TERVAKOSKI NEWS

MODERN WORK ENVIRONMENT MIXING NORDIC AND SLAVIC WORKING CULTURES

FUTURE ELECTRIC VEHICLES NEED MORE HEAT-RESISTANT CAPACITOR FILMS

MODERNISING EUROPE'S LEADING CAPACITOR FILM PRODUCTION – LISIM LINE

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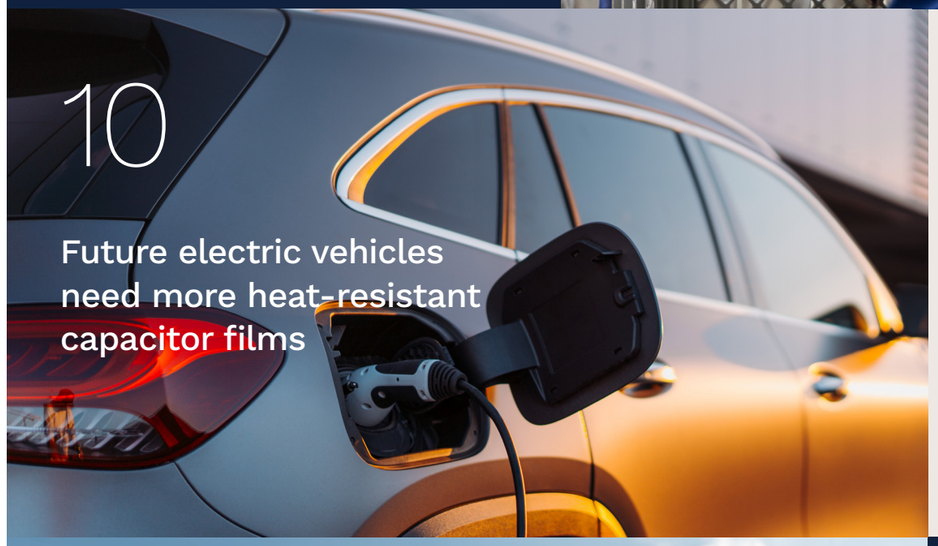

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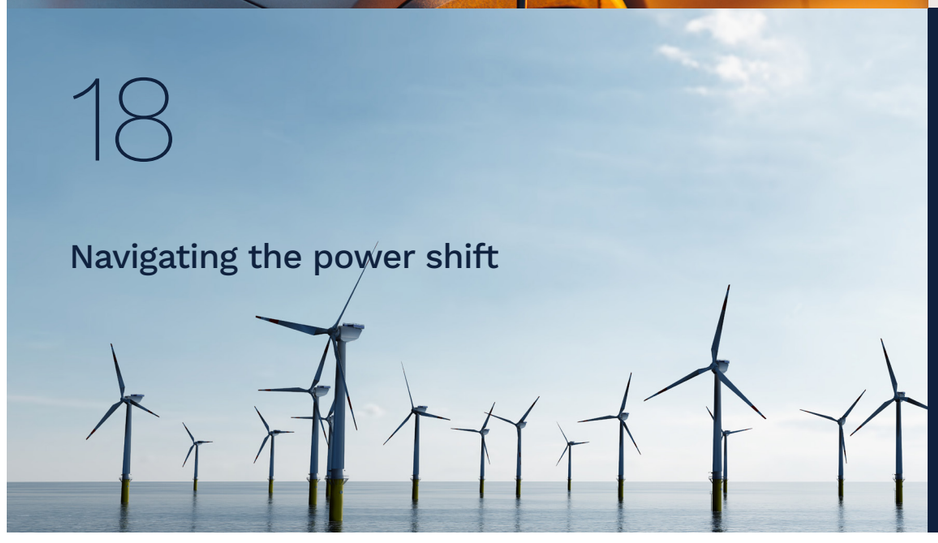

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Jari Nurminen,
CEO

A FRESH FIVE-YEAR STRATEGY: *OUR COMMITMENT TO A SUSTAINABLE FUTURE*

The urgency of addressing climate change and prioritising sustainability has never been greater. Globally, ambitious environmental objectives have been set for the upcoming years, with Europe leading the charge toward carbon neutrality and cleaner energy solutions. These goals drive not only our actions but also the collective efforts of industries worldwide.

