Climate Change in the Ecological Policy of Enterprises

Monika Wińska[1], Iwona Rybicka[2]

[1]Faculty of Mechanical Engineering, Lublin University of Technology, Lublin, 20-618, Poland (MSc. Eng.)
[2]Faculty of Mechanical Engineering, Lublin University of Technology, Lublin, 20-618, Poland (MSc. Eng.)

Abstract Climate change is nowadays one of the most urgent challenges facing humanity. Therefore, each company, considering its good reputation, devotes a lot of attention to introducing pro-ecological solutions. This is done both at the level of processes carried out in the company and at the staff level. Regardless of the industry, there is an improvement in the awareness not only of employers but also employees in the matter of jointly caring for the environment in which they live. A number of new technological solutions are being introduced and employees are trained to stimulate and develop pro-environmental behaviour. In addition, reports are prepared containing information on the current situation in the company regarding the implementation of ecological solutions. Hence, the environmental policy of companies, regardless of the company's industry, plays an extremely important role in improving the state of the environment. The article presents examples of solutions used by one of the leading logistics operators with a range not only local or European but also global.

Keywords environmental management, green technologies, teardrop trailer, CO_2 emission

JEL Q55, L99

1. Introduction

Although the significance of environmental aspects in company management has been growing in recent years, the significance and value attributed to this subject by people and organizations are still very different. In some organizations, responsibility for the environment consists in preparing for changes in legal regulations imposed by the government, while in others it is about taking account of the changing needs of customers. It may also address a number of other issues, such as cost efficiency, energy security, attractiveness of employers, or shareholder value. And sometimes it is a phenomenon driven by a sense of environmental awareness.

Views on activities carried out under environmental responsibility vary widely. When it comes to improving environmental performance, different areas of interest can be observed - while some organizations focus on supporting employee awareness and responsible behaviour on a daily basis, or on introducing technological innovations, others focus on setting policies and guidelines or creating space for new ideas and finding an innovative solution. The article presents pro-environmental solutions that have been introduced in the policy of one of the major logistics operators on the global market, which is the Deutsche Post DHL Group. As part of the DHL group's operations, most of the previously mentioned aspects played an important role in configuring and managing the environmental program. However, especially in recent years, the path of technological innovation is gaining more and more importance in the environmental protection agenda, leading to solutions such as its own StreetScooter - an electric vehicle for delivery of letters and packages that was created for the needs of the Deutsche Post DHL Group, an aerodynamic teardrop trailer for supply chain operations and DHL Cubicycle with downtown express delivery services.

Motivating factors and strategic justification for ecological innovations in the DHL Group, as well as the framework for supporting appropriate approaches and selected results will be discussed in more detail on the following pages.

2. The role of environmental management and innovation in the Deutsche Post DHL Group

The factors of responsible logistics in many cases correspond to those observed in other companies. For the Deutsche Post DHL Group, the initial motivating factor for its environmental management activities was responsibility towards society and the environment for limiting the negative impact of business operations. Since then, additional factors have been taken into account, including stricter legal requirements, growing customer requirements, and increasing investor and employee awareness, which underlines the need for commitment. However, greenhouse gas emissions have the largest share in the environmental footprint, so this issue has been recognized as the most important position in environmental policy programs in logistics companies.

Recognizing the need for change, DHL was the first globally operating logistics company to set a carbon efficiency target, striving to improve its carbon efficiency by

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30% by 2020 compared to base year 2007. By the end of 2016, DHL had achieved a 30% low carbon goal well ahead of schedule.

Pursuant to these final arrangements, the GoGreen program was established in 2008 to increase the DHL Group's environmental performance. The program consists of five pillars presented and described in Figure 1.

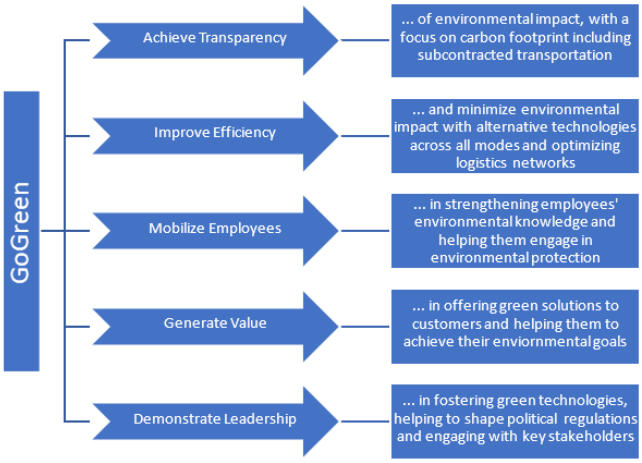

Figure 1. The five pillars of the GoGreen program implemented under the DHL Group Environmental Policy [1].

