

Joint Report 2021



on occupational health, safety
and environmental protection

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1. Introduction to the ORLEN Unipetrol Group

The Group specialises in refining and petrochemical production and sales in the Czech Republic and the Central European region. The Group companies mainly produce and sell refinery products, chemical and petrochemical products, polymers and specialty chemicals. The Group also operates its own transport services and funds its own research and development. ORLEN Unipetrol is the leading refining and petrochemical group in the Czech Republic and a major actor in Central and Eastern Europe. The Group focuses on three strategic business segments:

- ▷ oil refining and wholesale of refinery products;
- ▷ petrochemical and agrochemical production;
- ▷ motor fuels retail sales.

ORLEN Unipetrol is the 100% owner of the following companies:

- ▷ ORLEN Unipetrol RPA – a producer of and trader in refinery, petrochemical and agrochemical products, the largest oil processor in the Czech Republic for a wide range of products with a total annual capacity of 8.7 million tonnes. The Benzina ORLEN petrol station network and Polymer Institute Brno are registered branches of ORLEN Unipetrol RPA.
- ▷ ORLEN Unipetrol Doprava – a professional railway carrier not only for chemical and petrochemical products, including related services.
- ▷ Paramo – the largest producer of asphalt, lubricating and fuel oils and other refinery products.
- ▷ Spolana – a member of the ORLEN Unipetrol Group since 2016, a producer of polyvinyl chloride, caprolactam, sulfuric acid and ammonium sulphate.

The following refinery and petrochemical products are the flagship products of the ORLEN Unipetrol Group:

- ▷ Refinery products: motor petrol, diesel fuel, light fuel oil, aviation fuel, LPG, asphalts, naphtha, lubricating and fuel oils.
- ▷ Petrochemical products: ethylene, propylene, C4 fraction, benzene, high density polyethylene, polypropylene, PVC.
- ▷ Agrochemical products: ammonia, highly conductive carbon black, caprolactam, sulfuric acid, oleum and ammonium sulfate.

2. Important milestones of the ORLEN Unipetrol Group in 2021

The following events can be considered the most important events of 2021 for the ORLEN Unipetrol Group in terms of occupational health, safety & environmental protection:

- ▷ In 06/2021, SPOLANA s.r.o. completed the process of the ecologically sound disposal of hazardous waste (liquid mercury) from the discontinued production of chlorine and sodium hydroxide using amalgam electrolysis. The total amount of waste mercury handed over to an external company was 149 tonnes.
- ▷ To be able to purchase trichlorethylene from countries outside the EU, SPOLANA s.r.o. completed the registration process for trichlorethylene in the range of 10 to 100 tonnes per year. On 7 December 2021, the ECHA (European Chemicals Agency) issued a decision to assign a registration number.
- ▷ Spolana continued with the flood protection project entitled PPO Neratovicko.
- ▷ A new product, dicyclopentadiene, was registered in accordance with the European regulation REACH. The ECHA has issued a registration number.
- ▷ A decision has been reached to discontinue the operation of production units at PARAMO HS Kolín as of 31 March 2022.
- ▷ The implementation of the (5-year) Safety+ programme to implement 15 safety, fire protection, process safety and contingency planning was completed.
- ▷ The TRR (objective: 1.7, actual: 0.66) and PSER 1 (objective: 1.1, actual: 0.20) objectives were achieved.
- ▷ Safety Days were organised across the entire ORLEN Unipetrol Group.
- ▷ A senior employee e-learning programme was launched.
- ▷ The ORLEN Unipetrol Group Incentive Programme was revised and re-launched.
- ▷ The "Safety Polygon" was implemented in the training centre.
- ▷ Emergency planning in ORLEN Unipetrol RPA was unified – a single uniform document was issued.
- ▷ The emergency and crisis documentation was revised and updated.
- ▷ In June 2021, wet oxidation of sulfide liquors was commissioned in the biological wastewater treatment plant.
- ▷ In 2021, there was an environmental impact assessment for the construction project for a new combined cycle source – Heating Plant T600. The EIA opinion was issued by the Ministry of the Environment on 30 August 2021.
- ▷ On 24 June 2021, the new boiler room at the Ethylene Unit was officially commissioned (with the signing of the PAC).
- ▷ By a decision of the Ústí nad Labem Regional Authority of 8 September 2021, the processing of HVO was permitted as part of the integrated permit for the "Ethylene Unit" facility.
- ▷ The construction of a new DCPD plant and the construction of new silos for the storage of polypropylene began.

3. The role of employees

In the ORLEN Unipetrol Group companies, employees are considered to be key players in environmental protection, occupational health and safety and fire protection activities. Therefore, the individual companies have implemented an effective training system for all employees. Employee training and education are part of the management systems in place and are subject to regular review, evaluation and supplementation in the companies in accordance with the ISO 9001, 14001, 45001 and 50001 standards.

All employees are actively and constantly involved in the creation and application of occupational health, safety and environmental protection.

Proper training does not only apply to the companies' own employees, but also to employees of external companies operating at the production sites. Occupational health, safety, environmental protection and fire protection related obligations are part of the contracts signed with individual contractors.

Employees are further trained through becoming familiar with policies, operating regulations, organisational and management standards in the areas of environmental protection, health and safety, fire protection, the environmental aspects of their activities and with the goals and programmes defined for their workplace.

The active role of employees is also supported by the implemented IDEA platform, through which the Group's employees are motivated to submit their own suggestions that help meet and improve the goals of the ORLEN Unipetrol Group, including the areas of environmental protection, and occupational health and safety.

4. Public communication

To communicate with the public, the ORLEN Unipetrol Group primarily uses the following:

- ▷ Compliance with corporate social responsibility (CSR) principles by the ORLEN Unipetrol Group companies towards cities and municipalities in the surrounding areas.
- ▷ Informing about the company's impact on the environment in the surrounding areas through the participation of representatives of the ORLEN Unipetrol Group management in public meetings of the councils of neighbouring municipalities.
- ▷ Regular meetings with the mayors of the municipalities in the vicinity of the production plants, during which the participants are informed about all activities, including environmental protection and information on the occurrence of non-standard operating situations.
- ▷ Operating the Green Line of the Most and Kralupy nad Vltavou Ecological Centres and internal communication sources (print, intranet, email communication).
- ▷ Online connection of the Police of the Czech Republic and the City Police in Litvínov and Most to the company warning system reporting in Chempark Záluží.
- ▷ Sending emergency text messages via the information channel of the cities of Most and Litvínov.
- ▷ Operation warning and alert signalling and sound systems at production sites and in the surroundings areas.
- ▷ Sharing information with the public through the Most and Kralupy nad Vltavou Ecological Centres.
- ▷ Cross-border cooperation with Saxony within a joint working group and through the Most Ecological Centre.
- ▷ Internet and social media: Facebook, Twitter, Instagram, LinkedIn and YouTube.
- ▷ Interactive and educational programs for primary and secondary school students, such as A Journey to the Secrets of Oil.

5. Integrated management system policy and integrated management systems

The integrated management system policy is based on the basic values of the ORLEN Unipetrol Group and the PKN Orlen Group, namely **Responsibility - Development - People - Energy - Reliability**. In line with the strategic focus of the Group companies, the policy includes commitments in the areas of occupational health and safety, environmental protection, quality, energy management, ethical standards, and property protection.

The integrated management system policy is published on the websites of the individual companies.

Management systems in place are an important factor in environmental protection, product quality, occupational safety and health protection, fire protection and major accident prevention. ORLEN Unipetrol Group companies have implemented and certified their quality management systems (QMS), environmental management systems (EMS) and health and safety management systems (HSMS) as a guarantee of their systematic approach towards customers and their needs, quality of the products and services provided, environmental protection and occupational health and safety. Most companies have implemented and certified their energy management systems (EnMS), by which these companies declare their commitment to energy consumption optimisation, and at the same time also meet the legislative requirements of the Energy Management Act.

The aforementioned management systems are certified according to international standards ISO 9001, ISO 14001, ISO 45001 and ISO 50001.

In May and June 2021, a surveillance audit of the QMS, EMS, HSMS and EnMS management systems was conducted by ORLEN Unipetrol, ORLEN Unipetrol RPA (incl. the Benzina ORLEN registered branch and Polymer Institute Brno), ORLEN Unipetrol Doprava and Petrotrans. A certification organisation, Lloyd's Register Quality Assurance, has confirmed compliance with system standards. Recertification is planned for 2022.

In May 2021, Paramo underwent a recertification audit conducted by Lloyd's Register Quality Assurance covering all three systems – EMS, HSMS and QMS (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018).

In May 2021, SPOLANA s.r.o. conducted a QMS, EMS, HSMS and EnMS recertification audit. The certification company was newly Lloyd's Register EMEA (as a result of the implementation of a single certification company for the entire ORLEN Unipetrol capital group).

ORLEN Unipetrol RPA has a certified system of sustainability in the production of motor fuels with bio-based components (ISCC). The last audit, which verified compliance with the system requirements, was conducted in December 2021 by TÜV SÜD Czech, s.r.o. Since November 2021, the company also has a certified system of sustainability in the production of monomers and plastics from raw materials containing bio-based components (ISCC PLUS).

ORLEN Unipetrol Doprava has implemented the Safety and Quality Assessment System for Logistics Service Providers (SQAS). The system was successfully recertified in October 2021.

Certified/verified management systems in the ORLEN Unipetrol Group in 2021

Company	ISO 9001	ISO 14001	ISO 45001	ISO 50001	SQAS	RC	ISCC	ISCC PLUS
ORLEN Unipetrol	●	●	●	●		●		
ORLEN Unipetrol RPA (including its Benzina ORLEN registered branch)	●	●	●	●		●	●	●
ORLEN Unipetrol RPA – PIB registered branch	●			●				
ORLEN Unipetrol Doprava	●	●	●	●	●	●		
Paramo	●	●	●					
Spolana	●	●	●	●		●		

Certificates are published on the websites of the individual companies.

