

OPERATIONALIZING REGIONAL CIRCULARITY:  
BEST PRACTICES FROM TURKU

# SMART CHEMISTRY PARK: AN INDUSTRIAL SYMBIOSIS PROJECT TO REDESIGN THE CHEMISTRY SECTOR



INDUSTRY  
SYMBIOSIS



The chemical sector plays a central role in modern economies. It allows turning raw materials into high-value products that will be used in our everyday life. Yet there is a growing recognition that raw materials extraction is fueling climate change, pollution and ecosystems degradation. Chemistry will be critical to rethink the way waste streams can be used to decrease pressure on raw materials as well as the impacts of industries as diverse as the plastic, construction, energy or electronics industries.

Yet circulating molecules is linked to many challenges, from achieving the required performance properties to complying with safety standards and finding demand for secondary uses. Small and medium enterprises play a pivotal role in developing and testing innovative solutions that can then be implemented at a bigger scale.

Smart Chemistry Park offers a relevant example of how local public actors can support innovative circular economy solutions for high-value materials through industrial symbiosis.

## CONTEXT

Like in most regions, the vast majority of waste production in Southwest Finland is a result of the manufacturing industry. Recognizing the need for cleaner production processes and the key role that small and medium size businesses could play in renewing the

industries, the city of Turku created the non-profit company Turku Science Park Ltd.. Through the city-owned company, Turku has been supporting a number of circular economy initiatives in the region, including Smart Chemistry Park (SCP). SCP was created to support

SMEs to grow by offering a unified infrastructure for piloting innovative circular economy solutions aimed at recycling industrial side-streams into high-value chemical products.



## KEY ACTORS

Smart Chemistry Park was established in 2015 as a platform for regional companies in chemistry and chemical engineering to collaborate and identify synergies. The development of SCP was financially supported by Sitra and the cities of Turku and Raisio.

SCP supports small businesses whose solutions are based on material technology, process chemistry and refining technologies. The center also works with business networks at the regional and national level and with municipal energy and waste companies such as Turku Energia Oy and Lounais Suomen Jätehuolto Oy.

SCP continues to work directly with both Turku and Raisio on a strategic level. SCP also collaborates with public sector actors such as Business Finland, Sitra and the Chemical Industry Federation of Finland to support the growth of bio- and circular economy solutions in the chemistry sector.

Finally, SCP cooperates with both national universities and regional research and education institutes, such as Åbo Akademi University, the University of Turku and the Turku University of Applied Sciences, which play a crucial role in supporting companies involved in the SCP on research, development and innovation issues.

## ACTION

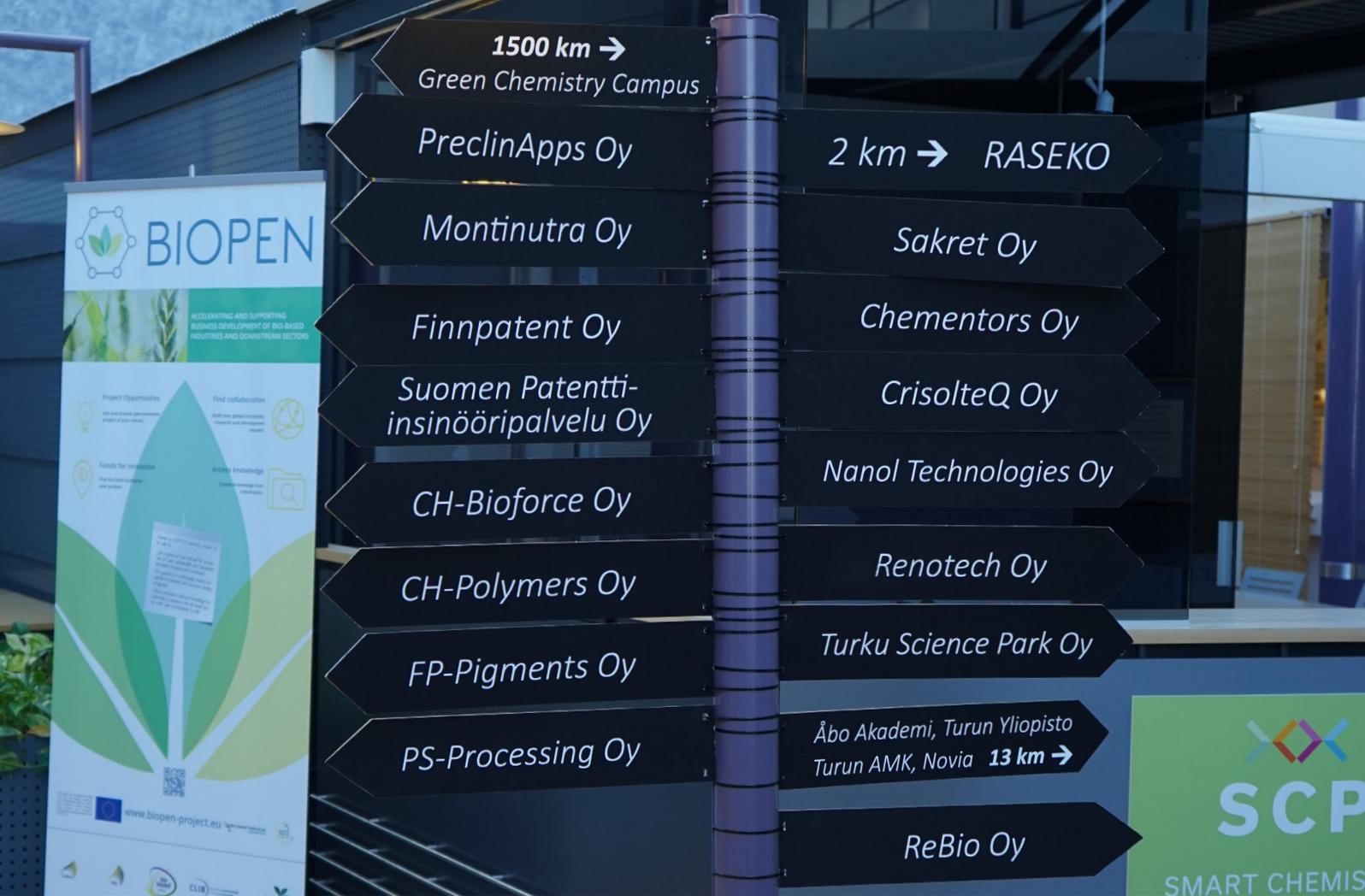
Smart Chemistry Park is located in the industrial area of the municipality of Raisio, a few kilometers away from Turku. Within the park, companies have access to shared laboratory spaces and the possibility to pilot and expand production to an industrial scale.