Our mission is to help both our customers and the world achieve these critical climate targets.

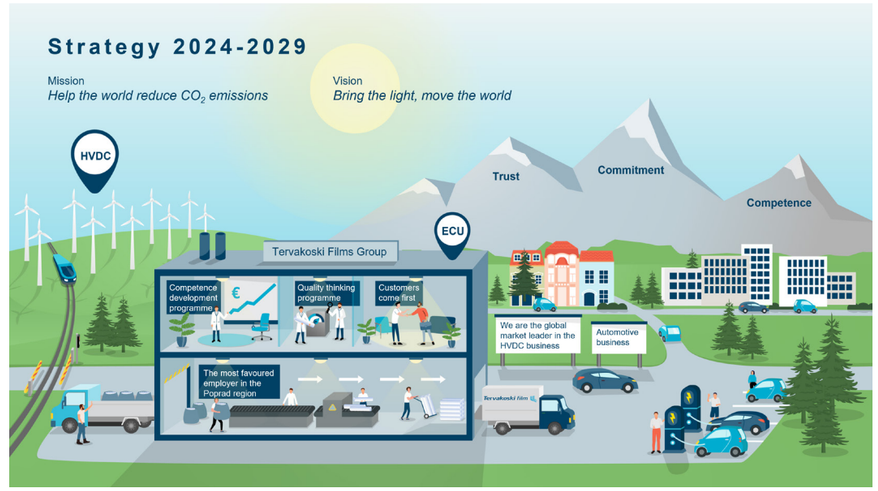
During 2024, we have been developing a strategic roadmap for the next five years, guiding our company through to 2029. At the heart of this strategy is a clear focus: supporting global climate goals and helping the world reduce CO2 emissions.

Focus on growth

Tervakoski Films Group is experiencing rapid, dramatic growth. We've expanded our film production capacity with the largest investment in the company's history, and significant investments are to be made in metallisation capabilities. Following our strategy will enable us to double our revenue by 2029.

While the largest growth will come from green energy products, we also aim to capture a significant share of the automotive industry. The momentum is strong, and our entire team is working together toward this common goal with a sense of purpose and collaboration.

By staying committed to this vision, we're not only building a stronger business but also contributing to a healthier planet. Our five-year strategy is more than just a roadmap — it's our promise to support the world in achieving a sustainable future.



THE BEST OF BOTH WORLDS
– MODERN WORK ENVIRONMENT MIXING NORDIC AND SLAVIC WORKING CULTURES

Tervakoski Film has a history of being one of the first capacitor film brands on the dielectric market. Originally, the company was founded in Finland and its roots go all the way back to 1921.

The transition from Finland to Slovakia and Ukraine has left its mark on the company culture – combining the best features of Nordic and Slavic working habits.

Multicultural way of thinking

Concentrated people over their working tables, small discussions happening by the machines, and lift forks moving huge rolls around the halls. Yet no hassle, rush, or loud noises are present at the premises in Svit when visiting the production facilities. The atmosphere is active yet calm – even serene.

Production facilities seem squeaky clean – just as required for producing high-quality capacitor films. The purity and precision in production, high-quality raw materials, modern machinery, and excellent know-how and expertise ensure Tervakoski Film products achieve the highest quality daily.

The best possible electrical conductivity is achieved in production facilities where no dust or other particles have access to the film during the production phase.

Additionally, clean and tidy production facilities and well-structured operations improve occupational well-being.

– Our product originates in Finland where the first dielectric materials for capacitors were produced in the 1920s. The company culture has both Scandinavian as well as Slavic roots, explains **Ladislav Dulovič**, Financial and Administrative Director of Terichem Tervakoski, a.s.

Ladislav further describes the ways of working that persist at the company. Lean organisational culture with clear responsibilities is a distinguishing feature not commonly found in other companies.

– Short reaction time and accuracy describe our precise working culture quite well. Our team is creative and commited, Ladislav continues.