6. Responsible Business in Chemistry Programme – Responsible Care

The Responsible Care (RC) programme is a voluntary, globally accepted initiative of the chemical industry aimed at supporting its sustainable development by increasing the safety of its operating facilities, transport of products, and by improving the protection of human health and the environment. The programme is a long-term strategy coordinated by the International Council of Chemical Associations (ICCA) and the European Chemical Industry Council (CEFIC) in Europe. The RC's contribution to sustainable development was recognised at the World Summit in Johannesburg with the United Nations Environment Programme award.

The national version of the RC programme is the Responsible Business in Chemistry programme, officially launched by the Minister of Industry and Trade and the President of the Association of the Chemical Industry of the Czech Republic (SCHP ČR) in October 1994. Since 2008, the program has met the requirements of the Responsible Care Global Charter.

Based on a successful public defence, the right to use the Responsible Care programme logo was regranted in 2021 to the ORLEN Unipetrol Group, which includes ORLEN Unipetrol a.s., ORLEN Unipetrol RPA s.r.o., incl. its Benzina ORLEN registered branch, and ORLEN Unipetrol Doprava s.r.o. The three companies have the right to use the Responsible Care logo until 2025 when they will once again go through the public defence system.

Paramo is no longer a member of the Czech Chemical Industry Association and therefore does not use the authorisation, although it continues to comply with the principles.

In 2018, Spolana defended the right to use the RC logo for the ninth time. Its tenth defence is planned for 2022.

7. Compliance with environmental protection laws

In 2021, there were two cases of violation of legal requirements at ORLEN Unipetrol RPA. Non-compliance with the NOx emission limit at the ethylene unit power unit was caused by a delay in the construction of the new power unit due to an emergency – damage to the new boiler during the installation of the new equipment. Our supplier was the originator of the emergency. The non-compliance with the solid pollutant parameter limit at the Kralupy Refinery was a failure of part of the separation system on the FCC unit. Fines were imposed for both violations of legal requirements.

Except for the above, the operating conditions and emission limits set out in the integrated permits for all ORLEN Unipetrol RPA facilities were complied with in 2021, and there was no other non-compliance with the legal requirements in the area of air, waste and water and rock environment protection.

In 2021, all activities of ORLEN Unipetrol Doprava, Paramo and Spolana were carried out in full compliance with environmental protection legislation.

8. Integrated pollution prevention and control

The obligations of selected industrial enterprises in the area of integrated pollution prevention and control (IPPC) are regulated by Act No 76/2002, as amended. All ORLEN Unipetrol RPA production units, including the refineries in Litvínov and Kralupy nad Vltavou, are subject to the IPPC Act and have valid integrated permits issued by the regional authorities of the Ústí nad Labem and Central Bohemian Regions. These permits are updated on an ongoing basis in response to the requirements of amended legislation and compliance with deadlines, the implementation of investment projects, changes in technological equipment or changes in the substances used. During 2021, a total of 13 changes to integrated permits were issued for ORLEN Unipetrol RPA facilities. The changes included but were not limited to the following:

- ▷ The descriptions of the facilities or the wording of the conditions of the integrated permits were formally modified, and updated versions of the operating rules for air pollution sources and the operator's emergency plans were approved.
- ▷ The condition of the integrated permit for the Kralupy Refinery was modified – the frequency of monitoring the phenol index in wastewater from the WWTP.
- ▷ An application was submitted for a change in the IP for the Litvínov Refinery in connection with the Petrol Purification Machine Optimisation and High H₂S Content Petrol Pumping investment project.
- ▷ Following changes to the project, the entire integrated permit was updated for the DCPD facility, for which a review was subsequently carried out in accordance with the findings on the best available techniques.
- ▷ As part of the integrated permit for the EJ facility, the processing of a new raw material, HVO, was permitted and the frequency of TOC monitoring in the pyrolysis furnace decoking process was changed.
- ▷ An application for the issuance of an integrated permit for the "Heating Plant T600" facility was prepared.

During 2021, following the BAT conclusions issued for the shared wastewater and waste gas treatment and management systems in the chemical industry (CWW) and the BAT conclusions for the production of large quantities of organic chemicals, a review of the integrated permit for the "dicyclopentadiene production" facility was carried out. The review was carried out in accordance with the Integrated Pollution Prevention and Control Act and found that a condition relating to the monitoring of air emissions needed to be added to the integrated permit and that the remaining conditions were up to date and in line with the relevant BAT conclusions. The condition concerning the monitoring of air emissions was added to the integrated permit in the form of a permit change.

ORLEN Unipetrol RPA, through a technical working group established by the Ministry of Industry and Trade of the Czech Republic, was involved in the preparation of a document on the best available techniques for the purification of gases generated by the chemical industry and large-volume inorganic chemicals.

Valid integrated permits have been issued for all technologies operated by Paramo. The Pardubice Profit Centre obtained a joint integrated permit for energy operations, asphalt operations, fuel operations and oil operations issued by the Regional Authority of the Pardubice Region. During 2021, the IP was updated once (change in the operator of the hydraulic groundwater protection (HMGWP), including the related surface and groundwater management permit, approval of the water management emergency plan). The Kolín Profit Centre obtained one integrated permit issued by the Regional Authority of the Central Bohemian Region. In 2021, an application was submitted for a change in the IP in connection with the decommissioning of production units at the Kolín Profit Centre site (IP updated in 2022).

Spolana has obtained a total of four integrated permits for the operation of the facility. In 2021, the Regional Authority issued a total of six changes to the integrated permits (IPs). The changes concerned the permission to operate a replacement ammonium sulphate storage facility and the formal transfer of the substance from one IP to another, the permission to renovate sulphuric and fuming sulphuric acid filling stations where the substances are filled in tank trucks and rail tanks, modifications to the Elbe discharge permit, the approval of the project focusing on the disposal of the facility and equipment of the existing heating plant at the Spolana site after their decommissioning, including the schedule of works, approval of the revised Operating Rules for the Storage of Sludge from the WWTP, and the permission to demolish the facility. On the basis of a review of the IP for the production of PVC (in connection with the BAT conclusions under Commission Implementing Decision (EU) 2017/2117 establishing best available techniques (BAT) for the production of large volume organic chemicals (LVOC)), the binding operating conditions concerning air and wastewater were modified (the limit values and monitoring).

9. Overview of valid integrated operating permits

Production unit	Integrated permit – (issued by)
ORLEN Unipetrol RPA	
Production of polypropylene and polyethylene	Regional Authority of the Ústí nad Labem Region
Ethylene Unit	Regional Authority of the Ústí nad Labem Region
Ammonia production	Regional Authority of the Ústí nad Labem Region
Production plant – Gasification of mazut	Regional Authority of the Ústí nad Labem Region
Energy Services Unit	Regional Authority of the Ústí nad Labem Region
Production of dicyclopentadiene	Regional Authority of the Ústí nad Labem Region
Litvínov Refinery	Regional Authority of the Ústí nad Labem Region
Kralupy nad Vltavou Refinery	Regional Authority of the Central Bohemian Region
Paramo	
Operation of the refinery, Pardubice Profit Centre	Regional Authority of the Pardubice Region
Kolín Profit Centre	Regional Authority of the Central Bohemian Region
Spolana	
Energy and toxic waste landfill	Regional Authority of the Central Bohemian Region
Production of chlorine and sodium hydroxide using amalgam electrolysis	Regional Authority of the Central Bohemian Region
Production of polyvinyl chloride (PVC)	Regional Authority of the Central Bohemian Region
Production of caprolactam and sulphuric acid	Regional Authority of the Central Bohemian Region

10. Emissions into the environment

Pollutant emissions into the environment have stabilized over the last five years thanks to extensive environmental investments made in the previous decade. The individual emissions into various environment components are described in the following chapters.

10.1 Wastewater discharge

At ORLEN Unipetrol RPA, the quantity of discharged wastewater corresponds to the long-term average and is partly affected by precipitation. The concentration of pollutants in wastewater has been stable for a long time and their quantities are directly proportional to the quantity of wastewater discharged. In terms of the amount of water and the content of pollutants in it, 2021 did not deviate significantly from the values of recent years.

The Kralupy Refinery underwent an extensive renovation of the wastewater treatment plant in 2013–2015. In 2016–2017 the treatment plant completed a two-year trial operation, and permanent operation began on 1 January 2018. In 2019, the validity of the existing limits for wastewater discharge was extended until 31 December 2023. 2021 was evaluated according to the results of the accredited ALS laboratory while the WWTP experienced greater input pollution.

The quantities of pollution discharged at Spolana have been stable, with the exception of mercury, the quantity of which has dropped significantly. The partial concentrations of contaminants have increased slightly due to the loss of a significant amount of water from the discontinued crude-ash hydrotransport. At the final point of treated wastewater discharge into the Elbe bearing the designation K10, the "p" limits of the following indicators were exceeded in 2021, however the permissible numbers of samples non-compliant with the "p" limit were not exceeded, and the "m" limits were not exceeded. CODCr indicator (2 out of 5 possible exceedances), suspended solids SS (1/5), 1,2-dichloroethane (3/5), ammoniacal nitrogen (4/5), inorganic nitrogen (1/3), dissolved inorganic salts DIS (3/5), trichloromethane (1/5), adsorbable organically bound AOX halogens (1/3).

Paramo – the rate of transmitted wastewater pollution has not changed significantly over the years. The COD and BOD pollution indicators increased slightly at the Pardubice Profit Centre due to a change in the operating mode of the HMGWP system (a lower ratio of dilution water from remediation pumping). Wastewater pollution in the Kolín Profit Centre (recipient Hluboký potok) shows a steady condition.

The wastewater pollution indicators for the Benzina ORLEN registered branch cannot be listed, as the monitored parameters are inconsistent throughout the petrol station network and thus cannot be reported in the overview. In the overall evaluation of the individual petrol stations, the monitored parameters were not exceeded in terms of the "m" value.

