

Annual Report 2016 Fundacja PlasticsEurope Polska



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processing recycling

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From the European perspective

Looking back at 2016 with an objective eye on the plastics industry, on the one hand, we can be quite content. World plastics production is still rising. Europe is still an important market for the plastics products. Plastics all over the world are playing an important role when it comes to sustainability, to more efficiency, to making the world a better place. But then, on the other hand, all that glitters is not gold. This is also true for us. We surely have some challenges to deal with. There is marine litter, there are discussions on plastics and health, on science and its value, there are even some who would like to put an end to innovation.

How can we react? I am convinced, the only way to secure that our wonderful material will be able to fully contribute to sustainability and progress is cooperation. Not only in Europe, but especially here, between our two countries – Poland and Germany. PlasticsEurope Polska has already been an important partner for us for many years and meanwhile is one of the most active parts of the association within the region "Central Europe". Our cooperation has proven to be extremely useful not only for us, but for the whole pan-European association. We should make good use of our close cooperation, today and tomorrow.



Dr Rüdiger Baunemann Director of the PlasticsEurope Central Region



Dr Kazimierz Borkowski Managing Director of PlasticsEurope Polska

Our priorities

We present the annual report of the PlasticsEurope Polska Foundation, that documents the most important events related to the organization's activity in 2016 and contains current information regarding the industry, including data on the production of plastics, their consumption and waste management. The Foundation is a Polish branch office of PlasticsEurope – the European Association of Plastics Manufacturers. At present it includes 19 member organizations in Poland – these are both national manufacturers and distributors of plastics, and international corporations conducting business activity in Poland. As an integral part of PlasticsEurope, the Foundation implements elements of the common, European strategy of the association, with the consideration of Polish conditions. In its activity, it focuses on the three main priority areas:

- Rational management of natural resources plastics are necessary to ensure sustainable development of societies
- Rational energy management and climate protection the role of plastics in material resources saving
- Contribution of plastics to health and life protection

When implementing the above objectives, the Foundation offers expert knowledge in the case of assessing legislative initiatives related to plastics in their entire life cycle (including the waste phase), and through information and educational actions. Information actions cover active participation in conferences, fairs and other forums where the discussion on plastics and aspects of their use is conducted. These are both meetings of the plastics industry and other industry branches, and conferences of the waste and recycling industry. By publishing specialized articles in technical magazines or concise information intended for an average citizen in other media, we reach also a broad group of users of plastics: from food packagings to building insulation and consumer electronic equipment. We would like to draw your attention to the positive role of plastics as a material for the manufacture of products in practically every aspect of life. When striving to provide the knowledge concerning plastics existing in the industry and their importance for sustainable development to the broadest possible extent, we also present challenges for the industry and society connected with the use of plastics and plastic products. We particularly emphasize the necessity of a holistic approach to plastics, i.e. an approach that includes the full life cycle – from the production of the raw material through the product manufacturing phase, its use period, to the waste (after-use) phase of the product. The waste phase may be a real environmental hazard (e.g. marine environment pollution), in particular in the context of ineffective waste management. In this respect our actions are conducted together with various companies and organizations representing the plastics industry in Poland, Europe and worldwide – the latter includes the World Plastic Council established several years ago. The most important common subjects of global scale relate to environment protection solutions, such as, e.g., the Operation Clean Sweep program (page 45) and the Zero Plastics to Landfills initiative that promotes 100% use of plastic waste, and thus the complete resignation from landfilling of these valuable materials (page 38). Education related to plastics and their meaning in everyday life is an important part of the Foundation's activity. Using our proprietary programs we reach children and young people of every age, we explain to them what plastics are, their role in the constant technological progress and improvement of the standard of living, and the manner of waste handling in order to prevent environment pollution and wasting these unique materials.

Plastics – innovative and indispensable

Polymer materials – multi-functional and innovative – have opened broad horizons for scientists and designers, enabling them to create new products, to develop pioneering innovations and modern technologies that contribute to the development of society and increase in its prosperity.

Smart packaging

Electronics, IT, medicine, sport, energy production, construction industry, transport, packagings – in all aspects of life the maintaining of modern standards and further progress would be impossible without the use of innovative plastics. What is more, the use of these materials has allowed not only the obtaining of much better parameters and the reducing of costs, but also significantly decreased the consumption of energy and resources, contributing to the protection of our planet. This has also increased the safety and protection of human health and life. Plastic packagings are one of the examples where the exceptional properties of polymer materials are beneficial not only as regards the protection of consumer health, but they also contribute to environment protection. The packaging sector is the largest user of plastics – these materials have been so popular for numerous reasons: they are lightweight and durable at the same time, they can be easily molded, and provide good protection against pollution and contamination. In addition, they allow for a safe sealing, which is very important, e.g. in the case of medicines and household chemicals.