The implementation and development of innovative solutions in the field of "green" technologies finds their main application in the pillar of the "Improving performance" program. The mobilization of employees and increasing employees' awareness of the impact of their daily activities on the environment also plays a significant role in increasing productivity.

Activities such as driver training and "GoGreen office controls" have brought positive results in the Deutche Post DHL Group. Nevertheless, emission reduction due to technological innovations and implemented solutions brings a number of benefits that made this approach particularly applicable and successful in the organization:

• Green technologies are often seen as an attractive "premium" option compared to the traditional quo status. This increases the involvement of employees and managers in caring for the environment.

Example: electric vs conventional diesel vehicle

• Technological solutions offer the possibility of achieving a high level of carbon efficiency up to 50% and more. Without the right solutions, achieving the goals of the Paris Climate Agreement would be difficult to achieve.

Example: advanced biofuels for transport, LED lighting in buildings

• For organizations and employees who face huge challenges, technological solutions can help improve environmental impact.

Example: speed limiters and anti-idling systems, individual behaviour management.

The company's environmental and energy policy also plays a huge role in enterprise management. It is based on generally prevailing laws and regulations regarding environmental protection supplemented with additional corporate principles. These include an investment policy that requires all new investments to be more efficient in terms of carbon dioxide emissions than previous ones (each new investment proposal must include calculations indicating lower emissions). The second element of the company's environmental policy is the policy of ecological electricity. It boils down to the assumption that the primary source of electricity in the DHL Group is green energy, i.e. electricity obtained from renewable sources. The only exceptions allowed are the unavailability of appropriate resources to conduct this policy or the fact that their use would be commercially unprofitable. The DHL Group car fleets largely use liquid biofuels that do not negatively affect local food production in the countries where they are produced.

3. Solutions used by the DHL Group

The transport sector currently represents 14% of global carbon dioxide emissions. The DHL Supply Chain Group is committed to providing solutions to the challenges it faces every day. Innovative solutions developed as part of the GoGreen environment and climate protection program include measures to reduce emissions and improve low-carbon emissions. It also reduces the company's dependence on fossil fuel resources, protects against rising energy prices and ensures the company's long-term success. Regular reporting on environmental and climate protection measures and progress in achieving specific goals allows for immediate intervention in the event of deviations from the planned objectives.

There are many solutions that help enterprises develop ecological behaviour applied by the company or its employees. While some focus on raising employees' awareness and work on their responsible behaviour during their daily routines, or on launching better and better technological innovations, others focus their efforts on implementing pro-ecological policy and supporting new innovative ideas for improving the environment.

3.1. Mission 2050: Zero emission

In March 2017, the DHL group announced its mission that by 2050 all logistics-related emissions will be reduced to zero. The goal of this endeavour is to contribute to a significant reduction of global warming. At the Paris Climate Conference in 2015 (COP21), it was established to limit global warming to well below 2 degrees Celsius. This also appeared in the UN 2030 Agenda for Sustainable Development.

The Group is introducing solutions that could also become helpful to clients using DHL services in achieving their own environmental goals. The zero emission logistics mission concerns both the activities of the DHL Group itself and its subcontractors in the field of transport. It is supported by intermediate stages, which are to be achieved by 2025 under the aforementioned GoGreen program:

• Globally, it will increase the carbon efficiency of its own activities and those of its transport subcontractors by 50% compared to the 2007 baseline.

• At the local level, the Group aims to improve the lives of people right where they live and work using clean transport solutions. Deutsche Post DHL Group will operate 70% of its own first and last mile services with clean pick-up and delivery solutions e.g. by bike and electric vehicle.

• More than 50% of sales will incorporate Green Solutions, making customers' supply chains greener.

• The Group will train and certify 80% of its employees as GoGreen specialists by 2025, and actively involve them in its environmental and climate protection activities. The company also plans to join with partners to plant one million trees every year [6].

3.2. Tree-planting

Referring to the mission "Zero emissions", the DHL group has started the tree planting campaign since 2017. Forests have always been recognized as factories "converting" carbon dioxide into oxygen. CO2 capture from the air is one of the many ecosystem services they provide. Most trees used for afforestation were planted by DHL's partner organizations - recognized charities, NGOs and national forest authorities around the world - as they are most familiar with local conditions and habitats. In 2019, the result was about 3 million trees planted.

