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BUSINESS MAGAZINE MAGAZINE ÉCONOMIQUE WIRTSCHAFTSMAGAZIN

FREIBURG

blue
economy

2014

BLUE ECONOMY

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Tobias Regell

Sculpture *Pair of walking figures-Jubilee* de Lynn Chadwick, 1977.
Collection Benjamin et Ariane de Rothschild. Jardins de Château Clarke, Bordeaux.

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BUSINESS MAGAZINE MAGAZINE ECONOMIQUE WIRTSCHAFTSMAGAZIN

FREIBURG

“FRIBOURG-FREIBURG...
IS BLUETIFUL!”

Editorial by
Beat Vonlanthen, 4-5

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Editorial

FRIBOURG-FREIBURG... IS BLUETIFUL!

**by Beat Vonlanthen,
President of the Cantonal Government,
Minister of Economic Affairs and Employment**

The Fribourg business world has understood that only a Blue Economy can unlock the door to a bright and sustainable future. The watchwords of the “Blue”: create, innovate, recycle, upcycle, optimize, economize and, ultimately, grow. Regardless of their size or field of business, companies today must reconcile their economic goals with the energy, societal and environmental challenges we face in the 21st century.

Without a doubt it is a tall order. With its new Energy Strategy 2050, the federal government has set a series of highly ambitious goals for Switzerland. Along with the phase-out of nuclear power, the strategy focuses on the development of renewable energies and improving energy efficiency. These last two areas offer great development and economic potential for the building, mobility and industry sectors.

The canton of Fribourg wants to play a leading role in this period of profound change. Political and economic stakeholders must act “with awareness of their responsibilities to future generations”, as foretold in our own cantonal Constitution, written in 2004.

Industrial ecology projects and an innovation policy geared towards cleantech are some of the ways Fribourg is cementing its reputation as a regional center of excellence in clean technology.

In February 2014, we appointed the members of the Board of Directors of blueFACTORY Fribourg-Freiburg SA and the think-tank that will support it. blueFACTORY, the first innovation district and zero-carbon technology park in Switzerland, is also in keeping with this approach and is clearly the shape of things to come. I have observed with great joy the incredible drive and enthusiasm surrounding this uni-fying project.

A Blue Economy is more than an obligation. It offers us all a unique opportunity to boost and expand our competitiveness, broaden and strengthen the sphere of influence of our canton, and bring about greater social cohesion, environmental responsibility and economic prosperity.



FRIBOURG-FREIBURG... IS BLUETIFUL!

**von Beat Vonlanthen,
Präsident des Staatsrats,
Volkswirtschaftsdirektor**

Die Zukunft wird *blue* sein... oder gar nicht stattfinden. Die Freiburger Wirtschaft hat dies sehr wohl begriffen. Die Leitworte des *blue*: Recyceln, optimieren, einsparen und im Endeffekt Gewinne erzielen, dabei stets Innovation und Kreativität im Hinterkopf behalten. Die wirtschaftlichen Zielsetzungen der Unternehmen sind künftig unabhängig von ihrer Grösse oder ihrem Geschäftsbereich untrennbar mit den energetischen, sozialen und ökologischen Fragen unserer Zeit verbunden.

Vor uns liegen enorme Herausforderungen. Die neue Energiestrategie 2050 des Bundes sieht einen schrittweisen Ausstieg aus der Kernenergie und weitere ehrgeizige Zielvorgaben vor, unter anderem die Entwicklung von erneuerbaren Energien und die Steigerung der Energieeffizienz. Im Bau-, Mobilitäts- und Industriesektor besteht diesbezüglich ein bedeutendes Entwicklungs- und Sparpotenzial.

Die politischen und wirtschaftlichen Akteure müssen « im Bewusstsein unserer Verantwortung gegenüber zukünftigen Generationen » handeln. Dies ist bereits seit 2004 die Vorgabe unserer Kantonsverfassung.

Mit der Umsetzung von Projekten im Bereich der industriellen Ökologie und einer auf Cleantech ausgerichteten Innovationspolitik sorgt der Kanton Freiburg dafür, dass er im Bereich der sauberen Technologien regional gut verankert ist.

Im Februar 2014 haben wir die Mitglieder des Verwaltungsrats der Bluefactory Fribourg-Freiburg AG und des zugehörigen Think Tanks bezeichnet. Als erstes Innovationsquartier und erster « CO₂-neutraler » Technologiepark des Landes ist blueFACTORY ein Teil dieser Strategie und diesbezüglich wegweisend. Ich freue mich ganz besonders, dass dieses verbindende Projekt bei seiner Entwicklung auf eine unglaubliche Dynamik und grossen Enthusiasmus stösst.

Die *Blue Economy* ist für sämtliche Freiburger Akteure viel mehr als eine Notwendigkeit – sie ist eine Chance und eine einzigartige Gelegenheit, die Wettbewerbsfähigkeit und die Ausstrahlung unseres Kantons im Hinblick auf sozialen Zusammenhalt, Umweltverantwortung und wirtschaftlichen Wohlstand zu stärken und auszubauen.

FRIBOURG-FREIBURG... IS BLUETIFUL!

**par Beat Vonlanthen,
Président du Conseil d'Etat,
Directeur de l'économie et de l'emploi**

L'avenir sera *blue* ou ne sera pas. Le monde économique fribourgeois l'a bien compris. Les mots d'ordre du *blue*? Recycler, valoriser, optimiser, économiser et, au final, rentabiliser, dans un perpétuel élan d'innovation et de créativité. Les objectifs économiques des entreprises, quels que soient leur taille ou leur domaine d'activités, sont désormais indissociables des enjeux énergétiques, sociétaux et environnementaux qui caractérisent notre temps.

Car le défi est grand. La nouvelle stratégie énergétique 2050 de la Confédération, en faisant le pari d'une sortie progressive du nucléaire, se fonde sur des objectifs ambitieux. Développement des énergies renouvelables et amélioration de l'efficacité énergétique figurent au centre des préoccupations. Les secteurs du bâtiment, de la mobilité et de l'industrie recèlent, à cet égard, un potentiel d'évolution et d'économie décisif.

Dans ce contexte de profonde mutation, le canton de Fribourg veut jouer un rôle de premier plan. Les acteurs politiques et économiques doivent agir en étant « conscients de leurs responsabilités envers les générations futures ». Telle était la consigne, en 2004 déjà, de notre Constitution cantonale.

Par la réalisation de projets d'écologie industrielle et une politique d'innovation orientée vers les cleantech, Fribourg donne un véritable ancrage territorial à son positionnement dans le domaine des technologies propres.

En février 2014, nous avons nommé les membres du Conseil d'administration de Bluefactory Fribourg-Freiburg SA et du think tank qui l'accompagnera. Premier quartier d'innovation et parc technologique « zéro carbone » du pays, blueFACTORY montre clairement le chemin à suivre. La dynamique et l'enthousiasme formidables qui accompagnent la naissance et le développement de ce projet fédérateur me réjouissent au plus haut point.

Bien plus qu'une contrainte, la *Blue Economy* représente, pour tous les acteurs fribourgeois, une chance à saisir et une opportunité unique d'asseoir et d'étendre la compétitivité et le rayonnement de notre canton, dans une perspective de cohésion sociale, de responsabilité environnementale et de prospérité économique.

Fribourg, an Ideal Location

About Fribourg

With around 300,000 inhabitants, the canton of Fribourg – the youngest in Switzerland! – is experiencing particularly strong demographic growth. According to current figures, 68% of its population speak French as their main language and 29% speak German as their “mother tongue”, making Fribourg one of Switzerland’s three officially bilingual Cantons. English, Italian, Spanish and Portuguese are also widely spoken. This multilingual population allows companies to access the main cultural communities in Switzerland, Europe and the World. In comparison with the major Swiss agglomerations, the cost of living and operational costs for companies are perceptibly lower in Fribourg.

At the heart of Switzerland and Europe

Traversed by two motorways, the Canton of Fribourg is situated on the main road and rail networks of Switzerland and Europe. Nearly a fifth of the Swiss population (1.5 million people) lives within 45 minutes of the Canton. Switzerland’s main centers and airports (Basle, Berne, Geneva, Zurich) are all accessible within 90 minutes. Neighboring countries – Germany, France, Italy and Austria – are easily accessible by rail, road and air.

Strong higher education sector

As well as a cosmopolitan university attended by more than 10,000 students, Fribourg has a further five hautes écoles (technical colleges and institutes) including the schools of engineering and architecture, management, social work, health and education. The Federal Institute of Technology in Lausanne, set to launch a new presence in Fribourg, is located less than one hour away from the city of Fribourg. Specialized institutes of learning are also established in the Canton, providing professional training in trade, agriculture, music, art, multimedia and hospitality. At almost all levels, instruction is given in French and German, as well as in English in the case of postgraduate courses.

A dynamic economic environment

Fribourg’s economic fabric is characterized by its dynamism and diversity. The canton’s geographic location and multilingual population make it an ideal location for the Swiss and European headquarters of major international groups. Exports account for 59% of the Canton’s GDP (36% for Switzerland). Precision instruments, watches, jewelry, pharmaceutical and chemicals products, machinery and electronics represent the main export sectors. More than 18,000





firms domiciled in Fribourg are listed in the commercial register. The unemployment rate in 2013 was 2.7% (3.2% for Switzerland). The State of Fribourg, which is under a constitutional obligation to submit a balanced budget, has no debt and enjoys a very solid financial situation.

Business Development

Companies that want to locate in the Canton can benefit from the Scientific and Technological Center of the Canton of Fribourg (PST-FR), which includes over 200 partners. The core is made up of three thematic clusters: the Plastics Processing Network, the Energy and Construction Network, and the IT Valley Cluster. Two centers of expertise, the Nanotechnology cluster and Cleantech Fribourg complete the PST-FR, which encourages productivity and the creation of high value-added jobs by financing research projects and promoting the transfer of technology to all companies in the region.

An ambitious technological park

Work is currently in progress on the blueFACTORY innovation district, located in the center of the city of Fribourg. Switzerland's first "zero carbon" park is aimed primarily at innovative high-tech companies in business sectors such as life sciences, biomedical, materials, plastics processing, nanotechnology, energy and information sciences. Several technological platforms are scheduled to start operation in 2014. Created under a partnership between the city and the State, the blueFACTORY innovation district heralds the start of a new era in Fribourg's competitiveness (see p. 13).

Global companies by the dozens

Many well-known global companies have selected Fribourg to be their home, including Alcon Pharmaceuticals (USA), Bayer International (Germany), Bio-Rad Laboratories (USA), Bongrain (France), Nestlé (Switzerland), Geberit (Switzerland), Inditex (Spain), Johnson Electric (China), Ladurée (France), Liebherr (Germany), Magtrol (USA), Mapei (Italy), Meggitt Sensing Systems (United Kingdom), Michelin (France), Nespresso (Switzerland), Novartis (Switzerland), Pall (USA), Richemont International (Switzerland), Scott Sports (USA), Tetra Pak (Sweden), Tupperware (USA), UCB Farchim (Belgium), VeriSign (USA) and Wago Contact (Germany).



A single point of contact for all your needs

The Fribourg Development Agency is on hand to advise and guide you through the many different support mechanisms and opportunities offered by the Canton of Fribourg. A project manager will help you to engage with specialists and experts from the private sector and public administration, and to resolve any concerns or questions on issues such as financial support, tax relief, locating the right site, recruiting staff, making contact with higher education establishments, etc.

To find out more, please visit : www.promfr.ch

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What Is Blue Economy?



e_ The Blue Economy is promoting a transition from the existing system towards a sustainable and circular economy – inspired by the circular flows of natural systems – in which the recycling of waste and use of renewable resources are central concerns. In constant pursuit of profitability, competitiveness and productivity increases, the Blue Economy helps, in particular, to optimize consumption of energy, water and raw materials, while integrating a social dimension focusing on human needs. By extension, the Blue Economy also encompasses production processes, products, services and technologies which contribute towards preserving the environment.

f_ La *Blue Economy* favorise la transition du système actuel vers une économie durable, circulaire et inspirée par le fonctionnement cyclique des systèmes naturels, où la valorisation des déchets et l'utilisation de ressources renouvelables tiennent une place prépondérante. Dans un but permanent de rentabilité, de compétitivité et d'augmentation de la productivité, la *Blue Economy* permet notamment d'optimiser la consommation en énergie, en eau et en matières premières, tout en intégrant une dimension sociétale tournée vers les besoins humains. Par extension, la *Blue Economy* englobe également les processus de fabrication, les produits, les services et les technologies qui contribuent à la préservation de l'environnement.

d_ *Blue Economy* fördert den Übergang vom derzeitigen System zu einer nachhaltigen Kreislaufwirtschaft, die von natürlichen Kreisläufen inspiriert ist, bei denen die Verwertung von Abfällen und die Nutzung erneuerbarer Ressourcen im Mittelpunkt stehen. Um Rentabilität und Wettbewerbsfähigkeit sicherzustellen und die Produktivität zu steigern, ermöglicht die *Blue Economy* insbesondere die Optimierung von Energie-, Wasser- und Rohstoffverbrauch, während auch eine gesellschaftliche, auf die menschlichen Bedürfnisse ausgerichtete Dimension berücksichtigt wird. Im weiteren Sinne umfasst die *Blue Economy* auch Fertigungsprozesse, Produkte, Dienstleistungen und Technologien, die zur Erhaltung der Umwelt beitragen.

e_ Groupe E's new Minergie-certified administrative head office in Granges-Paccot, equipped with 34 geothermal probes and high-performance insulation, aims to set an example in terms of energy efficiency.

f_ Labellisé Minergie, équipé de 34 sondes géothermiques et doté d'une isolation très performante, le nouveau siège administratif de Groupe E, à Granges-Paccot, se veut un exemple en matière d'efficacité énergétique.

d_ Der neue Verwaltungssitz der Groupe E in Granges-Paccot hat das Minergie-Label und ist mit 34 Erdsonden und einer leistungsfähigen Wärmedämmung versehen: Ein Musterbeispiel für Energieeffizienz.



Energy and Buildings



MANY FRIBOURG COMPANIES HAVE SET TARGETS FOR REDUCING ENERGY WASTAGE IN BUILDINGS, RESPONSIBLE FOR ALMOST HALF OF SWITZERLAND'S CO₂ EMISSIONS.

The figures speak for themselves. According to the Swiss Federal Office of Energy (SFOE), buildings now consume almost half of all primary energy in Switzerland. Broken down this represents 30% for heating, air conditioning and hot water, 14% for electricity, and around 6% for construction and maintenance.

Exploiting the considerable potential for reductions in this consumption is very interesting in both ecological and economic terms, particularly in view of the building sector's high responsibility in relation to use of materials, production of waste and environmental pollution.

The authorities have grasped the situation. Created in cooperation between the Confederation and the cantons, and funded by the CO₂ tax, the "Building Program" aims to promote improvement of energy in buildings, optimization of technical installations, and investment in renewable energies.

The private sector is also demonstrating a very innovative approach, with many Fribourg companies taking proactive steps to tackle energy wastage.

In cooperation with the Fribourg School of Engineering and Architecture, Lutz Architectes (p. 33) has developed a very efficient renovation technique, using prefabricated peripheral insulation. While ECO-logements (p. 35), once again in partnership with the Fribourg School of Engineering and Architecture, is developing lighter and more environmentally friendly concrete.

Swisspor, a manufacturer of insulating materials, has high hopes for its new recycled concrete, Bikutop Eco, for which the company is installing a complete recovery line at its customer's premises. At Energy Management & Storage Solutions (p. 25), the focus is on phase changing equipment – capable of absorbing heat during the day and redistributing it at night – as a means of considerably reducing CO₂ emissions and operating costs for buildings.

In the Cleantech area, companies such as Glass 2 Energy (p. 16), Hymexia (p. 29) and Cosseco (p. 35) are working on promising technologies using solar energy. While engineering offices such as SD Ingénierie (p. 27), CSD Ingénieurs (p. 17) and Energie Concept (p. 31) are applying their skills and expertise to pursue a constantly evolving series of sustainability objectives.

blueFACTORY
Fribourg – Freiburg

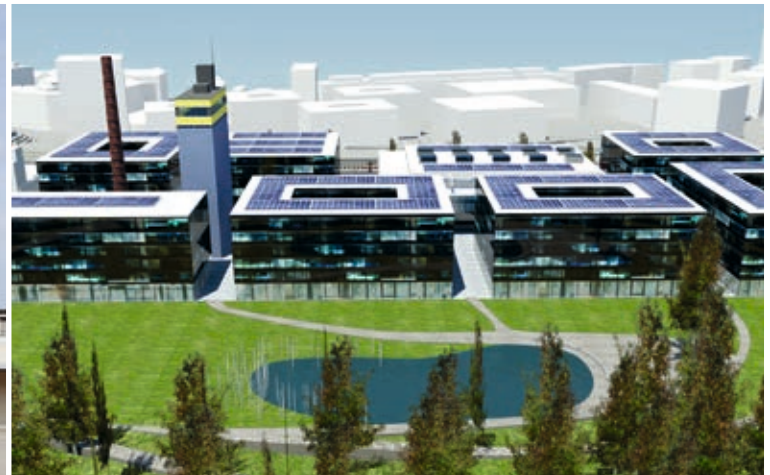
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www.bluefactory.ch

blueFACTORY, a Showcase for Fribourg

2014 REPRESENTS AN IMPORTANT TURNING POINT FOR THE BLUEFACTORY INNOVATION DISTRICT IN FRIBOURG. WE PUT THREE QUESTIONS TO JEAN-LUC MOSSIER, MANAGING DIRECTOR OF THE FRIBOURG DEVELOPMENT AGENCY.