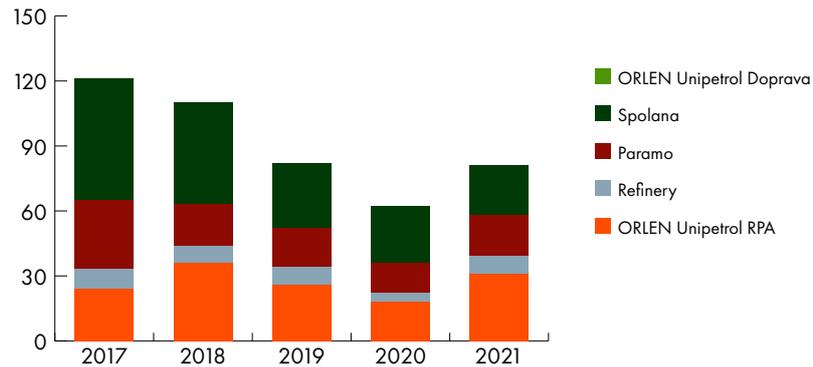
The pollution contained in the ORLEN Unipetrol Doprava wastewater is directly proportional to the number of the treated facilities containing harmful substances.

Pollution discharged into wastewater in the Group (t/year)¹⁾

Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	BOD ₅	24	36	26	18	31
Refinery²⁾	BOD ₅	9	8	8	4	8
Paramo	BOD ₅	32	19	18	14	19
Spolana	BOD ₅	56	47	30	26	23
ORLEN Unipetrol Doprava	BOD ₅	0	0	0	0	0
ORLEN Unipetrol Group	BOD ₅	121	110	82	62	81

¹⁾ The Benzina ORLEN registered branch is not monitored as a whole. No representative data can be assessed.

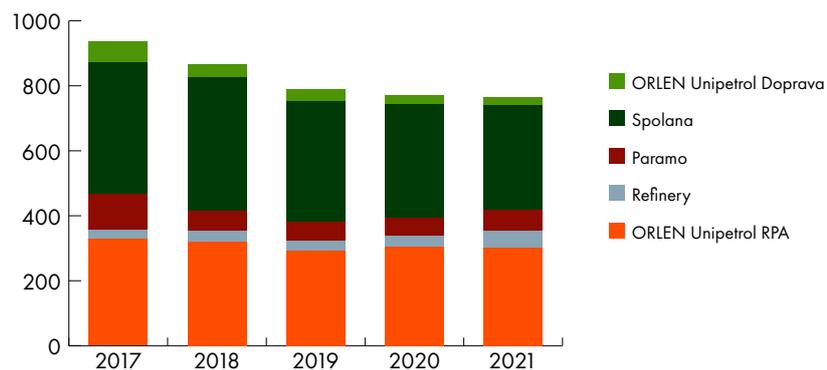
²⁾ Only the Kralupy site. There is no direct discharge in Litvínov.



Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	COD _{Cr}	328	321	293	305	301
Refinery²⁾	COD _{Cr}	28	32	29	31	52
Paramo	COD _{Cr}	110	62	61	57	65
Spolana	COD _{Cr}	407	412	370	352	321
ORLEN Unipetrol Doprava	COD _{Cr}	63	39	36	26	25
ORLEN Unipetrol Group	COD _{Cr}	936	866	789	771	764

¹⁾ The Benzina ORLEN registered branch is not monitored as a whole. No representative data can be assessed.

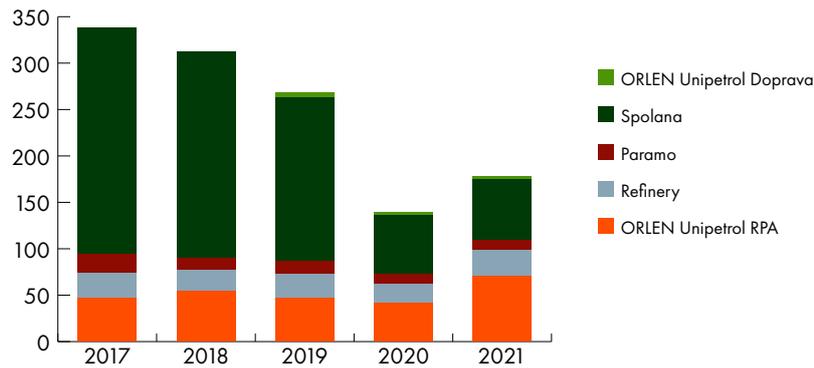
²⁾ Only the Kralupy site. There is no direct discharge in Litvínov.



Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	SS	47	54	47	41	70
Refinery²⁾	SS	27	23	26	21	29
Paramo	SS	20	13	14	11	10
Spolana	SS	244	215	176	63	66
ORLEN Unipetrol Doprava	SS	0.38	7	5	4	3
ORLEN Unipetrol Group	SS	338	312	268	140	178

¹⁾ The Benzina ORLEN registered branch is not monitored as a whole. No representative data can be assessed.

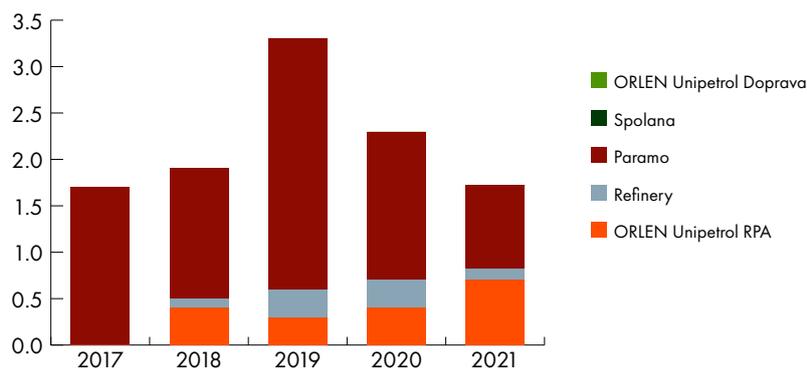
²⁾ Only the Kralupy site. There is no direct discharge in Litvínov.



Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	oil products	0	0.4	0.3	0.4	0.7
Refinery²⁾	oil products	0	0.1	0.3	0.3	0.1
Paramo	oil products	1.7	1.4	2.7	1.6	0.9
Spolana	oil products	-	-	-	-	-
ORLEN Unipetrol Doprava	oil products	0	0	0	0	0
ORLEN Unipetrol Group	oil products	2	1.9	3.3	2.3	1.7

¹⁾ The Benzina ORLEN registered branch is not monitored as a whole. No representative data can be assessed.

²⁾ Only the Kralupy site. There is no direct discharge in Litvínov.



10.2 Waste management

The amount of waste generated at ORLEN Unipetrol RPA in 2021, including the Litvínov Refinery, was significantly lower than the amount of waste generated in 2020, and was associated with shutdown work at the company. At the Kralupy Refinery, waste generation was approximately at the same level as in the previous year. In Paramo, there was higher waste generation in 2021, primarily due to the preparatory work related to the decommissioning of production units at the Kolín Profit Centre.

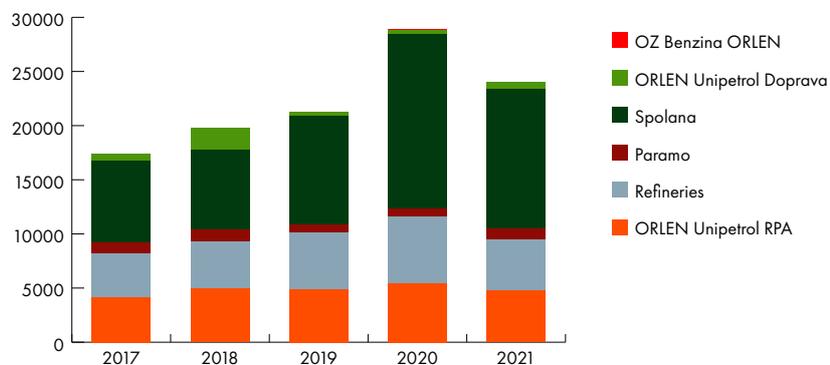
The increase in the generation of hazardous waste by ORLEN Unipetrol Doprava is related to the increased capacity utilization at the steaming station in Litvínov. The increase in the generation of other waste is related to the disposal of decommissioned rail vehicles.

The increase in the generation of hazardous waste at Spolana in the last several years is related to the decommissioning, remediation and gradual dismantling of selected technological units at the amalgam electrolysis facility, while the increase in the generation of other waste is related to the disposal of metal waste.

Not all waste generated in the operations of petrol stations - only waste from investment and other contracts - is reported for the Benzina ORLEN registered branch. The originator of the remaining waste generation is the petrol station lessee as an independent business entity.

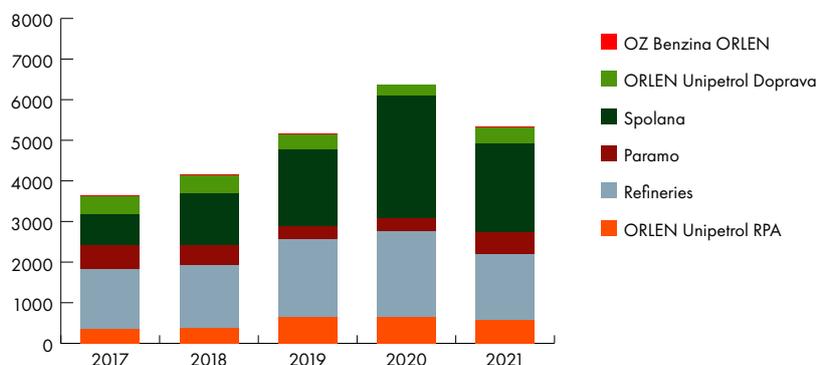
Waste generation in the Group (t/year) – total

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	4 165	4 932	4 896	5 439	4 786
Refineries	4 003	4 409	5 180	6 092	4 671
Paramo	1 079	1 072	788	796	1 087
Spolana	7 510	7 364	9 997	16 152	12 854
ORLEN Unipetrol Doprava	633	1 985	387	362	564
RB Benzina ORLEN	16	28	16	18	35
ORLEN Unipetrol Group	17 405	19 790	21 264	28 859	23 997



Waste generation in the Group (t/year) – hazardous waste only

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	347	369	651	651	584
Refineries	1 470	1 546	1 915	2 109	1 608
Paramo	591	494	297	316	533
Spolana	759	1 285	1 907	3 020	2 205
ORLEN Unipetrol Doprava	463	443	372	269	375
RB Benzina ORLEN	2	7	10	2	30
ORLEN Unipetrol Group	3 633	4 144	5 152	6 367	5 335



10.3 Air protection

Total refinery emissions in 2020 and 2021 were lower in most parameters than in previous years. The SO₂ parameter dropped significantly due to the positive impact of the start of the DeSO_x additive dosing at the fluid cracking unit at the Kralupy Refinery in the autumn of 2018.

