suited for use in large-scale industry as well as for storing excess wind and solar energy.

Alongside climate change, geopolitical uncertainties have increased public interest in the energy transition. Is renewable energy now unavoidable from an economic perspective?

Becker: That's correct. The Russian war of aggression against Ukraine has caused many companies to realise that fossil fuels won't always be cheap and readily available. Renewable energy is being increasingly seen as a safe and attractive long-term alternative and a local economic factor.

Scheurer: If electricity prices rise, investments in renewable energy will become more appealing - not just for climate protection, but also for economic reasons. I know of many cases where companies chose one location over another for the sole reason that a renewable energy supply was available there.

Wissing: We all absolutely need renewable energy, not just due to climate change, but to become independent from foreign suppliers. Wind and solar have the greatest potential and must be installed in an intelligent and economically-responsible manner. Other energy carriers such as biomass and hydropower contribute to a failsafe and perpetually-available energy mix. This expansion needs to be as decentralised as possible and will require a country-wide, uniform general framework. 

ABOUT THE EXPERTS:



Hendrik Becker is a partner in the PlanET Biogas Group and Chairman of the NRW Renewable Energy Association of the Münster regional association. He was also the long-time Chairman of the Federal Association for Renewable Energy and Vice President of the trade association Biogas.



Ali Gökdoğan is the Global Segment Manager for photovoltaics with HELUKABEL and has been with the company for 6 years. Before joining HELUKABEL, he held other positions in the solar industry.



Andreas Kulke is the Executive Director and founder ofalcona Automation Ltd. At first, the company specialised in control systems for agriculture, but now offers wall boxes and other infrastructure for e-mobility, as well as battery storage systems for both the private and commercial sectors.



Uwe Schenk has been with HELUKABEL since 1998. As a Global Segment Manager for renewable energies, his primary focus is on wind power.



Jürgen Scheurer is the Executive Director of the Plattform Erneuerbare Energien Baden-Württemberg. The trade association manages contacts with government ministries, organises trade events, and represents the interests of its member companies.




Anton Wissing has been a wind energy operator for 25 years and took part in the development of many community wind parks. He founded the company B&W Energy 20 years ago, which specialises in photovoltaic plants.

Renewable Energy, Optimally Utilised

TESVOLT outfits battery storage systems
with HELUKABEL cables





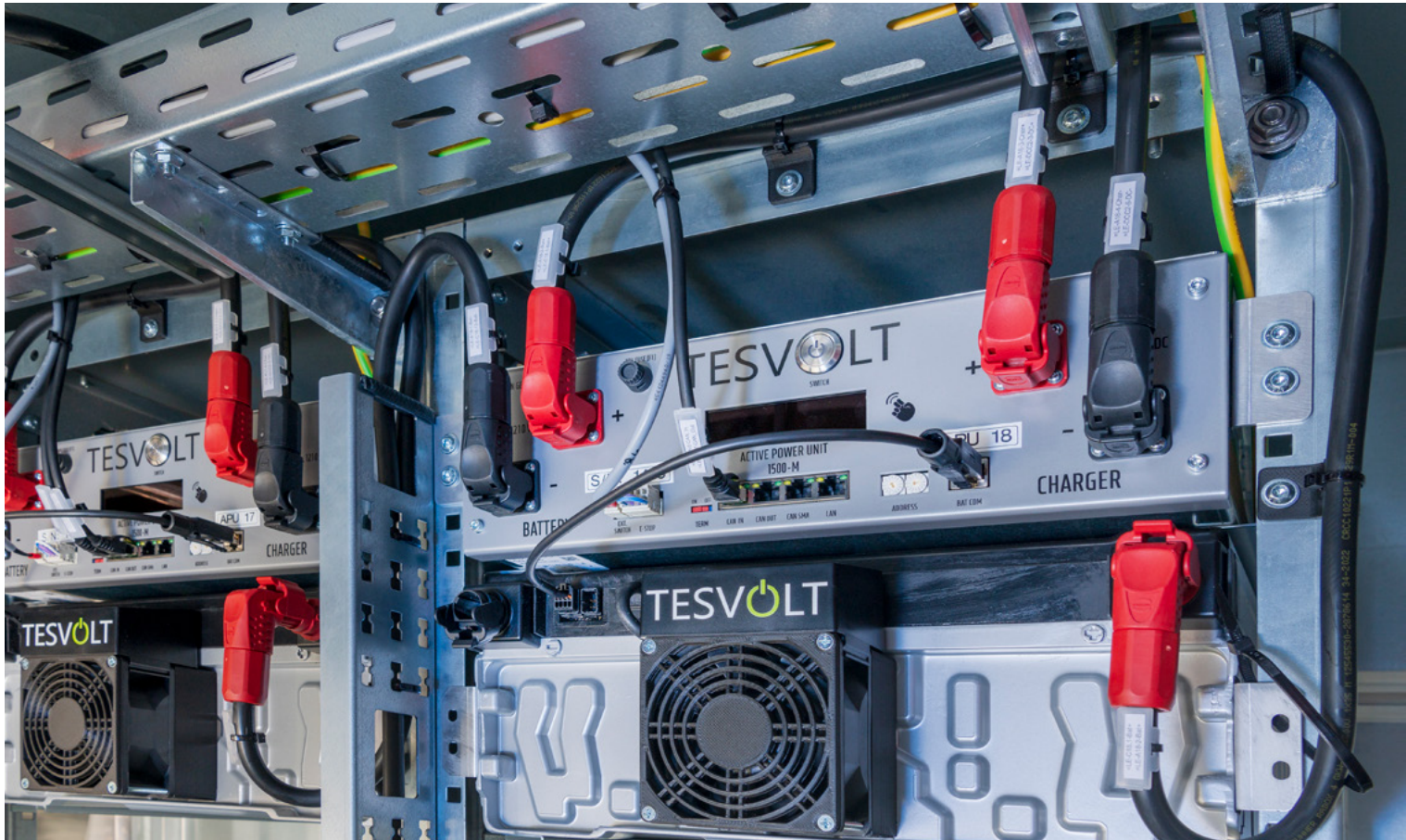
TESVOLT battery storage systems are used by craft businesses and farming and industrial operations, among others.

The vision of TESVOLT is to store the electricity generated by wind, solar, and hydropower plants in a way that enables it to be continuously available. This is made possible thanks to the innovative battery storage systems developed and realised by the company. To wire their systems, TESVOLT relies on HELUKABEL cables, which adhere to all necessary standards and international approvals and ensure the reliable and efficient transmission of data.

With the expansion of new and renewable energy, sufficient production is not the only challenge. This energy also needs to be stored. Users will, naturally, want to use the electricity created from solar, wind, or hydropower, even when the specific sources aren't exactly accessible. Battery storage systems offer a solution for this in photovoltaic plants. They collect the energy generated during the day, and then at night, the energy is made available for use. Users are thus able to optimise the efficiency of their plants, increase the proportion of their private consumption, minimise peak loads, and further reduce dependency on fossil fuels.

TESVOLT plc, which was founded in 2014, has achieved notable success in their endeavours with this promising technology. Based in Lutherstadt Wittenberg, they are a world-wide leader for technology and quality in energy services and storage in both commercial and industrial settings. With more than 250 employees, TESVOLT develops and produces battery storage systems that are used by craft businesses, farming operations, supermarkets, municipalities, energy providers, and in industrial settings. This young company has already received many awards, including the "German Start-Up Award".

© Armin Okulla



Each individual battery module is connected to another with cables, and the storage system to the power inverter.

**FACTS ABOUT
TESVOLT PLC**

- Founded in 2014
- Located in Wittenberg, Germany
- Europe's first CO₂-neutral gigafactory for stationary energy storage
- Battery storage system capacities ranging from 10kWh to 20MWh
- More than 5,000 successful projects world-wide
- Awarded with the "German Start-Up Award" and designated "the most innovative company in Germany" by the Top-100-Jury



VERSATILITY: COMPATIBLE WITH VARIOUS ENERGY SOURCES

The battery storage systems developed by TESVOLT are compatible with photovoltaic and wind power facilities, as well as hydro and thermal power plants, and can also be used to optimise conventional energy sources such as diesel generators. "The range of applications for our products is extremely wide," explains Simon Schandert, co-founder and CTO of TESVOLT. "We have already successfully completed more than 5,000 projects around the globe, from fish farms in Norway to vacation resorts in the Caribbean." With a portfolio containing diverse, modularly-built storage models with capacities ranging from 10kWh up to double-digit megawatt hours, they have a fitting solution for every application.

