

## Environmental protection

The strategic objectives of DTEK Group include the introduction of modern technologies and best practices which minimize the impact of its production on the environment and optimize the use of hazardous substances and materials. The principles of the UN Global Compact, which DTEK Group follows in the field of environmental protection, reflect the "E", Environmental, in the ESG criteria.

**6 CLEAN WATER AND SANITATION**  
  
**7 AFFORDABLE AND CLEAN ENERGY**  
  
**12 RESPONSIBLE CONSUMPTION AND PRODUCTION**  


Ensure availability and sustainable management of water and sanitation for all

Ensure access to affordable, reliable, sustainable and modern energy for all

Ensure sustainable consumption and production patterns

**13 CLIMATE ACTION**  
  
**15 LIFE ON LAND**  


Take urgent action to combat climate change and its impacts

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

All enterprises and their employees are required to adhere to DTEK Group's Environmental Policy.

The document defines the following long-term goals in relation to environmental protection:

- protecting the environment, including pollution prevention, responsible use of resources, reducing the impact of climate change, protecting biological diversity and ecosystems;
- developing renewable energy and modernization of thermal generation;
- ensuring the environmental safety of enterprises;
- continuous improvement of environmental management system to improve environmental performance.


To achieve these goals:

- ensures the environmental management system's operation, analysis and continuous improvement;
- compulsory legislative and other requirements adopted by DTEK Group are complied with;

- implementation of preventive measures are being incorporated as part of the modernization of technological processes at all stages of the production chain;
- annual and strategic environmental programs are implemented to sufficient level to achieve efficient and effective management of significant environmental aspects and risks;
- monitoring, measurement, analysis and assessment of environmental indicators are carried out;
- environmental safety is ensured by improving production and management processes;
- interaction with the public and stakeholders in relation to environmental activities;
- participation in external initiatives on environmental protection, including development and improvement of the environmental legislation of Ukraine;
- employees are trained in environmental protection;
- programs are initiated to motivate employees to improve environmental performance.

## Environmentally-related expenditure of the DTEK Group, UAH mln

	Capital investments			Operating expenses			Additional expenses			Total business segment		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
DTEK Energy: coal production and processing	38.8	26.3	30.9	127.9	97.1	150.2	63.8	34.4	47.6	230.6	157.8	228.7
DTEK Energy: electricity generation	72.9	292.7	213.6	542.3	633.8	859.5	8.1	10.4	12.6	623.3	936.9	1,085.7
DTEK Renewables	—	—	—	0.1	0.2	0.7	—	—	—	0.1	0.2	0.7
DTEK Oil & Gas	—	29.3	55.2	1.3	0.8	2.2	—	0.5	0.03	1.3	30.6	57.4
DTEK Grids	0.2	0.05	0.3	1.0	0.5	2.1	1.9	0.8	2.4	3.1	1.3	4.8

**12 RESPONSIBLE CONSUMPTION AND PRODUCTION**  


the impact of activities which pose a heightened environmental risk, has been established. Responsibility has also been established for non-compliance with the provisions with the possibility of suspending the activities of the enterprise.

## Implementation of environmental protection standards

### Environmental protection legislation

Within the framework of the Association Agreement between Ukraine and the EU, regulatory legislation of the European Union was implemented, and these essential documents adopted:

- Energy Strategy of Ukraine for the period until 2035. A high level of environmental responsibility, compliance with high environmental standards of production, transportation, transformation and energy consumption is required from the state and energy companies.
- The National Emission Reduction Plan for Large Combustion Plants. The document provides that emissions of dust and sulfur oxides to the atmosphere should be reduced by 40 and 20 times respectively by 2028, while emissions of nitrogen oxides should drop four-fold by 2033 in accordance with the requirements of Directive 2010/75/EC.
- The National Waste Management Strategy for the period to 2030. As a part of implementation of the strategy, national and regional waste management plans will be developed.
- Law of Ukraine "On Environmental Impact Assessment". A new mechanism for assessing

