

Sustainable development of the Polish chemical industry – challenges and barriers

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The United Nations General Assembly has passed a resolution (No. 63) declaring 2011 as the International Year of Chemistry. The celebrations will emphasize the importance of chemistry as a science. The year 2011 was chosen as it marks the 100th anniversary of the award of the Nobel Prize in chemistry to Maria Skłodowska-Curie.

During the last decade, the situation of the European chemical industry, as well as of the Polish chemical industry, has changed markedly. The industry of the Old Continent has lost part of its share in the global market to Asian countries. During the last ten years the share of the sales of chemical products from those countries has doubled. The European leaders in sales of chemical industry products are the following countries: Germany, France and United Kingdom. The value of sales of these three countries constitutes more than 50% of the total sales of the European chemical sector. The share of the Polish chemical industry is a little more than 2%.

The crisis that struck the global economy in recent years has also upset the chemical sector. The data for 2007-2009 clearly show how the economic downturn has affected the condition of the European chemical industry. The situation of the chemical sector in the Polish market was optimistic for the pharmaceuticals and rubber and plastic products. Statistics show that in 2009 there was a year to year increase in production sold. The Polish chemical sector suffers a large foreign trade deficit, which in 2009 amounted to €7.2 billion, less by €2 billion as compared to 2008 (due to the crisis). However, its share in the overall foreign trade deficit increased to 80%. The value of chemical industry sales in 2008 made up 10.6% of the total industry sales (similar figure as in previous years).

Referring to the title of this article, we must cite the definition of sustainable development. Let's get back to the roots: part of the famous sentence in the *World Commission on Environment and Development* report of 1987 – “*Our Common Future*”, (the so called Brundtland Report – known by the name of the Commission Chair): “At the present level of civilisation sustainable development is possible, that is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This statement means, for simplicity's sake, that a balance is necessary between three basic pillars: economy, needs of social nature and natural environment. The authors of this article try to show that the chemical industry supplies materials which enable sustainable development of communities, and to present how the industry itself attaches great importance to sustainable development, and point out to the contribution of the chemical industry to sustainable development.

The data available indicate that there is a correlation between consumption of chemicals by a community and its affluence. This is caused by the frequent and increasing use of modern materials supplied by the chemical industry. The main applications of these materials include: materials for thermal insulation, plastics for the automotive industry and building industry, household chemicals and mineral fertilizers. In Europe, the highest consumption of chemicals is in the Scandinavian countries, where GDP is the highest (€2000-2500 per capita). Poland is in the lower region of this list – in European terms our GDP is relatively low, therefore the consumption of chemicals is also low (fourth position from the end). Correlation between per capita GDP and chemicals consumption in European countries is illustrated in Figure 1.

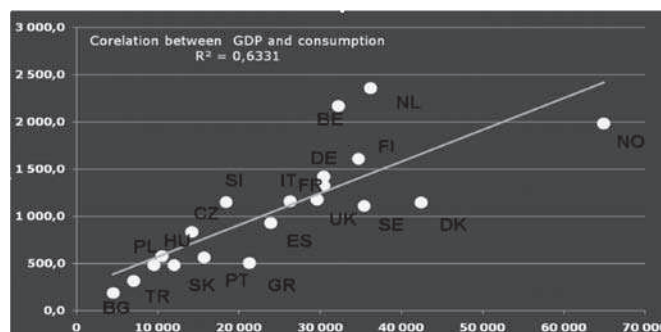


Fig. 1. Chemicals consumption vs. per capita GDP

The Polish Chamber of Chemical Industry has data which indicate that economic growth, as represented by per capita GDP, is accompanied by increase in the share of highly processed and more expensive chemicals used in manufacturing processes. In other words, the richer the country, the more complex chemicals are used by its industry. This relation is illustrated by the path of chemical industry growth (Fig. 2), where the Polish industry is between points C and D.

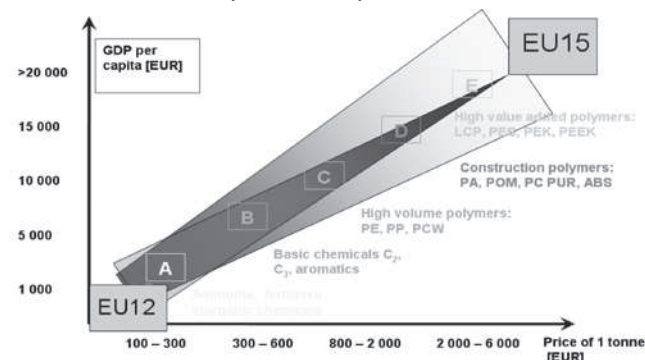


Fig. 2. Development path of the chemical industry

It is therefore certain, that the chemical industry supplies products and materials, which are very important for highly developed communities and which are used in many fields.

