

2021 — BIOECONOMY: A WORLD OF OPPORTUNITIES!







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Olivier Curty, State Councillor, Minister of Economic Affairs.

FRIBOURG, FERTILE GROUND FOR THE BIOECONOMY

With feet firmly on the ground and eyes fixed squarely on the future, the canton of Fribourg has skillfully reaped the benefits of its rural past and agrifood tradition.

Today, it is home to a host of companies whose quality products are enjoyed around Switzerland and across the world. The Food & Nutrition Cluster, a collaborative network with over 100 members, is also based in Fribourg, as is 'Swiss Food Ecosystems', an NTN Innovation Booster specializing in the fields of nutrition, the circular economy and sustainable packaging.

Switzerland's federal government certainly made the right choice when it decided to establish the new headquarters of Agroscope, the national center of excellence for agricultural research, in Fribourg. More recently, the canton has become a member of the Swiss Food & Nutrition Valley, which will undoubtedly boost its international visibility even further.

This exceptional dynamism did not simply appear out of thin air. Rather, it reflects the determination of the cantonal government to support the bioeconomy, which includes mainstays of the local economy like the construction and energy efficiency sectors right the way through to key strategic niche sectors like human nutrition, biobased products and biotechnologies. Another strand of this development strategy for the high-potential agrifood sector are the major investments currently flowing into the AgriCo campus in St-Aubin.

The canton offers all these different sectors an environment where healthy competition and innovation can flourish, and leading-edge companies, centers of excellence and specialist institutes play a central role.

At a time when the challenges of climate change are forcing us to reinvent ourselves, Fribourg is leading the way in Switzerland by championing a bioeconomy that offers huge potential and embraces technology. For further proof, you need look no further than the present issue of Fribourg Network Freiburg, which takes a deep dive into the canton's bioeconomy and its major players.

Enjoy!

Cover illustration: Turning chicken feathers into biodegradable plastic, flax fibers into car parts, and hazelnut shells into vanillin is not the stuff of science fiction. It is now a reality thanks to PICC, Bcomp and Bloom Biorenewables. Biomass conversion technologies are a core part of the bioeconomy and a key environmental optimization tool.

JERRY KRATTIGER

BIOECONOMY: CONSOLIDATING GAINS AND GENERATING ADDED VALUE



The bioeconomy is a central focus of Fribourg's new economic development strategy, which was devised by the cantonal authorities with input from the private sector and academic community. Interview with Jerry Krattiger, Managing Director of the Fribourg Development Agency.

What is the bioeconomy exactly?

A host of recent studies and plans has addressed the bioeconomy concept, in varying degrees of detail. We apply a pretty broad definition that encompasses all activities related to the production, conversion and use of biomass to create foodstuffs, molecules and innovative materials. As a result, our definition covers a wide range of sectors, including agrifood, construction and biotechnology. However, the bioeconomy and the circular economy are not



interchangeable concepts. The bioeconomy should actually be viewed as a component of the circular economy. It also has nothing to do with the 'bio' label that is used widely in Switzerland and Europe to identify products from organic farming.

Why has Fribourg made bioeconomy a focus of its economic development strategy?

If we had opted for a disruptive scenario, we would have stacked all our chips on cryptocurrencies, for example. However, we decided to capitalize on the existing strengths of our economic fabric and ensure a through line with the investments we have already made. Specializing in the bioeconomy allows us to build on the pillars of the Fribourg economy: construction – through biomaterials and energy efficiency – and agrifood. At the same time, it offers us the opportunity to integrate and galvanize high-potential sectors like biotechnology and biobased products.

This is a world of opportunities...

Our goal here is to consolidate our gains while advancing those areas that offer higher added value. The cross-sectoral and interdisciplinary nature of the bioeconomy opens up lots of interesting avenues in terms of development and innovation, particularly when they tie in with Industry 4.0. These two strategic components are not only complementary but also mutually beneficial. Automation and robotization are commonplace in the food industry and in companies like Nespresso (see p.25), JNJ Automation and Frewitt.

The canton of Fribourg is therefore in the fortunate position to have strong expertise in these two fields already at hand.

The boundaries between agrifood and biotechnology are also becoming increasingly blurred...

Biomass harvesting and conversion systems are really attractive, and in some instances help to address biochemical and biotechnological concerns. Vanillin extraction at Bloom Biorenewables (see p.25)

“Our definition of bioeconomy encompasses all activities related to the production, conversion and use of biomass to create foodstuffs, molecules and innovative materials.

As a result, it covers a wide range of sectors, including agrifood, construction and biotechnology”

Jerry Krattiger

and Alver's precision fermentation with Golden Chlorella (see p.23) are just two of many examples. The products that are derived from these processes are highly effective and help towards resolving issues surrounding CO₂ emissions, food security and oil dependency. This takes us into the very interesting and on-topic territory of social and environmental concerns. The same is also true of the materials sector, where flax-based biosourced composite solutions offered by firms like Bcomp are garnering a great deal of attention (see p.7).

Does the Fribourg ecosystem have what it takes to bolster the bioeconomy?

Absolutely. Given the historical predominance of the agrifood and construction sectors in the canton, the bioeconomy is therefore a direct continuation of our economic development efforts to date. Over the years, we have grasped strategic opportunities and made targeted investments which have led to the creation and development of research institutes, centers of expertise, and specialized innovation sites. These include the Smart Living Lab, a research center for the housing of the future; the Biofactory Competence Center, a biopharmaceuticals and biotechnology education, training and research institute (see p.19); the Adolphe Merkle Institute, which specializes in nanomaterials, and the AgriCo campus, which is dedicated to creating value in the fields of agriculture, nutrition and biomass (see p.23). There are also the Food & Nutrition and Building Innovation (see p.22) clusters, both of which foster synergies and promote competitiveness and innovation, all with a keen eye on the bioeconomy.

What does the future hold?

The canton of Fribourg must make sure that its approach accommodates both tradition and ambition. It must guarantee that there is a place not only for manufacturers of cutting-edge biotech molecules like UCB Farchim but also for the production of Gruyère d'Alpage AOP. This is a fantastic challenge, and we are ready to take it on.

→ www.promfr.ch

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→ www.fribourgnetwork.ch



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OKAPAI

THE FINAL STRAW FOR PLASTIC



The four eco-conscious founders of Okapai – Sandar Hnin, Nathalie Tao, Alessio Parata and Amélie Maradan (L to R) – have created a range of ingenious alternatives to plastic drinking straws.

It is virtually impossible to sip a cocktail elegantly without a straw. But these tiny single-use tubes are a big environmental problem, with many ending up in the world's oceans. In response, a growing number of countries have banned them. Four young entrepreneurs, based in Fribourg, have come up with the ultimate green alternative: a straw made from... straw. The team went back to the humble drinking tube's origins, as Amélie Maradan, co-founder of **Okapai** explains, "Stalks of cereal grasses had been used for centuries, hence the name. Straws were used by beer drinkers well before our time."