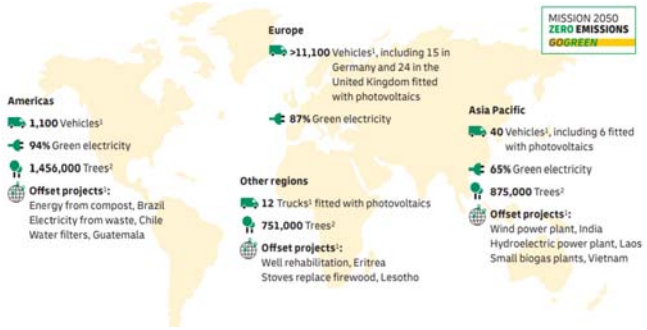

Figure 2. Environmental and climate protection measures in 2019 [7].

3.3. „Burn less" and „Burn clean" rules

In DHL's environmental policy, two basic principles can be observed in the efficiency approach: "burn less" and "burn clean". "Burn less" solutions focus on reducing energy and fuel consumption in the company's operations, while the "burn cleanly" task is to promote the use of alternative non-fossil energy and fuel sources to reduce harmful emissions to the environment.

The type of technology introduced in the company, based on two basic principles, is determined by a number of aspects, such as the area of application, geographical location or use. These conditions can be divided into four categories:

- expense;
- operational feasibility;
- environmental benefits;
- local or legal factors.

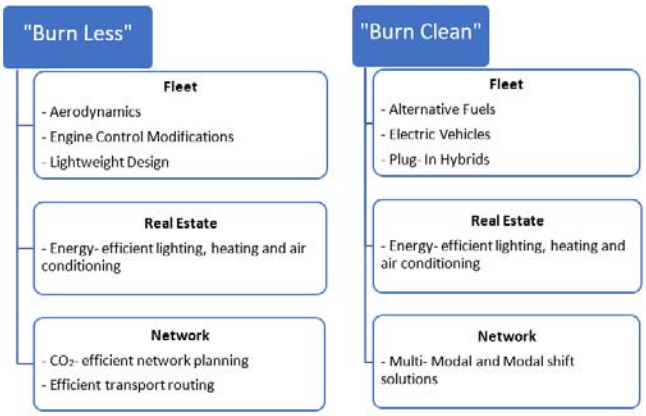

Figure 3. The DHL Group efficiency framework (based on [1])

3.4. Teardrop trailers

Teardrop trailers have been known for decades. Their aerodynamic shape reduces air resistance while driving, which results in lower fuel consumption. DHL Supply Chain Fleet Engineering UK together with the manufacturer Dob Bur created a design of such a semi-trailer dedicated specifically to the DHL group and introduced the first such vehicle on the market in 2009. The introduction of such a solution allowed to reduce fuel consumption by up to 10%.This solution was developed in subsequent years, taking into account the requirements set mainly by the logistics market in the UK.

In 2014, the DHL group expanded the range of use of teardrop trailers also to European countries. Currently, several trailers support deliveries in Germany, Benelux and France

3.5. StreetScooter

In 2013, DHL was looking for a more environmentally friendly method of collecting shipments from its own distribution centres and delivering them to recipients at the last stage of the delivery process. Because no manufacturer of delivery vehicles met DHL's expectations, the company decided to create its own car. However, due to the fact that DHL is a shipment supplier and not a car manufacturer, the company was not in the best position to start its own production of electric vehicles, all the more so because it requires excellent knowledge and technologically advanced production facilities. Therefore, in 2014, DHL invested in the StreetScooter electric startup vehicle designed from the very beginning exclusively for the commercial market.

Today, DHL uses 7,000 StreetScooter vehicles and 3,200 electric bikes, as well as 9,000 e-bikes and electric tricycles from other manufacturers (recently introduced to emerging markets, e.g. in Vietnam). Currently introduced mainly on European markets, StreetScooter is equipped with an electric drive system charged 100% with green energy, reducing CO2 production by approx. 20 thousand. tons per year. Almost every fifth vehicle in the DHL supply fleet is a zero-emission vehicle. The level of green energy use in the entire company is currently 63%.

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According to the 2019 report, the DHL group uses 13,532 vehicles with alternative propulsion systems, of which 11,610 are electric vehicles. The diagram in Figure 4 shows the distribution of the use of vehicles with alternative propulsion systems by DHL [7].

