JOINT CALL AI – HPC

CALL DESCRIPTION

The Ministry of the Economy, the National Research Fund ("granting authorities"), and Luxinnovation have joined forces to launch a funding opportunity that supports consortia of private companies and public research institutions in conducting R&D projects in the fields of High-Performance Computing (HPC) and/or Artificial Intelligence (AI). This initiative aims to facilitate the integration of cutting-edge technological advancements into their research and innovation activities.

Context of the call

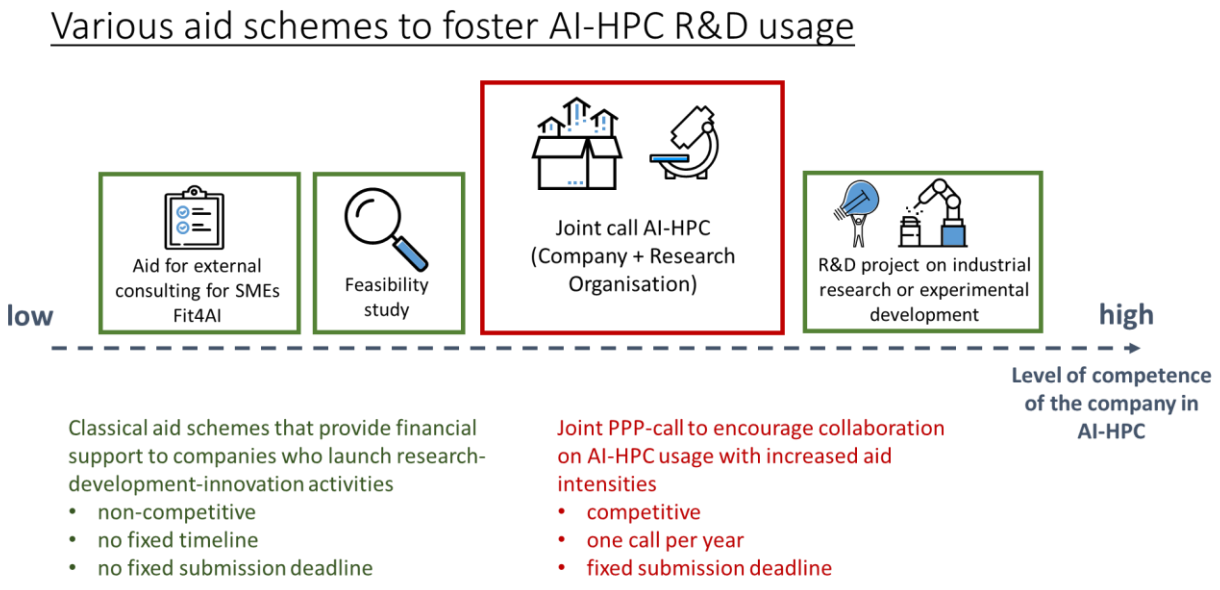
The development of disruptive innovations along with the broader adoption of digital technologies and the fostering of a collaborative ecosystem, supporting technology and knowledge transfer among private and public actors are key priorities of the government's strategy to accelerate digital sovereignty. AI and HPC are the technological backbone of the national ambitions.

AI has become popular partly due to media coverage of recent developments in general purpose AI models, generative AI, or large language models (LLM), and partly due to the EU AI Act, which establishes a common framework for the development and deployment of AI-based systems in the European Union. AI encompasses a wide range of technologies, from machine learning and computer vision to natural language processing. Thanks to AI, machine-based systems are able to act intelligently, i.e. their actions are aligned with a priori defined goals, they adapt their behavior based on past experience or changes in the environment. Based on input, AI systems generate predictions or recommendations with a degree of autonomy. Companies in a wide range of industries can use AI to optimize their efficiency, improve the way they work, and innovate. AI models can be used to automate repetitive tasks, improve the accuracy of predictions, or provide in-depth analysis for informed decision making. In addition, access to powerful computing infrastructures has made it possible to process massive amounts of data and train more advanced and complex models.

HPC offers great value in big data analytics and training of artificial intelligence algorithms with millions of data points. These types of endeavours would take a very long time or would not even be possible on traditional laptops or workstations, whereas HPC is able to analyse data with unparalleled speed and impressive accuracy. HPC can also reduce the cost of an organization's R&D process through simulation and virtual prototyping, enabling them to stay ahead of the competition and significantly reduce time to market. HPC is thereby particularly useful for performing simulations that require high-resolution and high-accuracy results to explore the granularity of large and complex problems with many parameters that need to be tuned simultaneously. Beyond classical applications, HPC also plays an increasingly important role in quantum research. It can be used to run quantum simulations via dedicated emulators, enabling researchers to model quantum algorithms and systems even in the absence of physical quantum hardware. This integration is particularly valuable for exploring use cases, benchmarking performance, and advancing algorithm development.