The idea of creating the start-up began to germinate in 2019 as part of the Ventures in Action module run by the Fribourg School of Management (HEG-FR), which aims to give Business Administration students the opportunity to launch their own business. With the principles of the circular economy in mind, Sandar Hnin, Amélie Maradan, Nathalie Tao and Alessio Parata decided to use rye straw because it is compostable and can be sourced from local, organic farmers, which would in turn offer the growers a new income stream from an underused product. In late 2020,

the enterprising team launched a successful crowdfunding campaign and their first batch of biodegradable straws sold out in flash.

Edible cutlery

Before they came up with the clever, compostable solution, the Okapai founders first tested the market by selling other alternatives: steel straws, bamboo straws, even edible straws made from rice and wheat flours as well as vegetable juices. However, Maradan says that what the team really wanted was to invent their own product and make it locally. With coaching from Fri Up, the official support service for new entrepreneurs in the canton of Fribourg, Okapai is currently upgrading its production process and developing other products geared primarily towards the hospitality and catering industry, starting with edible cutlery. "We are working on formulas for fruit fiber prototypes and the initial results are pretty good." The company hopes to create a range of plant-based products, from straws, to knives, forks and spoons, right up to packaging. It looks like the Fribourg start-up will be making hay in 2022!

→ www.okapai.ch

BCOMP

IN POLE POSITION



Bcomp has achieved so much in such a short time span. Since it was founded by a couple of sports-mad engineers in 2011, the Fribourg company has not stopped racking up awards and attracting new and prestigious partnerships. The key to its phenomenal success is its ultra-resistant and ultralight natural composites made from flax fibers. Not only is the raw material behind their world-beating solution renewable, it is also local (because most flax is grown in Europe).

Bcomp originally used its trademarked technology to create the lightest ski core in the world – a balsa wood base reinforced with a flax composite. Before long the technology found its way into other snow sports equipment and lots of other new applications. In 2017, the company took its activities to another level, raising substantial equity and entering the motorsports market in head spinning style. With names like McLaren Racing, Porsche and Polestar, producer of high-performance electric vehicles, Bcomp's customer list now reads like a who's who of the best in the motorsports world.

Lightweighting – Doing more with less

Christian Fischer, CEO and co-founder, is over the moon, "Lightweighting has become a recurring theme in the automotive and transport industries. The two main

drivers behind this movement are the introduction of increasingly stricter CO₂ regulations coupled with vehicle performance issues. But I also feel that there is a genuine desire out there to offer more sustainable materials. There has been a real shift in the last few years. The social, environmental and legal context has changed and we have the tools to become a major player in this new landscape." With two illustrious motorsports awards already under its belt since 2018 – *Most Innovative New Motorsport Product* and *Autosport International Product Showcase Innovation Award* – it certainly looks like Bcomp is on track to fulfil the CEO's ambitions.

One thing is sure: the sky is the limit when it comes to the potential of Bcomp's composite materials. The Fribourg company worked with the European Space Agency (ESA) to develop the first natural fiber reinforced satellite panel, which will help make space exploration cleaner and safer. Another example of the incredible versatility of the Fribourg-made technology can be found in the Netherlands: in 2020 a 400-tonne concrete bridge was replaced by a lightweight 30-tonne biocomposite model. Buoyed by these successes, Bcomp has decided to invest in its first in-house production line. A new chapter begins.

→ www.bcomp.ch



Formula 1 seats developed by Bcomp in partnership with McLaren Racing were used for the first time by drivers Lando Norris (photo) and Daniel Ricciardo in July 2021 during the British Grand Prix.

KERA PROJECT

FROM POULTRY WASTE
TO PACKAGING

A network of partners from Fribourg and other parts of Switzerland have set themselves the challenge of turning chicken feathers into plastic wrapping for poultry products.

In 2020, nearly 19 million metric tons of chicken were processed in the European Union. But only two-thirds of it ended up on our plates. Very little of the remaining one third, of which around 10% are feathers, is not recycled; much is simply burnt, which also has a negative CO₂ impact. According to Rudy Koopmans, Director of the Plastics Innovation Competence Center (PICC) based in Fribourg's blueFACTORY, "While this is happening, the agrifood industry relies on massive quantities of synthetic polymers for its packaging." So, could there be a way to upcycle this mountain of waste by transforming it into biobased plastics? This was the mission that researchers at PICC set for themselves. They were joined in this ambitious venture by the ChemTech Institute of the Fribourg

School of Engineering and Architecture (HEIA-FR), the Bern University of Applied Sciences (BFH), as well as companies Micarna, Centravo, Alma Packaging and Maillefer. Kera, as this exciting project is called, benefits from New Regional Policy (NRP) support.