In addition to the use of electric vehicles, the DHL group is also constantly improving conventional vehicles in line with the latest emission standards. Optimizing parcel collection and delivery routes is one of the steps to minimize the impact of company operations on air quality in urban areas. The changes that took place in the years 2015-2019 in the fleet of vehicles performing deliveries for the DHL group are presented in Figure 5 (in the next section of article).

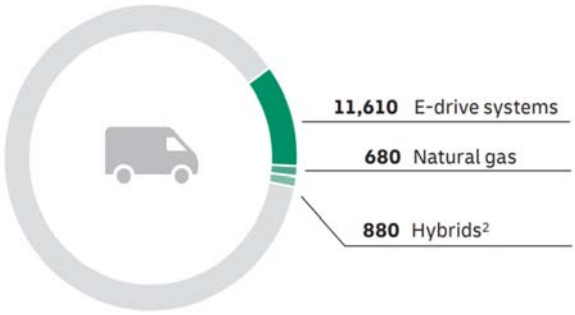

Figure 4. Alternative drive systems in 2019 (2- including 71 dual-fuel drive systems) [6]

3.6. Cubicylces

Cubicycle are special delivery bicycles, electrically assisted, which take a small 120x100x80 cm container. It can fit goods weighing up to 125 kg. The dimensions of the said cargo are calculated so that they fit the delivery trucks and can easily be loaded into larger containers, which DHL distributes its goods around the world.

The idea that a large delivery vehicle would reach a specific point in the city centre, where the packages were unloaded onto a cargo bike and delivered to the addressees nearby, was created in 2015. Then two pilot programs were launched - in German Frankfurt and in Utrecht in the Netherlands. Since then cubicycles operate in seven European cities. In total, DHL delivers bicycle shipments in 80 cities in 13 European countries.

In the case of instant deliveries, bicycles have many advantages: they freely drive around traffic jams and make twice as many stops per hour as delivery vans. The total cost of using our delivery bikes is more than twice the cost of vans. And the key thing is zero carbon, so they reduce our share of urban air pollution and help city authorities promote sustainable transport.

4. Analysis and forecasts regarding the environmental impact of the DHL group's operations

The DHL Group is constantly improving its conventionally vehicles to qualify for the latest emission standards. By optimizing supply routes, it indirectly minimizes the impact of your business on air quality in urban areas. The vast majority of vehicles providing transport services in the DHL group are vehicles belonging to the Euro 5 and Euro 6 standards or to the group completely emission-free (ZEV - Zero Emission Vehicle). The chart in Fig. 5 presents the share of individual emission standards among the DHL vehicle fleet in 2015-2019.

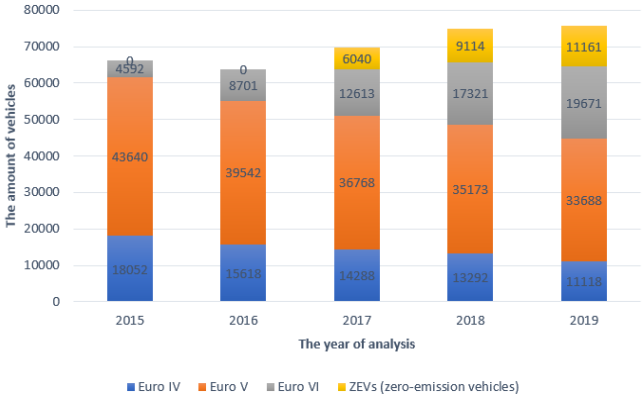

Figure 5. The amount of the DHL group's vehicles classified into individual emission standards [7].

The chart presents the changes observed in the years 2015-2019 in the development of DHL group's vehicles fleet. Since 2017 there appeared vehicles with „zero-emission" and every year this amount increases. At the same time, the share of vehicles with the lowest Euro 4 standard is decreasing. The Table 1 presents these changes in percentage:

Table 1. The percentage of vehicles in individual emission standards among all vehicles, in 2015-2019 [7]

	Year				
EURO Norm	**2015**	**2016**	**2017**	**2018**	**2019**
Euro IV	27,23%	24,46%	20,50%	17,75%	14,70%
Euro V	65,84%	61,92%	52,74%	46,96%	44,54%
Euro VI	6,93%	13,62%	18,09%	23,13%	26,01%
ZEVs	-	-	8,66%	12,17%	14,76%

Every year the amount of vehicles with the latest norm – Euro 6 and zero-emission vehicles increases. It can be observed also that the number of ZEVs increased twice in 2019 comparing to situation from the year when they were used first time in the DHL Group. Thus, a downward trend is observed in the share of vehicles with lower emission standards in all used vehicles.

