CATALOGUE OF CHALLENGES

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1.   INTRODUCTION

Through the #1 Open Call | LAUDS Exploration, the LAUDS Factories project aims to fund and support Experiments focused on the collaboration and co-creation relationship between artists/creative people and technology providers and end-users, following the spirit of the New European Bauhaus. The main objective is for hybrid teams to explore and work with LAUDS factories to enhance their usability and uptake, aligned with the wider scope, challenges and specific applicable conditions.

This catalogue presents the challenges proposed by the three LAUDS Factories of as part of the exploration phase and related to pressing matters in the mobility, energy, and agriculture/food production sectors. Activities proposed by the hybrid teams when submitting their application should provide answers, including products or solutions, to these challenges.

2.   Challenges Presentation

2.1 Mobility-related challenges

Challenge M1: Reviving Mobility in the City of Bicycles: From Discarded Transportation Parts to Innovation

Description: Are you up for the challenge of breathing new life into discarded transportation components? We invite you to explore the potential of old car parts, bicycle components, scooters, and other mobility objects. Your task is to re-imagine their purpose, transforming them into innovative, functional creations/products/solutions that serve new needs or enhance existing ones. From repurposed gears to upcycled frames, unleash your creativity and ingenuity to reshape the future of mobility. In Copenhagen alone, there are approximately 32,000 abandoned bikes, representing a vast resource waiting to be utilized in new products. These materials can be sourced locally and repurposed at the LAUDS Factory. Join us in the quest to give these neglected objects a second life and redefine the possibilities of transportation.

LAUDS Factory hosting the challenge: Maker V-10

Challenge M2: Pop-up Factory Zone: Enabling Ad-Hoc Manufacturing on Bicycle Wheels

Description: LAUDS Factory is on a quest to redefine manufacturing mobility. Imagine a cargo bike, but not just any bike - a mobile maker's dream equipped with a 3D printer, laser cutter, and more. The challenge? Upgrading existing cargo bike projects to carry this tech powerhouse. We are looking for a modular marvel that allows for the swift transport and setup of manufacturing tools, all neatly packed to fit existing cargo bike dimensions. Plus, we would be adding a twist with an energy box to keep the gears turning wherever this bike rolls. It is about creating access to manufacturing power in the nooks and crannies of our cities, wherever the road takes us. It's about taking the factory to the streets, one pedal at a time.

LAUDS Factory hosting the challenge: Fab City Hamburg

Challenge M3: Smart Mobility Solutions for Efficient, Resilient and Sustainable Forms of Transportation

Description: In the Lorraine region, cities are seeking to limit the use of both combustion and electric vehicles to reduce pollutant emissions and traffic density. At the same time, the installation of electric recharging points is encouraged. Town centers are also very attractive to the surrounding areas because of the amenities they offer. In rural areas, transport options are becoming increasingly precarious, and the individual vehicle remains an agile means of getting around easily when necessary. We invite you to pioneer new solutions for active mobility, based on human physical activity, to transport people or goods through non-motorized means. Unleash the power of immersive and commons-based technologies to develop inclusive soft mobility products and solutions. Whether it is facilitating the dissemination of cultural projects in the countryside or empowering local authorities and citizens to transform public spaces, let us create flexible and accessible solutions that reduce the need for travel or make it more efficient.

LAUDS Factory hosting the challenge: Université de Lorraine

2.2 Energy-related challenges

Challenge E1: Revolutionize Local Recycling: Solutions Repurposing Materials into Valuable Composites

Description: Are you ready to revolutionize recycling beyond plastics? We challenge you to create a system that transforms various materials into valuable composites. Inspired by initiatives like Precious Plastic, we are looking for innovative solutions that go beyond traditional recycling methods. Imagine a machine that can turn wood sawdust into durable composites or repurpose other waste materials into valuable resources. Your task is to design a solution that promotes circularity, sustainability, and resource efficiency while ensuring that it can produce new products locally. By closing the gap and keeping all resources within the local ecosystem, your solution will contribute to building a more resilient and sustainable community. Join us in redefining the future of recycling by turning waste into valuable assets through creative engineering and ingenuity.

LAUDS Factory hosting the challenge: Maker V-10

Challenge E2: Unlocking Insights: Revolutionizing the Way We See and Manage Resource Consumption

Description: Dive into LAUDS Factory's world where every watt and drop counts. We are on a mission to weave a digital web that tracks and optimizes how resources flow through space, using the coolest tech from IoT stacks to machine learning. The challenge? Boost and deploy innovative solutions that can, for instance, pump up a sensor game to make them a breeze to add to our data universe, streamline Node-Red for seamless sensor integration, and turbocharge Grafana for slick, insightful visualizations. The visualizations are one major factor to trigger a change of behavior into more sustainable patterns. It is about predicting the pulse of consumption and lighting the way to smarter use of energy and materials. And yes, we are throwing open the doors for all to tinker, because this challenge is open source.