Innovative plastic packaging protects food from the moment of its production to consumption. In the case of perishable food, smart packagings extend the expiry date and hinder the development of microorganisms. They may also contain information about the history and conditions of storage. Plastic packagings are environmentally friendly also due to their small weight as compared to packagings made of other materials. In addition, innovative technologies have helped significantly reduce the consumption of raw materials for the production of plastics. This has translated into the reduction of transport needs, which means lower fuel consumption, emission and costs (page 12). Due to the fact that the production of food requires a large amount of energy and water, the use of appropriate packagings to protect and extend the durability of food products not only prevents the loss and wasting of food, but also contributes to the reduction of CO₂ emission and other environmental loads.



Irreplaceable for health protection

Medicine is a great example of a sector where plastics have allowed for revolutionary changes. Great progress in health protection, extension of life expectancy and improvement of its quality are caused by, i.a., polymer materials present in the majority of medical products and equipment. These plastics are used for the equipment of hospitals and doctors' offices, such as syringes, catheters, disposable gloves, surgical sutures, bags and containers for body fluids or medicine packagings. In line with common use of plastics, the standard of medical care has significantly improved and the risk of infection has been reduced. Prostheses, implants, lenses or hearing aids are only some of the examples of products that are currently commonly used in medicine, which facilitate or even enable normal functioning of patients with motor organ, eye or hearing dysfunctions. Innovative plastics and technologies have meant that patients with complicated injuries or serious illnesses are more likely to recover. Shape-memory polymers used in minimally invasive surgeries can be an example, including smart self-sealing surgical sutures, smart implants, coronary vasodilator stents, urological stents, blood vessel prostheses or valves. Another technologically advanced example of plastics use in health protection is polymer carriers for targeted drug delivery. Also 3D printing technology has opened new possibilities in medicine. This method, with the use of appropriate plastics, allows for the production of bone implants, prostheses, hearing aids or even complete artificial organs. In tissue engineering, polymer materials used as microporous scaffold for the formation of tissues are of key importance.

Safety first

Plastics ensure safety during travelling (safety belts, air bags), at work (protective equipment and clothing) and during leisure (helmets, sports equipment, knee pads and other protective sporting gear). Also when referring to user safety and protection, specialized products, protective clothing and equipment, and the importance of plastics in the provision of access to clean and uncontaminated potable water (plastic pipes) have to be mentioned.

Despite those incontestable benefits of using plastics in various applications, the issue of plastic products safety in the context of the occurance of some chemical substances is touched upon in public discussion more and more often. Packagings arouse particularly strong emotions as products in contact with food and potable water, as well as all types of products for children.



The plastics industry considers consumer health and environment protection the most important priorities – all plastic products should be safe and cannot pose a threat for the consumers. Very restrictive legal requirements, inspection procedures and quality standards applicable in Europe ensure that plastics and plastic products are safe for both the users and natural environment. The Foundation expands this message to a wide group of recipients. When participating in the discussion concerning safety of plastic products during meetings, public speeches or at scientific and educational forums, we present scientific arguments and expert knowledge available in the industry. We also cooperate with other organizations, submitting to Polish authorities the official position of the plastics industry in relation to the proposed legal solutions concerning the safety of plastics.

Plastics– innovative and indispensable

Climate changes and rapidly growing energy demand are the challenges that force us to search for solutions that are aimed at preventing losses and increasing the effectiveness of energy use. Plastics have a lot to offer in this respect.

More for less

Plastics are lightweight – the density of most of them is only slightly higher than that of water – and their other properties such as mechanical strength and resistance to atmospheric and chemical factors mean that the plastics offer outstanding performance characteristics together with small weight, which can be particularly well displayed in the case of plastic bottles or parts of vehicles. This obviously translates into energy saving: smaller weight for transport = lower energy and fuel consumption and, in consequence, lower emissions to the atmosphere.

For climate protection, the use of plastics in the building and construction sector is of significant importance. The insulation of walls and roofs made of plastics and the use of PVC window profiles, enables the significant improvement of energy efficiency of buildings. Although plastic products are only a small share of all building materials, their contribution to energy saving is disproportionately high. The use of plastic applications is necessary for both new builging and for the renovation of the existing ones. For instance – in a standard house that is not provided with thermal insulation, annual thermal energy demand is more than twice higher than in a house where safe insulation, e.g. made of EPS, was used. Presently plastic products used in the construction industry (energy-saving windows, pipes, cabling, insulation, etc.) allow for saving in Europe the amount of energy equivalent to energy of 53 million tonnes of fossil fuels. Due to plastic pipes in water, gas and sewerage systems, and in ventilation or recuperation systems, we protect the resources, recover heat and improve the quality of air in the rooms.