- Law of Ukraine "On Amendments to the Budget Code of Ukraine". Changes have been made to the allocation of eco-tax funds between the central and regional budgets. The state budget revenues will include 45% of the eco-tax. The exception is the eco-tax levied on stationary sources of pollution for carbon dioxide emissions into the atmosphere, which, from 2019, will be included in the general fund of the state budget.
- The Law of Ukraine "On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine on Improving Administration and Revising the Rates of Certain Taxes and Fees". Changes have been made for determining who pay environmental tax for CO<sub>2</sub> emissions, and the environmental tax rate for such emissions has been increased from 0.41 to 10 UAH per tonnes.
- Order of the State Statistics Service of Ukraine "On Approval of the State Statistical Observation Form No.2 (air)". The improved form of the "Report on Emissions of Pollutants and Greenhouse Gases into the Air from Stationary Emission Sources" has been approved.
- Order of the Ministry of Ecology and Natural Resources of Ukraine "Technological standards for permissible emissions of pollutants from thermal power plants, the nominal thermal capacity of which exceeds 50 MW" (updated). For existing plants that are included in the National Emission Reduction Plan for large combustion plants, the deadlines for achieving the indicators for permissible pollutant emissions have been amended.

## DTEK Group's approach to Environmental Impact Assessment

Preventing and minimizing the negative environmental impacts of DTEK Group operations is one of the main priorities of the organization's environmental activities. The structure of responsibility for the environmental management system is defined, the main elements of which are as follows:

- implementation, operation and improvement of the environmental management system in accordance with ISO 14001;
- auditing the environmental management system;
- identification and assessment of environmental risks and opportunities, development of measures to manage them;
- development and implementation of environmental programs (annual and prospective) in the field of atmospheric air protection, rational use of water resources, regulation of waste quality and groundwater in the areas hosting production facilities, waste management and land reclamation;
- conducting annual environmental trainings for all employees of enterprises;
- work with contractors and suppliers.

In response to updates in the requirements of standard ISO 14001:2015, DTEK Group's industrial enterprises have developed internal regulatory documents for introducing changes, and started compliance audits. To date, auditing companies have confirmed the compliance of the environmental management systems at DTEK Skhidenergo, DTEK Dniproenergo, DTEK Westenergy, Wind Power, Naftogazvydobuvannya, DTEK Dnipro Grids, DTEK Donetsk Grids, DTEK Power Grid. The scope of certification included 100% of employees working at these enterprises. In 2019, there are plans to conduct a certification audit for compliance with ISO 14001:2015 by DTEK Kyiv Grids.

In addition, DTEK Group supports adherence to the international environmental standard among its counterparties. For example, according to the Technical Policy of Enterprises for Electricity Generation, equipment

suppliers must comply with the requirements of ISO 14001, while technical specifications for the purchase of materials are formed in line with environmental protection requirements.

DTEK Group enterprises monitor their environmental impact in accordance with the requirements of current legislation. For this, a control system has been built that covers the entire production cycle: emissions and discharges pass laboratory tests, waste accumulation sites are assessed for their impact on soil and air, atmospheric air and groundwater at the border of enterprises' environmental protection zones are taken for quality control, and environmental facilities and cleaning equipment are checked for compliance with technical conditions. Environmental monitoring data demonstrates the impact production has on environment and ensures enterprises can identify actions which improve the situation and prevent adverse developments, in a timely manner.

For example, electricity generation enterprises of DTEK Energy have implemented the "Automated System of Environmental Indicators" project. There are five automated functional units in this project: control over the state of flue gas monitoring systems, control over the state of ash and slag pipelines and ash dumps, informing about environmental emergencies, managing inspections of compliance with environmental legislation requirements, calculation of the eco-tax.

The locally monitored observation network at Naftogazvydobuvannya became a basis for a similar style of monitoring the quality of soils and groundwater at the Semyrenkivs'ke and Machukhs'ke fields. A constant collection of relevant data ensures can identify and prevent negative environmental impacts. The company takes water and soil samples at the local operational sites of, carries out measurements on static water, pumps observation wells and takes gas from near-surface sediment on a quarterly basis.

In addition, DTEK works with the village of Kovalivka, where the main production activities of the enterprise are concentrated, to carry out tests of water and soil at sites identified by the residents. To date, the research results demonstrate the absence of a detrimental impact environmental impact from Naftogazvydobuvannya.