Beyond the simple analogy of the names, is there any direct link between the blueFACTORY innovation district and the Blue Economy?

In view of its aim of becoming Switzerland's first "zero carbon" technological park and a pioneer in Europe, blueFACTORY is an ideal fit with the sustainable development model advocated by the Blue Economy. Considering the technological and environmental challenges facing the construction sector, which represents a high proportion of the canton's economy, the steering committee has decided to position the park on the basis of its infrastructure first. Consequently, blueFACTORY's exemplary infrastructure and energy concept, designed in anticipation of future needs, will attract companies seeking this type of environment, but not necessarily from the same sector.

Have some of the contents of the park been defined?

Existing premises on the site currently accommodate around twenty start-up companies, from innovative fields in technology and sustainable development, reflecting the diversity of the canton's economic fabric. However, there is not enough space and the waiting list is growing! Several technological platforms, starting with the

e. The former site of the Cardinal Brewery (on the left) will progressively be replaced by Switzerland's first "zero carbon" innovation district.

f. L'ancien site de la Brasserie Cardinal (à gauche) cèdera progressivement la place au premier quartier d'innovation «zéro carbone» de Suisse.

d. Auf dem ehemaligen Gelände der Cardinal-Brauerei (links) entsteht schrittweise das erste CO₂-neutrale Innovationsquartier der Schweiz.

Smart Living Lab (see below) are scheduled to start operating in 2014. Supported by a global and differentiated strategy, blueFACTORY is intended to act as a showcase for the canton of Fribourg's technological and industrial expertise.

What is the schedule?

Now that the limited company and board of directors are in place, our focus is on speeding up decision-making processes and committing to an initial investment of CHF 50 million for two key purposes: renovation of existing premises and development of an architectural draft in preparation for the construction of an initial base of new buildings. Work is scheduled to begin in 2015.

www.bluefactory.ch

Fribourg, Capital of the Intelligent Home

The buildings of the future will be designed in Fribourg. The Federal Institute of Technology in Lausanne (EPFL) plans to install a unit in Fribourg, which will become the cradle of a dedicated center of expertise with which the School of Engineering and Architecture of Fribourg and the University of Fribourg will be associated. Baptized the Smart Living Lab (SLL), it will be housed in an experimental building to be constructed on the site of the blueFACTORY technology and innovation park. "The networking of the various research groups will advance the knowledge

relating to the home of tomorrow in an interdisciplinary fashion", explains Marilyne Andersen, Professor of Sustainable Construction Technologies and Dean of the Natural, Architectural and Built Environment Faculty of the EPFL.

Construction technologies and questions of well-being of the occupant will play a prime role in achieving the objectives of the Swiss Confederation in energy saving and sustainable development. "In this light, the SLL plans to develop research projects with an international aim in the fields of energy effi-

ciency, materials, law and human sciences. It is planned that around eighty researchers will work on the site in the long term", adds Marilyne Andersen.

The Canton of Fribourg expects to assume the financing of the infrastructure, as well as the establishment of two permanent chairs and a visiting professorship for the EPFL. For its part the EPFL undertakes to add two additional chairs. New research groups of the University and of the School of Engineering and Architecture will also move onto the site, so as to create a unique synergetic platform.



INNOVATION ET CRÉATIVITÉ

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Recycled Bitumen – The Latest Innovation from Swisspor

THE INSULATION MANUFACTURER AND CHAMPION RECYCLER HAS LAUNCHED BIKUTOP ECO, A NEW KIND OF HIGH-QUALITY BITUMEN MADE FROM RECYCLED MATERIAL.



e The roof of the Swisspor factory in Châtel-St-Denis is the location of the largest photovoltaic installation (8000 m² of panels) in the canton of Fribourg.

f La toiture de l'usine Swisspor, à Châtel-St-Denis, accueille la plus grande centrale photovoltaïque (8000 m² de panneaux) du canton de Fribourg.

d Das Dach des Swisspor-Werks in Châtel-St-Denis ist mit der grössten Photovoltaikanlage (8000 m² Solarpanels) des Kantons Freiburg ausgestattet.

“Saving energy” is at the heart of everything Swisspor does. Among the leading manufacturers of insulation materials in Europe, Swisspor has long understood the need for greater energy efficiency and the importance of sustainability. “It’s now more than 10 years since Swisspor, with support from the Swiss EPS Association, introduced a pioneering system for recycling expanded polystyrene”, says Jacques Esseiva, head of Quality, Security and Environment at Swisspor Romandie SA in Châtel-St-Denis. Today, the recycling system runs like clockwork. In 2014,

the company set itself the ambitious goal of repeating this success with its new product, “Bikutop Eco”, a high-quality bitumen made from recycled materials. As Jacques Esseiva explains: “The product has been in our catalogue since January. Not only does it look exactly like standard bitumen, but it also has the same properties.” Swisspor worked with the Recycling and Sustainability Consultancy (BIRD) in Lausanne on the development of the recycling system.

The manufacturing facilities of Swisspor also reflect the company’s green credentials. The

factory at Châtel-St-Denis, which opened in 2010, is built entirely from locally sourced timber and meets Minergie standards. The energy concept for the building, which has the largest solar power facility in the canton of Fribourg (8,000 m² of solar panels), has allowed the company to cut its CO₂ emissions by 66% and halve its energy consumption. With business booming, Swisspor is set to open a second factory in Châtel-St-Denis by early 2016.

www.swisspor.ch

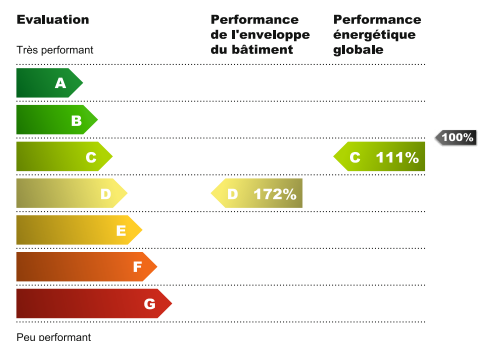
Energy as a Search Criterion

Since its creation ten years ago, Immomig SA has become the Swiss market leader in real estate brokerage software. This spectacular success is thanks to the development of a comprehensive, ergonomic and user-friendly real estate management solution, including the Immomig® software, a website and a publication portal. The solution automates a wide variety of tasks and helps to streamline process flows in real estate agencies, property management offices and developers. “Our recent innovations include the incorporation of the energy label as a search criterion for properties. As far as I’m aware, we are the only company in Switzerland to have taken this step”, comments Patrick Maillard,

founder and manager of the Givisiez-based company.

The canton’s energy certification for buildings (see illustration) classifies structures into seven categories (A to G) based on their overall energy efficiency (heating, domestic hot water, lighting, etc.) and exterior. “This type of information is appealing to an increasing proportion of the population and some cantons have even made it mandatory for any new constructions or disposals of property. People’s attitudes and requirements are changing and this prompted our decision to include this information in our software”, explains Patrick Maillard.

www.immomig.ch



An Award and a Global First for Glass2Energy

AWARDED THE 2014 "WATT D'OR" (GOLDEN WATT) BY THE FEDERAL OFFICE OF ENERGY, THE FRIBOURG COMPANY IS ON THE VERGE OF WINNING ITS AMBITIOUS INDUSTRIAL GAMBLE.



e_ In April 2013, Glass2Energy installed a balustrade equipped with photovoltaic glass panels capable of converting ambient light energy in the departure hall at Geneva International Airport.

f_ En avril 2013, Glass2Energy a doté le hall des départs de l'Aéroport international de Genève d'une balustrade photovoltaïque vitrée capable de convertir l'énergie lumineuse ambiante.

d_ Im April 2013 hat Glass2Energy in der Abflughalle des internationalen Flughafens von Genf ein Geländer mit verglasten Solarmodulen versehen, die die Energie des Umgebungslichts umwandeln können.

Although it has only been operating since late 2011, Glass2Energy is already considered a pioneer in its field. Based in Villaz-St-Pierre, the company is the first in the world to bring a promising technology – the dye sensitized solar cell (or Grätzel cell) – to industrial viability. Official recognition of this exceptional achievement came in the shape of the 2014 Watt d'or in the "Renewable Energies" category, a prize awarded annually by the Federal Office of Energy.

The advantages of the Grätzel cell, a third-generation photovoltaic cell, are its transparency and ability to generate electricity even when light is poor and indirect. The glass-encapsulated photosensitive pigments replicate the natural process of photosynthesis.

"This technology has been around for more than 20 years but manufacturing problems made it difficult to use", explains Stefan Müller, director of Glass2Energy. Thanks to a new assembly technique, the Fribourg-based company has managed to significantly improve the resistance and shelf-life of the product. From facades to roofs and even furnishings, the applications for these panels are many and diverse. In 2014, Glass2Energy will introduce a brand-new production line, making it possible to manufacture 3,000 panels a year with a view to widespread market uptake in the future.

www.g2e.ch

Intelligent Boilers, Thanks to EcoBITs

Accounting for almost half of all primary energy consumption in Switzerland, buildings hold great potential for savings. This sums up the mission of the start-up company Pronoó, created in 2013 in cooperation with the Fribourg School of Engineering and Architecture. EcoBITs, the product developed by the young company, helps to save up 20% of heating energy. This predictive and self-learning management system uses algorithms based on artificial intelligence to fine-tune internal temperature settings.

"The aim is to anticipate rather than react", explains Beat Ackermann, Pronoó's founder. "Modern buildings tend to have a very high thermal inertia. This means that it takes a few hours for us to perceive even significant adjustments in heating settings." EcoBITs considers weather forecasts, occupancy levels

as well as the building's technical parameters to take appropriate preventive action.

"Our system, comprising a software solution and a patented electronic box, adapts to all types of buildings and heating systems. It also offers a rapid return on investment, estimated at less than three years for oil, gas or wood-fired boilers, thanks to its easy installation and configuration, low-cost hardware and high savings potential", explains Beat Ackermann.

Following a two-year pilot phase in the ultra-modern Fribourg Vocational Training Center (see photograph) premises, EcoBITs has now been installed in around twenty public and private buildings in the canton. Its commercialization is expected by the end of 2014.

www.pronoo.ch



CSD Ingénieurs : Sustainability in its Genes

WITH A TRACK RECORD OF OVER THIRTY YEARS IN THE ENVIRONMENTAL SECTOR, THIS ENGINEERING CONSULTANCY FIRM HAS MANAGED TO STAY A STEP AHEAD OF ITS COMPETITORS.

"Sustainable development is written in the genes of CSD Ingénieurs." Olga Darazs, CEO of this major engineering consultancy player, explains: "The environment became an integral part of our business shortly after the company's creation, back in the 1970s." Originally a trailblazer in this area, forty years later, in an age where some level of environmental awareness has become a prerequisite in the industry, CSD is managing to maintain its lead. "Our teams (editor's note: around 500 employees at thirty sites across Switzerland and internationally) work closely together and all dimensions, from environmental, to economic and social, are integrated into each project. In our company, sustainable development is not an afterthought. It's a constant concern." This focus on the environment is also reflected within the company, through actions including free season tickets to encourage employees to use public transport, a set of standards for company vehicles and "bike to work" campaigns. Many of the projects entrusted to CSD by its customers are also directly linked to sustainable development. Over a period of two years, the company managed the groundwork of a new Swiss sustainable construction standard (SNBS), presented in June 2013 by the Federal Minister Doris Leuthard. The Granges-Paccot-based company was also commissioned to carry out a technical, ecological and economic feasibility study on the first

e_ CSD is supporting the client throughout the certification and sustainable construction phases of the ambitious "Torfeld Süd" project in Aarau (Switzerland).

f_ CSD accompagne le maître d'ouvrage pendant les phases de certification et de construction durable de l'ambitieux projet « Torfeld Süd », à Aarau (Suisse).

d_ CSD begleitet den Bauherrn während der Phasen der Zertifizierung und des nachhaltigen Baus des ehrgeizigen Projekts « Torfeld Süd » in Aarau (Schweiz).



section of the Swiss underground transport project (conveying cargo underground to reduce CO₂ emissions). Further from home, a CSD team is in the Peruvian capital Lima, working on a global waste management project.

www.csd.ch

Soleol : Leading by Example



Soleol SA, a specialist in solar energy – as its name suggests – is experiencing rapid expansion. A new building is being constructed opposite the company's existing premises in Estavayer-le-Lac. "The building will be powered by positive energy. In other words,

it will be completely autonomous and even produce more energy than it consumes," explains Jean-Louis Guillet, manager and founder of the company created in 2008. The leader in the canton of Fribourg, installing more than 50,000 m² of photovoltaic panels in 2012 and 70,000 m² in 2013 (see photograph: eg a farm in Donatyre), Soleol will be equipping this new building with many items from its catalogue: LED, thermal and photovoltaic panels on the roof, facing south. A helical wind turbine will cover electricity requirements for the IT system. Finally, "photovoltaic shelters" will be set up for the electric vehicles the company intends to purchase in the near future.

www.soleol.ch

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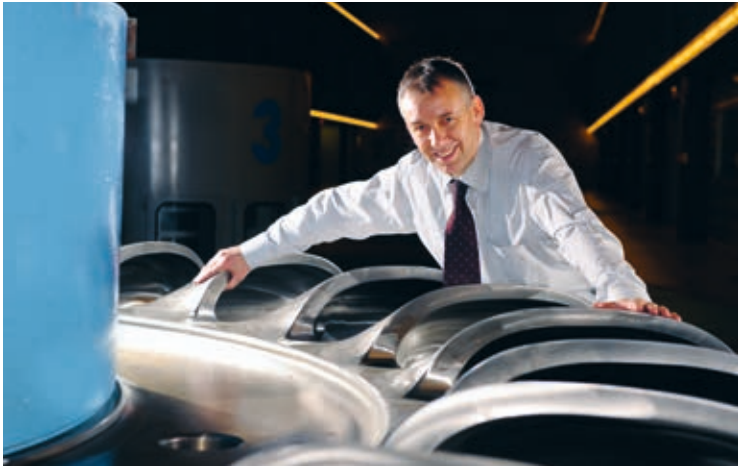
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Meggitt Has its Sights Set on the Top Spot in the Energy Sector

THE ENERGY MARKET OFFERS A MAJOR COMMERCIAL OUTLET FOR THE FRIBOURG COMPANY, WHOSE MEASURING AND MONITORING SYSTEMS ARE INSTALLED IN THE MAJORITY OF MODERN PLANES.



e_ Henry Reinmann, Vice President, Strategy, Sales & Marketing, by the largest Pelton turbine in the world at the Bieudron hydroelectric power station in canton Valais (Switzerland).

f_ Henry Reinmann, vice-président des ventes et du marketing, à côté de la plus grande turbine Pelton au monde, à la centrale hydroélectrique de Bieudron, dans le canton du Valais (Suisse).

d_ Henry Reinmann, Vice President, Strategy, Sales & Marketing, neben der weltweit grössten Pelton-Turbine im Wasserkraftwerk Bieudron im Kanton Wallis (Schweiz).

Already the world's leader in the aerospace market, Meggitt Sensing Systems (MSS) is now strengthening its presence in the energy sector. "The majority of commercial planes in service across the world contain our sensors and high-performance monitoring systems" explains Henry Reinmann, Vice President Sales and Marketing for the energy market at MSS. "Within the aerospace industry, our scope for development is therefore limited. The energy sector, on the other hand, offers us enormous potential for growth." With expertise in hydroelectric, steam and gas turbines, motors, pumps and fans, MSS products can be found in more than 10,000 energy plants across the globe. "Our monitoring systems not only protect the machines from technical failures, but also help increase efficiency and reduce sulfur oxide and nitrogen oxide emissions", explains Henry Reinmann.