In 2021, NO_x emissions were reduced at ORLEN Unipetrol RPA due to the installation of the DeNO_x emissions reduction facility at Heating Plant T700 and the commissioning of a new power unit at the Ethylene Unit where DeNO_x is also used. At Heating Plant T700, SO₂ emissions increased due to more frequent use of bypass, while solid pollutant emissions decreased due to the installation of new separators both at Heating Plant T700 and at the new Ethylene Unit power unit equipped with electrostatic precipitators.

In Paramo, only natural gas was burned in the boiler rooms of the Pardubice and Kolín Profit Centres, which has led to low long-term emissions of sulphur dioxide, solid pollutants and volatile organic compounds. This situation is also the result of, among other things, eliminating air pollution sources in fuel operation and reducing the total power input of the boiler room in the Pardubice Profit Centre, where only boiler K1 was in operation. Boiler K2 was a backup source and boiler K3 was disconnected. In order to comply with the new emission limits effective since 1 January 2020, the existing burners in the boiler room and the RDH unit in the Kolín Profit Centre were replaced with new low-emission burners. In the Pardubice Profit Centre, VOC emissions were reduced thanks to the commissioning of a new VRU recuperation unit.

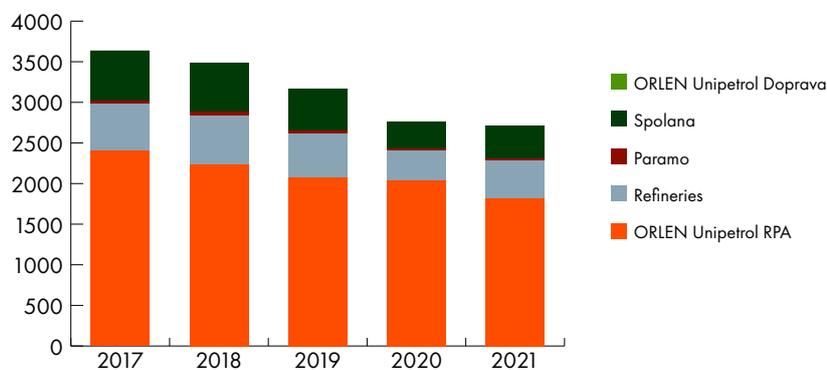
At Spolana, as a result of the decommissioning of coal-fired boilers as of 12/2019, emissions of SO₂ and solids from the company's energy operations were significantly reduced, and NO_x emissions also decreased. The higher emissions of solids in 2021 were caused by the penetration of substances through the terminal equipment.

At ORLEN Unipetrol Doprava, VOC quantities from the tank truck and rail tank cleaning and steaming station were lower in 2021 than in previous years, due to the lower number of tanks where materials capable of emitting VOCs were cleaned.

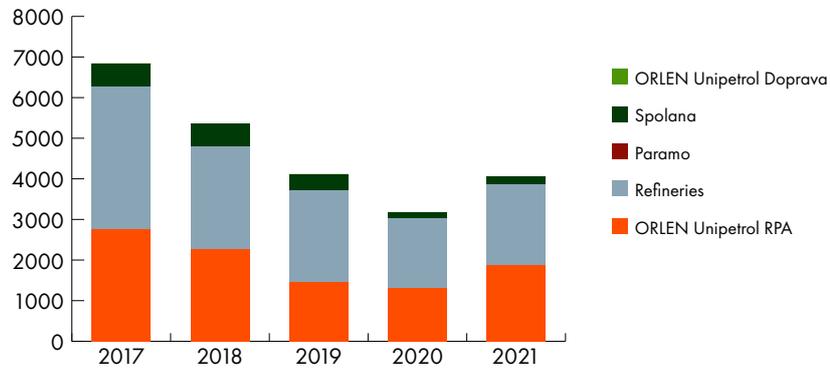
BENZINA introduced new pumps equipped with an automatic Stage II petrol vapour recovery control system (VRSM).

Air pollution in the Group (t/year)

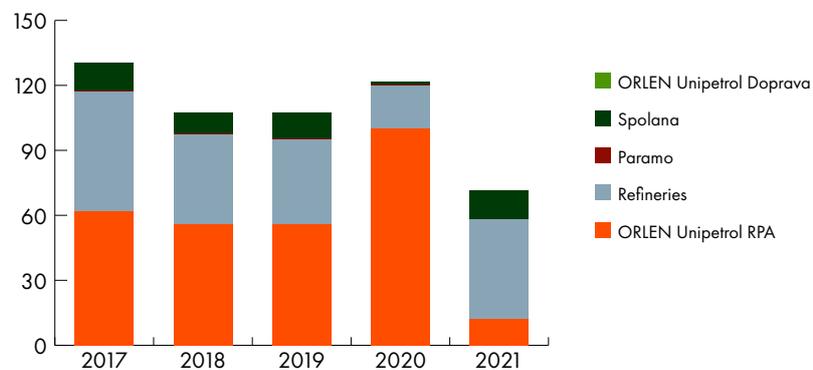
Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	NO _x	2 400	2 237	2 077	2 039	1 820
Refineries	NO _x	582	599	540	365	465
Paramo	NO _x	39	42	28	24	20
Spolana	NO _x	616	609	523	335	404
ORLEN Unipetrol Doprava	NO _x	0.0	0	0	0	0
ORLEN Unipetrol Group	NO _x	3 637	3 487	3 168	2 763	2 709



Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	SO ₂	2 771	2 261	1 470	1 317	1 876
Refineries	SO ₂	3 490	2 534	2 236	1 707	1 974
Paramo	SO ₂	1.3	0.37	0.03	1.1	0.9
Spolana	SO ₂	585	557	416	148	198
ORLEN Unipetrol Doprava	SO ₂	0.0	0	0	0	0
ORLEN Unipetrol Group	SO ₂	6 847	5 352	4 122	3 073	4 020.9

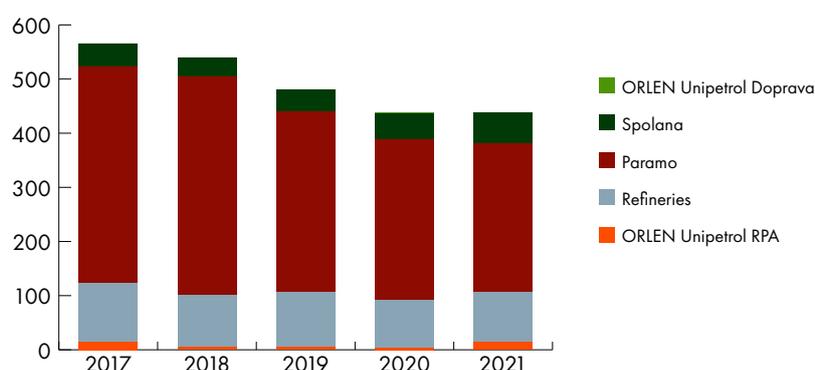


Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	Solid compounds	62	56	56	100	12
Refineries	Solid compounds	55	41	39	20	46
Paramo	Solid compounds	0.5	0.5	0.5	0.4	0.3
Spolana	Solid compounds	13	9.8	12	1	13
ORLEN Unipetrol Doprava	Solid compounds	0.0		0	0	0
ORLEN Unipetrol Group	Solid compounds	130.5	107.3	107.5	121.4	72.3



Company	Indicator	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	VOC	15	5	5	4	14
Refineries	VOC	107	97	101	87	93
Paramo	VOC ¹⁾	400	402	335	297	274
Spolana	VOC ¹⁾	43	35.3	39	49	57
ORLEN Unipetrol Doprava	VOC	1.1	0.9	1.1	1	0.8
ORLEN Unipetrol Group	VOC	566	540	481	438	439

¹⁾ 90% are fugitive emissions reported only on the basis of the purchases of solvents in the relevant calendar year.



10.4 CO₂ emissions and allowance trading

The regulation of carbon dioxide emissions according to the EU Emissions Trading System (EU ETS).

In the third trading period (2013–2020), the number of monitored sources of CO₂ emissions increased significantly and the method of calculating, monitoring and reporting the amount of CO₂ emissions changed. The calculation of freely allocated allowances also underwent a significant change.

Allocation of allowances to ORLEN Unipetrol Group companies according to the National Allocation Plan for the period 2013–2021 and actual CO₂ emissions in 2013–2021

Allocation of allowances (thousands) real emissions (kt/year)	ORLEN Unipetrol RPA	Refinery RB ¹⁾	Paramo	Spolana	ORLEN Unipetrol Group
total allocation for the period 2013–2021	10 159¹⁾	6 494	445	1 051	17 333
2013: real CO ₂ emissions	3 062	772	47	232	4 113
2014: real CO ₂ emissions	3 138	877	37	251	4 303
2015: real CO ₂ emissions	2 841	888	36	239	4 004
2016: real CO ₂ emissions	2 491	678	37	233	3 439
2017: real CO ₂ emissions	3 324	954	42	207	4 527
2018: real CO ₂ emissions	3 210	880	43	204	4 337
2019: real CO ₂ emissions	3 221	941	40	159	4 361
2020: real CO ₂ emissions	2 875	764	40	81	3 760
2021: real CO ₂ emissions	3 326	917	40	82	4 365

¹⁾ In 2017, ORLEN Unipetrol RPA and Česká rafinářská merged. Until 31 December 2018, the refineries operated as a registered branch of the Refinery.

The emissions calculation for 2021 shows that the allocated annual amount of allowances at ORLEN Unipetrol RPA, including the refinery units, covers approximately 38% of the annual emissions. The allowance deficit for 2021 was addressed by purchasing allowances on the market. In 2019, applications for the free allocation of allowances for the fourth EU ETS trading period were independently verified and submitted to the ministry. Free allowances were allocated after the values of the relevant benchmarks and correction factors were updated during 2021 and their amount was further adjusted according to the report verification results at facility operations level in 2019 and 2020. In 2021, an audit of operating data was carried out for the purposes of the submission of an application for compensation for indirect costs due to the pass-through of emissions costs into electricity prices.

