

creating bioeconomy

# PAPERIPUU

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2022

**WE ♥ WOOD**

  
**PULPAPER**  
7-9 June 2022  
HELSINGIN MESSUKESKUS  
Helsinki Expo and Convention Centre

Includes trade fair program

**The financial, social and ecological sustainability of forests are combined in commercial forests 22**

Investments in the forest industry are on the rise 28

Finland is well-suited to startups 47

+

Antti Vasara  
Risto E. J. Penttilä  
Marco Eikelenboom  
Winfried Schaur



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**FORESTBIOFACTS**  
Professor Olli Dahl has made the ForestBioFacts portal his own.



© MIKKO TIKKANEN



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As an investor, the forest industry is also one of the most active fields, says Maarit Lindström.



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**AN OPPORTUNITY FOR PROMOTING BIODIVERSITY**  
Esa Lappalainen has good ideas to transfer forest ownership to the next generation.

© MAGNUS FOND



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**THE CHANGE IS SIGNIFICANT**  
says Stora Enso's Country Manager Finland, Seppo Parvi.



© WOODIO



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**PI:N KEVÄTSEMINAARISSA**  
jaettiin palkintoja ja kuultiin innovaatioista.



© JARI HÄRKÖNEN



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Woodio uses sustainable bio-material innovation in a contemporary way.

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# Forward together – Neles is now part of Valmet



Neles was merged into Valmet on April 1, 2022. Valmet is now an even stronger, globally leading company with a unique and competitive offering for process industries.

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## Building tomorrow's bioeconomy

The Paperi ja Puu – Creating Bioeconomy magazine wishes all visitors a warm welcome to the PulPaper 2022 event in Helsinki!

The leading international forest industry event is finally here. The world has been in turmoil for two years, and these challenging times have also impacted trade fair arrangements.

Due to the continuation of the coronavirus pandemic and the war in Ukraine, forecasts related to the development of the global economy have become increasingly difficult. Among other things, the uncertainty in the operating environment complicates the strategic planning of businesses.

Although risks around the world have grown, we feel confident about our industry's future. Global megatrends, such as increased environmental awareness, support the demand for wood-based products.

The 2035 carbon neutrality target set by Finland is one of the toughest in the world. Diverse forestry and a renewing forest industry play a key role in the achievement of this target.

The range of new products offered by the bioforest industry is growing continuously. The list includes wood-based chemicals, textile fibres, construction materials, a battery material, packaging paperboards and bio-based fuels.

The main theme of this year's event is the bioeconomy of tomorrow. We need to think about it now.

ChemBio Finland, an event for chemistry and biotechnology professionals, and the Helsinki Chemicals Forum, an international chemical industry conference, will be held simultaneously with the PulPaper event.

New solutions, products and services are not created by the know-how of one industry alone. The importance of cooperation between networks continues to grow as we build tomorrow's bioeconomy. The joint event offers excellent opportunities for this.

Welcome to the PulPaper 2022 event and find out more about the bioeconomy of tomorrow!



*Jouni Törrönen*  
Managing Editor  
Paperi ja Puu  
– Creating  
Bioeconomy

*Katja Metsäranta*  
Chairperson  
PI - Finnish Forest  
Products Engineers'  
Association

*Antti Lindqvist*  
Managing Director  
PI – Finnish Forest  
Products Engineers'  
Association

*Marcus Bergström*  
Sales Team  
Manager  
Messukeskus  
Helsinki

The forest industry's share of Finland's exports was

**19%**  
in 2021.

FINNISH FOREST INDUSTRIES

## Forest industry's exports' value over EUR 13 billion

According to the preliminary data for 2021, the export value of forest industry products was a little over EUR 13 billion.

The strong global increase in demand for sawn timber also raised prices and raised the wood product industry's share of export value to 29 per cent of the forest industry's total exports.

8.7 million cubic metres of sawn timber were exported in 2021. The export value of sawn timber was EUR 2.6 billion.

Sawn timber was the wood product industry's most exported product, accounting for one fifth of the entire forest industry's export value. The export value of sawn timber grew no less than 51 per cent from the previous year, and 49 per cent from the average of the past ten years.

Paperboard surpassed paper as the forest industry's most important export product and accounted for a quarter of the forest industry's export value. The share of paper was 22 per cent.

SOURCE: NATURAL RESOURCES INSTITUTE FINLAND



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## Increasing value added

The main goal of the national bioeconomy strategy update published in April is increasing the added value produced in the bioeconomy.

This goal encapsulates the desire to create valuable bio-based solutions with a greater quality grade to meet the challenges of our time.

A solution-oriented approach has been needed in bioeconomy policy.

However, the need for business as an implementor of bioeconomy has been neglected in previous national and European strategies.

The new bioeconomy strategy will bring solutions related to prod-

ucts to the forefront. Without developing bio-based energy, raw material and product solutions and bringing them to the market, strategies will have little effect. The constant development of the bioeconomy's production value chains is important for raising the value added to the product, as this also raises the added value gained from the product.

The forest industry currently creates about one third of the value added in the Finnish bioeconomy. The industry is aiming to increase the value added in connection with its climate roadmap. ●

SOURCE: FINNISH FOREST INDUSTRIES

The forest industry is aiming for an increase in value added of about

**30** per cent per cubic metre of wood by 2035.



© ISTOCK

## A delicious and cool cellulose solution

FOR THE SPRING AND SUMMER, ice cream made with carboxymethyl cellulose (CMC) as a stabiliser is a good fit.

The Finnish forest sector introduced practical solutions during its spring campaign. The wood-based products chosen for the Forest Finland campaign in May represent the top Finnish expertise in the forest sector.

The campaign focuses on new wood-based solutions, and eight Finnish products were chosen for it as examples of world-class Finnish expertise.

In addition to ice cream, these included wood plaster and a wood-based textile product.

The campaign also presented a medicinal ointment derived from plant resin and an anode material to replace a non-renewable raw material used in electric car batteries.

Perfectly transparent wood-based packaging material and cosmetics packages made from wood-based raw materials were also included. Washbasins, too, can be made from ecological wood-plastic composite.

The Forest Finland campaign was carried out through television, radio, out-of-home advertisements and social media in May.

The forest industry's joint public relations project's aim is to show how forests have a role in everything in Finland. The campaigns also update the image of cutting-edge wood-based innovations.

The previous Forest Finland campaign was held in November–December 2021. The campaign was considered likable, convincing and nearly three quarters of Finnish adults also considered it interesting. ●



© AALTO UNIVERSITY / MIKKO RASKINEN

From the left, Mikael Hannus, Marcus Wallenberg Foundation, Herbert Sixta, Aalto University, Ilkka Kilpeläinen, University of Helsinki, and Johanna Buchert, Marcus Wallenberg Foundation.

## A new method for wood-based textile fibre production

The Marcus Wallenberg prize will be awarded to professor **Ilkka Kilpeläinen** and Professor **Herbert Sixta** in 2022. They will be honoured for developing new kinds of ionic solvents and applying them to the processing of wood biomass into high-quality textile fibre.

The international Marcus Wallenberg prize is awarded in recog-

inition of ground-breaking scientific achievements, which significantly promote the broadening of understanding and technological development in the forest industry and important related fields.

The prize will be presented by the King of Sweden during a ceremony that will be held in Stockholm in the October of this year. ●



We are strongly strengthening energy self-sufficiency. We will add EUR 350 million to large energy projects, hydrogen production and the creation of a battery cluster.

**Mika Lintilä, Minister of Economic Affairs of Finland, on Twitter, 7.4.2022.**

## The season for thinning

**FINNISH WOOD REMOVED** in thinning is needed now that wood imports from Russia have been interrupted. According to Stora Enso's forest director **Janne Partanen**, the Finnish Forest Centre's statistics show there are plenty of growing forests in different provinces, where thinning is just waiting to be carried out. Finland's factories can be kept in business through timber trade.

Thinning especially results in pulpwood, which Stora Enso uses to make renewable and recyclable products in Oulu, Varkaus, Imatra, Uimaharju in Joensuu, Heinola, Kotka and the Anjalankoski factories in Kouvola. ●



© CISION

## Valmet renewing in Brazil

**VALMET IS HANDLING** the modernisation of CENIBRA's Belo Oriente pulp mill's fibre line facility 1 in Brazil. The fibre line is being prepared for an increase in capacity that would allow it to produce 100,000 tonnes more cellulose per year. It is planned to start in September 2023.

The modernisation is part of CENIBRA's project to increase the pulp mill's capacity. Previous projects have been the deliveries of bleaching line 3 (2016) and bleaching line 2 (2018).

The delivery and installation of the newest Valmet TwinRoll press technology aims to decrease the consumption of chemicals in the bleaching process and mitigate environmental impacts. ●

## INNOVATION

## Towards sustainable textile manufacturing

The Telavalue project, which began in February 2022, aims to solve the current sustainability and waste problems relating to textiles with the help of circular economy. Its purpose is to promote sustainable textile manufacture in Finland. In this way, Telavalue also supports the reform of the textile industry. One of its goals is to combine recycled and new bio-based fibres into the foundation of Finnish textile production.

The project is backed by Finnish companies and organisations together with research and educational institutions. It is a continuation of the earlier Telaketju projects, which have promoted the creation of textile circular economy in Finland.

**Katariina Kemppainen**, head of Metsä Group's innovation company Metsä Spring's R&D activities, highlights the importance of the new bio-based and recycled material flows, as products produced in this way help decrease the strain on the environment caused by our way of life.

"We want to accelerate the development of these new products in Metsä Group's and Fortum's ExpandFibre innovation ecosystem, which Telavalue is also a part of. The project will help ensure that new, sustainably produced, bio-based textile fibres will fit right into the coming textile circular economy," says Kemppainen, who also acts as a programme manager for the ExpandFibre Ecosystem project.

VTT's role in the Telavalue project is, among other things, to come up with recycling solutions for textile materials mostly made out of plastic-based artificial fibres. In previous projects, VTT's processes suitable for plastic recycling have been successfully tested on the side streams of technical textile production.

According to the project's coordinator, VTT's Senior Scientist **Pirjo Heikkilä**, the development of VTT's processes will be continued in such a way that used, dirty technical products could also be used for manufacturing composites. ●

© STOCK

# FROM SUMMER EMPLOYEE TO PERMANENT PRODUCTION ENGINEER

A successful summer job experience brought together an enthusiastic trainee and a production plant in need of a good worker.

TEXT **TUIJA HOLTINEN**  
PHOTOS **STORA ENSO**



Since 2020, Joonas Mikkonen has been the production engineer for a paperboard machine line.



**J**oonas Mikkonen first came to Stora Enso's Oulu paper factory in 2011 through a regular summer job application. He had a bit of luck on his side – he was given the job after another applicant cancelled. Later, Joonas proved he was the right person for the job as he was a good worker and eager to constantly develop himself.

“For the first four summers, I was a process operator. By 2015, I was already a shift supervisor and, at the beginning of 2017, I was made a permanent employee,” says Joonas Mikkonen.

“I started university in 2012, and completed my studies alongside my work.”

Mikkonen is now 35 years old and has progressed in his career with determination and an eye on the long term, and he feels that the paper industry has been a good place for him to work. Although he has always had an interest in technology, he didn't know what he wanted to do

*“I like to figure things out and solve problems.”*

when he was still at school. Joonas admits that his career path has not been entirely straightforward and his current position has demanded a lot of hard work and perseverance.

“Traditionally, upper secondary school would probably have provided a better foundation for higher education, but I was still feeling restless enough during school that I chose vocational school and studied carpentry. It was just the right choice for me at the time. A year

of military service followed vocational school, and, after being inspired to do so by friends, I started studying mechanical engineering at a university of applied sciences. Once I got into studying, I also decided to go to university. It took longer than I had planned, but I graduated as Master of Science in mechanical engineering in 2019.”

He spent his summers at the start of his university studies working with the paper machine and his winters in a small machine shop, first as a design engineer and later as a production manager. There has been plenty of work for the capable young man. However, Mikkonen was interested in the massive machines and devices used in the paper industry, as well as a permanent job and new challenges, so he wanted to take the opportunity when he was offered the position of shift supervisor. In his own words, he has not regretted it.

Since 2020, Joonas has been the production engineer for a paperboard machine line.

“There is a lot of variety in my day-to-day work. Of course, there are regular daily meetings, such as the meetings at the start and end of every day, but there is also a lot of time spent out in the field, problem-solving together with maintenance and operators. A large part of the work is made up of downtime planning and carrying plans out in such a way that they are implemented safely.”

When his initial excitement for large machines cooled into an everyday good feeling, Mikkonen noticed that the aspect of his work that he enjoyed the most was working together with other people. He describes himself as a kind of link between process and maintenance in his work.

“I like to figure things out and solve problems. Although automation largely takes care of processes and is helpful, people will always be needed here. Another good thing about working at a large company is that there are career opportunities in-house. I don't need to switch companies if I want to do something else,” says the Oulu resident from Kempele. ●



The most current and new information in forestry and the bioforest economy can be discussed during lectures when students are able to study the basics independently using the ForestBioFacts portal.

TEXT MINNA SAANO



# ForestBioFacts

## – freedoms and opportunities for teaching

**O**lli Dahl, the Professor of Bioproducts and Biosystems at Aalto University, says that the ForestBioFacts digital learning environment is a great portal that supports teaching.

Dahl was Editor in Chief of the Environmental Control and Management theme in ForestBioFacts. In doing so, he noticed how useful this learning environment is for both teachers and students.

“For teachers, it provides more freedom in teaching, and for students, it pro-

vides opportunities to search for, review and complement information.”

### UPDATING EXPERTISE

The advanced studies of the Department of Bioproducts and Biosystems include Dahl’s course, Sustainability in Bioproduct Industry, which is based on the theme he created for the ForestBioFacts.

The course covers different areas of sustainability: sustainability in procuring wood raw material, sustainability in production processes and evaluating sustain-

ability in forest industry products. Other areas include environmental management and evaluating environmental sustainability using LCA calculation.

“Learning always builds on previous information. Students participating in the course are expected to know certain things. If they do not know how a pulp mill’s process works, what raw materials go in, what comes out, or there are gaps in other information, then I recommend they use the ForestBioFacts to find out. Everything can be found and learned there.”

Sustainability themes are of interest to many, and Dahl’s courses are also attended by eager participants who are not students at Aalto University. Professor Dahl recommends the materials in the ForestBioFacts for them too, in order to make sure they have the prerequisite information to attend the course.

### BASIC INFORMATION IN FORESTBIOFACTS

For each section of the Sustainability in Bioproduct Industry course, an outside expert or forest industry representative has been asked to speak about sustainability from their own perspective.

“This way, students receive the most up-to-date information on how sustainability is currently understood in industry. Every year, the course can emphasise those areas of sustainability that are rel-

## Digital learning environment ForestBioFacts

**F**orestBioFacts is a learning environment meant for the forest industry and forest-based bioeconomy, created with the help of over 150 experts in research and industry.

The learning environment consists of 21 themes, which in turn consist of 1,500 articles and 300 videos.

The content is based on the 20-part Papermaking Science and Technology series of textbooks, but is broader in its scope, including new technologies, bio-based nanomaterials, wood-based textiles, environmental management and investment planning.

The learning environment is meant for university students and staff, professionals in product development and production, and professionals working in sales and business development.