The seamless transmission of energy and data is an essential component of every application. Each individual battery module is connected to another with cables, and the storage system to the power inverter, which converts the batteries' direct current into network-compatible alternating current. "A high-performance battery management system is required to maintain maximum efficiency in the complex interplay between different components," states Schandert. In this vein, TESVOLT has developed the Active Battery Optimizer (ABO) and the Dynamix Battery Optimizer (DBO), which optimally regulate and monitor the charging and discharging of the battery cells. "Through these, we can prolong the life spans of our systems and reduce their energy consumption," the TESVOLT founder explains.

QUALITY THAT LEAVES AN IMMEDIATE IMPRESSION

As with all built-in components, TESVOLT only uses the highest quality cables in their battery storage systems. This is, in the end, an extremely important factor in how well the systems operate. The power and data

cables are, naturally, HELUKABEL cables. The decision to go with the connection technology specialists at HELUKABEL, of course, came down to the product catalogue. "HELUKABEL had the cables with the exact specifications we needed in their portfolio, and the transparent presentation and selection immediately won us over," remembers Schandert. "With their delivery capabilities and service, we've been satisfied HELUKABEL customers for almost ten years."



"HELUKABEL had the cables with the exact specifications we needed in their portfolio, and the transparent presentation and selection immediately won us over."

Simon Schandert, CTO, TESVOLT

used as both a signal and measurement cable in machine and plant construction," says Eggers. "The construction of the conductor is based on AWG sizing and has both UL and CSA approvals. With this, the cable is suitable for use in storage facilities in the American market." For an export-oriented company such as TESVOLT, this is an ideal solution, as they are no longer required to keep multiple cable types in stock.

DURABLE, SAFE, AND FLEXIBLE

With their robust PVC sheathing, these cables are resistant to many environmental conditions. At the same time, they are flexible enough to be able to be used in cramped assembly spaces. "They are also flame-retardant according to both European and American standards," Schandert adds. "Another small detail that cannot be understated is that our systems must adhere to strict safety requirements."

When it comes to energy and data transmission, HELUKABEL products contribute significantly to the exceptional quality and intelligent features of TESVOLT battery storage systems, which continue to impress users around the world. "We are very happy to have such a reliable and competent supplier as HELUKABEL," TESVOLT's CTO concludes. "I'm convinced that the success of our products is directly tied to this cooperation."

Area sales manager Roland Eggers is an experienced point of contact with HELUKABEL for TESVOLT and provides advice and support in all things pertaining to electrical connection technology. "One of the products we deliver to TESVOLT is our HELUDATA TRONIC 2464/300, which is a flexible data cable that can be

Fragile, Handle with Care

pei tel Communications
relies on KABELMAT
automatic winding technology

For over 30 years, pei tel has been a supplier of professional voice and data transmission equipment. Their portfolio includes radiating cables, which are used in mobile and indoor radio technology. In order to supply customers with the cable lengths they require, pei tel relies on KABELMAT winders and unwinders from the UMROL product range, which was specifically developed by the HELUKABEL subsidiary to be able to safely handle even the most delicate cables.

"If you're sitting in a train in Berlin and hear an announcement, it is usually thanks to one of our devices," explains Dirk Grambke, division manager of distribution and retail for pei tel Communications GmbH in Teltow near Berlin. "You may even hear our devices in the USA and in the far east," he continues. The company's extensive portfolio includes professional wireless and infrastructure technology from

© Andreas Metzner





A KABELMAT automatic rewinding line makes the protective handling of delicate cables at pei tel possible.

well-known manufacturers, as well as their own designs for diverse kinds of microphones. pei tel is primarily active in Germany, Austria, and Switzerland, and distributes products world-wide through their retail partners. They are also the only German manufacturer of classic fixed-installation telephones used in vehicles and additionally offers handheld telephone receivers, speakers, desktop microphones, and headsets, as well as communication solutions for security agencies. In 2020, the decision was made to add mobile and indoor radio technology to the pei tel product range. This includes components such as coaxial and radiating cables.

CABLES IN THE DESIRED LENGTH

Radiating cables, also called leaky feeder cables, deliver reliable, high-frequency coverage for tunnels, hospitals, and even in shopping centres. They feature small slits or openings in the outer conductor along the entire length of the cable which allow a wireless signal to pass in and out. "With these cables, network providers are able to offer scalable and wireless broadband services, which are even required in larger building complexes as a preventative fire protection measure," clarifies Grambke. "We collaborate with well-known manufacturers which provide us with these solutions." The cables arrive in ISO standard lengths of 2,000 metres, which are wound on

2.5-metre-wide wooden drums, each weighing multiple tonnes. "We cut the cables individually according to the customer's needs," says Dirk Grambke. "Very few companies in Germany still offer this kind of service."

For one customer, that could mean 150 metres, but 500 metres for another, which is why pei tel precuts their cables into standardised lengths. This off-the-shelf availability saves an enormous amount of time. Custom-cutting cables to length is also important, as it makes transporting the cable drums to and on the worksite that much easier, because, typically, the drums are transported using small vans. pei tel cuts the requested length of cable from the massive stock drum, then winds the new section of cable onto smaller drums. For this, the specialists from the HELUKABEL subsidiary KABELMAT Wickeltechnik have installed an automatic winding line. The cable manufacturer themselves recommended this supplier who delivered with an UMROL 2000 unwinder and an UMROL 1800 winder

ANYTHING BUT ORDINARY

"The systems are not off the rack," explains KABELMAT sales consultant Manfred Wössner. This is because high-frequency cables are very delicate. Any alteration at all to the cable could impact its electrical characteristics and lead to malfunctions. The worst-case scenario is that the cables are no longer usable after being wound. "To prevent the cables from being deformed by the machine, we installed a belt length measuring device," says Wössner. "This device spreads the contact pressure across multiple rollers and thereby protects the cable." It is also important to keep in mind that the cables should not be subjected to high tensile forces, since these can not only change the length of the cable, but also its shape. "The machines run perfectly in-sync and are controlled using traction force," describes Wössner. "The winder and unwinder are perfectly coordinated. This relies heavily on the settings of the installed servo motors." KABELMAT also adjusted the machines to prevent the cables from being bent too excessively and becoming damaged.

Only one person is needed to control the line. The operator is able to adjust the tensile strength and speed between the two winders using a state-of-the-art Siemens touch panel and is able to follow the process in real-time on a monitor. The UMROL 1800 is designed to be able to wind cables, depending on their type, onto



pei tel utilises an UMROL 1800 and an UMROL 2000 to wind and unwind cables.

drums or rings, however, radiating cables are typically wound onto the classic wooden drums. After cutting the cable, a second operator removes the filled drum from the system and packs it onto a pallet. These are then transported for dispatch by a forklift. Meanwhile, the operator is able to take care of the next drum.

SAFETY AND SERVICE COME FIRST

For pei tel, safety plays an important role. Safety grates, for instance, prevent employees from reaching inside the machines, and motion sensors stop the machines if a body part is detected inside of a dangerous area. "All KABELMAT machines are calibrated in accordance with the European Measuring Instruments Directive (MID) and are thus approved for use throughout Europe," explains Wössner. All steps of the operation are saved to a data storage device and can be seamlessly tracked. "All of this is to ensure we're offering our customers the highest quality and maximum uptime."

"After everything was up and running, KABELMAT provided the operating personnel from pei tel with intensive training and answered all of their questions," adds Dirk Grambke. He is, after all, enthusiastic about after-sales service. "If a problem arises, KABELMAT technicians can connect to our system remotely from their location in the Black Forest, initiate a remote diagnosis, and, if necessary, change certain parameters." This minimises downtime and contributes to the efficiency of the operation, because every minute of downtime costs money.

Thanks to the new KABELMAT winding line, pei tel is able to quickly and affordably deliver custom-cut lengths of sensitive radiating cable without the fear of damaging them. "This investment was completely worth the cost for us," concludes Grambke. "Our customers are extremely satisfied with our service, and that is what matters in the end." ◀



The operator is able to adjust the tensile strength and speed between the two winders using a state-of-the-art touch panel.




