

Non-Technical Summary

This report is concerned with the impact that the undertaking titled **"Propylene glycol (1,2 MPG) production plant with the capacity of 30,000 tons/year and ancillary installations for purifying glycerin and producing hydrogen, along with ancillary infrastructure on the premises of ORLEN POŁUDNIE S.A. in Trzebinia"** will exert on the environment.

The total area of the premises on which the installation will be constructed (equal to the area covered by the environmental permit) equals **approx. 3.0 ha**, and includes the following:

- surface area of the new plant (primary area)	approx. 14,960 m ²
- area of the hydrogen manufacturing plant	approx. 520 m ²
- area of the waste water pretreatment plant	approx. 1,500 m ²
- area occupied by utility supply systems/bridges	approx. 13,020 m ²

The main plot of land intended for the propylene glycol production plant and glycerin purification plant will be located on plots no. 479/63, 950/15, 950/16, 950/17, 954/11 between Dąbrowskiego street and the biodiesel plant. The hydrogen production plant will be located in the vicinity of the DRW Unit, on the plot no. 1987/10. The external trestle bridge between the facilities will be located on plots no. 950/17, 1906/2, 1987/113, 1987/108, 1987/109, 1987/10 and 1906/1. As part of the ancillary infrastructure, the project will include the construction of a waste water pre-treatment plant located on plot no. 2212, in the vicinity of the existing waste water treatment plant.

Utility supply lines, including those located on existing trestle bridges, will be positioned on plots No. 2188, 2221, 2189, 2218, 2190, 2217, 2220, 2198, 2210, 2197, 2211, 2214, 2196, 2193, 2212, 2209, 1987/81, 1987/84, 1987/10, 1987/108, 1987/109, 1987/77.

The project comprises three primary plants - propylene glycol production plant, raw glycerin purification plant, hydrogen production plant and ancillary infrastructure.

The capacities of the individual plants are as follows:

- propylene glycol production plant with the capacity of 30,000 tons per year
- glycerin purification plant - processing approx. 160 tons/day (approx. 53,280 tons per year); flow of purified glycerin, with the minimum purity ratio of 99.7% weight-wise, from the glycerin purification plant equals 5,417 kg/h, 130 tons/day.
- hydrogen production plant - capacity of 1,970 Nm³/h

The plants will be operated continuously, running for approximately 8,000 hours per year. The employees will work in a 3-shift system.

In addition to the primary plants, the investment project comprises the following ancillary installations:

- Tank farm with tanks for raw materials and products - facilities 400 and 500,
- Bays for unloading raw materials and loading products — facilities 600a and 600b,
- Nitrogen receiving station — facility 700,
- Flare stack — facility 800,
- Air treatment plant — facility 900,
- Water treatment station – facility 1000,
- Mechanical draft cooling tower — facility 1100,
- Waste water pre-treatment plant — facility 1200,
- Social and technical building — facility 1300,
- Instrument air, nitrogen and hydrogen buffer tanks.

The following plants will be located on the main plot of land between Dąbrowskiego street and the Biodiesel Plant:

- Propylene glycol production plant — facility 100,
- Glycerin purification plant — facility 200,

- Raw material and product storage tank park — facilities 400 and 500,
- Flare stack facility — facility 800,
- Bays for unloading raw materials and loading products — facilities 600a and 600b,
- Nitrogen receiving station — facility 700,
- Social and technical building — facility 1300,
- Air treatment plant — facility 900,
- Water treatment station – facility 1000,
- Mechanical draft cooling tower — facility 1100,
- 400 kV power generator – facility 1400,
- Instrument air, nitrogen and hydrogen buffer tanks.

The hydrogen production plant will be located in the vicinity of the Tubular-Tower Distillation Plant, and the wastewater pre-treatment plant will be located to the east of the existing waste water treatment plant.

An external technological trestle bridge with process pipelines with utilities and electrical cables from the glycol plant (facility 100) to the hydrogen plant (facility 300) will be erected as a part of the undertaking as well.

The trestle bridge has been designed as a solution with one or two levels, depending on the type and quantity of pipelines to be positioned thereon.

One-level trestle bridge (width of approx. 3.5 m and height of 7.00 m, length of approx. 40.0 m).
Two-level trestle bridge (width of approx. 3.5 m, height of 7.0 m (level 1) and 8.50 m (level 2), length of approx. 290.0 m).