The renewable energies sector, for instance wind and hydraulic power, and the fossil fuel sector are at the top of the list of new market segments being targeted by MSS. "Among the products we are launching in 2014, the VibroSmart® protection and condition monitoring system is particularly well adapted for extreme environments and suit the potential applications we are targeting. This revolutionary technology will enable us to penetrate these market segments, which represent a growth opportunity for MSS. The sensors, electronics and software solution have all been entirely developed on the Villars-sur-Glâne site by a team of around 40 engineers", explains Reinmann. In total, Meggitt Sensing Systems employs 600 people in Fribourg and 1,600 across the globe.

MSS has 12 sales offices and 30 distributors enabling them to cover the international energy market. "In 2013 we opened a new office in São José Dos Campos, Brazil, and a new office in the Middle East will follow soon", explains Henry Reinmann, before concluding "we have high ambitions to grow this market and have our sights set on the global top spot."

www.meggittsensing.com

Natural Gas is Gaining Ground

The natural-gas distributor Frigaz is continuing to invest in innovative projects. In 2012, the expansion of its network – which totals more than 420 km – made a significant step with the connection of the Biologuma greenhouses in Frasses (see photograph). This agricultural site is the first in the Seeland region to benefit from a connection to natural gas. "With its some 400 market-garden operations, this region represents a strong potential for Frigaz. These businesses can benefit from natural gas and recover the CO₂ useful for the development of their cultivations. By saving hundreds of tons of CO₂ annually, they have in particular the opportunity

to substantially improve their ecological balance", emphasizes Pascal Barras, the manager of Frigaz.

For Messrs Etter and Frey, managers of Biologuma, the change to natural gas has seemed obvious: "working in a natural environment, it is logical for us to change to a more ecological operating method, in accordance with our values. The financial aspect is also advantageous since, unlike propane and oil, we pay for the gas only after consumption." Other projects are under consideration at Frigaz, such as the production of biogas from organic waste from the market gardeners.

www.frigaz.ch



BLUE INSPIRES THEM...
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Martial Bujard (55), Manager of the Minergie Branch for French-speaking Switzerland

"I'm convinced that by 2020, Swiss construction standards will be in line with the Minergie label." Martial Bujard, Manager of the Minergie branch for French-speaking Switzerland, based in Fribourg, perceives a basic shift towards a legal framework. "Buildings account for almost half of the country's energy consumption. This area holds very high potential for savings, in particular in view of the level of expertise now available in constructing Minergie houses." Minergie is a Swiss energy performance label intended for new or renovated buildings. Supported by the industry, the cantons and the Swiss Confederation, it guarantees the comfort of a building's living and working environment by means of a high quality outer shell and systematic renewal of air. "After fifteen years of sustained growth, Minergie certifications – of which close to 1,000 were awarded in 2013 in French-speaking Switzerland – have now levelled out. We need to move our focus to renovations, which still account for just 10% of the total, and on developing new products," comments the manager. The creation of the increasingly specialized Minergie-P and Minergie-A standards, and the ECO complement, reflect a commitment to leading the way. "The cantons realize the Minergie label's effect on increasing awareness, its great strength being the fact that it persuades rather than obliges. We need to ensure that this attitude is here to stay," emphasizes the engineer, who views continuous training as a cornerstone of the success of the Confederation's 2050 energy policy. "The FE3 training platform offers courses in Minergie and is the most comprehensive platform for the energy and construction sectors in French-speaking Switzerland. From architects to engineers, technical installers or building caretakers, everyone involved must understand the future issues."

www.minergie.ch



Katharina Fromm (45), Professor of Chemistry at the University of Fribourg

Lithium batteries are everywhere. They are found in laptops, cell phones and the majority of small electronic appliances. "At first considered dangerous, they were sold only at the start of the 1990s. Now they are used daily and accidents are extremely rare. However, technology still has a lot of progress to make", considers Katharina Fromm, Professor in the Department of Chemistry at the University of Fribourg since 2006. Supported by a team of three researchers, since 2010 the scientist has been studying the development of new electrode nanomaterials intended for lithium-ion batteries, as well as the risks related to their manufacture and recycling. The group is the foundation of a new center of expertise in energy research, financed by the Swiss Confederation. "Using new synthesis means, we have managed to significantly reduce the energy necessary for producing electrode materials. However, this is not all: nanoparticles also help us to substantially improve the capacity and recharge time of current electrodes", boasts Katharina Fromm. The existence of a functional prototype has made it possible to undertake discussions with industry. Lengthy mobility represents, in the long term, an important potential prospect. "With our research project, we wish to contribute to the biocompatible and environmentally friendly manufacture of high-performance lithium-ion batteries intended, for example, for electric automobiles. This contribution has a special dimension in the current context of the energy debate. Energy storage at a local level will certainly assume more and more importance. The potential is there."

www.chem.unifr.ch/kf

Groupe E's EcoSolutions Are Promoting Energy Efficiency

THE ELECTRICITY PRODUCER AND DISTRIBUTOR OFFERS A WIDE RANGE OF SERVICES TO HELP COMPANIES CONTROL THEIR ENERGY CONSUMPTION.



e_ The measurements and analyses conducted by Groupe E's specialists help to quickly identify a company's potential energy savings.

f_ Les mesures et analyses effectuées par les spécialistes de Groupe E permettent d'identifier rapidement les potentiels d'économie d'énergie d'une entreprise.

d_ Dank der Messungen und Analysen durch die Fachleute der Groupe E können Energieeinsparpotenziale von Unternehmen rasch identifiziert werden.

Alongside its status as the main electricity distributor in Western Switzerland, Groupe E is also carving out a position as a national leader in the implementation of Swiss energy and climate policy. "The energy world is undergoing rapid transformation. For companies operating in the sector, this represents an amazing opportunity to evolve. Rather than limiting its activities to its core business of electricity production and supply, Groupe E has set itself the task of supporting companies as effectively as possible during this transition phase", explains Urban Achermann, Groupe E's Sales & Marketing Manager.

EcoSolutions is one of the tools developed by the Granges-Paccot-based company. "EcoSolutions is a complete palette of energy efficiency services. Competent agents analyze, implement and monitor a company's infrastructures and installations", explains Florian Buchter, Energy Efficiency

Product Manager. "As a single point of contact, Groupe E provides a global vision of energy issues. This allows our customers to concentrate on their sales strategy and production operations", adds Urban Achermann.

Since its launch in 2011, the program has proved very successful. "To date, we have implemented more than one hundred projects. The introduction of new legislation and the pursuit of synergies are encouraging companies to call on our extensive and unique set of skills", comments Florian Buchter. Take, for example, Tetra Pak in Romont. The inventory carried out by Groupe E has enabled the company to identify potential annual savings of CHF 166,000, representing 14% of its total energy bill. A third of this potential can be achieved with a return on investment in less than three years.

www.groupe-e.ch

A Solar Park with an Educational Benefit

Reflecting their commitment to sustainable development, Gruyère Energie and the municipality of Bulle have joined forces to install solar parks on the roofs of La Condémine school (see photo) in Bulle, and Tourmaline school in La Tour-de-Trême. The investment represents CHF 400,000. Commissioned in July 2013, the 836 m² of photovoltaic panels are capable of producing around 130,000 kilowatt hours per year, equivalent to the electricity consumption of 28 standard households.

The choice of school buildings as the site for this project was by no means random. "These installations create an opportunity to teach young people about energy issues", emphasizes Dominique Riedo, Sales and Marketing Manager at Gruyère Energie. An information board is displayed in each of the schools. "Pupils and teachers will also be able to access an online platform where they can view a range of data, including sunshine, weather and production levels", adds the manager, whose company is currently developing many more renewable energy projects.

www.gruyere-energie.ch



Du punch dans vos projets

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frutiger-fribourg.ch

Construction Goes Green

AS MAJOR ENERGY CONSUMERS, CONSTRUCTION COMPANIES ARE DEVELOPING ENVIRONMENTAL STRATEGIES. TAKE, FOR EXAMPLE, FRUTIGER, IMPLENIA, JPF AND LOSINGER MARAZZI.



e Setting a new record in Switzerland, the huge Poya bridge project has a cable-stayed span of 196 meters. Work is scheduled to finish in October 2014.

f L'immense chantier du pont de la Poya, dont la portée haubanée de 196 mètres constitue un record en Suisse, prendra fin en octobre 2014.

d Der Bau der Poyabrücke, deren Spannweite von 196 m einen Rekord in der Schweiz darstellt, wird im Oktober 2014 abgeschlossen.

Frutiger SA Fribourg

Within the Frutiger construction group, efforts aimed at preserving and protecting the environment encompass all of the company's activities. The one hundred employees of Frutiger SA Fribourg (formerly Tacchini SA) share the parent company's philosophy. "We implement actions to avoid energy wastage, adapt our vehicles to the latest standards, process waste water at major sites and sort materials during demolition works", explains Hanspeter Piller, the new manager of the Fribourg-based company. Always open to new technologies, including recycled concrete, the company has already constructed several important Minergie-certified buildings (see p. 20), including Botzet school and the EMF vocational school in Fribourg, as well as several administrative and industrial buildings.

www.frutiger.com

Losinger Marazzi AG

Losinger Marazzi Ltd.'s website states its aim in no uncertain terms: when it comes to sustainable construction, its sights are set on Swiss leadership. To achieve its objective, this company with 800 employees strives "to be proactive and highly innovative", explains Pascal Bärtschi, Manager of the Fribourg branch. Part of the French giant Bouygues Construction, Losinger Marazzi takes part in its "Actitudes" program, encompassing economic as well as social and environmental responsibility. "This program provides us with a framework and pushes us forward." It was demonstrated in 2011 by the company's launch of the creation of Switzerland's three largest eco-districts, in Gland (VD), Zurich and Lenzburg (AG), the latter two holding "2000-Watt Site" certification. In Fribourg, Losinger Marazzi's creations include the Agora, a 68,000 m³ Minergie-certified building (see p. 20) above the central bus station. The company has also been commissioned to develop a zero-carbon concept for the blueFACTORY site (see p. 13).

www.losinger-marazzi.ch

JPF

Laurent Pasquier has no doubt: "What is good for the environment often makes sense financially." JPF Holding's General Services Manager knows what he's talking about. In preparation for the introduction of the CO₂ tax on fuel in Switzerland, the Bulle-based construction firm assigned him the task of conducting a detailed assessment of its energy consumption. "We drew up a clear and precise action plan designed to achieve maximum efficiency." Rather than losing their way in lofty theories, the managers of this family-owned company, founded in the early 20th century, set realistic targets: "Every year, we correct two or three issues." As a result, in the period between 2005 and 2012, the company – which has 480 permanent employees – achieved savings of around CHF 850,000. Actions to date include renovation of gravel processing installations, optimization of fuel in the coated materials plant and an improvement in compressed air production.

www.jpf.ch

Implenia

In 2009 Implenia, Switzerland's leading construction company, launched a group-wide sustainability strategy. As François Guisan, sustainable development integrator with Implenia Suisse SA, explains: "The idea behind this initiative is a thorough review of all of the company's activities." In 2010 Implenia management signed a Code of Conduct, which was drawn up in consultation with the Ethos Foundation and seeks to ensure transparent governance across the group. "The group has also introduced a set of sustainability performance indicators in accordance with Global Reporting Initiative (GRI) standards and now publishes a sustainability report every two years", continues Mr. Guisan. The three Fribourg-based branches of the company (Construction, Buildings and Development) have already had to overcome several major environmental hurdles, which included the construction of the new Poya Bridge as well as buildings which comply with Minergie (see p. 20) standards.

www.implenia.com



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BioPCMat Bids to Conquer Europe

ENERGY MANAGEMENT & STORAGE SOLUTIONS MARKETS A PHASE CHANGE BIOMATERIAL CAPABLE OF INCREASING BUILDINGS' THERMAL MASS.



e The University of Washington's molecular engineering building has been designed according to BioPCMat in order to minimize its energy consumption.

f Le bâtiment d'ingénierie moléculaire de l'Université de Washington est conçu autour du BioPCMat, afin de minimiser sa consommation d'énergie.

d Das Molekulartechnik-Gebäude der Universität Washington wurde zur Minimierung des Energieverbrauchs gemäß BioPCMat geplant.

Anyone sensitive to the cold is no doubt familiar with pocket hand warmers. This ingenious little device works by bending the tiny metal disc inside the water-filled pouch, which causes the solution to crystallise and ultimately emit heat. The phase change material, BioPCMat, from Phase Change Energy Solutions, also harnesses the power of this natural phenomenon whereby materials can absorb or emit heat, without any mechanical process, when changing from one state to another (solid to paste and vice versa).

"When a sufficient quantity of BioPCMat is installed in a building's internal structure, the material will absorb heat during the day and release it during the night. This solution can greatly reduce energy consumption, CO₂ emissions, and general running costs", explains Vasco Ferreira, Managing Director of Vaulruz-based Energy Management & Storage Solutions and representative for Phase Change Energy Solutions in Europe.

Encapsulated in fire-retardant polyfilm, BioPCMat has a wide range of applications. "The volume of the 13 mm-thick sheets never changes. They can be easily cut to fit around wall sockets and doorframes. Also, they are easy to install, whether in new builds, retrofits or temporary structures", adds Ferreira.

Another advantage of this innovative product is that it is 100% biodegradable. "Most phase change materials like paraffin are manufactured using petroleum. Our solution offers the same high performance as traditional phase change materials without the downsides". Business is booming for Ferreira: "We've only been in Vaulruz since September 2013 and I've already found distributors for Belgium, the Netherlands, the UK and Portugal. Several major companies and a number of public authorities in Switzerland have also expressed an interest in our product."

www.pcmeurope.com

Charpentes Vial: an Innovative Wood-concrete Connection System

2009 saw the completion of work on the Bulle bypass (H189), one of the biggest projects ever undertaken by the canton of Fribourg's highways agency. It also marked the debut of a completely new concept in Switzerland, the assembly of mixed wood-concrete bridges without metal connectors. Developed by Charpentes Vial SA in Mouret, "This technique eliminates all the metal components generally used to connect the concrete slab

to the wooden structure, with the two materials working through contact", explains Jacques Vial, Director of the company. Building on this success, the company then turned its attention to transposing this method to the construction sector. "The results of the many trials carried out with the Fribourg School of Engineering and Architecture during the BBPéco project were very conclusive. As well as effectively combining the benefits of

the two materials, our system for connecting wood and concrete results in a very positive eco-balance", states Grégoire Vial, Manager of the construction company. The thickness of the concrete slabs used in the first application of this method, at the primary school in La Heitera, was a maximum of 12 cm, for spans of more than 10 meters.

www.vialcharpentes.ch



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SD Ingénierie : Where Sustainability is Second Nature

FROM THE MOMENT THEY BEGIN STUDYING ALTERNATIVES, SUSTAINABILITY IS A KEY CONSIDERATION FOR THE COMPANY'S EMPLOYEES. IN SOME CASES, LEADING TO INNOVATIVE SOLUTIONS.



e_ Banque Raiffeisen's new Sarine-West headquarters in Belfaux is the first administrative building in the canton of Fribourg to meet the Minergie-ECO standard.

f_ Le nouveau siège de la Banque Raiffeisen Sarine-Ouest, à Belfaux, est le premier bâtiment administratif du canton de Fribourg à répondre au standard Minergie-ECO.

d_ Der neue Sitz der Raiffeisenbank Saane-West in Belfaux ist das erste Verwaltungsgebäude im Kanton Freiburg, das den Standard Minergie-ECO erfüllt.

The structure: a very dilapidated concrete bridge in Montbovon, built in 1916. The task: ensure the safe passage of abnormal loads over the River Sarine. The simplest option: demolish the existing bridge and build a new one. When Groupe E enlisted the services of SD Ingénierie Fribourg, its engineers weighed up various alternatives to identify the most sustainable solution for the project. "We managed to demonstrate to the client that using modern technologies to refurbish and strengthen the bridge was preferable to demolition and reconstruction, which would have used far more resources", explains Nicolas Messerli, manager of SD Ingénierie Fribourg, part of the SDplus group. The selected solution represented a first in the canton: installation of a layer of ultra-high performance fibrous concrete, accompanied by additional pre-stressing under the deck of the bridge. "This allowed us to limit the time scale and physical scope of the work. It also meant that we could preserve the bridge's original character," explains lead engineer

Damien Metry, who does not rule out the wider scale use of this *modus operandi* in the future.

