

**400 MW COMBINED CYCLE POWER PLANT
IN THE AREA OF
ELEKTROWNIA STALOWA WOLA S.A.**

Non-technical environmental impact abstract

February 2010

This non-technical abstract is based on reports regarding environmental impact and prepared in co-operation with Elektrownia "Stalowa Wola" S.A. ["Stalowa Wola" Power Station plc, hereinafter referred to as "the ESW"] by institutions and companies having knowledge and experience in certain areas of economy and environmental management, namely:

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- *EKO – GEO Pracownia Geologii i Ochrony Środowiska [Geology and Environment Protection Study EKO – GEO] in Lublin;*
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- *Przedsiębiorstwo Badawczo-Wdrożeniowe Ochrony Środowiska i Inżynierii Wodnej "HYDEKO" [HYDEKO – Environment Protection & Hydroengineering Research and Implementation Enterprise] in Warszawa; and*
- *Biuro Projektów Wodnych Melioracji i Inżynierii Środowiska "Biprowodmel" Sp z o.o. [Bureau of Hydro-Melioration & Environmental Engineering Design "Biprowodmel" Ltd.] in Poznań.*

This non-technical environmental impact abstract relates to an investment project planned to be implemented within the area of Elektrownia "Stalowa Wola" S.A. in Stalowa Wola (the Project) and was prepared with the purpose of providing the community with information about the Project and – if needed – consult it about the information.

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1. Introduction

This non-technical abstract is a concise presentation of basic information about environmental and social aspects of a project to build a combined cycle power plant [the CCPP] (a gas and steam turbine unit [the GSTU]) within the area of Elektrownia Stalowa Wola S.A. [*Stalowa Wola Power Station plc being a member of the Tauron Group*] in Stalowa Wola. It also considers action to be taken in order to reduce emissions into the environment. Data presented herein come from reports on environmental impact assessments concerning the planned investment tasks, which were carried out in 2009 pursuant to Polish and European ecological regulations legally binding at that time.

For over 70 years the ESW has been producing heat and electric energy and acquired a deep knowledge of technology as well as ecological law. It has implemented its own, certified by an independent external auditor, Integrated Management System that covers issues regarding quality, health and safety and environment protection. It has also formulated and introduced a detailed environmental policy constituting a part of the Integrated Management System. More information on the plant's environmental policy and how it is implemented you can find on the web site <http://www.esw.pl> (see page: Environment Protection).

2. The Project outline

2.1. Scope of the Project

The Project in question is a package of investment tasks containing:

- construction of a combined cycle power plant including the following components and systems: an engine room equipped with both gas and steam turbine units as well as a boiler room fitted out with a waste-heat boiler constituting a part of the exhaust system taking away combustion gas from the gas turbine, a waterside pumping station together with a stabilising checkdam on the San River and an open cooling system, a fuel feeding and controlling system, an output system for power transmission, communications roads and railway tracks adapted to the existing ones and the central control room;
- construction of a power unit for production of electric energy using renewable energy sources including adaptation of the boiler OP-150 #10 for combusting biomass. In the initial preparatory phase this investment task was named "Adjustment of the OP-150 boiler to combusting biomass fuel including auxiliary systems for storing, handling and conveying the biomass to the boiler". The change of the investment task's name was noted in the construction permit.
- construction of a power unit for production of electric energy using renewable energy sources including adaptation of the boiler OP-150 #11 for combusting biomass.

2.2. Location

The CCPP including pumping station, cooling water disposal system, additional output lines for power transmission, fuel feeding and controlling system, internal communications roads and railway tracks as well as central control room are to be built and carried out within the area of the present Elektrownia Stalowa Wola, i.e. within the area earmarked in the local development plan for industrial investments. On the same site modernisation of two OP-150 boilers is to be performed (adaptation of the boilers for combusting biomass including installation of equipment for biomass storage, preparation and conveyance to the boilers).

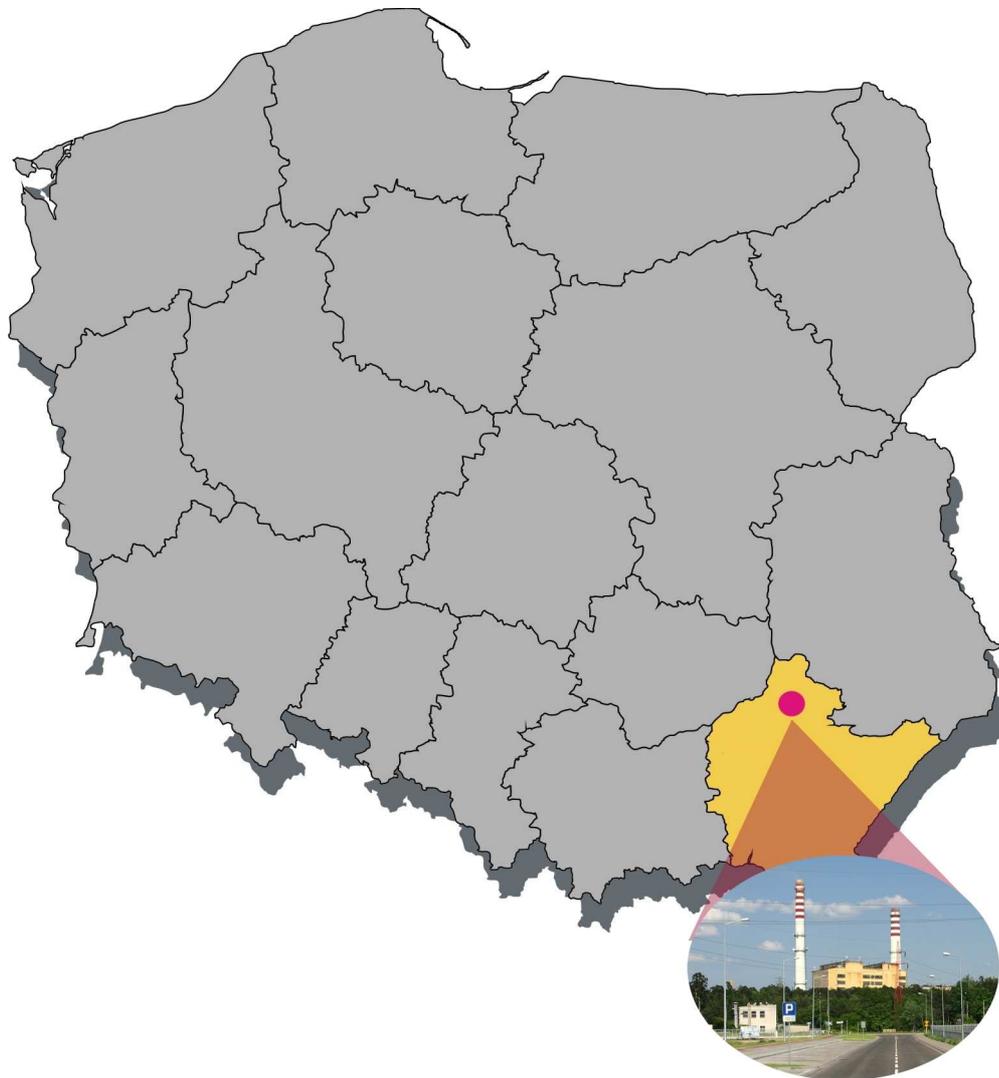


Fig. 1. Location of the ESW [*Stalowa Wola Power Station*] on the map of Poland.