– Ultimately, it’s the people who shape the culture. They are making the company better every day.

Ladislav Dulovič,
Financial and Administrative Director

Michaela Černáková,
Sales Assistant

Martin Navratil,
Supervisor Technician R&D Laboratory

We are a stable, active and growing company. That offers you great personal learning opportunities. The atmosphere here is international. It still retains a touch of Finnish flair in how things are done.

Michaela Černáková,
Sales Assistant

Global company with growth opportunities

The long history and stability of the company enable growth and aim towards a sustainable future – a goal achieved not in months but over years.

– Our products help the world reduce CO2 emissions and thus further the achievement of common, global climate goals, states **Jari Nurminen**, CEO of Terichem Tervakoski, a.s.

Thus, despite running relatively small factories in Slovakian and Ukrainian rural areas, the company is combating the global fight against climate change. During his 21 years in the company, Ladislav has witnessed the company's growth as well as the impact of globalisation on younger generations.

– Globalisation is bridging cultural gaps. Young people are more like-minded, they share a common base. It's not just Scandinavian and Slavic cultures anymore: the company culture is becoming more global.

A resilient company with ambitious long-term plans offers employees stability and opportunities to enhance their skills and abilities.

– We are a stable, active and growing company. That offers you great personal learning opportunities. The atmosphere here is international. It still retains a touch of Finnish flair in how things are done, says **Michaela Černáková**, Sales Assistant.

– For me, it's crucial to be part of a modern company that is continuously evolving. We make new investments, have modern machines, renovated buildings, and young talent joining the company, adds **Martin Navratil**, Supervisor Technician R&D Laboratory at Terichem Tervakoski, as.

FUTURE ELECTRIC VEHICLES NEED MORE HEAT-RESISTANT CAPACITOR FILMS

Since the invention and dominance of the combustion engine, the transport industry has become one of the most polluting industries. Public pressure on the automotive industry has forced car manufacturers to reinvent themselves. For nearly two decades, they have been relentlessly pursuing more sustainable ways to power their vehicles.

This has not been an easy task, given that fuel engines have dominated for more than 100 years. The shift to new technology and infrastructure is costing billions of euros globally. It is clear that electric vehicles are here to stay – and perhaps save the planet. However, this requires the development of advanced battery and power technology.

Demands of the booming electric vehicle sector

Electric vehicle sales have been growing rapidly year by year. By 2030, the number of electric vehicles is expected to reach 240 to 380 million, depending on various scenarios. This rise is largely fueled by the push towards sustainable transportation solutions, urbanisation trends, and rising consumer demand for eco-friendly vehicles.

As the EV market expands, the demand for advanced battery and power technologies becomes critical. The performance, range, and efficiency of EVs heavily depend on the quality and innovation of battery systems. Key needs include the development of batteries with higher energy densities, faster charging capabilities, longer lifespans, and lower costs. Advancements in power electronics are expected to enhance the overall efficiency and reliability of electric powertrains.

The growing demand for durability, efficiency, and reliability in advanced electric vehicle power systems is driving the need for superior capacitor films.

– New generation of semiconductors is taking place in the future of power electronics. They create a significantly more challenging environment for the capacitors. The expectation is that the operating conditions for capacitors are more challenging in all markets – not only in e-mobility, R&D Director **Vladimír Monček** at Terichem Tervakoski, a.s. explains.

Rastislav Veles,
R&D Manager

Tervakoski Film ECU meets the real need

At Tervakoski Films Group, our goal is to enhance the performance of demanding dielectric films to meet both current and future needs. Our metallised and base films for capacitors are designed to have a long lifetime and perform excellently under high electrical and thermal stresses.

However, the targets set by car manufacturers are challenging to achieve with standard films. This is why we have developed an entirely new product.

Tervakoski Film ECU is a capacitor film that unleashes the full potential of the new generation of power semiconductors. It offers superior electrical properties even at 135 °C. Its exceptional heat resistance enables the utilization of new power semiconductors in the car onboard systems – without any compromises.

– Tervakoski Film ECU supports the rise of green technologies by advancing the development of more energy-efficient and high-performing power systems, Vladimír states.