Currently, the ForestBioFacts portal is being used by 46 licensed organisations and companies, including all Finnish higher education institutions that teach forestry and Finland’s largest forest industry companies. The portal is also being used in several foreign universities and companies.

The ForestBioFacts was launched in November 2020.



During the PulPaper fair to be held at Messukeskus Helsinki on 7–9 June, Professor Olli Dahl will present his ForestBioFacts theme, Environmental Control and Management. The presentation will be streamed as part of the ForestBioFacts webinar series.

evant and useful to know at that time,” says Dahl.

“This is exactly the kind of thing that the ForestBioFacts enables. We are able to cover new things, with self-study using ForestBioFacts providing students the basic, existing information related to the topic. Students are always provided detailed instructions for their independent study.”

Dahl also points out teachers’ legal protection, which is ensured by the ForestBioFacts material. When ForestBioFacts is used as the basis for course requirements, exams can ask about topics which are covered there.

#### **TAILORING SUPPLEMENTARY STUDIES**

Students from other higher education institutions who have completed their Bachelor’s degree and are working on

their Master’s also come to Aalto University. ForestBioFacts serves them well here.

“In order to get all students on the same page, for students from elsewhere to have the same knowledge as Aalto students for Master’s level courses – although the level of those students from other institutions may, of course, also be higher – they can learn any missing information through the ForestBioFacts. It offers excellent opportunities to tailor the areas a student ought to study to supplement their knowledge,” says Dahl.

Going forward, the ForestBioFacts will be introduced to all students coming to the Department of Bioproducts and Biosystems.

“I believe that ForestBioFacts will become more broadly used. It has plenty of tools for learning, presented in an interesting and varied way.” ●



© UNTO RAUTIO / AALTO

## The ForestBioFacts learning environment in Aalto University

**A**t Aalto University, the ForestBioFacts is currently used in the Master’s degree programmes for Fibre and Polymer Engineering, and Biorefinery studies. For Bachelor’s degree programmes, it is used for the Industrial Biomass Processes course.

Expanding the usage of ForestBioFacts is planned for the next academic year. ForestBioFacts will be introduced to first-year students during the Teollisuuden toimintaympäristöt (Operational Environments of Industry) course.

Broader learning paths and tasks in ForestBioFacts are being planned for the Industrial Biomass Processes course. ForestBioFacts will be introduced to Master’s students during the Academic Learning Community course and to doctoral students during the Tehdassuunnittelun ja kemian laitetekniikka (Plant Design and Chemical Device Engineering) course.



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A young woman with long dark hair, wearing a bright yellow coat over a striped shirt, is smiling and talking on a mobile phone. She is holding a brown paper coffee cup in her left hand and several colorful shopping bags (green, orange, and red) in her right hand. The background is a blurred city street at night with lights and a building.

██████████

**”People should be informed more about how we are present in their daily lives.”**

**Ilkka Härmälä**



# Forest Industry

## is Variouslly Impacted by EU Regulations

The European Commission has forgotten that the forest industry has solutions for countering climate change, says Ilkka Härmälä.

TEXT **KATARIINA KRABBE** PHOTO **ISTOCK** AND **SEPPO SAMULI**

**P**resident and CEO of Metsä Group, **Ilkka Härmälä**, promotes the interests of the forest industry as the chairman of the Confederation of the Paper and Pulp Industry (Cepi).

His term started in the beginning of 2022 and will last two years.

“Our job is to ensure that the decision makers in the EU understand the sustainability of wood-based products and the forest industry, as well as our social significance.”

The commissioners are aware that the forest industry doesn’t cause any problems concerning climate change, but according to Härmälä, they don’t understand as well as the previous commission, that the forest industry may in fact offer solutions for preventing it.

“I hope that the next commission better understands the value of renewable materials, and the significance of forests as their source.”

Cepi wants to show how important the forest industry is for the total economy.

“In Europe we are considered a small sector because there are no large corporations at European level, and countries without any forest industry don’t completely understand our significance. However, our sector is not small at all, if we consider the whole value chain.”

### **TSUNAMI OF REGULATIONS**

There is much legislation work to prevent climate change going on in the EU.

“This tsunami of regulations affects our industry from multiple directions. The forest industry is not the focus of the EU climate change agenda, but many climate and energy questions and regula-





“Our goal is to reconcile different perspectives,” says Ilkka Härmälä.



## *Replacing the fossil economy with renewable materials is a big opportunity for the forest industry.*

tions concerning consumer behaviour affect us.”

This causes insecurity for the industry.

“If we consider regulation concerning single-use products, we don’t know what kinds of products are required in the future, and what kind of industry is needed to produce them.”

The most vital concern is the role of forests in the future. Besides climate change issues, questions of biodiversity will have an impact on how raw material can be acquired.

“There is no overall perception about the forest industry in the EU, but we must remember that there are many kinds of forest industry activities. The Nordic forest industry for example, uses very different energy sources than the southern European forest industry.”

According to the European Union’s charter, any regulation focusing on forests is at national level, but indirectly there is much EU legislation that concerns the forest economy.

Geopolitical risks have materialised after Russia attacked Ukraine. This is

reflected in the forest sector, especially in terms of changes in trade and wood raw material flows, and energy production.

“This is why the industry must be renewed and become more and more resource efficient. The availability of wood is more limited than before, and energy production can’t rely on fossil fuels in the future.”

### **MORE BIODIVERSITY IN COMMERCIAL FORESTS**

The confrontations are highlighted in the media: some demand that forests should be left in their natural state, while others want to continue the current level of intensive use for economic reasons.

“Our goal is to reconcile different perspectives. The future development will be found somewhere between the extremes,” says Härmälä.

In his view, the climate issue is often employed with false arguments to pursue biodiversity goals.

“The economic use of wood and carbon sequestration in forests are in line with each other, while increasing the

extent of old forests doesn’t promote carbon sequestration. However, it does promote biodiversity. Of course, it should be promoted, but different intentions become confused in the debate, partly out of ignorance, partly perhaps on purpose.”

Long-term business is conducted with decades or even centuries of perspective. In that case, the business must be economically, socially, and environmentally sustainable as a prerequisite.

“Before, for example, environmental goals were based on preventing damage, but today we are working to improve the situation, for example by increasing the biodiversity of commercial forests.”

### **FORESTS ARE USED EFFICIENTLY**

Replacing the fossil economy with renewable materials is a big opportunity for the forest industry.

“However, the aim should not be to increase individual-level consumption, but to ensure that the functionalities needed by the individual can be implemented in the most resource-efficient way possible.”

“For example, we at Metsä Group are constantly thinking about how to reach needed strength properties for paper-board with as little material as possible, or how to attain required strength for wooden structures that replace concrete and steel, or absorbency for tissue paper with as little raw material as possible.”

The integration of factories into complete ecosystems serves the same purpose.

“Äänekoski is our largest ecosystem, where a dozen products and six different companies are technically integrated to utilise all material flows. This also increases resource efficiency.”

According to Härmälä, the profile of the industry must be able to be raised.

“Today, our industry communicates too much about what is important to us in our own business. People should be informed more about how we are present in their daily lives. A survey was conducted some time ago asking how often people use forest industry products. The typical estimate was once a month, when in reality every European uses forest industry products several times every day. Without them everyday life would be very different – and quite a lot more difficult.” ●

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# The forest industry acts to preserve biodiversity

Promoting biodiversity in commercial forests is based on the protection of the most valuable sites and the nature management of commercial forests. These activities are on the right track, and they should be continued and made more effective.

TEXT **SUSANNA CYGNEL** PHOTO **MARKO TARVAINEN / VASTAVALO**

The protection of biodiversity has taken significant steps forward over recent decades in Finland. This can be seen in both the total area of protected forests and the nature management of commercial forests.

Together with Natural Resources Institute Finland and the Finnish Environment Institute, the Finnish Forest Industries Federation implemented a joint project which, among other things, looked at changes in structural features that are important for biodiversity. According to the project, the total area of protected woodland has increased five-fold in all of Finland since the end of the 1970s, and has increased by a factor of 17 in Southern Finland.

Nature management of commercial forests is constantly being integrated further into day-to-day forestry as environmental awareness increases.

“The financial, social and ecological sustainability of forests are combined in

commercial forests. We are constantly learning new things from this balance,” says **Karoliina Niemi**, the Director of Forest Affairs at the Finnish Forest Industries Federation.

In the Forest Act, biodiversity was strongly brought up for the first time in 1997. This is when Section 10, which protects valuable natural sites, came into effect. These sites include luxurious herb-rich forest patches, heathland forest islets located in undrained peatlands, and the immediate surroundings of springs and brooks.

#### **VOLUNTARY PROTECTION ALONGSIDE REGULATIONS AND CERTIFICATES**

In the early 2000s, the market-oriented forest certification systems of PEFC and FSC were adopted. These require, among other things, buffer zones on the shores of bodies of water and leaving retention trees and coarse woody debris when felling. These requirements are not stated in the law.

The PEFC’s and FSC’s silviculture criteria have just been updated, and the new standards will come into effect over the course of this and the following year. Particular attention has been paid specifically to promoting biodiversity, and the amount of retention trees and coarse woody debris will be increased, for example.

In addition to standards, valuable forests in terms of biodiversity are protected and managed in Finland through the voluntary METSO programme. The new HELMI programme expands METSO’s good practices to other habitats, such as bogs and traditional biotopes.

“The members of the Finnish Forest Industries Federation are strongly committed to ensuring biodiversity. In addition to the law and certification, we have our own forest environment programme, which focuses on increasing the amount of coarse woody debris and managing herb-rich forests, among other things,” says Niemi.





**The total area of protected woodland has increased five-fold in all of Finland since the end of the 1970s.**

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*“The members of the Finnish Forest Industries Federation are strongly committed to ensuring biodiversity.”*

The protection of herb-rich forests is important: their share of the total forest area is only one to two per cent, but they account for the habitats of almost half of the endangered species of forests.

#### STRONG DIVERSE FOREST

So why is protecting biodiversity in our commercial forests so important?

“Diversity increases a forest’s ability to adapt to changes in the environment—for example, as the climate warms up. Forest damage can increase in homogenous forests, and, as such, supporting the biodiversity of forests is in everyone’s best interests,” says biodiversity researcher **Juha Siitonen** from Natural Resources Institute Finland.

Coarse woody debris plays a key role in biodiversity, as it is the habitat of many endangered species. According to Siitonen, coarse woody habitats can be created by leaving dead wood uncollected and by artificially producing rotten standing trees during felling.

“Some trees are left behind in forests during felling as retention trees, and their purpose is to grow into old trees, die and rot in their own time. Deciduous trees and aspen are especially important pillars of biodiversity,” says Siitonen.

In 2017, the forest industry launched the Lisää lahoppuuta talousmetsäin (More coarse woody debris in commercial forests) action programme in order to promote the preservation and increase of coarse woody debris in forests.

As part of the programme, forest industry companies have committed to ensuring their personnel’s awareness of the significance of coarse woody debris, and to inform forest owners of it when doing business, among other things.

“It is important for forest companies to introduce all of these options for ensuring biodiversity to forest owners during timber sales,” says Siitonen. ●

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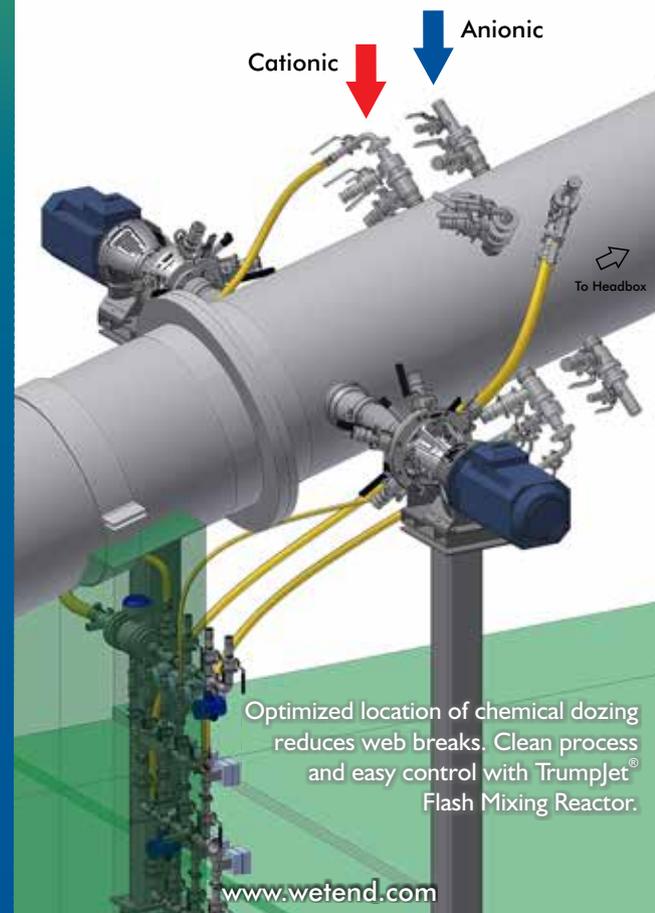
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# Succession a boost for supporting diversity

When a forest property passes from one generation to the next, it may also offer an opportunity for promoting biodiversity.

TEXT **SUSANNA CYGNEL** PHOTO **MIKKO TIKKANEN**

A few years ago, **Arnevi Rautanen** moved from Helsinki to Joroinen together with her family and took over her aunt's farm. The property also included a forest, which the former urban dweller has started to see in a new way.

"Before, I found the forest calming and thought it was a fun camping destination, but now I take a more analytical view: I take into account the age of the trees, the forest's structure and quality, and think about its financial life cycle and all the related decisions."

The forest already had several sites falling under Section 10 of the Forest Act while it was still owned by her aunt, and Rautanen has kept the agreements for these areas as-is.

"We have also mapped out new potential environmental aid sites, which we

want to exclude from the commercial forest," says Rautanen.

She believes that in forest management, it is important for all measures to be carefully considered and for options to be weighed. Rautanen places a lot of emphasis on nature values in her decisions.

"I have definitely inherited the idea that individual old trees must be cherished. My grandfather excluded ancient pines and spruces from felling, and these same trees will certainly still be standing after us as well," says Rautanen.

## VALUABLE NATURE AREAS IN FORGOTTEN FORESTS

In all, 75 per cent of forests will change hands within the same family as either inheritance, forest sales or donations.

Forest structure expert **Esa Lappalainen** from the Finnish Forest Centre

helps forest property owners with succession and organising estates.

"It is a good idea to transfer forest ownership to the next generations in an active succession, where the forest is given up during the lifetime of the owner in a planned manner. This also opens up the opportunity to pass on forest management expertise," Lappalainen says.

Sometimes the forest to be inherited is forgotten as the owner ages.

"These kinds of forgotten forests may have had areas develop within them, which are valuable in terms of biodiversity, and it may be possible to receive environmental aid for them. As such, the situation should always be re-evaluated during succession with regards to aid as well," Lappalainen advises.

Habitats which are important for biodiversity can be such lovely areas that the forest owner has naturally left them



Succession can be a new opportunity for the development of a forest's diversity.

untouched during felling for decades.

“For example, the forest may have a beautiful spring which the owner wishes to preserve in its natural state and exclude from felling,” Lappalainen describes.