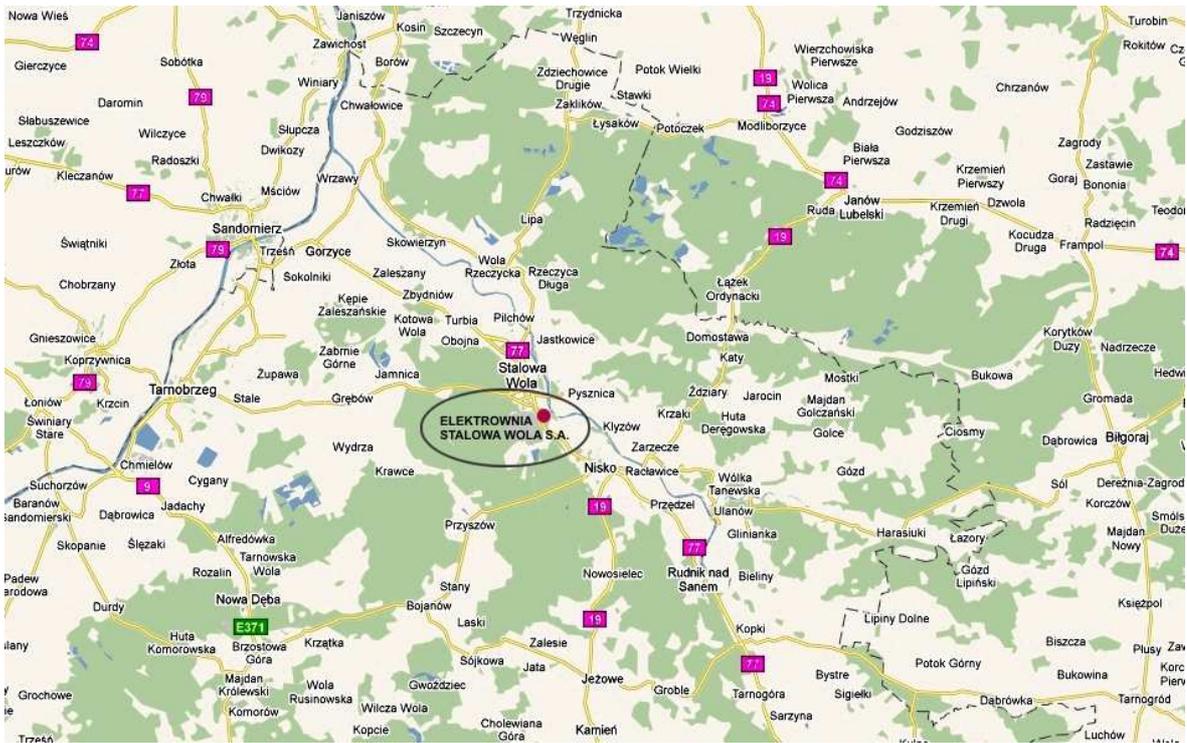


Fig. 2. Location of the ESW [Stalowa Wola Power Station] on the map of the local area.



Photo 1. The area where the CCPP is planned to be built.

The stabilising checkdam on the San River will be built outside the area of the ESW. The part of the investment Project to be performed outside the ESW S.A. is a sine qua non for safe operation of facilities and equipment to be erected and installed within its area.

2.3. The projected and present activity

Elektrownia Stalowa Wola produces presently electric energy and heat using boilers fired with pulverised hard coal and steam turbines equipped with an open cooling system. Surface water taken from the river San is used as a cooling medium. The coolant is taken in a “returnable” manner because after-cooling water is returned to the river.

The main purpose of the investment Project is to change fuel and start using another fuel which is more friendly for natural environment as well as to replace inefficient and low-duty power units with a new high-duty unit based on a proven technology. Currently used coal will be replaced with fuel gas and a renewable fuel (biomass).

At the first stage K10 boiler and auxiliary systems will be modernised and adapted for combusting biomass, this investment task is expected to be commissioned in 2012. At the second stage the new combined cycle power plant with all auxiliary systems and facilities will be built, this investment task is expected to be commissioned in the second half of the year 2014. At the final stage K11 boiler and auxiliary systems will be modernised and adapted for combusting biomass, this investment task is expected to be commissioned in 2014.

2.4. Investment realisation process

Construction of the gas & steam turbine unit [the GSTU] including adaptation of boilers (**K10 and K11**) for combusting another fuel are complex processes both from legal and technical points of view. The main stages of the investment process are presented below. This is a general presentation, it allows, however, to acquaint with the scope of investment as well as typical problems and nuisances related to it. Chapter 4 describes the actual state of realisation of the Project and its individual investment tasks.

At the stage of **investment location planning** some arrangements are made with local authorities and landholders. Investment location has to be approved by local authorities after it has received a positive opinion of regional authorities and has been consulted with local community. Compliance of the planned location with local development plan must be confirmed; should the plan not exist, a decision on investment locality must be obtained. In case of power industry investments and the ones located in the vicinity of or within the “Natura 2000” area, the decision on investment locality may be made after an assessment of environmental impact has been carried out (including public consultations) and a decision on environmental factors conditioning the approval for the investment project realisation has been obtained.

The latter decision is issued by district authorities after consulting the Regional Environment Protection Agency and the Provincial Sanitary Inspector, this document sets down the investor’s responsibilities and technical specifications to be met by the investment Project. After the design documentation has been worked out the investor has to apply for construction permit to relevant

county authorities. Civil work may be started only after the investor has obtained decision confirming civil design and granting permission to start the work (construction permit).

The stage of **civil work** can be divided into the preparatory phase, phase of main construction work including installation of all basic and auxiliary equipment and facilities and the final phase. In the preparatory phase all work necessary to start diggings must be carried out, among them removing or relocation of existing facilities and systems that collide with both the planned ones and existing wildlife habitats (local fauna and flora – if any). Some infrastructural facilities like access roads and construction camp have also to be carried out; the latter should not only provide the employees with appropriate living conditions and ensure proper conditions for storage of materials but also satisfy environmental requirements and has to have required features regarding environment protection (e.g. proper organisation of material storage area and refuse dump, water supply and sewage disposal systems, etc.).

Phase of construction work begins with diggings for foundations for buildings and structures to be erected, then comes carrying out and construction of the said foundations, buildings and structures followed with installation of fittings and internal equipment. It happens sometimes that dimensions of equipment to be installed exceed dimensions of the standard cargos, so it is necessary to make a number of arrangements regarding organisation of traffic and deliveries (transport route, haulage time, information transfer, etc.) or to be made with some third parties (road administration agencies, police, local authorities, etc.). Due to big dimensions and weight of some machines and devices, heavy cranes have very often to be used in order to install them. All construction, erection and installation work should be performed by well-skilled and trained staff and health and safety matters treated with due diligence.

In the **final phase** (sometimes during construction phase) required technical tests and examinations are carried out. The final acceptance (commissioning) is performed with participation of competent authorities and controlling bodies, including such institutions as a health inspectorate, labour inspection agency and fire brigade. Before the plant is put into operation, the integrated licence (IPPC licence) has to be granted.

After putting the plant into operation its functioning is usually monitored for environmental protection within the scope set down in the integrated licence.