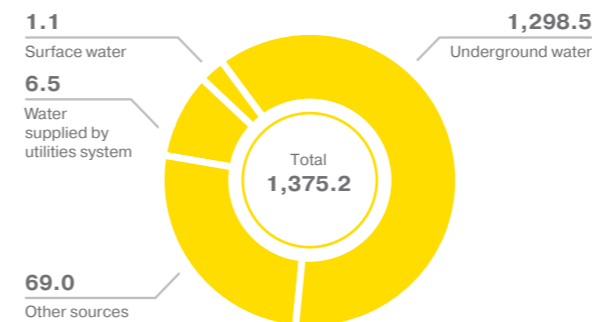


## Water resource

### Water consumption

DTEK Group focuses its water resource management efforts around economic and efficient use at all its production facilities. To ensure optimum water consumption, DTEK enterprises use both circulating water supply systems and reuse of water.

### Water withdrawal by DTEK Group's enterprises in 2018, mln cubic meters



The largest volumes of water are used by the electricity generation enterprises of DTEK Energy. Most of the company's power plants reuse industrial water in the production cycle, working with a circulating cooling system in their main and auxiliary equipment. The exceptions are DTEK Zaporiz'ka TPP and DTEK Prydniprovs'ka TPP, which operate on a once-through water supply system.

A circulating water supply system is used if, for technical or economic reasons, it is not possible to use a once-through water supply system. Such a system includes cooling reservoirs, which are created on the basis of a small river. A once-through water supply system is designed when the needs of thermal power plants do not exceed the minimum flow of water in the river. Water passes through the station's equipment once turbines are cooled and then returns to the river. Thus, almost the entire volume of industrial wastewater is heat-exchanging water and is classified as clean.

In 2018, the company's power plants implemented the following activities aimed at more rational use of water resources and water treatment:

- DTEK Prydniprovs'ka TPP retro-fitted an automated system for monitoring and recording water supply and sanitation, by installing 32 instrument sets for measuring water flow at supply, distribution and drain nodes;

- DTEK Burshtyns'ka TPP reconstructed a drinking water pipeline, which ensured drinking water savings of 10 ths cubic meters per month;
- DTEK Dobrotvirs'ka TPP completed the first start-up complex of its project to reconstruct the water deferrification station. Now, treated wastewater is subject to iron removal of drinking water from wells, and then is reused to clean the filters. The project makes it possible to reduce discharges to local bodies of water by 95%.

Rational use of water by mining and concentrating enterprises of DTEK Energy is ensured by the reuse of mine water for production needs and circulating water supply systems. For example, CCM Pavlohrads'ka and DTEK Dobropil's'ka CEP installed filter presses, which create two products: clean water and small fractional waste with humidity of 40%. This eliminates the need for an external slurry pond. Water is returned to the enrichment process, the plants have created a complete closed cycle of the water-slurry scheme, and waste is taken to a waste dump or used for land reclamation works.

For drinking and other needs, Naftogazvydobuvannya uses water contained in four wells. All wells are subject to permits which limit the daily and annual water consumption. Wells are equipped with verified meters, and water consumption logs are kept. Limits have not been exceeded, to date.

## Wastewater discharges

DTEK Energy's enterprises continuously monitor the quality of wastewater, implement projects to modernize treatment facilities and reuse wastewater in technological cycles.

## Mass of pollutants in wastewater of DTEK Group's enterprises in 2018, tonnes

Pollutants	Mass, tonnes
Iron mass (total)	3.4
Mass of petroleum products	6.1
Mass of ammonium nitrogen	8.8
Mass of nitrates	64.9
Mass of BOD (full)	202.3
Mass of suspended substances	762.0
Mass of sulphates	22,990.0
Mass of chlorides	38,262.0
Mass of dry residue	109,976.0



In order to reduce the negative impact of wastewater on surface and groundwater, DTEK Energy TPPs monitor the quality of discharged wastewater and the status of groundwater. Furthermore, all stations monitor the quality of wastewater and groundwater in areas where dumps are located in accordance with the approved schedules and carry out measures to clean up the reservoir-coolers from bottom sediments.