LAUDS Factory hosting the challenge: Fab City Hamburg

Challenge E3: Efficient Recycling for a Greener Future

Description: Plastic materials waste is a global concern, demanding a paradigm shift. It is time to embrace a circular economy. The 'Green Fablab' at Université de Lorraine is a pioneer in distributed recycling with open-source machines, exploring the impact of local plastic recycling in a short supply chain. However, additional recycling facilities could mean higher energy consumption and increased emissions, jeopardizing both our planet and workplace safety. That is where you come in. We are looking for visionary projects to enhance energy efficiency across the recycling process value chain, from collection to manufacturing, using open-source, low-tech solutions. Whether it is improving sorting methods or designing safer work environments, your ideas can make a difference.

And it is not just about innovation—it is about inspiration. You will have the chance to spread awareness and ignite passion for recycling through creative and artistic means, empowering local communities in the city of Nancy via L'Octroi-Nancy.

LAUDS Factory hosting the challenge: Université de Lorraine

2.3 Agriculture/Food Production-related challenges

Challenge A1: Greening Urban Spaces: Innovate Vertical Farming Systems from Local Waste Streams

Description: Are you ready to revolutionize urban sustainability and food production? We challenge you to develop and produce, at the LAUDS Factory - Maker, a solution that grows food using local waste streams. Inspired by the need for sustainable food alternatives, the lack of space in the cities and heightened environmental awareness, we're seeking innovative creations that can be deployed in public or private spaces. You may imagine a modular, vertical system that utilizes recycled materials and waste products (grey or yellow water for example) to cultivate fresh food products; imagine enriching local communities with accessible and nutritious food options.

Your task is to produce a structure that not only raises awareness of sustainability, but also provides practical solutions for urban food insecurity. By leveraging local waste streams and transforming them into productive assets, your solution will contribute to building resilient and self-sufficient communities. Join us in reimagining urban spaces as vibrant hubs of sustainability and food abundance through creative engineering and ingenuity.

LAUDS Factory hosting the challenge: Maker V-10

Challenge A2: Towards the Future of Farming: Low-Maintenance Innovation for Local Food Production

Description: Imagine a world where fresh, local food is at your fingertips, effortlessly grown with minimal manual intervention. We challenge innovators to create and execute innovative solutions for local and urban food production, emphasizing feasibility, scalable application, resource efficiency in both construction and operation, modularity for easy adaptation, repair and modification, as well as sustainability. This challenge seeks to transform the accessibility of fresh, locally sourced produce within communities while mitigating environmental harm. Drawing inspiration from initiatives like farm.bot, the goal is to revolutionise conventional approaches for food production, fostering a more sustainable and community-centric paradigm. Join us in this quest to revolutionize how we grow and harvest food, paving the way for a healthier, more sustainable future.

LAUDS Factory hosting the challenge: Fab City Hamburg

3. LAUDS Factory: Fab City Hamburg

FAB CITY Hamburg

Fab City Hamburg (https://www.fabcity.hamburg/) is a network of makerspaces, SMEs as well as public and educational institutions acting in the field of cosmo-local and circular value creation. The goal is to transform Hamburg into a Fab City where everything that Hamburg consumes is produced in Hamburg and with this the promotion of science and research, the promotion of environmental protection, the promotion of education and vocational training and the promotion of art and culture.

Fab City Hamburg is diverse, professional, approachable and cross-disciplinary at the core and it embodies this through its urban presence. The Fab City Hamburg's vision is → with open source and digital manufacturing, we are making the economy of city of the future circular and sustainable.

3.1 Resources and technology available to the hybrid teams

Picture an innovation playground spread across Hamburg, brimming with cutting-edge machine tools and the freedom to hack, solder, and print your way to new sustainable solutions. Fab City Hamburg is opening its physical and digital doors, offering a treasure trove of open-source tools, from 3D printers to CNC-mills. Real tasks to prototype, and local community members to guide, the setup's ripe for revolution. It's more than a workspace; it's a launchpad for sustainable making.