3. Grounds for the Project

3.1. Need to build a new power plant

As a result of growing fear of effects of climate changes and a rise in content of carbon dioxide and other pollutants in the atmosphere (especially content of sulphur dioxide, nitrogen oxides and dust), deeper and deeper interest in fuels generating lower emission than hard coal (among them renewable fuels like biomass) has appeared.

Before a technology to be used in the new plant was finally chosen a feasibility study presenting analysis of some practicable technological alternatives to be used in the ESW for power and heat generation had been work out. Arguments weighing in favour of implementation of investment actions presented in section 2.1. above are listed below:

- **in regard to the gas and steam turbine unit:** a proven and available technology that meets requirements of best available techniques and provisions of the IPPC directive, characterised by high efficiency of power generation process, high operational reliability, certainty of fuel supplies and low environmental impact including a distinct reduction in emission of sulphur dioxide, dust and furnace waste material as well as – to a less degree – a drop in nitrogen oxides emission;
- **in regard to K10 and K11 boilers:** renewable energy source, certainty of supplies of fuel to be delivered from nearby wooded areas and agriculturally non-productive land and a significant reduction in emission of sulphur dioxide, dust and furnace waste material as well as – to a less degree – a drop in nitrogen oxides emission.

Replacement of traditional power generation processes that in Poland are based on use of hard coal and lignite with new technologies is a part of the national strategy strongly supported by the European Union's policy. Pursuant to the international obligations the Polish government has committed to reduce greenhouse gas emission in order to prevent climate changes and determined as a target to raise by 2020 the share of energy produced from renewable sources up to 15%.

The planned investments are conformable with this programme.

3.2. Local benefits of the Project

Apart from advantageous ecological effects such as clear reduction in emission of pollutants into the environment and a guarantee of sustainable development consisting in fulfilment of the existing population's needs without any damage to potential for satisfying needs of the future generations, the Project enables:

- to hold on jobs necessary to operation of the new power plant as well as developing auxiliary activities related to it, like for example technical inspections and surveys, consulting and communications services, cleaning, green belt maintenance, etc.;
- to create new jobs for a period necessary to realise all investment tasks;
- to maintain a part of production without necessity of purchasing carbon dioxide emission allowances related to combustion of fossil fuels;
- to improve effectiveness of productive assets management;
- to ensure a reliable and permanent source of incomes for local – present and future – suppliers of processed and unprocessed biomass. It is especially important for the Podkarpackie region where there are large resources of biomass useful for power industry and coming from wooded areas as well as regions where no plants suitable for combustion in the ESW have been cultivated till now.

4. Legal and administrative proceedings – summary

4.1. Legal status of the Project

Degrees of progress in preparatory work regarding individual investment tasks differ from each other. There are two factors conditioning the degree of progress: the first one is an extent to which the site is prepared (especially in case of the combined cycle power plant), the second one is intended sequence of performance of investment tasks; the latter factor must regard necessity to avoid collisions because the main investment activities are to be conducted within the area of the ESW while the existing machines and installations are in operation.

The CCHP:

1. **Initial stage in the construction of the CCPP commenced by preparing the site.** The preparatory work includes demolition of the oldest and useless part of the power station comprising 9 boilers and 4 turbines. The demolition work was broken down into some phases. In 2001 the said ESW's part was demolished after the Governor of Stalowa Wola District had issued the decision no.: 9/2001 dated June 1, 2001 on approval of demolition work design and granting a demolition permit. At present the last phase of preparatory work connected with the new investment is being performed, this phase comprises (i) demolition of foundations of WP70 and WP120 boilers including the electrostatic precipitators' foundations, foundations of the boilers of the EI. I power station, the building containing ash storage reservoir including its foundation, cooling water channels, underground passages, roads made of reinforced concrete slabs, pipelines supporting steelwork and (ii) rebuilding of some installations (foundations, underground cable runs, sewage systems). The work described above is due for completion halfway through the year 2011.
2. **There was obtained decision GKVI/3-7662/12/09 dated December 7, 2009 on environmental factors conditioning the approval for realisation of the investment project named "Construction of a new 400 MW combined cycle power plant within the area of Elektrownia Stalowa Wola S.A. in Stalowa Wola" issued by the President of Stalowa Wola.** This decision was issued after the local community, the Regional Chief Executive Officer for Environment Protection Agency in Rzeszow and the Provincial Sanitary Inspector in Rzeszow had been consulted and positive opinions (in form of an administrative rulings) of the said bodies had been obtained. The mentioned decision determines (among others) the following:
 - a) essence and location of the Project;
 - b) conditions for making use of the environment – paying special attention to necessity to preserve treasured fauna and flora habitats, natural resources and national monuments as well as to limit nuisance for adjacent land – to be met during realisation of the following investment tasks:
 - construction of the combined cycle power plant,
 - construction of the stabilising checkdam on the San River,and operation of the said checkdam and plant;

- c) requirements regarding environmental protection to be necessarily taken into consideration in the construction design;
 - d) obligation to keep monitoring;
 - e) obligation to carry out a post-construction analyse (draw up the as-built documentation).
3. **There was obtained** decision AP.III.7331.2 dated January 11, 2010 on conditions for constructing a 400 MW combined cycle power plant including all auxiliary systems and facilities issued by the President of Stalowa Wola.
4. **There was worked out** the construction design and an application for construction permit is being prepared.

If only the Contractor is chosen on the basis of the competitive tendering procedure, **completion** of demolition work (as described in chapter 1 above) and **obtaining** the construction permit mentioned above will enable to start the main work related to construction of the CCPP.

K10 boiler:

1. **There was obtained** decision GKVI/3-7662/14/09 dated September 1, 2009 on environmental factors conditioning the approval for realisation of the investment project named "Adjustment of the OP-150 boiler to combusting biomass fuel including auxiliary systems for storing, handling and conveying the biomass to the boiler" issued by the President of Stalowa Wola. This decision was issued after the local community, the Regional Chief Executive Officer for Environment Protection Agency in Rzeszow and the District Sanitary Inspector in Stalowa Wola had been consulted and positive opinions (in form of an administrative rulings) of the said bodies had been obtained. The mentioned decision determines (among others) the following:
- a) essence and location of the Project;
 - b) conditions for making use of the environment, paying special attention to necessity to preserve treasured fauna and flora habitats, natural resources and national monuments as well as to limit nuisance for adjacent land;
 - c) requirements regarding environmental protection to be necessarily taken into consideration in the construction design.
2. **There was obtained** decision no.: 14/2010 dated February 5, 2010 on approval of the construction design and granting a construction permit enabling realisation of the task "Construction of a power unit for production of electric energy using renewable energy sources" in Elektrownia Stalowa Wola S.A. This decision was issued by the Governor of Stalowa Wola District and recorded under item 318 (ref. no.: AB.SW-7351/4/10, document issued on February 5, 2010) in the register kept by the issuing body; it determines (among others) the following:
- a) necessity to satisfy and observe all provisions set down in the above mentioned decision on environmental factors (ref. no.: GKVI/3-7662/14/09) and regarding special conditions for securing the site and performing construction work;
 - b) obligation to appoint an investor's supervision officer;
 - c) obligation to keep building logbook;

- d) obligation to position, in a place where it is visible, an information board containing information about the investment task and health and safety data;
- e) obligation to obtain a final decision granting an operation permit (before the equipment / plant is put into operation).

The said decision comprises explanations regarding the change of the investment task's name (see section 2.1). It also permits to start construction work.