**The main activities aimed at prevention and minimization of wastewater discharges implemented by DTEK Energy TPPs in 2018:**

- DTEK Prydniprov's'ka TPP implemented the "Technical re-equipment by installing an automated system for monitoring and metering water consumption at discharge channels No. 1 and 2 of DTEK Prydniprov's'ka TPP" project, during which measuring instruments were installed to assess heat exchange water indicators (volume and flow rate, water

temperature), as well as the reconstruction of the industrial drainage system;

- DTEK Luhans'ka TPP is implementing a project for the construction of industrial drainage systems;
- DTEK Burshtyn's'ka TPP developed designs for the construction of wastewater treatment plants for domestic wastewater.

To maintain the water reservoir levels required to ensure the reliability and safety of their operations, DTEK Dobrotvirs'ka TPP and DTEK Burshtyn's'ka TPP installed new segmented gates on spillway dams in 2017–2018; DTEK Kurakhov's'ka TPP organized the construction of an additional gateway regulator for its open discharge channel; DTEK Luhans'ka TPP developed a project and started the reconstruction of shandors on discharges of heat exchange waters.

**Facilities of water intake for production and drinking water supply and discharge of industrial wastewater**

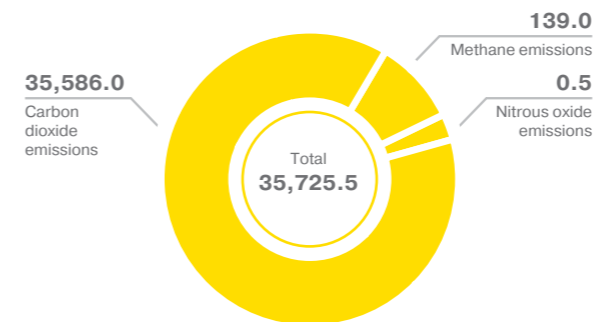
Enterprises	Facilities for water intake for industrial and drinking water supply	Facilities for industrial wastewater discharge
<b>DTEK Energy: TPPs and CHPP</b>		
DTEK Kurakhov's'ka TPP	Siverskyi Donets — Donbas Channel and Kurakhove reservoir on Vovcha River	Cooling reservoir on Vovcha River
DTEK Luhans'ka TPP	Siverskyi Donets River	Siverskyi Donets River
DTEK Prydniprov's'ka TPP	Dnipro River	Dnipro River
DTEK Kryvoriz'ka TPP	Dnipro — Kryvyi Rih Channel and cooling reservoir	Inhulets River
DTEK Zaporiz'ka TPP	Kakhovka reservoir on Dnipro River	Kakhovka reservoir on Dnipro River
DTEK Burshtyn's'ka TPP	Cooling reservoir on Hnyla Lypa River	Cooling reservoir on Hnyla Lypa River
DTEK Dobrotvirs'ka TPP	Cooling reservoir on Zakhidnyi Buh River	Cooling reservoir on Zakhidnyi Buh River
DTEK Ladyzhyn's'ka TPP	Cooling reservoir on Pivdennyi Buh River	Cooling reservoir on Pivdennyi Buh River
DTEK Myronivka CHPP	Cooling reservoir on Luhan River	Cooling reservoir on Luhan River
<b>DTEK Energy: mines (including dust suppression) and processing plants</b>		
DTEK Pavlohradcoal	Underground water PROWSST, Dnipro — Western Donbas SE, mine waters	Samara River
DTEK Dobropolyeugol	Underground water and mine waters, surface waters of the Pokrovskiy and the Dobropil'skiy Production Department of Water and Sewer Utilities of Public Utility Company "Voda Donbasu", artesian wells of the Pioner mine	Byk River, Gnylusha River, Vodyana River
DTEK Dobropil's'ka CEP	Surface waters of Dobropillia Production Department of Water and Sewer Utilities	None, a recirculation system is used
CCM Kurahiv's'ka	Surface waters of Selydove Production Department of Water and Sewer Utilities	None, a recirculation system is used
CCM Pavlohrads'ka	Surface waters of Pavlohrad Production Department of Water and Sewer Utilities	None, a recirculation system is used
<b>DTEK Oil &amp; Gas</b>		
Naftogazvydobuvannya	Underground water	Special tanks and cesspools with further disposal



**Air emissions, climate change and greenhouse gases**

To minimize its negative impacts on the environment, DTEK Group makes considerable efforts across all stages of the production process. Systematic capacity modernization is carried out to preserve the ecological balance, ensure reliability of production and guarantee compliance with European environmental standards.