**MANY HAVE NOT APPLIED FOR ENVIRONMENTAL AID**

Environmental aid, which can be applied for through the METSO programme, is primarily intended for the preservation of the features of particularly important habitats, as defined by Section 10 of the Forest Act. According to Lappalainen, there are many habitats in Finnish forests, which meet the criteria of Sec-

**Forest structure expert Esa Lappalainen from the Finnish Forest Centre.**

tion 10, whose owners have never even applied for environmental aid.

“A forest owner might think that the time period for environmental aid – ten years – is a long commitment, or that applying for aid is not worth the trouble because the areas are small, but even small areas can bring income,” he encourages.

Succession can be a new opportunity for the development of a forest's diversity.

“It might bring with it the realisation that felling is not the only way to make money from a forest, that profit can also be gained in the form of, for example, environmental aid,” says Lappalainen.

You can learn more about your own forest's resources, felling needs and natural sites to be protected using the metsään.fi service. ●

# The forest industry is a **LARGE INVESTOR**

According to the chief economist of Finnish Forest Industries, Maarit Lindström, years are not the same in terms of euro amounts, as investments are long-lasting.

TEXT **JAAKKO LIIKANEN** PHOTO **METSÄ GROUP**



*The forest industry's exports totalled EUR 13.1 billion in 2021.*

“Investments in the billions cannot fit into quarters. During the calculated payback period for investments, some of which can even be 30 years long, there can be many shifts in the economic situation,” **Maarit Lindström** says.

However, the direction is clear – investments in the forest industry have noticeably been on the rise over the last few years. As an investor, the forest industry is also one of the most active fields.

Only the energy industry has made more investments in Finland over the last few years.

“Investments in the energy supply have traditionally been large, and this has also been the case in recent years, where the sector’s investments have been EUR 2–3 billion per year.”

Observing changes and impacts in the operating environment is exceptionally difficult right now, as a result of Russia’s attack.

“What the situation will be like in the long term for things such as investment planning will be most impacted by the length of the crisis, its economic and societal consequences, and the measures

taken in Finnish decision-making based on the situation,” says Lindström.

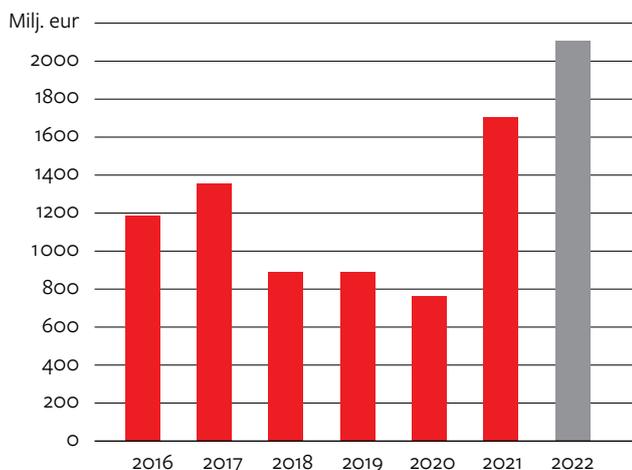
Forest industry investments are also distributed among companies of many sizes in the chemical and mechanical forest industry. The products of the chemical forest industry include cellulose, paperboard and paper, as well as new products such as biochemicals and textile fibres, and the mechanical side is represented by the timber industry and wood construction, as well as the plywood and chipboard industry.

*Finland's most important trade partners for forest industry exports were Germany (13% export revenue), China (10%) and the United Kingdom (8%).*

SOURCE: NATURAL RESOURCES INSTITUTE FINLAND, FOREIGN TRADE IN ROUNDWOOD AND FOREST INDUSTRY PRODUCTS, FINNISH CUSTOMS.

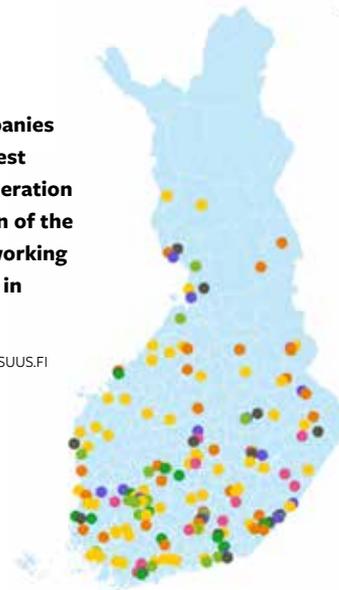
According to the investment inquiry by Statistics Finland and the Confederation of Finnish Industries (EK), investments in the forest industry in Finland amounted to about **EUR 4.6 billion** during 2020–2022.

**FOREST INDUSTRY INVESTMENTS IN FINLAND IN 2016–2022 (MILJ. E)**  
WHOLE FOREST INDUSTRY



Member companies of Finnish Forest Industries Federation and Federation of the Finnish Foodworking have 169 mills in Finland.

WWW.METSATEOLLISUUS.FI



SOURCE: NATURAL RESOURCES INSTITUTE FINLAND, STATISTICS FINLAND AND THE CONFEDERATION OF FINNISH INDUSTRIES (EK)



© VEIKKO SOMERPURO

**”In the Finnish forest industry, a total of about 20 investment projects are either under way or starting out,” says Maarit Lindström.**

One of the largest current or planned facility investments in Finland is Metsä Fibre’s bioproduct factory that will be built in Kemi, which, at EUR 1.85 billion, is Finland’s largest forest industry investment of all time. Investments nearly reaching 1 billion may also be Stora Enso’s plan to change the decommissioned paper machine in their Oulu factory into a large-scale consumer paperboard line.

**PRODUCT DEVELOPMENT IS A DYNAMIC FORCE**

The other half of the forest industry’s investments are those in research and development. The total EUR 450 million in investments by large companies in R&D is split in half between Finland and abroad.

Lindström emphasises the importance of R&D investments in the development

of new bio-based solutions and innovations and in scaling them up to industrial-scale production. Bio-based products are already partly at a stage where they can soon be produced in volume for the market.

“Examples of this include, among others, Metsä Group’s textile production demo plant in Äänekoski and Stora Enso’s test plant at their Sunila factory in Kotka, which produces anode materials for batteries out of lignin. UPM, on the other hand, produces biochemicals in Leuna, Germany.”

Lindström also emphasises that facility investments create new things.

“R&D investments should be seen as long-term investments in new products. Facility investments have a quicker impact and create production, all the while developing and modernising to create something new.” ●

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# INVESTMENT UNCERTAINTY

According to Nordea's economist Juha Kostiainen, it is time to look past the crisis despite the lack of clarity.

TEXT **JAAKKO LIIKANEN**

“It would be good for the forest industry to start considering how to best meet rising demand. There is now a strong desire to move away from fossil fuels and raw materials, and the forest industry already has and is developing numerous bio-based solutions.”

**Juha Kostiainen** is well aware that this is not easy. It is impossible to predict how the crisis will go and how long it will take.

“Companies would like to wait a little before making investment decisions, for the outlook to become clearer and the situation to become more predictable. This is understandable, but I would still encourage companies to start considering their investments for the near future and plan their implementation.”

## ECONOMIC GROWTH PROJECTIONS CHANGED

The scale of the impact on the economy is largely dependent on how long the war goes on. However, it is already clear that Russia's role as Finland's trade partner will shrink significantly and will do so for a long time to come.

“If a truce can be achieved quickly, the impact on the economy will remain moderate. Prolonging the war and the expansion of sanctions and boycotts would increase the impact on the export sector. Consumers' purchasing power would weaken even further as a result of a rise

in prices for global raw materials and energy. In the same way, investments and private consumption would decrease due to general uncertainty.”

According to Kostiainen, the scale of the impact also depends crucially on whether Finland is able to find a replacement demand for the exports to Russia, and whether the goods usually imported from Russia can be replaced with imports from elsewhere or Finland's own supply.

“One of the challenges for the forest industry is that there will be no more

wood from Russia, mostly birch fibre and energy woodchips.”

According to the economic growth projections made by Nordea at the end of March, Finland's economy will grow by 0.5–2 per cent this year. In January, before the start of the crisis, growth was projected to be 3 per cent.

Kostiainen points out that even large drops in economic growth are possible if the economic sanctions increase and the conflict becomes prolonged. ●



“We still believe that Finland's GDP will grow this year, despite the war in Ukraine,” says Juha Kostiainen.

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\* FSC™ N003159  
\*\* PEFC/01-44-43

# WOOD AT THE HEART OF INVESTMENT

Stora Enso has many ongoing investments, as there is demand for the forest industry's renewable and recyclable products. The need to move to renewable materials and raw materials is strong worldwide.

TEXT **JAAKKO LIIKANEN** PHOTOS **STORA ENSO** AND **MAGNUS FOND**

“The change is significant. Consumers are demanding change, our customers want change and mitigating climate change requires it.

The EU's Green Deal, Forest Strategy and Fit-for-55 all support our strategy. We have invested about EUR 2 billion in Finland over the last six years, even though usually only our largest investments are highlighted,” says Stora Enso's Country Manager Finland, **Seppo Parvi**.

Russia's attack on Ukraine in February stirred up international economic prospects, and created uncertainty in the investment environment.

According to Parvi, Stora Enso is naturally very closely following the situation and its effects on global supply and demand.

“However, we do not currently have a need to change our plans.”

## **PAPERBOARD, WOOD CONSTRUCTION AND BATTERY MATERIALS MADE FROM LIGNIN**

Investments are used to support Stora Enso's strategy focusing on packaging, wood construction and biomaterial innovations.

Parvi highlights examples from the packaging side first.

“The modification of the Oulu paperboard factory was already an investment of EUR 350 million. The preliminary survey for a possible modification of a second line would, if implemented, be an investment of nearly EUR 1 billion. The modification of the factory in Varkaus from paper to paperboard in 2015 should also be remembered. It provided a good

foundation for modifying the Oulu factory.”

For its part, Varkaus' LVL investment in 2016 supports solid wood construction, alongside the CLT investment made in Gruvön, Sweden in 2019.

On the biomaterials side, Parvi highlights the investment made in 2015 in the production of special dry lignin in Sunila, Kotka.

“It was supplemented last year at the test plant. We are replacing anodes made from graphite with our Lignode material, to be used in things such as electric car batteries. We have already delivered test batches to potential customers.”

## **TOGETHER IN INNOVATION**

Stora Enso's investment strategy focuses on packaging, wood construction and biomaterial innovations. Firstly, it strength- →



—

*“The modification of the Oulu paperboard factory was already an investment of EUR 350 million.”*



—

*Bio-based battery made in Kotka, Lignode by Stora Enso.*



**“Innovating is not limited to new bioproducts. We are also developing our existing products,” says Seppo Parvi.**



**Lignode will enable, for example, the replacement of graphite in electric car batteries with a renewable material in the future.**

ens those areas in which the company’s market position was already strong, such as in paperboard.

“At the same time, we are renewing our production processes in a more environmentally friendly direction. In addition, we are investing in new bio-based products; along with Lignode, we are investing in formed fibre, among other things.”

Stora Enso’s investment activities go hand in hand with the company’s investment planning. In 2021, the company spent EUR 133 million on innovations and research and development work, that is, about 1.3 per cent of its turnover.

“Innovating is not limited to new bio-based products. We are also developing our existing products to make them even better than before. For example, in terms

of paperboard, we are able to make more using less. At the Imatra paperboard factory, one load of wood now produces twice the amount of paperboard it did 50 years ago.”

According to Parvi, the chances of new bioproducts becoming the new products produced in volume alongside pulp and paper are good.

“I see a lot of opportunity in bioproducts. When it comes to pulp, it is important to remember that pulp production is still needed, as pulp is the starting point for new innovations. The test plant focusing on lignin in Sunila would not exist if not for the factory’s pulp production. Lignode will enable, for example, the replacement of graphite in electric car batteries with a renewable material in the future. Paperboard, too, is already being produced in volume, and it has a strong future in replacing non-renewable packaging materials.”

According to Parvi, when it comes to innovation and product development, it is crucial to understand that good and high-quality products are not created alone. Although wood-based biomass is the raw material for new bioproducts, and the forest industry is thus a significant field in the bioeconomy, the whole with its new products is still multisectoral in nature.

“Innovation does not happen in isolation. As such, cooperation with other industries, research institutes and customers is extremely important.” ●

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# THE STATE RETURNED TO GUIDE THE ECONOMY

The “New Industrial Policy” report was almost ready to be sent off to print when Russia invaded Ukraine. The report commissioned by the forest, chemical and technology industries had to be updated at the last minute, but its basic claim remains the same.

TEXT **JAAKKO LIIKANEN** PHOTO **NORDIC WEST OFFICE**

According to the CEO of Nordic West Office **Risto E. J. Penttilä**, the new industrial policy is mission-centric as it attempts to solve large challenges, such as climate change and the pandemic. It also differs from the old industrial policy in bringing responsibility, digital platform economy and the state’s liberal financial policy into building the future prerequisites for operation for industry.

Its premise is that the EU – and as such, Finland – must base their industrial policy on incentives and clear targets rather than detailed regulation. Thus, Finland must also make sure that its own business and innovation policies are on the right track in supporting industrial policy.

Export unions must know how Finnish industry export opportunities and competitiveness can be improved. As such, the report is an important document for them.



**According to Risto E.J. Penttilä a shift toward green market economy creates many possibilities for forest industry.**

Even before Russia’s attack, it was clear that industrial policy was an important part of the great change in the paradigm of economy and politics. The time of freedom and the market economy had passed, and the state had returned to guide the development of the economy and society.

“The basic claim still holds but, due to the war, the change in paradigm became larger than we had originally anticipated.”

## “HOW THE STATE GUIDES IS CRUCIAL”

According to Penttilä, the state’s return to the helm could be either a good or a bad thing.

“The key question is whether the new industrial policy creates the conditions for competitiveness through the use of incentivising financial instruments. If this happens, then the transition towards a green market economy, for example, will offer companies many opportunities.”

But if the return of the state means a protectionist national industry, which has

*A world of rules*

*Green market economy*

*Emergency*

*Free-rider*

*A new cold war, a transition to the green market economy, a state of emergency and the free-rider are all possible future realities that will guide industrial policy.*

lost its competitiveness being protected from equal competition, the situation is bad. In such a case, old industrial structures and practices are supported without allowing for any creative destruction to take place.

“The markets do not work if all companies receive money regardless of their viability.”

The “New Industrial Policy” report presents four scenarios.

A new cold war, a transition to the green market economy, a state of emergency and the free-rider are all possible future realities that will guide industrial policy.

#### **ARRIVAL OF GEOPOLITICS**

According to Penttilä, the return of the state to the driver’s seat happened even before Russia’s attack.

“It was already happening during the pandemic, when states began to protect themselves in many ways. Now those developments are being strengthened by

the war, as states highlight the security of supply, for example. Defence budgets are increasing too, as states take measures to protect themselves from a military threat.”

Russia’s attack did not really surprise Penttilä.

“The chance of it happening could be seen for the past year, at the latest when Russia began massing its troops along the Ukrainian border.

The division of the world economy into power blocs made up of the USA, China and the EU left no more room for Russia, so it had to do something.”

What state leadership will look like when combined with strengthened geopolitics is not yet clear.

“It is rather likely that there will be some kind of new cold war. It will be more complicated than the one that ended with the fall of the Berlin Wall, as the alliances are not as clear as before. Right now, the ones actually in opposition are NATO and Russia, as well as the USA

and China. The EU is still a third empire building mutual cooperation with and being led by the US. Europe may still fall into crisis particularly when it comes to energy, in which case unity may fail.”