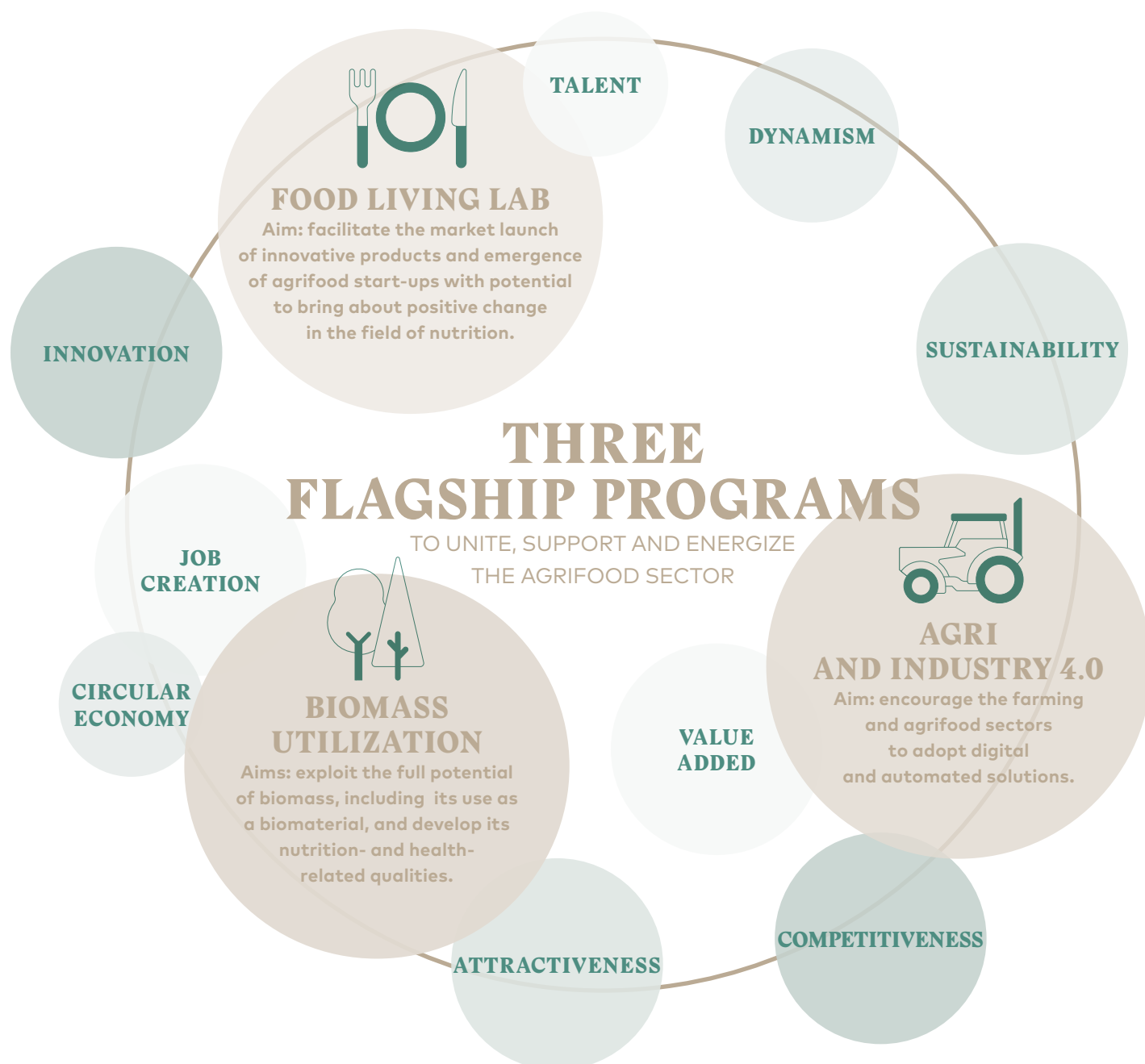
An exportable model

Koopmans explains that chicken feathers are an extremely rich source of keratin. So, the Fribourg research team set about extracting this protein, which they then used to begin the small-scale production of various plastic objects. In the medium term, the goal is to create injection-molded parts and plastic film packaging for the agrifood industry. "These products would not only be renewable, but also compostable and non-toxic. We would also be able to create a

local bioeconomy chain, as poultry producers and processors would no longer have to ship their waste to incineration plants outside Switzerland." This approach, which is already widely used in the chemical industry among others, "is pretty groundbreaking for the agricultural sector". In the long term, the Kera model could be exported to other countries and to other sectors of the economy as well. However, the PICC director stresses the importance of taking account of the needs and sensitivities of everyone concerned, especially the end customer, before undertaking such a move. This is why the BFH is currently conducting a sociological study to determine consumer acceptance of packaging made from chicken feathers.

→ www.picc.center

FRIBOURG AGRIFOOD STRATEGY

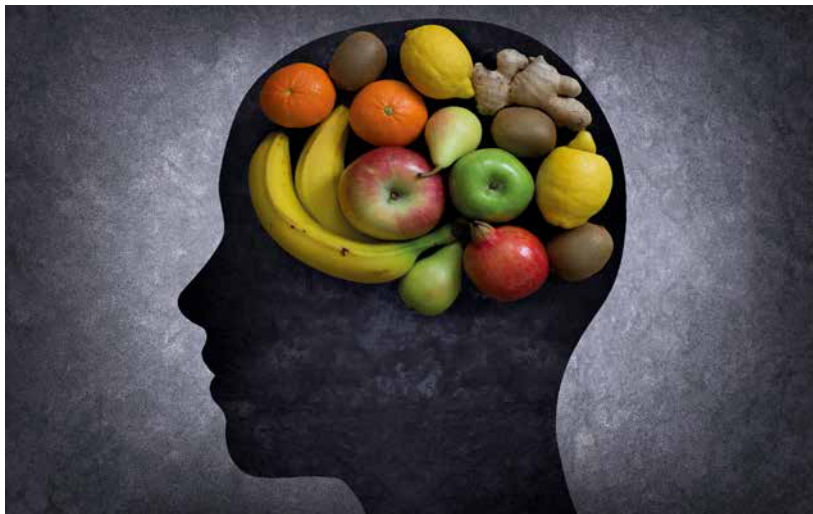


FOOD & NUTRITION CLUSTER
RESPONSIBLE FOR OVERALL COORDINATION

SWISS FOOD ECOSYSTEMS LEARNING TO LOVE DISRUPTION

The NTN Innovation Booster is the latest program from Innosuisse, which aims to encourage radically new ways of thinking that will spur on the emergence of ground-breaking products and services. Following the Swiss Innovation Agency's call for projects, the Food & Nutrition Cluster in Fribourg and Swiss Food Research in Zurich decided to join forces and created the 'Suisse Agro Food Leading House'. The network, which is based in Fribourg, has 250 members and is home to the NTN Innovation Booster Swiss Food Ecosystems project, which will run until 2024 and has an annual budget of CHF 250,000. "The core strength of the NTN Innovation Booster is undeniably the scope and diversity of its network, which includes academic partners as well as major companies, start-ups and industry associations", explains Nadine Lacroix Oggier, Director of the Food & Nutrition Cluster and co-manager – with Peter Braun – of the Suisse Agro Food Leading House. "We have challenged our members to come up with disruptive innovations." Referred to as 'ideation', this is the first of the project's three phases. The next is 'exploration' (workshops and prototypes), followed by 'continuation' (project realization and funding). According to Lacroix Oggier, the leading house has already received quite a few promising ideas, ranging from sustainable coffee to a label for dairy products, all the way through to the creation of an anti food-waste market.

→ www.swissfoodecosystems.ch



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FRIBOURG DAIRY INDUSTRY 'MOOVES' TO DIGITAL

JEAN-CHARLES PHILIPONA,
HEAD OF LIVESTOCK PRODUCTION
AT GRANGENEUVE

Why are the Fribourg authorities keen that the dairy industry is embracing digital technologies?

The main reason is because these technologies improve livestock health. Lots of new tools has come on the market that let farmers monitor their herds more closely and take a more proactive approach to disease prevention, which in turn will cut antibiotic use. Digital technologies also make it easier for the dairy industry to reduce their greenhouse gas emissions because they enable animals to age out better and therefore prolong their productive lifespan.

Grangeneuve, the canton of Fribourg's agricultural institute, is overseeing the project. Can you talk about what its role is?