"This investment was completely worth the cost for us. Our customers are extremely satisfied with our service, and that is what matters in the end."

*Dirk Grambke,
Division Manager of Distribution and Retail,
pei tel Communications GmbH*



Reverion has developed a container-based power plant system that is capable of electrochemically converting biogas and hydrogen into electricity with 80% efficiency.



Converting Gas into Electricity... and Back Again!

HELUKABEL cables give
the fuel cell plants from
Bavarian start-up Reverion a leg up

Biogas plays an important role in the world of renewable energies. However, there is still considerable potential yet to be harnessed in its production and usage. It is the goal of the start-up Reverion to better exploit this resource through innovative, container-based power plants. These Bavarian visionaries rely on high-quality HELUKABEL cables to connect the electronic components of their fuel cell systems.

The production and usage of biogas play an important role in the global transition to renewable energies. In Germany alone, around 10,000 biogas production facilities are currently in operation, which produce biogas by fermenting livestock manure and other forms of biomass. The biogas produced in this way is primarily transformed into electricity, typically in cogeneration plants with combustion engines. More than 30 terawatt hours of electricity is produced from biogas per year in Germany, which equates to approx. 18% of the total energy produced domestically from renewable sources.

© Reverion GmbH

The advantage biogas has over other renewable energy sources is that its usage is unaffected by weather and sunlight. This means that it continues to be useful even when wind and solar plants fall behind in energy production. Biogas technology also has its drawbacks. Most facilities are only roughly 40% efficient, resulting in most of the energy being lost in production. The amount of CO₂ released by burning biogases is relatively low when compared to electricity produced by burning coal or natural gas, but still considerably higher than wind, hydro, and solar energy.



The system can be switched to an electrolysis mode, which allows electrical energy to be used to produce hydrogen and methane.



Reverion's electrical equipment relies on the expertise of, among others, HELUKABEL.

INCREASED EFFICIENCY AND A REDUCED CARBON FOOTPRINT

"Biogas has a lot of potential, it just needs to be better utilised," says Lukas Berneiser, head of electronics at Reverion GmbH. With roots in the Technical University of Munich, the Bavarian start-up has made it their goal to improve the efficiency of biogas production. Reverion has developed and patented a revolutionary, container-based power plant system that is capable of electrochemically converting biogas and hydrogen into electricity with 80% efficiency. The carbon dioxide produced during this process is separated and then sequestered, which, for the first time, allows for cost-efficient negative CO₂ emissions.

"Our systems are especially attractive for agricultural and industrial businesses that have their own biogas production facilities," explains Berneiser. "This is because with our technology, they could produce twice as much energy from the same amount of biogas." Their system comes with another significant advantage: It's reversible. "This means that, in less than a minute, the system can be switched to an electrolysis mode, which allows excess energy from solar and wind power stations to be used to produce hydrogen and methane," says Berneiser. Through this, energy can temporarily be stored as gas, and then converted back into electricity or thermal energy when needed.

ENERGY STORAGE AND CUSTOMER DEMAND

Central to the Reverion system is a framework of solid oxide fuel cells, called the skid. To produce electricity, purified biogas is injected into the cells where it is partially oxidised by ambient air. This produces electrical energy, which is picked up by the grid. The pure CO₂ byproduct is separated and sequestered and can then be utilised in a number of technical or industrial applications. The electrolysis mode essentially goes through this process in reverse. The fuel cells use electrical energy to produce pure hydrogen, which can be stored or further converted into methane using CO₂. Methane has similar characteristics and applications as natural gas. Berneiser is convinced that, "this system is the solution to multiple challenges, especially those of efficiently storing and utilising renewable energy."

Reverion's electrical equipment relies on the expertise of, among others, HELUKABEL, who supplies the cables that connect the fuel cells, power inverters, sensors, and actuators, as well as the wiring for the internal control panels. Data cables are also used for communication between the skids over an Ethercat



"HELUKABEL has contributed substantially towards the incredible speed at which we are approaching serial production of our fuel cell power plants."

Lukas Berneiser, Head of Electronics, Reverion GmbH



Reverion plants are especially attractive for agricultural and industrial businesses with in-house biogas production.

network, as well as hybrid lines which feed and monitor various motors. "The built-in cables need to be able to endure voltages as high as 1,500 volts and temperatures up to 300 degrees Celsius," explains Berneiser. "For us, it is of equal importance that all of our required components are of the highest quality and are reliably available."

COMPETENT ADVICE AND A VAST PORTFOLIO

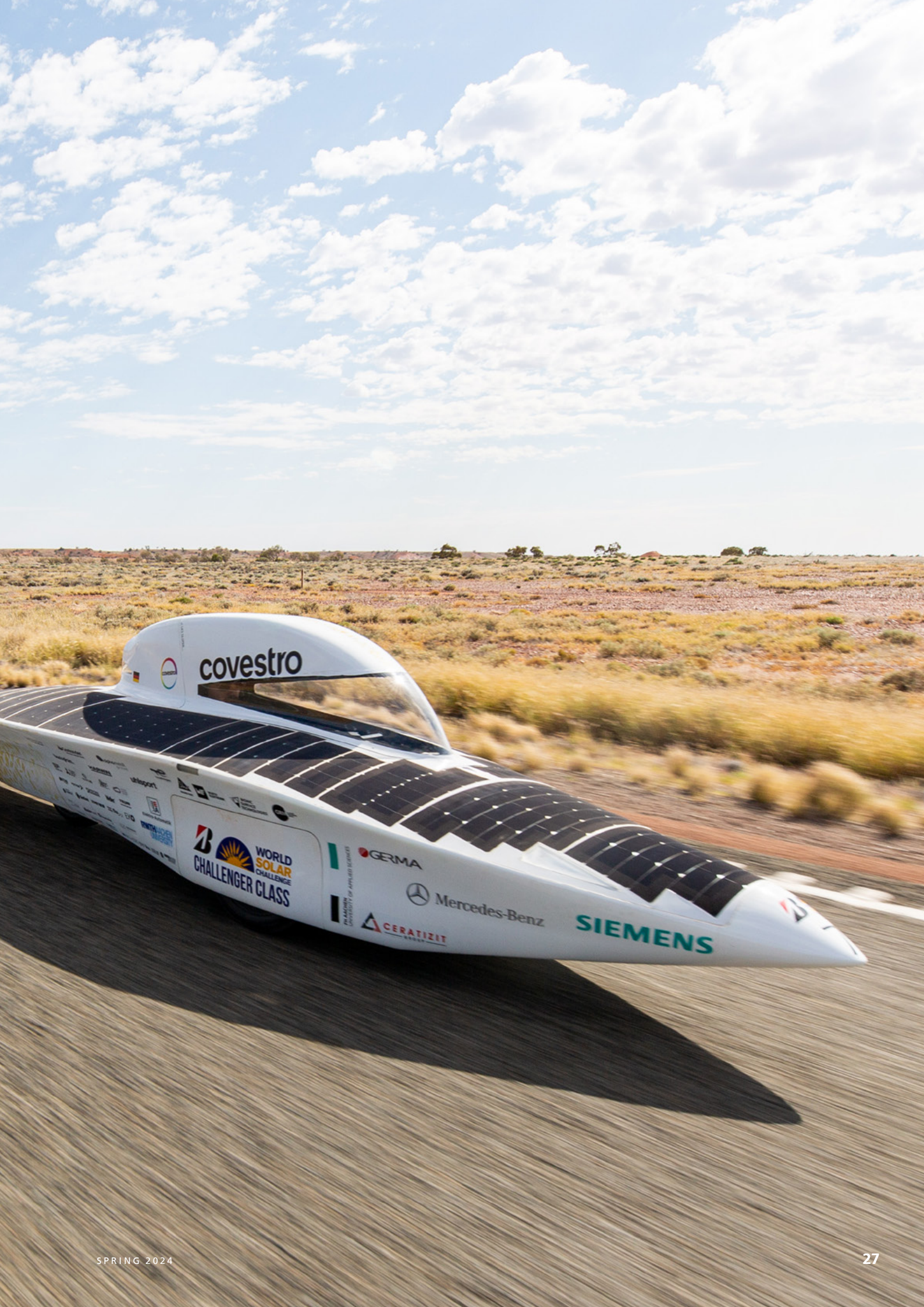
After many recommendations, the Reverion team came in contact with HELUKABEL and regional sales manager Philipp Walter. "Our conversations were pleasant, and Mr. Walter was friendly and competent," remembers Berneiser. The two worked together to find the ideal cable for each application. "We're supplying Reverion, for example, with solar cables from the SOLARFLEX series, weather-resistant H07RN-F cables, TOPSERV hybrid cables, and H07V-K single-core wires. Accessories such as cable glands from the HELUTOP product line round out the shipment," explains Walter. In high-temperature areas, such as near the fuel cells, Reverion utilises especially heat-resistant HELUTHERM 400 nickel cables, which are

capable of withstanding temperatures up to 400 degrees Celsius. With a product range consisting of over 33,000 items, HELUKABEL is able to find a fitting solution for any application, regardless of how challenging, and it was this ingenuity that won over the leadership at the Bavarian start-up.