Imagine a city-wide lab network (you can have an overview here), Hamburg, dotted with innovation hubs each packed with digital fabrication tools—3D printers, laser cutters, and CNC-mills, some rigged with smart sensors ready to inform about their day and mesh their insights into a live, learning picture of how Hamburg makes and creates. Ready to join the resource revolution?

With Hamburg as its sprawling canvas, LAUDS Factory is all set to provide a sandbox of digital fabrication tools across various sites, each brimming with potential for innovation (you can have an overview of existing resources here). Supported by a crew of local experts, Fab City Hamburg is geared to prototype, test, and refine a LAUDS Factory.
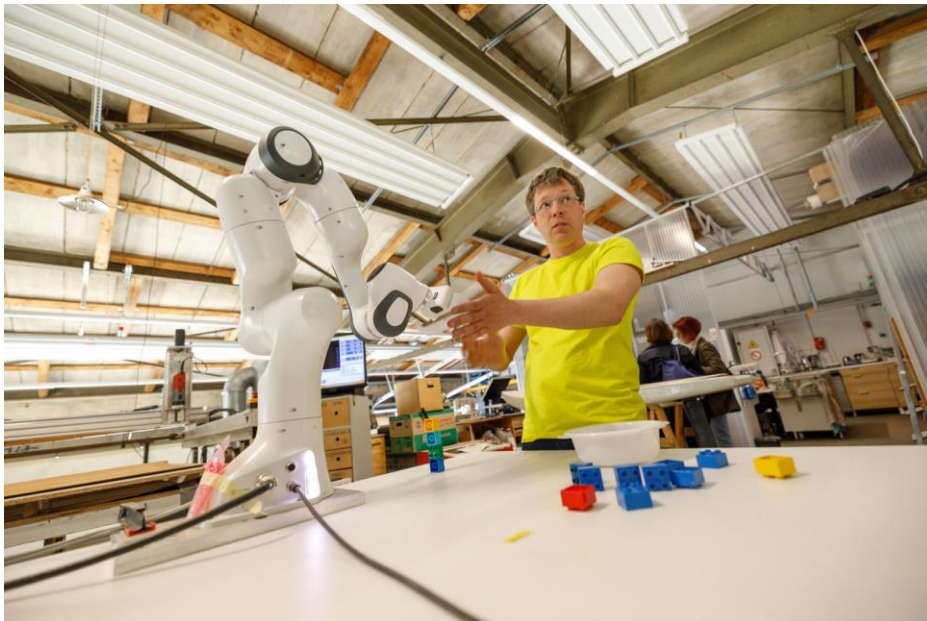
Robotic Arm in the use by Fabolous St.Pauli e.V. under CC-BY-SA 4.0 License

Solarboxes with Cargobike and 3D-Printer by New Production Institute, under CC-BY-SA 4.0 License

3.2 Period for cooperation

Experiments may be implemented between October 2024 and September 2025. Fab City Hamburg is available to cooperate directly with the hybrid team from October 2024 to January 2025.

4. LAUDS Factory: Maker V-10

With digital production technologies and traditional craftsmanship, Maker V-10 (www.maker.dk) is a meeting place for people with different backgrounds and interests. Our ever-evolving facilities is made for entrepreneurs who are curious and open to exploring new opportunities and pushing the boundaries of urban and local production in a globalised world.

The current way products are designed, developed, and manufactured is outdated and unsustainable. We believe that a paradigm shift is needed, and we approach this by providing a physical space for research, innovation, prototyping and local production.

At Maker, we empower the next wave of creators and physical entrepreneurs, those who will serve as the

driving force behind a more circular future. We do this by providing access to a space where anyone can build, share and learn, nurturing a culture of innovation-by-collaboration within our community.

We are diverse, professional, approachable and cross-disciplinary at the core and we embody this through our urban presence: our open lab for sustainable product development in Copenhagen.

Perhaps it's something for you?

We are looking for hybrid teams that are curious and open minded and with a willingness to test and reiterate on a product/solution together with us and the rest of the community in both formal and informal settings. The end goal is to be able to perform a small-scale production of the product. In our efforts to transform our facilities into a LAUDS Factory, we also expect the hybrid teams to actively engage in the discussions around aspects such as being local, accessible, urban, digital and sustainable.

4.1 Resources and technology available to the hybrid teams

At Maker V-10 we can offer office- and co-work facilities as well as fully equipped workshops in the center of Copenhagen. Furthermore, we encourage the hybrid teams to participate in community events and activities to be inspired and be able to inspire others in an innovative environment.