The plants concerned will be powered by energy and ancillary utilities from the existing plants which currently provide these to the production installations operating at ORLEN Południe S.A. Dąbrowskiego and Kruczkowskiego streets, located next to the plant, will serve as main transport routes.

Most of the vehicle traffic at the glycerin and glycol Plant site will be handled one- and two-way roads. A perimeter road around the facility and a transverse, east-west oriented road located between facility 100 and 400 will be available.

The system of internal roads will be connected, by means of a proposed junction, to the existing parking area for trucks awaiting entry, located in the eastern part of the plot.

The area in the immediate vicinity of the exit junction will be equipped with an electronic weighbridge designed to weigh trucks entering and leaving the Plant site.

An emergency exit from Dąbrowskiego Street will be located in the northern part of the plot.

The report contains a description of the environmental elements that will be subjected to impact exerted by the planned undertaking, with some of those elements protected pursuant to the Nature Protection Act. It also lists historic monuments located in the vicinity of the plant, which are protected pursuant to the Monument Protection Act.

The report identifies also the forecast environmental impact of the potential variant solutions.

At the construction stage, the environmental impact will consist in landscape transformation, increased traffic of heavy vehicles and machinery, as well as the related, increased emissions of exhaust gases and noise. Dust will be created on the roads and at bulk material storage areas. Construction waste will be generated as well, and soil excavated by machines will need to be disposed of.

The impact exerted at the construction stage will be mitigated by using proper machinery and equipment that guarantees low emission levels, by segregating waste and handing it over to specialized companies for recycling or disposal, and by proper organization of work.

As the investment is located on the premises of a refinery, soil contamination may need to be dealt with while performing earthworks. In such a case, the contaminated soil will be removed and will be handed over, for treatment or disposal, to a specialized company or to an in-house installation that is legally certified to conduct this type of activity.

Activities mitigating the potential adverse environmental impact exerted at the construction stage include the following:

- ensuring that the equipment and the construction site are prepared and protected in the correct manner - vehicles and machines need to be parked at a location with compacted surface; the materials, technologies and structural solutions need to be properly selected; building materials

need to be transported on paved roads only, bulk materials need to be transported in their packaging, in properly suited vehicles, top speed needs to be limited, equipment used needs to be in a good technical order, engines of machines that are not used need to be turned off, the time required to achieve specific milestones needs to be shortened by proper planning of the construction process, during windy and dry days internal roads need to be sprayed with water, dirty vehicles cannot leave the site, with dirt attached to their wheels.

With the work organized in a proper manner, the process divided into stages and with the aforementioned requirements complied with, the construction phase should not be particularly arduous, as no housing estates are located in the direct vicinity of the site.

At the operational stage, emissions will be generated mainly by the propylene glycol plant, the glycerin purification plant, the hydrogen production plant, by storing and distributing feedstock, by the boiler room serving the pre-treatment station, by the movement of delivery vehicles, by the power generator (operating only in emergencies and considered to be an insignificant source of emissions, with its operating time remaining undefined).

The glycerin purification plant will discharge, into the atmosphere, non-condensed gas containing up to approx. 0.6% (weight-wise) of methanol. The remaining components of the discharge gas are not considered to be pollutants in the meaning of applicable legal regulations.

Gas containing <200 ppm of nitrogen oxides will be discharged to the atmosphere from the hydrogen production plant. The remaining components of the discharged gas are not considered to be pollutants in the meaning of applicable legal regulations.

Discharge gases are generated in the propylene glycol production plant that are directed to flare stack where all substances contained therein are burned completely. A flare stack that will be approx. 16.8 m tall and will have the diameter of 0.254 m is envisaged. Other process gases may be burned in the flare stack as well. It may also be used in the event of an emergency. Gases discharged to the atmosphere from the flare stack will contain primarily carbon dioxide, steam and small amounts of pollutants generated in the incomplete burning process, such as methanol and carbon oxide. Flare stack gases may also contain nitrogen oxides created in nitrogen oxidation processes.

The boiler room will be powered by gas recovered from the pre-treatment station. It will emit such pollutants as nitrogen oxides, carbon oxide and small amounts of sulfur dioxide and suspended matter.

Both the feedstocks used and the products created are characterized by low vapor pressure, which means that emissions associated with their storage and distribution are deemed to be negligible. Due to the low traffic volume expected, emissions levels related thereto are insignificant as well.