For the Fribourg company's 25 or so employees, a quest for sustainability is second nature. "From the moment we start to study alternatives, we aim to offer our clients solutions incorporating this criterion", comments Nicolas Messerli, aware of the work still required to increase environmental awareness among some clients. Raiffeisen is not one of them: when the banking group asked architects and SD Ingénierie to design its Sarine-West headquarters in Belfaux, the briefing included the instruction to aim for the Minergie-Eco environmental label, a first in the Fribourg region. "This called on all of our engineers' skills. One of the key issues was finding solutions to compensate for the lower static performance of environmentally friendly concrete", the company's manager explains. A challenge accomplished masterfully.

www.sdplus.ch

Insulating Concrete Based on Recycled Glass

With excellent insulating properties, high resistance to compression and minimal weight, with no use of oil or gravel: foam glass has a lot to offer. Realizing the financial and environmental potential of this porous construction material, made 98% from recycled glass (see photograph), in 2009, Marc Corpataux joined forces with a Swedish partner to set up a production facility in this great Scandinavian country. The start-up company Vetropor began trading in Ecuwillens the following year, set up to handle Swiss distribution of the material and develop new applications.

"The main focus of our business is marketing an environmentally friendly insulating concrete based on foam glass", explains Raphaël Gaudart, Vetropor's Marketing and Business Development Manager. He also points out that his company is currently the sole supplier of this type of insulating concrete in Switzerland. The company has already received requests to supply the foundations for new wooden villas scheduled for construction. "This combination of recycled insulating wood-concrete is ideal for people who are concerned about environmental issues", comments Raphaël Gaudart, who also markets insulating concrete conservatories. "They are prefabricated in Fribourg and then assembled at the customer's home in just one day."

www.vetropor.ch



Formation



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Weiterbildung : www.hta-fr.ch/weiterbildung

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Glass: Increasingly Efficient as an Insulator

THE THERMAL VALUES OF THE INSULATING GLAZING, WHICH IS BEING DEVELOPED AND MANUFACTURED BY SOFRAVER SA IN AVRY-SUR-MATRAN, ARE GETTING BETTER AND BETTER ALL THE TIME.



e. One third of the 150,000 m² of insulation glass produced each year by Sofraver is installed directly by specialists from the Fribourg company.

f. Un tiers des 150'000 m² de vitrages isolants produits annuellement par Sofraver est directement posé par les spécialistes de l'entreprise fribourgeoise.

d. Ein Drittel der 150'000 m² Isoliergläser, die jährlich von Sofraver hergestellt werden, werden direkt von den Fachleuten des Freiburger Unternehmens eingebaut.

“The efficiency of insulating glass, introduced in Switzerland in 1970, has made dramatic progress. Today, this material has become a fully-fledged component in the insulation of buildings”, explains Pierre-Yves Biemann, Director of Sofraver SA. As a specialist in the development, assembly and installation of high-performance insulating glazing, the Fribourg company sells its products across the whole of Switzerland, as well as abroad. “During the 1980s, the heat loss from a square meter of window would have meant an annual consumption of 30 liters of fuel, in comparison to just eight at the pres-

ent time”, explains Chantal Robin, Executive Director of the company based in Avry-sur-Matran.

Contemporary architecture now favors large glass surfaces, offering plenty of natural light and increasing well-being. “Low-E (low emission) glazing has a thin layer of metal oxide, which allows it to reflect heat towards the building's interior during the winter and towards the exterior in summer”, explains Pierre-Yves Biemann. An increase in comfort and a reduction in energy bills are two reasons to celebrate. “The amount of energy consumed with this Low-E glazing installed

is lower than with a traditional wall”, stresses the Executive Director, who welcomes a standardization of this new-generation product. With 70 employees, Sofraver has not held back on implementing the blue economy in its operations. “Several years ago, the implementation of a new system for managing deliveries allowed us to make an annual saving of 50,000 km, while delivering 50% more products”, concludes Chantal Robin. The company is celebrating its 50th anniversary in 2014.

www.sofraver.ch

Hyboo, a Sustainable Technology with Great Promise

“Hyboo is short for hydraulic booster”, explains André Droux, founder of Hymexia, an automotive engineering firm in Granges. As well as advising the public authorities, Hymexia focuses its efforts on implementing innovative and environmentally friendly hydromechanical solutions, such as Hyboo. “The challenge facing us was to come up with an energy concept that would allow us to generate considerable hydrostatic power using small solar panels. To put it another way, we wanted to find a way of storing solar energy so that we could recover it in one go and use it to boost its power”, continues Droux, who illustrates the idea with the example of a party balloon which takes time to blow up but deflates as soon as

it is released. At the blueFACTORY technology park in Fribourg, an engineer has been working hard on developing the product since 2003. So far, 16 potential applications have been identified for Hyboo, the first of which is a 1.2 m³ solar-powered composter devised by a German company. This is a major step forward for the Hymexia team, who have invested heavily in the project both in terms of money (CHF 60,000) and time. “We're already at the commercialization phase and we've got high hopes for the product”, says André Droux.

www.hymexia.ch



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A Carpentry Firm that Reuses its Waste Wood

AT NOËL RUFFIEUX & FILS SA, RECOVERED WOOD SHAVINGS ARE BEING USED TO HEAT THE COMPANY'S PREMISES IN WINTER. THE SYSTEM WAS INTRODUCED BACK IN 1996.



e_ Since 1996, the carpentry firm has stored its waste wood in a silo with the aim of using it to generate heating energy in winter.

f_ Depuis 1996, un silo permet de stocker les déchets de bois de la menuiserie, dans le but de les utiliser comme énergie de chauffage en hiver.

d_ Seit 1996 können die Holzabfälle der Schreinerei in einem Silo gelagert werden, um sie im Winter zu Heizzwecken zu nutzen.

The Epagny-based carpentry firm Noël Ruffieux & Fils SA specializes in producing and installing wood, wood-metal and PVC windows. Wood is a key raw material, used in almost 40% of its production, and the resulting waste shavings are put to good use: generating heat for the building. "Wood shavings are vacuumed up and stored in a silo during warmer months and then used as heating energy when temperatures fall. We introduced the system back in 1996", explains Damien Ruffieux. The manager of

this family company outlines the dual benefit: "using this waste avoids disposal costs while at the same time saving on purchases of gas or fuel oil." Although this practice is not unusual at joinery companies, this small Fribourg firm has taken it a step further. Since September 2012, the 940 m² of photovoltaic solar panels installed on the roof of its building have been producing more than 140,000 kWh per year, meeting two thirds of its electricity needs.

www.noel-ruffieux.ch

Two Brothers, One Goal: Improving Energy Efficiency

Stéphane Camélique is a qualified engineer, while his brother Alain is a trained architect. They each operate their own complementary companies and share a common interest in energy efficiency and environmental protection. Stéphane is the managing director of Etanchéité Camélique SA, a company specialising in the installation of waterproofing systems. Alain runs Dimension Solaire Sàrl, which analyses potential solar power projects, as well as designs and installs solar (thermal and photovoltaic) panel systems.

Their combined expertise allows them to see a project through to the end – from the initial building analysis to successful application for cantonal and federal grants. Both companies offer their customers a range of turnkey solutions. As Stéphane Camélique explains: "Dimension Solaire, which was founded in 2008, can bring real value-added to its older partner thanks to its image as a technologically-savvy company that prizes sustainability." For example, the synergy between the two firms means that Alain, who holds a federal diploma in energy consultancy, can rely on a suitably qualified workforce to carry out



the work. With a customer base that extends well beyond Fribourg's cantonal borders, both companies benefit from this skill-sharing arrangement. It also comes as no surprise to learn that their brand new offices in Farvagny are fitted with solar panels that generate 21,000 kWh per year, which means that they produce much more power than they use.

www.etancheite-camelique.ch

www.dimension-solaire.ch

Energy Expert

Greater energy efficiency is at the heart of everything Energie Concept does. This engineering consultancy in Bulle specializes in the design and installation of district heating networks, but also supports municipalities with devising tailor-made energy management plans. As Thierry Dewarrat, managing director of Energie Concept, explains: "The canton subsidizes up to 50% of this exploratory work, which goes a considerable way towards the development of the wider municipal energy management plan." The firm is also working on the creation of a canton-wide energy performance certificate, which would set the standards that renovation work on apartment buildings and single-family homes would have to meet. Companies looking to obtain environmental certification also seek out the advice of Energie Concept. Dewarrat is quick to point out, "We were also involved in discussions on the energy needs of the new blueFACTORY technology park as a zero-carbon site."

www.energieconcept.ch



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THE COCCUM CONSTRUCTION SYSTEM, DEVELOPED BY LUTZ ARCHITECTS IN COOPERATION WITH VARIOUS PARTNERS, COMBINES PERFORMANCE, ECOLOGY AND FINANCIAL PROFITABILITY.



The former Pensier convent in the canton of Fribourg has been transformed beyond recognition. Now an apartment building, it is the first renovation in French-speaking Switzerland to be carried out according to the very strict requirements of the Minergie-P standard. It also marks the first implementation of the Coccum project, developed by Lutz Architectes in cooperation with Fribourg higher education establishments and private partners.

In an age where renovation of housing stock is an integral part of efforts to combat global warming, the Coccum construction system promises major savings in thermal energy while considerably reducing the environmental impact linked to construction materials. "For Pensier, the choice of prefabricated peripheral insulation brought a range of advantages, including maintenance of the habitable space and the speed of on-site operations. This innovative method allowed us to install the building's 1,000 m² frontage in just one week", explains Conrad Lutz, manager of Lutz Architectes in Givisiez.

e The very run-down former Pensier convent (on the left) has been replaced by highly energy efficient rental accommodation.

f L'ancien couvent de Pensier (à gauche), fortement dégradé, a fait place à un immeuble locatif d'une grande efficacité énergétique.

d Das stark verfallene ehemalige Kloster von Pensier (links) hat einem Mietshaus mit hoher Energieeffizienz Platz gemacht.

Results are already apparent: together with other effective methods, including a heat pump and solar panels, the new external insulation has helped to reduce the building's energy consumption by around 90%. Conrad Lutz concludes: "The Coccum renovation technique combines performance, ecology and financial profitability in the long term."

www.lutz-architecte.ch

Simple Innovative Solutions for Improving Energy Efficiency

Saia Burgess Controls, in Morat, is designing simple innovative solutions for reducing electricity consumption. "The Energy Strategy 2050 of the Federal Council is a reality that cannot be ignored. Half of the objectives relating to the concept of a 2,000 watt society can be achieved by means of energy efficiency", considers André Gross, the sales manager for Switzerland and Austria. The Fribourg company, specializing in automation and controls for infrastructure and buildings, sees an enormous potential for

savings in businesses and shopping malls, which constitute the core of its client base. Sold in Europe, the Middle East and Africa, the products of Saia Burgess Controls, a subsidiary of the Honeywell group since 2012, are of three types. Electricity meters represent the basic activity of the company. "Their small size makes it possible to integrate them easily in existing buildings", notes André Gross. For a few years, the 350 or so employees of the company, 233 of whom work on the Fribourg site, have also been

developing monitors for displaying the data collected by these meters. "Users who are directly involved in the energy management process, are more able to adapt their consumption." Finally, Saia Burgess Controls offers programmable automatic controllers that optimize heating, air-conditioning or the position of blinds in a building. Several well-known establishments, such as the Westside shopping mall, in the Canton of Berne, have already opted for these solutions.

www.saia-pcd.com



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International Potential of Wood-Based Concrete

TRUE TO ITS GREEN CREDENTIALS, ECO-LOGEMENTS IS CURRENTLY DEVELOPING PREFABRICATED EXTERIOR WALLS MADE FROM WOOD-BASED CONCRETE.



Reducing the carbon footprint of concrete is one of many ambitious goals pursued by ECO-logements in Cottens. Together with the Fribourg School of Engineering and Architecture (EIA-FR) and several industrial partners, the Fribourg company has been involved in the BASIC project to develop concrete that is not only lightweight but also more environmentally friendly. "By the end of the first phase of the project, we had managed to reduce the thickest part of the prefab concrete components, including external insulation, to 12 cm compared to the standard external wall thickness of 20 cm",

explains Eric Demierre, director of ECO-logements. The architectural firm, which specializes in the design and construction of low-energy buildings, continues to build on its promising achievements. "We're currently testing the mechanical resistance and heat conductivity of a new type of concrete that contains a mixture of wood and rubble", continues Demierre. While it looks the same as traditional concrete, this new product is considerably lighter, weighing in at 1,700 kg per cubic meter compared to 2,500 kg. "We still have to carry out a detailed assessment of the effects – economic, insulation

e Initially, the new construction system developed by ECO-logements – here on a site in La Roche (canton of Fribourg) – has allowed the thickness of concrete walls to be reduced to 12 cm.

f Dans un premier temps, le nouveau système de construction développé par ECO-logements – ici sur un chantier à La Roche (canton de Fribourg) – a permis de réduire l'épaisseur des murs en béton à 12 cm.

d Erstmals konnte mit dem neuen, von ECO-logements entwickelten System - hier auf einer Baustelle in La Roche (Kanton Freiburg) - die Dicke von Betonwänden auf 12 cm reduziert werden.

and embodied energy – that this concrete would have when used in the construction of a single-family home or an apartment block." With ever tighter environmental regulations, this research could clearly offer interesting economic opportunities both nationally and internationally.

www.eco-logements.ch

Cosseco Frees the Heat Pump from the Electrical Network

In Switzerland, demand for heat pumps is growing. A system praised for its low CO₂ emissions, yet simultaneously criticized for its dependency on the electrical network. But not anymore, thanks to Cosseco. Established in 2010, this small company based in Châtel-St-Denis has eliminated this drawback by producing heat pumps linked directly to photovoltaic panels. Energy produced on a building's roof during the day is used for internal heating (or cooling) and hot

water supplies. The extra energy generated is stored in hot (or cold) water tanks which then release energy overnight. "With optimal programming, this system can cover between 30% and 50% of a building's annual electricity consumption", emphasizes Pierre Guiol, Cosseco's Manager. The remainder is supplied by the network, with the heat pump connecting automatically as and when required. The idea – currently exclusive to Switzerland – of combining energy

generation and consumption was the brain-child of David Orlando, an engineer (and the company's CEO). He has even patented his power modulation system, designed to create optimal energy efficiency. As for the price, Pierre Guiol explains that the complete Solarline kit, consisting of photovoltaic panels and pump, costs 5% to 15% more than the thermal equivalent. "However, this extra cost is amortized in three to seven years."

www.cosseco.ch

e. The design of the Solar Impulse, a revolutionary solar-powered aircraft planned to be flown around the world in 2015, required the project partners to push the boundaries of knowledge in the areas of materials, energy management and the human-machine interface.

f. La conception de Solar Impulse, un avion solaire révolutionnaire dont le tour du monde est prévu en 2015, a obligé ses partenaires à repousser les limites des connaissances dans le domaine des matériaux, de la gestion énergétique et de l'interface homme-machine.

d. Für das revolutionäre Solarflugzeug Solar Impulse, das 2015 um die Welt fliegen wird, müssen die Projektpartner die Grenzen ihres Wissens in den Bereichen Werkstoffe, Energiemanagement und Mensch-Maschinen-Schnittstelle ausdehnen.



Mobility and Transport



THE CREATION OF A MORE SUSTAINABLE WORLD CALLS FOR THE DEVELOPMENT OF INNOVATIVE AND RESPONSIBLE MOBILITY SOLUTIONS AND BEHAVIORS. FRIBOURG COMPANIES ARE TAKING PROACTIVE STEPS.

While mobility represents one of the more beneficial characteristics of our civilization, it is also one of the greatest sources of nuisance and consumers of resources. In Switzerland, traffic is responsible for around one-third of energy consumption, which is produced almost exclusively from fossil fuels. The creation of a more sustainable world will therefore be impossible without the development of innovative and responsible mobility solutions and behaviors.

In Switzerland, two-thirds of distances traveled each day are made by individual motorized transport, compared to one-quarter made by public transport and one-tenth on foot or by bike. Private passenger vehicles, accounting for 75 percent of the six million or so road vehicles circulating in Switzerland, remain the hub of the problem.

Fribourg companies have realized the extent of this potential. For example, Bcomp's organically sourced materials (p. 41) are helping to reduce the weight of various vehicle components by up to one-third, with several major manufacturers having approached the Fribourg start-up.

Michelin (p. 39) is focusing its attention on tires, whose rolling resistance is responsible for 20% of fuel consumption. At its innovation center in Givisiez, the global giant is also working on the development of the electric fuel-cell powered car, a standard technology of the future.

At Liebherr Machines Bulle (p. 47), every day about 250 engineers are working to optimize the energy of diesel and gas engines for construction vehicles. Meanwhile, the freight company Von Bergen, in Domdidier, is introducing an increasingly wide range of initiatives to reduce the fuel consumption of its fleet of around one hundred trucks (p. 42).

The Adolphe Merkle Institute (p. 42) is assessing the negative effects of the inhalation of exhaust gases from diesel and gas engines. The research being undertaken by Professor Barbara Rothen-Rutishauser is generating a lot of interest in the automotive industry.