#### **AN OPPORTUNITY FOR THE FOREST INDUSTRY**

The “Towards a green market economy” scenario is also boosted by the fact that getting away from fossil energy produced by Russia in particular is a big issue in Europe right now.

According to Penttilä, a green market economy would be the best direction for development – in terms of both Finland’s competitiveness and climate change.

However, it is unlikely to happen, especially quite so soon. Still, there is potential for transition towards green technology – and not least for the competitiveness and investment outlooks of the forest industry.

“The green market economy needs solutions based on the bio-based fuels and materials offered by the forest industry. I believe that after this stage of shock, no one will seriously question the role and importance of the forest industry in implementing the green transition anymore. As such, now is a good time to start planning investments, among other things.” ●

*The report was released at the start of May on the premises of Technology Industries of Finland, in Eteläranta, Helsinki.*

*The writing of the “New Industrial Policy” report was overseen by Nordic West Office’s team: Risto E. J. Penttilä, Anni Marjomaa and Anton Engelberg.*

# A Year of Full

# TRANSFORMATION

There will always be a graphic paper market, but no one knows how big it will be, says Sappi Europe's CEO, Marco Eikelenboom.

TEXT **KATARIINA KRABBE** PHOTO **IRISHAIDAU**

**M**arco Eikelenboom has worked for the paper industry all his working life. Previously he was VP in charge of marketing and sales of graphic papers at Sappi Europe. On April 1st last year, he started in his current role as CEO.

"It has been a year of full transformation, both businesswise and personally," he says.

"The Sappi organisation has radically transformed itself, and besides our strategic choices, we are focusing more and more on innovation and sustainability."

Decarbonization is something that can be seen as a liability, but there is also a very positive sustainability trend, which provides many more opportunities than risks.

"We are all living on the same planet, so this is something we can't wish away, although decarbonization costs the indus-

try a lot. On the other hand, we have an industry that has everything: renewable, biodegradable, and recyclable raw material. It is an industry that stores carbon by default with its forestry and has paid attention to for example water treatment for a long time."

Still, the year hasn't been the easiest of his career. Covid hit the graphic paper business particularly hard, which caused huge uncertainty.

"We thought we already had it all, but even the aftermath of Covid was spectacular. The recovery took place at a rate that nobody expected, and our supply chains were extremely disturbed. It came back with a rate that nobody expected. We had to fill the pipeline very quickly, containers were in the wrong place, vessels not allocated, and prices of transport, pulp and then energy and chemicals were shooting up. Still, I could say we mastered the challenges very well, and even

right now, amid the disaster in Ukraine, and all the consequences of the sanctions on Russia, we can weather the storm reasonably."

Personally, finding himself in the right place with a good team to tackle the challenges gives him energy.

"I have been lucky. We came together as a team on the first day I started. We gave ourselves six months to create the new strategy, which was presented to our board at the end of September. The strategic direction was fully approved, and we are in the process of implementing it as we speak."

## **MARKET-DRIVEN STRATEGIC DECISIONS**

The recent demand for graphic papers has suddenly peaked, prices have gone up and we have seen even a scarcity of paper, but Marco Eikelenboom sees this as only temporary.



“We intend to remain the market leader.”

“There will be different kinds of market corrections, but eventually the pipelines will be filled again, and the market will be normalized.”

The long-term trend of market decline is still valid.

“The market has been declining for a long time and will keep on doing so, but we won’t see the last sheet of paper being printed. There will always be a residual paper market, but nobody knows how big it will be,” Marco Eikelenboom says.

Sappi is the market leader in graphic paper and will be committed to it in the future too.

“We intend to remain the market leader, which of course requires keeping our assets in the top tier segment. Many companies have closed some of their paper mills, and we have reduced some of our capacity, too, but there is still the possibility to make very decent returns. There will always be a sizable

market, but probably there won’t be as many players in it in the future as we are used to.”

At the same time, Sappi is going to reduce their dependency on the declining markets and develop certain areas in packaging and specialty paper segments. The focus is on the premium segment of the packaging market, with high quality printable end use applications.

“We need to focus more than ever on growth markets, especially in the areas where we see significant potential. We are for example entering the label market, where we see a fantastic growth opportunity.”

Also, there is a strong drive towards innovation-based sustainable packaging that will replace plastics – the sustainable smart packaging in the high-end segments.

The attitude is much more market driven than before.

“We identify the markets where we can play and where we can win. We only play to win and if it’s not possible, we forget it and look at something else. Assets are important, but they are the consequences that follow strategic market choices.”

#### **PASSIONATE PAPER DINOSAUR**

Marco Eikelenboom describes himself as one of those pulp and paper dinosaurs, who came to the field fresh from university and has never really moved between companies since. He studied business economics at the Erasmus University in Rotterdam and in 1992, after having served as a Reserve-Officer in the Dutch army, entered the management trainee programme at the Royal Dutch Papermills, KNP, which soon afterwards was merged with Leykam-Mürztaler. In 1997, KNP Leykam was acquired by Sappi.

“It was a very exciting time. I wasn’t even 30, and I first was appointed Manager Corporate Planning in charge of the post-merger integration and soon after became the managing director of Sappi Benelux,” he says.

The most unforgettable time personally, however, were the years in South Africa, where he worked as a Marketing Director for the Fine Paper Division.

“We moved there with the whole family, and our three sons were just 6 months, 2 years, and 4 years old. For them it was like a safari holiday that lasted for a couple of years with summer every day. I loved the working environment, where you work hard and play hard.”

After 30 years he is still passionate about the industry.

“This is a no-nonsense industry, where you only win as a team in the broadest sense of the word. I’m passionate about building teams, driving business, creating dreams, and putting ambitions as high as possible.” ●

# FOUR PERSPECTIVES ON BIOECONOMY

The materials people use are largely made up of petrochemical products. When they are manufactured from fossil materials – oil, gas and coal – their carbon footprint is large. This is why the bioeconomy is developing similar products using renewable raw materials. Here, we have collected four examples of Finnish bio-innovations.

TEXT **ANTTI KIRVES** PHOTOS **MANUFACTURERS**

## 1. **UPM: DRINKING BOTTLES FROM BIOPLASTIC**

UPM is building a large refinery in Germany, which will mainly produce monoethylene glycol (MEG), one of the components of polyethylene terephtha-

late, that is, PET plastic. UPM has been reported to be starting the manufacture of bio-bottles for Coca-Cola, among others.

MEG is usually made using fossil raw materials. When it is made using renewable raw materials instead, the product's carbon footprint shrinks significantly.

“At the same time, its characteristics match what is expected from PET plastic

bottles, without our customers having to change anything in their own processes. It can also be completely recycled using current recycling infrastructure. It is also a matter of resource efficiency. Of course, it is better for the world that all materials are recycled and used as many times as possible,” says **Juuso Konttinen**, Vice President, Biochemicals at UPM.





“Coca-Cola is a potential customer for us. We manufacture this material and Coca-Cola sells drinks. When they buy bio-MEG in the future, nothing will change on their end, apart from the fact that the bottles will be far more sustainable in terms of carbon footprint. Chemically speaking, the bottle is an exact match for what it was before, only using different raw materials and processes,” says Konttinen.

He believes that there will be plenty of opportunities and many expectations for bio-based MEG.

“PET plastic is used in other packaging as well. Polyester fibres use a lot of MEG in, for example, a significant amount of textiles. MEG is also used in the fluid of cooling systems in cars. As other components of cars are increasingly considered in terms of CO<sub>2</sub> efficiency, MEG is part of this development as well,” Konttinen says.

The factory in Germany is estimated to begin operations at the end of next year. According to Konttinen, UPM is already able to manufacture the material on a pilot scale, allowing the company’s customers to test it out in their test series.

“Bioplastic and other biochemical products are the spearhead of our growth and a part of our transformation, together with our biofuel business and pulp. Biochemical refineries make many products when we create additional value for each of the main components of wood. And of course, it greatly opens up opportunities when we can manufacture different chemicals for different end uses. There is tremendous potential in the chemistry market, and it is a big opportunity for UPM as well,” says Konttinen.

## 2.

### THE PAPER LID COMPANY AND METSÄ BOARD: PAPERBOARD LIDS FOR COFFEE CUPS

“The world is full of plastic lids made for disposable cups. Compared to them, a paperboard lid reduces CO<sub>2</sub> emissions by 60–80 per cent. This is a game-changing factor in terms of the environment,” says **Ilkka Harju**, Metsä Board’s Packaging Services Director, EMEA.

Metsä Board was involved in the development of the paperboard lid for disposable coffee cups manufactured by the Masku-based The Paper Lid Company.

“The demand for solutions made from renewable materials that can replace plastic is growing continuously. We want to be involved in creating innovations and added value for both packaging manufacturers and consumers. This requires new technology, development and cooperation. Other innovations capable of replacing plastic are already on the drawing board,” adds Harju.

**Matti Salonoja**, the founder of The Paper Lid Company, says that it all started with sustainability.

“What you had on the market was disposable cups that were no longer made from traditional plastic, while their lids were. That seemed paradoxical. Our idea is to replace all disposable plastic products that we can with fibre-based solutions and this technology,” says Salonoja.

The other essential factor in terms of coffee-cup lids is the user experience. The paperboard lid can be easily placed on top of a cup and removed multiple times without it losing its tightness. The user never has to wonder whether the lid is secure.

“When you hear that satisfying soft snap, the lid is in place. A plastic beverage lid breaks easily or bends out of shape when you place it on a cup. Paperboard doesn’t have that problem. The lid is a snug fit and you won’t risk spilling your drink even if you turn the cup upside down. The basic structure in all the lids is the same, but the holes cut in them vary according to the use. A straw lid has the hole cut in the middle, while the lids for hot drinks are equipped with a similar hole at the edge that we’ve become used in plastic coffee-cup lids,” adds Salonoja.

The paperboard coffee-cup lids have been in production for several months now. While the company’s biggest customer in Finland so far has been Helsingin Burger, its biggest market is currently in the UK, where it ships several containers full of lids every month. For now, the company’s maximum hourly production capacity is around 25,000 lids. In the summer, the capacity will triple, at which point it will be able to manufacture a container-full of lids per day.

“Disposable plastic unfit for recycling will be banned at some point, and this is when the market will truly change. However, as long as we’re competing against plastic lids, there will always be those who go for the cheaper solution, regardless of ecological values. Fibre and paperboard may be more expensive than plastic, but we take the points home in terms of sustainability,” says Salonoja.





# 3.

## STORA ENSO'S BINDER IS BIO-BASED

NeoLigno is Stora Enso's bio-based binder, which can replace fossil-based adhesives in, for example, the manufacture of chipboard and insulation wool. Stora Enso lists the improvement of indoor air quality in households and offices, as well as diminished emissions and carbon footprint of the end product as benefits of the binder. The end product is safer to manufacture, as NeoLigno does not contain formaldehyde or isocyanate, which are commonly used in adhesive resins and industrial products.

"NeoLigno is an entirely bio-based and natural binder. It is manufactured using the lignin – nature's own adhesive – which is collected from the side streams of pulp production, and which Stora Enso has produced commercially since 2015 in the Sunila factory in Kotka. The raw material of NeoLigno is wood, which grows back, unlike the raw materials of oil-based binders. The trees used for manufacturing are certified and their origin can be traced," says **Heikki Lotti**, who is in charge of the development of the lignin business in Stora Enso's Biomaterials division's innovation organisation.

There are two versions of the product. NeoLigno Trim is suitable as chipboard adhesive, and NeoLigno Therm is suitable as a binder for insulation materials, such as glass wool. The substance is strong and handles contact with water well.

"The world's first one hundred per cent wood-based furniture board, Zero Furniture Board, was created in a collaboration between Koskisen and Stora Enso. NeoLigno is used in the furniture boards, replacing fossil-based adhesive resins. Koskisen is the world's first company to use NeoLigno in their industrial production. Zero Furniture Board will hit the market towards the end of this year," says Lotti.

He anticipates a great deal of innovation in the near future.

"Lignin can already be used to replace oil-based bitumen in asphalt. In the future, it will be possible to use lignin in the manufacture of coatings and specialty chemicals, and it can be refined into carbon fibre and biochar for energy storage. Carbon fibres made from lignin offer interesting opportunities for light structures and the transport industry, for



example, which also benefits the environment," says Lotti.

As a replacement for non-renewable carbon fibre, lignin is suitable for the vehicle industry, wind farms and solar panels, among others. A test plant was completed in Sunila last year, where renewable wood-based carbon is manufactured and tested to meet the increasing demand in the global battery market. In the future, special dry lignin can be used to replace graphite for the needs of consumer electronics and the vehicle industry, among others.

"We will continue cooperating with our customers, and hope that we will be seeing more bio-based adhesives in our living and working environments," says Lotti.

# 4.

## SPINNOVA MAKES TEXTILE FIBRES FROM PULP

Jyväskylä-based Spinnova is currently commercialising a technology with which textile fibres can be made from cellulose without a chemical dissolving process.

Spinnova is using microfibrillated cellulose (MFC) as the raw ingredient for their fibres. Textile brands are looking for fibres which behave the same way as natural fibres – in other words, the same way as cotton, wool or flax, for example.

“We use very little water and chemicals, and our CO<sub>2</sub> emissions are very small. In addition to our product currently being the world’s most environ-

mentally-friendly fibre, it is a truly natural fibre. Spinnova’s production method combines natural microfibrils together, meaning that the characteristics of the end fibres are also very natural,” says Spinnova’s CEO and co-founder **Janne Poranen**.

He also mentions a project in its pilot stages, where leather waste – that is, protein – is used instead of cellulose. The side streams of agriculture, for example, can be used as a raw material just as easily.

“We have tried wheat and barley stalks and food waste. Even textile waste such

as old cotton can be used in the same way, and when it is eventually more globally available, we will be ready. It is very important for us that we are able to completely recycle our fibres. It will not turn out that the quality weakens during recycling, as with paper, but rather that mechanical grinding back into microfibrils, for example, will become easier, suspension will become more homogenous, and thus, quality may even increase with recycling,” says Poranen.

Spinnova has a pilot plant on the outskirts of Jyväskylä, which has been in operation for a couple years now. The first small-scale commercial plant owned by Woodspin, a joint company founded together with pulp company Suzano, will be completed by the end of the year. The goal is an annual capacity of at least one million tonnes in about ten years.

“We are actively working together with Adidas, The North Face, H&M and Bestseller, among others. On the Finnish side, we have worked together with, for example, Marimekko for a long time, and will continue to do so going forward. After all, we have only just scratched the surface. Wearable textiles are a huge market, and we are off to a good start there. The composite market is large as well, and there are many opportunities there. And then there are nonwoven fabrics, wiping materials, single-use products... The single-use plastics directive will definitely increase demand.”

In Poranen’s view, Finland provides a good environment for bioeconomy innovations.

“Education and expertise are world-class here. We must do the kinds of new things here which no one else out in the world can do yet,” Poranen says. ●





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UPM **BIOFORE**  
BEYOND FOSSILS



# *Finland is well-suited to startups*

The situation for Finnish bioeconomy startups looks very good, says the CEO of the Finnish Startup Community Riikka Pakarinen.