The competences of the companies working at SCP lie in different fields of chemistry. They deliver products or technical expertise to a wide variety of industrial sectors, such as metal, energy, paper and packaging, building, and life science industries.

At the core of SCP's business model is the reuse of industrial waste streams, which companies can access from the surrounding industrial zone.

For example, CH-Bioforce develops fractionation technologies for wood chips from industrial side-streams to extract bio-materials such as cellulose and lignin. CrisolteQ is a company specializing in recovering metal resources like nickel, chromium and iron from industrial processes. As for Renotech R&D Inc, the company developed the 'Ash to cash' concept, which turns ashes produced through different combustion processes into reusable insulating material for infrastructure construction.

The SCP companies work independently, developing their own technologies and businesses, but in close collaboration with each other, testing and reusing side-streams from one another in the shared laboratory. In addition, companies exchange their infrastructures, equipment



and know-how. SCP also includes consulting companies with expertise to complement the value chain with services such as chemical safety and patent engineering.

At the moment, 14 companies operate in the Smart Chemistry Park. The SCP network is broader, with 60 companies working together on cross-cutting issues such as raw material supply or research and development.

SCP also facilitates access to accelerator programs and funding networks to ease the operationalization of innovative and sustainable business models.

Finally, the Smart Chemistry Park offers international cooperation opportunities through programs at the European Union level and with non-EU countries such as Malaysia and China.

## SUCCESS FACTORS

- **Access to multiple networks** from universities to business has supported the development of an attractive cluster of expertise. These networks offer regional visibility for SCP companies and strengthen access to relevant markets.
- **A strong focus on SMEs**, with services targeted to their specific needs and facilities allowing to share operational costs, enables the development of innovative solutions in cost-efficient ways.
- **Collaboration with public sector actors** has facilitated access to financing and helped anchor the work of the SCP within national circular economy priorities.

## IMPACTS

- **Industrial renewal:** Innovations at SCP are transferred into large branches of industry in Finland. For example, the SCP based Crisolteq was acquired in January 2020 by the Finnish state-owned energy company Fortum to scale an innovative method for recycling of electric vehicle batteries. This technology enables a recycling rate of 80 percent of lithium-ion batteries compared to the current recycling rate of around 50 percent.
- **Employment opportunities:** The SCP has created training and employment opportunities for jobs in the circular economy. An estimated 40 new jobs have been created in SCP companies between 2015-2019.



## NEXT STEPS

The SCP aims to continue supporting the growth of sustainable startups that deliver chemistry solutions that advance climate action. Thematic issues that will continue to be important include the battery industry, construction materials and bio-based products, especially for use in textiles.

