Non-technical Summary
for the PAVLODARENERGO, JSC's Investment Projects
on Environmental Impact Assessment

Policy of PAVLODARENERGO, JSC determines principles, objectives, tasks, and key focus areas of the Company in the field of reconstruction and modernization of CHP primary equipment. Essential obligations of policy of the PAVLODARENERGO, JSC management are aimed at the increase in electrical and thermal capacity of the plant, reduction in primary equipment wear and tear, increase in fleet life, increase in efficiency of plant operation, and reduction in negative environmental impact of the enterprise.

PAVLODARENERGO JSC has a long-term investment program aimed at modernizing the energy complex, the purpose of which is to increase the park's resource of equipment, increase the available and installed electric and heat capacity, reduce pollutant emissions into the environment, and save energy.

I. Current Practice of the Investment Projects' Environmental Impact Assessment

Environmental policy of PAVLODARENERGO, JSC is an integral part of the quality, energy management, occupational health and safety, and environment integrated policy. It identifies principles, goals, tasks, and objectives of the company's environmental protection and safety activities. Execution of respective law and regulations related to ecology, improvement of technological energy generation processes, as well as information availability and accessibility to all stakeholders are the key policy liabilities. Within the process of developing technical projects, which implementation may directly affect the environment and citizens' health, the company mandatorily develops the "Environmental Impact Assessment" (EIA) volume. Within the environmental impact assessment of the project decisions in accordance with "Guidelines on assessment of environmental impact of projected economic or other activities within the pre-plan, pre-project and project documentation development" (Astana, Ministry of Environmental Protection of the Republic of Kazakhstan, 2007) as amended by the Order of the Minister of Energy of the Republic of Kazakhstan No.253 dated June 17, 2016, the company assesses atmospheric effects, impact on surface and underground waters, soil, subsoil, plant and animal life, physical environmental impact, as well as that on socio-economic sphere. After the project development, in order to comply with the Article 57 of the Environmental Code of the Republic of Kazakhstan requirements in terms of observing transparency principle of the government ecological expertise and involve public into decision-making processes, the company announces public hearings through mass media. For providing clear and reliable information on forthcoming works and the company's environmental impact, public hearings involve all interested parties: representatives of local authorities (Akimat), environmental protection authorized agencies, mass media, motivated community members, and population. The events are recorded, published by mass media, and records are posted on website of a local executive authority (Akimat) and environment protection authorities, then EIA projects are eventually submitted to respective authority for the government ecological expertise.

Pursuant to approved long-term investment program aimed at the modernization of power complex of PAVLODARENERGO, JSC for 2016-2020, the "Environmental Impact Assessment" (EIA) projects were developed and the conclusions of the State Environmental Expert Review (SEER) were obtained for the following investment projects:

- Conclusion of SER No.KZ06VCY00014817 dated 13.08.2014 on environmental impact assessment for the "Ekibastuz CHP. Construction of section 2 of ash dump in the Tuz lakebed" Project;
- Conclusion of SE No. 01-0414/17 dated 25.08.2017 on the EIA to the project "Construction of the 3 stages of the ash dump of CHP-3 in Pavlodar";

- Conclusion of SEE No. KZ45VDC00035054 dated 08.04.2015 on the EIA to the project "Construction (reconstruction) of sewage of household waste water from the sewage collector of KazEcoProm LLP to the CHP-3 pumping station";
- Conclusion of comprehensive independent expertise No. ҚCO-0031/18 dated 15.06.2018 to the project "Topping of dams of the 1st stage of the ash dump of CHP-3";
- Conclusion of the state expertise No.ҚSO-0062/19 dated 07.12.2019. to the feasibility study ("Feasibility Study") "Expansion of the CHP-3 of PAVLODARENERGO JSC with the installation of boiler units station No. 7, station No. 8 turbo unit station No. 7";
- Conclusion of the SEER No. S01-0006/20 dated 31.01.2020. to the working draft "Extension of dams of the 2nd line of the ash dump of CHP-2 of PAVLODARENOGO JSC. Reconstruction"
- Conclusion of the SEER No. KZ95VDD00128163 dated 01.10.2019. to the project "Reconstruction of the heating network recharge scheme at CHP-3 of PAVLODARENERGO JSC";
- Conclusion of the SEER No. KZ65VDD00128509 dated 04.10.2019. to the project "Reconstruction of the firing-up collectors with the replacement of the boiler units of pressure-reducing desuperheating stations No1-No.6 at the CHP-3 of PAVLODARENERGO JSC;
- Conclusion of the SEER No. KZ89VDD00124294 dated 05.08.2019. to the project "Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC;
- Conclusion of the SEER No. KZ74VDD00124370 dated 06.08.2019. to the project "Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC.