Developed in cooperation with our clients and tested extensively for over 200,000 hours, Tervakoski Film ECU is ready to meet the demands of the evolving market.

– We are constantly preparing for the market's evolution, including in our production capabilities. Our new LISIM production line strengthens our position, ensuring we are ready to meet the demand.

Superior properties at high temperatures

The ECU film's manufacturing material, Stelora™, is produced using renewable feedstock. The unique properties of Stelora™ and our high-quality manufacturing process give Tervakoski Film ECU its advanced performance.

Currently, Tervakoski Film ECU is going through a qualification test round with customers.

– We can test capacitors from low to ultra-high temperatures. The final stage, testing the maximum limits with customers, is ongoing. They provide us with constant feedback, and we offer advice, creating a very open and strong bond of communication, explains **Rastislav Veles**, R&D Manager at Terichem Tervakoski, a.s.

Once the qualification tests are complete, the commercial product will be ready for market launch. While the primary application and demand in the automotive sector are well-established, the coming years will reveal how other industries respond and adopt the product.

We are constantly preparing for the market's evolution, including in our production capabilities. Our new LISIM production line strengthens our position, ensuring we are ready to meet the demand

Vladimír Monček,
R&D Director

Vladimír Monček,
R&D Director

LISIM line project team from left to right: R&D Director Vladimír Monček, Maintenance Manager Miloš Ondra, Investment Manager Richard Radek, Base Film Production Manager Ondrej Jačanin.

MODERNISING EUROPE'S LEADING CAPACITOR FILM PRODUCTION – *LISIM LINE*

Tervakoski Films Group has made its largest investment yet in a new capacitor film production line, which will feature state-of-the-art LISIM technology. This installation represents the first implementation of the most advanced capacitor film production technology in the western world.

Throughout the spring and summer of 2024, our dedicated project team made notable progress in constructing our LISIM line. The new LISIM line will be situated on the same factory lot as the current Svit production unit in Slovakia, creating significant synergy benefits for production.

What is the LISIM technology?

Traditionally, sequentially stretched capacitor film is first stretched longitudinally and then transversally to produce the desired film quality. This has long been the industry-standard technology for biaxially oriented film products.

LISIM® technology, developed by Brückner, utilises simultaneous biaxial stretching, where the film is stretched in both directions (MD and CD) at the same time. With LISIM® technology, this is accomplished using delicate tenter clips and linear motors that smoothly stretch the film without any mechanical connections.

The name LISIM® is derived from the term "Linear motor simultaneous stretching". Brückner's unique LISIM® technology can produce extra-thin capacitor films with optimised film quality and the utmost flexibility in production – features that are highly valued by Tervakoski Films Group's customers.

Construction of the first European LISIM line is well underway

The LISIM line is expected to substantially increase our production capacity, supporting the growing demand for high-quality capacitors in the power and smart grid, automotive, and locomotive industries. LISIM technology also enables the production of entirely new solutions.

– With LISIM technology, capacitor film thickness can range typically from 2 to 5 microns. These ultra-thin capacitor films meet the growing market demand, particularly in the e-mobility sector, states **Ondrej Jačanin**, Manager of Base-film Production at Terichem Tervakoski, a.s.

Massive LISIM machinery will be installed in the Tervakoski Film production facilities in Svit, Slovakia. The factory's original structure, dating back to the 1970s, has undergone comprehensive renovation, including stripping and reinforcing, to meet the stringent standards of contemporary industrial facilities.

– We are transforming an old factory premise into a modern production hall to accommodate the completely new LISIM technology, **Miloš Ondra**, Maintenance Manager at Terichem Tervakoski, a.s. explains.

A robust new roof has been installed to support modern ventilation systems and other industrial building technologies. Additionally, the building's floor has been fortified to accommodate the weight and demands of the state-of-the-art LISIM machinery.

– New slitting machines are also placed in this new building. Yet, approximately half of the building will remain empty for now, ready for our near-future growth, Ondrej describes.

The installation of the LISIM line will commence in winter 2025 with production beginning in late summer 2025.