Recently, there has been much talk about climatic changes. The subject became one of the priorities in European Union policy. Emissions of greenhouse gases have been blamed for the anthropogenic greenhouse effect, which affects global climate stability. The chemical industry may also in this context prove to be very important: it provides products which help reduce emissions of greenhouse gases. Such effect is brought about by materials manufactured for the building industry: thermal insulation can significantly reduce emissions of greenhouse gases by improving thermal efficiency of buildings. The European Chemical Industry Council (CEFIC) estimates that each tonne of greenhouse gases evolved during the manufacture of chemicals can reduce emission of such gases in other sectors by 3 tonnes.

The importance of the chemical industry is immense, both for the improvement of life comfort, as well as from the safety and climate protection point of view. However, for many years the public perception of the chemical industry was poor. Representatives of the sector, including those participating in local and international organisations, decided to change this situation. The chemical industry's approach to environmental issues has changed dramatically.

Until recently the meaning of the term “production engineering” was limited to the basic manufacturing process. Now and in future it will include the whole life cycle of a product - starting from the raw material and energy carrier, through the manufacture of intermediate products for the principal manufacturing process, to the handling of production waste, provision of services and information on rational product use, and disposal and processing at the end of the life cycle of the product. The strict requirement imposed on the manufacturer to supervise and bear responsibility for the products, from the stage of planning, through manufacture, to final disposal, is a relatively novel approach. Therefore the manufacturer becomes, like never before, responsible for the process and the product, for the safe manufacture and safe use, for proper handling of production waste, as well as the used up product, throughout the life cycle of the product.

One of the first branches of industry which adopted the approach of sustainable development was the chemical industry. On the initiative of the Canadian Producers Association, announced in the mid-1980s, supported also by the US industry, and later on by the chemical industries of an increasing number of other countries of the world, the Responsible Care programme was charted. This programme is being implemented in Poland (under its Polish name “Odpowiedzialność i Troska”) since 1990. Responsible Care defines the role of industry in the community and natural environment, it also embraces a number of commitments concerning permanent improvement of processes and products and maintaining and creating proper relations with the surrounding nature and the community. Participation in this Programme is voluntary. Each of the member companies in the Programme is subject to a systematic, internal and external verification procedure. It should be emphasised that activities undertaken within the Programme reach far beyond the standards prescribed by law. Law must be obeyed by all, whereas the Programme requires that additional initiative is shown and solutions are proposed, which are not imposed by law, but are aimed at improving one of the areas covered by the concept of sustainable development.

The concept of sustainable development lends weight to the issues associated with energy efficiency. This is the reason why chemical industry associations take actions aimed at raising the entrepreneurs' awareness in this area. The European Chemical Industry Council (CEFIC) proposed a CARE+ project as a response to the First Report of the High Level Group on the Competitiveness of the European Chemicals Industry. That report included a statement that there is a need for a project indicating the cost benefits of improving energy efficiency in the chemical sector. Three countries, that had not undertaken initiatives in this area at national level before, have been invited to the project: Bulgaria, Italy and Poland. Polish partners in this project included the Polish Chamber of Chemical Industry, as the project coordinator, and the Polish National Energy Conservation Agency.

The European chemical industry, including the Polish chemical industry, is in relation to industries in other parts of the world, a low emission, energy efficient and safe industry. Paradoxically it now faces challenges, which may prove too difficult to meet even for an innovative industry. The threat lies mainly in the Union legislation, which instead of supporting sustainable development, forces an environment-centred approach. The idea of sustainable development lays stress on the necessary balance between social, economic and environmental aspects. The scope of regulations being set up by the European Union legislative bodies, which will affect the operations of the chemical sector, will impose on that sector (as estimated) an enormous cost. Already in 2013, after the implementation of the Revised Directive on Emissions Trading, the costs borne by the industry will be significant. In addition, the Industrial Emissions Directive will come into force after 2016. In consequence it may turn out that the functioning of the energy-intensive chemical industry is not possible in Europe. As the demand for chemical products grows with the progress of civilisation,

the effect may be that chemical manufacturing moves out of Europe, to regions where the concept and principles of sustainable development are virtually non-existent, where labour conditions are bad, where environmental protection is far below European standards.

In Poland there are also plans for imposing an excise duty on electrical power used by energy-intensive manufacturing sectors. This will lead to further aggravation of the situation of the national industry. The Polish chemical industry is in an awkward situation in terms of local availability of raw material resources. All planned regulations are indirectly tied to material resources or, by specifying emission limits, constrain the industry to use specific types of fuels or energy raw materials.

Chemical industry products are essential to social development. The manufacturers' approach, with regard to products and to the manufacturing process, changes in the direction of assuming higher responsibility both for the employees, as well as for the environment. The conviction that the European chemical industry, including the Polish chemical industry, is the leader in responding to environmental challenges in the spirit of sustainable development, is well justified. Therefore this industry should be supported and motivated, rather than constrained by regulations, which are impossible to comply with without fighting for survival.

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