However, there is no single metric that can be used across industries to measure the benefits of these developments. The reasons for deploying AI and/or HPC tend to be unique to each organization and linked to its strategic priorities. However, adoption in the private sector is still limited, often due to a lack of expertise in scaling numerical simulations, performing big data analysis on large computing systems, or selecting, adapting, and validating AI algorithms, which can be intimidating at first glance. To fill this gap, the Ministry of Economy, the National Research Fund (FNR) and Luxinnovation are launching a joint call for proposals to encourage close and interactive collaboration between private companies and public research institutes to carry out innovative research projects. It is a strategic priority of the FNR to turn public research into a competitive advantage for Luxembourg and to give researchers the opportunity to pursue a high-impact research strategy while working with the most innovative private actors. To this end, the FNR supports the development of Luxembourg's knowledge-based economy by promoting applied research, strengthening the collaboration between public research and the innovative economy, and facilitating the potential commercial exploitation of research results.

This joint call for projects (red box in the Figure below) will be accompanied by a dedicated portfolio of aid schemes (green boxes) offered by the Ministry of the Economy, which takes into account the different levels of AI and HPC expertise of private actors. The goal is to create a general awareness of the use of these technologies in companies' R&D activities and to support a sustainable evolution towards a relevant ecosystem. Together, the dedicated portfolio of aid schemes intends to accelerate the digital transformation process in companies by integrating artificial intelligence as well as HPC into their internal innovation process. A more detailed explanation of the additional aid schemes that, unlike the call for proposals, are non-competitive and have no fixed submission deadline, and how they fit into this call initiative can be found at the end of this document.



Purpose of the call:

The purpose of this joint funding call for projects is to accelerate the integration of computer-aided engineering, design and analytics, artificial intelligence-based solutions and high-performance computing into the internal innovation process of companies. Additionally, it seeks to foster the development of new solutions and services leveraging these technologies. The joint funding call therefore supports the implementation of high-quality, high-impact and innovative applied research and development projects with a focus on artificial intelligence and/or high-performance computing.

Objectives:

As a pillar of a company's performance, the R&D department must offer innovative products while controlling development costs. To be effective, the R&D strategy must be based on cutting-edge technologies that reflect the latest scientific and technical advances in the field. Harnessing the latest technological advances, including AI and HPC, is instrumental in this effort and represents a key element in building a sustainable, competitive and digital economy in Luxembourg.

In this sense, the present call for projects aims at facilitating collaborative projects between public research institutions and companies to jointly achieve applied research and development results that are mutually beneficial. Public research institutions will have the opportunity to address new or different research questions, and companies can improve their innovation capabilities and gain access to high-level public research expertise in AI-HPC. Projects should also have added value to the national industrial and economic landscape and be consistent with national strategic priorities.

The specific objectives of the AI-HPC Joint Call are:

- to foster innovation and sustainable value creation by stimulating strong partnerships between public research institutions and the industry in the field of artificial intelligence and high-performance computing.
- To strengthen the company’s expertise in:
    - AI models, enabling their fine-tuning and deployment for relevant use cases.
    - HPC applications, enhancing capabilities in complex computations such as modeling and simulation, quantum simulation via emulators, data analysis, virtual testing, machine learning, and AI, ultimately leveraging the long-term opportunities these technologies offer.
- To encourage the implementation of innovative projects that contribute to the development of Luxembourg's economic landscape and are in line with national strategic priorities.
- To enhance the attractiveness of Luxembourg as an innovation hub based on advanced technological research in AI and HPC.

Call topic:

Projects submitted under this call must be innovative, of the highest quality, and contribute meaningfully to the development of Luxembourg’s economic landscape. They should demonstrate a positive and sustainable impact by diversifying or strengthening the future business activities of companies, while simultaneously enhancing their R&D capabilities, knowledge base, and technical expertise. Eligible projects may fall within the categories of *industrial research* and/or *experimental development*.

The R&D projects should address complex and forward-looking challenges, resulting in new solutions or services that either outperform existing technologies or significantly accelerate their development. Projects must also tackle key issues relevant to industry, science, or society at large. Applicants are required to clearly justify the integration of AI and/or HPC technologies, and demonstrate how their proposed products, processes, or services will benefit from these innovations.