K11 boiler:

As regards modernisation of K11 boiler, analyses concerning environmental impact assessment are in progress. From the environmental impact point of view this investment task is identical to modernisation of K10 boiler, in case of the latter all activities related to the environmental impact assessment had been completed and decision on environmental factors conditioning the approval for realisation of the investment was issued (see information hereinabove).

4.2. Environmental impact assessments and consulting the local community.

Proceedings regarding the environmental impact assessments and closed with issuing the decisions on environmental factors had been conducted in connection with investment tasks presented in section 4.1. During the said proceedings local community was also consulted, pursuant to the Polish law (rules concerning environment protection and land development) and European regulations.

The right of any citizen, non-governmental organisation or other stakeholder to take part in the proceedings is guaranteed by virtue of law and any report on environmental impact assessment is made available for public consultations for 21 days. Non-governmental organisations may participate in all stages of the proceedings provided however, that such an organisation shows its interest and this interest is conformable with the organisation's statutory activity.

A body conducting proceedings is obliged to announce and place on its web site information that reports on environmental impact assessment has been made available for inspection and the interested stakeholders may familiarise themselves with them and give their opinions on.

During open debate on the presented investment tasks no negative remarks were reported.

5. Local determinants regarding the Project

5.1. Present environmental conditions in the area of investment activity

In the vicinity of Elektrownia Stalowa Wola S.A., west of the ESW and between the power station and Sandomierz – Nisko public highway there is one of Stalowa Wola's housing estates. East of the ESW in turn there is the San River constituting the right-bank tributary of the Vistula River located at the 279 + 700 kms downstream Sandomierz. Along the San's shoreline the ESW borders on the area "Natura 2000 – The Lower San Valley".

The ESW has got the title to the area where most facilities under discussion will be erected and installed. In the local land development plan this area is designed for industrial investments.

Purity of the atmospheric air in the Podkarpackie Province including the area of the city of Stalowa Wola and Stalowa Wola District is monitored by the Provincial Environment Protection Inspectorate and Provincial Disease Control Centre. In Stalowa Wola no limit of tested substances level (sulphur dioxide, nitrogen dioxide, carbon monoxide, lead monoxide, benzene) have been exceeded.

In 2006 within the area of Stalowa Wola average annual concentrations of sulphur and nitrogen dioxides was (respectively) $6.4 \mu\text{g}/\text{m}^3$ (21.3 % of the limit) and $21.5 \mu\text{g}/\text{m}^3$ (53.8 % of the limit; the presented data were given in 2006 report on environment protection programme performance).

Stalowa Wola is exposed first of all to a traffic noise. This exposure is rated among the most onerous. A planned to be built ring road bypassing Stalowa Wola (so-called Trasa Podkarpowa [*Under-slope Route*]) is expected to enable TIR lorries and other heavy trucks to drive around the city and reduce this arduousness. It also ensures direct access to the ESW from the side of the freight entrance without necessity to drive into the city. Railway traffic is less onerous. It is expected the biomass will be delivered to the ESW by road and by rail.

Businesses entities located in the city do not make worse the acoustic conditions significantly. In the past they were legally obliged to implement programmes for reduction of noise emission to the environment.

Inventory of condition of monolithic surface water units¹ in 2008 is presently being worked out. The Provincial Environment Protection Inspectorate in Rzeszów has prepared the preliminary data concerning classification of surface water resources, its ecological potential and chemical condition; relevant water samples were taken in 2008 from test checkpoints selected for water condition monitoring. For the reason that methodology of hydromorphological data assessment is being worked out at the moment, no data of such kind are available and were not presented in the said classification.

Initial 2008 inventory results describing condition of the San River on the stretch from 47 kms to the river's mouth are presented below:

- presence of biological elements (C-chlorophyll "a" – phytoplankton) was assessed as very good;
- presence of physical and chemical elements was assessed as less than good;
- content of particularly harmful substances was assessed as good;
- the river's condition and ecological potential were assessed as good and moderate (respectively);
- chemical condition of the river was assessed as good.

The San River is one of the biggest and most water-rich Carpathian rivers of great economic significance.

¹ *monolithic surface water unit is a specific term used in Polish classification of surface water resources; it means a separated, and constituting isolated entirety element of surface water like e.g. lake, river, water reservoir, man-made lake, etc.*

5.2. Social and economical issues

Communications

Stalowa Wola is an important communications hub in its region. It lies at the intersection of communications roads running from the south to the north and from the east to the west. One of main domestic roads (#77 road, direction: Lipnik – Stalowa Wola – Przemyśl) and two provincial roads (#855 road connecting Olbięcín and Stalowa Wola as well as #871 road from Nagnajów through Tarnobrzeg towards Stalowa Wola) run through the city. At a distance of 60 kms of Stalowa Wola the A-4 motorway is planned to be built. In the city there is a public bus service comprising 10 bus lines of total length of 160 kms (including neighbouring localities).

Conditions of residence

It is estimated that number of flats is three times lower than a number of dwellers and does not meet needs of local community.

Employment conditions

In the years 2002 – 2006 a slight decrease in employment level occurred (especially in number of employed women: in 2000 9,679 women were employed but in 2006 this number amounted to 8,776). There are almost twice more employed men than women.

Industrial plants and installations

Within the area of Stalowa Wola there are about 36 industrial plants and installations of significant importance.

People's health

Occupational disease incidence rate in the district of Stalowa Wola is close to national average rate and cancer mortality rate is slightly higher than the average rate. The mortality rate is rather bound up with people's age. High cardiovascular disease rates are observed, respiratory system disease rate tends downwards.

6. Expected environmental impact

During environmental impact assessment the following scenarios and situations were analysed: abandonment of the Project as well as construction and operation of the new power plant and its closing down.

The expected environmental impact bound up with the investment tasks constituting the Project was analysed from the point of view of requirements provided in both Polish and European laws.

As a foundation of Polish ecological regulations there were taken Environment Protection Law including accompanying laws (among others: Waste Management Law, Water Management Law, Nature Protection Law, the Act on Prevention and Removal of Damages to the Environment, Emission Trading Law, Greenhouse Gas and Other Substances Emission Management System Law, the Act on Availability of Information about the Environment and its Protection, the Act on the

Community's Participation in Environment Protection and Environmental Impact Assessments) as well as executive regulations (like e.g. Emission Standards Regulation).

As a foundation of European ecological regulations there were taken relevant directives (among others: IPPC directive² taking into account large combustion plants including industrial emissions draft directive, directive on the limitation of emissions of certain pollutants into the air from large combustion plants³ as well as water framework⁴, waste incineration⁵, birds⁶ and habitats⁷ directives) and decisions of the European Parliament and Council.

The selected technology was compared with the best available techniques and the following – among others – factors were analysed:

- the existing environmental conditions and the expected impact on individual environmental factors;
- preventing from and limitation or natural compensation of negative environmental impacts;
- direct, indirect, secondary, cumulative, short-, medium-, and long-term as well as permanent and temporary effects on environment;
- the need to establish an area of limited environmental impact;
- local social and economical issues;
- the need and scope of monitoring to be conducted in the individual stages of the Project realisation (construction, operation).

Each of the investments tasks constituting the Project will influence the environment in a different way.

6.1. The gas and steam turbine unit

The significant environmental impact of the gas and steam turbine unit is connected with emission of pollutants into the air, noise emission, intake of surface water feeding the cooling system and waste water disposal and with some other negligible impact on other environmental elements.