Finally, far above our highways, the Solar Impulse project is being greeted with enthusiasm. This revolutionary solar-powered aircraft, set to embark on a round-the-world flight in the spring of 2015, is equipped with innovative technologies from companies including Bayer MaterialScience (p. 45).

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The Future of Electric Mobility with Michelin

AT ITS INNOVATION CENTER IN GIVISIEZ, MICHELIN IS DEVELOPING THE CAR OF TOMORROW. IT WILL BE POWERED BY A FUEL CELL, IN TURN DRIVEN BY HYDROGEN.



Tires account for around 20% of a car's fuel consumption. Since becoming aware of this phenomenon back in the 1990s, Michelin has been working to reduce rolling resistance. Its innovative project has resulted in the launch of the "energy saver" tire, made from a new rubber compound designed to reduce fuel consumption and CO₂ emissions. "Sustainable mobility is part of the company's DNA," sums up Pierre Varenne, Manager of Michelin Recherche et Technique Ltd.

At its innovation center in Givisiez, the global tire giant is working on subjects linked to its core business. "Electric mobility, and by exten-

e_ Six charging terminals for electric vehicles appeared in January 2014 in the outside car park at Michelin Recherche et Technique SA.

f_ Six bornes de recharge pour véhicules électriques sont apparues en janvier 2014 sur le parking extérieur de Michelin Recherche et Technique SA.

d_ Sechs Ladesäulen für Elektrofahrzeuge stehen seit Januar 2014 auf dem Aussenparkplatz von Michelin Recherche et Technique AG.

sion the fuel cell, are two of our key focuses," continues Pierre Varenne, who believes that the use of hydrogen as opposed to traditional storage batteries brings two main advantages: battery life and charging time. "Toyota and Honda have announced the launch of hydrogen-powered electric vehicles in 2015. The technology is there. Here at Michelin, we feel this very strongly." In 2011, engineers at the Fribourg center had already developed the energy module for the F-City H2, the first urban electric vehicle with a fuel cell and stored hydrogen energy to be approved in France.

Still in the theme of promoting clean mobility, Michelin Recherche et Technique Ltd. has just installed six private electric terminals in its outdoor car park. The manager concludes: "To support the growth of electric vehicles, now driven by 10% of our 70 employees, more charging facilities will be required. We need to lead by example."

www.michelin.com

Reduce Unnecessary Travel With ePark

In large towns, more than one third of automobile journeys result in a search for a parking place. The ePark mobile application (see photograph), launched by the School of Engineering and Architecture of Fribourg, makes it possible to map available parking lots, to consult their occupancy level or to display an itinerary that maximizes the chance of finding a free space. "The collection of statistical data and sharing of information by the users help to improve the performance of the application, at the moment usable only in Fribourg", says Jean Hennebert, professor of computing at the School and the manager of the project.

Further developments are planned, such as

the indication of the locations of recharging points for electric vehicles. In this regard, ePark has enabled the School to obtain participation in the new RIdERE (intercantonal electric recharging roaming) project of the Energy and Municipal Research Center, which aims to produce open solutions for roaming of electrical vehicle users. "Our ambition is to define a communication standard at the Swiss level and to offer solutions in micro-invoicing", says Jean Hennebert. Several strategic partners, including the Canton of Geneva, several industrial services in Valais and the Federal Office for the Environment are giving their financial support to the new project.

portal.hefr.ch/eifr/epark





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Bcomp Technologies in the Driver's Seat

THE FRIBOURG START-UP, BCOMP, IS ATTRACTING INTEREST FROM SEVERAL MAJOR CAR MANUFACTURERS AND THE SWISS SPACE OFFICE.

e_ The chassis and framework of the "Bio-Mobile" car, a prototype very low-consumption vehicle, are made from ampliTex flax fibers, a technology developed by Bcomp.

f_ Le châssis et la carrosserie de la voiture « BioMobile », un prototype de véhicule à très faible consommation, sont constitués de fibres de lin ampliTex, une technologie développée par Bcomp.

d_ Das Fahrgestell und die Karosserie des Autos « BioMobile », Prototyp eines Fahrzeugs mit sehr niedrigem Verbrauch, bestehen aus ampliTex-Flachfasern, einer von Bcomp entwickelten Technologie.

"We are realists. We know that it'll take more than a few years to change the world of mobility. Having said that, we can make it better", smiles Christian Fischer, co-managing director of Bcomp. The Fribourg start-up made a name for itself on the international market – winning a clutch of innovation awards along the way – with its ski cores made from natural fibre composites. Today, its biocomposite materials are attracting the attention of several major automotive manufacturers. As Fischer, a qualified engineer, explains: "We are currently in discussion with a number of car makers. Our technologies could allow them to reduce the weight of certain car components by a third." At a time when environmental regulations are forcing the entire automotive industry to develop lighter vehicles, Bcomp's biocomposite solutions could make their task considerably easier. For example, the start-up's flagship product, the flax-based ampliTex fabric, is well-suited to the manufacture of structural car components like roofs and doors.

This is not the first time that Bcomp, which has its headquarters on the blueFACTORY site (see p. 13), has made a foray into the world of



mobility. It was involved in the development of the "Catecar", a green high-tech urban vehicle, as well as the futuristic tandem "CIEO", the "BioMobile" car, and the e-trike taxis used in the Philippines. These projects offer car manufacturers proof "that driving does not have to be polluting", notes Christian Fischer. While the four thrill-seekers who founded the company in 2011 may have their feet firmly on the ground, they are also keeping an eye on the stars, or rather space. "We were one of the winners of a "Call for Ideas" launched by the Swiss Space Office. Our proposed thin-walled composite structures could triple the damping properties of spacecraft components without compromising on stiffness and weight."

www.bcomp.ch

Industrial Ecology in Action in Villars-sur-Glâne

In a first for the canton of Fribourg, 15 companies located at the Moncor business park – including Cremo, Groupe Mutuel, Jesa, Meggitt, Richemont and Vifor – have joined forces to improve their economic, environmental and social performance. They held the incorporation meeting of the new Moncor Business Park Association (Association du Parc d'activités de Moncor, APAM) on 18 September 2013. "Association members employ two-thirds of the park's 3,500-strong workforce. This high concentration bodes well in terms of energy use, waste management and

shared services", says Erika Schnyder, the mayor of Villars-sur-Glâne which, alongside the Greater Fribourg Area, is the main backer of this industrial ecology pilot project.

The first resolution taken by this public-private partnership was to commission an external firm to carry out a mobility study (public transport, parking, car-sharing etc.) and come up with a set of tailor-made solutions for the business park. A series of meetings and workshops identified that the most pressing concerns were mobility, safety, daycare facilities and energy efficiency. As Séverine Lago,

head of economic development for the Greater Fribourg Area, explains: "This first step towards putting industrial ecology into practice will not only bring benefits to the Moncor business park but it will set an example and be a source of encouragement for other business parks both in the Greater Fribourg Area and beyond."

www.agglo-fr.ch

www.villars-sur-glâne.ch

Helping to Make the Air We Breathe Healthier

IN ORDER TO MEASURE THE NEGATIVE EFFECTS OF PETROL AND DIESEL ENGINES ON THE LUNGS, THE ADOLPHE MERKLE INSTITUTE IS SEEKING NEW WAYS TO MAKE THE AUTOMOBILE INDUSTRY SIT UP AND LISTEN.



What happens to a person's lungs when they breathe in exhaust fumes from gas or diesel engines? This is a question in which Barbara Rothen-Rutishauser, Professor at the Adolphe Merkle Institute (AMI), is passionately interested. Until now, this question has been addressed by conducting experiments on animals. In recent years the automobile industry has optimized fuel efficiency and developed numerous exhaust treatment systems and alternative fuels, in order to reduce the harm to human health.

However, in order to be able to make better predictions about the effects of the exhaust fumes on the lungs, the researcher Barbara Rothen-Rutishauser and her team have created a very complex lung cell culture model. Furthermore, in collaboration with the Fachhochschule Biel, they have developed a system, which creates the realistic conditions that will help scientists research what happens when cells come into contact with exhaust fumes. "We direct the fumes towards the cell cultures and are therefore able to monitor

e_ Barbara Rothen-Rutishauser's research focuses on the harmful effects of nanoparticles, originating mainly from exhaust gases from diesel engines.

f_ Les effets néfastes des nanoparticules, provenant principalement des gaz d'échappement des moteurs diesel, sont au centre des recherches de Barbara Rothen-Rutishauser.

d_ Die schädlichen Auswirkungen von Nanopartikeln, in erster Linie aus den Abgasen von Dieselmotoren, stehen im Mittelpunkt der Forschungen von Barbara Rothen-Rutishauser.

the reactions in the lungs. Our model enables us to undertake far more experiments simultaneously than was possible with the animal experiments. Moreover, we are working with human cells, which increases the results' relevance for medical practice", explains the professor. Thanks to these cell cultures, she has been able to prove that, despite having the best possible particle filters in engines, the fumes still have a damaging effect on the lungs. "Admittedly with the filters better results are achieved, but the problem of exhaust fumes has not yet been fully addressed", she stresses. "Exhaust fumes still cause damage to the lungs, even this is at lower levels."

Her complex model of lung cell cultures, which is being exposed to exhaust fumes, has attracted strong interest at international exhibitions and conferences. She appreciates being asked for advice by the automobile industry. "The best situation would be when nothing at all comes out of the exhaust pipes", she says, and she is well aware that she is far from finishing her research project. "Our model has been able to show the acute negative consequences of exhaust fumes on the lungs, but not what happens in these organs when subjected to 40 or more years of inhaling these poisonous gases, she states, and reveals that her research also involves developing a medicine that is administered directly to the lungs, without being injected into the bloodstream, which could help asthma sufferers, for instance.

www.am-institute.ch

von Bergen: Traveling Responsibly

"In March 2013, we were the first hauler in French-speaking Switzerland to acquire a truck complying with the Euro 6 antipollution standard (see photograph). The latter will however be imposed on new vehicles starting in September 1st 2014." Marc von Bergen, Manager of the Von Bergen SA transport company in Domdidier, has made fuel savings his slogan. "All our fleet of vehicles is limited to 85 km/h, instead of the normal 90 km/h. This simple measure has resulted in an average drop in our consumption of 2 liters per 100 km." A computer program connected to the trucks' GPS calculates the optimum route for each journey. In order to

encourage his drivers to drive responsibly, Marc von Bergen enters them every three years in Eco-Drive courses. "Installed in each vehicle, an electronic box gives information on their driving and makes it possible to rank the best drivers. This is a good means of involving them and getting them to compete with one another." In the end, on a total consumption of about 2.5 million liters of diesel per year, the saving achieved amounts to 2.5%. However, the Fribourg company, with 150 employees, has other projects: in 2014, 7,000 m² of solar panels will be installed on the roof of its logistic center in Domdidier.

www.vonbergensa.ch



BLUE INSPIRES THEM...
LE BLUE LES INSPIRE...
BLUE INSPIRIERT SIE...



**Katherine Foster (47),
Faculty Member of the School
of Management of Fribourg**

Fribourg is catching up with cities such as Zurich and Lausanne as the Blue Economy gets underway, according to Katherine Foster, faculty member of the School of Management in Fribourg.

Foster teaches intercultural management, corporate responsibility and innovation, a shift from her previous role as a diplomat on climate change: "There are big differences in how these issues are handled in different countries – there are even differences within Switzerland! Innovation and entrepreneurship can address sustainability issues. But not all entrepreneurs are Mark Zuckerberg in a hoodie!" Foster added.

For Foster, the term "Blue Economy" reflects a way of doing business. "It's about innovation, integration and finding new ways to deal with waste – viewing it as a resource in itself. Whereas the "green" economy can be too expensive for some people, its "blue" counterpart is arguably more attainable. One example of a "blue" project in Fribourg is the Red Cross Zig-Zag shop on Blvd. de Pérolles, which collects discarded items from people and resells them", she added.

Foster coordinates the Innovation Discovery and Technology Transfer paper that Graduate students conduct in cooperation with local companies in a broad range of sectors. She also teaches a course on Green Entrepreneurship at ETHZ and serves on the board of the Innovation Club.

Nonetheless, Fribourg's Blue Economy' is still in its infancy: "The Blue Economy is only just getting started in Fribourg", Foster said. "But innovation and entrepreneurship are very strong here, which makes it easier to try and solve problems relating to waste, resources and climate change. I'm actually very excited about that."

www.heg-fr.ch



**Gilles Bersier (47), President of the
Small Cause Big Effects Foundation**

"If you want to engage people on the issue of sustainable development, you have to stop haranguing them and making them feel guilty. Make it fun and pleasurable instead."

When it comes to climate change, Gilles Bersier, President of Small Cause Big Effects Foundation, takes a positive and innovative approach. It is this vision which underpins an ambitious exhibition "L'Oracle du Papillon", which is set to open on 21 March 2014 at the site of the blueFACTORY technology park (see p. 13) in Fribourg, where it will run until November 2014. The result of close cooperation between national and international partners, the exhibition will feature user-friendly, interactive and living interfaces that mix art, science and technology. "The centerpiece of the exhibition will be a giant cube with a side length of eight meters, representing the space that one metric ton of CO₂ takes up. Given that each person in Switzerland annually emits an average of five tons of CO₂, the cube shows visitors what a 20% reduction in their emissions would look like", explains Bersier. There will also be a "Solutions Center" designed around four key themes: energy, habitat, consumption and mobility. As its name suggests, the center will offer visitors practical ways to reduce their carbon footprint. "Collective action is nothing more than the sum of individual actions", notes the 47-year-old, who was born in London to parents who hail from Fribourg. A trained singer by profession, Gilles Bersier joined the environmental movement somewhat later in life: "It was my children who opened my eyes". He also credits the Al Gore film on climate change An Inconvenient Truth for his green awakening. "We need to make the public more aware of the issue and try as best we can to strike the right balance between what we need and what we want."

www.big-effects.org



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Solar Impulse, a Test Bed for Innovative Materials

BAYER MATERIALSCIENCE HAS BEEN WORKING ON THE SOLAR IMPULSE PROJECT SINCE 2010. ONE OF ITS MAJOR CONTRIBUTIONS IS THE ULTRA-LIGHT INSULATING FOAM THAT LINES THE PLANE'S COCKPIT.



e Bayer MaterialScience was involved in the design of the cockpit, wings and windows of the Solar Impulse solar-powered aircraft.

f Bayer MaterialScience est intervenu dans l'élaboration du cockpit, des ailes et du vitrage de l'avion solaire Solar Impulse.

d Bayer MaterialScience ist an der Entwicklung des Cockpits, der Flügel und Fenster des Solarflugzeugs Solar Impulse beteiligt.

In 2015 Bertrand Piccard and André Borschberg are set to pilot the Solar Impulse on a unique round-the-world voyage. The plane features a number of technologies developed by Bayer MaterialScience, part of the Bayer Group, which specializes in the manufacture of high-performance materials such as polyurethanes and polycarbonates. "We began working on the Solar Impulse project in 2010. We were fully involved in the development of the cockpit, and have also supplied the cockpit glazing as well as key components for the plane's wings", explains Bjoern Skogum, Director of Bayer International SA in Fribourg. The two main constraints for the solar-powered plane are weight – it should be no heavier than an average-sized car – and insulation. With neither a heating system nor a pressurized cabin, the plane will have to be able to withstand the extreme temperature fluctuations that it will encounter during the flight.

With this in mind, researchers at Bayer developed an ultra-light and highly effective insulating material called Baytherm™ Microcell for the cockpit. "Solar Impulse is the ideal testing ground for us (trials with the first prototype began in 2010). For example, the insulating foam in the cockpit can also be used in other applications like refrigerators", notes Mr. Skogum, who manages the 100-strong workforce in Fribourg.

Solar Impulse is not the first challenge that Bayer has faced with regards to mobility and sustainable development. "Our slogan, Science For a Better Life, implies a certain degree of environmental awareness", continues the regional managing director. The group manufactures a wide range of lightweight components for the automotive industry to help make vehicles more energy-efficient.

The Blue Economy also benefits from the expertise and support of Bayer MaterialScience. "Thanks to new technology we can now use CO₂ to produce polyol, a primary material used to make high-quality polyurethane foam, thereby replacing some of the fossil raw materials, like petroleum, that we would normally use." Commercial-scale production is scheduled to begin in 2015.