This joint call focuses on R&D initiatives in **Artificial Intelligence (AI)** and **High-Performance Computing (HPC)**, with particular emphasis on the following application areas:

1) Artificial Intelligence (AI) for Industry and Scientific Innovation

This topic area supports the development and application of AI technologies to improve industrial processes, enable scientific breakthroughs, and create intelligent systems that drive innovation.

- Machine learning-driven solutions to optimize industrial processes
- AI-based automation, including pattern recognition, predictive maintenance, and computer vision
- AI-powered decision-support to address complex industrial and scientific problems
- AI-enhanced control algorithms

2) High-Performance Computing (HPC) for Advanced Simulations and Data Processing

This area targets projects leveraging the computing power of HPC to simulate, analyze, and interpret complex systems across domains, accelerating innovation in science and industry.

- Large-scale simulations (e.g. Computational Fluid Dynamics (CFD), Finite Element (FE) analysis) for engineering design, materials science, and environmental applications
- Big data analytics and visualization techniques applied to vast datasets for industrial or scientific insights
- Advanced predictive modeling and forecasting of complex systems
- Quantum simulation use cases, including quantum algorithm design and execution on HPC-based emulators, for material science and design, energy applications, and next-generation technology development

3) Cross-Domain Projects Combining AI and HPC

This category encourages the convergence of AI and HPC to address complex, data-intensive challenges.

- Development and deployment of large-scale AI models powered by HPC infrastructure for predictive analytics, optimization tasks, and real-time decision-making

This call for projects primarily targets private-sector stakeholders with strong R&D capabilities but limited in-house experience in artificial intelligence (AI) and high-performance computing (HPC). The objective is to support these companies in exploring, adopting, and integrating cutting-edge AI and HPC technologies into their operations, thereby accelerating innovation and boosting long-term competitiveness.

To ensure the successful implementation of these complex technologies, each project must be carried out through close collaboration between a public research institution and an industry partner. These partnerships are crucial for providing the scientific expertise, access to specialized infrastructure, and guidance on best practices required for effective execution. By fostering strong public-private cooperation, the initiative aims to facilitate knowledge transfer, lower technological barriers, and maximize the return on R&D investments.

General eligibility criteria and instruments of the joint call:

1) Consortia are expected to include at least one eligible participating company and one FNR-eligible participating research organization. In the consortium, the contribution of the private and public parties should be as close to equal as possible, whereas no party shall bear more than 70% of the total project cost. Companies must fulfil the general eligibility criteria as set out in the RDI law [1] and the respective criteria of the specific state aid scheme they apply for as set out in the R&D schemes [2]. Research organizations must be eligible under article 3-(2) of the FNR statute (*Loi modifiée du 31 mai 1999 portant création d'un fonds national de la recherche dans le secteur public*) and be registered at the FNR.
2) The project must be in the field of industrial research and/or experimental development as defined in the RDI law [1], and in line with the call topic.
3) For research and development activities under the joint call for projects, public institutions should comply with the general principles set forth in the FNR Guidelines, such as the formal requirements to qualify as PI (Principal Investigator) of an FNR-funded project and/or as supervisor of an FNR-funded PhD student, the FNR Research Integrity Guidelines, and the FNR data management plan, as well as those included in the FNR BRIDGES Programme description.
4) The consortium must have the necessary expertise in the relevant fields to carry out the specific research task.

The FNR will fund the costs of the eligible research organizations in Luxembourg, up to 500.000 € per project covering all project specific costs.
The Ministry of the Economy will co-finance costs borne by Luxembourg eligible companies up to 700.000 € per project, using the R&D aid scheme [1].

It is expected that the projects will be considered as industrial research and/or experimental development projects. In this case, the maximum co-financing rates for companies through collaboration are as follows:

Maximum aid intensities	Large company	Medium company	Small company
Experimental development	40%	50%	60%
Industrial research	65%	75%	80%

Project durations are targeted for a 24 to 36 months period.

Upon justification regarding their liquidity needs, the Ministry of the Economy may give a 30% upfront payment to SMEs leading a project selected in this Joint Call. For public research organisations FNR financial regulations apply.

Self-funded international or national partners are permitted to participate in the consortium.