TEXT **ANTTI KIRVES**

“**M**ore investments were made in Finnish startups at the start of the year than ever before. That, in itself, already shows that there is real growth happening here. Our shared goal is for Finland to become the world’s best place for startups. Our second goal is for startups to become a strong export sector and support pillar of the economy alongside the forest and metal industries. We are aiming for exports worth EUR 10 billion by 2030, and as of right now, that seems more than realistic,” says **Riikka Pakarinen**.

The biggest challenges are in acquiring labour and foreign expertise.

“The competition for experts is fierce worldwide. We have to get our processes up to par and make them faster than before in order to attract new experts.”

So how can a Finnish startup succeed? In Pakarinen’s opinion, success stories feed into each other, and there are already

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*Fincet is a software startup from Kajaani which produces the Tool4Pro task and project management application for the needs of industry.*

famous examples in Finland, starting with Wolt and Supercell.

“The game industry is a good example. An ecosystem began to form around Supercell. Finland is one of the best countries in this, and I believe that a similar ecosystem can also develop around bioeconomy startups.”

According to Pakarinen, the green transition and Finland’s goal of self-sufficient energy production free from Russia offers good opportunities for improvement.

“These create a need for new solutions and inventions. We have been investing in this in Finland for a long enough time to have a head start when compared to many other countries. Traditionally, Finland and Finnish companies have received investments because our society is stable and the operating environment is safe.”

In the big picture, investors and financiers expect startups to provide solutions →

Who we are, why we exist, what we do.

to global problems. In Pakarinen’s view, this is a big opportunity for the bioeconomy in particular.

“The future looks very bright. There is now a clear need to find new solutions in order to see the green transition through. This need will create demand and new ideas at the same time, and that is a good starting point in my opinion. In addition to invested funds, public funds are being strongly allocated towards the green transition, both in the EU and nationally,” says Pakarinen.

**A CHALLENGING BUT GOOD ENVIRONMENT**

“Finland is an open operating environment that is brimming with potential for startups. One of the most important areas for a new company is the creation of a brand and verifying its trustworthiness. Of course, they go hand in hand: who we are, why we exist, what we do,” says the CEO of Fincet **Lasse Kauppinen**.

Fincet is a software startup from Kajaani which produces the Tool4Pro task and project management application for the needs of industry.

“Traditionally, regardless of sector, maintenance downtime operations are often managed using paper. Plans are usually drafted in Excel or comparable programmes, but in these cases the actual monitoring of activities is a little challenging. That is why we exist. We offer

real-time information for the management of different tasks and projects, and simultaneously guarantee significant savings and better occupational safety in, for example, the operations of a factory,” says Kauppinen.

Fincet’s customers operate in different industries. Currently, their customers include the mining company Sotkamo Silver and Finnos, which supplies x-ray measurement systems for the lumber industry.

“The bioeconomy has traditions in Finland, and I believe that it will have a strong foothold here in the future as well.

As a former papermaker, it has been great to see these new innovations surrounding bioeconomy, such as different packaging materials and textile fibres.”

According to Kauppinen, in practice, it does not matter what kind of facility is in question – managing maintenance and maintenance downtime is always quite similar.

“The forest industry has always been an early adopter of the newest technologies. This makes the forest industry a potential playing field for Tool4Pro.”

Kauppinen sees plenty of opportunities in the international markets.



**Woodio is a Finnish design brand that uses sustainable bio-material innovation in a contemporary way.**



**Finnish Startup Community,  
Riikka Pakarinen**



**Finset, Lasse Kauppinen**



**Foodio, Petro Lahtinen**

“Similar tools and methods are used in this sector everywhere in the world. We are ready for the international markets, and when a chance presents itself, we will go for it immediately. Europe is a natural goal for us for the near future. Our aim is to become international one way or another, either during this or the next year at the latest.”

How are financiers assured?

“The business’ outlook and opportunities for internationalisation are significant matters. Investors look at how their money will be used. At that point, a product idea and a team are important. Investors must be able to see that there is potential in the product and that it is backed by a team that can take it forward,” says Kauppinen.

#### **A SCENE HAS FORMED**

Woodio is a company that manufactures bathroom furnishings made of wood composite, and their founder and CEO **Petro Lahtinen** knows how to keep an elevator pitch short and sweet.

“Woodio is an ecomaterials and design brand for the modern day. We have our own material technology, which we currently use in practice for making bathroom furnishings. Finnish-Scandinavian design,” says Lahtinen.

“We have taken over the Finnish market, have done immense amounts of product development, and we are now

on the threshold of internationalisation. We are in the markets enough to know that there is demand and that people are interested. Our next hurdle is constructing a new factory.”

In the case of Woodio, taking over the Finnish market means that the company has plenty of resellers from K-Rauta to Bauhaus, more or less in all channels dealing with bathroom products.

“Quite many people have seen our products or at least heard of Woodio. Of course, we are not on the level of Marimekko or Fiskars as a brand yet, but at least those following the field already know who we are,” says Lahtinen.

In Lahtinen’s opinion, Finland has a “good and rather lively” startup environment.

“A scene has definitely formed, business ideas receive funding and you are starting to see frequent successes. Finland is definitely far from the worst on a global scale. Public administration considers it a good thing that even the slightly crazier ideas are being tested, and supports this in the hope that, at some point, one or two new Nokias may rise up, and that is just sensible for everyone. It certainly feels like there is a lot of investment in the bioeconomy. It seems that if a business idea or product has the ‘bio’ prefix, it somehow has a tailwind. I believe and hope that this is not a passing trend.”

Woodio has received many awards, and has succeeded in securing a significant amount of investments. According to Lahtinen, for a financier to be willing to commit their money to a startup, a credible idea and business plan are needed, along with a credible team to implement them.

“The same rule of thumb applies to any business. When you have the plans, team, quality and credibility, then you will find the money. And of course, there is public funding. We have also received quite a lot from Business Finland and the EU for the development project.”

The company is setting its sights on the Norwegian and Swedish markets next.

“The Nordic countries are already a big enough market for us that we will have plenty of work for some time to come. But last year, we sold to 26 countries around the world, so there is work to be done further out as well. The vibe is positive. There is clear demand and sales are growing. We are excitedly planning the new factory, so that we can take our output volumes to the next level,” says Lahtinen. ●



# Ready for the **NEXT LEVEL**

Winfried Schaur is excited about his new role in leading UPM's new Biorefining business unit.

TEXT **KATARIINA KRABBE** PHOTOS **JARI HÄRKÖNEN**

# W

**Winfried Schaur** has worked for UPM for 20 years, in seven different roles. Last year he was appointed as Executive Vice President, Technology, after leading the Communication Papers Business Area for almost six years. He also leads UPM's totally new business unit which gathers all the businesses prefixed with the word 'Bio' together.

"I am quite excited about this new role. First, I am a person who likes to take on new challenges now and then. I also

think that it is an honour to be responsible for these new businesses, where we have clear aspirations for growth. There is a lot to bring forward," he says.

Winfried Schaur grew up in Schongau, Bavaria, where he still lives. The town is situated near the Alps, about 80 kilometres southwest of Munich.

"There is a paper mill in Schongau, and it was very usual for students to finance their studies by working there during the summers. So did I, although I am not a paper maker; I studied mechanical engineering."

After graduating he worked first in an automotive supplier but after two years, he was asked to come back to the paper mill which at the time was family-owned. In 2001 it was bought by UPM.

He has no plans to relocate even though this new role brings him to Helsinki, UPM's headquarters, every other week.

## **BUILDING THE BUSINESS PLATFORM**

The biorefining business unit consists of four different product groups: biocomposites, biomedical, biofuels and biochemicals. They all are in completely different phases of their development from innovation through to business.

"Biomedicals are in the beginning phase in terms of business. Biocomposites have been around for several years, and they have the potential to be ramped up maybe in the next couple of years. Biofuels are in industrial production, and they can really be scaled up, while the



first industrial plant for biochemicals is under construction,” Schaur says.

“All of these have gone through our innovation process, and now we want to take them to the next level.”

Winfried Schaur finds this phase very inspiring, and he believes that he can bring a lot in towards building the business platform, because of his experience in many different roles.

“What is fascinating is that we are operating start-ups within a big industrial corporation. Not everything is settled and every day there is something that we must think about or organise. We have to build a lot from scratch and can design our organization and its processes, as well as the culture to guide completely new teams. The work has many facets: We

need to establish a commercial presence and build markets for our completely new products. We have to design and to ramp up operations and establish supply chains to both source or raw materials and deliver our products. And we must ensure that we are establishing a resilient business and offering a safe working environment for our employees.”

#### **THE FOUR BIO BUSINESSES**

Biomedicals are nanocellulose, which is used in applications in a medical setting – for wound care and cell cultivation among others. This is a demanding area because of the references and certificates that are required in this field, yet at the same time, it is something completely new.

“There is a lot of development in this field, and many more products are on their way,” Schaur says.

The biocomposites business has two different product lines: ProFi and Formi.

“ProFi is decking material for terraces; it is a composite made from residues of the recycling process. This is a perfect example of the circular economy,” Schaur explains.

Formi products, on the other hand, are bioplastics; granulates made of residues of pulp and wood processes. These polymers can replace fossil-based materials, especially polypropylene, and are used amongst others for the production of household products such as lamps, chairs or 3D printing.





**The market demand for the renewable chemicals produced in Leuna is immense, says Winfried Schaur.**

Biofuels is an industrial scale business producing advanced biodiesel and renewable naphtha which is used for example in plastic production. The Lappeenranta Biorefinery has been operating for seven years and it uses a residue of pulp production, crude tall oil, as raw material for producing biofuels.

“We are planning the second plant for biofuels, which could be five times bigger than the biorefinery in Lappeenranta. One big difference will be that we would be able to use multiple feedstocks to increase the flexibility and to accommodate the increasing output quantity.”

“We are considering building the plant in Rotterdam, but have not yet made the investment decision which is at the end of a very thorough process assessing the technology and feasibility of the investment, as well as the long-term viability of the business case.”

Then there is the Biochemicals business.

“We are building the world’s first industrial scale biorefinery for the pro-

duction of second-generation renewable chemicals in Leuna, Germany, and plan to start the production by the end of 2023.”

The products to be made in Leuna are renewable glycols which can replace the highly CO<sub>2</sub>-intensive, oil-based glycols to produce PET based packaging, polyester-based textiles or cooling liquids. Potential customers include the major car brands or food and beverage companies like Coca-Cola.

The second product line is a performance chemical called Renewable Functional Filler which will replace a toxic and CO<sub>2</sub>-intensive oil-based material called carbon black, in a large variety of rubber products used in shoes, flooring and above all automotive components.

“The market demand for the renewable chemicals produced in Leuna is immense. We focus on ensuring high product quality and are marketing a completely new category of sustainable products which will revolutionise the plastics and rubber industries and offer consumer brands an option for a step change

in their sustainability performance. Our main attention is now on ensuring the completion of our refinery and a robust start-up of production. Then we are in for a very promising market.”

#### **MORE INNOVATIONS ON THE WAY**

Besides building a platform for the new businesses, the innovation pipeline must be fed all the time. The work is done in the Biofore Base research centres in Lappeenranta, Finland and Changshu, China. The newest will soon be opening in Leuna.

The Biofore Bases are the core of the R&D organisation, and they are undertaking development for existing businesses, as well as new ones.

“We constantly investigate many ideas to find out if they are suitable for UPM. They must be 100 percent sustainable. We want to create products for tomorrow that are not based on oil, gas, or any other fossil-based substance.” ●



## Deep technology startups create radical innovations that will revolutionise different fields

Now is the time for radical changes. Climate change, the need for securing sufficient resources, and the need to ensure health are speeding up and clearing the way for solutions that will change the world. We are once again facing a technological transformation. It is based on breakthroughs in science, changing our economy and lives more thoroughly than the digitalisation of the last decades. This transformation offers opportunities in nearly every field, from food production to the construction industry and from healthcare to the process industry.

Unique and revolutionary solutions for global problems can be found in startups commercialising deep technology, that is, breakthroughs in both science and technology. This is why traditional companies interested in fast and sustainable growth should start working together with these startups.

A few years ago, I suggested that Finland should start solving challenges and become a global leader in these fields in particular: biotechnical food production, quantum technology, small nuclear reactors, chemical recycling of plastics and the optimisation of material usage. In my pocket book *Discovering Exponential Hope*, I continued to map out the path of exponential hope by focusing on a fast-growing form of business: deep technology startups.

We have a good number of these interesting startups. Scaling them up to become world-class operators will require cooperation with companies. Finnish start-

ups ought to be supported in order for their production to grow into world-class businesses. This is how we can create new industries and international business in Finland through startups.

The unique expertise Finland has gained over the decades will enable world-class breakthroughs. Our startups, which support sustainable growth, can rise up from these deep technology fields in particular: new materials, nanoelectronics, and health technology. In these fields, we could solve the world's resource shortage, create a carbon-neutral society and improve people's lives. Our strongest areas are connected with the expertise of the other Nordic countries and the Baltic states. We also have an opportunity to make use of this (perhaps even unfair) northern competitive advantage by acting quickly.

The jump from laboratory to factory production can cost tens of millions of euros. This is why quickly scaling solutions up to a global level will require cooperation between deep technology startups and large companies. By abstaining from the ever-accelerating development of deep technology, a company may quickly be displaced from the market.

The road to the top of the economy is paved by deep technology startups, and the transformation offers new opportunities for the forest industry as well. I recommend that companies in the forest industry take the opportunities provided by deep technology immediately. The fastest ones win the race.



*“The transformation offers new opportunities for the forest industry as well.”*

**ANTTI VASARA**, CEO  
VTT

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gineered with 'plug and play' connections for ease of use. The offer comprises a range of containerised tanks, pumps, and accessories to provide a complete end-to-end solution. We also provide transport and logistics, process knowledge, training, and ongoing support during commissioning and operation. Our services enable clients to be as hand-on or hands-off as they need. Mobile Water Services has a proven track record for rapid

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# Kevätkokouksessa jaettiin tunnustuspalkintoja

Kevätseminaarissa kuultiin myös uusista kuituinnovaatioista.

TEXT **KATARIINA KRABBE** PHOTOS **JARI HÄRKÖNEN**



**Jyrki Kettunen ja Johanna Buchert palkittiin ansiokkaasta työstään Lampén-mitalein.**



**Magnus Diesen ja Ainomaija Haarla saivat PI:n ansiopaketit.**

**PI:N VUOSIKOKOUS** ja kevätseminaari järjestettiin Helsingin Pörssitalolla 26.4. Noin sata henkilöä tarttui mahdollisuuksien verkostoitua ja tavata tuttuja koronataudin jälkeen.

Ansiokkaasta, laaja-alaisesta, teknisestä ja tieteellisestä työstä myönnettävän Lampén-mitalin saivat Luonnonvarakeskuksen pääjohtaja, tekniikan tohtori, professori **Johanna Buchert** sekä professori, tekniikan kunniatohtori **Jyrki Kettunen**.

”Arvostan Lampén-mitalia erittäin paljon, ja kun toinen palkittava on vielä suuresti arvostamani Jyrki Kettunen, se nousi vielä seuraavalle tasolle”, Buchert kommentoi.

Skenaariotyön metsäteollisuuteen tuonut Jyrki Kettunen suhtautui palkitsemiseensa vaatimattomasti:

”Kun tällainen osuu kohdalle, pitää muistaa, että hampuusikin voi selvitä elämänsä loppuun ilman hirsipuuta, mutta kukaan ei voi selvitä ilman huomionosoituksia”, hän sanoi **Mark Twainia** siteeraten.

