

Innovation and carbon footprint: which synergies?

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WTC GRENOBLE CONVENTION CENTER



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10 innovative projects from regional research laboratories will be presented at the Technology Showcase during Forum 5i. This year's theme is: "Innovation and carbon footprint: which synergies?"

A 2020 edition that is committed and responsible

Every year, Forum 5i welcomes over 500 visitors and focuses on a major societal issue. This year's theme: Innovation and Carbon Footprint: which synergies?

The event, one of the highlights of the regional economic calendar, allows major players in the sector of innovation to come together and exchange ideas about technological, economic and societal problems and discover new innovative projects at the same time.

Despite the current situation, the Grenoble-Alpes Metropole has decided to go ahead with this 23rd edition of Forum 5i which will take place on the 29th of September. Their top priority will be ensuring that all the necessary precautions are taken to safely host the exhibitors, visitors, partners and collaborators. In addition, all of the preventative measures recommended by the competent authorities will be implemented (masks must be worn, coordination of crowds and navigation, provision of hand sanitizing gel, counting system, etc.). **For the Metropole, maintaining this event is a way of showing their strong support of local entrepreneurs and the local ecosystem.**

The Technology Showcase presents 10 projects

The Technology Showcase presents the latest innovations from the region's laboratories and research centers. Realised thanks to La Casemate and the research actors, this exhibition shows the great vitality of local research, its pluridisciplinarity and its presence in high potential fields of innovation. 10 projects that cover a wide variety of subjects have been selected. Subjects range from hybrid materials that are more respectful of their resources, the production and use of different types of energy, transport, etc.

In 2020, 10 projects will be exhibited on the the topic of "Innovation and carbon footprint: which synergies?":

- **BeFC - Bioenzymatic Fuel Cells**

Ecological technology with a high environmental impact enabling electricity to be generated from paper and enzymes while reducing disposal costs for low-power electronic devices

BeFC has developed an environmentally-friendly technology that can generate electricity using paper and enzymes. This solution, which is based on bio sourced materials, also helps to reduce the disposal costs for low-power electronic devices, which are becoming increasingly popular. These bioenzymatic batteries are ultra-thin, flexible and portable. A drop of liquid (sweat, saliva, blood, urine, etc.) is all that is needed to activate them. A small reservoir can also be used to activate the battery. Its intellectual property is protected by a patent portfolio. Potential customers include manufacturers of single-use medical devices, packaging companies and logistics companies.

Partners: CNRS (DCM/BEA), SATT Linksum

- **FUNCELL**

- Synthesize bio-based additives with high added value to strengthen cellulosic materials**

FunCell hopes to become a leader in the chemistry of bio sourced products with high added value, particularly in the area of paper additives. Developed by CERMAV [Plant Macromolecule Research Centre] and fine-tuned at the Centre Technique du Papier, the BioWet additives (patent pending) reduce the quantity of paper pulp needed to make a box while maintaining or even improving on the box's original performance, particularly when it becomes damp. At the same time, FunCell has also been working with the FCBA [The French Institute of Technology for Forest-based and Furniture Sectors] in Grenoble to develop BioGlue (patent pending), a range of wood-based glues. Primarily designed for use with furniture particle boards, BioGlues can be used to produce flat-pack furniture kits which are 100% bio-based and non-toxic.

Partners: CERMAV, FCBA, CTP, SATT Linksum

- **HANABI**

- Alternative solution to plastic and aluminium packaging – 100 % bio-based and biodegradable**

The aim of the Hanabi project is to come up with an alternative to plastic packaging by developing hybrid materials that combine cellulose (99.9 %) and ceramic (0.1 %). The main areas of application for this product are the food packaging and high-tech markets. The combination of cellulose (which comes from waste from the paper industry) and ceramic means that the barrier properties inherent to plastic (with regards to oxygen, water, water vapour, etc.) can be maintained. The material can also be printed onto and is biodegradable.

Partners: laboratoires SIMaP et LGP2, SATT Linksum

- **HYPSTEP**

- Technology to recover wastewater by producing low-carbon hydrogen**

When it comes to addressing the issues of energy transition, hydrogen is a solution that has been widely developed, but there still remains the major challenge of developing a low-cost, zero carbon hydrogen production. HYPSTEP technology makes it possible to produce low-carbon hydrogen at a low-cost by using biomass from waste water. The HYPSTEP innovation, consists of combining three systems: a bio fuel cell, an electrochemical mediator and an electrolyser. Tried and tested in the laboratory, the system is currently being tested with different effluents and a prototype is under construction at the Aquapole, the water purification station for the Grenoble Metropole. The energy recovery from the waste water would make it possible to have a local and sustainable production of hydrogen closer to users.