**Greenhouse gas emissions by DTEK Group enterprises in 2018, tns tonnes**



Since 2012, DTEK Energy has been reconstructing electrical filters when upgrading and reconstructing power units to achieve dust emission levels in line with Directive 2001/80/EC — the residual dust content of exhaust gases is not more than 50 mg/Nm<sup>3</sup>. Gas cleaning plants at modernized power units are equipped with flue gas monitoring systems for the continuous monitoring of atmospheric emissions. Additionally, all power plants have video surveillance systems installed, which allows operators of boiler units to obtain additional operational information about the combustion modes in those boilers.

Permits for emissions were received at all power plants of the company in accordance with accepted changes to environmental legislation.

In 2018, DTEK Prydniprov's'ka TPP started using an automatic monitoring station for atmospheric air at the border of its sanitary protection zone. Digital sensors monitor the concentration of dust, carbon monoxide, sulfur dioxide and nitrogen in the atmospheric air. The installation of the station allows residents to have greater control of the quality of atmospheric air — all data is transmitted to the site <https://ecoinfo.pro>, which aggregates indicators from other monitoring posts installed in the Dnipropetrovsk region.

**Reducing the concentration of dust emissions to European standards due to the construction and modernization of electrical filters**

Power units of TPPs (equipment)	Decreased dust concentration, number of times
No.6 DTEK Kurakhov's'ka TPP (electrical filters)	50.6
No.8 DTEK Kurakhov's'ka TPP (electrical filters)	48.9
No.9 DTEK Kurakhov's'ka TPP (electrical filters)	40.0
No.10 DTEK Luhans'ka TPP (wet dust collectors)	3.3
No.13 DTEK Luhans'ka TPP (electrical filters)	46.2
No.1 DTEK Zaporiz'ka TPP (electrical filters)	6.4
No.3 DTEK Zaporiz'ka TPP (electrical filters)	6.8
No.9 DTEK Prydniprov's'ka TPP (electrical filters)	17.0
No.10 DTEK Prydniprov's'ka TPP (electrical filters)	18.8*
No.11 DTEK Prydniprov's'ka TPP (electrical filters)	24.6
No.1 DTEK Kryvoriz'ka TPP (electrical filters)	26.0
No.5 DTEK Burshtyn's'ka TPP (electrical filters)	24.3
No.7 DTEK Burshtyn's'ka TPP (electrical filters)	21.7
No.10 DTEK Burshtyn's'ka TPP (electrical filters)	8.0
No.12 DTEK Burshtyn's'ka TPP (electrical filters)	2.7
No.8 DTEK Dobrotvirs'ka TPP (wet dust collectors)	5.8
No.12 DTEK Dobrotvirs'ka TPP (wet dust collectors)	22.0
No.1 DTEK Ladyzhyn's'ka TPP (electrical filters)**	3.0

\* Works completed in the first quarter of 2019. The power unit is in commissioning mode until August 31, 2019, in connection with which design indicators are specified.

\*\* In 2018, the first stage of the project for the technical re-equipment of dust-cleaning equipment was implemented. In 2019, it is planned to implement the second stage of the project.

In 2009-2011 was reconstructed electrical filters and significantly reduced dust emissions at power unit No.3, No.5, No.7 DTEK Kurakhov's'ka TPP.

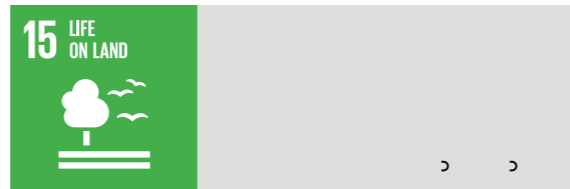


A significant project in 2018 was a collaboration with the World Bank that formed part of the Partnership for Market Readiness project. This project was implemented in compliance with the requirements of Directive 2003/87/EC on the establishment of a greenhouse gas emission trading scheme in order to prepare for DTEK Energy TPPs' participation in the national greenhouse gas emission trading system. With technical support from the bank, DTEK Zaporiz'ka TPP successfully implemented a pilot project on monitoring, reporting and verification of greenhouse gas emissions. Representatives of the World Bank trained employees from the environmental departments at all power plants of the company to develop plans for monitoring greenhouse gas emissions.