The following investment projects at the stage of implementation:

1. "Ekibastuz CHP. Construction of section No. 2 of ash dump in the Tuz lakebed" The construction of section No. 2 of the ash dump in the Tuz lakebed Ekibastuz CHP will continue in 2019. The cost of the works performed in 2019 is 38 810 tenge excluding VAT.

2. "Topping of the dams of the 1st stage of the ash dump of CHP-3 of PAVLODARENERGO JSC. In 2018, the works were begun under the project "Topping of dams of 1st stage of the ash dump of TEP-3", which will be continued in 2019. The cost of the implementation of this measure in 2019 is 260 797 tenge, excluding VAT.

3. Construction of the 3rd stage of the ash dump of CHP-3, started in 2017, will be continued in 2019, the cost of the work performed in 2019 is 1 269 121 tenge excluding VAT.

4. Reconstruction of the firing-up collectors with the replacement of the boiler units of pressure-reducing desuperheating stations No1-No.6 at the CHP-3 of PAVLODARENERGO JSC, construction and installation works will be carried out in 2020. The cost of the works performed in 2019 is 210 197 tenge excluding VAT and includes the costs of the development and approval of project documentation and the purchase of materials.

5. Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC, the cost of the works performed in 2019 is 39 425 tenge excluding VAT, the facility has been commissioned.

6. Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC, the works will continue in 2020. Actual costs for 2019 were 94 198 tenge without VAT.

II. Description of Implemented and Continuing Investment Projects

1. Construction of ash dumps of CHP-3 and Ekibastuz CHP of Ekibastuzteploenergo LLP

The construction of the 2nd section of the ash dump of the Ekibastuz CHP in the bed of Tuz Lake is one of the largest investment projects of PAVLODARENERGO JSC, which began in 2015. The construction of this section of the ash dump in 2019 was continued. Construction and installation works were carried out on the dust suppression water line, field and technical supervision was carried out, the working draft was adjusted with the passage of state expertise.

In 2019, the implementation of the project "Tapping dams of the 1st stage of the ash dump of CHP-3" was launched. Work on building this dam will continue in 2020. This project shall be carried out to increase the accumulating capacity of the existing ash dump before the construction of the 3rd stage of the ash dump of CHP-3 with the aim of organizing the storage of ash and slag waste generated during the production activities of the station.

In 2019, the works were continued on the construction of the 3rd stage of the ash dump of CHP-3. During the construction of the new ash dump, a special film – geo-membrane - will be applied, which allows achieving 100% waterproofing. It is a reliable and durable anti-filtration screen that protects groundwater and surface water from pollution, which eliminates chemical contamination of groundwater due to the chemical components contained in the water. The technical effect of the measure is the ability of the enterprise to bear the production load, since without an ash dump, electricity generation and heat supply are impossible.

2. Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC

The purpose of the measure is to reduce the ash wear of the pipes of the tubular air heater of the boiler unit Barnaul boiler plant-160/100 station No. 1 and, as a result, an increase in their service life. The scope of the reconstruction involved the dismantling of 12 cubic meters of the second-level internal consumption and 12 cubic meters of the third-level internal consumption of the first stage. In their place, a similar number of internal consumption cubes with a nozzle pre-installed on them was mounted. In fact, the nozzle plays the role of the initial section of the internal consumption pipe, taking on the negative effects of abrasive particles of the exhaust gases.

3. *Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC*

The purpose of the reconstruction is to increase the reliability of the condensing unit and the turbine unit as a whole. To reduce the tendency of tubes to dezincify and increase their resistance to corrosion, it is provided to install tubes in a capacitor made of complex alloyed brass grade LO70-1.
Replacing the condenser tubes with tubes of complex-alloyed brass of the LO70-1 brand improves the reliability of the condensing unit and the turbine unit as a whole.

III. Environmental Impact Assessment

The projects play important economic and social role, measured by scope and share of electric and thermal power generation in Pavlodar load center. Approved technical decisions on the investment projects lead to the following conclusions on environmental, economic and social impact.

1. Atmosphere Air

All projects stipulate activities on preventing (reducing) pollutant substances emissions to the atmosphere.
Main sources of impact on environment components during building and assembly works for recultivation, and topping the embankments of ash dumps, reconstruction of basic equipment are:

motor and construction vehicles' engines, construction machinery charging with combusting and lubricating materials, soil, stones, clay gravel, sand and gravel mix, sand transfer, welding and cutting, painting and hydro-insulating works, etc.

Construction of ash dumps of CHP-3 and ECHP of Ekibastuzteploenergo LLP

During operation of the 2nd section of the ECHP ash dump in the bed of Tuz Lake in order to avoid the process of ash and slag deflation, the project provides for irrigation of surface ash and slag beaches in case of drying, using the DD-80 sprinklers, water is provided to the sprinklers via the designed dust suppression water duct from an existing pump station.