Good insulation – climate benefits

Today in Europe buildings are responsible for approx. 40% of primary energy consumptions and 36% of greenhouse gas emissions. At the end of 2016, the European Commission proposed a legislative package named "Clean Energy for all Europeans", which contains the proposals of law changes concerning energy efficiency (EED), energy performance of buildings (EPBD) and other legal acts that have an impact on the energy market. According to the plastics industry the implementation of this package will create beneficial legal frameworks for new buildings, including the so called Nearly Zero Energy Buildings (NZEB), and through the increase of the building renovation share it will contribute to a significant reduction of energy consumption in the already existing facilities. As part of the voluntary industry initiatives, PlasticsEurope have for years actively supported the Renovate Europe campaign, which postulates the increase of the building renovation ratio from the current level of 1% to 3% annually by 2020. Locally, the PlasticsEurope Polska Foundation actively participates in actions of the Effective Poland initiative (the national partner of Renovate Europe), which focuses on two main issues: thermal

modernization of single-family buildings and improvement of the air quality in Poland. In 2016, as part of the Effective Poland initiative, the frames were prepared for the National Program of Building Modernization supporting the financing of single-family houses modernization.

At present, in Poland, the insulation systems based on plastic materials constitute 50% of the market, therefore the position of the industry has to be clearly indicated. The Foundation has organized a working group that associates the most important organizations and companies of the plastics insulation industry, the task of which was to prepare official positions and argumentation to review the draft regulation of the Minister of Infrastructure and Construction of May 11, 2016, amending the regulation on technical conditions to be met by buildings and their location. This draft included provisions discriminating, in some applications, the insulation systems made of polystyrene (EPS, XPS) and polyurethanes (PUR). Owing to expert analyses presented by the Foundation that in this case represented the insulation industry, the legislator withdrew the questioned provisions.

Priority: clean air

The air quality and the phenomenon of the so called low emission is an integral part of climate protection. The PlasticsEurope Polska Foundation addressed this subject, drawing public attention to the harmful impact of incineration of plastics waste in households. During the information campaign organized in 3 regions in Poland (Kraków, Łódź, Upper Silesia), an animated spot was displayed on the LCD monitors in public transport. At the meetings with local media organized during the campaign, issues were discussed related to the appropriate management of plastics waste (through recycling and energy recovery) and the effects of plastics waste incineration in households harmful to human health.

The Foundation also requested all municipalities in Poland to create on the municipal websites the tab titled "Cleaner air", containing, i.a., the infographics and links to pages with specialistic information, delivered by PlasticsEurope Polska, concerning the harmful effects of waste incineration and appropriate methods of plastics waste management. This idea was implemented by more than 500 municipalities, by publishing the relevant information on their websites. These actions coincided with other national information campaigns on air quality in Poland, that were aimed to reveal the importance of this problem that contributes to the increase in the risk of cancer and respiratory diseases.





Plastics industry in Poland

Plastics, since the moment of their generation, i.e. for 150 years, have continued to revolutionize our lives.

Plastics industry in Poland

The plastics industry in Poland is an important industry sector: with the 2016 turnover at the level exceeding PLN 80 billion, it significantly contributes to the Polish Gross Domestic Product (GDP).

The plastics industry in Poland is represented by approx. 8000 enterprises that employ nearly 160 thousand employees. The largest and most dynamic part of this industry is plastics processing companies that are responsible for 84% of turnover and 95% of the industry employment. The plastics processing companies in Poland are mainly small and very small enterprises that employ 19 employees on average. Among the processing companies, the largest group is represented by manufacturers of packagings (containers, bottles, boxes, plastic foil), followed by manufacturers of pipes and profiles (for application in the construction industry), and manufacturers of cables.

The plastics industry in Poland has developed very quickly and has exceeded considerably both the increase in the GDP and the growth of the entire industrial processing in Poland. In 2016, this growth amounted to 6.7% (compared to 2.7% of the increase in the GDP and increase by 4.2% in the entire manufacturing sector).

Long-term analyses related to the manufacture of plastic products and rubber products reveal that over the past 15 years the production in this sector has tripled, despite a slowdown during the 2008-2009 crisis. On the other hand, due to minor investments in new production capacities, the production capabilities of plastics in the basic forms are maintained at a stable level.

All the basic plastics: polyolefins (HDPE, LDPE, PP), polyvinyl chloride (PVC), polystyrene (PS, EPS) and polyethylene terephthalate (PET) are produced in Poland. Engineering plastics (PA6 and POM), polyesters, epoxy and phenol resins, and polyurethane systems are also produced here. All the leading global manufacturers of plastics whose products are delivered by their local representatives or distribution companies operate on the Polish market as well.