Total efficiency of the high-efficient GSTU for electric energy production using a condenser will be ca. 57.4% (net efficiency: 56.11%).

As a fuel the methane-rich natural gas of GZ-50 type is to be used. An axial-flow compressor supplies the compressed air to the combustion chamber equipped with burners that are fed with pressurised natural gas. Combustion gas leaving the turbine is directed to the heat recovery steam generator where the gas flows around the generator's heating elements in order to produce a required stream of fresh, superheated and low-pressure steam. The last heating element to be flowed around is a water heater supplying the hot water to the central heating network. After it

² Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 on integrated pollution prevention and control.

³ Directive 2001/80/EC of the European Parliament and the Council of 23 October 2001.

⁴ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

⁵ Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste.

⁶ Council Directive 2009/147/EC on the conservation of wild birds.

⁷ Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora

leaves the HRSG the combustion gas is directed to the stack constituting an integral part of the steam generator. The steam is supplied to the double-casing, single-shaft turbine which drives the air-cooled generator producing electric energy. The expanded steam flows into the surface condenser. The steam is to be cooled and condensed using the cooling water taken directly from the San River. It is planned to install a bleeder turbine that enables to extract process steam and supply it to e.g. a heat engineering system.

The new 400 MW combined cycle power plant is to be connected with 220 kV Stalowa Wola distribution station. Access roads to the new facilities are to be included in the existing ESW's and municipal road systems. The planned access roads together with the existing in-house ones and municipal roads will meet communications and transportation needs as well as the fire-fighting requirements.

Air protection

Emission of sulphur oxides and dust is practically excluded because the gas fuel to be used in the GSTU contains neither sulphur nor particulates. The gas turbine is to be equipped with a water / steam injection system that ensures reduction of nitrogen oxides emission and enables to keep it at a required level. Application of a combined cycle power plant producing simultaneously electric and heat energy and use of the gas fuel instead of coal allows to limit emission of essential pollutants into the air (sulphur dioxide, dust, carbon oxides). Emission of pollutants coming from the gas turbine (SO₂, NO₂, CO, dust) shall be kept at a level determined by Polish laws and the new EC Directive regarding new gas turbines.

Water and waste water

Operation of the CCPP involves consumption of water to be supplied to the turbine and auxiliary equipment cooling system, make-up water installation feeding the HRSG's circulation system, fire-fighting equipment and for social purposes. This means process and industrial waste water will be generated. Water feeding the existing cooling, process and fire-fighting systems is surface water drawn from the San River. Operation of the new CCPP will neither cause any changes regarding the surface water demand compared with quantities and quality specifications set down in the integrated licence being in force now nor alter the efforts to save water resources. Process waste water (after treatment) is to be used in closed circulation systems to make up water level in steam and water systems; after-cooling water is to be returned to the San River.

Noise

Level of noise generated by a continuously operated machine or device constituting a part of the new combined cycle power plant, measured at a distance of 1 m from such machine / device, will not exceed 85 dB(A). It will be the responsibility of the contractor to meet noise level specifications. As a result of building the new plant in the ESW'a area, some old and more noisy devices and equipment will be put out of operation and dismantled. Suppliers of new machines and equipment will be obliged to meet specifications regarding permissible noise level. Actions listed above will enable to meet within the areas covered with noise protection and exposed to the ESW's activity influence relevant requirements set down in applied standards, pursuant to which the noise level shall not exceed 45.0 dB(A) at night time and 55.0 dB(A) during the day. Figure 3 below shows the forecast territorial range and level of noise exposure after putting the CCPP into operation.

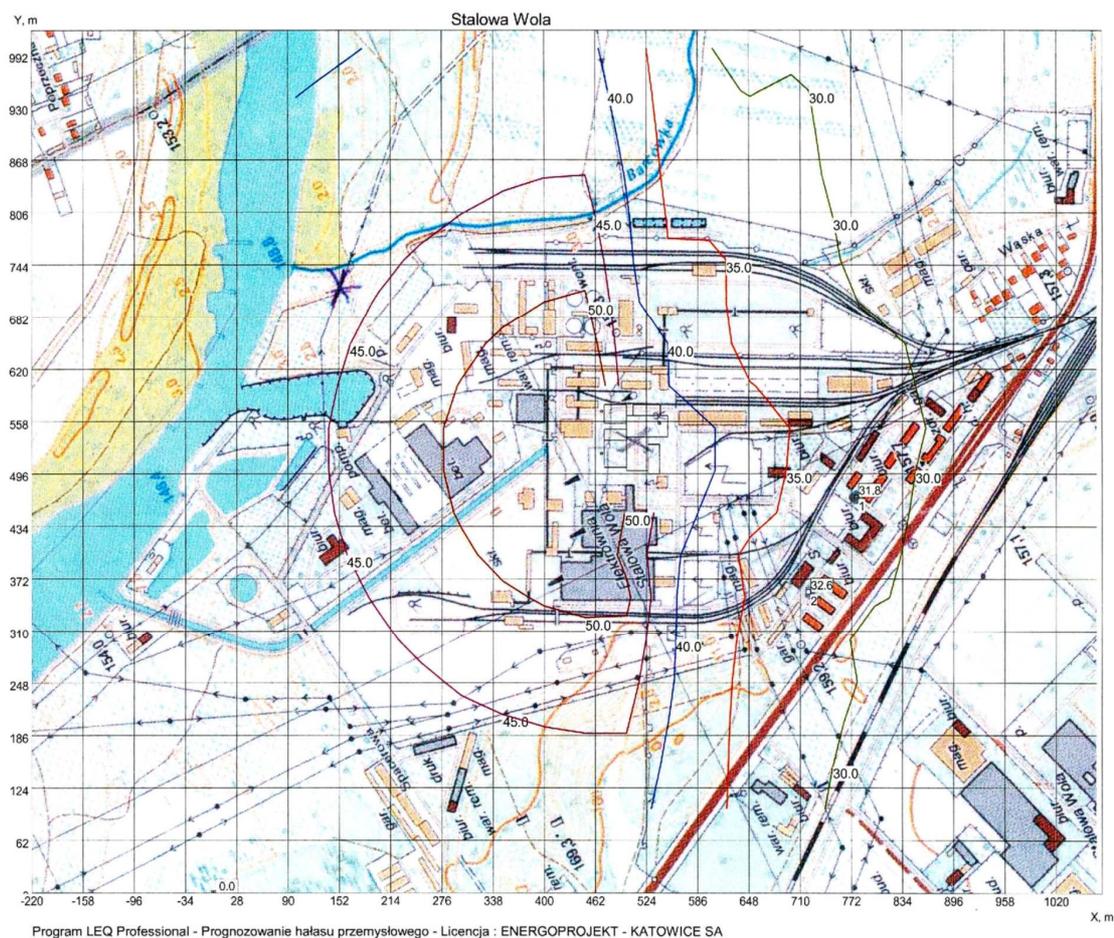


Fig. 3 Forecast territorial range and level of noise exposure after putting the CCPP into operation.

Waste

Use of a gas fuel for electric power generation complies with the rule to prevent forming waste materials constituting products of energy-generating fuel combustion; one of effects of putting the CCPP into operation will be significant reduction in quantity of produced furnace waste material resulting from the fact that natural gas contains practically no particulates compared to 20% ash content in coal.

Natural environment

The Project realisation carries no hazards resulting from electromagnetic radiation. The ESW emits no electromagnetic radiation of frequency of 50 Hz causing exceedance of any imposed environmental limits.