At Paramo, the generation of CO₂ emissions for 2021 shows a steady development compared to previous years. PARAMO did not have to address a deficit of allowances (on external markets) for 2021. The slight surplus of allowances from previous years was used to surrender allowances.

At Spolana, CO₂ emissions fell compared to 2020 due to the discontinued operation of coal-fired boilers.

10.5 Other greenhouse gases

All Group companies operate their production facilities in accordance with the requirements for the protection of the Earth's ozone layer and in accordance with applicable international agreements. Refrigerants have already been replaced by more environmentally sound media in previous years.

11. Management of primary sources of raw materials and energy

To conserve primary sources of raw materials and energy, the ORLEN Unipetrol Group follows the principles of sustainable development and focuses its basic strategy on innovative methods leading to the optimisation of energy and material inputs while promoting continuous improvement of environmental performance and increasing energy efficiency. The Group companies, whose energy management systems have been successfully certified in accordance with ISO 50001, have committed to complying with these principles as part of the Integrated Management System Policy.

ORLEN Unipetrol RPA has prepared a strategy for reducing greenhouse gas emissions as part of the Decarbonisation programme. ORLEN Unipetrol, as part of the ORLEN corporate group, has committed to achieving the carbon neutrality goals by 2050. One important step is the continuous reduction of energy losses within the Zero Tolerance programme. This programme includes large-scale insulation replacement, significant renovation of condensate systems and the regular elimination of steam leaks. The emphasis on the implementation of energy-efficient and innovative solutions (reducing energy and raw materials consumption and waste and wastewater generation) is constantly increasing in the capital group, and this goal is a key parameter in evaluating and approving projects by investment committees.

In 2021, the project entitled New Boiler Room in the Ethylene Unit was completed and the facility was commissioned. The new boiler room enables stable operation of the Ethylene Unit in compliance with the strictest legislation. In 2021, the second implementation phase of the Combustion One combustion control using new pyrolysis furnaces was also completed, and it was decided to continue with the remaining furnaces, i.e. BA-101 through BA-105, in the third phase. At the same time, the Combustion One project continued with the CCR furnace.

The project entitled New Energy Source at Chempark Záluží continues – the new gas heating plant will significantly contribute to the efficient use of fuels and at the same time significantly reduce emissions in accordance with all legal requirements (including CO₂ emissions). At present, the optimal variants are already being evaluated in terms of investment costs and, above all, in terms of the required capacity. The area of advanced process control (APC) methods is still being developed. An APC system is being installed at Heating Plant T700, and will significantly contribute to the optimisation of operations and savings of primary raw materials, including but not limited to lignate. The APC system at the T700 will focus on the combustion process and its optimisation.

The EnMS Visual MESA tool is important for optimal energy consumption and utilisation. This system enables the optimal use of fuels and other media across the entire Chempark Záluží site, starting with the production of energy at the T700 and the consumption of all production units, i.e. refinery, petrochemical and agrochemical units. Visual MESA is used for the standard evaluation and optimisation of energy consumption. The fact that the created model evaluates individual technologies as a whole and seeks to optimise the entire site continues to be a significant benefit. Additional optimisation project ideas are always being sought.

Within the units, great emphasis is placed on optimal capacity utilisation contributing positively to the energy efficiency of production. Projects aimed at increasing the reliability of the facilities continue in this area.

In terms of innovative projects, the preparation of projects for the use of low-potential (waste) heat continues. The project to use flue gas heat in the Kralupy Refinery for condensate preheating continues. As a result of the preparation of connection points, this project has progressed to the implementation phase. Experience within the capital group is leveraged in this area. Other projects include the optimisation of the use of medium-pressure steam at the ethylene unit, the reduction of energy losses using simple reduction valves, replacement with rotary reduction valves or OCR (Organic Rankine Cycle) and electricity generation. These projects will be further developed into the implementation phase when the ORLEN Unipetrol Group will be involved in pilot installations.

An important part of energy efficiency is the installation of new and efficient devices that have the potential to save electricity.

The Benzina ORLEN registered branch focuses primarily on water, electricity and gas consumption at petrol stations. Energy consumption has been regularly monitored since 2017. Since 2018, IoT meters have been gradually installed to monitor the consumption of individual media (electricity, water, gas) at selected petrol stations (Energy Management System). The idea behind the project is to obtain accurate data on the consumption of individual media and to use these data for the regular evaluation of energy consumption at petrol stations through online monitoring. Data obtained in this manner will be used to compare and evaluate opportunities for reducing consumption. The installation of IoT meters to monitor energy consumption at petrol stations continued in 2021. At the same time, the necessary steps to start remote data transmission from these meters (online monitoring) continue. The use of electricity at petrol stations is also optimised through the implementation of low-energy appliances and technologies (LEDs).

At the Polymer Institute Brno branch, energy performance is improved mainly by the installation of new equipment. This was successfully achieved primarily by heating less in all buildings. Unfortunately, this did not have much effect on the costs incurred due to the rising cost per GJ of heat. We mostly focus on savings from reduced water consumption. In 2021, we managed to reduce total water consumption to 7 789 m³ the best result since 2011. The largest savings were achieved at lab. 45 after the installation of both lines on the internal cooling circuit of the new industrial cooler as the consumption was 1 544 m³ in 2020 and only 575 m³ in 2021. In 2021, a new complete air conditioning system was completed in the production hall, including air recuperation, which saves electricity through the operation of a central exhaust and heating savings in the winter (filtered air is returned to the hall).

In the area of improving energy performance, Paramo has long been implementing projects that contribute to reducing steam consumption for heating products and pumping lines (using heat from its own steam produced at the asphalt incinerator). The lengths of the steam pipeline routes are optimised (reduction of heat losses in the pipeline) and thermal insulation is installed on selected tanks. Great attention is also paid to insulation within the Zero Tolerance for Steam Leaks and Missing or Damaged Insulation project.

New feed pumps have been installed in Paramo to reduce electricity consumption.

Reducing the energy intensity of energy generation, reducing losses in heat distribution, reducing the energy intensity of production technology and reducing the energy intensity of buildings are the priorities of Spolana's efforts to improve energy efficiency. A new gas boiler room with a total nominal output of approximately 70 tonnes of medium-pressure steam per hour was built and commissioned (building approval in 03/2022) and the operation of a heating plant with a cogeneration unit was shut down as part of the plan to reduce the energy intensity of thermal energy generation. A partial modernisation of the equipment and optimisation of steam pipelines at SPOLANA s.r.o. resulted in a reduction in total internal heat consumption in the sulphuric acid operations, essentially reducing the consumption of natural gas in the gas boiler room. The planned modernisation of sulphuric acid production and increasing energy efficiency and economy are strategic goals in the company's energy management, and the aim is to complete the work in 2026. Furthermore, a project was implemented for the direct injection of 1,2-dichloroethane into the fission section, without a distillation and washing process (commissioned in 02/2022), also reducing, among other things, gas consumption in the boiler room. The insulation on steam and condensate pipes was restored at the PVC plant as part of an insulation restoration programme. Normally, all accessible condensate drains are diagnosed, and defective pieces are subsequently repaired/replaced.

In the field of energy management, ORLEN Unipetrol Doprava focuses mainly on optimising the consumption of fuel, electricity and process and heating steam.

The company has continued to modernise its locomotive fleet, and as of 31 December 2021 there were a total of 5 Vectron multi-system locomotives in its fleet. The modernisation of the locomotive fleet has resulted in fuel and electricity savings. In addition, Vectron multi-system locomotives help reduce emissions. The engines are equipped with electricity meters which also enable the measurement of energy recovery. In 2021, 1 112 MWh of electricity was returned to the distribution system by locomotives.

Furthermore, technological equipment is continuously modified and technological procedures are continuously updated. Since 2016, sidings have been technically modified. For example, photocells have been installed on the lighting towers along the siding track. Heating controls for building No 6419 have been installed. In 2019, the first stage of the installation of energy-saving lighting fixtures at the siding in the ORLEN Unipetrol RPA complex in Litvínov took place, the switch heating system was replaced, heating controls were installed, and thermal insulation was installed on buildings. The steaming time during car cleaning has been reduced.

Water consumption in the Group (million m³/year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	18.4	18.2	18.5	16.1	17.8
Kralupy Refinery	2.0	2	2.2	1.9	2.1
Paramo	0.4	0.4	0.4	0.3	0.3
Spolana	15.8	16.2	15.9	12.1	12.2
ORLEN Unipetrol Group	36.7	36.8	36.8	30.4	32.4

A positive trend is seen mainly in specific energy consumption due to the utilisation of production capacities. This always has a positive impact on the use of energy and raw materials, therefore it is more appropriate to monitor the ratio of energy consumption in tonnes of oil equivalent (TOE) to tonnes of production per year:

Energy consumption in the Group (thous. TJ/year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	9.2	9.1	9	8.6	9.9
Litvínov Refinery	9.6	9.9	10.2	8.1	9.3
Kralupy Refinery	7.7	7.5	7.9	7.1	8.7
Paramo	0.5	0.892	0.868	0.83	0.903
Spolana	3.4	2.7	2.6	2.0	2.0
ORLEN Unipetrol Group	30.4	30.1	30.6	26.63	30.80

Specific energy consumption in the Group (TOE/t of production per year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	0.141	0.143	0.151	0.158	0.145
Litvínov Refinery	0.045	0.045	0.047	0.050	0.048
Kralupy Refinery	0.050	0.057	0.053	0.059	0.063
Paramo Pardubice Profit Centre	0.135	0.123	0.134	0.148	0.154
Paramo Kolín Profit Centre	0.290	0.317	0.281	0.304	0.331
Spolana	0.147	0.117	0.126	0.119	0.109

12. Environmental investments

Environmental investments are defined as investment projects directly triggered by the requirements arising from environmental protection legislation, and which are closely related to the application of integrated pollution prevention and control in practice or have a significant positive effect on the environment.

In 2021, the following environmental investments were made in the Group.