The development of the renewable energy sector, which is led by DTEK Renewables, will help reduce greenhouse gas emissions. The company is actively building green power plants, and the portfolio of implemented projects should reach 1,000 MW in 2020. This means that the annual production will amount to 2,500 mln kWh of green electricity — the equivalent of Ukraine's total consumption for seven days. This also means that CO<sub>2</sub> emissions will decrease by 2,650 ths tonnes per year.

In addition, since 2016, DTEK Renewables has been promoting an Industrial Tourism program to build greater awareness of green energy. Every Friday for anyone who would like to join, Botievo Wind Power Station conducts free tours, which include an inspection of the station's control center, visits to the wind installations and the site near the wind tower. Every year such tours are becoming more and more popular — in 2018, Ukraine's largest wind power plant received 1,500 visitors, and almost a third of them were schoolchildren.

Twice a year, in the sphere of natural gas production, compliance with the standards for maximum permissible emissions at the border of the sanitary protection zone is monitored, and once a year — the monitoring of pollutant emissions broken down into sources and substances is carried out according to the permissions set out in "Measures to monitor compliance with the approved standards for allowable emissions". Naftogazvydobuvannya received permits for emissions of pollutants into atmospheric air from stationary sources that cover all gas treatment facilities and wells in operation. Emissions do not exceed the permissible limits and are in the limit of requirements.



## Conservation and restoration of biodiversity

Considering the ornithological safety of electrical equipment remains a new issue for the Ukrainian energy sector. Previously, power engineers were only concerned about protecting power lines from potential damage and emergencies, but now special attention is paid to cooperation with ecologists and ornithologists.

According to research, birds are making increasing use of power line pylons, used by them instead of trees in the open areas. White storks, stock doves, and saker falcons all have been nesting on these structures. Ornithologists estimate that more than 50% of the population of white storks nest on power lines, because they make a convenient place for the birds to rest and look for prey.

DTEK Group's enterprises responsible for distribution of electricity were among the first to introduce programs for ornithological safety on power lines back in 2013 when bird-protecting devices were installed. The benefits of the program are twofold: birds receive greater protection and consumer receive more reliable power supply.

In addition, in the protected areas, distribution system operators are implementing special projects for the conservation of rare bird species. For example, since 2015, together with the Dnipro-Orel Nature Reserve, together with the Dnipro-Orel Nature Reserve, DTEK has monitored the impact of power lines on the aerial wildlife in the Dnipropetrovs'k region. This monitoring is primarily aimed at protecting the white stork. Monitoring allows to select areas for the installation of bird protection devices. 179.8 km of power lines have been already surveyed. In the territory of the ornithological reserve "Bulakhivs'ky Lyman", 2 km of power lines are equipped with special markers. Markers with light-reflecting elements that are visible at a distance of up to 15 meters, thanks to which birds can safely fly over wires at dusk or in bad weather. Also, in the Orels'ky national natural park, covers have been installed (a cap of insulating material that covers the insulator and wire sections on the sides).

Each year, experts at DTEK Grids monitor the appearance of new stork nests on power lines during inspections in order to equip them appropriately future. In 2018, DTEK Dnipro Grids and DTEK Donetsk Grids transferred 16 nests of white stork to special artificial platforms, and 111 nests were transferred over the last five years. In addition, two artificial nests and three protective visors for the stock dove (*Columba oenas*), a species listed in the Red Book of Ukraine, are installed on the power transmission towers.

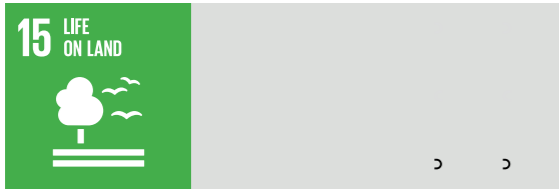
DTEK Dnipro Grids attract children and young people to the protection of white stork, conducting an annual regional competition "Leleka" since 2015. In 2018, 11 winners of the competition were awarded with valuable gifts. The company focuses on motivating employees to engage with environmental activities. Employees across three structural divisions of the company were awarded with the "The Best in Taking Care of Nature" Cup alongside monetary prizes.

