



Press release
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Institut Mines-Télécom and elm.leblanc are disrupting the heating industry with the CORENSTOCK Industrial Chair, which aims to create a demonstrator in just 4 years

Institut Mines-Télécom (IMT) and elm.leblanc are launching the CORENSTOCK Industrial Chair - Life Cycle-Oriented Design & Systematic Approach for Energy Efficiency in Heating System Storage – co-funded equally by the French National Research Agency (ANR) and elm.leblanc. The chair addresses issues posed by the energy and digital transitions by transforming the heating industry, which is energy-intensive by nature. It is intended for the domestic water storage market, which has great potential for innovation. This partnership has an ambitious goal: entirely reshape the design, life cycle, use of the product and its economic operation. Selected from among 12 candidates by ANR for its scientific excellence, the CORENSTOCK industrial chair brings together researchers from different disciplines at IMT schools, in particular from IMT Lille Douai and Mines Saint-Etienne. The chair operates at the crossroads between fundamental research, industrial innovation and higher education.

A strategic challenge: create the hot water tank of the future

Heating, producing and storing hot water make up the majority of a household's energy costs. Regardless of the heating system used, storage is a key component for regulating energy consumption and comfort. As such, elm.leblanc seeks to create the domestic hot water storage unit of the future, which will be more energy-efficient, recyclable and use fewer raw materials. It will also be self-adjusting and smart based on the needs of the final user and its sustainability will be ensured through continuous monitoring. This large-scale project responds to strategic challenges facing all manufacturers: innovate responsibly, from the design phase, by taking into account the context in which the product is used to adapt to its user, while anticipating the end of its life cycle through a circular economy approach.

360° innovation: technologies, design, business models

The CORENSTOCK Industrial Chair is the result of a longstanding partnership between elm.leblanc and IMT, both of whom are strongly committed to the industry of the future. The aim is to go beyond technological innovation by adopting a systematic approach. Elm.leblanc will therefore be supported in its twofold transition – energy and digital – by laying the foundation for a new business model redefining the concepts of maintenance, which will be predictive, and life cycle. The partnership-based research program will be based on two major and complementary advances:

- Designing a next-generation technology for thermal generation systems aimed at increasing both energy efficiency and life span
- Developing and implementing new systematic design methods, acting as a catalyst for a long-term transition of industrial innovation practices

For elm.leblanc, the objective of the industrial chair project is to gain the skills and tools it needs to design new structures by teaming up with IMT, which brings together multidisciplinary teams (materials, industrial process, energetics, digital), to respond to questions about the industrial transformation of the production process. The manufacturer will therefore strengthen its innovation efforts and accelerate its transformation towards an industry 4.0 factory.

At the crossroads of fundamental research and industrial experimentation

The industrial chair team will work on overcoming the many scientific and industrial obstacles that affect the design stage, commercial production, use, and end of life of the equipment. It focuses on both the transformation of design methods toward a systematic approach and the development of a storage system:

- Develop smart sensors
- Define a method for designing value chains combined with smart product-service systems (PSS) in order to find multi-stakeholder business models
- Use performance simulations throughout the life cycle
- Improve thermo-hydraulic performance
- Optimize thermal performance
- Design a multi-material, multifunctional structure (complex thermal, mechanical, economic, feeding, recyclable, sustainability).

A partnership that combines academic and industrial excellence

Each partner will contribute its expertise and the various parts of the project will be brought together through the systematic approach. Elm.leblanc is also in charge of developing an equipment characterization method, setting up a demonstrator of considerable size and assembling databases of household usage habits.

Three teaching, research and innovation centers at IMT Lille Douai and two Mines de Saint-Étienne departments are working together to achieve these objectives. Mylène Lagardère, a research professor at IMT Lille Douai's Materials & Processes department since 2006, is the Head of the CORENSTOCK industrial chair. She has published some twenty A-ranked publications, supervised ten PhDs and taken part in around forty national and international conferences. Xavier Boucher, a professor at Mines Saint-Etienne (Fayol Institute training and research center), is responsible for the operational management of the chair.

Dissemination of knowledge

The knowledge about developing new systematic design methods acquired through CORENSTOCK will be widely disseminated, with initial and continuing education figuring prominently in the project. First, elm.leblanc teams will have the opportunity to benefit from a vocational training program being put in place and a "Industry of the Future" Specialized Master's program and an IMT MOOC for students and the general public will eventually be introduced.

Key figures

The CORENSTOCK Industrial Chair is co-funded equally by the French National Research Agency (ANR) and elm.leblanc and is also **supported by IMT and its Télécom & Société Numérique Carnot Institute**. Its research program will be carried out over four years and **includes** 5 PhDs, 4 postdoctoral researchers and 3 engineers.

Christian Picory Donné, Director of Industry Partnerships and Transfer at IMT and Director of the Télécom & Société Numérique Carnot Institute says, "*The CORENSTOCK chair demonstrates the importance of ties between research and industry. By bringing together academic and industrial talent to support innovation, we help achieve an industry 4.0 that is both resilient and sustainable, equipped to meet the challenges ahead. In the current climate, it's essential to capitalize on and disseminate knowledge that allows us to design new models while advancing scientific and technological knowledge.*"

François Vuillaume, Director of Research and Development for elm.leblanc says, "*This new partnership with such a prestigious academic institution as IMT will help us meet society's expectations in an uncertain and ever-changing environment. Today, a company is defined not only by*

the products it makes, but by its commitment to sustainability. As a large company, we must propose new industrial approaches that are innovative and resilient."

About elm.leblanc

Elm.leblanc SAS designs, manufactures, markets and handles maintenance for heating, hot water production and cooling systems in France. It is active in the French market with two strong, complementary brands, Bosch and elm.leblanc, and manufactures its products at two factories, in Drancy (93) and Saint-Thégonnec (29). It also has its own Research and Development Center, keeping it at the cutting edge of technology and innovation. Elm.leblanc, a historic brand, has specialized in gas and renewable energy solutions for over 85 years. Bosch Thermotechnology is a provider of overall multi-energy solutions for the residential, commercial and industrial sectors. www.elmleblanc.fr

About IMT www.imt.fr

Institut Mines-Télécom is a public higher education and research institution under the aegis of the French Ministry for the Economy, Industry and Digital Affairs, which groups together 8 graduate schools, 2 subsidiaries and a network of strategic and affiliated partners. Its activities in the fields of engineering sciences and digital technology support the education of engineers and managers, partnership-based research, innovation and economic development. Always attentive to the economic world, IMT combines strong academic and scientific legitimacy, close corporate relations and strategic positioning in the key transformations of the 21st century: digital technology, industry, energy and ecology, and education. IMT is a founding member of the Alliance for the Industry of the Future and co-founder of the Franco-German Academy for the Industry of the Future with Technische Universität München (TUM). It is recognized by 2 Carnot Institute accreditations for the quality of its partner-based research. Each year, IMT trains over 12,000 students, enters into nearly 70 million research contracts, and hosts some 100 start-ups in its incubators.



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About the French National Research Agency

The National Research Agency (ANR) is the funding agency for project-based research in France. The agency is a public institution under the authority of the French Ministry for Research which aims to fund and promote the development of basic and targeted research, technological innovation and technology transfer, as well as partnerships between public and private research teams across France, Europe and worldwide. ANR is also the main operator of the Investments for the Future program (PIA 1, 2 and 3), in the field of higher education and research and is responsible for selecting, funding and overseeing projects covering excellence initiative activities, research facilities and support for advances in research and research commercialization. ANR is ISO 9001 certified for all of its "project selection" processes.

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