Finally, in 2009, Bayer International SA launched its EcoCommercial Building programme, which aims to reduce the carbon footprint of buildings and is supported by a global multidisciplinary network of member companies. Within the space of a few years, it has succeeded in constructing zero-emission buildings in Germany, Belgium, India and the United States.

www.materialscience.bayer.com

Harnessing the Potential of Pedal Power

The mission of the cantonal Mobility Office (SMo), which was set up in 2012, is "safeguarding mobility today and tomorrow". On the to-do list of the 17 members of SMo staff are the development of a cantonal mobility strategy, the planning of transport networks and infrastructure, the management of the public transport supply and the promotion of

non-motorized mobility. "These last two issues are major priorities for the canton", explains Martin Tinguely, head of the SMo. Two of the main items on the SMo agenda deal with sustainable mobility. The first is the expansion of the RER Fribourg/Freiburg, which is the centerpiece of the canton's public transport development plan. The second is

a review of the bicycle master plan so that canton is in a position to provide cyclists in an efficient, attractive, safe and uninterrupted network of cycle lanes. According to Martin Tinguely: "Bicycle use in the canton has real development potential."

www.fr.ch/smo

Vivre le progrès.



Compétence pour système d'entraînement

Liebherr Machines Bulle SA appartient à la division composant du groupe Liebherr. En tant que filiale de Liebherr-Component Technologies AG, celle-ci exploite une usine de production très moderne où sont développés et fabriqués des composants d'entraînement et de commande pour les engins de construction Liebherr. La société dispose d'une surface totale de plus de 118'000 m² et emploie actuellement plus de 900 personnes. A Bulle, dans le canton de Fribourg, sont développés et produits des moteurs Diesel couvrant une plage de puissance entre 130 kW et 750 kW ainsi

que des moteurs à gaz de 100 kW à 516 kW. Les moteurs Diesel sont équipés de notre propre système de traitement des gaz d'échappement d'injection et management électronique. Depuis près de 30 ans, Liebherr développe et fabrique également des pompes et des moteurs hydrauliques à pistons axiaux ainsi que des soupapes et éléments de commande hydraulique. Une gamme de réducteurs complète l'offre. Ces systèmes complets à circuits hydrauliques multiples équipent différentes machines d'un entraînement moderne et performant.

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LIEBHERR

Le Groupe

Liebherr: Increasingly Less Polluting Engines

WITH REGARD TO BOTH THE PRODUCTS DEVELOPED AND THE PROCESSES USED FOR MANUFACTURING THEM, THE FRIBOURG COMPANY IS ENDEAVORING TO APPLY A SUSTAINABLE POLICY.

At Liebherr Machines Bulle SA., around 250 engineers work each day on the energy optimization of the diesel and gas engines produced by the Fribourg company. "Complying with legal requirements is of course part of the gradual and continual reduction of polluting emissions from our engines, but we also take our responsibility to the environment very seriously. Its protection requires our products and manufacturing processes to be safe, effective and ecological", emphasizes Claude Ambrosini, one of the three managers of Liebherr Machines Bulle.

Since construction machinery operates under more severe conditions than road vehicles, the challenge is huge. "Our engines must withstand wet, dust, shocks and temperature differences covering a range from -50°C to +60°C", says the manager, whose technical teams still see the possibility for improvement. "Soon, the use of energy-recovery systems will make it possible, for an equivalent volume of work, to reduce the engine fuel consumption."

With regard to processes, Liebherr Machines Bulle has ultramodern test stands for its development work, which are designed to maximize energy saving. Thus the heat given off by these installations is used to heat some of the company's buildings, while mechanical energy is converted into electricity and re-injected into the system.



e The ultra-modern test stands at Liebherr Machines Bulle SA allow for the recovery of heat and mechanical energy.

f Les stands d'essais ultramodernes de Liebherr Machines Bulle SA permettent une récupération de la chaleur et de l'énergie mécanique.

d Die hochmodernen Prüfstände der Liebherr Maschinen Bulle AG erlauben die Rückgewinnung von Wärme und mechanischer Energie.

During 2014, two new test stands intended for the development of gas engines will be inaugurated. "With the energy produced, it will be possible for us to heat the entire main administrative building. We will also be able to recover electrical energy in large quantities", Claude Ambrosini is delighted to say.

It is in Bulle that the Liebherr Group established its world headquarters. The company currently has some 39,000 employees – including around 1,000 at the Fribourg site – and 130 companies throughout the

world, with an annual turnover exceeding CHF 11 billion. Its extensive catalogue ranges from construction machinery to dock cranes, through products intended for aeronautics, machine tools and domestic electrical equipment.

www.liebherr.com

The First Electric Cabs in the Canton

A subsidiary of the Wielandbus transport company in Morat, Taxis Fribourg has embarked on a new experience. "I have decided to supplement my fleet of eleven cabs with four electric vehicles, on test for six months" says Philipp Wieland. Supported in his project by Group E, Chevrolet, and the Belle-Croix garage, the manager is aiming at two objectives: to test the efficacy and profitability of these ecological vehicles, equipped with a lithium-ion battery and enjoying a range of 60 kilometers. Though he does not deny the enhanced image achieved by

his business, Philipp Wieland is also acting through personal conviction. "The future of the automobile lies with the all-electric, I am convinced of this." In the meantime, he gives himself until the summer to make a first assessment of his "rechargeable" cabs. Their low consumption could provide a return on investment in less than five years, despite a purchase price 20% higher than that of a conventional vehicle.

www.wielandbus.ch



e. Fribourg industry – in this case Vifor Pharma in Villars-sur-Glâne – is making major efforts to optimize the efficiency of production processes, by controlling consumption of resources and recycling waste.

f. L'industrie fribourgeoise – ici Vifor Pharma, à Villars-sur-Glâne – fait des efforts importants pour optimiser l'efficacité de ses processus de production, par la consommation maîtrisée des ressources ou la valorisation des déchets.

d. Die Freiburger Industrie – hier Vifor Pharma in Villars-sur-Glâne – unternimmt bedeutende Anstrengungen, um die Effizienz ihrer Produktionsprozesse durch sparsame Ressourcennutzung oder die Abfallverwertung zu steigern.



Industry and Services



GREATER ENERGY EFFICIENCY, BETTER WASTE RECOVERY AND THE ADOPTION OF SOCIALLY RESPONSIBLE PRACTICES ARE SOME OF THE WAYS THAT INDUSTRY AND THE SERVICE SECTOR SEEK TO APPLY THE PRINCIPLES THAT UNDERPIN THE BLUE ECONOMY.

The blue economy takes its inspiration from the natural world, where ecosystems consume little energy, recycle as a matter of course, and generate next to no waste. For the resource-intensive industry sector, not only is this business model sustainable and ethical but it is also cost-effective and competitive.

Improving energy efficiency involves companies adopting a series of voluntary measures, such as upgrading their production processes, heating systems and lighting. When Vifor Pharma (p. 67) replaced the air-conditioning system in its production facilities, it saw its electricity consumption fall by 25%. Installing new air compressors to drive the packaging line led to 20% energy savings for the company.

JetSolutions (p. 53) has also slashed its energy consumption thanks to a new automated facility management system which, among its many features, directly shuts down the company's computers as soon as the lights are turned off.

The systematic use of the residual heat generated during the manufacturing process holds great potential for companies that want to become more energy-efficient. This is precisely how Wago Contact (p. 65) in Domdidier heats its 14,000 m² facility. So far, the St Paul printworks (p. 70) saved around 187,000 kWh thanks to a free cooling system which uses heat recovered from its brand-new printing press.

No business is too big, or too small, to recycle and upcycle. The two-man outfit, Rondechute (p. 55), makes bags and accessories from used sails and PVC off-cuts, while one of the largest employers in the canton, Micama (p. 59), has set itself the goal of recycling 100% of its industrial by-products and waste, organic or otherwise.

The Fribourg-based milk processor, Cremo (p. 57), has turned to renewable sources of energy. Since July 2013, the system used to sterilize the group's coffee creamer at high temperatures is powered by energy from a new-generation solar power installation.

It is important to remember that the blue economy also has a social dimension, which is equally capable of driving growth. Frewitt (p. 69) and Ringier Digital (p. 69), for example, have improved working conditions for their employees, which in turn has improved their business performance.



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Geberit: Environment and Productivity, a Similar Battle

IMPROVING PRODUCTION PROCESSES AND ENCOURAGING EMPLOYEE INVOLVEMENT ARE CENTRAL ELEMENTS OF THE GIVISIEZ-BASED COMPANY'S ENVIRONMENTAL STRATEGY.



The figures are impressive. In less than ten years, Geberit in Givisiez has managed to reduce its consumption of water by 95%, gas by 65% and electricity by 35%, while cutting CO₂ emissions by 69%. And all this is in parallel with a surge of more than 200% in the company's productivity. "These results are good for both the company and the environment," comments Michel Pittet, General Manager of the factory producing multilayer pipes (99% recyclable). Part of the St. Gallen-based Geberit group - the European leader in sanitary technology - since 2001, the Fribourg factory has invested tens of millions of Swiss francs in improving its production processes. "For example, we take advantage of low winter temperatures to cool our pipes after extrusion (free cooling). Thanks to this action, and a wide range of further initiatives, we are exempt from the CO₂ tax", emphasizes the engineer-chemist.

e The ultra-modern "Pulse" system analyzes specific data from production lines and energy consumption sources.

f Le système ultramoderne «Pulse» permet d'analyser les données spécifiques des lignes de production et les sources de consommation d'énergie.

d Mit dem ultramodernen System «Pulse» können die spezifischen Daten von Produktionslinien und die Quellen des Energieverbrauchs analysiert werden.

The six production lines are also equipped with an ultra-modern diagnostic system called "Pulse". "This system carries out real-time analyses of all energy consumption sources and specific data from the production lines. The resulting, very comprehensive, statistics allow us to identify areas for improvement and anticipate problems." At the moment, the Fribourg factory is the only one in the group – which has 16 companies around the world and a total of 6,000 employees – to use the fully automated "Pulse" system. "However, there is increasing interest from the other companies!" adds the manager.

Another key aspect for Geberit is staff training. "When it comes to safety or the environment, bringing employees – we have 75 in Givisiez – on board is essential. Well-intentioned directives are not enough. Rather than enduring, employees need to play an active role." Annual training, working groups, meetings, notice boards, external coaching and involvement in drawing up company rules are just some of the methods used to achieve this.

Michel Pittet reminds us: "Above and beyond the environmental aspect, our optimization policy is helping us to maintain our margins and grow in a highly competitive international market."

www.geberit.ch

Informative Articles on Sustainability in the French-speaking World

The title sets the tone: "LaRevueDurable" (the sustainability journal) publishes articles and features on sustainability issues. From farming to biodiversity, energy, climate, town planning, mobility and consumption, this quarterly magazine keeps its readership up to date with all the latest developments in the areas of ecology and solidarity. The Fribourg-based "LaRevueDurable" was created in 2002, as a result of the determined efforts and energy of a scientist and an economist. "While it generated great enthusiasm, the concept of sustainability lacked visibility," remembers Susana Jourdan, director and co-founder (with Jacques Mirenowicz) of the magazine distributed throughout French-speaking Europe as well as Quebec.

Over the years, this visibility has been increasing "reaching a peak between 2006 and 2007," with the Stern report and Al Gore's documentary on climate change. "At the time, we thought that in a way our work was done." Far from it. After the financial crisis and the failure of the Copenhagen summit, "the environment is once again an endangered cause," concludes Susana Jourdan. Consequently, more than ten years after its launch, the magazine continues to publish informative articles on sustainability. And, in response to advances in information technologies, the management team is now offering readers the option of purchasing individual articles on the magazine's web site.

www.larevuedurable.com



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An Exemplary Carbon Balance

FRIBOURG CANTONAL BANK (BCF) HAS BEEN STEPPING UP EFFORTS TO REDUCE ITS CO₂ EMISSIONS, RATED AS NEUTRAL SINCE 2012 ACCORDING TO THE ISO 14064 STANDARD.

The BCF, the canton's leading bank and a major player throughout Switzerland, is assuming its environmental responsibility. In 2008, it calculated its first CO₂ balance, now an annual exercise. "We managed to reduce our remissions by 7% between 2008 and 2013, despite strong business growth. Since 2012, we have been offsetting the remaining emissions through purchases of CO₂ certificates. Thanks to its environmental policy, the BCF was the first bank in the canton to receive the Swiss Climate "Gold label", certifying that its carbon emissions are neutral according to the ISO 14064 standard," explains Christian Meixenberger, a member of the bank's management team and manager of the service center division. The measures

introduced by the BCF include connecting – wherever possible – its sales branches to remote heating systems, using LED lighting, raising employee awareness of positive energy saving steps, reducing its consumption of electricity and water, purchasing certified products where possible and recycling according to applicable environmental standards.

"We have also set up an internal working group tasked with setting annual targets for sustainable development that are then approved by general management. The group consists of representatives from different departments, including human resources, legal, logistics and sales," comments Christian Meixenberger.

Finally, another key focus is the bank's "green IT" policy, encompassing measures such as the virtualization of servers - now hosted in ISO 14001 information centers - as well as the automatic shutdown of computers at the end of the day. In 2011, the BCF became the first company in Switzerland to offer a CO₂ emission-free Web service, according to the ISO 14044 standard.

In the period leading up to 2020, the BCF is aiming to cut its CO₂ emissions by 3% each year.

www.bcf.ch



e_ In 2011, the BCF became the first company in Switzerland to offer a CO₂ emission-free Web service, according to the ISO 14044 standard.

f_ En 2011, la BCF a été la première entreprise en Suisse à offrir un service web exempt d'émissions CO₂ selon la norme ISO 14044.

d_ 2011 war die FKB das erste Schweizer Unternehmen, das einen CO₂-emissionsfreien Web-Service gemäss der ISO-Norm 14044 angeboten hat.

JetSolutions, a Model Building

Built in 2010, JetSolutions' facilities in Rossens are a veritable treasure trove of cutting-edge technology. Patrick Mayor and Daniel Leva, joint Managing Directors of this company that specializes in powder and liquid handling solutions, drew on their own professional expertise to install an automated facility management system. "For example, when we switch the lights off in the office, the computers automatically power down." The system has enabled JetSolutions to slash its energy use. Buoyed by their success, Mayor and Leva embarked on an intelligent heating project with the Fribourg School of Engineering and Architecture. The aim: to automate, regulate and forecast the energy needs of JetSolutions.

The Fribourg entrepreneurs have used their company to open doors to new markets. The wood pellets used to heat the building are stored in a silo which is marketed by JetSolutions SA. As Mayor explains: "We're in a win-win situation because we have an efficient system and can extol its merits to our customers." In October 2013, the company installed 850 sqm of solar panels on the roof, at a cost of CHF 350,000. However, it will take only a few years to recoup this substantial investment as the Rossens-based plant now generates twice as much energy as it needs. According to Patrick Mayor, "Not only are we able to go high-tech, but we can also devise our own approach to energy management."

www.jetsolutions.ch





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INSPIRED BY THEIR PASSION FOR THE SEA, THE GIOVANNINI BROTHERS ARE MAKING FASHIONABLE BAGS FROM RECYCLED SAILS. SINCE ITS LAUNCH A FEW YEARS AGO, IT'S BEEN PLAIN SAILING FOR THE RONDECHUTE BRAND.



e_ Rondechute's shoulder bags, backpacks, clutch bags, purses and smartphone covers are made mainly from recycled materials.

f_ Les besaces, sacs à dos, pochettes, porte-monnaie ou fourres à smartphones confectionnés par Rondechute font la part belle aux matières recyclées.

d_ Umhängetaschen, Rucksäcke, Portemonnaies oder Smartphone-Hüllen von Rondechute bestehen aus Recycling-Materialien.

They discovered the lure of the sea at an early age and never looked back. Passionate sailors, for the last few years, the Giovannini brothers have been producing accessories made from recycled boat sails at their workshop in Fribourg. "Switzerland doesn't exactly have a strong sailing tradition, but it's amazing how many people seem to have sails lying about their cellars," smiles David Giovannini, co-founder – along with elder brother Alexandre – of Rondechute. Together with their designer, the brothers have dropped anchor on Rue de la Fonderie where, in a space shared with other design businesses, they produce around twenty items each week. Sold online and in various shops throughout French-speaking Switzerland, their creations include shoulder bags, backpacks, clutch bags, purses and trendy covers for smartphones.

"Racing boat sails are rarely used for more than two or three years. After this, they lose their shape and are generally put into storage. We wanted to give them a new lease of life, so to speak," explains David Giovannini. These two young entrepreneurs take great pleasure in "telling the future owner of a bag the story of the sail used to produce it." At Rondechute, the workshop door is always open to interested visitors or customers. "We operate as a craft business and deliberately avoid expanding to a size that would force us to subcontract production of our accessories or purchase new materials." This micro-company uses recycled materials wherever possible: with pieces of PVC obtained from tarpaulin producers used to brighten up sometimes faded sections of sail.

www.rondechute.ch

A Body Shop Powered by Solar Energy

"I'm always keen to be first to try out anything new." This sums up Claude Pasquier's philosophy. In his automotive body shop in Riaz, he has been thriving on challenges for 25 years. He has already put this approach into practice on several occasions in the area of sustainable development. For instance, he was one of the first panel beaters in the canton of Fribourg to use water-based rather than solvent-based paints. He also uses a UV lamp (see photograph) to dry his vehicles: "As well as the fact that it runs on electricity rather than gas or fuel oil, this technique also reduces the drying time", says the manager, explaining the added benefit.