Future possibilities: Leading the way in the modern capacitor market

– Customer demand for high-quality capacitor films is rising, and we are ready to meet that demand. The LISIM line is something entirely new – there's nothing like it in Europe, R&D Director **Vladimír Monček** at Terichem Tervakoski a.s. states.

The high durability of capacitor films can be efficiently achieved in thinner films by using the LISIM line.

– The LISIM line is a tool to respond to the increasing demand for thin and ultra-thin films. Advanced capacitor films are needed to answer the requirements coming especially from the automotive market. LISIM, in combination with our Tervakoski Film ECU, is a perfect platform capable of covering all the challenges coming from the market, Vladimír continues.

Tervakoski Film ECU is a capacitor film specifically developed for the automotive industry, which withstands ultra-high temperatures and harsh conditions exceptionally well.

With LISIM technology, capacitor film thickness can range typically from 2 to 5 microns. These ultra-thin capacitor films meet the growing market demand, particularly in the e-mobility sector,

Ondrej Jačanin,
Manager of Base-film Production

– Tervakoski Film ECU can endure higher temperatures than before, without losing all the best qualities of PP films, **Rastislav Veles**, R&D Manager at Terichem Tervakoski a.s states.

Thinner, long lifespam capacitor films are also suitable for a wide range of technically advanced applications, offering high performance and durability.

We are transforming an old factory premise into a modern production hall to accommodate the completely new LISIM technology.

Miloš Ondra,
Maintenance Manager

NAVIGATING THE POWER SHIFT

According to the International Energy Agency (IEA), green energy is expected to surpass coal in 2024, driven by global efforts to reduce carbon emissions and meet rising electricity demands.

This shift is accelerated by growth in solar, wind, and hydropower technologies. As renewable energy sources expand, power systems require more efficient components, such as capacitor films, to handle the increasing energy flow.

The future of electricity and decarbonisation

Power generation stands as the world's largest source of carbon dioxide emissions, yet it is at the forefront of the transition to net zero through an accelerated shift towards renewable energy sources like solar and wind.

As global electricity demand is projected to grow at an average rate of 3.4% annually through 2026, the sector's role in combating climate change is critical.

Electricity's share in final energy consumption has risen to 20% in 2023. According to the IEA's Net Zero Emissions by 2050 Scenario, electricity should account for nearly 30% of final energy consumption by 2030.

While the global electricity demand grew by 2.2% in 2023, this was a slight slowdown from 2022's 2.4% growth. Growth in electricity demand remains robust in China, India, and Southeast Asia, but advanced economies are seeing declines due to economic uncertainties and high inflation impacting manufacturing and industrial output.

As we navigate these shifts, the evolution of the power sector remains pivotal in our collective journey toward a sustainable, low-carbon future.

The rise of electric vehicles has an impact on electricity consumption as well – already in 2023, EVs accounted for approximately 0.5% of the world´s total final electricity consumption. In Europe and China, the percentage reached about 1%.

Higher efficiency, less hickups

Due to the growth of renewables in energy production, ensuring the stability of power systems generates development of new solutions.

Capacitors play a critical role in stabilising grids and ensuring reliable power distribution, supporting the transition from coal to cleaner energy sources.

High-quality capacitor films, as one of the key component of the capacitors, help to maximise the purity of electricity, minimise losses in electricity production and transmission, and thereby improve energy efficiency. We call this high-quality electricity.

We see all of this as part of advancing environmental goals. The efficiency of electricity consumption can be improved by using cleaner and higher-quality electricity.

Jari Nurminen,
CEO

WE ARE TERVAKOSKI FILM: *A TALE OF INNOVATION AND TEAM SPIRIT*

Flexibility in innovation, a forward-thinking atmosphere, and strong team effort are key factors that make Tervakoski Film products exceptional. These qualities also define our company culture.

Many employees at Terichem Tervakoski, a.s. have been with us for decades, and this is the story of two such dedicated individuals.

Behind the smoothly running business

Andrej Timkovic first crossed paths with Terichem Tervakoski, a.s. in 2002 while studying Mechatronics Engineering at the Alexander Dubček University of Trenčín. Andrej was searching for a company to collaborate with on his final assignment for his informatics specialization.