Total annual emissions from all sources (organized and unorganized) of the projected plant will amount to:

Dust	- 0.02 kg/year
Sulfur dioxide	- 3,84 kg/year
Nitrogen dioxide	- 11,360.56 kg/year
Carbon monoxide	- 17.19 kg/year
Hydrocarbons (mixture)	- 3.05 kg/year
Soot	- 0.66 kg/year
Methanol	- 768.00 kg/year

The analysis conducted shows that emissions generated by all sources within the plan will meet environmental protection objectives pertaining to air pollution - the permissible pollutant concentration levels will not be exceeded outside the plant premises. The applicable requirements will be met also if cumulative impacts are experienced.

The planned undertaking will generate noise caused by technological sources (installations, pumps, cooling tower). To a lower degree, noise will be also generated by ventilation and air conditioning systems and by vehicle traffic. Ventilation will be required in closed buildings within the plant (air treatment station, water treatment station, social building). The remaining process installations are located on open trestle bridges, platforms or trays that are ventilated and aerated naturally.

Calculations obtained as a result of the acoustic analysis show that the permissible noise levels will be complied with in the direct vicinity of the installation that is covered by noise abatement program.

Cumulative impacts exerted by the sources currently in existence on the premises of the ORLEN Capital Group and planned in connection with the expansion of the biodiesel plant will also fail to exceed the permissible noise levels in the vicinity of housing estates.

Waste will be generated in the area of the undertaking, during the construction, operation and liquidation stages. At the construction and liquidation stage, the waste will have, primarily, the form of soil, rubble, packaging materials and scrap metal. At the operational stage, process waste will be created during the distillation process, during technical inspections and while performing maintenance (replacement of catalytic converters, adsorbers, column fillers). All waste will be stored in sealed tanks and containers, at designated locations, on paved surfaces, and will be removed by specialist companies holding all permits required by law and operating pursuant to specific agreements.

As the undertaking will be located in an industrial zone, the quality of soil will be assessed prior to commencing any construction work, in order to identify any potential soil contamination. Where the permissible soil contamination values are exceeded, the Investor is required to submit a Draft Remediation Plan to the Regional Environmental Protection Director in Kraków. Should a need to remove the contaminated soil arise, it will be moved to an in-house plant that has been issued with all certificates that are required for this purpose, or to an external, duly licensed entity, holding certificates allowing it to recycle or dispose of hazardous waste.

Municipal solid waste generated on site will be collected pursuant to an agreement concluded with the municipality, in a segregated form - in accordance with the Waste Management Plan in effect in the municipality of Trzebinia. Pursuant to the Act on keeping order in municipalities of 13 September 1996 (uniform wording - Journal of Laws of 2013, item 1399, as amended), the economic operator collecting municipal solid waste from property owners is required to be registered by the municipality in which it intends to collect waste from property owners. End-of-life electric and electronic equipment should be handed over, in accordance with the Act on end-of-life electric and electronic equipment dated 11 September 2015 (Journal of Laws of 2015, item 1688) to specialized collection or processing points.

The site at which the project will be implemented is of the industrial variety, with sparsely located trees or bushes. The plants present on site are not valuable from the nature protection-related point of view and are to be removed (approx. 6 trees).

The project will not exert a significant impact on plants or animals, neither at the construction nor at the operational stage.

Construction of the propylene glycol plant and the ancillary plants will increase the volume of household and industrial wastewater produced by ORLEN Południe S.A. The quantity of rainwater discharged into the sewage system, that is currently absorbed by undeveloped and unpaved areas, will increase as well.

Household wastewater generated by additional employees, in the amount of approx. 1.3 m³/day, will not affect the operation of the in-house wastewater treatment plant that is capable of processing approx. 110 m³ of wastewater per day.

Rainwater - "clean" rainwater from roofs and biologically active surfaces will be created on site, and "dirty" rainwater from paved areas on which contaminants may be present.

Clean rainwater from the glycol and glycerine plants will be discharged via a treatment system (sediment tank + separator) to the Ropa stream, in accordance with the applicable permit. It is also assumed that water from tank trays will be discharged to the same sewage treatment system, after its condition has been assessed to be satisfactory. Such controlled measures are possible thanks to locks installed in the trays, with the said locks being closed under normal operating conditions. "Dirty" rainwater from the tank trays, in turn, (if contamination is identified), from surface drainage systems around the plant and from loading and unloading areas (truck filling stations) will be discharged to the in-house wastewater treatment station via the industrial sewer. All rainwater from the hydrogen plant and the wastewater pretreatment plant will be dumped into to industrial sewer as well.