Refineries

Investment projects in environmental protection amounting to CZK 18 million were implemented in the refinery units. The most important ones include:

- ▷ reconstruction and renovation of sewerage and slope systems at the Litvínov and Kralupy Refineries
- ▷ renovation of industrial sewerage in block 13
- ▷ replacement of slop pipelines and industrial sewers at the VBU production plant
- ▷ installation of camera systems for checking the position of tankers on the weigh station
- ▷ construction of an emergency overflow and a sulphur tray at PS 2517

ORLEN Unipetrol RPA

Investment projects in environmental protection amounting to CZK 319 million were implemented at ORLEN Unipetrol RPA. The most important ones include:

- ▷ construction of a new ethylene unit boiler room
- ▷ filtration of coke from flue gases
- ▷ handling of sulphide lyes in wastewater
- ▷ renovation of the Zickert facility
- ▷ construction of a pumping station in the shared sewerage system in block 69

A number of other measures with a positive environmental impact were implemented as part of equipment maintenance operating costs.

Paramo

Investment projects in environmental protection amounting to CZK 0.83 million were implemented at Paramo. The most important ones include securing HK tanks against overflow and conducting the Energy Audit for the Pardubice and Kolín Profit Centres.

Spolana

Investment projects in environmental protection amounting to CZK 21 million were implemented at Spolana. The most important ones include:

- ▷ construction of a new energy centre – continuation
- ▷ sewer renovations and sewer modifications
- ▷ a new filling point for sulphuric acid dispatch
- ▷ reconstruction of air ducts for PVC drying

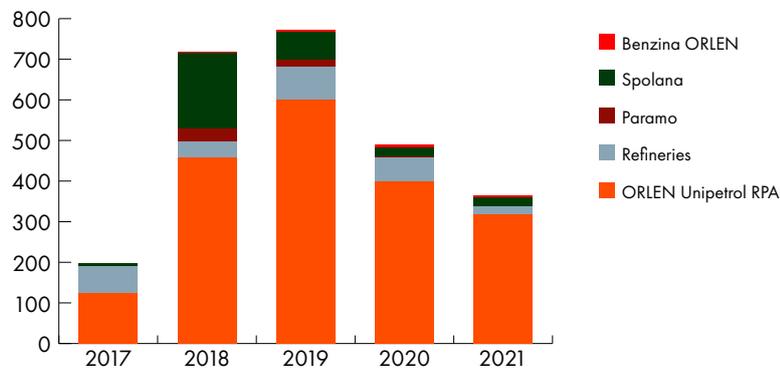
Benzina ORLEN registered branch

The Benzina ORLEN registered branch implemented investment projects in environmental protection amounting to CZK 5.1 million. The investment projects focused primarily on:

- ▷ reconstruction of the sewer
- ▷ installation of a new wastewater treatment plant and washing line treatment plants
- ▷ replacement of the emergency collectors
- ▷ adjustment of drainage in water-proofed areas

Environmental protection investment costs in the Group (CZK mil./year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	124.4	458	601	398	319
Refineries	64	38	81	60	18
Paramo	0.4	33.5	15.4	2.7	0.8
Spolana	8.2	186.4	70.5	22.2	21
Benzina ORLEN	0.097	2	2.5	6.7	5.1
ORLEN Unipetrol Group	197	718	770	490	364



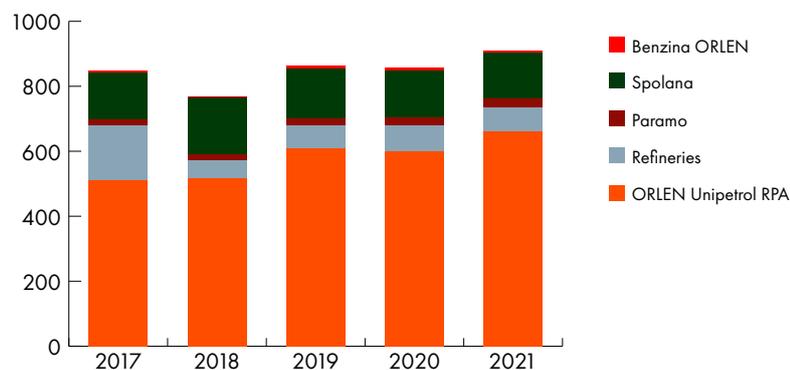
13. Environmental operating costs

Costs associated with the operation of facilities for air protection, wastewater treatment, waste management, operation of environmental management systems, monitoring of substances discharged into the environment, environmental impact assessment (EIA), integrated pollution prevention and control and other related environmental activities are referred to as environmental operating costs.

Newly installed modern technologies with a high degree of raw material conversion, reduced waste volume and high energy efficiency have resulted in an overall reduction in environmental operating costs compared to the previous decade. Environmental protection operating costs have been more or less stable over the last decade.

Environmental protection operating costs in the Group, 2017–2021 (CZK mil./year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	512	516	608	601	661
Refineries	168	55	70	77	73
Paramo	17.4	19.8	22.4	25.8	28.7
Spolana	145	172.2	154	144	139
Benzina ORLEN	4	4	8	8	7
ORLEN Unipetrol Group	846	767	862	855	909

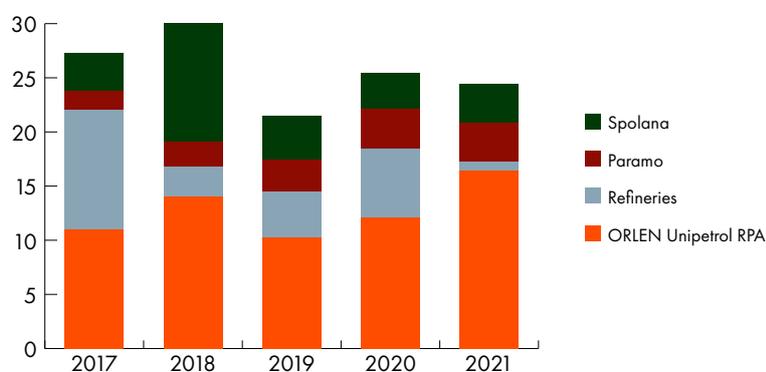


14. Total environmental protection costs

The total environmental protection costs at the ORLEN Unipetrol Group include environmental investment costs, environmental protection operating costs, environmental remediation costs and charges for air pollution, wastewater discharge, landfill disposal, generation of a landfill reclamation reserve and compensation for pollution damage to forests.

Environmental pollution fees and payments in the Group, 2017–2021 (CZK mil./year)

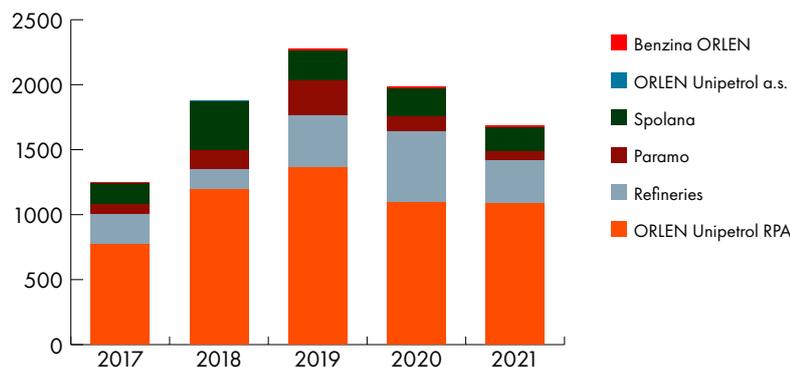
Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	11	14	10.3	12.1	16.4
Refineries	11	2.8	4.2	6.3	0.9
Paramo	1.8	2.3	2.9	3.7	3.6
Spolana	3.5	10.9	4.1	3.4	3.5
ORLEN Unipetrol Group	27	30	22	26	24



The total environmental protection costs incurred by the Group in 2021 amounted to approximately CZK 1.6 billion.

Total environmental protection costs in the Group (CZK mil./year)

Company	2017	2018	2019	2020	2021
ORLEN Unipetrol RPA	771	1 192	1 362	1 097	1 086
Refineries	233	158	400	541	336
Paramo	79	146.2	274.5	119.03	67.5
Spolana	158	369.5	229	211	178
Benzina ORLEN	9	9.9	11.6	16.2	16.7
ORLEN Unipetrol a.s.	1.3	1.3	1.3	1.6	1.6
ORLEN Unipetrol Group	1 251	1 871	2 251	1 986	1 686



15. Remediation of old environmental burdens

Based on a decision of the government of the Czech Republic in connection with the privatisation, the ORLEN Unipetrol Group companies have concluded the following agreements with the Ministry of Finance of the Czech Republic to address environmental liabilities that arose prior to privatisation (Environmental Agreement):

- 1) Environmental Agreement No 14/94, as amended by Amendment 4 of 6 May 2019, signed by Unipetrol
- 2) Environmental Agreement No 32/94, as amended by Amendment 2 of 6 May 2019, signed by Unipetrol
- 3) Environmental Agreement No 39/94, as amended by Amendment 4 of 28 January 2019, signed by Paramo
- 4) Environmental Agreement No 58/94, as amended by Amendment 5 of 28 January 2019, signed by Paramo
- 5) Environmental Agreement No 184/97, as amended by Amendment 9 of 18 June 2019, signed by the Benzina ORLEN registered branch
- 6) Environmental Agreement No 33/94 including Amendments 1-4, signed by Spolana

Remediation work, which is at various stages of progress, is performed under environmental agreements. **An updated overview is provided in the following table:**