The first Reverion plant with an electrical output of 100 kilowatts has been undergoing a pilot run since October 2023, and serial production is planned for 2024 and 2025. With this, the containers will be able to be distributed throughout Germany, as well as to neighbouring countries. "If the cables in our pre-series products prove themselves in practice, then we plan to continue placing our trust in HELUKABEL for our serial production," states Berneiser. "HELUKABEL has proven to be a reliable partner and has provided us with the exact cables needed to fulfil our particular demands. This has drastically increased the speed at which our innovative fuel cell plants are approaching serial production. We look forward to continuing to work together in the future!" ◀

CROSSING THE OUTBACK USING THE POWER OF THE SUN

Powered exclusively by solar cells, the solar car titled the "Covestro Adelle" from "Team Sonnenwagen Aachen" can reach an impressive top speed of 136 km/h. This marvel of engineering was built by a combined team from two universities in Aachen, Germany, who have been researching and building solar-powered race cars since 2015. The fourth generation of solar cars was completed in 2023 with the support of HELUKABEL, which supplied the various cables connecting the solar car's different components. Whether it's hot and dry or cold and damp, these dependable cables ensure the efficient flow of energy to components ranging from the batteries to the solar modules; from the drive engine to the control system. A highlight for the team was participating in the Bridgestone World Solar Challenge last year, which is a 3,000-kilometre-long race through the Australian Outback. This was an amazing experience for the students, and also clearly shows that, even in these extreme conditions, such spectacular performances are made possible by HELUKABEL products.



Energy Supply in a Confined Space

Siltronic equips new wafer production plant in Singapore
with connecting cables from HELUKABEL

The new production facility of wafer manufacturer Siltronic has a large number of production machines. There is often little space for the power connection - this requires flexible cables with small bending radii. Thanks to the support of HELUKABEL Singapore and the PVC control and connecting cables of the HELUPOWER 1000 RV-K series, the semiconductor specialist can rely on the reliable operation of its machines.

From smartphones and computers to modern cars, medical technology, machine tools, solar and wind power plants: countless technological achievements of recent decades would not have been possible without a tiny, inconspicuous component called a microchip. Integrated circuits are able to perform complex logic operations and calculations in a very small space, which is the basis for the functioning of all electronic devices.

The basis of microchips are wafers. These are round or square slices of silicon less than a millimetre thick on which the required transistors, capacitors and other resistive elements are deposited and combined to form a circuit. Demand for wafers has been growing rapidly for decades. This is due to increasing digitalisation and the introduction of electronics into more and more areas of application.

Siltronic is one of the leading manufacturers of silicon wafers. The Munich-based company has existed in its current form since 2004, but its origins date back to the 1950s, when it began researching and developing ultra-pure silicon. Today, Sil-

tronic employs nearly 4,500 people, has facilities around the world and produces an average of one wafer per second. The strategic focus is on the production of wafers with a diameter of 300 millimetres, the size of which makes them suitable for high-tech applications such as graphics cards in computer technology.

LARGEST INVESTMENT IN THE COMPANY'S HISTORY

The largest and most modern production facility for these products to date is currently being built in Singapore. This is the biggest investment in Siltronic's history. Around 600 new jobs will be created to expand production capacity to meet the growing demand for semiconductor devices. Ground was broken in 2021 and construction is now well underway.

Wafers are made from blocks of semiconductor material, known as ingots, and undergo numerous processing steps before they are finished. Siltronic's machinery is correspondingly extensive, ranging from the sawmill to surface finishing. To power the machines, the building has an extensive electrical infrastructure that provides various voltages up to 66 kilovolts at numerous connection points. It is Anton Waltl's job to connect the machines to these points: The project engineer at Siltronic Singapore and his team ensure that all the production equipment has the energy it needs to operate.

FLEXIBLE INSTALLATION IN HARD-TO-REACH AREAS

"We use connection cables with different numbers of conductors, cross-sections and nominal voltages to supply power to

the machines," says Waltl. "However, one challenge is often the same: the limited space and hard-to-reach connection areas where we have to lay the cables. It is particularly important that the cables are suitable for tight bending radii. "Otherwise there is a risk of damage or even cable breakage, which can lead to expensive production downtime," explains Waltl.

During his time in Germany, the project engineer had already had good experiences with HELUKABEL as a partner for electrical connection technology - so it was obvious to bring the specialist on board for the new building in Singapore as well. "HELUKABEL is represented here by a local subsidiary, so the company was able to offer us the desired service and fast response times," says Waltl, explaining his choice. "Especially with a project of this size, it is a considerable advantage to have a contact person nearby who knows the local market and the applicable regulations inside out and who can also respond quickly to short-term requirements."

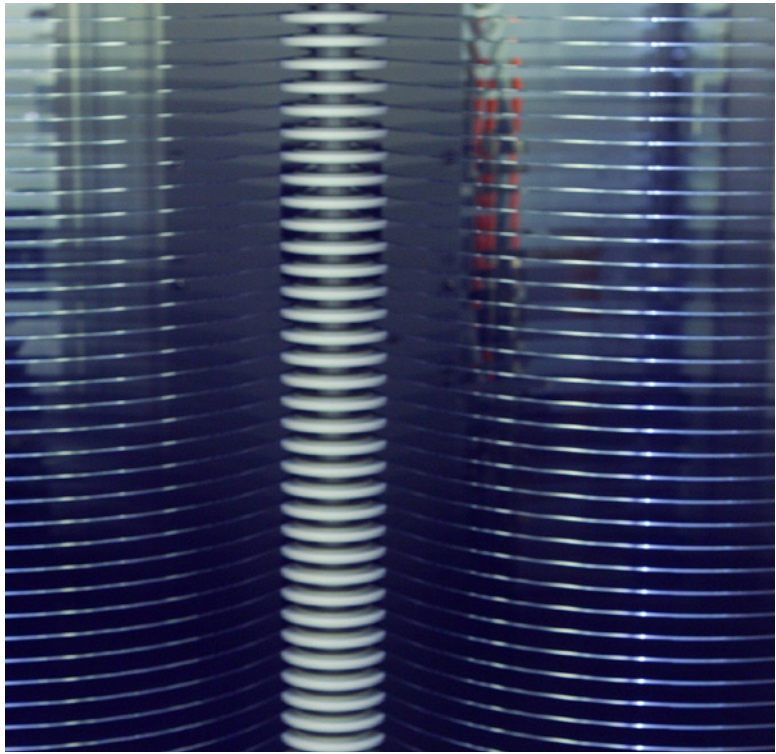
RELIABLY HIGH PRODUCT QUALITY

However, it was not only the service that was convincing, but also the products: With the PVC control and connecting cables of the HELUPOWER 1000 RV-K series, HELUKABEL offers high-quality power cables for devices and machines, which, among other things, impress with their high flexibility. Depending on the size, they have a minimum bending radius of only four times the outer diameter. "Local cable manufacturers here in Singapore do not offer such cables in this form," says Waltl. The HELUPOWER 1000 RV-K is

flame-retardant and resistant to UV radiation, ensuring long-term reliable machine operation. "We also benefit from the fact that the cables are manufactured in accordance with all applicable regulations and are of consistently high quality. This creates security of supply, which is an important factor for us," emphasises Walzl.