Industrial wastewater - glycol production and glycerine purification plants will serve as the primary sources of highly contaminated industrial wastewater (COD – approx. 130 g/ml, BOD₅ – approx. 90 g/ml).

Lower amounts of industrial wastewater will be also created in the hydrogen plant, water pretreatment plant and air treatment plant. Negligible amounts will be created by closed cooling systems.

The combined amount of industrial wastewater generated will equal approx. 57,012.4 m³/year (i.e. approx. 171.2 m³/day), with approx. 39,563.2 m³/year being wastewater with an increased COD and BOD₅ content and requiring pretreatment and the applicable facility. The maximum hourly discharge rate (with periodic plant discharge amounts taken into consideration) will equal approx. 9,3 m³ of industrial wastewater (from the glycol and glycerine plants).

The designed pretreatment station capacity equals approx. 8 – 10 m³/h. The wastewater pretreatment technology is based on an anaerobic reactor, where biogas is generated in the process of anaerobic digestion. Further on, the wastewater is filtered (diaphragms), with the biomass returning to the process, and the filtrates directed to the in-house wastewater treatment plant. The process is complemented by sludge dewatering, system deodorisation, and recovery of biogas - combined with co-generation and partial combustion (flare stack). The technical facility is planned to house a chemical dosing and storage station, filtration systems, process heating system and complementary systems, as well as a social unit for service personnel.

The expected parameters of post-treatment wastewater are presented below:

- COD < 1500 mg/l O₂,

- BOD < 1000 mg/l O₂,

Aqueous sludges in the amount of up to 120 m³/day will be directed to common dewatering station located within the in-house wastewater treatment facility.

After pretreatment, wastewater will be directed directly to the existing in-house wastewater treatment plant and to the municipal sewer, or to the new treatment plant after its construction has been completed, and to the surface waters of the Ropa stream.

The remaining industrial wastewater (other than that referred to above) will be discharged directly to the in-house treatment station.

The analyses conducted have shown that the additional wastewater generated by the plants in question (with industrial wastewater subjected to pretreatment) should not affect the operation of the new treatment plant that is expected to lower the content of pollutants to the permissible values set forth in the Regulation of the Minister of Environment of 18 November 2014 on the conditions that need to be met while discharging wastewater to waters or soil, and on substances that are particularly hazardous for the environment - Journal of Laws of 16 December 2014, item 1800. This means that they should not affect the quality of the Ropa stream as well.

Introduction of a small amount of clean rainwater, via the sediment tank and the separator, to the Ropa stream, will not affect the quality of the stream's water as well.

It has also been determined that industrial wastewater, after being subjected to pretreatment, discharged into the existing treatment station and the city sewer, will not affect the parameters of the treatment station, meaning that the parameters of the wastewater discharged into the city sewer will not be changed considerably.

The undertaking in question does not pose a threat to the quality of the surface and underground waters.

No sites that would be protected under the Monument Protection Act are present on the site and in its vicinity, meaning that the project will not affect the condition of such sites.

The proposed undertaking, having the form of a propylene glycol production plant, a glycerine purification plant and a hydrogen production plant poses a risk of significant failures, both in the proposed and in the alternative scenarios.

Fire is the most significant of the risks that need to be considered. Therefore, the process of designing fire protection and signaling systems plays such an important role. It needs to be noted that the projected plants will be located on the premises of the ORLEN Południe S.A. Trzebinia Plant, i.e. a high-risk facility. A Safety Report approved by the Voivodeship State Fire Brigade Commander in Kraków on 30 January 2017 has been drawn up for the facility. The report was implemented based on an internal regulation of the OPD Director General, titled "Fault Prevention Program", that was approved by the Voivodeship State Fire Brigade Commander in Kraków in July 2016. An Internal Operational-Rescue Program is in place as well, implemented by means of an internal regulation of

the OPD Director General and approved by the Voivodeship State Fire Brigade Commander in Kraków in May 2017. All documents referred to above apply to the entire premises of the Company and to all its plants.

Once the project has been completed, the documents required under applicable regulations pertaining to serious industrial failures will be updated.

To recapitulate, one may state that the planned undertaking will not exert a considerable environmental impact due to the application of the design and organizational solutions presented in this report. The undertaking meets the definition of a sustainable development project provided for in the Environmental Protection Act, as it contributes to social and economic growth, does not disturb the natural balance and does not interfere with the permanent nature of primary natural processes.