Litvínov

Location	Current status	Further steps
Růžodol lagoons	Landscaping with subsequent land reclamation has begun	Landscaping with subsequent reclamation of the area, continued monitoring, updating of the monitoring project, a project for the elimination of the occurrence of free-phase oil products, a project for the destruction of shafts in the R14 lagoon
Plant complex	Remediation was completed and dispersion plumes 1, 2c, 3, 6, 10 were handed over to the acquirer, post-remediation monitoring was carried out in dispersion plume 4, remediation was evaluated on dispersion plume 9, remediation work not completed on dispersion plumes 2, 5, 7, 11 and in block 32	Extension of the bridging periods for KM2a and 11 by 1 year, design documentation for the selection of a remediation contractor for KM2a, 11 and 7b, selection of a contractor for KM2a, 11 and 7b, continuation of remediation or, where appropriate, post-remediation monitoring on other plumes
Uhlodehta landfill	Approval of the final report updated with a risk analysis	Design documentation for the selection of a remediation contractor
Landfill for solid industrial waste	A new CEI decision has been issued	Monitoring continues, landfill reclamation project
Lime sludge dump II	A new CEI decision has been issued	Monitoring continues, landfill remediation feasibility study
Lime sludge dump by the siding	A new CEI decision has been issued	Monitoring continues, landfill remediation feasibility study
South foreland of ash dumps	Partial reclamation, a new CEI decision has been issued	Monitoring continues, extension of the monitoring project, project for the operation of protective pumping and treatment of water from the Nová voda střed reservoir, including a flood test, a project for oil product sludge removal, a project for the removal of bottom sediments in the Nová voda sever reservoir, a project for covering unrehabilitated flue ash at Nová voda střed
Ash landfills	Partially reclaimed, a new CEI decision has been issued	Monitoring continues, a project for the removal of local surface sites with the presence of oil sludge, a project for landfill remediation, a project for drilling works (extension of the monitoring system), extension of the monitoring project
Dispersion plume 13	Protective remediation pump and treat process at the acquirer's expense (ORLEN Unipetrol a.s.)	Remediation feasibility study
Pump and treat in the Nová voda střed reservoir	Protective remediation pump and treat process	Protective remediation pump and treat process and for further steps see 'South foreland of ash dumps'
Pumping and treatment of Růžodol dispersion plume 12	Protective remediation pump and treat process	Protective remediation pump and treat process, feasibility study for an optimal water management solution in the area

Kralupy nad Vltavou

Location	Current status	Further steps
Plant complex	Risk analysis updated (RAU)	Additional research, remediation project documentation
Nelahozeves landfill	Pollution remediation	Pollution remediation, monitoring of groundwater and surface water, documentation updating, contractor selection, remediation completion
Plant complex – dispersion plume E	Finalization of the review of the remediation project documentation and preparation of the tender documentation for the selection of the remediation contractor	Pollution remediation
Oil sludge	Feasibility study – finalisation of verification and updating	Pollution remediation

Benzina ORLEN registered branch (distribution storage sites and the most important petrol stations)

Location	Current status	Further steps
PS Ostrava-Muglinov	Remediation implementation project	Pollution remediation
DS Točník	Pollution remediation, protective remediation pump and treat process	Post-remediation monitoring
DS Liberec-Rochlice	Additional pre-remediation research	Protective remediation pump and treat process Remediation implementation project
DS Šumperk	The implementation project for updating the risk analysis for the contractor selection is underway, protective remediation pump and treat process	Processing of the risk analysis update
DS Bartošovice	Pollution remediation	Post-remediation monitoring
PS Pardubice Chrudimská	Pollution remediation implementation project	Pollution remediation
PS Přelouč	Pollution remediation	Post-remediation monitoring
DS Nový Bohumín	Pollution remediation	Post-remediation monitoring

Paramo Pardubice

Location	Current status	Further steps
Časy	Remediation implementation according to the remediation completion project	Remediation continues according to the remediation completion project
Hlavečník	Protective pumping of rainwater	Protective pumping of rainwater
Surroundings of the main plant – LIDL	Contract completed in May 2018	-
Surroundings of the main plant – U Trojice	Pump and treat in wells and drains, and monitoring	Pump and treat and monitoring continues (managed by Paramo since 09/2021)
Main plants – phase 1 A	Contract completed in October 2020	-
Nová Ves	Post-remediation monitoring	Post-remediation monitoring

Paramo Kolín

Location	Current status	Further steps
Plant complex and sludge lagoons	Implementation project approved and remediation work started	Remediation implementation based on approved project documentation

Spolana

Location	Current status	Further steps
Remediation of a toxic waste landfill	Remediation completed	Remediation completed
Remediation of facilities contaminated with dioxins	Remediation completed	Site maintenance – in progress
Remediation of an amalgam electrolysis facility	Remediation completed	Post-remediation monitoring
Groundwater remediation, petrochemical	Targeted updating of risk analysis, new decision, contract with the remediation project contractor	Remediation project
Groundwater remediation, old plant	Feasibility study, targeted updating of risk analysis, new decision, contract with the remediation project contractor	Remediation project
Remediation of mercury contamination on the banks of the Elbe	Remediation completed	Remediation completed, replacement planting of trees and follow-up care
New contamination hotspots	Preparation of tender documentation for the selection of the Risk Analysis contractor	Risk analysis

Overview of financial guarantees of the Ministry of Finance of the Czech Republic and drawing of funds at the ORLEN Unipetrol Group as at 31 December 2021 (CZK mil. incl. VAT)

	ORLEN Unipetrol Litvínov	ORLEN Unipetrol Kralupy	Paramo Kolín	Paramo Pardubice	Benzina ORLEN registered branch	Spolana	Group total
Financial guarantees of the MF CR	6 012	4 244	1 907	1 241	1 323	8 159	22 886
Costs covered by the MF CR in 2021	28.1	1.2	1.4	36.6	87.4	17.6	172.3
Costs covered by the MF CR since start of work	4 393	65	1 902	993	786	5 660	13 799
Expected cost of future work	2 214	777	3	2 235	798	2 364	8 391
Total (estimated) cost per remediation	6 607	842	1 905	3 228	1 584	8 024	22 190

16. Chemical safety

All Group companies manufacture or use chemicals and mixtures in accordance with the applicable Chemical Act and Regulation (EC) No 1907/2006 (REACH). They classify their marketed chemical products in accordance with Regulation (EC) No 1272/2008 (CLP), and for those with hazardous properties they process safety data sheets, which are then provided free of charge to all customers. At ORLEN Unipetrol RPA, the safety data sheets of manufactured and purchased hazardous chemicals and mixtures are, in accordance with the REACH Regulation, available to all employees via the intranet – CASEC database (a system for the administration and accessibility of safety data sheets).

The Group companies continuously comply with the requirement of the REACH Regulation to keep the registration documentation up to date, and therefore they also have to make sure that their IUCLID software application, in which technical documentation for registered and notified substances is processed, complies with the latest version published on the ECHA website.

The Group constantly pays great attention to communication in the supply and demand chains in order to implement measures to protect employee health and the environment when hazardous chemicals are used directly or in mixtures. The Group monitors and incorporates any changes resulting from the clarification of processes associated with registering and classifying chemical substances and updates its safety data sheets accordingly.

All Group companies continuously monitor the handling of chemical substances and mixtures, from raw materials to finished products, and ensure compliance with applicable laws and regulations, including internal and external testing and the subsequent issuance of legal statements for the specific applications of selected products, for example when they are in contact with food, drinking water or used for medical purposes, etc. Customer services in the companies are in charge of providing detailed information about the characteristics of the products in relation to their specific use.

The Group companies are subject to international inspection by the UN focusing on compliance with commitments assumed under the Chemical Weapons Convention. All inspections carried out by government authorities and international inspection bodies in the Group companies to this day have shown compliance with the Convention commitments.

In June 2021, ORLEN Unipetrol RPA successfully completed the REACH registration process for the chemical dicyclopentadiene (DCPD). During 2021, the company also began analytical testing of the chemical methylcyclopentadiene (MeDCPD) and preparatory work to obtain registration of this substance under the REACH Regulation. These are new products that the company intends to add to its product portfolio.

In 2021, the registration documentation of all active substances in PARAMO a.s., including the one for which Paramo is the main registering entity on the EU market (Lubricating oils / EC 278-012-2), was fully updated. In 2020, the ECHA published an official request for additional testing of oxidised asphalts. All members of the joint submission will contribute financially to the testing. Furthermore, all business activities of the company were identified in detail in connection with possible complications caused by BREXIT and the transition to the 'UK REACH'. Paramo has been continuously monitoring the situation surrounding the restriction of "N-methyl 2-pyrrolidine" (Restriction as per Annex XVII, REACH), which is used as an extraction agent in the selective refining plant in the Pardubice Profit Centre.

In August 2014, Spolana submitted its first application for authorisation to use trichlorethylene in the production of caprolactam under Article 56 of Regulation (EC) No 1907/2006 REACH to the European Chemicals Agency (ECHA). The authorization was granted and was valid until 21 April 2020. In order to ensure the use of trichlorethylene after this date, an application for a review of the authorisation to use trichlorethylene (TCE) as an extraction solvent in the production of caprolactam was submitted to the European Chemicals Agency in accordance with REACH in August 2018. The first permit to use TCE was granted to Spolana (to April 2020), and in its review application Spolana requested an extension of the permit for another 12 years. In 2019, the ECHA made a recommendation to the European Commission to extend the Company's permit by the requested 12 years. On 4 March 2021, the European Commission issued an implementing decision authorising the use of trichlorethylene. The permit will expire on 21 April 2032 unless a review report is submitted in accordance with Article 61 (1) of the REACH Regulation by 21 October 2030.

To be able to purchase trichlorethylene from countries outside the EU, the trichlorethylene registration process in the range of 10–100 tonnes per year was completed in 2021. On 7 December 2021, the ECHA (European Chemicals Agency) issued a decision to assign a registration number.

17. Occupational health and safety, process safety and fire protection

The ORLEN Unipetrol Group considers occupational health and safety, process safety and fire protection as fundamental policy values.

In 2021, the Safety+ project was completed, implementing a standardised approach to the newly introduced processes in the area of personnel and process safety, fire protection and crisis planning in accordance with the requirements of PKN Orlen. Subsequently, the Detal + project was completed, which standardises safety rules in the Benzina ORLEN petrol station network in a similar way. In 2021, the Logistics + project was launched to harmonise the rules of occupational safety and fire protection within the logistics processes followed at all ORLEN Unipetrol production sites.

The Group continued to apply a unified system for monitoring selected performance indicators with the definition of target values for 2021. Monitoring selected performance indicators in the area of process safety (according to ANSI/API Recommended Practice 754 Performance indicators in the area of process safety for the refining and petrochemical industries) and TRR indicators in the area of accidents - Total Recordable rate - continued. In 2021, there were only 3 events in the entire Group classified as level 1 process safety (PSE Tier 1) events, with the frequency of these events in the Group reaching 0.20 (PSER Tier 1).