Evaluation criteria and scoring system of the joint call:

The project proposals will be evaluated in a balanced manner based on the following criteria and taking into account the general considerations formulated under the call topic and objectives:

1. Relevance (33.3%)

This criterion aims to evaluate the quality and the innovative character of the project through the following aspects:

- project idea; clarity and pertinence of the objectives;
- level of innovation, including advance on state of the art;
- soundness of the research approach and methodology;
- scientific and technical maturity of the project;
- clarity, coherence and adequacy of the application regarding the theoretical framework, objectives, methodology, work plan and expected results and impacts;
- national societal and economic relevance of the expected project results.

2. Implementation: quality and efficiency of the project plan (33.3%)

This criterion is intended to assess the quality and feasibility of the project work plan to ensure its success. The following aspects are considered:

- coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources;
- realistic timing taking into account where applicable time allocations within computing infrastructures;
- competences, experience and complementarity of the individual participants, as well as of the consortium and collaboration as a whole;
- level of ambition of the collaboration and commitment of the participants in the proposed program;
- appropriateness of the measures to comply with applicable legislations and regulations;
- credibility of the management structures and procedures, quality of the risk management plan and soundness of the risk mitigation plan.

3. Impact (33.3%)

This criterion is intended to assess the potential impacts and contributions of the project. The following aspects are considered:

- broader impact with economic, environmental and societal added value of the proposed research and development project in line with national priorities;
- strengthening of the competitiveness and growth of the companies involved by developing innovations;
- effectiveness of the proposed measures to exploit and disseminate the results of the project;
- contribution of the project to the advancement of knowledge and expertise of companies in the fields of AI and HPC ;
- particular focus on R&D projects involving new innovations and processes rather than improvements to existing technologies and core business activities.

Call process:

The submission and evaluation process will be composed of 2 phases.

- **Submission process:**

Phase-1: (1st *of May 2025 – 18th of June 2025 2pm)*
Project outline (PO) to be submitted on the research-industry-collaboration platform of Luxinnovation.

The PO shall provide information on:

- Project description;
- Project outcomes;
- Expected technical contributions of the different partners;
- Statement explaining the benefits of using AI and/or HPC;
- Intellectual Property Rights for collaborative project proposals (in view of a draft collaboration agreement in phase 2);
- Preliminary project costs;
- CV of the main investigators;
- For companies: Organizational chart of the group, 2023 and 2024 balance sheets and P&L accounts of the applicant and the group, cash-flow forecast.

Phase-2: ***(21st of July 2025 – 17th of September 2025 2pm)***
Full project proposal (FPP) to be submitted by each project participant either to the Ministry of the Economy (Myguichet platform) for companies and to FNR (FNR Grant system) for accredited research organizations. The FPP as well as the financial annexes to be appended by each partner to the aid application can be downloaded from the platform *www.research-industry-collaboration.lu*.

The FPP shall provide information on:

- Detailed description of the research project;
- Different activities of the project (Work packages);
- Description of the technical challenges and implementation of the project;
- Description of the expected outcome and the economic impact;
- Milestones;
- Timeline;
- Resources;
- Description of costs;
- Collaboration agreement (draft ready for signature) including agreement on intellectual property[1];
- GDPR aspects: data flow and ownership, delegations to data processors.

[1] Any intellectual property (IP) rights that result from the collaboration should be allocated to the different collaboration partners in a manner which adequately reflects their contributions and respective interests in the project. The main IP terms of the collaboration agreement between the company and the public research institute should thereby comply with the "Framework for State aid for research and development and innovation (2014/C 198/01)", paragraph 2.2.2. "Collaborations with undertakings" [3].

- **Evaluation process:**

Phase-1:
Based on the Project Outlines (PO) and the annexes submitted via the research-industry-collaboration platform, the granting authorities in collaboration with Luxinnovation will check:

- Eligibility of all parties and co-funding capacity of the company;
- If the project description is in line with the call topic;
- If the technical capabilities and benefits of using AI or HPC are consistent with the topic and the objectives of the call.

