Mapping of Nuclear Start-ups in Europe





NUCLEAR ENERGY IN EUROPE

Nuclear energy has shifted in a few months from a source shunned by governments to becoming an essential solution for achieving the energy transition necessary in the face of global warming.

Experts agree that solar, wind and hydropower will not be enough to replace fossil fuels. Germany intensively debated over whether to <u>restart three nuclear power plants</u> in response to the country's severe energy crisis caused by the Russian-Ukrainian conflict. Additionally, 10 European countries have been pushing for classifying <u>nuclear energy as green energy</u> in the EU taxonomy.

According to the <u>European Nuclear Society</u>, in August 2022 there were a total of 171 nuclear power plants in Europe and 12 plants were under construction in six countries. In terms of electricity generated by nuclear energy in 2021, France holds the top position with a share of 69%, followed by Ukraine (55%) and Slovakia (52.3%), then Belgium (50.8%).

As part of France 2030, ≤ 1 billion of investment will be dedicated to the development of technologies in the nuclear field.



NUCLEAR POWER PLANTS IN EUROPE, IN OPERATION AND UNDER CONSTRUCTION, AS OF AUGUST 1, 2022

Source : European Nuclear Society

START-UPS INNOVATING IN NUCLEAR

In this context, **venture funding for nuclear energy start-ups reached a peak in 2021, with an investment amount of <u>\$3.4 billion</u>.** This amount was \$381 million in 2020 and only \$131 million in 2012.



* 2022 data as of March 14 Source : <u>Bloomberg</u>

Additionally, investors point to the low carbon emissions, reliability and potential of nuclear energy as a path to energy independence. The attraction of venture capital in the nuclear industry is also due to technological innovations, including advances in <u>nuclear fission and fusion</u>. Combined with long lead times, the <u>capital investment requirements</u> in nuclear technologies are high.

Innovation in nuclear fission – the technology that splits nuclear atoms to generate huge amounts of energy – now involves highly automated and smaller reactors. Today, there are around <u>70 small modular reactor (SMR) projects</u> in the world, carried out by both start-ups and incumbent operators. New nuclear power plants will no longer be the huge and expensive installations of the past – technical developments will allow them to be smaller and safer.

Innovation in nuclear fusion – the merging of atoms to generate power – is an area of technological development of particular interest. The reactor does not generate long-lived radioactive waste and is sustainable due to the lack of greenhouse gas emissions.

GEOGRAPHY AND MATURITY OF NUCLEAR START-UPS IN EUROPE

The mapping of nuclear start-ups is based on the data on 46 start-ups* listed on the Skopai platform in October 2022. These companies were created after year 2000, develop solutions for the nuclear industry, and vary in size from less than 10 to 500 employees. The analyzed start-ups are spread across **12 countries, with the majority operating in France and the UK, as well as Sweden, Switzerland and Denmark**.



Start-ups are evenly distributed between the early stage, go-to-market and maturity stages. **There is a positive trend in the creation of new nuclear start-ups**: 39% of start-ups have been created since 2016.



* Explore the landscape of nuclear start-ups in Europe – New user: <u>link</u> / Skopai user: <u>link</u>. Note : The graphs are created using Skopai data.

NUCLEAR START-UP INNOVATION MAP



SIZE, BUSINESS MODEL AND TECHNOLOGY

In terms of team size, most of the start-ups analyzed have **less than 10 employees (39%) and between 11 and 50 employees (41%).** 1/5th of companies (20%) are larger and employ between 51 and 500 employees.

The majority of nuclear start-ups operate in the sector of development and manufacturing (54%). Consulting and agency, as well as R+D+I services (Research, and Innovation, or Development sometimes Research, Development and Industrialization) account for 21% and 18%, respectively. Software as a service (SaaS) is also present in the landscape (7%).



More than one third of nuclear start-ups (37%) have filed patents. Excluding start-ups in the consultancy and agency sector, **the percentage of patented start-ups rises to 46%.** A total of **71 patent filings** were registered by start-ups, according to the data analyzed.



* A start-up can have several business models. Note : The graphs are created using Skopai data.

INVESTMENTS IN NUCLEAR START-UPS

Nuclear start-ups are increasingly attracting the attention of venture capital funds and individual investors. They are developing new technologies to design cheaper, safer and more efficient nuclear reactors that could boost the production of low-carbon energy. However, the technology is very complex and difficult to develop. The nuclear industry is characterized by high capital investments, safety concerns and long-term management of nuclear waste.

According to public data analyzed on the Skopai platform, European nuclear start-ups received **funding in 2022** through different funding rounds and from different investors.



<u>Nuclear AMRC</u> works with manufacturers to improve their capabilities and performance for nuclear and other demanding industries. In August 2022, the company secured additional funding of <u>£1.3 million</u> provided by Innovate UK through the HVM Catapult. The funding is for the development and delivery of training equipment for the new Nuclear Skills Academy in Derby.



<u>Thorizon</u> develops next-generation nuclear reactors to help solve today's energy challenges. In August 2022, it raised $\underline{\in}12.5$ million in funding for the development of a new generation of nuclear power plants, to carry out tests and research, and to compele the design of a first prototype. The round was led by Positron Ventures and Impuls Zeeland, with participation from Invest-NL, Huisman and PDENH.

newcleo

<u>newcleo</u> develops lead fast reactors to provide a safe and stable source of energy and reduce the volumes of radioactive waste. In June 2022, it raised ≤ 300 million to further accelerate the company's international growth plans.



<u>Siteflow</u> develops a software to facilitate the administrative work of operators in complex industries. In June 2022, it raised <u>€10 million</u> in series A led by Bpifrance (via its Digital Venture fund), followed by the Fonds France Nucléaire (managed by Siparex) and 360 Capital.



<u>First Light Fusion</u> researches energy generation via inertial fusion. In February 2022, it raised <u>\$45 million</u> in Series C for delivering a maiden fusion result and performing further work on the development of a full scale fusion power plant. Investors include Oxford Science Enterprises, Hostplus, IP Group plc., Braavos Capital and Tencent.

METHODOLOGY

The study is based on the data on **46 nuclear start-ups in Europe and Israel**, presented on the <u>Skopai</u> platform and extracted in October 2022. The data on start-ups are collected from sources publicly available on the internet, using data science and AI algorithms.



Access a **comprehensive list with detailed information** on nuclear start-ups in Europe – New user: <u>link</u> / Skopai user: <u>link</u>.

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BIG DATA AND AI TO CAPTURE THE NUMBER AND DYNAMICS OF START-UPS

Skopai intelligence and innovation platform offers a full set of comprehensive and qualified real-time information on start-ups worldwide. Using the validated methodology and machine learning algorithms, the Skopai platform helps discover, monitor and evaluate technology companies and innovation ecosystems across all sectors by providing accurate and reliable information in real-time.



Al-based platform



CONTACT

Tatiana Beliaeva

Senior Entrepreneurship Researcher Skopai tatiana.beliaeva@skopai.com



<u>www.skopai.com</u>