When considering the environmental impact of a company, carbon dioxide emissions are a very important aspect to

consider. Each of the companies which is interested in limiting this issue conducts detailed annual reports, which are thoroughly analysed. Based on the results obtained and conclusions drawn, new solutions are introduced to minimize this factor.

Table 2 presents amount of CO2 emission in the years 2015-2019 and also amount of vehicles used in these years. Based on this data, the conventional annual CO2 emission rate per vehicle was calculated.

Table 2. The annual CO2 emission rate, counted per vehicle

Year	2015	2016	2017	2018	2019
CO_2 emission [tonnes]	27020000	26860000	28860000	29460000	28950000
Vehicles	66284	63861	69709	74900	75638
Rate of CO2 emission	407,64	420,60	414,01	393,32	382,74

Using the data contained in Tab. 2, the CO2 emission rate per vehicle was forecast for the next 6 years (until 2025).

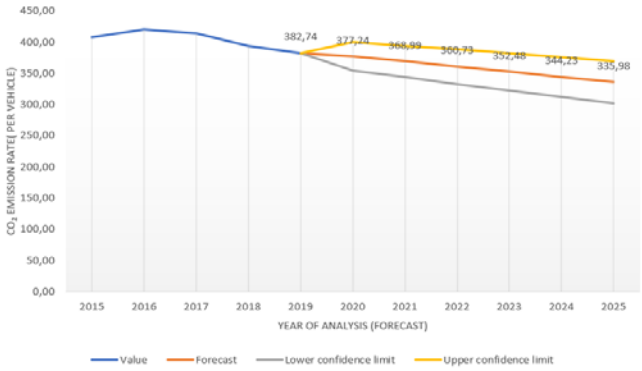

Figure 6. The forecast of the CO2 emission rate per vehicle in the years 2015-2019.

The chart at Figure 6 shows mentioned forecast and the decrease of the CO2 emission rate in the next years (2020-2025) what could be a proof for effects of ecological policy of the DHL Group. There wasn't considered that will be the significant increase of the vehicles amount and what will be the number of ZEVs. Forecast is based on historical data. The predicted value is the y value for a given x value. The known values are existing x and y values, and the new value is calculated by linear regression. The red line presents mentioned forecast. The orange lines are the chart of confidence limits for calculated forecast. Confidence interval is the range around each of the forecasted values, which according to the forecast should be 95% of future values (assuming normal distribution). The confidence interval can help to determine the accuracy of the forecast. A smaller range means greater certainty of the forecast for a specific point. The confidence interval at the chart 9 equals 95%.

5. Conclusions

At a time when so much is said about ecological disasters and about human impact on the environment, it is of great importance that the leading companies on the market, both large and small, use ecological solutions. It is understandable that if humanity wants to ensure that the Earth can be sealed for future generations, it must now work together to identify and reduce emissions. Enterprises join this mission by balancing their activities and ultimately moving to a circular economy.

The Transport and Logistics Sector, as an element of the global economy, plays a key role in terms of environmental impact, at least because of the means it uses when implementing the transport function. Hence, companies of global importance, among which the DHL group is discussed in the article, devote great attention to solutions that they introduce to the market. They focus on customer satisfaction, but above all they ensure that their activities have as little damage as possible to the environment. They introduce solutions that not only contribute to reducing the harmful effects of the company's activities, but also help their clients and subcontractors to pursue ecological policy in their own companies.

The analyses described above prove that the environmental policy pursued by the DHL group actually brings effects in terms of minimizing the harmful effects of their activities on the environment. Following the forecasts received, it can be safely stated that the dimension of this activity is noticeable and brings measurable effects. There was forecasted that rate of CO2 emission (per vehicle) will decrease even by 12,3% in the next 5 years. However, it was assumed that the situation would develop the same as in 2015-2019 (without taking into account radical changes that could affect the volume of this issue and significantly reduce it.

Using the knowledge of the people forming the DHL community, as well as many years of experience, the DHL group strives to run the enterprise by applying the principles of circular economy in order to eliminate waste and preserve the greater value of products. This is extremely important in the context of ensuring the common good, which is the Earth's resources, which are so much exploited should be subjected to even more protection than ever.

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