SAVED ASSEMBLY TIMES

HELUKABEL is also supplying motor cables from the TOPFLEX range, single conductors from the NSGAFÖU range and many other products for the new Siltronic plant. Anton Walzl and his team also like the way the cables are laid: "The cables are easy to handle and pull thanks to their smooth surface. This saves us a lot of time during installation. This is also an important aspect for those responsible at Siltronic, because the machines often have to be commissioned quickly. The semiconductor specialist will continue to rely on HELUKABEL for further expansion stages of the production site. Walzl is fully confirmed in his choice: "We are very satisfied with the cooperation and look forward to bringing this project to a successful conclusion together".



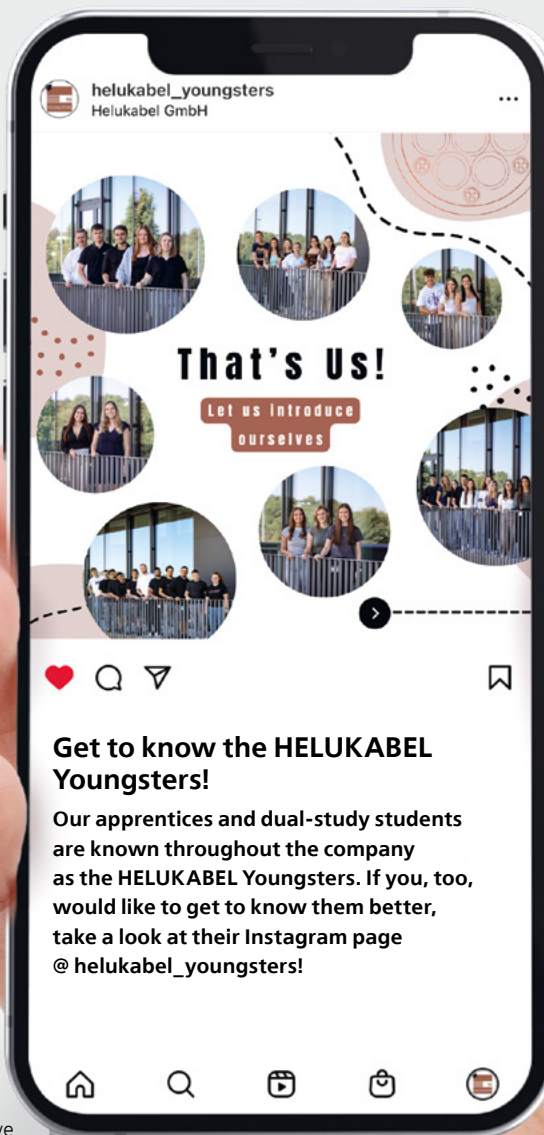
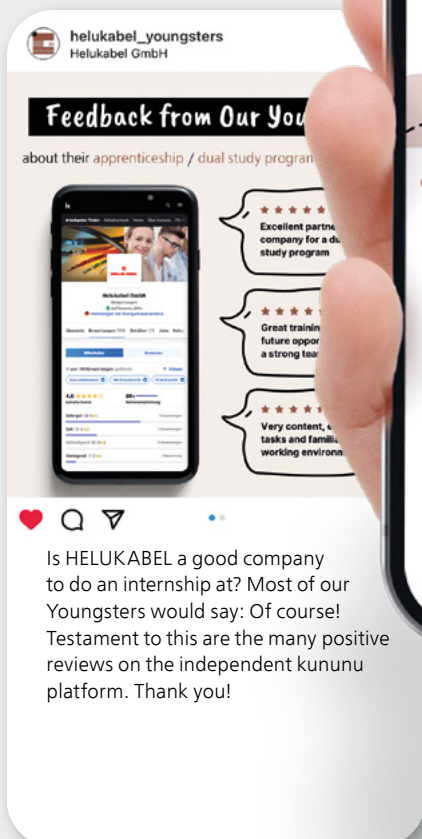
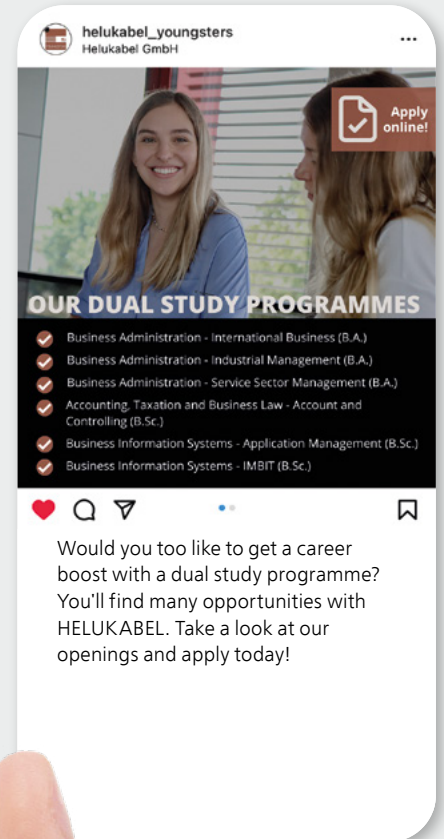
Wafers are round or rectangular sheets of silicon that are less than a millimeter thick. They are the basis for microchips.

To power the machines, the building has an extensive electrical infrastructure.



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"Change Requires Good Communication"

The HELUKABEL production facility in the Franconian city of Windsbach is already considered one of the most modern of its kind in the world. Their goal is to continue their future-oriented development and eventually become a digitalised and interconnected "smart factory", which is programmed and controlled with the help of ideas and methods from the lean management system. In this interview, plant manager Ralf Preißer explains how such a transformation is possible and how HELUKABEL's customers will benefit from it.

Mr Preißer, you have been the head of HELUKABEL's production facility in Windsbach since May 2023. Before that, you worked in mechanical and plant engineering. What made you want to switch to the cable industry?

For me, the branch itself wasn't the deciding factor; it had more to do with HELUKABEL as a company. Over the past few years, HELUKABEL has grown considerably and has become a player in important industries like renewable energies and e-mobility. This means that their prospects for the future are promising. Additionally, I've worked almost exclusively for family-owned businesses thus far, so it was easy to transition to another family-owned business. It just so happens that this one has a global presence. The Windsbach cable-manufacturing plant leads the way technologically, and I couldn't pass up the exciting opportunity and challenge to help guide the plant on its way to becoming a smart factory.

How different is your job with HELUKABEL compared to your previous positions?

To be honest, not much at all. Of course, every company has its own structures and many of my tasks as plant manager differ from those of previous positions. The technology and products that I'm working with now are new to me. And you can't ignore the fact that norms and regulations play a huge role in the

cable industry. In management, however, the topics and challenges are often the same, regardless of the industry.

What does a typical workday look like for you?

Every day comes with new challenges for me, be it leadership tasks such as meetings or coordinating projects with employees in manufacturing. Often, we're meeting to discuss strategy. What are our goals? Are we on the right path? Where can we improve? I also deal with technical aspects, such as the quality of our products, and make necessary decisions there, too. Other days, I'm thinking about benefits for our colleagues, supervising tours of the plant, or completing different audits. Despite all of this, I try to always have a sympathetic ear for our employees, even if it's dealing with personal matters.

The HELUKABEL plant in Windsbach is one of the most modern cable plants in Europe. What about the plant makes this true?

First of all, our facilities are top of the line. Our plant's technology is ultramodern, which is a result of us not being reluctant to invest in it in the past. This is also something that separates us from our competitors and allows us to be extremely flexible in production. You just don't find the same variety of products with other manufacturers as you do here



in Windsbach. We have our team's years of experience, competence, and know-how to thank for always being able to find the best solutions for our customers.

"You just don't find the same variety of products with other manufacturers as you do here in Windsbach."

One of your areas of speciality is lean management, that is the most efficient configuration of the entire value-added chain as possible. What changes have you already been able to make here at HELUKABEL?