Our neighbor Agroscope, the Swiss center of excellence for agricultural research, and Vetsuisse, the Faculty of Veterinary Medicine, partnered the process. We selected a range of digital tools best suited to the needs of the project. These instruments include digital grass height sensors, multifeed robot and monitoring systems that track the cows' health, nutrition, physical activity and physical fitness.

Is the digital transformation of agriculture here to stay?

Absolutely. Otherwise, one will not be able to mount an effective response to environmental challenges and global demographic growth. Fribourg wants to tackle these concerns head on.

MAISON AMARELLA

AN EXOTIC TWIST ON A CULINARY CLASSIC



Alia Adi brings a sprinkling of her Middle East heritage to her luxury macarons.

Macarons simply look too good to eat. But those who dare to bite into the satiny smooth, jewel-colored shell are justly rewarded with a toe-tingling burst of flavor as the velvety ganache filling caresses their palate. "We use only natural flavorings and keep the sugar content to a minimum so as not to overpower the taste", explains Alia Adi, the founder of **Maison Amarella** which uses the finest ingredients and Swiss expertise to craft these elegant confections that "reflect the flavors of the world." The start-up, which is based in the AgriCo Food Innovation Campus, prides itself on sourcing its products locally, wherever possible. Adi's passion for macarons began in the Middle East where she worked for many years. She noticed that people there were fascinated with these sweet treats. So, the marketing graduate and holder of a diploma in pastry decided to set up her own little macaron-making outfit. Before long, customers were snapping up these bitesize morsels of Swiss quality. "That was when I realized that my macaroons had real potential." She left the Middle East and returned home to Fribourg, where she set up her company in 2020.

Natural and eco-friendly

Maison Amarella has been producing its macarons at its 160 m² facility in Saint-Aubin since July 2020. A few weeks later, the start-up opened its online store, offering

customers in Switzerland a delectable choice of flavors, ranging from the traditional ('Chocolate Love') to the exotic ('Sweet Desert'). "What sets our products apart is the use of typically Middle Eastern flavors like dates, rosewater and cardamon, as well as our uncompromising commitment to locally sourced, natural and environmentally friendly products." Adi is also quick to point out that the company's green credentials extend even to the presentation boxes; developed in partnership with local company Novopac, they are both beautiful and recyclable.

As well as its online store, Maison Amarella has struck up partnerships with a high-end retailer and a hotel and catering supplier to sell its macarons in Switzerland. The Fribourg company also has been making inroads in Saudi Arabia thanks to a distribution deal with a local pastry chain. With as many as 2,500 macarons finely crafted every day, the AgriCo facility has already reached peak production capacity, according to Adi. This, coupled with growing interest from other Gulf states means that "We already are looking to expand our operations", the clearly delighted start-up founder adds.

→ www.maisonamarella.com

«FRIBOURG GIVES US ACCESS TO HIGH QUALITY WORKFORCE AND GOOD INFRASTRUCTURE»*

* Per H. Dybwad, Executive Chairman, Condis Ltd



13.72 %

Income tax rate

1.5 million

Inhabitants within
a 45-minute radius

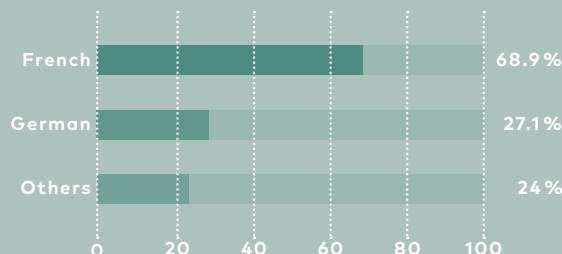
22.2 %

are under 20, making it
the youngest population
in Switzerland

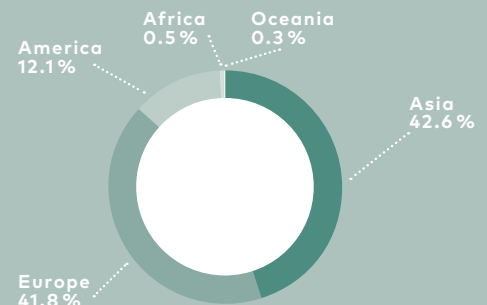
Fribourg offers the perfect environment in which to grow your business and gain access to Europe's major markets



MAIN
LANGUAGE



EXPORTS



"FRIBOURG HAPPY!"

Fribourg has so much to offer. First, there is its enviable central location that includes excellent transport links to the main Swiss and European road and rail networks. The country's main cities and airports – Basel, Bern, Geneva and Zurich – are only a 90-minute journey away.

The canton's unspoiled nature, diverse landscapes, vibrant sporting and cultural life, rich history, and exceptional cultural and culinary heritage are some of the reasons why Fribourg is such a great place to live, work and study. The people of Fribourg are famed for their down-to-earth, open-minded, optimistic and friendly approach to life. At the same time, their drive has transformed the canton into a dynamic region and an ideal breeding ground for a host of innovative and exciting projects. Why not come see for yourself?



FRIBOURG – A HIVE OF INNOVATION

The Global Innovation Index has repeatedly ranked Switzerland among the most innovative countries in the world. It is fair to say that the canton of Fribourg has played its part in this designation thanks to a development strategy that is focused on promoting innovation and high value-added activities. Since 2011, five innovation hubs have sprung up across the canton. Offering first-rate infrastructures and superlative services, these technology centers are now home to many start-ups and hightech companies.



AgriCo

- Specialization: agrifood and biomass
- Location: Saint-Aubin
- www.agrico.swiss



blueFACTORY

- Specialization: built environment of the future, circular economy, mobility and human health
- Location: Fribourg city center
- www.bluefactory.ch



La Maillarde

- Specialization: biopharmaceuticals and environmental technologies
- Location: Romont



blueFACTORY is a member of the Switzerland Innovation Park network.



Marly Innovation Center

- Specialization: fine chemicals and 3D printing
- Location: Marly
- www.marly-innovation-center.org



Le Vivier

- Specialization: automation and robotization
- Location: Villaz
- www.vivier.ch



Fribourg Innovation Award

The biennial Innovation Award, organized by the Fribourg Development Agency and the Fribourg Cantonal Bank (BCF), celebrates Fribourg's most pioneering and visionary companies. Since 1991 some 50 businesses have reaped the benefits of this showcase of Fribourg entrepreneurial creativity, raising the visibility of their company and their products in the process. The 16th edition will take place in 2022.

FRIBOURG – A TECHNOLOGY TRANSFER POWERHOUSE

The transfer of knowledge and technology is a core feature of Fribourg's economic ecosystem. It allows industry to remain innovative and competitive, fosters collaborative projects, and generates win-win outcomes. There is a wealth of resources and specialist services to help companies leverage technology transfer to grow their business.