In terms of accidents, the TRR value achieved in 2021 was 0.66. There were 10 accidents at work resulting in incapacity for work in the entire ORLEN Unipetrol Group.

Overview of the number of level 1 process safety events in the ORLEN Unipetrol Group, 2018-2021

Company	2018	2019	2020	2021
ORLEN Unipetrol RPA	4	4	2	1
ORLEN Unipetrol Doprava	0	0	1	0
PARAMO	1	0	0	0
SPOLANA	1	3	1	2
Group total	6	7	4	3

The target values for the frequency of level 1 process safety events for 2021 were met by the ORLEN Unipetrol Group. The resulting values are shown in the table below.

As part of the process aimed at continuously improving safety, the gradual implementation of the LOTO system (Lock-out // Tag-out – an improved system for the safe preparation of equipment for repairs/maintenance) continued in all production units at ORLEN Unipetrol RPA. In 2021, a unified LOTO system was set up and applied to all planned production units within the scope of the Safety + project. The system is set up and ready for test and live use in the preparation of equipment for repairs. Given the experience with setting up and applying the LOTO system, the practical suggestions gained will be incorporated into the controlled documentation in the following period (Directive 416 "Basic requirements for the implementation of the lock-out tag-out system - LOTO").

At PARAMO a.s., the ČSN ISO 45001:2018-compliant system was recertified. In 2021, the implementation of the PKN ORLEN Safety + standards continued and the Logistics + project started.

"In 2021, Spolana, in cooperation with TTC telsys a.s., completed and implemented a project to create single-worker workplaces. In 2021, the standard HAZOP safety studies for the PVC, HAS, VCM and KL plants were completed. In 2022, the HAZOP study for TZO and oxychlorination has been completed and work on the HAZOP study focusing on the start-up and shutdown sequences for the plants listed above will continue. In 2021, the noise study for the SPOLANA complex was updated. A noise emissions reduction study based on the aforementioned noise study will also be carried out in 2022. In 2022, the fire and emergency prevention department split from the Safety Department and currently falls under the Company Fire Department. There were 9 accidents at work in 2021 (of which 5 LTI) and 12 emergencies (of which 2 PSE I) at SPOLANA.

Target safety indicators

ORLEN Unipetrol Group	Objective for 2021	Final value
TRR: Number of accidents resulting in absence per million hours worked	1.7	0.66
PSER – Tier 1: Number of process safety events per million hours worked	1.1	0.20

18. Prevention, personal protective equipment

Prevention as part of occupational safety is ensured by employees professionally qualified in risk assessment. These employees inspect individual workplaces. Personal protective equipment is distributed to employees based on risk identification and the evaluation of risk to life and health.

19. Quality of the work environment

Following job categorisation, the conditions of the work environment in the ORLEN Unipetrol Group companies are regularly checked by measuring work environment factors, especially employee exposure to noise, chemicals and dust.

20. Healthcare and prevention

The ORLEN Unipetrol Group companies have concluded occupational medical services contracts with physicians. Preventive medical examinations are performed in accordance with applicable laws and regulations and internal guidelines.

21. Major accident prevention

For years, the ORLEN Unipetrol Group companies have paid great attention to the prevention of major accidents. Accident prevention is based on the reliable and trouble-free operation of production equipment which is designed, operated, inspected and maintained in accordance with the legislation of the Czech Republic and the company's internal regulations. Some of the regulations also contain requirements beyond legislation and are based on the best practices of the Group companies.

Production sites are equipped with control systems signalling deviations from standard operating parameters. Some dangerous plants are equipped with systems that automatically shut down operating units in the event that the specified operating parameters are exceeded. Depending on the type of hazardous substances handled, the plants are equipped with modern detection systems (detection of flame, smoke or leaks of hazardous substances) with outputs to control rooms and operational centres of the relevant company's fire brigade. Stationary and semi-stationary fire extinguishers and fire monitors are installed at the production plants.

Regular internal audits focused on safety and accident risk prevention are carried out at the ORLEN Unipetrol Group companies. In addition, regular external audits and inspections are carried out by state expert supervision authorities. This includes, for example, the CEI, RLI, FD, RHS, Czech professional organisations, insurance brokers, insurers and foreign reinsurers. Recommendations and conclusions from these audits are included in the relevant implementation plans.

Regular employee training and education are important components of major accident prevention. The functionality of the major accident prevention system is checked throughout the year using emergency and crisis response exercises for on-site employees as well as in cooperation with internal and external intervention units, in the form of emergency drills at the individual production plants, as well as on-site emergency drills carried out in cooperation with companies managing industrial premises or doing business in their immediate vicinity. In the ORLEN Unipetrol Group companies, emergency drills are carried out according to plans. The drills are used for practical training of appropriate employee response to a possible accidents to verify the valid emergency plans and procedures, and to improve the knowledge of everyone involved. If shortcomings are revealed during a drill, appropriate measures are taken during the evaluation of the drill to ensure such shortcomings are eliminated, including setting deadlines and nominating persons responsible for their implementation.

The management of major accident risks also includes liability insurance within the meaning of Act No 224/2015, on major accident prevention, as amended.

The safety level of the Group companies is significantly affected by new investments in production facilities. The potential risks of operating such facilities are already addressed in the project phase using generally accepted methods of assessing the risks of a major accident. New plants are always equipped with state-of-the-art safety systems and meet the requirements of the laws and regulations of the Czech Republic and the European Union.

The ORLEN Unipetrol Group production companies have their own fire brigades. Their equipment and training are top-notch, and this allows them to intervene in a highly specialised manner in the event of accidents involving the release of hazardous substances. The Kralupy Refinery unit uses the services of the Fire Brigade of SYNTHOS Kralupy, a. s.

Most ORLEN Unipetrol Group production companies are, due to being classified as Group B, subject to the strictest interpretation of Act No 224/2015, on prevention of major accidents when handling selected hazardous chemical substances / mixtures.

Overview of the classification of businesses under Act No 224/2015, as amended.

Company	Facility	Group	Safety report
ORLEN Unipetrol RPA	Litvínov facility	B	Approved by a decision of the Regional Authority of the Ústí nad Labem Region
	Kralupy facility	B	The updated Safety Report for Unipetrol RPA (Kralupy Refinery Unit) at the Kralupy Chemical Production Site was approved by a decision of the Regional Authority of the Central Bohemian Region on 15 February 2021
	Benzina ORLEN, registered branch	-	In accordance with Act No 224/2015, reports on non-inclusion of petrol stations were updated according to the law and submitted to the relevant regional authorities
ORLEN Unipetrol Doprava	Operations, Pardubice Plant, Semtín, Pardubice Railway Operations	B	Approved by a decision of the Regional Authority of the Ústí nad Labem Region
	Operations, Pardubice Plant, Semtín, Semtín siding	B	Approved by a decision of the Regional Authority of the Ústí nad Labem Region
	Operations, Pardubice Plant, Semtín, Kolín siding	-	In accordance with Act No 224/2015, a report on non-inclusion was submitted to the Regional Authority of the Central Bohemian Region
	Operations, Litvínov siding plant	B	Approved by a decision of the Regional Authority of the Ústí nad Labem Region
	Operations, Kralupy Plant, Neratovice, Kralupy Railway Operations	B	Approved by a decision of the Regional Authority of the Central Bohemian Region
	Operations, Kralupy Plant, Neratovice, Neratovice Railway Operations	B	Approved by a decision of the Regional Authority of the Central Bohemian Region
Paramo	Pardubice Profit Centre	B	The updated Safety Report was approved by the Regional Authority of the Pardubice Region on 8 September 2020
	Kolín Profit Centre	-	Not subject to Act No 224/2015
Spolana	Spolana	B	Update approved by a decision of the Regional Authority of the Central Bohemian Region

22. Major accidents

In 2021, no major accident occurred in any facility of the ORLEN Unipetrol Group subject to Act No 224/2015, on major accident prevention.

Other operational accidents that occurred during the year were handled using our own resources, or using the companies' fire brigades. The response was adequate to remedy the issue and prevent recurrence. The effects of minor accidents did not extend beyond the territory of the Group companies.

23. TRINS transport information and accident system

The TRINS transport information and accident system is a system of assistance in case of accidents associated with the transport of hazardous substances. TRINS was established by the Association of the Chemical Industry of the Czech Republic as part of the Responsible Care programme in 1996 based on an agreement between the Association and the General Directorate of the Fire and Rescue Service of the Czech Republic, and included in the Integrated Rescue System of the Czech Republic as a support system. Foreign equivalents of TRINS include, for example, the British CHEMSAFE system and the German TUIS system, which served as a model for the development of TRINS. Similar systems have also been created in Slovakia (DINS), Hungary (VERIK), and have been operating in a number of EU countries for many years.

TRINS centres, in cooperation with the Fire and Rescue Service of the Czech Republic, provide the necessary urgent work-related consultations concerning data on chemical substances and products, their safe transport and storage, practical experience with handling dangerous substances and response to extraordinary events associated with their transport. TRINS centres also provide practical assistance in handling such emergencies and eliminating subsequent environmental damage.

There are currently 21 companies included in the TRINS system in the Czech Republic, while there are a total of 36 centres providing assistance at the individual levels within the TRINS system throughout the Czech Republic. The ORLEN Unipetrol Group companies are founding members of TRINS. In addition, ORLEN Unipetrol RPA serves as the system's national coordination centre.

The names of the ORLEN Unipetrol Group companies (ORLEN Unipetrol a.s., ORLEN Unipetrol RPA s.r.o., ORLEN Unipetrol RPA s.r.o. – BENZINA, odštěpný závod, ORLEN Unipetrol RPA s.r.o. – POLYMER INSTITUTE BRNO, odštěpný závod, ORLEN Unipetrol DOPRAVA s.r.o., PARAMO, a.s., SPOLANA, s.r.o.) are also included in their simplified versions (ORLEN Unipetrol, ORLEN Unipetrol RPA, Benzina ORLEN / Benzina ORLEN registered branch, Polymer Institute Brno / PIB, ORLEN Unipetrol Doprava, Paramo, Spolana) in this report.