DTEK Renewables also continuously monitors bird and bat populations, conducting annual research on the environmental impact of wind turbines. The monitoring covers the sites of all wind farms of the company: Botievo, Orlivs'ka, Prymors'k and Prymors'k-2. Since 2018, ornithological monitoring has been carried out in accordance with the recommendations of the Scottish Natural Heritage, the Equator Principles and the standards of international financial companies.

DTEK Energy's electricity generation enterprises, which use significant volumes of water in their production cycles, carried out an assessment of bio-reclamation works and the possibility of fish farming, as well as expert analysis of the state of cooling reservoirs. Pilot projects on bio-reclamation and fish farming are being implemented at DTEK Ladyzhyns'ka TPP and DTEK Kryvoriz'ka TPP, and a fish protection device has been installed at DTEK Kurakhovs'ka TPP to protect fish, particularly juvenile fish from entering the intake facilities of the TPP.







## Waste management and land reclamation of lands

99.9% of the waste generated during the production activities of DTEK Energy's enterprises is non-hazardous, but it still needs to be distributed across available land. In this regard, one of the key tasks in the field of environmental protection is increasing the use of ash and slag materials (ASM), which are formed during the combustion of coal for electricity generation.

ASM can be used in the construction industry in the production of cement and concrete, which will also help reduce the use of natural raw materials and greenhouse gas emissions. In Ukraine, an average 5-10% of ash and slag materials are transferred to construction organizations, while in European countries that figure is 95%.

Programs for increasing the use of fly ash, slag and ASM have been developed and are being implemented at all TPPs of DTEK Energy. In 2018, the first stage of the project "Technical re-equipment of the electrical filter of the power unit No.1 DTEK Ladyzhyns'ka TPP" was implemented, aimed at increasing the collection of dry ash to 50 ths tonnes per year. Also, power units No.7 and No.12 of DTEK Burshtyns'ka TPP re-equipped systems for pneumatic ash removal, which will increase the amount of ash utilization up to 70 ths tonnes per year. In addition, DTEK Zaporiz'ka TPP developed technical documentation for the construction of a pneumatic ash removal system on the electrical filters of power units No.2 and No.3.

To halt the allocation of new lands for the disposal of ash and slag waste, thermal generation enterprises are increasing dams of ash dumps using this material. In particular, DTEK Kurakhovs'ka TPP, DTEK Dobrotvirs'ka TPP, DTEK Ladyzhyns'ka TPP, DTEK Zaporiz'ka TPP and DTEK Prydniprovs'ka TPP performed such works in 2018. At the same time, stations are being replaced at ash and slag lines to stop ash and slag waste mixing into the environment. In 2018, 5.7 km were replaced.

In 2018, the amount of ash and slag used was 949.5 ths tonnes. In total, DTEK Energy TPPs used 516.3 ths tonnes for their own needs and 433.2 ths tonnes were sent to external customers. This is 21.8% of the total ash and slag formation.

Road construction is another promising area for the re-use of ash and slag. An expert opinion was developed concerning the use of ash and slag by DTEK Ladyzhyns'ka TPP, DTEK Burshtyns'ka TPP, DTEK Dobrotvirs'ka TPP, DTEK Kryvoriz'ka TPP, DTEK Kurakhovs'ka TPP and DTEK Prydniprovs'ka TPP, which in 2017 was approved by Shulgin State Road Research Institute. This made it possible to introduce the use of ash and slag materials in the design and estimate documentation for construction, reconstruction, overhaul of state and local roads.

In 2018, cooperation with the research institute continued — rock studies were carried out for DTEK Pavlohradcoal mines, and recommendations were given on the design and construction of road embankments using rocks. This will allow the company to conduct further work to better utilize waste.