Construction of the new CCPP in the area of Elektrownia Stalowa Wola S.A. will have no impact on coherence and integrity of the "Natura 2000" area. The Project has no influence on priority habitats (located at a distance between 600 and 1,100 m east of discharge points). It will have no impact on conditions of life and nesting of birds, either.

The Project will neither have any impact on flora communities nor cause any changes to scenic landscaping. Analysis of the Project shows there is neither the risk of any transboundary effects nor the need to establish a limited use area. Interference that at the stage of construction and / or operation may occur in the aquatic environment of the place where the stabilising checkdam and waterside pumping station are to be built is discussed in the next chapter.

An important element of the process of verifying the Project's environmental nuisance assessment will be monitoring of the natural environment condition after the CCPP has been commissioned and put into operation. Issues related to such monitoring are discussed in chapter 7.

The stabilising checkdam is to be located in the "Natura 2000" area, outside the ESW, to the east of the plant and in its immediate vicinity.

6.2. The stabilising checkdam and waterside pumping station



Photo 2. The area where the stabilising checkdam on the San River is planned to be built.

As regards the stabilising checkdam and waterside pumping station their important environmental impact is bound up with the area “Natura 2000 – The Lower San Valley” and consists in disruption in both natural aquatic environment of the San River and wildlife within a strip of land along the banks of the San – especially during the construction stage. The area “Natura 2000 – The Lower San Valley” (see the map – Fig. 4) neighbours the ESW along the left bank of the San. It covers the San River along with its right riverbank.



Photo 3. Location of the planned waterside pumping station to be erected in the San River's bay.

In order to enable the ESW to draw water from the San River for cooling the main and auxiliary equipment, the ESW plans to build a stabilising checkdam along with a fish pass for migrating species. The checkdam is to be built on the San River at 30 + 070 kms, it will allow to build the waterside pumping station in the river's bay and to keep the required minimal river's water level (not less than 147.4 m above Kronsztadt⁸ sea level) during low water level periods.

The stabilising checkdam is to be located in the area “Natura 2000 – The Lower San Valley”. The waterside pumping station is to be erected in the river's bay located in the immediate vicinity of this area but outside it.

⁸ unit of altitude used in Poland in hydrology that means number of metres above the sea level in Kronsztadt; Kronsztadt is a town in Russia located on the Kotlin Island close to St. Petersburg.

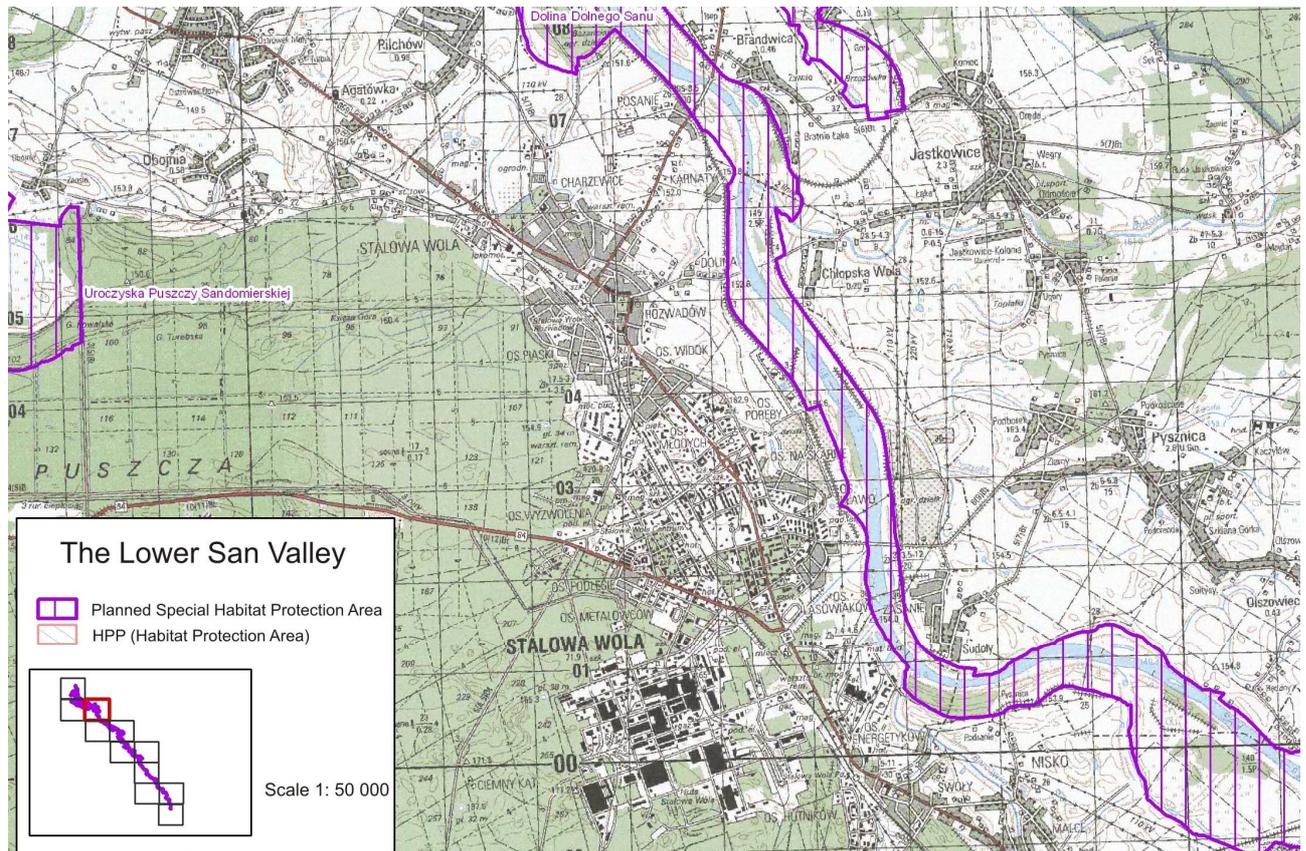


Fig. 4. The area “Natura 2000 – The Lower San Valley”

“Natura 2000 – The Lower San Valley” – aquatic environment

When water flow in the river reaches the lowest of low flow levels (NNQ) and the average of low flow levels (SNQ), range of damming up of water (backwater range) will be 1,200 m and will have no influence on any changes within zones of potential inundations. Should water flow in the river reach higher levels, the stabilising checkdam will be flooded with water and will have no impact on fish species that live here.

The stabilising checkdam is to be built in two phases. At first its left part (running from the left bank of the river to its centre line) will be built, and afterwards there will be carried out its right part (running from the river's centre line to its right bank) along with the fish pass. The latter will be made from natural stones in the form of a two-slope inclined plane. Inlet of the fish pass is to be located at the level of 146.20 m above sea level because this location guarantees that during periods of low water flow levels the pass is filled up with water to the height of 1.2 m.

While preparing environmental impact assessment there was examined and analysed the aquatic environment of the San River's part located within the area of potential environmental exposure related to the planned CCPP. On the basis of 2004 and 2005 historical data and information about fish harvesting fish species living in the San River and its tributaries were inventoried. Spawning places and seasons of fish species living in the San within the area of the CCPP's environmental impact are not the same and differs from each other. The most crucial period is the one from March till May; when any species living in the Natura 2000 area listed in the EC's habitats directive as being protected must be considered, the protection period may be prolonged till June.