Yhdistyksen ansiopaketin saivat tekniikan tohtori, MBA **Ainomaija Haarla** sekä diplomi-insinööri **Magnus Diesen**, jotka molemmat ovat osallistuneet myös ForestBioFacts-oppimisympäristön tekemiseen, jälkimmäinen eläkkeeltä käsin.

”Siinä oppi huomaamaan, miten hyvä työkalu digitalisaatio on. Samalla se oli työläs projekti, koska piti oppia digitaaliset konstit, jotka olivat minulle vieraita”, Diesen sanoo.

## **UKRAINAN SODAN VAIKUTUKSET JA UUDET KUIDUT SELLULOOSASTA**

Ekonomisti **Juho Kostiainen** Nordeasta kertoi Ukrainan sodan vaikutuksista Suomen talouteen ja kilpailukykyyn.

”Suomen teollisuus kohtaa sodan aiheuttaman kysynnän heikkenemisen hyvästä tilanteesta, ja vaikka kasvuodotukset ovat pudonneet, talous kuitenkin kasvaa edelleen.”



**Olli Kähkönen, Nordic Bioproducts Group**



**Juho Kostiainen, Nordea**



**Marja-Liisa Niinikoski, Suomen Tekstiili ja Muoti ry**



Vaikka hinnat ovat nousseet, vaihtosuhte on Suomessa pysynyt vakaana.

Suomen Tekstiili ja Muoti ry:n toimitusjohtaja **Marja-Liisa Niinikoski** kertoi kestävästä tekstiilikuituinnovaatioista ja tekstiilialan tulevaisuusvisiosta. Suomi voisi olla vastuullisen ja tietämyspohjaisen muotialan edelläkävijä. Kuituosaaminen on hyvällä tasolla, mutta Niinikoski haastaa miettimään koko arvoketjua.

”Brändiliiketoiminnan arvo arvoketjun loppupäässä on jotain aivan muuta kuin kuidun arvo ketjun alkupäässä.”

Nordic Bioproducts Groupin perustaja ja toimitusjohtaja **Olli Kähkönen**

kertoi Aaltocell-tekniologiasta, jolla pystytään valmistamaan mikrokiteistä selluloosaa, sekä uudesta Norratex-tekstiilitekniologiasta.

”Niinikosken ja Kähkösen esitykset olivat erittäin kiinnostavia”, bisnes-

enkelinäkin toimiva Ainomaija Haarla kommentoi.

”Opetan Aalto Arts Fashion Design -ohjelmassa ja CHEMARTS-kesäkoulussa, ja yritän saada opiskelijat kiinnostumaan näistä uusista kuiduista.” ●

**PI:N VUOSIKOKOUKSESSA** käsiteltiin katsaus yhdistyksen toimintaan, vuoden 2021 tilinpäätös, jäsenasiat sekä jaettiin stipendit sekä tunnustuspalkinnot. Vuosikokouksen virallinen osuus striimattiin suorana lähetyksenä.

## Neljä uutta kutsujäsentä

**PUUNJALOSTUS-INSINÖÖRIT RY:N** kutsujäseniksi voidaan kutsua johdantavassa asemassa olevia henkilöitä, jotka voivat merkittävässä roolissaan tukea ja edistää yhdistyksen tarkoituksen toteuttamista.

Vuosikokouksessa julkistettiin neljä uutta kutsujäsentä: ABB:n toimitusjohtaja **Pekka Tiitinen**, VTT:n toimitusjohtaja **Antti Vasara**, Metsä Tissuen CEO **Esa Kaikkonen** sekä Aalto-yliopiston Kemia tekniikan korkeakoulun dekaani **Kristiina Kruus**.

”Olin aidosti yllättänyt ja iloinen tästä kunnianasta, ja odotan innokkaana, miten voin oman osuuteni kantaa. Olen aina ollut sydämeltäni insinööri, ja haluan myös korkeakouluamme kehittää insinöörikorkeakouluna”, Kruus sanoo.



**Antti Vasara (vas.), Pekka Tiitinen, Kristiina Kruus ja Esa Kaikkonen ovat PI:n uudet arvostetut kutsujäsenet.**

Kemia tekniikan korkeakoulun opiskelijoista noin 30 prosenttia sijoittuu valmistuttuaan metsäteollisuuteen.

Antti Vasara on ollut mukana jo useissa PI:n järjes-

tämässä tilaisuuksissa ja aikoo olla jatkossakin.

”PI edustaa Suomen historian ja tulevaisuuden kannalta merkityksellistä teollisuuden alaa ja siksi koen kutsujäse-

nyden erityiseksi huomionosoitukseksi. On iso kunnia tulla kutsutuksi jäseneksi PI:hin”, hän sanoo. ●



**Ilkka Hämälä kutsuttiin PI:n kunniajäseneksi.**

## Ilkka Hämälä sanoi ”tahdon”

**PUUNJALOSTUSINSINÖÖRIT RY:N** vuosikokous päätti kutsua vuorineuvos, DI **Ilkka Hämälän** yhdistyksen kunniajäseneksi. Arvostettu ja monipuolinen yritysjohtaja on toiminut yli 35 vuoden ajan merkittävässä tehtävässä metsäteollisuudessa ja erityisesti sellu- ja biotuoteollisuudessa.

Hän on ollut avainroolissa toteuttamassa Metsä Groupin transformaatiota. Lisäksi hän on näkyvä vaikuttaja sekä kansallisissa että kansainvälisissä järjestöissä – Cegin lisäksi esimerkiksi Metsäteollisuus ry:ssä ja Suomen Laatu yhdistyksessä. PI:n jäsen hän on ollut vuodesta 1990 lähtien.

”PI on tiivis aatteellinen verkosto, ja meillä on hieno perinne verkoston ylläpitämiseen. Nyt verkostoja pitää laajentaa”, hän sanoi lounaspuheessaan.

Hämälä pitää erityisen tärkeänä PI:n pitkäjänteistä opiskelijatyötä.

”Tuomalla alalle tulevia yhteen voimme varmistaa yhteiskunnan hyvinvoinnin myös tulevaisuudessa”, hän sanoi.

Kunniajäsenyyden hän hyväksyi vastamalla puheenjohtaja **Katja Metsärannan** pyyntöön yhdellä sanalla: ”Tahdon.” ●



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TkT, pääjohtaja **Johanna Buchert**  
Professori, TkT h.c. **Jyrki Kettunen**

### YHDISTYKSEN ANSIOPAKETTI

DI **Magnus Diesen**  
TkT, MBA **Ainomaija Haarla**

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- 9.6.2022 **ForestBioFacts-webinar**: Environmental control and management
- 9.6.2022 **Talent Day for students**, Messukeskus, Helsinki
- 13.-17.6.2022 **TAPPI Nano Conference 2022**, Helsinki
- 30.8.2022 **Metsäteollisuuden historiailta PI:n toimistolla**
- 6.9.2022 **ForestBioFacts-webinar**: Forests and other biomass resources
- 21.9.2022 **Tutkimusseminaari & pitch-koulutus**, Aalto-yliopisto
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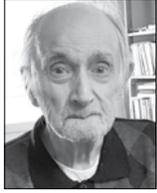
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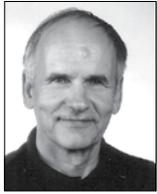
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## “Sawdust at the core of quality”

One of the world’s three leading manufacturers of laminating papers, MM Kotkamills in Kotka, has invested considerably in its Absorbex products with the aim of becoming the market leader in the industry. The pulp mill’s performance and capacity have been improved over a period of three years through several targeted investments, and this year the final development phase will be carried out with the modernisation of the paper machine itself. The superior quality of MM Kotkamills’ laminating paper is supported by decades of specialisation, and by the use of unbleached pulp derived from sawdust, a by-product of sawmilling, as the raw material for the company’s laminating paper.

“Now, in this final phase, the paper machine is being upgraded with a shoe press and small additional features. The paper machine’s capacity will be taken to a new level when the production increases from the current 165,000 t/a to 190,000 t/a. We will ramp up the production volume even beyond that, but in slightly smaller steps. Our product is unique in that Absorbex is made from pulp derived from sawdust,” explains **Ville Seppälä**, Head of Sales, Saturating Kraft Paper at MM Kotkamills. In addition, the machine’s product range also includes Absorbex® Eco papers, in which some of the sawdust pulp has been replaced by recycled fibre pulp, the raw material of which is OCC.

The first thing Austrian MM Group did last year as the new owner of the Finnish MM Kotkamills was to invest in the new press section of Paper Machine 1. The modernisation will replace the old equipment, increase production, reduce energy consumption and make production more sustainable.



**Ville Seppälä**

The environmental aspect is, in fact, one of MM Kotkamills’s key messages about laminating papers in the global market, as sawdust stores carbon dioxide. The life cycle of high-pressure laminates and surface films for wood-based panels can be as long as several decades.

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### We know what our customers want.

“The products our customers manufacture using our papers have a very long life, for instance, as kitchen furniture surfaces and compact laminates for interior and exterior walls. The CO<sub>2</sub> stored in our products remains sequestered for decades. This is a crucial argument for us in our use of sawdust for such highly processed end products,” stresses Seppälä.

MM Kotkamills has been manufacturing laminate products from sawdust pulp since the 1960s, so the entire pulp production process has been designed for the requirements of this product. Sawdust has always been a good raw material; although its fibres are shorter, it nevertheless offers sufficient strength proper-

ties. Another special characteristic is the good and consistent absorption of resin into the paper.

In Asia, Absorbex paper is used in extremely demanding applications such as industrial high-pressure laminates, which means the paper is subject to very high purity requirements, e.g. for use in the electronics industry.

“Demand continues to be solid and there is strong faith in the future, so the refurbishment of the paper machine this year will take place in a strong market. What is unique about MM Kotkamills is that we operate globally and have an extremely well-established customer base made up of both large and small customers to whom we have been delivering products for decades. We know what our customers want, and they know what they get from MM Kotkamills,” Seppälä sums up.

Finland’s wood processing industry generates 3.3 million cubic metres of sawdust a year, 70 per cent of which is combusted for energy, and the remainder is used in various wood processing industry products. MM Kotkamills uses significantly growing volumes of sawdust, and these volumes are already approaching a quarter of the total volume of the sawdust generated in Finland. ●

# AFT

## New compact LC refiner series launched

“AFT (Aikawa Fiber Technologies) has launched a new MaxEdge™ refiner series. The first customer deliveries have already been made. The compatibility of AFT’s Finebar refiner plates with the actual refiner is a key advantage of our product innovation. We now have a refiner and a compatible refiner plate solution that we trust and believe in,” says AFT’s **Timo Koivisto**.

According to Koivisto, while all suppliers have double disc refiners, AFT’s refiner stands out from the others thanks to its compact size.

“Use of the refiner is hydraulically very economical. The refiner is also perfectly suited to IoT integration with our new AFTLinX™ platform. This provides comprehensive service for maintenance and process optimization,” he explains.

Koivisto says the development of the new refiner was possible thanks to the new Service Center in Varkaus that was completed a couple of years ago. The Service Center supports all global customers. Since last year, the Service Center has also been delivering POMp degasser technology, a centrifugal pump for air removal in the short circulation. At the same time, the Service Center has adopted new technologies that increase the product’s customer value while also reducing the impact on the environment. In addition, the Service Center is revamping its working methods by integrating capital business and aftersales in order to provide a better customer experience.

“The Service Center operates with quality awareness at the core. With all POMp deliveries going through a one-stop-shop process, the entire manufacturing process is in our hands. Of course, the components come from elsewhere as well, but it is important that we manage



**AFT’s new office in Helsinki was designed with the conditions of increased hybrid working in mind. The design of the premises aims to improve personnel’s job satisfaction and working conditions based on the employees’ own wishes.**

this flow in one and the same place,” says Koivisto.

“We are continuously recruiting both employees and salaried personnel in Varkaus, as the mill there is also being developed and invested in, with a focus on energy savings. The mill’s carbon footprint will be reduced,” he adds.

### **DIFFICULT COVID TIMES**

The Covid period affected AFT’s capital business, with deliveries slowing down for a while. The situation has turned around, and customer cooperation is said to have returned nearly to the pre-pandemic level. The company has also received a good amount of delivery enquiries. The spare parts business has not taken a hit due to Covid.

“At AFT’s Group level, our European unit is one of the cornerstones at AFT globally. We are trusted, which is also why

we have been getting investments. Strong investments have also been made in Finebar production at our Canadian plant, and sales have grown. Screening products are a significant business for us, which is why we are increasing our investments in them also in Finland,” says **Risto Weckroth**, AFT’s Director of European Operations.

In the beginning of April, **Kalle Lahti** started as AFT Europe’s sales manager for capital equipment and systems. He has a long career working on screening, refining and in the short circulation, most recently at AFT.

“This work is so interesting and rewarding that I did not hesitate to seize this new challenge. AFT is agile and large enough company to take on even major projects,” says Lahti. ●



# Cadmatic

## “Ability to manage change eases daily hustle and bustle”

“Digitalisation has been a buzzword for some time now, but it’s not a new phenomenon. Put simply, it refers to IT software and systems that are used intelligently to facilitate processes, businesses and people’s lives. When it comes to digital twins, however, we are talking about a perfect virtual model of a physical production plan and its processes. We are well on our way to achieving that goal in different industries,” says **Kari Manner** of Cadmatic.

“In digital twins, Cadmatic sees the ability to combine all information from a production plant’s operating systems to allow an overall analysis through a single tool. We have given this a lot of attention, with a special focus on life-cycle management,” says Manner.

According to him, the division into two main types based on different uses, i.e. during construction and conversion projects and during the production phase digital twin, is important. The first consists of a combination of data-rich 3D models generated by engineering systems

and systems used in construction projects. These include purchasing, project management, cost monitoring, resource management, change management, and occupational safety systems. Cadmatic’s ultimate aim is to keep the project within the agreed budget and schedule. At the end of the project, the digital twin used in the project is handed over with the plant, and its purpose changes to a tool to support the plant’s operation. The data models aligned with the built facility are connected to the maintenance, process automation, HSE and other systems used.

“Operators and plant owners have begun seeing the value of a digital twin as a tool to support the plant’s utilisation. One example of this is the elimination of thousands of drawings used during construction that become obsolete,” Manner points out.

### AGILE DEVELOPMENT DRIVEN BY CUSTOMER NEEDS

The people at Cadmatic note that investment projects are becoming very challenging, with almost unrealistic schedules

and budgets. The main reason for this trend has been unpredictable volatility in the market for end products. In turn, the pre-planning and decision-making process for investment projects is short and involves risks.

“Whereas before it was possible to focus on good pre-planning, nowadays we have no choice but to base our conclusions about many matters on the assumptions of experts. In practice, this often leads to a situation where foundation excavations are already underway at the construction site while the detail engineering is in many respects incomplete. The risk of errors grows, and the schedule doesn’t even need to be off by much for the whole project to become chaotic. The cure for this is change management. Passing the information on any required changes from the construction site to engineering is one of the most essential skills,” states Manner.