They include three sectoral clusters, six centers of expertise, a material sciences research center (AMI), the technology platform INNOSQUARE and a dedicated technology transfer office.

On top of all this, the Fribourg School of Engineering and Architecture has 10 applied research institutes

in three distinct fields: information and communication technologies, construction and environment, and industrial technologies. They work hand in hand with companies to find novel solutions and develop innovative products and processes.

TECHTRANSFER FRIBOURG



TechTransfer Fribourg is the official technology transfer office of the University of Fribourg, the Adolphe Merkle Institute, the Fribourg School of Management and the Fribourg School of Engineering and Architecture. It offers advice on intellectual property issues and acts as a link between academic research and industry.

→ www.tt-fr.ch

INNOSQUARE



INNOSQUARE is a technology platform that helps companies develop and realize their innovative ideas, and facilitates collaborative single- and multisector projects that bring together industry, the public sector and academia.

→ www.innosquare.com

SECTORAL CLUSTERS

Building Innovation Cluster

→ www.building-innovation.ch

Food & Nutrition Cluster

→ www.clusterfoodnutrition.ch

Swiss Plastics Cluster

→ www.swissplastics-cluster.ch

CENTERS OF EXPERTISE

Biofactory Competence Center (BCC)

→ www.bcc.ch

Digital Printing Competence Center (iPrint)

→ www.iprint.center

Plastics Innovation Competence Center (PICC)

→ www.picc.center

Robust and Safe Systems Center (ROSAS)

→ www.rosas.center

Smart Living Lab

→ www.smartlivinglab.ch

Swiss Integrative Center for Human Health (SICHH)

→ www.sichh.ch



adolphe merkle institute
excellence in pure and applied nanoscience

The **Adolphe Merkle Institute (AMI)**, is a center of excellence in nanosciences and material sciences research and education. Through collaborations with industrial partners, AMI seeks to stimulate innovation and foster industrial competitiveness. The AMI is also home to the internationally respected Bio-Inspired Materials National Center of Competence in Research (NCCR).

→ www.ami.swiss

FRIBOURG – A BEACON OF EDUCATION AND SCIENCE

Fribourg has the youngest population in Switzerland and a higher education landscape that is as diverse as it is dense. Alongside its cosmopolitan university, where over 10,000 students are enrolled in a wide range of undergraduate and postgraduate programs, the canton has five specialist higher education institutes: the School of Engineering and Architecture, the School of Management, the School of Social Work, the School of Health Sciences and the School of Teacher Education. It is also home to the Adolphe Merkle Institute, Switzerland's leading research and teaching center in the field of nanosciences

and material sciences. The renowned EPFL (Swiss Federal Institute of Technology in Lausanne) has a satellite here. Added to these is a plethora of colleges specializing in fields such as business administration, agriculture, music, art, multimedia and hospitality. Of course, there is a broad host of primary, junior and senior high schools, as well as vocational training schools and colleges. Throughout the education system, classes are taught in French and German, while English is the language of choice for many postgraduate programs.



University of Fribourg

→ www.unifr.ch



Adolphe Merkle Institute

→ www.am-institute.ch



School of Management & Innovation Lab

→ www.heg-fr.ch



School of Engineering and Architecture

→ www.heia-fr.ch



EPFL Fribourg

→ fribourg.epfl.ch

FRIBOURG – A STAUNCH SUPPORTER OF BUSINESS

Since 1972, the Fribourg Development Agency has been helping local businesses get off the ground, outside companies to relocate to the region, and established companies to expand their operations. We are on hand to advise and guide you through the many support mechanisms and opportunities offered by the canton of Fribourg. A dedicated project manager will be appointed to assist and coordinate your project, and will take the lead and put you in touch with the right people for: financial assistance and tax incentives, finding the ideal site or premises for your business, staff recruitment, applying for and obtaining work and residence permits, apartment/house hunting, the social integration of your family and your personnel, contacting institutions of higher education, and any other issue that might arise. Get in touch. We're here to help!

→ www.promfr.ch

THE BEST PLACE FOR THE BEST COMPANIES

These companies, among many others, have chosen to locate in Fribourg: Alcon (Switzerland/USA), Cartier (France), Cailler/Nestlé (Switzerland), Covestro (Germany), Geberit (Switzerland), Ladurée (France), Johnson Electric (China), Liebherr (Germany), Mapei (Italy), Medion Grifols Diagnostics/Grifols, (Spain), Meggitt (UK), Michelin (France), Nespresso (Switzerland), Pall Corporation (USA), Richemont International (Switzerland), Scott Sports (Switzerland), Sika (Switzerland), Spiro (Sweden), UCB Farchim (Belgium), VeriSign (USA) and Wago Contact (Germany)

→ www.promfr.ch/en/establish/references



Neue Regionalpolitik **nrp**
Nouvelle politique régionale **npr**
Nuova politica regionale **npr**

The **New Regional Policy** is a stimulus program launched by the federal government with assistance from the cantons. Its mission is to foster innovation both in industry and tourism by providing financial support in the form of loans, non-repayable grants and subsidies.

Innosuisse is Switzerland's national innovation promotion agency. It provides consultancy, networking services and financial resources to help turn scientific research into economic results.

FRI UP



Fri Up is the canton of Fribourg's official business start-up support agency. It offers free support for new entrepreneurs and fosters innovation.

→ www.friup.ch

PLATINN



Based in Fribourg, Platinn is the Western Switzerland Innovation Platform. Its mission is to foster the innovation capabilities and competitiveness of start-ups and SMEs through its coaching services.

→ www.platinn.ch

FRIBOURG, THE PLACE TO INNOVATE

And the winner is... innovation! In May 2021, the Fribourg Development Agency (FDA) and the Fribourg Cantonal Bank announced the recipients of the Fribourg Innovation Award. **Ascenseurs Menétrey** took home the Business Award; the Start-Up Award, which is voted for by the public, went to **GBY**; and **Bloom Biorenewables** won the inaugural Sustainable Economy Award. For the first time in its history, the award ceremony was livestreamed on YouTube.

→ www.innovation-fribourg.ch



BUSINESS AWARD: ASCENSEURS MENÉTREY



CelticLift is an elevator that scales new heights: it has a more spacious cab, offers an upgraded user experience re-engineered ergonomics as well as easy maintenance, and is the first elevator in the world to be made from composites. The elevator is the result of a three-year Innosuisse project that drew on the combined expertise of Ascenseurs Menétrey, the Fribourg School of Engineering and Architecture, HE-ARC in Neuchâtel and the EPFL in Lausanne.

