

Towards Sustainable Use of Resources

The whole world faces an ever-intensifying challenge to use natural resources wisely as the world population is growing and the standard of living is rising. One of the key questions is how to continue economic growth without increasing the world's environmental burden. The chemical industry can be part of the solution.

Timo Leppä

Chemistry is present everywhere, and so are the products of the chemical industry. The chemical industry is needed to produce chemicals but also to provide solutions for other industries and consumers.

Development of the industry as a whole has always been closely linked to advances in the natural sciences. The challenges that mankind is currently facing require new materials, processes and services that can be developed by the chemical industry.

Customer segments for the chemicals industry cover virtually all sectors of the economy. All segments are also represented in the Finnish chemical industry.

The chemical industry gains from being close to customer industry. This is part of the reason why it is important that both Finnish and European chemical industries remain in the home market.

The chemical industry in Europe is largely concentrated in a few countries. While Germany, France, Italy, Great Britain and the Netherlands account for more than 70% of the EU's chemical sales, Finland's proportion is 1.3 %. However, by focusing on sustainable use of raw materials and effective energy use, the Finnish chemical industry can play a bigger role than its size would suggest.

Globally, the European chemical industry is in second place after Asia. In the EU, there are around 29,000

chemical and pharmaceutical companies employing some 1.8 million people.

Representing 15% of Finland's industrial production, the chemical industry is the country's third biggest industrial sector after the technology and forest industries. In 2008, the chemical industry employed around 36,000 people, slightly less than 10% of the total work force in industry.

Chemistry allows wise use of resources

In reducing greenhouse gases and slowing global warming, energy consumption and ways to produce energy play an essential role. As sources of energy and raw materials, oil and other fossil fuels are limited. Thus, we need to cut energy consumption and find new, efficient ways to produce energy.

By producing new fuels through chemical and biological processes, the chemical industry can help solve this problem. Developed in Finland, renewable diesel production technology is a prime example of a new technology that helps reduce greenhouse gases by replacing fossil raw materials with renewable raw material, refined with new production technology.

The chemical industry also produces effective insulation materials for buildings, enabling new construction systems to be used to diminish energy

consumption, while new materials also make light-weight construction possible.

Price development and dependency on oil and gas has led the chemical industry to search for renewable raw materials as a complement and replacement for traditional feedstocks. Large amounts of different chemicals can be produced from renewable materials, but the financial, technical, and often logistical difficulties must be solved before new processes can be used on a larger scale.

Industrial processes need a reliable flow of raw materials of consistent quality. The use of renewable materials has a long tradition in chemical production. Chemicals from the forest industry and agriculture, such as cellulose and vegetable oils, are refined into a wide array of chemicals.

The goal of reducing carbon footprints and diminishing the use of fossil hydrocarbons has led to a competition for biomass, which can be burned in order to produce energy.

Regulation and subsidies in agricultural or energy industries can seriously endanger the current use of biomass in the chemical industry and slow down development work for new uses of renewable raw materials. It is therefore important that value-adding processes and production are prioritised over direct energy use for renewable raw materials.



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Innovations Needed and Achieved

For sustainable development in the chemical industry, the key is new innovations and products. This is clearly seen in Finland as the competition from emerging countries, Asia in particular, is getting stronger.

Mainly fuelled by the rapid growth in Asia, especially China, we have seen a rapid increase in raw material prices during the past five years. The current downturn in the economy will not solve the problem, since it is linked

with scarcity of natural resources. Even if the outlook is gloomy right now, the world economy will face a new growth period.

The chemical industry is often an enabler, providing innovations or sources of innovation to other industries using chemicals in their processes. Therefore, it will always be a strategically, economically and socially important player in the society. Innovation within the chemical industry is thus of utmost

importance for all of industry.

Finland has natural resources that are or can be used as raw materials for chemicals. Sustainable and wise use of natural resources is possible when technological know-how is combined with the right strategic choices. This can offer a sustainable competitive advantage for the chemical industry in the future, as Finland has all the necessary prerequisites for pursuing this strategy.



Clean water is becoming an even more important issue than energy.

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Clean water over energy

A prerequisite for life, clean water is becoming an even more important issue than energy. Today, clean water is a scarce resource in many big cities, regions and countries. Water is a natural resource necessary not only in agriculture but also in numerous industrial processes. Megacities around the world are facing challenges in water purification, and new ways to clean and circulate water are needed globally. Water treatment chemicals are needed both in preparation of drinking water and in waste water treatment.

Finland has long traditions in environmental protection and preservation of our water resources, and the Finnish chemical industry is solving water treatment problems globally. A good understanding of water chemistry and deep knowledge of water treatment

technologies are distinct features of the Finnish water cluster, which includes the chemical industry, universities and authorities, all representing the highest levels of expertise in their fields.

Population growth and decreases in arable land put tremendous pressure on agriculture. Besides water, fertilisers and plant protection agents are essential, and food production at the global level could not function without the chemical industry. Without products made for agriculture, famine and malnutrition would be even bigger problems than they are now. The basis of the Finnish fertiliser industry is pure raw materials combined with modern production technology.

Recycling saves raw materials

Essential ways to reduce the use of raw materials are recycling and material efficiency. New legislation and new innovations can turn waste streams

and by-products into materials that can be used in processes instead of virgin natural resources. Sometimes, the quality of the product is even enhanced by using recycled materials.

The production of metals is a good example of an efficient use of secondary raw materials. Globally, about 70% of the steel produced today has been recycled at some point. Another example is paper. In order to reach the optimum printing quality for newspaper, around one third of the fibre should be recycled material. Hence, the recycling of metals and different fibre-based materials represents a vast market.

In Finland, the use of solid recovered fuel (SRF), which mainly consists of soiled cardboard, plastics and wood, has been an efficient way to reduce the use of fossil fuels and also greenhouse gas emissions. □

The writer is Director General of the Chemical Industry Federation of Finland.
timo.leppa@chemind.fi