

The Fourth State

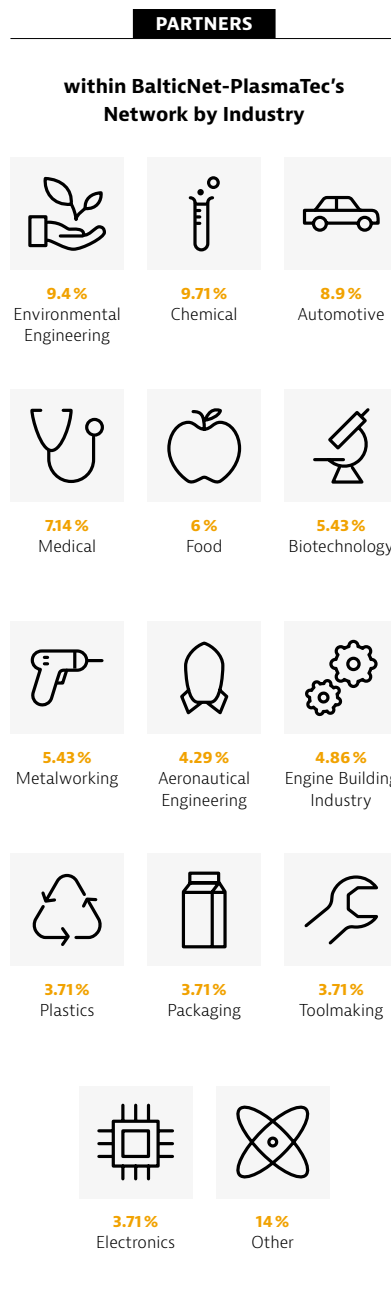
Plasma technology is all around us, although we may not know it. From food hygiene to engine manufacturing, this hidden science has multiple industrial uses, and is the reason why investors are flocking to the German city of Greifswald.

Plasma is said to be the state of around 99 per cent of visible matter in the universe. Its most celebrated form is probably the northern lights. It is created simply by adding energy to a solid (the first state), causing it to change to liquid (second state) and then to gas (third state). Once the gas is created, feeding extra energy into the gas creates the fourth state: plasma – matter with a high energy level. When this matter comes into contact with certain materials like plastics and metals, it can change important properties, making it a significant tool for selective modification of material characteristics, such as changing the adhesiveness or wettability of surfaces.

Plasma technology is a pan-industrial application, with industries as diverse as glass and engineering using it. Physical plasmas have been proven to disable tumor cells, causing them to stop dividing and spreading. Plasma filters reduce the emissions of hydrocarbons, nitrous oxides and sulfurous oxides, helping the fight against environmental pollution. In the life science field, plasma technology has helped to create such things as antibacterial surfaces or functionalized implants, and plasma sterilization techniques are currently being developed.

Awesome plasma cluster

In the Mecklenburg-Vorpommern town of Greifswald, BalticNet-PlasmaTec is becoming one of the best-known industry clusters within the field of plasma technology. Greifswald itself has a long tradition in plasma technology; these days the University of Greifswald, the Leibniz Institute for Plasma Science and Technology, the Max Planck Institute for Plasma Physics and several SMEs are all active in this field. BalticNet-PlasmaTec serves as a central partner to these players, enabling



Source: BNPT

networking and joint projects across the industry and research.

The BalticNet-PlasmaTec cluster started in 2006 with eight members from Germany and Poland, built up on an inter-regional EU funding source, while Germany's Federal Ministry of Education and Research (BMBF) funded a host of internationalization projects within the network. Eleven years later, BalticNet-PlasmaTec consists of 71 partners from 16 different countries, particularly from the countries bordering the Baltic Sea but also from Italy, France, India, Belgium, Brazil and the Netherlands. It manages all the essential business services on site, including new business development, marketing, education, R&D, funding and project management. Greifswald was chosen as the location on the basis of the extensive subject knowledge capital and human resources located there.

An ever-expanding net

This year will see the groundbreaking foundation stone ceremony for a new technology center in Greifswald, co-initiated by the cluster. The Centre for Life Science and Plasma Technology Greifswald, as it will be called, will enhance the collaboration in and economic use of bio-technology and plasma technology, including cross-sectoral co-operation. Such a collection of high-level facilities has enabled Greifswald to become a well-known European reservoir of plasma technology knowledge, with the Ministry of Economics, Employment and Health of the State of Mecklenburg-Vorpommern and the city itself putting in the investment for the new center.

"The crucial point was a cross-sectoral approach on bio-economy and plasma technology, which are two relevant technology areas in Greifswald," says Wolfgang Blank, chief executive of WITENO, one of the found-

ing firms in the cluster. “The close collaboration between different partners – from science, industry and administration – was critical in getting the support of the federal state of Mecklenburg-Vorpommern. We want to attract and build up high-tech industry in the region.” Any company which is interested in plasma technology or the bio-economy should keep an eye on opportunities at the center. “Cross-sectoral collaboration, tailor-made and modular infrastructure, professional services in business development, start-up culture and innovation management are the key advantages to be gained by joining our community,” says Blank.

The new center will serve as a hub of creativity for the future, enabling large and small companies alike to continue developing new innovations and enhancing Greifswald’s reputation as a center of cutting-edge knowledge. “The Centre for Life Science and Plasma Tech-

nology’s long-term efforts will expand the competences in the field of plasma technology and will create the prerequisites for the initiation of further projects, the formation of clusters and marketing possibilities,” says Klaus-Dieter Weltmann, chairman of the board at BalticNet-PlasmaTec. “A major advantage is that spin-offs of the University of Greifswald, the Max Planck Institute for Plasma Physics and the Leibniz Institute for Plasma Science and Technology could stay in Greifswald and strengthen their co-operation with other companies in Mecklenburg-Vorpommern; this means the other companies can also improve their chances of development.”

The BalticNet-PlasmaTec cluster implements its own innovations as well. The challenge of orchestrating scientists and research from such a wide variety of countries is considerable, but through the implementation of a bespoke communication platform known

as Clou5, the flow of information is secured. Clou5 brings together networking tools such as document exchange, management tasks, video conferencing and expert search. All interactions within the network take place in an environment of trust. Users can decide who can see their information: for example, a specialist group.

Like the sun – the largest plasma formation in our solar system – if Greifswald continues expanding, it will draw many other technologies into its magnetic field. Plasma technology has found its physical home.

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A newly-forged ring induction lamp glows pink at the Leibniz Institute for Plasma Science and Technology in Greifswald, in the German state of Mecklenburg-Vorpommern. The city is home to **BalticNet-PlasmaTec**, one of the most important clusters in the plasma field in Europe.

Key Industrial Applications of Plasma Tech

- Atmospheric pressure and vacuum coating at low and high temperatures
- Activation and modification of surfaces
- Etching
- Cleaning through to sterilization
- Plasma cutting and welding
- Pollutant degradation in gases and liquids (e.g. purification of water)
- Production of light and radiation
- Plasma-chemical processes, e.g. for synthesizing new materials
- Optimization of high-voltage switches