FINALISTS



Meggitt (Business Award)

Swissmeca (Business Award)

Mobbot (Start-up Award)

Rovenso (Start-up Award)

Enoki (Sustainable Economy)

La Sieste (Sustainable Economy)

SUSTAINABLE ECONOMY AWARD: BLOOM BIORENEWABLES



Tapping the hidden value of biomass is the secret behind the success of Bloom Biorenewables. The start-up has developed a procedure that extracts soluble lignin from wood waste. The natural polymer can then be used as a substitute for petrochemical compounds, which are widely found in all manner of products, from perfumes, cosmetics, drugs, plastics through to textiles. Bloom is the perfect example of a circular economy in action. It takes the waste generated by a major local industry and transforms it into a product that helps reduce dependency on fossil fuels.

START-UP AWARD: GBY (GO BY YOURSELF)



Go-Tryke is a revolutionary three-wheeled bike designed specifically for people with reduced mobility. It has two sets of connected pedals – one for the hands, the other for the feet – which, when activated, replicate the body's natural physiological movements. It also comes with a power-assisted rear wheel to prevent excessive strain on the rider's joints and muscles. The all-terrain, ergonomic and comfortable Go-Tryke allows users to combine physical therapy with the fun of the great outdoors.

BIOFACTORY COMPETENCE CENTER

**"FRIBOURG IS MAKING
A NAME FOR ITSELF"**

An instructor at the BCC (left) explaining the drug purification process as part of one of the center's industry-oriented training programs.

The **Biofactory Competence Center** (BCC) is like a Swiss army knife for the biopharmaceutical industry, both in Switzerland and further afield. As Ian Marison, founder and Director of the BCC explains, "There are very few structures like ours in the world and international demand for our services keeps on growing."

The BCC, which is based in Fribourg's blueFACTORY innovation quarter, has three main fields of expertise: training, technical consulting and modular system design. According to Marison, "There is a real talent gap in the biopharma industry, especially in Switzerland where the sector is extremely strong. Since the BCC opened in 2015, we have set up a 'model factory' where course participants benefit from training under real-life operating conditions, alongside their theoretical studies. Quite a few companies have already come on board, such as Pall Corporation and UCB Farchim, two multinationals present in the canton of Fribourg."

The Center also works closely with Lonza, perhaps best known as the manufacturer of Moderna's Covid-19 vaccine. Speaking of the pandemic, the BCC proved its adaptability by developing and delivering a series of online courses, to great success, "from the United States to Singapore and

also in Europe." One of the standout themes of these virtual classes was gene therapy.

Continuous bioprocessing expertise

In terms of technical consulting, the BCC offers a vast range of services: from troubleshooting and process optimization through to the design of new infrastructures and beta-testing of specific types of equipment. According to the BCC director, the center's continuous bioprocessing expertise is currently in high demand. As he explains, this is due to a desire on the part of its clients to improve quality, increase productivity and reduce costs. Last but by no means least, BCC is the go-to center for the biopharmaceutical industry when it comes to the design of modular production systems. For proof, one needs look no further than its recent collaboration with Vifor Pharma (see p.20), which ultimately went with a highly innovative solution. For Marison, "Both we and our regional partners are scaling new heights. In a highly competitive environment like Switzerland, Fribourg is successfully making a name for itself in the biotech sector."

→ www.bcc.ch

VIFOR PHARMA

A MODEL OF AGILITY AND SCALABILITY



Vifor Pharma will officially open its new production unit in January 2022. The facility – shown here while under construction – will be fully operational by 2023.

Our new facility is the result of incredible teamwork between **Vifor Pharma**, the Biofactory Competence Center (BCC) and the Fribourg Development Agency." Yvan Liard, Director of the Fribourg Vifor Pharma's facility in Fribourg, can barely believe how well the pharmaceutical company's ambitious expansion project went, "We are so grateful to the fantastic partnership we have had the privilege to enjoy over the last two years. Of course, we already had the existing infrastructure and valuable expertise on site, but the unequivocal support of the local authorities was a major factor behind our decision to expand our Fribourg operations."

Vifor Pharma, one of the world's leading manufacturers of iron deficiency and kidney disease medications, was

able to tap into the technical expertise of the BCC (see page 19). "Our new plant will allow us to customize

"The unequivocal support of the local authorities was a major factor behind our decision to expand our Fribourg operations"

Yvan Liard

our production lines by drug type. It will be entirely modular and incredibly agile. The BCC is the brains behind this extremely modular design," notes the boss of Vifor Pharma.

Most of production destined for export

The new production unit will allow Vifor Pharma to meet growing

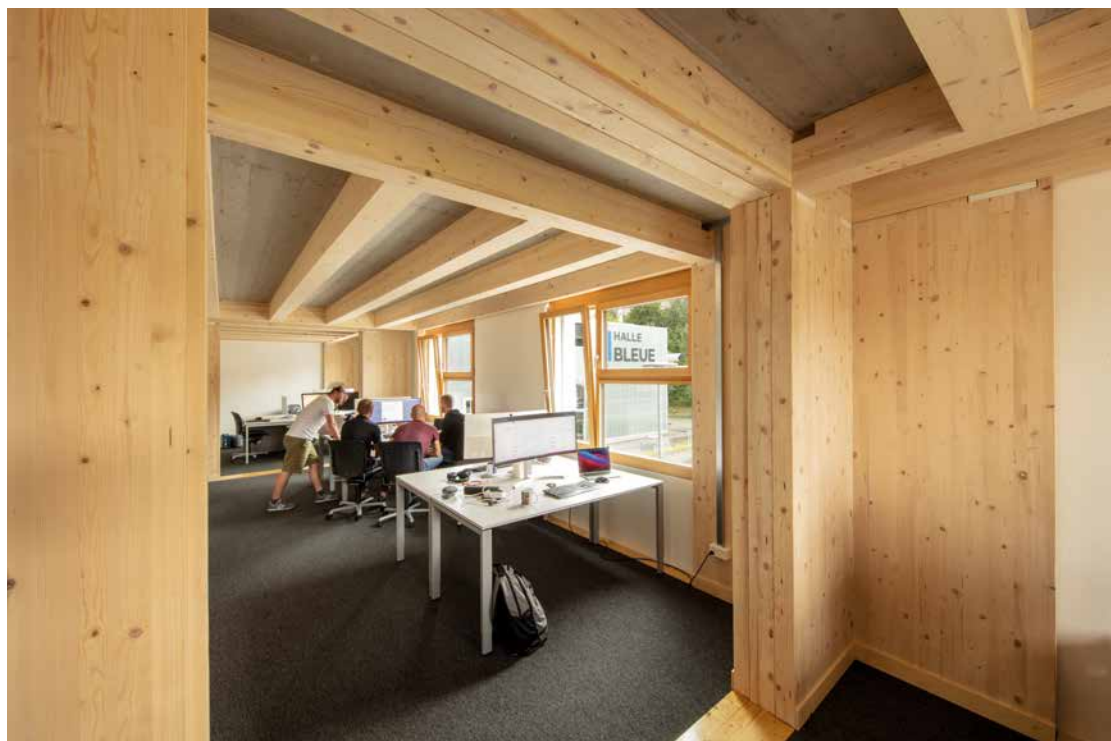
international demand. "Most of our production is destined for export, mainly to the European Union and the USA. But new countries have recently come on board, including Brazil, South Korea, Turkey and Russia. We also have plans to break into the Chinese market", adds Liard.