Partners: LEPMI, UGA, SATT Linksum

- **K-INF**

- Robust solution for coordinated control of multi-source energy systems such as renewable energies**

K-INF is a power management system (PMS) for hybrid/multi-storage systems which guarantees an optimal consensus based on the reliability criteria of the different storage technologies used. K-INF is based on a command algorithm embedded in a micro-controller. The potential applications are endless - particularly in the sector of renewable energies, on islands or in isolated geographical areas, or even in electric vehicles (including ships and aeroplanes). With this solution, the performance of storage systems is improved. For example, if the batteries are hybridised with super capacitors, the lifespan of the batteries can be extended by 10-15%.

Partners: GIPSA-LAB, Grenoble INP, SATT Linksum

- **KITOBIOSPHERES**

- Chitosan bead production system for the adsorption of metals contained in industrial effluents**

The KitoBioSpheres project allows for a large-scale production of chitosan beads using a vibrating jet granulation process to eliminate any heavy metals in the water. Chitosan is a biopolymer used in the pharmaceutical and agri-food industries, but it is not frequently used in water filtration processes. Thanks to the prepared formulation, these beads ensure a very high mechanical strength, an easy handling, and they are even reusable. This solution is mainly geared towards water sanitisation industries, as well as industries that have difficulties in eliminating dissolved metals from their effluents.

Partners: LCME, SATT Linksum

- **LE CHEMIN DES MÛRES**

- Smart pooling of local product transport

Created in September 2019, Le Chemin des Mûres uses state-of-the-art algorithms to organise the pooling of local transport between food producers who want to commercialise and deliver locally while keeping their costs down. The algorithm automatically and dynamically calculates the most efficient pooling solutions whereby one producer shares their delivery with several other producers and is partially reimbursed for the journey that they have made. The time, cost and environmental impact of local transport is therefore reduced to aid the transition towards a local economy.

Partners: Inria, Réseau Entreprendre Isère, Chambre Agriculture Ardèche, ADEME

- **OAD-VR**

- Predict and explain the traffic conditions to optimize the operation of the lanes reserved for carpooling

OAD-VR is a tool which delivers activation and deactivation recommendations for dynamic channels by predicting traffic conditions on the road network. This tool was developed as part of the LCE [Lyon Car-sharing Experiment] project launched in 2018 for a period of three years. The project aims to reclassify the A6-A7 highway to an urban boulevard and to reduce traffic on this key road. OAD-VR is solely geared towards operators (traffic regulation centres) to help them predict traffic conditions half-an-hour ahead of time and therefore be proactive. Delivered to the Lyon Metropole in 2020, this tool could be adapted to the size of other areas.

Partners: SPIE CityNetworks, IRT SystemX

- **SUMMER**

- The city of tomorrow, now!

The objective of this project is to propose a tool that can be used to explore urban planning and crisis management strategies at the same time. When it comes to urban planning, this tool can be used to respond to issues related to new modes of transport (car shares, bikes, etc.) and their impact on the environment. It can also be used to gather information about the time and speed of residents' journeys. Mainly geared towards design offices and urban planning agencies, it can also be used to simulate evacuations during natural disasters (floods, fires, etc.) and to optimise the solutions proposed by the communities affected. This project is based on a simulation software and human behaviour models (artificial intelligence agents) and on the use of geographical data.

Partners: LIG, SATT Linksum

- **TAPIR**

- Modular power module with integrated cooling

The TAPIR project has developed a technology which significantly reduces the mass of static converters (by up to 30%) thanks to an innovative solution for the cooling and packaging of semiconductor components. The TAPIR technology can also be adapted to modern components (SiC) and it can be used to increase energy efficiency, particularly when it comes to zero-carbon modes of transport (electric and hybrid vehicles, battery chargers, more electric aircraft, etc.) and renewable energies (solar panels, wind turbines, etc.).

Partners: G2Elab (Grenoble INP/UGA/CNRS), SATT Linksum

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