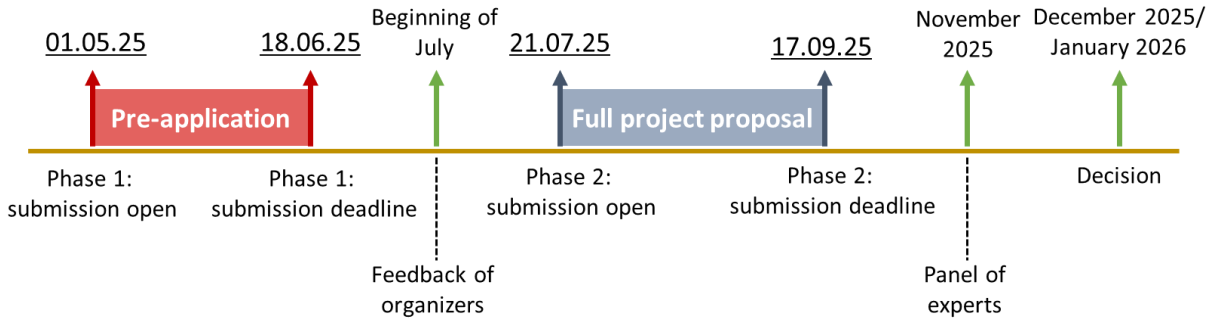
Participants will obtain written feedback from the granting authorities on Luxinnovation's research-industry-collaboration platform. Based on the analysis of the eligibility, the level of innovation and quality of the application, as well as the economic and societal impact in line with national strategic priorities, a recommendation for a submission to Phase-2 will be offered.

Phase-2:
Full project proposals (FPP) prepared in Phase-2 will be reviewed by an independent expert panel ("panel") that will assess FPPs from a scientific/technical and economic point of view. The panel will establish a ranking list based on the criteria set in the "Evaluation criteria and scoring system" section above. The highest ranked projects will be recommended for funding to FNR and Ministry of the Economy.

A project can only be funded by a concurring decision of FNR and the Ministry of the Economy.

The results of the evaluation will be communicated in January 2026, at the latest. Projects are expected to start in early 2026.

Joint Call AI-HPC timeline:



Portfolio of dedicated aid schemes complementing the joint call for projects:

As emphasized in the "context of the call" and visualized in the dedicated figure, the joint call for projects is accompanied by a portfolio of dedicated aid schemes by the Ministry of Economy that takes into account levels of AI and HPC expertise of private actors. The goal is to create a general awareness in the use of these technologies in companies' R&D activities and to help companies to innovate at different maturity stages. Unlike the main call for projects, these aid schemes are for companies only, have no fixed deadline and are non-competitive. The aid schemes are defined in the RDI law [1] and companies that want to benefit must fulfil the general eligibility criteria of that law and the respective criteria of the specific state aid scheme they apply for as set out in the R&D [2] or SMEs aid schemes [4].

- **Aid scheme 1:** Aid for external consulting for SMEs to demonstrate the potential of simulation-based R&D, data exploitation, AI-based solutions or HPC usage in company's innovation or business processes.
  The linked Fit4AI-aid scheme primarily targets SMEs that have no, or only very little expertise and knowledge, in AI-related fields. External expertise should be solicited from associated external consultancies to analyze the innovation processes and provide specific recommendations, as well as to propose tools and methods for the applicant to valorize internal data sources and implement AI-based solutions in its innovation or business processes.

- **Aid scheme 2:** Aid for a technical feasibility study for the evaluation and analysis of the potential to implement R&D projects based on simulation, modeling or artificial intelligence.

  The aid scheme intends to support private actors (SME or large company) to assess the potential of an AI or HPC project. The study should include all the preliminary analyses necessary to define the key elements to be implemented, in order to carry out the industrial research activities. This includes project design, assessment of the challenges and skills needed to successfully transfer physical R&D processes to virtual prototyping, data availability to train AI algorithms, software needs, etc. to demonstrate the technical feasibility of the project. Evaluation of the transformation of existing software, codes and tools to open source and HPC may be part of the feasibility study as well. External expertise may be sought from DIH, NCC-HPC, Luxembourg AI Factory, academic or private partners.

  Note, that for aid scheme 1 and aid scheme 2, projects can benefit from innovation support for SMEs to finance the detachment of highly qualified personnel who will contribute to the implementation of digital programs and software in innovation processes.

- **Aid scheme 3:** Joint call for projects (as defined above) to support the implementation of industrial research and experimental development projects that aim to benefit from artificial intelligence or high-performance computing.

Note that companies that have already a considerable level of competencies in the use of AI or HPC can make use of the aid for industrial research or experimental development projects under the RDI law [1] to carry out innovative research and development projects.

References:

[1] Modified law of May 17, 2017, on the promotion of research, development and innovation or equivalent in case of entry in force of a new law (Projet de loi N° 8314)

[2] *https://guichet.public.lu/en/entreprises/financement-aides/aides-recherche-developpement/rdi/aides-rdi.html*

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R1315; https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0651

[4] *https://guichet.public.lu/en/entreprises/financement-aides/aides-recherche-developpement/rdi/aide-innovation-pme.html*