Editorial

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Trends in Energy – Efficiency, Recovery and Production The Role of the Chemical Industry

The Swiss Chemical Industry is one of the largest energy consumers having a share of 15% of all industries in Switzerland. The ratification of the Kyoto protocol by 193 countries, Switzerland being one of them, has helped to accelerate the chemical companies' efforts of the last 20 years to further reduce their energy consumption and to increase their energy efficiency. Many companies have defined reduction targets and are reporting the progress in their yearly sustainability reports or *via* other channels such as the Carbon Disclosure Project (CDP) for example.

Since the Swiss Federal Council has decided to exit from atomic energy by 2034 the pressure has further increased to reduce energy usage. Furthermore this decision has created a much larger need to access cheap alternative energies from renewable sources.

This Special Issue shall give you an idea of how the Swiss Chemical Industry can provide solutions for these challenges.

How can we reduce our energy consumption? Thanks to the continued efforts towards energy efficiency the absolute energy consumption of the Swiss Chemical Industry has decreased despite an overall increase in chemical production. The contributions from DSM, Lonza, and Okavango Energies represent just some of the examples how the energy usage can be significantly reduced by firstly achieving full transparency on consumption with tools like pinch analysis and then by continuously implementing larger and smaller energy-saving measures.

How can we make our energy resources last longer? Chemical enhanced oil recovery (CEOR) is a strongly growing technology, which will help to secure future oil supply from our existing reserves. While conventional oil production methods give access to on average only one-third of the original oil in place, an additional proportion can be obtained with the help of specially designed polymers and surfactants.

How can we further reduce CO_2 emissions? As most energy sources lead to the production of carbon dioxide, additional methods like CO_2 capture by ionic liquids become increasingly important. The Vanoli group of the EIA Fribourg gives an overview of the state of the art and the advancements of their own work.

How can we access cheaper alternative energies? Clariant has developed a commercially viable process for producing biobased chemicals and fuels from agricultural residues named 'sunliquid'. Some examples where alternative energies are supported with chemical solutions are descibed by Sika: Solar panels need to be produced in a fast and cost efficient way. Modern adhesives can support the photovoltaic industry to achieve this.

How can we improve energy storage systems? This is one major hurdle for electrical vehicles powered by lithium-ion batteries. In order to become competitive to petrol cars the energy density needs to be further increased and the costs need to come down. The development of lithium-sulfur batteries could be one of the future solutions, as shown in the BASF article.

As you will see, the Swiss Chemical Industry is actively addressing these questions and achieving remarkable progress. Stay tuned for more in the years to come.

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