Plastics production capacity* versus demand for commodity plastics in Poland



Source: PlasticsEurope Polska

Plastics manufacturing in Poland





Plastics demand in Poland

On the European scale, Poland is an important participant in the plastics industry – in terms of plastics demand it ranks sixth, following Germany, Italy, France, Spain and Great Britain. It is estimated that in 2016, the Polish plastics processing industry consumed approx. 3.3 million of plastics, showing an increase by approx. 6.9% compared to 2015. The plastics demand in Europe in 2016 is estimated at approx. 50.5 million tonnes, which means an increase of 3.2 million tonnes in relation to 2015¹. The possibilities and potential of the industry in Poland is also reflected by the demand for plastics per capita, which is currently ca. 85 kg, whereas the European average exceeds 95 kg and the consumption in certain countries is even 200 kg per capita. The demand of the processing companies for plastics has been systematically increasing in Poland for a dozen years; this rapid increase is caused by the development of the related industries, in particular the sector related to packaging, electrical and electronic equipment, and the automotive sectors. This is demonstrated by the increase in investments in the plastics processing industry, which in 2016 amounted to 10%, whereas for the entire manufacturing sector a drop by 8% was noted

in 2016. The greatest share in the use of plastics in Poland is represented by the packaging industry (33%) and the construction industry (24%).

These two sectors cover also the highest consumption of plastics in all Europe, but there the advantage of packagings in relation to the construction industry is more prominent (39.9% vs 19.6%). The dynamic growth in the consumption of plastics for packagings (in the last 5 years, the average annual increase amounted to 4.4%), indicates that in Poland the proportions between the shares of these two sectors will follow all-European trend. The share of automotive and E&E sectors in the use of plastics has been growing. In recent years, Poland has become an important European manufacturer of vehicles (passenger cars and buses), and car parts, and the leader in the manufacture of white goods (washing machines, dishwashers, refrigerators). The consumption structure based on the type of polymer indicates the largest shares of polyethylene (LDPE, LLDPE, HDPE) - approx. 30%, polypropylene (19%) and polyvinyl chloride (13%), as well as polystyrene – PS and EPS collectively (14%).



Plastics demand by resin type - Poland 2016*

Plastics demand by segments - Poland 2016**

Source: Eurostat / PlasticsEurope Market Research Group (PEMRG) / Conversio Market&Strategy GmbH

Plastics demand for packaging in 2016*

1200 1000 890 935 985 1030 600 400 200 2012 2013 2014 2015 2016*

Local demand 2012-2016 (kt)

Demand by polymer (2016*)



** Others: PVC, ABS, SAN, ASA, PMMA, PA, PCS, PUR, other plastics

* Estimates based on Eurostat production indices for 2016

Source: Eurostat / PlasticsEurope Market Research Group (PEMRG) / Conversio Market&Strategy GmbH

Export – import

Production capacities of Polish plants manufacturing polymers in primary forms are insufficient, hence a significant part of plastics has to be imported. The negative trade balance has been increasing for a dozen or so years due to growing demand for plastics on the part of converters and lack of investments in new production capacities of polymers. Poland mainly imports raw materials for processing (polymers in primary forms) from abroad, and the total deficit in international trade of the sector (polymers and products) exceeded 3.3 billion euro in 2016. For many years, Germany has been the main business partner of Poland in intra-EU trade both in export and import of plastics in primary forms and products. 80-90% of plastics trade takes place with EU countries, whereas as far as non-EU countries are concerned, our greatest export markets are Ukraine – as regards plastics in primary forms, and Russia – as regards products. As regards non-EU countries, the greatest volume of plastics in primary forms we import from South Korea, and of products – from China.

The Polish plastics industry trade balance

Primary plastics and plastics products (kt)



Source: Eurostat / own study of PlasticsEurope Polska

Plastics industry in Poland



Polish plastics industry 2016 - main foreign trade partners

Source: Eurostat / own study of PlasticsEurope Polska

Information – Promotion – Education

Plastics are modern materials which, owing to their versatility, are present in every area of life. We often do not realize that we owe the great progress which has improved the standard and comfort of living to a large extent to the widespread presence of plastic products and innovative applications of polymers in other products. Therefore, education and accurate information regarding plastics are so important.

Dialog and cooperation

The task of the PlasticsEurope Polska Foundation, representing the industry of plastics manufacturing in Poland, is to maintain continuos cooperation with all major participants of the industry's value chain.

Under the "Prospects – Innovations – Challenges" slogan, PlasticsEurope Polska along with the Polish Union of Plastics Converters have been organizing for years annual meetings of the plastics industry in the form of one-day conferences. Last year the meeting was held in Kielce on May 16, on the day preceding Plastpol 2016 trade fair. The event gave an opportunity for the leading representatives of the plastics industry (manufacturers, distributors, converters), associated industries, as well as representatives of the government administration, science and industry media to discuss the impact of the circular economy concept on the industry, the industry innovations, as well as the challenges associated with new legislation concerning plastics and chemical substances.