These environmental initiatives earned the body shop ISO 9001 certification (quality management), followed by ISO 14001 (environmental management) in 2001. But that's not all: in July 2012, Claude Pasquier had 204 solar panels installed on the roof of the body shop - enough to cover the energy consumption of 10 to 12 households. At the end of 2012, the company became the first in the canton to receive the EcoEntreprise label, with the support of Cleantech Fribourg. Introduced in 2005, this label is the benchmark Swiss certification of a company's sustainable development and corporate social responsibility. Far from easing the pace,

Claude Pasquier is already preparing for his next project: a rental service for environmentally friendly vehicles.

www.carrosserie-pasquier.ch





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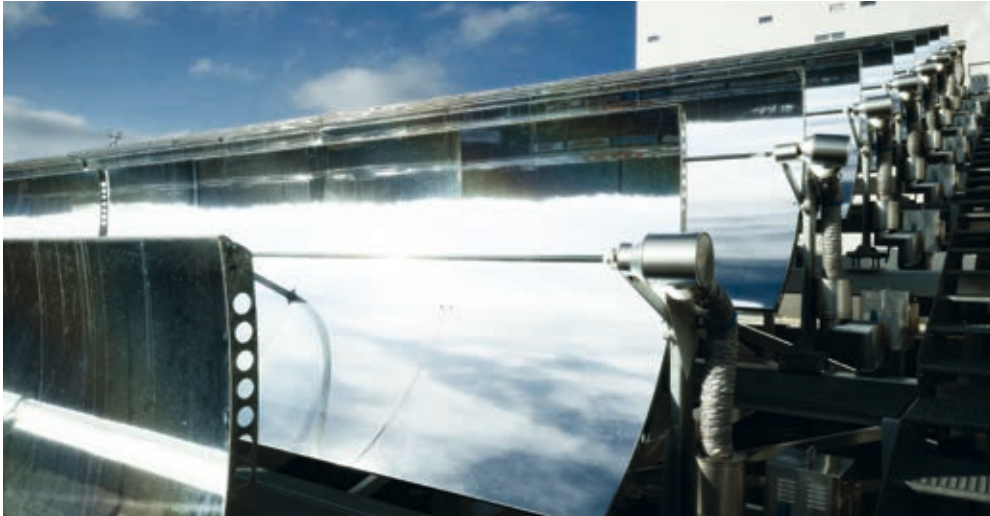
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Crema : Coffee Creamer with Added Sunshine

THE FRIBOURG MILK PROCESSOR AND LEADING SUPPLIER OF COFFEE CREAMER IN SWITZERLAND HAS BURNISHED ITS GREEN CREDENTIALS WITH THE INSTALLATION OF A SOLAR-POWERED STERILISATION SYSTEM.



e_ The eighteen parabolic trough collectors installed on the roof of Crema's refrigerated hall follow the sun on an east-west axis.

f_ Les dix-huit collecteurs paraboliques installés sur le toit de la halle réfrigérée de Crema suivent le soleil sur un axe est-ouest.

d_ Die 18 Parabolkollektoren auf dem Dach der Kühllhalle von Crema folgen der Sonne von Ost nach West.

"A dairy firm like Crema consumes a lot of energy, but we're taking action to improve our environmental record", said Michel Peliaux, general secretary of the Fribourg milk processor, while citing the group's connection in late 2008 to Fricad, the district heating network run by the incineration plant SAIDF. "We've already cut our greenhouse gas emissions by 25%, which means that we are now exempt from the CO₂ levy on fossil fuels."

In July 2013, the Fribourg company, which employs more than 650 people, half of whom work at the Villars-sur-Glâne site, took a major environmental leap forward with the installation of an innovative solar power plant. As Pascal Achermann, Head of Technical Services at Crema, explains: "Eighteen parabolic collectors covering a total area of 582 m² were installed on the roof of the refrigeration plant." The system works in principle like a magnifying glass by concentrating the rays of the sun in a tube to obtain a high temperature and thereby

heat the water circulating within. "We sterilise our coffee creamer at two temperatures, 120°C and 150°C. With the new system, we would be able to heat our products up to 220°C", continues Achermann.

This power plant, which is only the second of its kind in Switzerland, is the result of collaboration with the Swiss Confederation, the canton of Fribourg, the Fribourg School of Engineering and Architecture, and the Cleantech cluster attached to the Science and Technology Centre of the canton of Fribourg (PST-FR). "Based on forecasts, we should be able to save up to 200 MWh of energy per year, the equivalent of 24,500 litres of heating oil, or 64 tonnes of CO₂", adds Pascal Achermann. Through this pioneering project, which could also be adopted by other companies, Crema has set the benchmark for the rest of industry in Switzerland.

www.crema.ch

A Comprehensive Environmental Concept

"If it is to be truly effective and meaningful, an environmental strategy must be applied at all levels of a company," states Nicolas Roch-Neirey, General Manager of Cisel Informatique SA. A few years ago, the Matran-based company conducted an intensive review of its own environmental policy. The result was the comprehensive "Green IT" concept, encompassing issues ranging from employee transport to polluting emissions and corporate social responsibility. "An in-house survey revealed almost total support for this project among employees."

A second survey, this time involving customers of this company that specializes in information system outsourcing, printing services and the SAP integrated management system, was another factor in management's decision to enter the blue economy. The company has published an environmental charter on its intranet, with the aim of raising awareness among the 80 employees at its Matran and Morges sites. The use of videoconferencing has been stepped up to help reduce business travel. "We are in the process of calculating the company's total CO₂

balance and have signed an agreement with the AEnEC (Energy agency for the economy)." This new strategy also addresses Cisel's two power-intensive (around 950 kWh per year) data centers. "A specialist company has been appointed to measure our PUE (power usage effectiveness). This will then enable us to identify the actions required to improve this measurement."

www.cisel.ch



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Sustainability, the Cornerstone of Micarna

THE FOOD GIANT, A SHINING EXAMPLE IN TERMS OF RESOURCE SAVING, HAS SET ITSELF SOME AMBITIOUS TARGETS FOR THE NEXT FEW YEARS.



e. Despite continuously increasing production capacity, Micarna aims to reduce its consumption of water and gas by 10 % by 2020.

f. Malgré une capacité de production en hausse constante, Micarna vise une réduction de 10 %, à l'horizon 2020, de ses consommations d'eau et de gaz.

d. Trotz ständig steigender Produktionskapazitäten strebt Micarna bis 2020 eine Verringerung ihres Wasser- und Gasverbrauchs um 10 % an.

A major player in Switzerland's meat processing sector, the Micarna group has made sustainability a core component of its corporate strategy. In recent years, this member of the Migros industrial group, employing almost 1,550 people at its Courtepin site, has been working on an increasing number of initiatives intended to promote this aim. "New heat recovery systems installed in Courtepin have allowed us to cut our gas consumption by almost 40%", emphasizes Christina Marschall, the group's Sustainable Development Manager. "In addition to this, within the last two years, we have implemented a system to reuse cooling water from our production facilities. This saves some 30.5 million liters of water each year." New packaging trays, consisting mainly of cardboard and using 60% less plastic, are currently being used for the company's range of organic meat-based products.

"Conversion of animal by-products is another of Micarna's priorities. Blood can be used in the production of biogas and the pharmaceutical industry extracts heparin – a substance used to help prevent thrombosis – from pig intestines", explains Christina Marschall, by way of example. Looking ahead to 2020, the food group is even aiming to recycle all non-edible organic materials. This resolution is accompanied by an additional forty quantified objectives, divided into nine key categories. Planned actions include reducing greenhouse gas emissions (10%), water consumption (10%) and electricity (10%), despite the company's continuously increasing production capacity. Manfred Bötsch, Micarna's Development Manager, concludes: "By 2040, Micarna aims to process 100% sustainable raw materials, use 100% renewable energy and recycle 100% of all by-products or waste, both organic and non-organic."

www.micarna.ch

A Far-sighted Employment Agency

"The 21st century will be green... or blue, in the same way that the 18th century was the period of Enlightenment!" Vincent Garrigoux is convinced. Trusting his intuition, in 2011 he created a new department within his employment agency: Green-Ressources. The target for this new entity launched by the Frenchman, who opened his company Perl-Ressources in Ecuwillens in 2009, is the new energy engineering professions.

"I firmly believe that we will see the emergence of professions linked to the environment, mainly in the energy and construction sectors. These roles encompass a wide range of skills, from design through implementation of innovative and even avant-gardist solutions."

Vincent Garrigoux also appears to be a little ahead of his time. Green-Ressources is the first recruitment agency in French-speaking

Switzerland to specialize in this sector, while these professions of the future are still in their infancy. The entrepreneur has given himself five years to develop this activity.

www.green-ressources.ch

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www.michelin.ch



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**David Avery (45), Manager
of Cleantech Fribourg**

The association Cleantech Fribourg was formed in 2009 to promote the development and use of “clean” technologies, and to foster collaboration between the public

and private sectors in the interests of promoting economic growth and the creation of employment. It has three main objectives: to raise the level of awareness and understanding in companies of the value and opportunities that Cleantech represents; to analyse and assess the potential for using Cleantech solutions and their benefits; and to support innovation and development through technology transfer.

“Cleantech is committed to helping other firms create a sustainable economic model, thereby improving their efficiency and promoting the growth of the Blue Economy”, David Avery, manager of Cleantech Fribourg, said. “It’s difficult to define the term Blue Economy but essentially it’s about creating a sustainable economic model and about being more efficient and sensitive to the resources we use. It’s about the energy we need and how natural resources need to be used wisely and rationally”, added Avery.

As part of its overall initiative, Cleantech Fribourg offers an “innovation award”, which in November 2012 was won by Johnson Electric for their product that controls the temperature in motors, thereby making them more energy efficient. Two years previously, Riedo Networks won the award for their smart controller for public lighting. “These technological advances all help to reduce the energy and resources we use and so will contribute to the change to a sustainable economy”, Avery said.

Ultimately, the notion of a Blue Economy is about achieving harmony, according to Avery: “Society today uses too much energy and we need to mitigate that. The Blue Economy is about making a change and finding new ways to do things that won’t have negative impacts. The problem is that it challenges the current model of economic growth!”

www.cleantech-fr.ch



**Manon Delisle (49), Sustainable
Development Manager for the
State of Fribourg**

“My first mission was to promote and integrate sustainable development within the State. In 2013, we then moved our focus to a local level, with the publication of a portfolio of sustainable

actions aimed at municipalities. My plans for 2015 include stepping up cooperation and coordination with bodies close to the State, such as the Cantonal Bank, Groupe E and Fribourg University.” Since her appointment in 2009 by the Department of Planning, the Environment and Constructions, Manon Delisle has been the face of sustainable development within the canton. Her responsibilities also include helping Fribourg companies to achieve sustainability certification through the Swiss EcoEntreprise label, by financing half of their coaching and certification costs.

How does this former employee of the Federal Office for the Environment view the Blue Economy? “I perceive it as a technologically innovative economy that strives to reduce consumption of resources by means of reuse and recycling. Moreover, the blue economy is still aware of its social responsibility. It makes ethical choices in its purchases and involves employees in the company’s continuous improvement. It is the ecological and social dimensions, which are incorporated in the innovation process from the very start, that make the Blue Economy economically effective in the long term.” According to Manon Delisle, sustainable development is completely compatible with the concept of the Blue Economy. “Population growth, a growing scarcity of resources and the globalization process are increasingly urging us to find a balance between economic, social and environmental dimensions.”

www.fr.ch/daec/fr/pub/developpement_durable.htm

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CLIMATE SERVICES, SPECIALIZED IN CARBON FOOTPRINT ANALYSES, IS PROJECT LEADER OF AN ONLINE PLATFORM WHOSE DATABASE AND REPORTING TOOL AIMS TO SIMPLIFY THE PROCESS FOR COMPANIES.



e_ Carbon balance assessments, Climate Services' specialty, calculate a company's volumes of direct and indirect greenhouse gas emissions.

f_ Le bilan carbone, spécialité de Climate Services, permet de chiffrer les émissions directes et indirectes de gaz à effet de serre d'une entreprise.

d_ Durch eine CO₂-Bilanz, die Spezialität von Climate Services, können die direkten und indirekten Treibhausgasemissionen eines Unternehmens beziffert werden.

Climate Services in Fribourg specialises in carbon footprint analyses, a widely used tool for assessing and calculating greenhouse gas emissions. At a time when many are seeking to reduce their impact on the environment as well as their dependency on fossil fuels, the consultancy, which is based at the blueFACTORY site, offers its customers a range of tailor-made services, from simple advice to a comprehensive CO₂ reduction strategy, including an ISO 14064-compliant carbon footprint assessment and "CO₂-neutral" label.

"Although energy consumption is routinely blamed for CO₂ emissions, it is only one of many causes. Transportation, outsourcing, choice of suppliers, waste management and paper use also contribute to a company's carbon footprint. By applying a single unit, the Carbon Dioxide Equivalent, comprehensive analysis becomes easier. Also, because the findings are expressed in numbers, everyone can understand them", explains Werner Halter, director of Climate Services. No matter what they do, the company never loses sight

of the ultimate goal: "The solutions we propose, regardless whether they are of an environmental, social or purely economic nature, must be attractive for companies. It is our job to help them prioritise their actions to ensure that they enjoy a maximum return on their investment."

However, the collection and processing of the data needed to calculate corporate carbon footprints is time-consuming and costly. This situation led to the idea of setting up an online CO₂ platform with an integrated database and standardised reporting tool. "As project leader, Climate Services is in charge of defining the platform content and the key indicators." This project, which is national in reach, enjoys the financial backing of the Science and Technology Hub of the canton of Fribourg (PST-FR), as well as support from a number of Fribourg-based partners.

www.climate-services.ch

Ricoh is on the Hunt for Energy-Hungry Printers

"Our customers are often surprised to find out just how much energy their appliances are consuming", comments Jean-Bernard Favre, Sales Manager for the Fribourg region at Ricoh, the Japanese office equipment giant. As part of the Total Green Office Solution (TGOS) service, employees at the Swiss subsidiary in Villars-sur-Glâne visit companies, offices and healthcare establishments to analyze their energy consumption. "We look at the appliances being used, talk to us-

ers, and then put forward various scenarios designed to increase energy efficiency." As the regional manager reminds us, "we find a lot of companies with dozens of little power-hungry printers that are used only a couple of times a day." Ricoh's experts can help customers to achieve financial savings of around 30%, with energy savings generally in the region of 40 to 50%. One of the solutions behind these impressive results is the innovative Quick start-up mechanism, which

allows appliances in standby mode to quickly power up. Ricoh also supplies software to improve print management, as well as inks and toners which consume less heat.

www.ricoh.ch



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With an annual turnover of around CHF 250 million and 13 sites, Comet Ltd. is a company that takes its responsibility for the environment and for future generations seriously. As a result it is attempting to break new ground with its “ebeam” technology, whose positive effects for planet Earth can only be guessed at the present time. “We know that the world population is continuing to grow and that this growing population is consuming more, consequently putting a strain on the environment; “ebeam” should help to provide some kind of solution for this dilemma”, believes Charles Flükiger, Member of the Management Board and President of the “ebeam” Division.

“In our X-ray systems electrons are accelerated, focused and deliberately slowed down in ultrahigh vacuums. What happens though, if these electrons are accelerated to almost light speeds and released into the atmosphere in a controlled manner?” asks Charles Flükiger of “ebeam” technology. The answer to this question can best be answered by the world’s leading producer of packaging for liquids such

e_ Comet’s ebeam technology offers a very high potential for development in the agro-food sector.

f_ La technologie ebeam, développée par Comet, dispose d’un grand potentiel de développement dans l’industrie agro-alimentaire.

d_ Die von Comet entwickelte ebeam-Technologie hat ein grosses Entwicklungspotenzial in der Lebensmittelindustrie.

as milk, etc., Tetra Pak. In order to sterilize the cardboard packaging, it has thus far been channeled through a chemical bath and then dried. “With our technology, this procedure becomes unnecessary”, boasts Charles Flükiger. This means that the sterilization process in the Tetra Pak machines not only uses around 80% less energy, the environmental impact is reduced by 40%, the cartons are produced without adding chemicals and instead of producing 24,000 cartons per hour, the machines will in the future produce up to 40,000 cartons per hour. “Previously, environmentally friendly production has always involved higher costs. Our technology, however, means that the manufacturing process becomes more cost-effective”, he adds. Some 10,000 Tetra Pak machines produce 173 billion cartons each year across the globe.