Cadmatic focusses on software in its area of expertise to enable the engineering, construction and operation of anything from wood-processing bioproduct plants to cruise ships. Agile software is developed to integrate with other software companies within the same chain of events, so that the customer can choose the best tools based on their needs. ●



Kari Manner



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**PESMEL**



# Valmet

## “Business potential in the textile industry”

**A**s a process technology, services and automation partner for cellulose-based and recycled textile-based fiber production, Valmet sees significant business potential in the textile industry. Sustainable textile use is also well aligned with Valmet’s mission to convert renewable resources into sustainable results. In textile recycling, the potential is currently focusing strongly on the European market, where the EU is planning to stop textile landfills by 2025 and is increasingly pushing for more recycling of clothes.

In 2021, Valmet announced two major orders from the textile industry. Valmet will deliver the main equipment for Renewcell’s textile recycling plant, and drying technology for the Spinnova-Suzano joint venture textile fiber factory. Renewcell processes used cotton

and other cellulose fibers and transforms them into a biodegradable pulp product produced from 100 percent recycled textiles.

“Valmet’s experience in scaling up and demonstrating new technologies on a commercial scale and our own pilot facilities for testing innovations are great advantages for us in entering the textile fiber industry. We are also ready to develop technologies further for different customer needs with our key partners,” says **Ari Saario**, Vice President, Strategy and R&D, Pulp and Energy business line.

### RENEWCELL

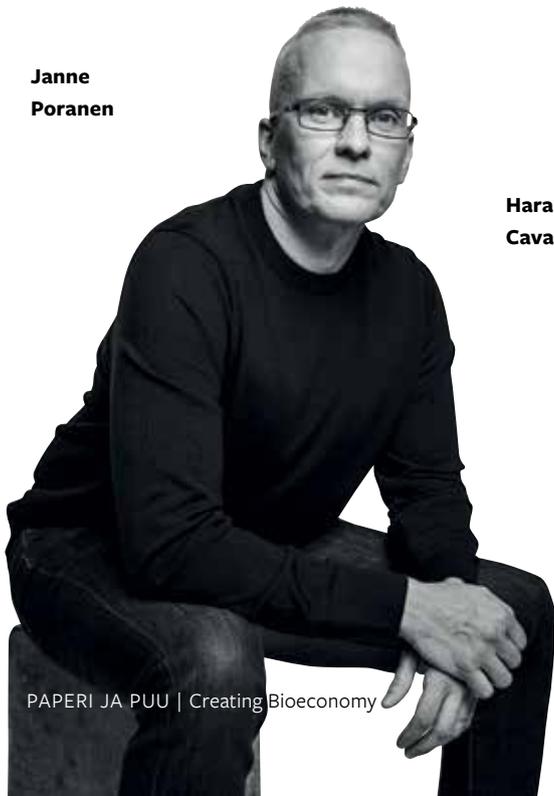
“Our customers use the dissolving pulp we produce, Circulose®, to make biodegradable virgin quality viscose or lyocell textile fibers. We are proud to be working with industry-leading textile companies

like H&M Group and Tangshan Sanyou in using our product. We are currently building a new industrial scale textile recycling plant at SCA Ortviken’s industrial area in Sundsvall, Sweden. Since 2017, we have been developing and optimizing our world-unique patented recycling process at our smaller scale plant in Kristinehamn, and we will use the findings from our Ortviken project, in which Valmet is our key technology partner,” says **Harald Cavalli-Björkman**, Renewcell’s Chief Growth Officer.

### SPINNOVA

“We chose Valmet, a global leader in pulp and paper technology, as a key partner in our technology to support the scaling of our sustainable fiber production. With proof of concept from our pilot factory in Jyväskylä, Finland, we are now building our first commercial fiber factory, also in Jyväskylä, as a 50/50 joint venture with our strategic partner Suzano. The factory is expected to be operational at the end of 2022, producing fiber for our brand partners, which, among other great brands, currently include Adidas, the H&M Group, The North Face and Marimekko. The textile industry is eagerly awaiting sustainable alternatives for their material base,” explains **Janne Poranen**, Spinnova’s CEO and co-founder. ●

**Janne Poranen**



**Harald Cavalli-Björkman**



# Honeywell

## “Bringing technology, design and processes together for better safety”

“Neither technology nor engineering design alone ensures safety in hazardous industries. The two work in harmony. Solutions such as real-time location systems and video surveillance, for example, can enhance emergency responses. Responders can know precisely where personnel are in real-time during an emergency; monitor and manage the event and mustering; and direct both rescue efforts and those in danger.”

The industrial Internet of things and Industry 4.0 movement are rapidly expanding such solutions’ power and range. They are most effective, however, in the context of an engineering design that ensures functional safety. Prevention, after all, is better than a cure.

### THE IEC61511 SAFETY LIFECYCLE

Engineering designs typically follow a well-defined process, most commonly that outlined in the IEC61511 safety life cycle. This seeks to ensure hazardous events are prevented or mitigated by equipment designed with an appropriate safety integrity level. The IEC61511 safety lifecycle details the various steps involved.

“In practice, this has traditionally been done manually, with teams creating the relevant documents using various tools in different formats to produce the functional safety basis of design. In an incident, these documents, such as the process hazard analysis (PHA), will be crucial to understanding what went wrong and how to continue operating safely,” says **Sherif Radwan** from Honeywell.

However, the process is time-consuming, and operations and maintenance

teams will not have immediate access to the latest PHA report. The quality of the information in these reports may also vary.

### THE PROCESS SAFETY SUITE

Honeywell’s Process Safety Suite (PSS) digitizes and standardizes the data management and processes within the safety lifecycle, giving operators an evergreen design basis. As a comprehensive software package, PSS can import existing engineering documentation and execute the steps across the safety lifecycle, including:

Modules for the hazard and operability analysis (HAZOP) and layers of protection

analysis (LOPA) assess the process unit’s risk and recommend appropriate IPLs to reduce the risk.

Engineering modules enable users to design and implement IPLs, with a safety integrity level (SIL) calculation engine, cause and effect chart generation and functional test plans to validate the safety instrumented function (SIF).

Operational modules on a real-time basis consolidate relevant operational data, such as IPL demands with timestamps, stroke time of valves during a demand, and time in bypass for each IPL.

Maintenance and inspection modules enable users to record test results and “as found and as left” information for IPL components.

### BRINGING SAFETY INTO FOCUS

According to Honeywell PSS provides operators with a centralized platform to digitize data and execute the lifecycle steps while giving role-based access for process safety, functional safety, operations and maintenance engineers and management. All phases of the safety life cycle are digitized, readily available and current. Users can even create and model offline “what if” scenarios in any part of the safety life cycle and see the effect of a modification ripple down.

“Critically, digitizing the data entry does not simply save time and money across the phases, nor even just improve the accuracy of the data – although it does all of these. It also enables users to focus on the design rather than creating the design deliverables. In other words, it puts safety first – which is where it should be,” states Sherif Radwan. ●

“Critically, digitizing the data entry does not simply save the time and money across the phases, nor even just improve the accuracy of the data - although it does all of these.”



**Sherif Radwan**



# IBS Paper Performance

## Fourdrinier technology taken to the next level



IBS Paper Performance Group laid the foundation for its iTABLE®, the first fully configurable sheet forming zone for Fourdrinier machines, with the development of height and angle-adjustable foils. The constantly evolving system solution gives papermakers full control over dewatering and stock activity. It produces consistent and reproducible results, providing a significant benefit particularly for paper machines with a large product range. Now the next revolutionary steps follow.

IBS states that FlexLINE forming board at the beginning of the wire section allows its position to be changed in relation to the headbox – and therefore the jet impingement point – at the push of a button while the machine is still running. The DCS connection also means it can be fully automated, which is particularly beneficial if frequent grade changes are made.

According to IBS FlexLINE ensures best paper profiles and quality for different machine conditions. In addition to dewatering elements, the vacuum system has a decisive influence on the entire dewatering and sheet forming process. EVA and EPB Plus vacuum control systems in combination with the Online-

PDC moisture sensor, they now also give operators the opportunity to implement fully automatic vacuum control based on the dry content. This control, e.g., in the ply bonding area, can improve gap strength and keep it constant across the entire product range. Other typical installation positions are before and after the top formers or before the suction couch roll. In this case, 3D scanning technology can significantly reduce lead times and risks in rebuild projects. Millimeter-precise 3D drawings of existing plants can be created in a matter of days. The high-precision 3D drawings then provide the perfect basis for downstream engineering, allowing components to be prefabricated and therefore reducing the risk from work carried out on the machine during downtime.

### CAMERA BASED SOLUTIONS OFFER NEW POSSIBILITIES

IBS company Papertech Ltd. recently introduced TotalVision™ product family and offers the potential to significantly influence the process of paper-making and further increase both paper quality and machine runnability. The patented solutions let papermakers e.g., monitor stock activity, formation, the wet line and

the jet impingement point at the forming table using cameras. Self-learning algorithms and artificial intelligence will also have a key role to play in future web inspection applications.

### THE NEW STEAM BOX FOR FOURDRINIER PERFORMANCE

IBS says that SUPER STEAM VAC® can be installed in addition to different multi-chamber suction systems in high vacuum. For the first time, a high-end dewatering element is combined with patented steam box technology in one optimized system, significantly enhancing high-vacuum zones in Fourdrinier machines and the entire downstream process. Quality improvements and in some cases significant production increases guarantee a quick ROI. ●

**The constantly evolving system solution gives papermakers full control over dewatering and stock activity.**

# Stora Enso and Process Genius

## Mill Digital Twins Collaboration

Thanks to mill digital twins, the daily ERP of factories has been taken to a new level. As digital twins share a cloud platform, individual factories can be connected to the platform, making it possible to access new features on them.

A digital twin can mean a number of things. It can be a 3D model of a single detail or a copy of an entire machine, enabling virtually assisted reality or simulation to optimise performance.

“Mill digital twins operate on a cloud platform, which makes it possible to scale up new use cases to several factories on short notice,” says Process Genius Oy CEO **Jani Akkila**.

Process Genius and Stora Enso developed digital twins to improve daily ERP decision-making by presenting key information visually. Digital twins were first tested in one factory. When it was established that they work, they were scaled up on several Stora Enso mill sites in Finland and abroad. Digital twins are used to get a clear understanding of the situation in a factory at any given time, and to determine what needs to happen next. They also indicate if any parts of the process are behind schedule. It is important to understand why the current situation



**Marko Yli-Pietilä**

is what it is. Accurate and readily understandable information about the operations help raise decision-making to a new level.

“The easier it is to get the information, the better the decisions will be. If the decision-makers do not understand the content of the data they see, they cannot decide the most suitable actions,” says **Marko Yli-Pietilä**, Head of Smart Operations, Stora Enso.

“Previously we had to read through hundreds of rows of reporting data, but now it’s enough to take a quick look at the digital twin to get an idea what’s going at the factory,” says **Tomi Pällo**, safety manager at Stora Enso’s Lahti mill.

Process Genius’s Jani Akkila says that in developing the product, the company’s focus was on the customer benefit. Only key information is presented visually in daily management. Other systems, of which there could be 50 different types in use in a factory, are not replaced; instead, a real-time production snapshot is made available to all personnel. According to Akkila, this allows personnel to work with up-to-date and accurate data.

Process Genius was established in 2012, and the company launched its operations in 2014, focussing solely on its core activities. The company’s business is evenly distributed across four industries. The largest segment by far is the process industry, namely pulp, paper and energy, but the engineering, food and real estate industries are also growing. More than 50 per cent of the user IDs are abroad, indirectly through large customer accounts.

“We have prioritised the customer benefit by developing, in particular, the user experience and automation. All of this can now be utilised even more cost-effectively in terms of technical performance and scalability. Our most recent contracts were concluded in the Netherlands, Germany, Poland and Sweden,” says Akkila. ●

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## ABB

### P&P Mill process optimization - today and tomorrow

“Digitalization to move operations towards autonomous is a critical strategy in improving both productivity and profitability in the pulp and paper industry. Advanced Process Control (APC) is regarded by many as a secret weapon in this because it can help make better use of automation systems. It empowers operators to apply their experience to improve quality and profitability rather than perform mundane tasks. It also serves as a link between low-level automation systems and higher-level management to help close the production loop efficiently,” said **Abhay Anand**, APC, Optimization & Data Analytics Specialist at ABB Pulp & Paper.

ABB states that one of the fundamental tools in an APC solution is model predictive control (MPC), a set of algorithms for feedback and feedforward control based on a process model. While around since the 1980s, it is still relatively new for the pulp and paper industry. The intricacy of the pulping process with its plethora of interacting parameters, varying dynamics and conflicting objectives has made it extremely difficult to model and control. Moreover, the process is easily disturbed by many factors such as the quality of raw material, age of the equipment and ambient weather. This has necessitated the evolution of MPC into a more robust and adaptable form before it could be adopted in the pulp and paper industry.

According to Anand, ABB’s APC solutions have been successfully implemented in pulp mill areas such as digesters, washers, bleaching plants, lime kilns, causticizers, and multi-effect evaporators, as well as paper machines. Having APC modules in an integrated pulp and paper mill can

help reduce variability to ensure a constant stream of high-quality pulp. This makes the work of the paper machine controls easier and allows the mill to focus on cost reduction and efficiency improvements without having to worry about disturbances from the pulp quality.

ABB considers there to be three success factors when implementing APC:

- Having a solid foundation of accurate sensors, robust actuators, and a reliable distributed control system (DCS) - upon which the APC is delivered - in place. If the measurement system or DCS is not up to scratch, the APC will not be able to deliver the expected benefits.
- Ensuring that the APC is not simply a black box but can incorporate both operational data and process knowledge into its models to achieve the targets with minimal efforts.
- Transparency and ease of use is important so that the operators can relate to the decisions that the APC makes, visualize the predictions, and use the system intuitively for fast and efficient start-ups.

“Once APC is implemented, it’s equally important to continuously monitor performance and share key performance indicators to enable ongoing improvements. We believe that performance can be sustained, and in fact improved, over many years through close collaboration with a service-based model for long-term successes,” added Anand.

One such customer of ABB’s commissioned their first APC in their integrated mill 10 years ago. Thanks to continuous improvements since implementation, the pulp mill has recently been ranked top performer in their global Group in terms of continuous digester production load

according to Anand. And that’s after the initial APC implementation helped the mill reduce Kappa variations by 56%. Process optimization is a never-ending journey; this case illustrates that a long-term commitment to adapt to mill changes and conditions will continue to bear fruit.

According to ABB, additional solutions can be integrated with APC to help further optimize the process automation. A Pulp Tracking feature, for example, provides a way to chart the movement of key pulp properties throughout the process, with the insights used to build models for various APC modules across the mill. Constraint Management is a concept patented by ABB to dynamically calculate high and low limits for the APC variables.

“The APC can be further supplemented with virtual measurements when physical measurements are infrequent or not available. Also known as soft sensors, these calculated measurements are particularly valuable in the pulp and paper industry where many processes are notoriously difficult to measure. They allow the operators to model and control parameters that cannot directly be measured and ensure that the APC can adapt to varying process conditions and maintain tight control, which otherwise would not be possible,” Anand said.