The Vifor Pharma Group is listed on the Swiss stock exchange and employs around 2,400 people worldwide. About half of its workforce is based in Switzerland. In 2020, the company had a turnover of CHF 1.71 billion and an operating profit (EBITDA) of CHF 576 million.

→ www.viforpharma.com

WOOD-ID

AT THE CUTTING EDGE OF WOOD INNOVATION



Versatility is one of many advantages offered by wood-iD. For example, the solution can quickly transform an office space (photo) into a classroom.

In the middle of the blueFACTORY innovation park stands a three-story structure made entirely from 24 timber blocks measuring 7.6 meters by 3.8 meters. It may look like a tower of Lego® bricks, but this experimental, modular building, designed by **wood-iD**, not only can house up to a dozen small- and medium-sized firms but also serves as a laboratory for Fribourg's new centre of wood expertise and innovation. As Yanick Joliet, Project Manager for blueFACTORY, explains, "The aim is to pool entrepreneurial and academic expertise in order to leverage the wood-related knowledge and skills available right here in Fribourg." Its versatile, aesthetic and renewable qualities have made wood an essential natural – and where possible homegrown – material for sustainable building projects.

In addition to its practical features, like swift on-site assembly, flexible layout and ease of use, wood-iD has impressive green credentials. "We have added a living facade and used secondhand materials. We also tested a carbon footprint tool developed by the Smart Living Lab," notes Axelle Marchon, co-founder of the start-up Enoki, which came up with the idea behind the project. Her colleague Loïc Simon adds, "Some of the technical features like the ability to transport and store the modules in 2D instead of 3D offer huge space-saving and CO₂ reduction potential."

Learning by doing

JPF Entreprise Générale SA and JPF-Ducret SA, which oversaw the technical side of the project, are delighted with the end result. It is the product of

first-rate team work and experimentation. According to company Director Jacques Pasquier, "The use of different types of slabs and flooring meant that we were able to conduct extremely instructive static, thermal and acoustic tests." The next step is bringing this promising modular, high-quality, sustainable and user-friendly building concept to market.

→ www.bluefactory.ch

→ www.enoki.ch

→ www.jpf.ch

CCRB, BIC

SUSTAINABLE AND INNOVATIVE BUILDING SOLUTIONS

When it comes to sustainability, making buildings more energy efficient is high on the world's to-do list. The canton of Fribourg grabbed the proverbial bull by the horns and established its own **Center of Expertise for Building Renovation (CCRB)** to help the construction industry, a major driver of the cantonal economy, to make the move to greener building techniques and solutions. "Our aim is to persuade private and public owners of the need to renovate their properties under favorable terms and in line with current statutory requirements", as project coordinator Blaise Clerc explains. "The role of the CCRB is to act as a facilitator between partners as well as serve as a point of contact for anyone interested or involved in building renovation. We also want to be a hub for professionals when it comes to exploring and applying new implementation strategies and business models."

The stakes are high because renovations can advance both economic and sustainable development. The refurbishment and retrofitting of existing property could potentially outstrip new builds in the future. At the same time, technologies are constantly evolving and the industry is suffering from a shortage of qualified workers. It is therefore vital that the general public, the authorities and professionals have access to the tools and skills needed to build greener. According to Clerc, CCRB services

will include personalized consulting, roadshows, webinars, drop-in advice sessions, guidance on renovation projects, training courses and a hotline.

Fostering industry-university collaboration

One of the CCRB's partners is the **Building Innovation Cluster (BIC)**. Its mission is to boost innovation in the construction sector by fostering closer ties between the industry and academia, and to promote the development of competitive and collaborative projects. Sustainable funding, innovative renovation solutions and digitalization are key strategic priorities for the cluster. Fortunately for BIC, it can count on the valuable and high-caliber input of the Smart Living Lab and the Fribourg School of Engineering and Architecture.

→ www.building-innovation.ch



AGRICO

A CAMPUS LIKE NO OTHER

The Swiss Campus for Agri & Food Innovation (AgriCo), which opened in 2020, is the first of its kind in the world. The site, which is owned by the canton of Fribourg and managed by the Cantonal Land Development Agency (ECPF), is dedicated to value creation in the agriculture, nutrition and biomass sectors. With further expansion expected in coming years, the campus offers extremely generous plots of industrial land, office premises, as well as laboratory space to rent. There is also one million square meters of agricultural land that is ideal for carrying out full-scale trials. For Giancarlo Perotto, Director of the ECPF and campus administrator, "The key strength of an ecosystem like this is its capacity to nurture innovation and synergies between private, institutional and academic actors." Quite a few innovative start-ups and SMEs have already set up shop. Early arrivals include Alver, Bee Vectoring Technology, Lowimpact Food, Maison Amarella, SensDRB and Techponics. Micarna, the leading poultry processor in Switzerland, has announced its plan to invest several hundred million Swiss francs in the site for its new state-of-the-art processing plant, from 2022 on.

→ www.agrico.swiss



Up to 1,600 jobs could be created on the AgriCo campus, once its fourth and final development phase is over by 2034. Around one billion Swiss francs will be invested in the ambitious project.



MICROALGAE – A GOLDEN BUSINESS OPPORTUNITY

MAJBRIIT BYSKOV-BRIDGES,
ALVER CO-FOUNDER

You launched your range of Golden Chlorella food products in 2017.

Why Golden Chlorella?

Golden Chlorella has two main advantages over popular microalgae like spirulina: it doesn't taste of much and is neutral in color. Its production is not resource-intensive and our bodies tolerate it really well. It is a superfood packed full of vitamins and minerals, including plant-based proteins, vitamin B, zinc, potassium and magnesium. All of these qualities mean that we can use it to make a wide range of products – pasta, cereal bars, granola and protein powders – which are not only sustainable, vegan, and nutritious, but also delicious, of course!

What does the medium term look like for your start-up?

We are now well-established in several western European countries, primarily thanks to our online sales platform. But we also have new high-potential markets like Russia, China and Japan in our sights. The chances of success are pretty good when the product is as innovative as ours.

Can you talk about the Swiss Campus for Agri & Food Innovation, where your offices are based?