The Foundation, while participating in the dialog with the government administration, comments and gives opinions other EU countries. In 2016, the major topics concerning this cooperation included, among others: the circular economy package (p. 37), chemical substances in plastics and plastic products with respect to consumer protection, including buildings potentially affecting the restrictions of applying insulation made of plastics, the strategy aimed to improve energy European Union and the United States (TTIP), the program of smart specializations in the Polish economy (to the extent of application of polymer materials in innovative technologies), development plan in Poland. As regards many topics relevant to the industry, the Foundation cooperated with other organizations

of Chemical Industry, the Polish Chamber of Commerce, the Polish Union of Plastics Converters, the Polish Association of Plant Protection, the Institute of Environmental Economics, the Polish Association of Expanded Polystyrene Manufacturers, and "SIPUR" – the Association of Producers of Polyurethane Insulation Systems.

value chain, the PlasticsEurope Polska takes part in specialist provides current data on the plastics industry and informs Polska's representatives shared their expertise during two major

Information and promotion

Knowledge of the positive role of plastics in energy saving and climate protection, or health and safety protection is seldom given spotlight in the media and other information channels. On the contrary, it is often the case that simplified or false information prevails and results in a negative perception of these fascinating materials.

Communication related to facts about the plastics industry and about the role of plastics as an indispensable material in the modern world constitutes an important element of the Foundation's activity, which, for this purpose, organizes campaigns addressed to various target groups, and is engaged in an ongoing dialog with the media (taking account of regular press release and constant updating of the website) as well as publishing brochures and reports.

Traditionally in May, press meetings devoted to the most recent data on the plastics market are organized. For several years such meetings have been organized together with Targi Kielce on the occasion of the Plastpol trade fair. In 2016





this event had an additional aspect – the 20 years jubilee of Plastpol – and the PlasticsEurope Polska Foundation, as a long-term honorary patron of the trade fair, was awarded a prize for its special contribution to the development of this most important trade fair event of the industry in Poland.

Regular meetings with the media are also held on the occasion of educational campaigns (the European Youth Debate, the Recycling Rally, the "Plastics not into the furnace" campaign) or industry events (the Plastpol trade fair, PolyTalk – a cyclical conference organized since 2012 by PlasticsEurope in various cities around Europe, the K trade fair – a global trade fair for the plastics industry organized every three years in Düsseldorf). A two-week information campaign on the phenomenon of low-stack emission d harmfulness of plastic waste combustion at home was addressed to the general public (p.

14). The sixth edition of the event named "Recycling Rally – let's recover plastics" also received a very

good response, both among the local communities and in the media (p. 46). Conferences and press meetings

devoted to the condition of the Polish plastics industry or accompanying events organized by the Foundation, brought about numerous press publications and interviews with experts from the PlasticsEurope Polska Foundation on the radio and television, both local and nationwide.

The publishing activities of the Foundation cover brochures, information leaflets, and reports, as well as information and educational posters related to use of plastics in everyday life, as well as information concerning rational plastic waste management and reflecting on the current market data of the industry. The annual report of the Foundation that has been published for several years now, available also in English, contains not only a review of the major areas of activity, but also the current data on manufacturing and demand for plastics in Poland. The data on the European plastics industry are included in published on the yearly basis PlasticsEurope report "Plastics – the Facts" (available also in Polish language). The publications and materials of PlasticsEurope Polska can be downloaded from www.plasticseurope.pl.

Education

Educating and promoting knowledge of plastics, their significance for economic and social development and for the protection of the natural environment and resources forms one of the priorities of the PlasticsEurope Polska Foundation. Educational activity includes programs for schools, local and international projects addressed directly to primary and secondary school students and university students, as well as cooperation with technical universities, educational centers and Foundation member companies. Since 2011 the Foundation has been implementing its own educational project entitled: "Plastek and his magic box" for primary schools. Through experiments students get to know the properties of modern plastics, develop their skills of observation and analytical thinking, as well as pro-environmental behavior. As part of the program schools are provided with free educational packages

consisting of an experimentation kit, a set of books for students along with supplementary materials for teachers. The program has been elaborated and supplemented on an ongoing basis – in 2016 additional materials for students were developed. The packages are distributed during free training workshops for teachers arranged by the Foundation in cooperation with the local centers for methodological improvement for teachers. So fa the program has covered schools in 9 provinces and 50 training courses have been conducted in which over 1,260 teachers of early childhood education and natural science have taken part, with approximately 60 thousand students being covered by the program. The Foundation also obtains co-financing (from the Province Fund for Environmental Protection and Water



Management) for the purchase of additional "Plastek" sets. The Plastek's art competition forms the integral part of the program and it constantly attracts considerable interest from the students.

"Plastics – Modern Materials" is the most recent (initiated in 2015) educational project of the PlasticsEurope Polska Foundation targeted at secondary schools and aimed at disseminating knowledge of polymer materials. As part of the project, teachers receive free of charge a set of "Plastics – Modern Materials" textbooks and an experimental set of plastics samples for the purpose of carrying out experiments at schools together with a brochure containing guidelines concerning the use of the set. Webinars organized by the Foundation twice a year are an additional support for teachers, during which webinars inter alia the issues which form the textbook topic are presented, supplemented by the demonstration of experiments. Distribution of the "Plastics – Modern Materials" textbooks takes place also during training courses and meetings for teachers, as well as on the occasion of pan-European projects of PlasticsEurope, such as the European Youth Debating Competition (pp. 32-33) as well as educational events arranged by the



Information – Promotion – Education

Foundation member companies. In 2016 the project was promoted at schools providing vocational education in the fields related to chemistry owing to cooperation with the National Center for Supporting Vocational and Continuing Education, which placed on its website a favorable review of the textbook.