– My final assignment was to develop an information system for production and in-house developed quality data management tool for the company. In the end, it was a very successful project – I received high grades for my final assignment and continued working at Terichem Tervakoski, a.s. as a summer worker, he recalls.

Driven by a passion for enhancing production and quality management, Andrej's summer job evolved into an official contract as an IT developer in 2003.

Since then, he has been instrumental in developing and implementing information and security systems in Svit and Lutsk.

Today, as the IT Manager of Terichem Tervakoski, a.s., Andrej leads a team of 6 people, ensuring the smooth operation of processes that give Tervakoski Films Group one of its main competitive advantages.

– The main goal of the IT department is to support the business by enhancing efficiency. We are currently focusing on automating our processes and are open to exploring robotisation as well, which could unlock many new possibilities, he explains.

Proactiveness in innovation

Digitalisation, automatisation, AI and possibilities of robotics are central topics in IT today. These are part of Andrej's daily work as he leads the upgrade of the SAP system. This leap will improve efficiency, flexibility, and information security by shifting all data, software, and services to the cloud.

Resistance to change is a common challenge when implementing IT projects that alter daily routines. However, Tervakoski Films Group stands out in this regard, which is one reason Andrej has remained with the company for over two decades.

– People here are not afraid of changes and innovation. We aim to be ahead of others.

– The top management has an eye for the future and is always behind the IT. This support makes my job easier and has a huge impact on the success of the projects. IT is not an internal service for installing computers, it´s a core part of the business.

Andrej Timkovic,
IT Manager

"Modern IT services help to keep us at the forefront. Another key factor are the people here. They are clever and open-minded for change and innovation."

Andrej Timkovic

The transparent and modern company culture is highly valued by employees. This culture, along with opportunities for growth and development, has also kept **Valér Ondík** with the company for over 20 years.

– We are a very open company – everyone has a possibility to express their ideas, Valér states.

Problems are solved with team effort

– I focus on maintenance, control systems of the machines, and everything related to them. You have to know the machines inside out to diagnose what's wrong and how to fix it, Valér Ondík Electrical Controls Specialist at Terichem Tervakoski, a.s. describes.

Valér certainly knows the machines well—he has been working at Terichem Tervakoski, a.s. since 2001. Also his journey with Tervakoski Films Group began as a summer job.

– I was doing cleaning and helping out while I studied radioelectronics. In 2010, I graduated from Faculty of Electrical Engineering and Information Technology of STU in Bratislava and started working on the maintenance of metallisers and slitters. Later, I specialised in control systems.

Currently, the maintenance at Terichem Tervakoski, a.s. consists of over 10 professionals of electrical work, each specialising in different machines and processes.

Maintenance work is also about problem-solving, quick reactions, and applying knowledge and experience in unfamiliar situations. For Valér, this is the essence of his work.

Valér Ondík,
Electrical Controls Specialist

"Every day brings something new. It's a great feeling to solve a problem that initially seems impossible, but with everyone working together, things always get resolved."

Valér Ondík

OUR QUALITY PROMISE

Quality is more than just the products we create; it’s embedded in everything we do and how we operate.

We believe in making processes as simple as possible, ensuring transparency, and fostering strong collaboration. Our pride in what we do is evident in how we interact, communicate, and work together. From the way we greet one another to our strict adherence to quality, we aim to embody a culture of excellence.

We are true to our values: honesty, seamless cooperation, and efficient communication. Every step in our production process reflects this commitment.

Our customers are welcome to witness firsthand how we ensure quality.

– We call this our traceability exercise: the entire production journey of each product can be fully traced, describes **Oksana Podolets**, IMS Manager at Terichem Tervakoski, a.s.

Each production cycle builds on the lessons learned from the previous one, continually improving quality.

– Our operators take responsibility for the quality of the film, without relying on additional support teams. Quality is tested by ourselves, built into every step, ensuring that each stage of the process is accountable for the next.

In fact, we believe that 100% of our personnel work in the quality department.

Oksana Podolets,
IMS Manager

Tervakoski film

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