ABB believes that driven by the need for better control over variability and reduced production costs, many more developments will likely come in short order to help keep mills competitive. APC solutions today are already proving far more versatile with an extended functionality that can adapt not only to a target but to a range as well, allowing it to find the best operating regime. This ultimately leads to significant economic savings without compromising on quality. ●

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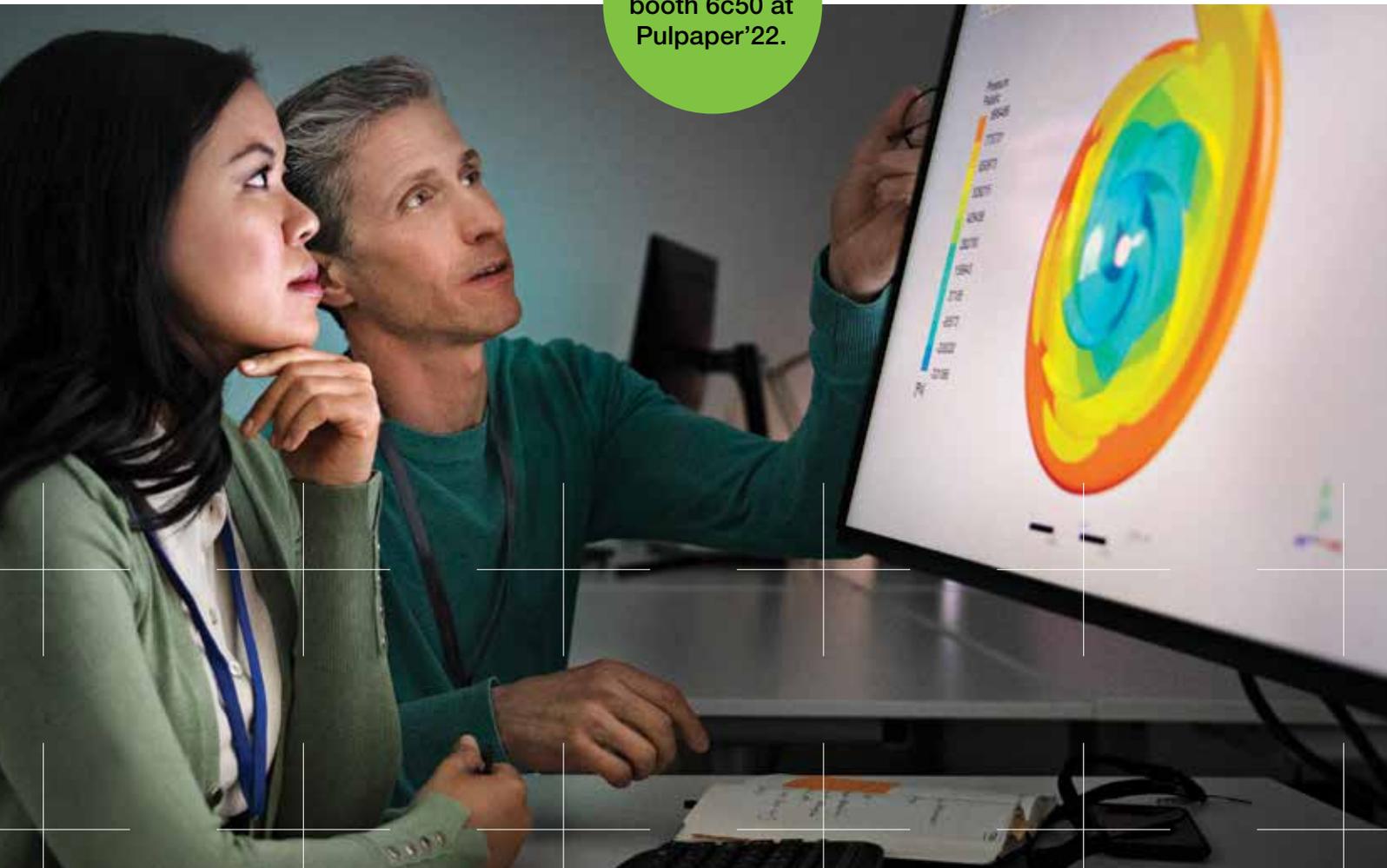


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# Stora Enso and DBSantasalo

## GearWatch enhances the reliability of critical gears

“Condition monitoring of industrial gear systems using conventional, previous-generation measurement methods has often been challenging and therefore also time-consuming and costly. The GearWatch system is changing that by shifting the focus from condition monitoring to condition management. Detecting changes in the condition of the equipment early on using advanced measurement methods allows the condition of the equipment to be managed and, in the best cases, failures to be entirely prevented,” says David Brown Santasalo’s Sales Director **Harri Koivuvirta**.

David Brown Santasalo is focussing strongly on developing remote condition monitoring. Using the latest technology, GearWatch offers entirely new insight into the condition monitoring of gears and other rotating devices.

Stora Enso introduced GearWatch condition monitoring systems at its pulp plant and hydropower plant in Varkaus. The Pro Systems used are tailored to the equipment and include vibration measurements of both gears and electric motors, and even generators. Online particle counting and oil quality measurements are used on all gears. As a GearWatch innovation, offline filter systems and maintenance monitoring measurements are used as an integrated package in splash-lubricated gear units.

### STORA ENSO CONDUCTED PILOT AT VARKAUS

A pilot project in which the data generated by GearWatch is integrated with Stora Enso’s cloud-based systems was carried out at Varkaus. The project is part of Stora Enso’s smarter maintenance strategy 2020–2025, in which the condition monitoring data generated by Gear-



**“In long-term analytics we can use the data generated by GearWatch as a life-cycle-management tool.”**

Watch will also be integrated with the data analytics system.

“In long-term analytics we can use the data generated by GearWatch as a life-cycle-management tool. It gives us a better picture of how malfunctions and costs are developing, and allows us to plan repairs and investments in a timely manner,” says Project Manager **Pasi Ojala** of Stora Enso.

According to Ojala, Stora Enso has a strategy, organisation and funding for various trials in the Group’s innovation funnel, which validates the benefits of pilot projects. The projects that are truly beneficial and bring added value are the ones that succeed in the digital environment. The pilot projects are always tested at a mill.

“I quickly noticed how the condition monitoring personnel gained more tools for their work. With the results now reported to the online system, it is no longer necessary to go right up to the equipment to measure vibration levels. We are able to detect signs of a malfunction early on. Besides vibration measurements, we also gain information on the

development of oil quality and the volume of wear metal particles,” says **Marko Turunen**, who is in charge of the mill’s preventive maintenance.

“We have been using GearWatch here at Varkaus for a bit less than a year, and I have been very pleased with the system. The system makes it easy to present the condition of the monitored equipment to personnel that have no prior experience or little experience of condition monitoring or oil analyses,” says Turunen.

### OIL IS THE LIFEBLOOD OF A GEAR UNIT

According to DBSantasalo, the GearWatch system can be tailored to the special needs and criticality of the equipment being monitored.

“Oil is like the lifeblood of a gear unit. By ensuring that the lubrication works properly, there is no moisture in the oil, the oil is clean, and there are no wear metal particles in the oil circulation, we maintain the gear system’s and therefore also the entire plant’s operational reliability,” says GearWatch Product Manager **Mika Hirvonen** of DBSantasalo. ●



## Sweco

### “Forest industry has significant potential for higher value-creation”

“**B**ioeconomy has a unique opportunity to address societal challenges such as food security, natural resource scarcity and climate change, while achieving sustainable economic growth. Current climate scenarios for how the EU could reach its climate targets rely too much on biomass, requiring a 70–150% increase in using biomass for energy and material purposes compared to now. So, at some point we need to make choices regarding how we utilise biomass that is extremely important for the production of paper and board, chemicals, and novel materials,” says **Janne Hulkko** at Sweco.

“I believe that the transition to bioeconomy in a wider context brings considerable business growth opportunities to companies, which have been and are willing to develop sustainable new products and their production technologies,” he adds.

At Sweco, Janne Hulkko works as a specialist in bioeconomy-related projects and services and their sales. He has long experience from research and development and has earlier served as technology manager and research team leader at the VTT Technical Research Centre of Finland.

“My extensive experience in chemistry helps me understand what happens to feedstock in processes at the molecular level and how the conversions influence the structure and properties of formed chemicals and materials,” Hulkko says.

Hulkko believes that the new normal will be carbon circular economy, which combines renewable feedstocks, including side-streams and biowaste, captured CO<sub>2</sub>, hydrogen technologies, renewa-

**Janne Hulkko**



ble energy, and recycling of plastics and other materials. We will see more and more high-value products coming to the market Hulkko says. The real value creation stems from the new functionalities and improved performance of biochemicals and materials, not just from the substitution of existing petrochemicals with structurally identical naturally-sourced alternatives.

“With sustainable chemistry we can reshape our future and generate solutions we all need in our daily life. The chemistry has enabling role in circular bioeconomy. With chemistry, processing is possible at the molecular level and chemical industry is strong networker. It is strongly linked to all other industries by producing materials and solutions for them,” says Hulkko.

#### **GREEN HYDROGEN AND LOW-CARBON PRODUCTS**

“Hydrogen applications play a growing role in the forest industry’s domains of energy, logistics and products. Therefore, hydrogen-related regulation and policy measures are a focal point of advocacy at the Finnish Forest Industries Federation. As the technology develops, the price of CO<sub>2</sub> capture and hydrogen production continuously falls. Large-scale

investments in CO<sub>2</sub>-based ethanol, methanol and aviation fuel are just around the corner to support climate change mitigation and to reduce our dependence on fossil resources. Low-carbon products made with green hydrogen could become a significant export product for Finland,” explains Hulkko.

#### **P2X – 20MW GREEN HYDROGEN PLANT**

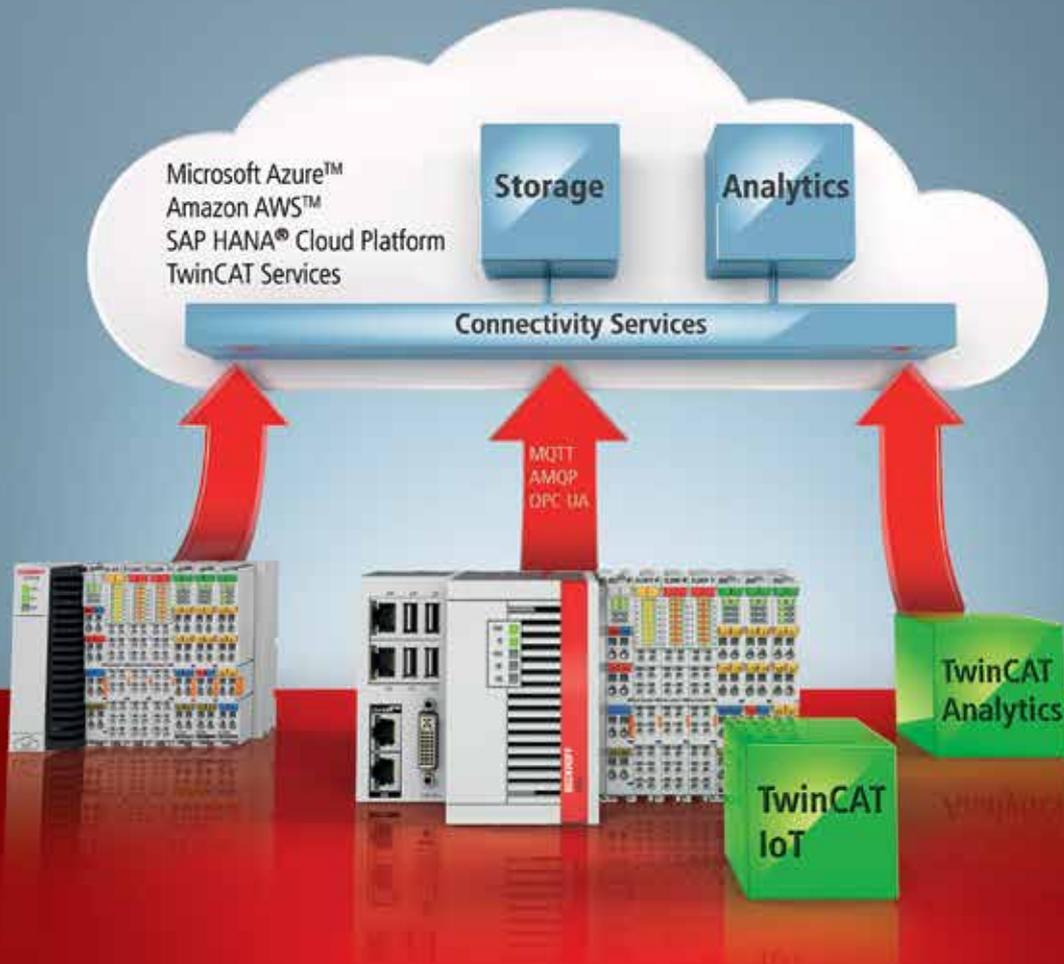
P2X Solutions, a Finnish hydrogen production forerunner, is currently preparing for the construction of Finland’s first green hydrogen production plant in Harjavalta. Sweco has been P2X Solutions’ partner since the feasibility studies and continues as the plant’s engineering consultant.

The project comprises a 20-megawatt green hydrogen production plant and methanation unit. The construction work will begin in autumn 2022, and the plant is expected to be completed in summer 2024. In addition to preparing for the construction of the new plant, the company has already begun planning future similar plants.

P2X Solutions produces completely emission-free green hydrogen by water electrolysis using renewable energy sources. The company further processes some of the green hydrogen into renewable synthetic fuels, such as synthetic methane. The heat and oxygen generated as by-products can be utilised in industrial processes.

“We are on the pulse – whether that means Power-to-X or green hydrogen technologies, plastics recycling or biodiversity issues in addition to pulp & paper, and energy technologies,” states Janne Hulkko at Sweco. ●

# Avoim automaatoratkaisu sahateollisuuteen



## Beckhoff on edelläkävijä PC-pohjaisessa automaatiossa

Beckhoffin PC-pohjainen ohjausteknologia on erinomainen ja turvallinen valinta modernin sahalaituksen automaatioon. Avoimuus ohjausjärjestelmässä tarkoittaa esimerkiksi laajaa valikoimaa standardien mukaisia kommunikaatio- ja liityntärajapintoja muihin järjestelmiin. Hyvät liityntämahdollisuudet takaavat helpon liitettävyyden esimerkiksi erilaisiin tehdastason tietojärjestelmiin ja pilvipalveluihin mahdollistaen Teollisuus 4.0:n mukaisten toiminnallisuuksien toteuttamisen. Tämä osaltaan varmistaa järjestelmän muokattavuuden ja joustavuuden koko elinkaaren aikana, tuoden näin turvaa tulevaisuuden muutoksille.

Järjestelmän ohjelmointiin ja konfigurointiin käytettävä TwinCAT-kehitysympäristö on suunniteltu vastaamaan tulevaisuuden vaatimuksiin. Suunnittelun lähtökohtina on ollut muun muassa prosessorikehityksen mukanaan tuoman laskentatehon maksimaalinen hyödyntäminen ohjausjärjestelmän tarpeisiin, sekä joustava laajentaminen erilaisilla uusilla toiminnoilla. Näistä hyvinä esimerkkeinä ovat ohjausjärjestelmään integroitu konenäkö - TwinCAT Vision ja koneoppivuuden ohjausjärjestelmään integroiva - TwinCAT ML (Machine Learning). Nämä molemmat lisättyinä monipuolisilla kunnonvalvontaominaisuuksilla ja modernilla TwinCAT HMI-valvomojärjestelmällä ovat esimerkkejä teknologioista, jotka auttavat sahalaiteksia nostamaan tuottavuuden uudelle tasolle!





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