DTEK Pavlohradcoal annually reclaims land disturbed by mining operations. Reclamation is carried out by dumping rock sections with a sunken surface. Then, a fertile layer is applied to the plot of land and biological reclamation is carried out: organic and mineral fertilizers are applied, land reclamation and sowing of various agricultural crops are carried out in order to restore fertility of the soil. In 2018, the technical stage of reclamation was completed on an area of 10.9 hectares with a conditionally fertile layer.

In addition, the company takes part in forest planting initiatives every year, replacing forests damaged during mining operations. In 2018, the Pavlohrads'ka, Ternivs'ka, Blahodatna and Samars'ka mines carried out forest planting across an area of 13 hectares.

Coal processing enterprises have switched to using an innovative "green dump" technology in the construction of waste dumps. Clay banking is built for each tier of the dump as well as an internal drainage system and a fire-prevention protective layer. This approach reduces the environmental impact by eliminating the formation of combustible sources and stopping waste coal leaking into the wider environment, while waste water can be discharged into the pond and reused in production. In 2018, DTEK Oktyabrs'ka CEP completed construction and installation work on the third phase of construction of a "green dump", ensuring the authorized and environmentally-friendly disposal of coal waste.

In the field of natural gas production, DTEK is applying modern technologies for utilization of waste products arising from the drilling of wells, which minimize the environmental impact. Previously, drilling waste — primarily cuttings and waste water — was collected in special waterproofing slurry barns, and after the work was completed, they were neutralized, cleaned and buried in places determined by environmental impact assessment projects.

Since 2017, when developing the Semyrenkivs'ke field, Naftogazvydobuvannya has been using heightened environmental standards and pit-free drilling for wells, which eliminates the detrimental environmental impact. Pit-free drilling makes it possible to clean up sludge using special equipment. DTEK Oil & Gas cleans up all of its sludge, with solid elements transported to specially equipped landfills and fluid elements reused in drilling. The land is then reclaimed and returned to its original state, suitable for biological reclamation. In 2018, the company reclaimed 4.5 hectares of land.

## Handling and optimizing the use of hazardous substances and materials

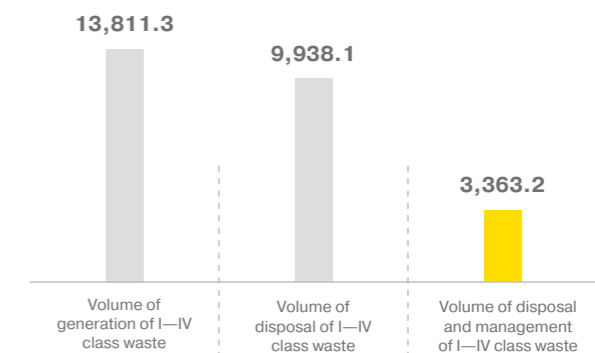
Optimizing the use of hazardous substances and materials is one of the key initiatives of DTEK Group's industrial enterprises. In 2018, work to reduce the use of materials containing asbestos continued. Enterprises responsible for electricity generation made a partial replacement of materials containing asbestos for alternative substances and materials during repairs, brick setting and insulation of equipment. In addition, distribution system operators are replacing oil-filled equipment with hermetic oil transformers that do not require maintenance, or with vacuum, gas-insulated, or dry dielectric. This makes it possible to improve the environmental safety of equipment and eliminates the risk of oil spills.

Also, enterprises are replacing lamps which contain mercury with LED lightbulbs, which are more economical and significantly less harmful to the environment. For example, in 2018, thermal generation enterprises replaced 15,711 lamps with LEDs, while distribution system operators replaced 2,775 lamps.

DTEK Dnipro Grids was recognized in the Green Technologies and Innovations Competition for its efficient system for separate collection and recycling of waste. The enterprise collects up to 40 types of waste generated during production activity: mercury lamps, tires, batteries, petroleum products, waste paper, electrical insulation, polymer waste, etc. The company separately collects waste and transfers it to a five-year disposal process, preventing the release of hazardous waste to landfills.

The competition was held by the Federation of Employers' Organizations of the Dnipropetrovs'k region within the framework of the Ukrainian-German "Green Business Solutions — Unity for Sustainable Development" project.

Waste management in 2018, ths tonnes



In 2018, the Pavlohrads'ka, Ternivs'ka, Blahodatna and Samarska mines on the area of

# 13 hectares planted trees