The basis of every lean transformation is a clear vision and mission, meaning what is your goal? Where are you trying to take the company and its employees development-wise? For this, we instituted a policy deployment process according to the Hoshin Kanri method. Every employee is provided with the knowledge needed for us to work together to achieve the goals of our mission. Good communication is required in order for all employees to understand the reasoning behind changes and comprehend the strategy behind decisions. In production, we have two pilot departments working on digital boards. There, the employees work with their leadership to evaluate the metrics relevant for their daily work, and pinpoint potential places for optimisation. We have done a lot of training in the basics of lean management, which has resulted in a few great projects, such as workplace layout, setup time optimisation, automation, and in administrative areas. Many of these were immediately put into practice. We strengthened ourselves structurally and even formed our own lean department. In the future, we want to continue going in the

consumption.

How important are digitalisation and automation in the cable industry?

In my opinion, this is what will decide which companies survive or not in the next few years, at least in Germany. For the past several years, the motto has been, "we need to network," and the technology required for that has since become available. These new technologies have enormous potential when it comes to rejection rate, machine utilisation and availability, orienting production controls based on value streams, or pre-emptive maintenance. However, to bring processes into line with these new technologies requires intensive preparation. It is also important that, during these technological changes, our employees' knowledge and experience is not lost. We need to create appropriate platforms for the exchange of information. I am expecting a real revolution in the coming years thanks to the utilisation of artificial intelligence. It will take the ability to predict and plan production processes, quality, raw materials, energy needs, and maintenance intervals to a whole new level. We at HELUKABEL are already delving into this today.

For years, many industries have been noticing a trend towards individualisation, even the cable

direction of paperless contracts. For this, we'll need a high level of digital connectivity between production and administration. Another goal of ours is to minimise waste, wastefulness, and energy



"We have done a lot of training in the basics of lean management, which has resulted in a few great projects, such as workplace layout, setup time optimisation, automation, and in administrative areas. Many of these were immediately put into practice."

industry. How well equipped is HELUKABEL to handle the production of more and more product variants in increasingly smaller quantities?

Of course, due to length-based manufacturing, manufacturers in the cable industry prefer large batch sizes. Customers, on the other hand, want flexibility, and don't want to accumulate stockpiles of products. They want to instead be able to quickly react to changes in the market. For many years, the cable industry was traditionally focused on standard products. In the meantime, however, custom solutions are being requested more and more. To adapt to this, production needs to be just as flexible. There is much left to be optimised with regard to setup times, whether it be through quick-change systems, external pre-setup, or digital setup plans. These are ways we can homogenise and standardise processes. In doing this, it is also important to include the employees operating the machines, with all of their specialised knowledge and experience.

The HELUKABEL plant in Windsbach has its own engineering department at its disposal, which develops customised cables and wires together with customers. How does the production of custom solutions differ from that of standard products?

In developing custom solutions, it is important to be in constant communication with the customer, getting their input even before production begins. Our colleagues in this department are able to use their immense know-how to assist customers through stages such as defining the structure, process engineering, and quality assurance. In this way, we're able to take on many tasks in the customer's stead. The initial production of every custom cable is closely moni-

tored by us to be able to immediately readjust and swiftly remedy emerging problems if necessary. Finally, we also support our customers in installation and operationalisation until we can definitively say that everything is working flawlessly.

Sustainability is playing an ever-more important role in this industry. What steps is HELUKABEL taking to make production as sustainable and environmentally friendly as possible?

Small batch sizes are a challenge here, too, since the production of each individual cable comes with startup costs, which we want to minimise. We do this by keeping the deviation of startup variables to a minimum. We are able to achieve this by optimising setup processes and by putting new insights gained through digitalisation into effect. Waste materials are fed into a clever recycling loop; we do the groundwork for our recyclers by separating sheath materials from copper cores, for example. When investing in new technology for the plant, we pay very close attention to environmental impacts and energy efficiency. The same goes for the procurement of consumable materials such as ink. We produce our own energy via a photovoltaic facility on our roof, and our environmental management system is certified according to ISO 14001. One requirement for this certification is to maintain a continuous improvement process. This means we are constantly looking for ways and means to operate even more sustainably. ◀

RALF PREISSER HAS TO DECIDE!

Tea or coffee?

→ Tea, absolutely. It just tastes better to me.

Suit or jeans?

→ Sometimes I'll wear a suit for work, but I much prefer a comfortable pair of jeans.

Cooking at home or going out to eat?

→ I find cooking and eating at home with my family to be a lot of fun.

Do you prefer playing sports or watching them?

→ Many years ago, my kids took me to compete in a triathlon. Since then, I've been quite active.

Summer or winter?

→ I prefer spring or summer. I enjoy being outside with my kids riding bikes or running. In the winter, it's often already dark outside by the end of the workday.

Go camping or stay in a resort?

→ Resort. There's something to be said about putting your feet up and relaxing.

Dogs or cats?

→ I've owned dogs for many years and grew up with them. This is a rather easy decision for me.

Music or podcasts?

→ I like listening to podcasts, but also listen to a lot of music. Preferably with a lot of guitar.

City or village?

→ I grew up in a village, so I'd pick village every time. There's a stronger sense of community there compared to in cities, where nobody knows each other.

TV series or books?

→ I'm always up for an exciting book. It could even be nonfiction.

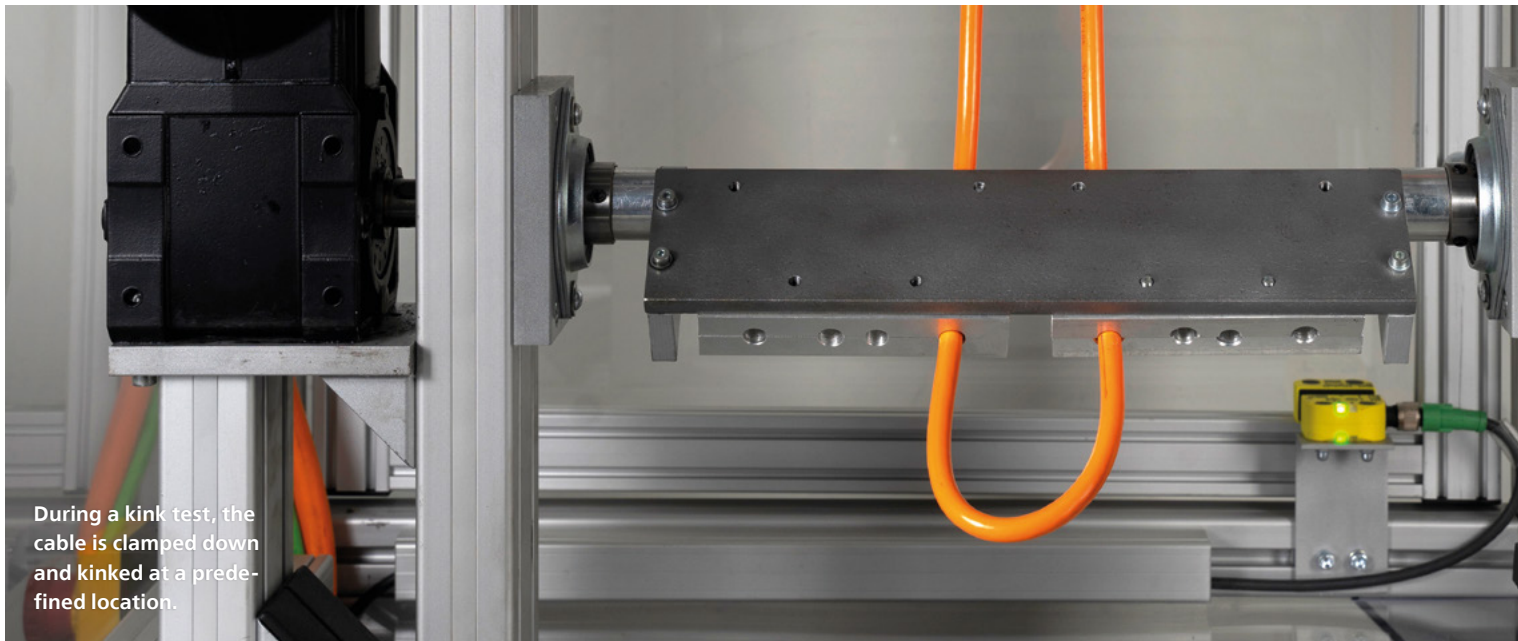


THE SERIES AT A GLANCE:

TORSION TESTS // BENDING TESTS // DRAG CHAIN TESTS // **KINK AND ABRASION TESTS** //
FIRE TESTS // AGING TESTS // EMC TESTS

Kink and Abrasion Tests

When developing our cables and wires, every product is extensively tested in our laboratories. In the fourth part of our series "Put to the Ultimate Test", we will explain our kink and abrasion tests.