Construction of the checkdam and pumping station will cause temporary turbidity of water in the San River resulting from dewatering the site surrounded with cofferdams. Water containing suspended matter will be discharged downstream one of the cofferdams that in turn will cause turbidity of the river's water. Water coming from site dewatering will be discharged locally (in one point) and at intervals (discharging time: about 5 hours during twenty-four hours). The construction work is to be carried out for about 12 hours a day and night. During the remaining time sedimentation of the suspended matter and reduction in its concentration will take place. Only one half of the river will be taken for the construction work, the second one will be free of suspended matter.

Construction of the waterside pumping station will cause water turbidity in the river's bay, concentration of suspended matter in the bay will have no influence on the river because water will flow from the bay to the existing and presently used surface water intakes of the ESW.

Operation of the stabilising checkdam will have a slight influence on underground water. The checkdam will trigger off the backwater resulting in a small increase in underground water level in the area adjacent to the river. Operation of the new pumping station will have no impact on the underground water condition.

Construction of the new CCPP will cause no changes neither in the quantities of surface water the ESW can draw pursuant to the existing integrated licence from the river to feed cooling systems nor in the quantity and quality of after-cooling water discharged presently to the San River. The after-cooling water quality is similar to the one of water drawn from the river with the one exception: the after-cooling water temperature is higher and heats up the San River's water downstream the discharge point by about 1 °C.

The stabilising checkdam will curb the San River's bed erosion process, its operation may furthermore lead to reduction in concentration of suspended matter in the intake water.

“Natura 2000 – The Lower San Valley” – land environment

While preparing environmental impact assessment there was examined and analysed the backwater zone connected with the construction of the stabilising checkdam as well as the pumping station construction zone, i.e. regions located within the field of potential environmental impact of the CCPP on the “Natura 2000 – The Lower San Valley” area. Flora communities were inventoried, there was also monitored existence of amphibians, reptiles, mammals, invertebrates (insects, spiders, arachnids, molluscs) and birds – special attention was paid to treasured species listed in EC's birds and habitats directives.

In the period of the Project realisation scaring birds may occur. Birds may be scared away by reason of noise coming from vibro-hammer during its operation, such noise can reach the level of 60 dB at the emission point and 40 dB at a distance of 10 m from the noise source. At a distance of 200 m from the source no perceptible noise should occur.

As a result of reconnaissance conducted no brood habitats were found in the area where the new CCPP is to be built. No flora communities that need to be relocated were found, either. Thus neither such habitats nor communities will be destroyed. Due to its nature the CCPP poses no hazards listed in “The Lower San Valley Standard Data-Entry Form”.

The reconnaissance conducted in connection with the assessment of potential impact on both aquatic and land environment allowed to emphasize environmental needs regarding the following issue: how and when the CCPP is to be built so that the influence on the natural environment is as small as possible and after completion of all work the environment is fully restored to its previous condition. The planned CCPP will have no significant influence on the “Natura 2000 – The Lower San Valley” area.

An important element of the process of verifying the Project's environmental nuisance assessment will be monitoring of the natural environment condition during construction of the CCPP and after it has been commissioned and put into operation. Issues related to such monitoring are discussed in chapter 7.

6.3 OP 150 boilers

As regards modernisation of the two OP 150 boilers (adaptation for combusting another fuel) an important environmental influence is bound up with emission of pollutants into the air and noise emission, slight or negligible influence on remaining elements of the environment is also possible.

Air protection

It is forecast that the modernisation (adaptation of K10 and K11 boilers for combusting biomass) will cause a decrease in annual emission of pollutants into the air compared with limits set down in the integrated licence in force and current actual emission – see section 6.4.

Noise

New noise sources will appear: a set of wood splitting machines, biomass driers, handling and conveying equipment (conveyors, loaders). Acoustic analysis conducted shows that within the area of adjacent housing estates noise emission level coming from the CCPP will not exceed permissible limits both during the day and night and the ESW will not pose any acoustic nuisance for the surrounding areas.

Water ad waste water

The CCPP will cause no significant changes to the balance of drinking water and sewage as well as process waste water. As a result of drier operation small quantities of process waste water coming from biomass dehumidification will be generated. The process waste water will not be discharged to the environment. It is to be used in closed circulation systems to make up water level in steam and water systems of the power plant; thus the non-returnable consumption of surface water drawn for this purpose will be limited a little. The quantity of surface water drawn for cooling and non-returnable consumption will not change compared with the present condition.

Waste

Replacement of coal with biomass fuel results in significant limitation of quantity of furnace waste material generated. This is a direct effect of ash content in the fuel (the ash content in coal amounts to 20% and in biomass – about 2%). Furthermore operation of a plant adapted for combusting biomass dust produces vegetable ash. So, realisation of the Project will not result in formation of additional waste of any other kind.

Natural environment

The Project carries no hazards related to the presence of electromagnetic radiation.

Adaptation of boilers for biomass co-firing including auxiliary systems for storing, handling and conveying the biomass to the boilers has no impact on coherence and integrity of the "Natura 2000" area. The Project has no influence on priority habitats (located at a distance between 600 and 1,100 m east of discharge points). It will have no impact on conditions of life and nesting of birds, either. Due to no interference in the aquatic environment the Project will have no influence on conditions of life and migration of fishes. The Project will neither have any impact on flora communities nor cause any changes to scenic landscaping. Analysis of the Project shows there is neither the risk of any transboundary effects nor the need to establish a limited use area.

An important element of verifying the Project's environmental nuisance assessment will be monitoring of the natural environment condition after the CCPP has been commissioned and put into operation. Issues related to such monitoring are discussed in chapter 7.

6.4 Expected emission reduction effect against a background of historical emissions

In case of large combustion plants the most considerable environmental impact is bound up with the air pollution, the rates of fees for making use of environment prove this opinion to be true. Fees for emission of pollutants into the air exceed 98% of all fees paid by the ESW due to making use of environment. This is because the ESW uses a well-thought-out water and waste water management system and stores no furnace waste material. All furnace waste material is utilised. The ESW uses only closed water and waste water circulation systems, they are either used repeatedly (like e.g. ash hydro-removal system) or utilised as sources of make-up water (e.g. rain water). In this way a reduction in non-returnable consumption of surface water is achieved.

For many years environment protection laws have been showing the ESW's management how to modernise and develop the plant. The diagrams presented below (see Fig. 5, 6 and 7) show actual emissions of such pollutants like dust, nitrogen oxides and sulphur dioxide into the air over the period of twenty years.

