Project Newsletter #5

The project GreenIndustrialAreas empowers public authorities to increase the share of smart and climate-neutral industrial areas and co-develop a transnational certification standard. The project is funded by the Interreg Baltic Sea Region programme of the European Union.

A busy spring and even more challenging autumn ahead

We are amidst the project's pilot phase in which our developed tools are tested at industrial sites in Germany, Denmark, Latvia, Poland and Finland. These sites differ in maturity, size and business activities and hence provide a suitable background to learn whether the tools are of universal added value to Baltic industrial sites. At this phase a larger number of stakeholders is getting involved and provides crucial feedback, for which the entire consortium is thankful. This dialogue will be levelled up when each site is visited by a small number of partners in September and October 2024.

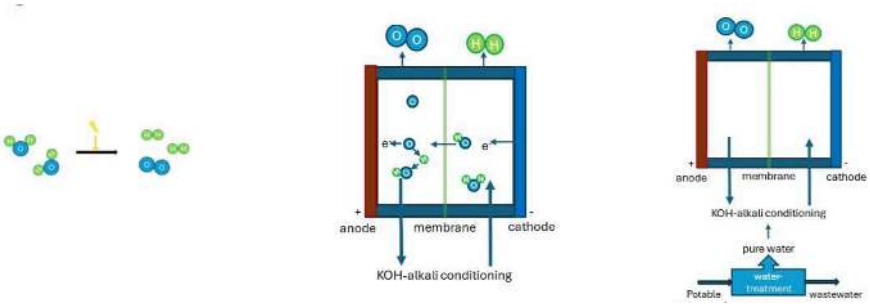
Electrolyzer in Lübesse, Germany: Pressurized alkaline water electrolyzers

In the coming years, water electrolysers will be put into operation more and more frequently. These systems use electricity to break down water into its molecular components hydrogen and oxygen. An alkaline pressure electrolysers

is going to be built at a plant in the industrial area of Lübesse, one of the pilot sites of the GreenIndustrialAreas project.

How does it work? First, water is mixed with a substance to form an alkaline solution and fed into the electrolyser stack as electrolyte. As with most alkaline electrolysers, potassium hydroxide (KOH) is then used in Lübesse to produce the potassium hydroxide solution. The “stack” of the electrolyser consists of many individual cells, each consisting of the two electrodes and a thin membrane. The entire process takes place at an increased pressure of around 15 bar.

As soon as voltage is applied to the electrolyser and the current flows, the water molecules contained in the alkaline solution are split at the cathode by the electrons (e-) of the current. In the process, one hydrogen atom is detached from each water molecule. Two free hydrogen atoms then bond to form a hydrogen molecule (H2) and the hydrogen can be removed from the cathode side. What remains is a negatively charged hydroxide ion (OH-) with an electron, which is attracted to the anode (positive pole). The membrane is semi-permeable - this means that it only allows these ions or smaller particles to pass through to the anode side. There, individual hydrogen atoms change to other hydroxide ions and thus form water molecules again, while the remaining oxygen atoms combine to form oxygen molecules (O2) and can be removed from the anode side. The electrons thus released are further attracted to the anode, completing the circuit.



After the lye in the electrolyser has lost some of its water due to gas production, new water is added to the lye circuit and pumped back into the electrolysis stack. The correct mixing ratio ensures that there is good conductivity in the electrolyser. The tap water is treated for this purpose before it is mixed with the lye. During this treatment (reverse osmosis), the minerals contained in the water, such as sodium or magnesium, are removed from the water. If such components were to remain in the water and thus in the alkaline solution, crystals or deposits may form on the electrodes or the membrane during operation, causing the electrolyser to stop working properly or even stop working altogether.

For 1 kg of hydrogen, around 16 liters of drinking water are used for purification. Of this, just over 5 liters are enriched with the minerals and returned to the water supply as waste water and the rest is fed back into the leach circuit as pure water.

How the pilot phase unfolds in Kaigu, Latvia

After several transnational meetings to inform the implementation of the certification in the Kaigu Bog area, the local project team is now at the point of analysing the stakeholders and measuring their impact. During the work on the stakeholder analysis, stakeholder questionnaires, interviews and meetings are used - with a larger stakeholder event planned in late summer/early autumn to promote the project idea and, as a result, raise the awareness of the certification process.

The project's certification guidelines will be applied on both the current area and on its future plans (see images above and below) as Kaigu Bog is still under development. The evaluation is foreseen until the autumn, after which it will be possible to draw conclusions on possible amendments to the criteria based on the results in Latvia. Work will also continue with external experts in the fields of energy, environment and certification, who will contribute to the evaluation of the pilot area modelling criteria.

A peer visit to Kaigu Bog is planned for early September (week of 9-13 September), where a valuable programme is planned for project partners, as well as for expert and stakeholder engagement.

Meet our partners: Lithuanian Innovation Center (LIC)

Lithuanian Innovation Centre‘s (LIC) mission is providing innovation support services by implementing Lithuanian innovation policy. The main strategic goal of LIC is the increasing of Lithuanian international competitiveness by stimulating innovations in business. This goal is divided into the following objectives: (i) To foster capabilities of the companies to develop and implement innovations. (ii) To accelerate commercialization of achievements of advanced sciences. iii) To decrease the risk of innovation implementation. LIC serves Lithuanian companies on all aspects of innovation management, including capacity building, funding and international partnerships.

LIC's main objective is increasing Lithuanian international competitive-ness by stimulating innovations in business, including the decarboni-sation of industrial activities. As a common institution of two public and one private-sector shareholder (Ministry of Economy and Innovation; Ministry of Education, Science and Sports; Lithuanian Confederation of Industrialists), the centre has the capacity to unite the perspectives of public administration and business

interest. LIC was therefore chosen to lead the project's activity which addresses the further roll-out of the solutions found by the project (to be implemented in 2025). The activity also addresses the durable integration of project outcomes in regional policies in Lithuania.

One last thing

A working group meeting of the Baltic Sea Parliamentary Conference took place in Greifswald on May 28th, 2024. The Interreg project GreenIndustrialAreas was presented by the lead partner on behalf of the State Secretary of Mecklenburg-Vorpommern. The presentation was met with great interest, especially from colleagues from neighbouring Schleswig-Holstein.

https://interreg-baltic.eu/project/greenindustrialareas/