The Foundation actively supports educational and CSR projects implemented by the member companies and cooperates with technical universities promoting knowledge of plastics. For several years the Foundation has been actively supporting the Basell Orlen Polyolefins company in implementation of educational competitions for the schools of the Plock region. In 2016 the representative of the Foundation conducted interactive training for students and was a member of the jury evaluating entries. The Foundation also

organizes along with third-party partners educational events all over Poland (in shopping centers and schools, public libraries and ecological education centers) promoting pro-environmental behavior (nonlittering, waste segregation) and the importance of recycling and plastic waste energy recovery for the protection of natural resources and the environment. During six such meetings which were held in the year 2016 the mobile thematic exhibition of posters was presented, and lectures and competitions concerning the ecological topics took place.



European initiatives: EYDC Project

The "European Youth Debating Competition" (EYDC), launched in 2016 by PlasticsEurope and the European Petrochemical Association (EPCA) is an international project for young people aged 16-19, as part of which in selected European countries student debates are arranged devoted to important concerns of the contemporary society.

The main objective of the project is to promote and underline the meaning of education in the field of science, technology, engineering and mathematics (STEM), as well as to form within young people the ability to argue and debate . As part of the EYDC project, in cooperation with the Young Leaders (an organization coordinating debates in particular countries), in Mar 2016 the Foundation organized the debate entitled: "How would you imagine your future – with or without the petrochemical industry and plastics?" in which 60 students from secondary schools from Warsaw, Płock and Włocławek took part. The students engaged in the debate were subject to evaluation Convention of the EPCA, where the finalists from 9 European the chemical industry and plastics. One of the Polish female Europe. In addition, the winners of the final debate (and the regarding education during the discussion with the participation arranged in the European Parliament in Brussels during the

Information - Promotion - Education



Plastics and environment

Reasonable use of resources does not disturb the natural balance of the environment and satisfies the present demand of mankind for those resources by ensuring their availability for future generations.

Full life cycle thinking

Non-renewable raw materials (such as coal, natural gas, crude oil), the resources of which are limited, require especially responsible management. It should be remembered here that over 80% of the extracted crude oil is used for ongoing energy generation, whether by production of fuel for combustion engines, or burning crude oil or their products (e.g. fuel oil) for production of energy, electricity or heat. In the light of such data, 4-5% of the globally extracted crude oil used for production of plastics (for the purpose of further saving of resources through various products) should be deemed a particularly reasonable use of this raw material. What also comes into play here is a significant aspect of assessment of management of available resources in the context of the overall environmental impact of the adopted solutions. The environmental impact of a product can only be assessed taking into account the entire product life cycle, through the phase of its use to the waste management. Such an approach is by no means new; it has been set forth in numerous strategic documents of the European Union, inter alia in the Waste Framework Directive. Unfortunately, on a daily basis one forgets about such a holistic approach in many discussions,

focusing instead on just one product life cycle phase, most frequently the waste phase.

The plastics manufacturing industry has reduced the environmental costs by a significant extent by optimizing the use of raw materials in the production processes over the years and decreasing the volume of post-production waste and pollutants. During the phase of their use, in turn, plastic products to a great extent contribute to the saving of other resources, e.g. when used as packaging material, as insulation of buildings or as construction material of parts of vehicles and aeroplanes, or, as the case may be, electrical or electronic devices. After the end of their useful life plastic products should, being a valuable resource, be returned to the circulation of raw materials in the process of mechanical or chemical recycling. However, recycling is not always economically viable for some waste and may constitute too large environmental burden. In such a situation one should recover energy contained in this waste through its use in burning or co-burning processes with energy recovery.

Use of crude oil



Circular Economy

More than two years ago the European Commission notified its proposal of a package of laws aimed at transition of the European economy from the linear model (manufacturing – use – waste neutralization) to the circular economy model, in which raw materials, materials and products will be used to a much larger extent than so far, e.g. through their multiple re-use, repairs, recycling, recovery, and the like. An important element of such an approach is appropriate use of the waste generated during the product life cycle, which will enable us to reduce the use of the raw materials for production and increase the stream of waste for recovery and recycling.

Plastic products, being so common in many areas of our life. and simply indispensable in many applications, have been included by the European Commission in the priority areas from the point of view of success of economy transformation. The idea of transformation of the economy towards increasing the extent of the use of the resources has the full support of the plastics industry. PlasticsEurope Polska has actively participated in the discussion regarding the circular economy, both at the national and European level, communicating the key industry demands. First and foremost, we draw attention to the fact that the assessment of "environmental performance" of a material and product must be based on the principles defined in the sustainable development rules, hence it should take into consideration environmental impact throughout the entire life cycle. The



issue of the value of plastics waste perfectly fits into the circular economy idea. The plastics industry for a long time has been calling for diverting of plastics waste from landfills, indicating that 100% of the waste should be recovered and returned to the economy. We also emphasize that, even though recycling of plastic waste is a recommended option of its management, in the case of certain waste the economic costs and environmental burden during its preparation for recycling are so heavy, that the recovery of energy contained in such a type of waste is currently both ecologically and economically justified. Those limitations of recycling directly affect the recycling targets to be achieved in the years 2025 and 2030, which should be taken account of when fixing the specific percentage values.