Charles Flükiger is of course pleased that Tetra Pak, a market leader in the packaging industry, relies on the “ebeam” technology. He is convinced that this technology can be applied in many other areas, for instance in food production. We cannot yet predict what advantages this “ebeam” technology will have for mankind, but Comet is convinced that it will achieve great things for planet Earth and it will amaze more than just the scientific community.

www.comet-group.com

Wago Contact is Halving its Energy Consumption

Wago Contact SA in Domdidier ranks among the world leaders in systems and components for industrial automation and electric connections, very energy-intensive activities. “We consume around 700,000 kWh per month, mainly through the 70 injection machines used to produce our casings”, explains manager Peter Lack, who has decided to take positive action. “In the long term, the gradual replacement of electrical equipment with hydraulic alternatives will halve our energy consumption.” Since 2012, a heat recovery system installed on compressors has been helping to heat the 14,000 m² of

factory space. “Our building is completely self-sufficient up to an outside temperature of -5°C. This will allow us to quickly amortize our CHF 120,000 investment”, explains the manager. He is not alone in his concern for Wago’s environmental impact, a company employing 6,000 people around the world. “As well as demanding ISO 14000 certification, one of our biggest customers recently carried out an audit in our Chinese plant.”

www.wago.ch



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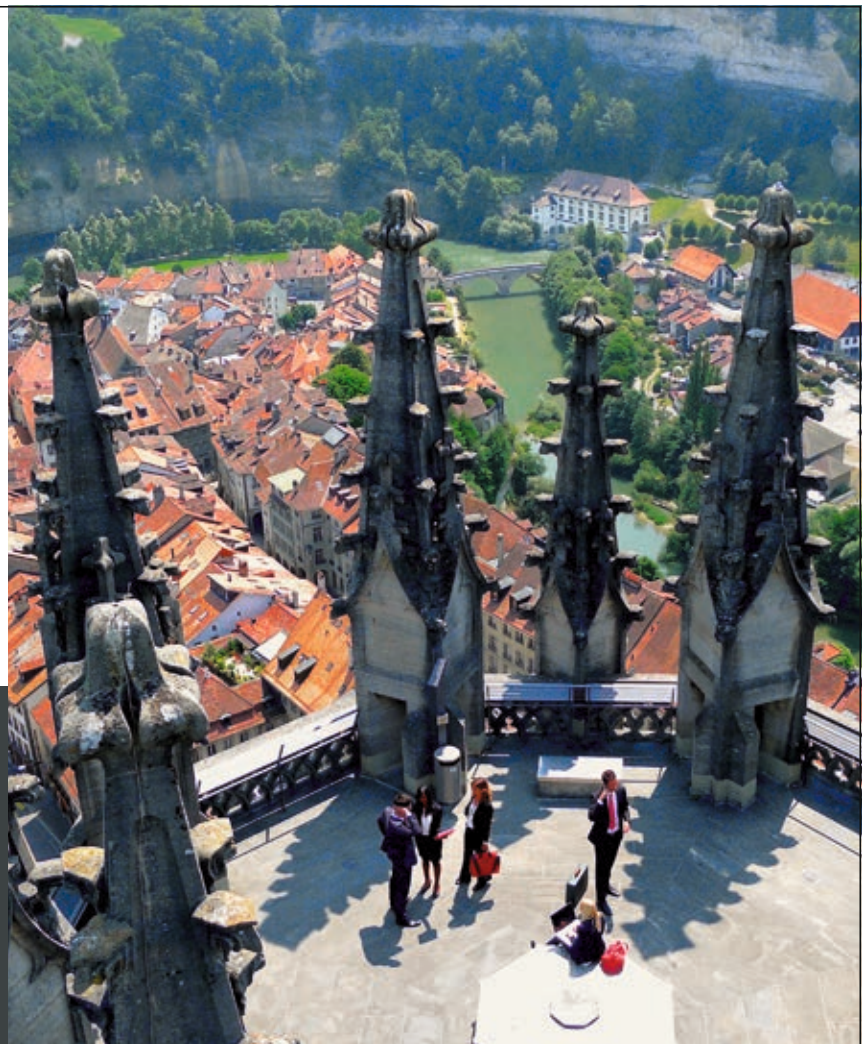
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ISO 14001 in the Sights

AT VIFOR PHARMA, IN VILLARS-SUR-GLÂNE, RENEWAL OF OBSOLETE EQUIPMENT HAS LED TO SUBSTANTIAL ENERGY SAVINGS.



“With each investment or renewal of equipment, we seek technical solutions for consuming less energy”. Frédéric Zwahlen, Manager of the Vifor Pharma site in Villars-sur-Glâne, does not lack examples for supporting his point. “In 2008, one of our first steps was to connect to Fricad, the district heating system of the Saidef incinerator. Now oil represents scarcely more than 3% of our energy consumption”, says the manager, whose international company – owned by the Galenica

e_ Fuel oil represents just 3% of Vifor Pharma’s energy consumption, further to the company’s connection to the Fricad district heating network in 2008. .

f_ Le mazout représente seulement 3% de la consommation d’énergie de Vifor Pharma, raccordée depuis 2008 au réseau de chauffage à distance Fricad.

d_ Heizöl macht nur 3% des Energieverbrauchs von Vifor Pharma aus, die seit 2008 an das Fernwärmenetz Fricad angeschlossen ist.

group – is devoted to research, development, manufacture and marketing of pharmaceutical products throughout the world.

A member of the voluntary AEnEC (Energy agency for the economy) program, which aims at reducing CO₂ emissions, the Fribourg site has carried out a global analysis of its equipment. “With us, heat recovery has only a limited potential. On the other hand, the renewal of obsolete equipment has proved to be very effective”, explains Frédéric Zwahlen. Replacing the air conditioning system, used in the production laboratories, has thus given 25% savings in electricity. Changing the air compressors, intended for driving the packaging equipment, has resulted in an energy saving of 20%. A new purified-water system, where storage partially replaces continuous production of water, helps to reduce consumption by a quarter.

“On our Ettingen site, managed from Fribourg, ISO 14001 certification was obtained in December 2013. This pilot project will then be reproduced at Villars-sur-Glâne, where the site is more complex”, says the manager, before concluding: “ISO 14001 will not make us sell more. But it will improve the image reflected by the company on its own employees, who identify with this type of procedure.”

www.viforpharma.ch

At Richemont Durability is Not a Luxury

On the Richemont campus in Villars-sur-Glâne, where some 900 employees work for the luxury goods group, the notion of durability applies at a practical level. As they have been connected to the Fricad district heating network since 2009, three of the four buildings on the site no longer use fossil fuels. The data center, which houses the servers that control Richemont’s activities around the world, underwent a multi-million franc redesign in 2012. “In particular, a new cooling system has enabled us to reduce our energy consumption by 28%”, explains Dominique Clément, Administrator for the site. “In winter

we have heat to spare. We anticipate using this to heat the administrative building next door.” The distribution center – which sees brands such as Cartier, Van Cleef & Arpels, Piaget, Vacheron Constantin, Jaeger-LeCoultre and Montblanc passing through its doors – benefits from an automatic shut-down of its computers and lights.

Far from just concentrating on the technology for the building, the company has also been putting its efforts into encouraging an environmental conscience among its staff. “For each of the 14 departments on the campus, we have nominated a “green electron” who

is in charge of promoting targeted action in areas such as waste recycling or water consumption”, explains Dominique Clément. In this way, the Richemont group is honoring the principles of its founder, the South African Anton Rupert, who was also co-founder of the WWF and a keen environmentalist.

www.richemont.com



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A+

A Collaborative Platform at Frewitt

THE ESTABLISHMENT OF A PARTICIPATIVE SYSTEM HAS ENABLED THIS FRIBOURG COMPANY TO INCREASE MOTIVATION AND PRODUCTIVITY AMONG ITS EMPLOYEES.

“Environmentally friendly solutions also result in an economic interest.” Antoine Viridis, Director of Frewitt SA, a machine manufacturer, can vouch for this. His company, a specialist in high-tech solutions for grinding, mixing and transporting various powders, is in the midst of reorganization. “For six years we had a sister company in Shanghai that was used to sell our machines on the Chinese market. But almost half of the devices sold there still came from our site in Fribourg, along with all the transportation costs and CO₂ emissions that entailed. So we recently took the decision to produce in China for China”, explains the Director. Everyone’s a winner: the Chinese branch benefits from the technology transfer and saves on import duties, the parent company in Fribourg benefits from the introduction of a technological license fee and makes savings on transportation costs, and the environment benefits too.

Another initiative that Frewitt has implemented is a collaborative platform on which ideas can be gathered and managed. “The system enables all employees to submit suggestions, with the assurance that they will be treated transparently and considered properly”, says Antoine Viridis. Faced with the difficulty of finding highly-qualified personnel, the company



has turned to its employees and asked them how to increase Frewitt’s attractiveness. “We received 167 suggestions in just one month!”, exclaims Viridis, whose company employs 73 full-time equivalents. An overwhelming majority supported more flexible working hours,

and the management has implemented this proposal. “In terms of motivation and productivity, the impact on the company has been extremely positive.”

www.frewitt.com

e The introduction of flexible working hours at Frewitt has increased the company’s attractiveness.

f Chez Frewitt, la flexibilisation des horaires de travail accordée aux collaborateurs a renforcé l’attractivité de l’entreprise.

d Bei Frewitt hat die flexiblere Gestaltung der Arbeitszeiten die Attraktivität des Unternehmens gesteigert.

A Healthy and Stimulating Environment

Ringier Digital, a key player in online marketplaces, e-commerce and e-marketing, has created a healthy and stimulating work environment at its headquarters in Flamatt. Constructed in accordance to the Minergie standard in 2008, this modern and elegant building features maximum natural light, comfortable workstations and an original and balanced color concept. Patios, relaxation areas and a gym encourage exchanges of ideas and creativity among Ringier Digital’s 254 employees in Flamatt, serving clients including Scout24, Anibis, Xmedia and Omnimedia. The staff canteen serves sophisticated cuisine, with an emphasis on fresh and regional produce. “By contributing to employee motivation, sense of belonging and productivity, these infrastructures and services are promoting Ringier Digital’s development”, comments the company’s manager Thomas Kaiser.

www.ringierdigital.ch

Lombard Odier Banks on Impact Investing

Impact Investing, which seeks to generate excellent financial performance with high social impact, is the rising star of investment strategies. “Although the amounts involved are still marginal, globally speaking, this is likely to change very soon given the potential of this sector”, argues Bertrand Gacon, Head of Impact Investing and SRI at Lombard Odier, a leading Swiss private bank with offices in the canton of Fribourg. “Our current Impact Investing solutions are one of the most highly developed offerings in the sector”, continues Gaucon, who has noted that there is a real sense of enthusiasm for this new segment. “There are a number of investors who want to mobilize their capital in order to solve some of the problems that our world faces today. Impact Investing is part of a palpable paradigm shift where business is no longer seen purely as an exercise in profit maximization but perceived as an indispensable driver of environmental and social progress.”

www.lombardodier.com

Concerted Efforts to Reduce Environmental Impact

THE PRINTING HOUSE IMPRIMERIE SAINT-PAUL IS AMONG THE FIRST COMPANIES TO SIGN UP FOR GROUP E'S ECOSCAN SERVICE. THE ASSESSMENT HAS RESULTED IN A CONCRETE ACTION PLAN AS WELL AS INCREASED AWARENESS AMONG EMPLOYEES.



e. Recovery of heat generated by the new press at Imprimerie Saint-Paul is helping the company to save around 187,000 kWh.

f. La récupération de la chaleur dégagée par la nouvelle presse de l'Imprimerie Saint-Paul permet l'économie de quelque 187'000 kWh.

d. Die Wärmerückgewinnung der neuen Druckmaschine der Paulusdruckerei ermöglicht Einsparungen von ca. 187'000 kWh.

Thomas Burri freely admits that Imprimerie Saint-Paul, the company he manages, is one of the biggest electricity consumers in the canton, using 2 GWh each year. "However, we are also best in class in sustainable development in our sector in Fribourg!" The environment has been an integral component of the Fribourg-based company's quality management system since 1999. "We started out by introducing actions based on recycling." Efforts intensified in 2010, when Groupe E invited the printing house to try out its range of EcoSolutions services. "An EcoScan was carried out to determine our precise energy consumption." Following this

detailed examination, the company's managers drew up a concept revolving around two key focuses: raising employee awareness and implementing a series of concrete actions.

The action plan included the installation of flow reducers on taps, heat recovery from the new press, as well as replacement of standard bulbs with LED versions. "On its own, this action is generating savings of 40% to 60% in lighting", emphasizes Thomas Burri. While the free cooling system (linked to heat recovery) is avoiding consumption of around 187,000 kWh. Other prospective actions identified by the EcoScan will be introduced

progressively. In parallel, Imprimerie Saint-Paul is continuing its policy of raising environmental awareness among its customers: "We offer the option of FSC-certified paper or offsetting their CO₂ emissions through the company SwissClimate." The company has also committed to switch 100% of its supplies to green energy. And, "even if they need a little reminder from time to time", its employees meticulously switch off unused computers and printers.

www.saint-paul.ch

Swep: a Business Made in Sweden

At Swep, in Tinterin, the consumption of resources has decreased by close to 20% in the space of four years. "A new heating system uses the heat discharged by our two large furnaces for heating our buildings", explained Patrik van de Scheur, manager of the factory making brazed-plate heat exchangers that are mainly used in air conditioning, refrigeration and heating applications. In addition, the installation of a system for the automatic filling of cooling tanks, as well as water-free urinals, has resulted in a 42% reduction in the company's water consumption, 150,000 liters per annum. Another noteworthy measure: the commissioning of a helium recovery system. "This gas, which is non-toxic but rare and expensive, is used for testing lea-

kages. Until recently, it was quite simply discharged into the atmosphere after use. Thanks to this new equipment, which re-injects the gas into the system, we have reduced our helium consumption by around 70%", says Patrik van de Scheur, who is pleased not only with the environmental gain but also the annual saving of 700,000 francs achieved in this way. Moreover, this installation should soon be adopted in other factories of the Swedish group, which has around 900 employees throughout the world.

www.swep.net

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www.fr.ch

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in the canton of Fribourg
www.expats-fribourg.ch
www.fewgroup.org

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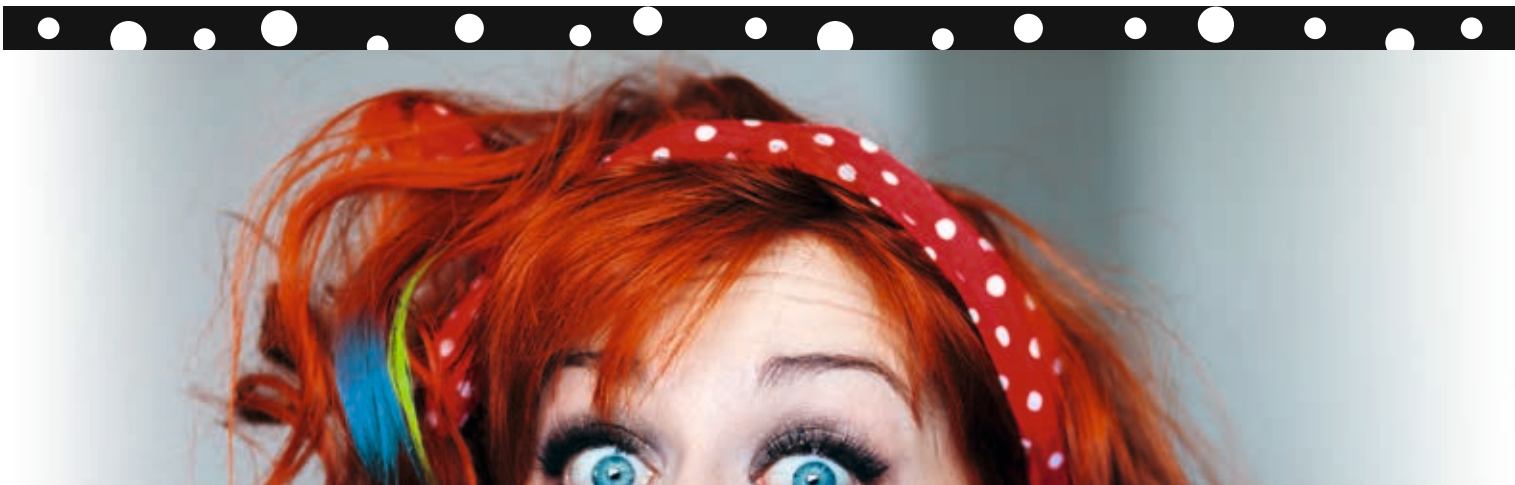
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