© Andreas Riedel

Cables used in dynamic applications are subjected to a variety of mechanical loads, including abrasion. These occur via contact with other machine components, for example. Constant rubbing can lead to long-term damage or destruction of the sheath and core insulation of the cable. This damage can lead to cable breaks, malfunctions, short circuits and fires.

In our testing laboratories, we therefore run abrasion tests to evaluate the suitability of our sheathing and insulation materials against the demands of everyday use. To test this, a metal pin is rubbed back and forth against a fixed cable, resulting in friction. In our testing facilities, it is possible to reach speeds of 400 mm/s and a max. acceleration of 2,000 mm/s². Through this, we are able to accurately simulate highly-dynamic applications ourselves to determine what effects friction has on the function and longevity of our products.

Bending loads are also a part of everyday life for cables and wires in many moving applications. Just as with friction, bending motions can cause irreparable damage to cable materials over time. We therefore perform special kink tests on our products to determine their resilience and to avoid unpleasant surprises.

In these tests, the cable inserted into moving device and kinked at a predefined location. The testing equipment reaches angular speeds of 440°/s, accelerations of 2,000°/s², and a maximum torsion angle of ±180°. For our engineers, a cable only passes when it is able to withstand these extreme mechanical loads without sustaining damage. ◀

Ask the Expert

How can I best protect cables and wires against abrasion?

There are a number of ways. The best way would, of course, be to avoid potential contact points between cables and other components in the designing phase of moving applications. This, however, is not always possible. If I know that friction may occur, then the choice of appropriate sheath material is important. Cables made of polyurethane (PUR) have the highest resistance to friction. Even other thermoplastic elastomers (TPE) exhibit a high abrasion resistance. Polyvinylchloride (PVC) is, however, not as resistant. It is also possible to protect cables from abrasion using additional sheathing, such as using heat-shrink tubing, braided sleeving, or fabric tape. In some circumstances, the incorporation of a cable trough or a drag chain can help protect the cable and avoid abrasion.

What exactly is cable breakage and why is it so dangerous?

A cable break occurs when the cores of a cable partially or fully break apart due to mechanical overload such as abrasion or kinking. The electrical connection is completely disrupted at this location. This can also mean that the electricity that normally flows through the now broken part is instead flowing through the remaining portions of the cable, which can lead to increased current densities. The cable will begin to heat up, damaging the core insulation and the sheath. This could result in short circuits or electric arcing, which themselves could cause a cable fire, which statistically is one of the most common causes of fire. This is why it is so important to pick appropriate cables and wires for every application and to monitor these regularly.

ABOUT THE EXPERT

Günter Meyer is the head of the Dynamic Testing Centre at the HELUKABEL plant in Windsbach



Welcome to Ireland!

Interesting facts about the HELUKABEL subsidiary and the country

- ▶ HELUKABEL Ireland is one of the company's newest subsidiaries and was founded in June, 2023.
- ▶ Including the managing director, Geoff Byrne, the team consists of five individuals, but they are hoping to expand further throughout the year.
- ▶ HELUKABEL Ireland is located in the capital, Dublin, and the airport and harbour can be reached in 15 and 20 minutes respectively, which allows for the quick receiving and distribution of products.
- ▶ In order to provide their customers with more comprehensive services, the Ireland subsidiary has their own cable-cutting facilities and a cable drum warehouse at their disposal.
- ▶ One of the most important industries for HELUKABEL Ireland is renewable energy. More than half of the energy used in the country is produced by wind and solar power plants.
- ▶ Some international giants in the tech industry have their data centres for the European market located in Ireland, making them some of HELUKABEL's most important customers.



FUN FACTS

The **WILD ATLANTIC WAY**

in western Ireland proudly stretches over 2,500 kilometres of coastline. Along this road, there are any number of sights to see, including spectacular cliffs stretching up to 688 metres high.



One of the Irish national sports, **HURLING** is not only the fastest, but, at 3,000 years old, also the world's oldest team sport. Played with sticks (hurleys) and a ball, it combines elements from hockey, baseball, and lacrosse. The championships are played in the Croke Park national stadium, which can seat up to 82,000 fans.



On the **17TH OF MARCH**, millions of Irishmen and women and those of Irish descent celebrate **SAINT PATRICK'S DAY** worldwide. What many don't know is that the patron saint of Ireland was actually British, and contrary to the legends, he did not expel the snakes from Ireland.



HARP. It is not only found on Irish coins, but is also represented in the logo of the world-famous brewery, Guinness.

Instead of the shamrock or the leprechaun that you may expect, the Irish national symbol is the

Ireland is known for its disproportionately high number of world-class authors. So far, **FOUR IRISHMEN** have won **THE NOBEL PRIZE IN LITERATURE**:



William Butler Yeats (1923), George Bernard Shaw (1925), Samuel Beckett (1969), and Séamus Heaney (1995).

Every year from the 10th to the 12th of August, the "Puck Fair" is celebrated in the town of Killorglin. As part of the celebration, a wild billy goat is declared king and is given the honorary title of **"KING PUCK"**. After the celebration, the goat is then released back into the wild.



FAQ

PUR or PVC? Which is the better sheath material for cables and wires?

Sheath material plays a deciding factor when choosing the right cables and wires. The outer sheath protects the cable and conductors from external forces such as temperature and weather, as well as chemical and mechanical damage. This is important to ensure the disruption-free transmission of energy, signals, or data inside cables and wires.

The most commonly used sheath materials are polyurethane (PUR) and polyvinyl chloride (PVC). Optically, there is no difference between these materials. However, they exhibit different properties, which are more or less suitable for different applications.

PUR (11Y) is a plastic with especially good mechanical properties. It is extremely resistant to abrasion, notching, tearing, and cutting, and remains highly flexible in low temperatures. This sheath material is especially suited for applications requiring dynamic movements and variable bending strains, such as in drag chains. Cables with PUR sheaths have no problem enduring millions of bending cycles or strong torsion forces in robotics applications. PUR is also highly resistant to oils, solvents, and UV-radiation. Furthermore, depending on the material's composition, it can be halogen-free and flame-retardant, which are important criteria for cables with UL approvals intended for use in the USA, for instance. PUR cables are typically utilised in machine and plant construction, in industrial automation, and the automobile industry.

PVC (Y) offers a multitude of possibilities as a sheath material thanks to its ability to be adapted to different demands by altering its component ratios. The mechanical loading capacity is not as high as with PUR, but PVC is also significantly more economically priced (price ratio 1:4). PVC is odourless and resistant to water, acids, and cleaning products, and is

therefore often used in the food industry or in damp environments. PVC is, however, not halogen-free, which is why it is not considered suitable for specific indoor applications. It is also not intrinsically resistant to oil. This resistance can, however, be achieved through special, chemical additives.

Alongside PUR and PVC, there are a number of other materials that can be used as a sheath material for cables and wires. These range from commercial rubbers to thermoplastic elastomers (TPE) and special compound plastics. There is no blanket answer for which material is best fit for each specific application; it is heavily dependent on the individual demands of the application. With more than 45 years of experience in all industries, HELUKABEL is happy to support its customers in selecting the optimal solution for their application. ◀

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**PUR VERSUS PVC**

Are you interested in learning more about the properties of different sheath materials? You can find additional information on this in our White Paper, "PUR vs. PVC". Download for free!



OUR TRADE FAIR DATES

HELUKABEL will be exhibiting at various trade fairs around the world over the next few months. Please check our website **helukabel.com/trade-fairs** for an up-to-date overview of the dates and locations. We look forward to your visit!