Maker V-10 is based on the principle of accessibility of machines, equipment and a knowledge pool of members and community affiliates. Here, everyone comes to experiment and prototype - not to hand over the drawings and sketches to others to prototype or produce. However, we can assist in the initial designs and guide you to people in our community and network that might have the right skills.

We have a wide range of workshops and machines including wood-, metal- and plastic workshops, CNC mills, laser cutters, 3D printers, textile- and material labs and a professional photo studio and event space for large scale prototypes, exhibitions, symposiums etc. For the full list please visit Facilities in V-10: Professional workshop for entrepreneurs.

4.2 Period for cooperation

Experiments may be implemented between October 2024 and September 2025. Maker V-10 is available to cooperate directly with the hybrid team from October 2024 to January 2025.

5. LAUDS Factory: Université de Lorraine, Lorraine Smart Cities Living Lab

Led by ERPI laboratory, the Lorraine Smart Cities Living Lab (LSCLL – https://lf2l.fr/projects/lorraine-smart-cities-living-lab) is a collaborative project of the Université de Lorraine (UL) to support the early design stage of development of systemic innovations towards an industry 5.0 and sustainable territories. It advocates for a commons-based technology framework and a circular economy, promoting collective resource management for sustainability.

The core competencies are based on structuring collaborative approaches to co-create intermediate design objects (IDO) linking the multilevel perspective of the innovation from technological development, organisation maturity, and the territorial development perspective. At each level, the integration of different stakeholders (e.g. company, providers, partners, academics… and the end-users and/or consumers) along the design and production process is fostered to better understand the socio-technical systems.

Furthermore, UL LAUDS Factory (LSCLL-UL) aims to implement the Do-It-Together (DIT) concept, an alternative co-creation and open-manufacturing process that enables customized production, promoting local manufacturing closer to consumers and open-communities who actively contribute to the production (see: https://www.inedit-project.eu/).

Finally, the LSCLL creates the conditions for Public-Private-Population Partnerships (PPPPs) that are aware of the environmental challenges and willing to develop solutions to serve the common good. That means we adopt a quintuple helix approach to disseminate innovation and related practices in the service of Research, Development of Innovations, Training, a Citizen Culture, and environment.

5.1 Resources and technology available to the hybrid teams

A physical platform[1]

As a research and teaching platform, the LSCLL-UL has a wide range of equipment, some aimed at the general public, others highly specialized. Description of the available equipment can be found in the following pages (in French):

- https://fabmanager.lf2l.fr/#!/machines

- https://pluginlabs.univ-lorraine.fr/fiche/lorraine-fab-living-lab/

- https://inspiration.dgesip.fr/Espaces/Lieu/WuMr6/

On this last webpage, a description of innovation spaces, including laboratories, within the LSCLL-UL is available.

HoliPress   Hydraulic press

A 2D-3D-4D process: from co-creation to test by use[2]

Support to the co-creation of concept (2D) and its suitability for its socio-technical and natural environment. Accompany projects for a validation of the prototype (3D) through an evaluation of the user experience in a real or virtual environment (4D) prior to physical production, to limit the number of trials and errors, while minimising wasted resources. Tests could be set up at LSCLL-UL (control environment), in relevant environment (open environment) or at the Foire Expo de Nancy with the Open citizen lab in pedagogical/citizen workshops, etc.

A territorial network

- L'Octroi Nancy – creative, cultural and citizen third place of the city of Nancy, which provides access to additional spaces such as offices, a creative community, etc.

- DHDA project: a regional and hybrid collective (entrepreneurs, foresters, artists, farmers, researchers, elected representatives, industrialists, financiers and naturalists, citizens…) to make the most of all the trees in our region.

5.2 Period for cooperation

Experiments may be implemented between October 2024 and September 2025. LSCLL-UL is available to cooperate directly with the hybrid team from October 2024 to mid-July 2025.

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[1] *Please note that as regulations evolve, certain areas of the UL platform may be subject to restrictions.*

[2] *idem*

6. Activities and Expected Outcomes

Hybrid teams applying to the #1 Open Call | LAUDS Exploration are free to propose the activities that will enable them to cooperate with the LAUDS Factories and for providing an answer to the challenge selected. Within the proposed activities, experiments are encouraged to develop open-source hardware either as new solutions or further development of existing solutions. It is expected that Experiments propose a period for on-site cooperation at the LAUDS Factories.

Selected Experiments are expected to deliver the following outcomes:

- one challenge-focused report describing the developed production process including a blueprint of the proposed solution (where relevant);
- one final report on the collaboration with the LAUDS Factory.

The LAUDS Factories project will be providing the respective templates to the selected teams.