Ash and slag storage at ash dumps of the 1st stage of the CHP-3 after dam building will be carried out hydraulically, i.e. under a layer of water. In this connection, subject to the technical regulations for the storage of ash and slag, the effect on air pollution after the implementation of the project is excluded, there are no emission sources.

In addition, during the implementation of these projects, the execution of work is accompanied by dusting in the atmospheric air from loading and unloading, as well as dusting of the work site and roads during the movement of construction equipment and vehicles. To prevent dusting, the projects envisage watering roads on dry days of the summer period, as well as moving vehicles and special equipment along existing roads and passages. Analysis of the results of dispersion calculations showed that there are no maximum surface concentrations created by emissions from the implementation of these measures at the border of the sanitary protection zone. from the emitted pollutants do not exceed the established MPC values (maximum permissible concentration).

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC

During the implementation of the working draft, air pollution was only in the process of construction and installation work on the construction and assembly operations site. Sources of atmospheric air pollution during the construction and assembly operations works were: motor vehicles, welding with piece electrodes, paintwork, as well as the operation of compressor plants and welding units with internal combustion engines. The impact on atmospheric air was episodic in nature, within the limits of standards and after the completion of construction and installation works were completely absent.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC

During the implementation of the working draft "Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 with the replacement of the tube bundle", air pollution occurred only during construction and installation works at the construction and assembly operations site. Sources of atmospheric air pollution during the construction and installation work were motor vehicles, welding with piece electrodes, as well as the operation of compressor plants and welding units with internal combustion engines. Emissions of pollutants into the atmosphere during construction work are insignificant, within the limits of standards and were of a short-term nature.

2. Water Resources

The ongoing projects include measures to prevent and reduce the impact on water resources.

Construction of ash dumps of CHP-3 and ECHP of Ekibastuzteploenergo LLP

According to the project "Construction of section No. 2 of the ash dump of Ekibastuz CHP in the Tuz lakebed according to the project, the water supply source is maintained, the volume of water consumption does not increase. In order to protect the environment and reduce the impact of the ash dump of Ekibastuz CHP on the hydrosphere, to protect surface and groundwater from pollution and reduce the consumption of fresh water, the recycle water supply system for hydraulic ash disposal

(HAD) is provided. The feed of the HAD system is carried out by CHP drains, fresh water is not used to feed the HAD system.
To reduce the harmful effects of ash dumps of CHP-3 to a minimum, protect surface and groundwater from pollution, reduce fresh water consumption by projects for the construction of the 3rd stage of ash dumps of CHP-3 and topping of dams of 1st stage of the ash dump of CHP-3 during their operation, the set of measures was provided, which include:

- full working cycle of the hydraulic ash handling system;
- device of an anti-filtration screen from the Canadian polysynthetic geo-membrane on the bottom and slopes of the designed section;
- tapping and return to the HAD cycle of leakage water from the pumping station of drainage water;
- collecting and returning to HAD cycle of leakage water during the operation of ash dumps using drainage drying;
- existing and projected wells of the operating-observation network;
- new drainage pumping station.

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC
Surface water bodies in close proximity to the location of the reconstructed object are absent, therefore, direct impact on them is excluded.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC
Surface water bodies in close proximity to the location of the reconstructed object are absent, therefore, direct impact on them is excluded.

3. Soil. Wastes

The projects provide for measures to prevent and reduce the impact on the soil cover.

Construction of ash dumps of CPH-3 and Ekibastuz CHP of Ekibastuzteploenergo LLP
To protect the adjacent lands from flooding, the project for the construction of the 3rd stage of the ash dump of CHP-3 provides: an anti-filter screen, a drainage ditch with a pumping ditch with the return of filtered water back to the ash dump. During the operation of the ash dump, as a main measure to protect the land cover from dusting of ash and slag waste, the maintenance of ash beaches in the wet state is provided. As an action to protect the soil with the projects for the construction of the 3rd stage of the ash dump of the CHP-3 and the building of dams of the first stage of the ash dump of the CHP-3, it is planned to remove the topsoil and then use it to attach the external slopes of the designed dams to build the ash dump. Upon completion of the operation of ash dumps, the projects provide for their restoration with the further use of the territory as industrial land.
For the construction of the 2nd section of the Ekibastuz CHP ash dump in the bed of Tuz Lake has been provided additionally for Ekibastuz CHP of Ekibastuzteploenergo LLP a land plot on the right of temporary paid land use. The project includes measures to reduce the impact on land resources:

- for the conservation of sections No. 1 and 5 of the old ash dump with grass sowing after completion of operation with grass sowing;
- removal of the plant soil layer with a thickness of 0.2 m with storage in a temporary dump with subsequent use.