We were the first start-up to move in. It was a fantastic opportunity and it's exciting to watch other companies of all shapes and sizes come on board, especially given that they might open up new avenues of collaboration for us. It's been, and still is a really rewarding experience.

→ www.alver.ch

SMARTFARMING PROJECT

ECOFRIENDLY AND SMART CROP MANAGEMENT

It is important not to downplay the impact that food production has on the environment. Farming uses close to 70% of the planet's freshwater resources. This is only one of many examples. It is a problem that has garnered increasing media coverage, and the research community is focusing more of their attention on ways to optimize resource utilization. Thanks to digital technologies, new solutions are constantly coming on stream. However, Serge Ayer, professor of IT and communication systems at the Fribourg School of Engineering and Architecture (HEIA-FR) has a word of caution, "Of course, many ideas are interesting but they must be affordable and user-friendly for the farming community." The SmartFarming project aims to develop a solution based on existing tools that matches user needs. It is piloted by the HEIA-FR and funded through the federal government's New Regional Policy (NRP).

One of these users is market gardener Blaise Guillod, who is partnering the project alongside Swisscom, Grangeneuve Agricultural Institute and Agroscope. Léandre Guillod, Manager of the family-run business, explains the difficulties it faces, "We generally inspect our crops once a week. This means that several days may go by before we notice that our plants are diseased." By placing sensors in the fields and programming them to

send an alert – say, to the producer's smartphone – as soon as they detect there is a problem means that "we can immediately take targeted action" to protect the environment as best as possible.

Technology transfer

This model opens up lots of avenues for smart solutions to crop management. Professor Ayer explains, "Take weeds, for example. Effectively eradicating them involves a machine that uniformly sprays herbicides over the crops. However, sensors could make it possible to pinpoint those plants that actually require intervention", adding, "A robot could even check the crops and treat them on the spot!" The SmartFarming project has huge potential. "Our long-term goal is to make all sorts of applications available to our industrial partners, and even to other countries."

→ www.heia-fr.ch



Sensors allow market gardeners to identify crops that require urgent and targeted intervention.

NESPRESSO

THE COFFEE GIANT EXPANDS ITS FRIBOURG OPERATIONS



According to unofficial estimates, Nespresso's three facilities in Switzerland produced around 10 billion coffee capsules in 2020. These numbers are pretty impressive, but the Nestlé subsidiary has set its sights even higher. In spring 2021, it announced plans to expand operations at its Romont site, to the tune of 160 million Swiss francs. This is on top of the 445 million Swiss francs it has already invested in its production facility in the canton of Fribourg since 2015. One of the reasons behind this decision is the growing demand for Nespresso's Vertuo capsules (see photo), which are made exclusively in Romont and exported to 24 countries across North America, Asia and Europe.

The global coffee pod leader is equally committed to honoring its environmental pledges. First, there is the AAA program, which promotes sustainable and equitable farming; as many as 110,000 coffee bean growers in 13 countries over four continents currently participate in the program. Second, the company aims to achieve 75% capsule recycling capacity in Switzerland by 2025. The coffee grounds are extracted from the pods and converted into heat and electricity in the largest agricultural biogas facility in the country, based in Henniez and operated by Groupe E. The residue organic matter becomes a high-quality, natural fertilizer. Waste not, want not is clearly the order of the day at Nespresso.

→ www.nespresso.com

BLOOM BIORENEWABLES

NUTS ABOUT BIOMASS

Since its stunning start (see *FNF* 2020), Bloom Biorenewables has continued its upward trajectory at breakneck speed. The start-up, based at the Marly Innovation Center in Fribourg, is one of the first European beneficiaries of the Breakthrough Energy Ventures Europe investment fund launched by Bill Gates to fast-track the shift to a green and circular economy. And Bloom certainly has a part to play in this movement thanks to its development of the first ever technology that can selectively

convert the most abundant biopolymers on earth – cellulose, hemicellulose and lignin, which are naturally found in wood – into added-value chemical products and high-performance materials. This is good news for consumers who increasingly want products that are renewable, non-polluting and carbon-neutral. As Florent Héroguel, Bloom's chief operating officer and co-founder explains, "We can extract the three constituents of biomass – lignin, cellulose and hemicellulose – and convert them into

products like flavoring agents, biodegradable plastics and textile fibers." The company is currently working on a host of projects, including a joint venture with the Belgian-Swiss chocolatier Barry Callebaut to produce vanillin from sustainable hazelnut shells instead of petroleum. Bloom Biorenewables is also preparing a new round of fundraising in 2022 for the construction of its first biorefinery demonstration plant.

→ www.bloombiorenewables.com

GESA, GROUPE E FRIBOURG WARMS TO DISTRICT HEATING



As much as 95% of the GESA district heating network is powered by wood, a local and renewable resource.

The main advantage of district heating is that it replaces fossil fuels like gas and oil with local, renewable energy. It centralizes heat production and does away with the need to install boilers, fuel tanks, firing systems and chimneys. GESA (Gruyère Energie SA) operates Fribourg's largest heating network, servicing the canton's second largest city Bulle, and its surrounding areas. Six heating plants and 150 kilometers of interconnected underground pipes supply 900 properties. "We distribute 110 GWh of heat per year, a figure that is expected to double by 2030", notes Dominique Progin, Director of Energy & Infrastructure at GESA. "We work with the Despond sawmill and the region's forestry corporations, which supply us with byproducts from their wood processing activities, such as bark and shavings. This means that we are able to supply 95% renewable energy at really competitive prices. Beyond the obvious environmental benefits, this fully local, circular economy model is incredibly robust which means that it is impervious to the major oil market fluctuations that happen from time to time."

Renewable energy – the only way forward

At the same time, Groupe E is busy expanding its district heating network in the canton's capital. According to Pascal Abbet, Director of Groupe E Celsius, "Our primary source at

the moment is waste heat from the Saidef incineration plant. But we have also begun to tap into local renewable sources like wood, deep geothermal energy and industrial waste heat." The canton's major electricity provider has set itself an ambitious goal of meeting 60% of the heating needs of the greater Fribourg area through almost entirely renewable energy sources (75%). "Our plan is to distribute close to 600 GWh per year by 2040." If it continues on this track, Groupe E will reach the lofty targets of the Paris Agreements and Switzerland's 2050 energy strategy, without breaking a sweat.

→ www.gruyere-energie.ch

→ www.groupe-e.ch

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Remi, UCB



Pushing the boundaries of **science**

**Everything we do starts with one simple question:
"how will this make a difference to the lives of patients?"**

UCB has a passionate, long-term commitment to help patients and families living with severe diseases lead normal, everyday lives.

Our ambition is to offer them innovative new medicines and ground-breaking solutions in two main therapeutic areas: neurology and immunology. We foster cutting-edge scientific research that is guided by patients' needs.

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