The Foundation presented these and other arguments during specialized conferences and meetings, including three workshops organized in 2016 by the Ministry of the Environment, and other meetings organised by the Ministry of Development, which in Poland coordinates the actions of the administration regarding the circular economy. Comments on the circular economy package proposal have also been communicated to particular Polish Members of European Parliament working in the two following committees of the European Parliament: ENVI (Committee on Environment, Public Health and Food Safety) and ITRE (Committee on Industry, Research and Energy). We have repeatedly presented our standpoint on the circular economy at the level of the waste industry during numerous industry meetings and conferences.

The PlasticsEurope Polska Foundation monitors on an ongoing basis draft legal instruments which could affect the plastics industry, such as, for instance, secondary legislation to the already implemented acts governing waste management. In 2016 the reviewed documents were related to, inter alia, selective waste collection standards, a recycling fee rate for light shopping bags, conditions for improvement of recycling of plastics through better harmonisation of regulations regarding waste and chemicals, as well as improvement of the conditions of functioning of the market for plastic recyclates.



Plastic waste in figures

In association with the implementation of the European law regarding the effective waste management and action plans for the circular economy, Poland must quickly adjust its waste management to targets set by these regulations. The following targets were specified for plastic waste:

- by 2020 the level of preparation for the re-use and the recycling of the secondary raw materials (paper, cardboard, glass, plastics, metal) in the municipal waste collected from households must be not lower than 50% (requirements of the Waste Framework Directive)
- by 2025 the recycling of plastic packaging waste must not be lower than 60% (a recommendation of the European Parliament as part of the Circular Economy package)
- from 2030 the maximum level of post-consumer waste landfilling shall be 5% (a recommendation of the European Parliament as part of the Circular Economy package).

Being aware that according to the latest available data 56% of plastic waste is landfilled in Poland and the level of packaging waste recycling is approx. 40%, we can obviously see that these targets are very ambitious for Poland. The relatively good recycling result with reference to plastic packaging waste is significantly affected by the high level of recovery of wholesale packaging, whereas the recovery of plastic packaging waste from households looks much worse. The figure (page 41) presents the relation between the amount of plastics processed to products (demand of the plastics processing industry) and the waste generated, including the method of waste management (the latest available data for 2014). Approx. 3 million tons of the produced plastics generate approx. 1,5 million tons of waste, and 25% of such waste is subject to recycling, whereas 19% is used for energy recovery.

For several years the PlasticsEurope Poland Foundation has been analyzing data regarding plastic waste and its management. Official data available in reports made by voivodeship governors, in voivodeship reports and

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Source: Plastics Europe Market Research Group (PEMRG), Conversio Market & Strategy GmbH, Consultic Marketing und Industrieberatung GmbH

reports prepared by the Central Statistical Office (GUS) are incomplete and frequently inconsistent, which prevents drawing general conclusions. For example, when we compare in various sources the levels of packaging waste recycling we receive the values from 29% GUS through 36% (voivodeship reports) to 41% (report prepared by Consultic, a renowned consulting company). In this report whenever we refer to the generated and treated plastic waste we mainly refer to the data from Consultic and PEMRG (PlasticsEurope Market Research Group) unless other sources have been clearly indicated. It is typical of Poland that a very small amount of recovered plastic waste comes from selectively collected streams from households (only 11%), compared to Germany where this level is 32%. The effective waste collection and waste quality directly affect the achieved recycling levels: in Poland the total level of recycling of all plastic waste amounted to 25% in 2014, and in Germany – 38%. Plastic packaging waste constitutes the majority of all generated waste (approx. 55%), and the recycling contribution of such waste is disproportionately high approx. 87% of plastic waste subjected to recycling is packaging waste.

Other waste streams which are important from the perspective of recycling are construction waste and agricultural waste.

Another phenomenon noticed in the Polish statistics regarding waste management is the high production of Refuse Derived Fuel (RDF). According to official reports more than 2.2 million tons of RDF were produced in Poland in 2015. This is much more than Polish plants, i.e. mainly cement clinker furnaces, could use at that time. According to the data in the voivodeship reports and information from the Polish Cement Association, approx. 1.1 million tons of RDF were used in Polish cement plants in 2015. Thus, the excessive fuel produced in the waste sector plants remains stored in warehouses. Another conclusion which can be made based on the analysis of official waste statistics is that almost no unprocessed plastic waste is landfilled, whereas a lot of waste is warehoused in waste management plants not only as RDF, but also as the so-called pre-RDF. It is important that these warehoused large amounts of RDF and pre-RDF are used as intended, that is for energy recovery in industrial plants (e.g. municipal waste incineration plants or waste co-firing plants, which were opened recently). Otherwise, the value of

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such waste is lost, including plastic waste which constitutes 30% of the RDF content. The assumption is that some quantities of waste are illegally dumped or incinirated in household furnaces and boiler houses. Therefore we reckon that, the real amounts of plastic waste that were not treated in the lawfull way were correctly estimated by Consultic (more than 50% of the generated waste).