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC
Reconstructed facilities are located within the existing land allotment of the enterprise, removal of the fertile soil layer is not provided, since the re-construction site is located in the existing main building of the enterprise.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC

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4. Subsoils

Construction of ash dumps of CHP-3 and Ekibastuz CHP of Ekibastuzteploenergo LLP

For the implementation of projects for the construction of the ash dump and the topping of the CHP-3 dam, the preliminary exploration has been carried out, which excludes:

- building on sites with useful mineral deposits;
- destroying rare geological outcrops, mineral formations, paleontological objects and subsoil sites, announced conservation areas, natural sanctuaries, history and culture monuments.

In the area of placement of ash dumps, there are no mineral and raw material resources, as well as groundwater reserves, which can serve as a source of drinking water supply of human settlements.

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC

For the implementation of the projects, no new land plots were seized, which excludes:

- development of mineral deposits;
- destroying the rare geological outcrops, mineral formations, paleontological objects and subsoil areas declared reserves, monuments of nature, history and culture.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC

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5. Plant and Animal Life

Analysis of flora and fauna of territories, which have been operating for a long time, shows that due to a long-term man-made load the structures of flora and fauna are simplified, which is connected, first of all, with a displacement factor.

Construction of ash dumps of CHP-3 and Ekibastuz CHP of Ekibastuzteploenergo LLP

The condition of the vegetation cover in the ash dump zone is characterized by the absence of plant communities and the sparse species diversity of the floristic composition. Rare and listed in the Red Book plants, as well as habitats of rare animals listed in the Red Book, in the area of ash dumps are absent. Work on these projects will not lead to a destroying the existing structures of the plant and animal world.

The project provides for the greening of the sanitary protection zone of the 3rd stage of the ash dump by planting 10,707 seedlings of green spaces and sowing grass on the accumulated dams and the territory of the ash dump after restoration, with the aim of strengthening the soil cover.

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC

Works on this project will not lead to a violation of the existing structures of the techno-landscape, flora and fauna.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC

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6. Physical Impact on Environment

All projects stipulate activities on reducing physical impact on environment.

Construction of ash dumps of CHP-3 and Ekibastuz CHP of Ekibastuzteploenergo LLP

A source of noise on the ash dump sites, at which the embankment is topped or construction works are performed, is a progress of equipment operation, but taking into consideration a factor of considerable remoteness from residential area, there is no noise negative impact. There are no sources of thermal and electromagnetic radiation at the sites of ash dumps under construction.

Reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 of PAVLODARENERGO JSC

Possible thermal, electromagnetic and noise impacts on the environment in the framework of this working draft took place as a local one, not exceeding the limits of permissible norms.

To reduce the noise level from the main and auxiliary equipment at the construction site, as well as other installations, units and mechanisms, the following main activities were carried out:

- installations were applied, the noise levels from which did not exceed the permissible values indicated in the regulatory documents;
- -high-temperature equipment and pipelines, as well as air pipelines
- compressors covered with thermal and acoustic insulation;
- if necessary, the equipment was additionally placed in special fences (casings, trimming) that protect it from both external factors and reducing noise levels;

In general, the enterprise with the completion of reconstruction of the cubes of the water discharge chambers of the boiler unit Barnaul boiler plant-160/100 FM station No. 1 at CHP-2 will not increase the level of physical impacts, since the reconstruction is carried out to replace obsolete equipment.

Reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2, CHP-2 of PAVLODARENERGO JSC

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On the whole, with the completion of reconstruction of the condenser of the turbine unit PT-25-90/10, station No. 2 of CHP-2, the increase in the level of physical effects will not occur, since the reconstruction is carried out to replace obsolete equipment.

7. Social and Economic Environment

Environmental and local population's health risks, as well as social and economic impact, are being assessed within all projects.

Due to the active construction of residential and public buildings and the rise of industrial production, the city's demand for heat and electricity is constantly increasing. The provision of heat comfort in dwellings that meets modern requirements is one of the most important social tasks,

therefore the centralized heat supply system must be technically perfect and reliable. Direct reconstruction of the CHP equipment does not have any impact on the socio-economic living conditions of the local population and does not cause a change in the characteristics of its labor activity. The implementation of investment projects for the reconstruction of the equipment of the thermal power station will improve the sanitary and epidemiological condition of the territories of the stations by reducing the gross emissions of inorganic dust into the atmosphere. One of the factors for the reliability of operation of heat sources is the timely removal of waste and slag waste and the possibility of their storage in accordance with existing requirement