HELUKABEL ON SOCIAL MEDIA

We use our social media accounts to share all the latest news from the HELUKABEL world with you: from product innovations and successful customer projects to delving deep and sharing knowledge on technical topics concerning electrical connection technology. Would you also like to stay up to date? Then follow us! We can be found on the platforms listed below:



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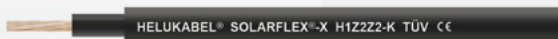
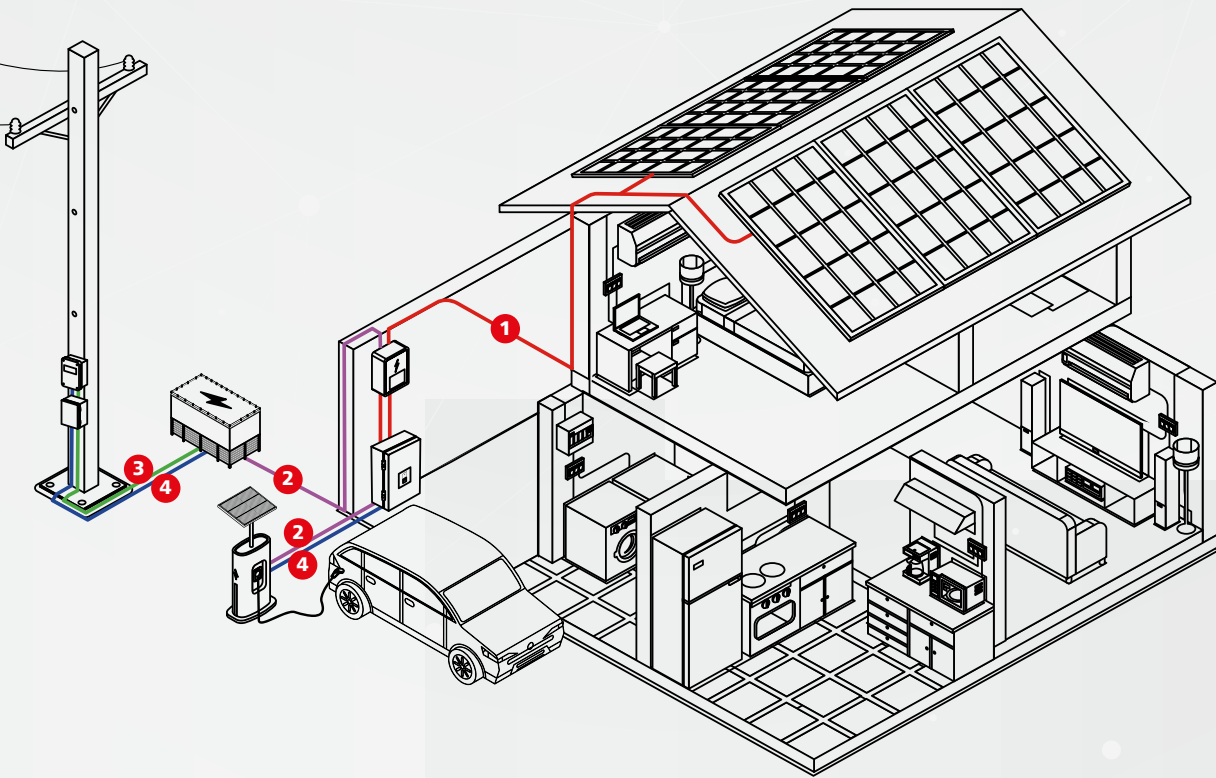
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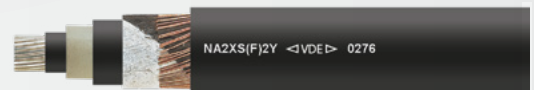
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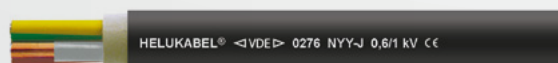
Did you know? Cables and wires from HELUKABEL are used in all areas of energy supply - from generation to consumer. These are a few of the most popular types:



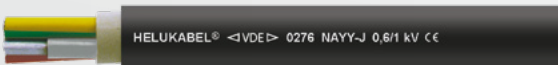
- 1 String wires**, such as the **SOLARFLEX-X H1Z2Z2-K**, are found connecting solar modules together, as well as with power inverters. These wires are especially resistant to UV radiation, ozone, weather, and moisture, and even have optional rodent protection.



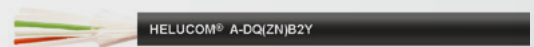
- 3 Medium-voltage cables**, such as the **NA2XS(F)2Y**, are primarily used to feed grids with electrical energy and to connect transformer stations to high-voltage networks. The nominal voltage is usually between 10 and 30 kV.



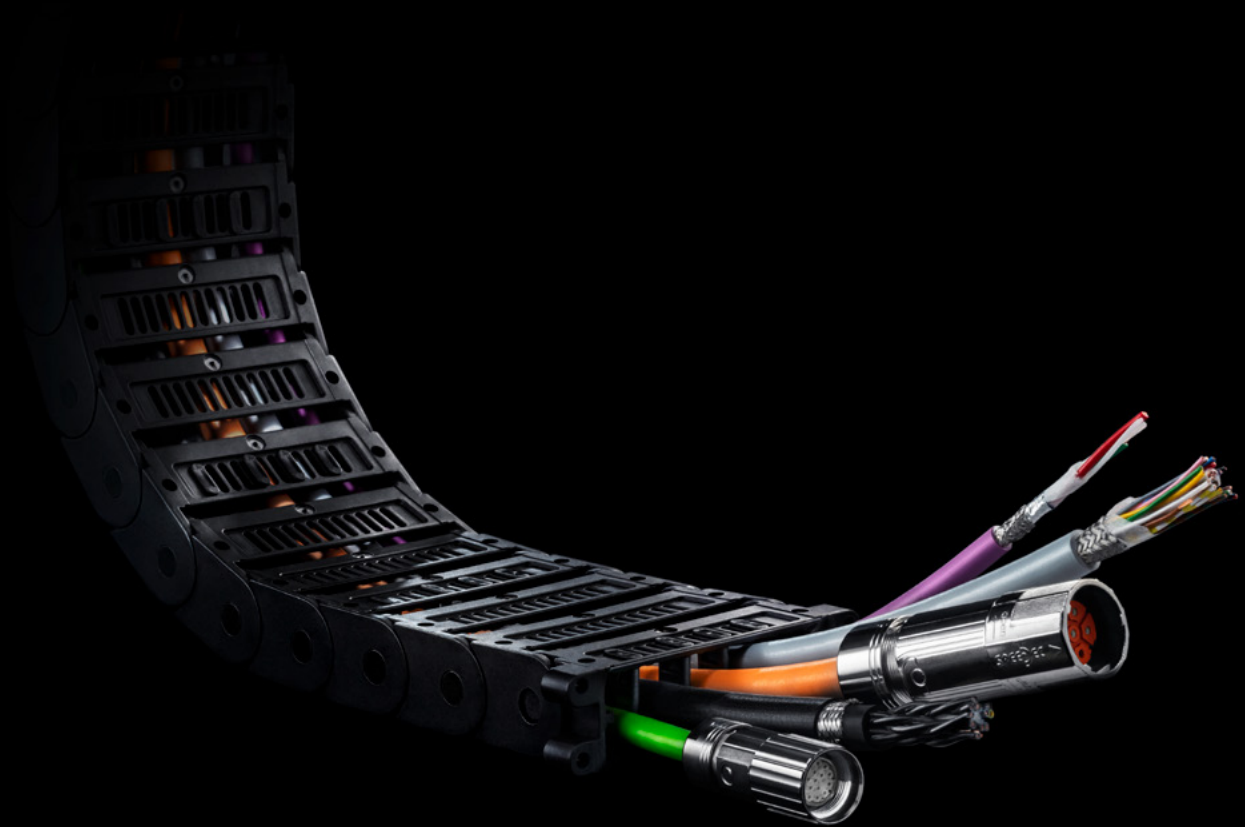
- 2 Energy cables**, such as the **NYJ** or the **NAYY-J**, generally carry voltages up to 1 kV. These cables also make up low-voltage networks, which distribute energy from transformer stations to the individual consumers.



- 4 Communications cables**, such as the **PAAR-TRONIC-LI-2YCYv** or the **HELUCOM A-DQ(ZN)B2Y**, are used in controlling the power grid and to transmit important measurements and other data.



Chains, Cables, Assemblies: Quality from a Single Source



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