For a few years the plastic waste recovery has been regularly increasing (see: graph). Although we still do not have any data regarding plastic waste management in 2016, the waste to energy recovery is expected to increase significantly, first of all, as a result of several energy plants commissioned in 2016 and also as a result of the observed growing interest in the combustion of RDF in power systems.

Plastics waste management in Poland in 2006-2014



1 The data will be published in the "Plastics – Facts 2017" report in October 2017

Source: Consultic

Plastics and environment

The problem of marine litter is not a new phenomenon but it has become more and more visible. The vast majority of waste in rivers and seas is a result of inappropriate waste management on land and littering.

Marine Litter Solutions

Marine litter is a broad concept, covering the presence of waste in water, on beaches and shores. There is no doubt that the presence of litter in the marine environment and adverse impact of such litter on the marine fauna are a result of human activity, both in the sea and on land. As part of the "Marine Litter Solutions" initiative which has operated since 2011, the plastics industry organizations from all over the world have been involved in numerous programs aimed to assess the scale of water environment pollution by plastic waste and its actual impact on the ecosystem, and to promote appropriate environmental attitudes. With regard to the above, these organizations conduct or cofinance scientific research and implement information and educational projects aimed to raise awareness of inhabitants of the necessity of correct waste handling. The actions within the industry regarding proper supervision over the transportation and distribution of the goods produced by the plastics industry – pellet and semi-products – resulted in 2013 in the "Zero Pellet Loss" ("Nie traćmy ani granulki") program which was included in 2015 in the global "Operation Clean Sweep" program. This initiative covers prevention of pellet loss and water environment pollution caused by the leaking of pellets to the environment.



The Foundation has actively promoted the program among member companies and other entities in the entire value chain, e.g. during the Ecological Forum of the Chemical Industry organized annually in Toruń by the "Responsible Care" Secretary Office. The Foundation participates in the Polish group working on the Marine Litter Regional Action Plan – a project of the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helcom). A representative of the Foundation also took part in the discussion during the annual Helcom conference in Helsinki in March 2016.

In turn, the "Recycling Rally – let's recover plastics" actions organized for the past 6 years by PlasticsEurope Polska together with the ecologist and traveler Dominik Dobrowolski is an example of an educational initiative being one of 260 projects currently carried out worldwide by plastics industry as part of the "Marine Litter Solutions" initiative (www.marinelittersolutions.com). During PolyTalk 2016 – the PlasticsEurope conference on marine litter – we had



an opportunity to share our experience internationally – Dominik Dobrowolski presented the achievements of the Recycling Rally initiative at the education session.

The sixth edition of the "Recycling Rally – let's recover plastics" was carried out on the combined Żuławy loop and Toruń loop (start and finish in Gdańsk) and was symbolically related to the campaign message about the necessity to circulate resources, including waste, according to the keynote of the Circular Economy program. During the meetings with media and local communities at the subsequent stages of the route information on how to protect the marine environment from littering and how to manage waste properly in order to exploit it and protect the resources was provided. Since the beginning the Recycling Rally actions have been positively reported by the press, radio and TV.





About PlasticsEurope Polska

PlasticsEurope Polska – a foundation representing manufacturers of plastics in Poland – associates 19 member organizations (2017) – national manufacturers of plastics, foreign corporations operating in Poland through local companies, as well as other companies of similar business profile operating in Poland:

Albis Polska Sp. z o.o. Arkema Sp. z o.o. Basell Orlen Polyolefins Sp. z o.o. BASF Polska Sp. z o.o. Borealis Polska Sp. z o.o. Brenntag Polska Sp. z o.o. Celanese Engineered Materials CIECH Sarzyna S.A. Covestro MS Global AG – Oddział w Polsce Dow Polska Sp. z o.o. Evonik Resource Efficiency GmbH Sp. z o.o. Oddział w Polsce Ineos Styrolution Poland Sp. z o.o. Krakchemia S.A. SABIC Poland Sp. z o.o. Solvay Engineering Plastics Poland Sp. z o.o. Total Petrochemicals&Refining SA/NV (Spółka Akcyjna) Oddział w Polsce Trinseo Europe GmbH Przedstawicielstwo w Polsce Versalis International SA Oddział w Polsce VYNOVA International nv

The authorities of the Foundation are the Management Board and the Foundation Council, consisting of representatives of the associated companies.

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