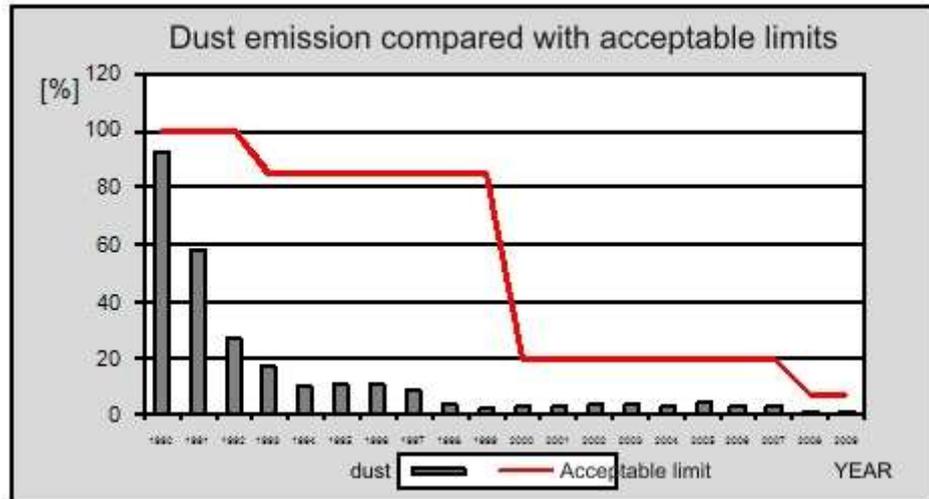


Fig 5

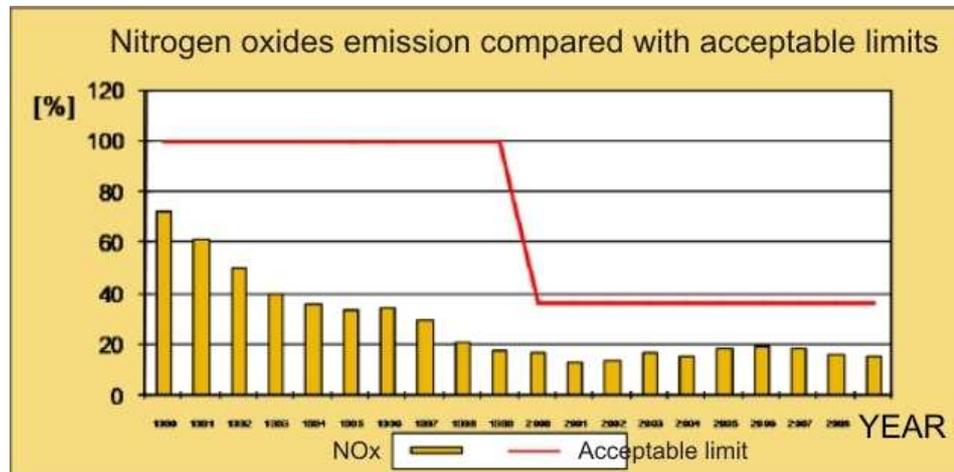


Fig. 6

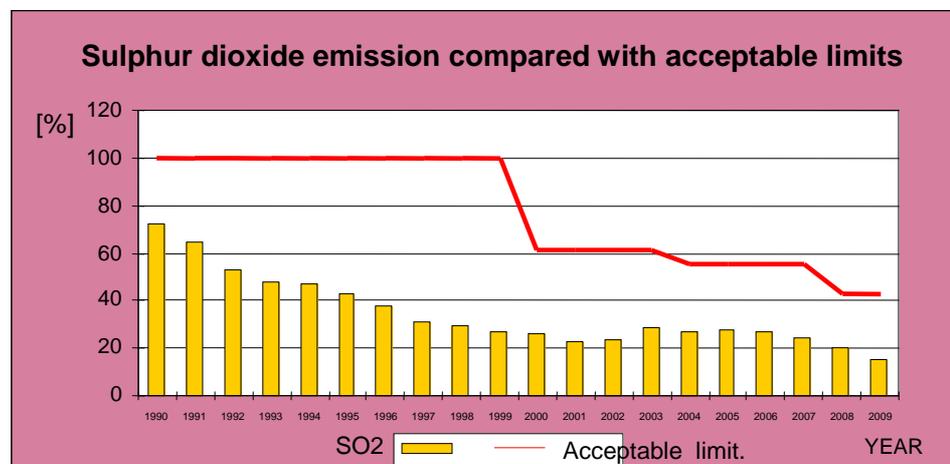


Fig. 7

The following diagrams (see Fig. 8, 9, and 10) illustrate the expected emission of pollutants into the air after the individual investment tasks constituting the Project has been completed.

The year 2009 marked on the axis of abscissae (see Fig. 8 to 10) relates to the present condition of Stalowa Wola S.A. producing coal-based heat and electric power. Year 2012 shows emissions after modernisation of **K10** boiler has been completed. Year 2016 shows emissions after **the CCPP** has been completed. Year 2020 shows emissions after modernisation of **K11** boiler has been completed and coal-fired boilers have been shut down.

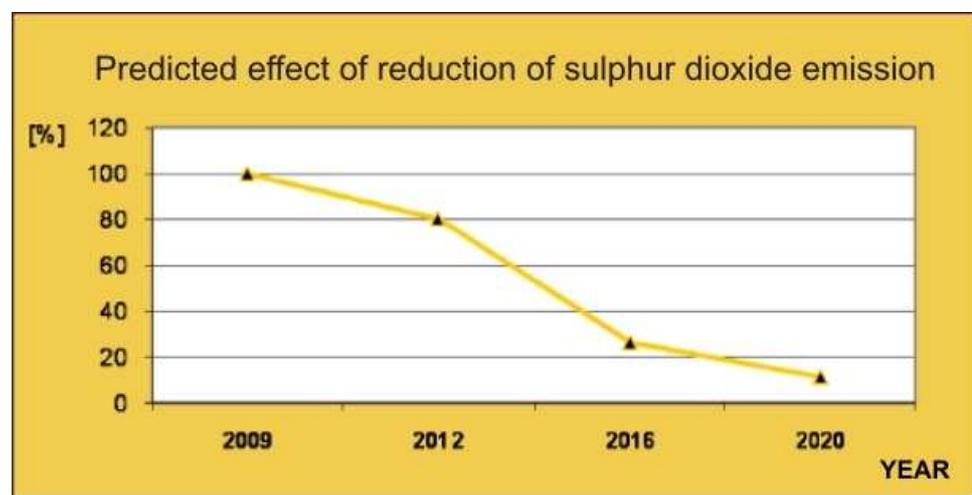


Fig. 8

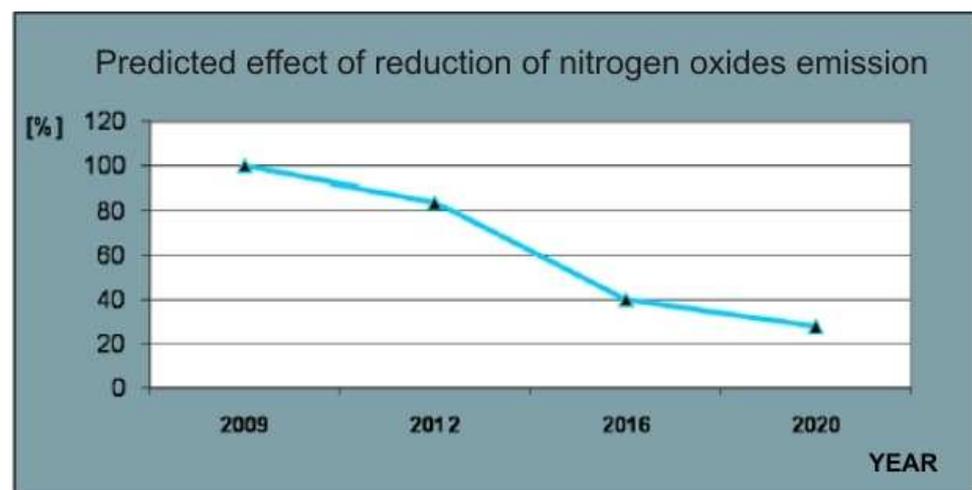


Fig. 9

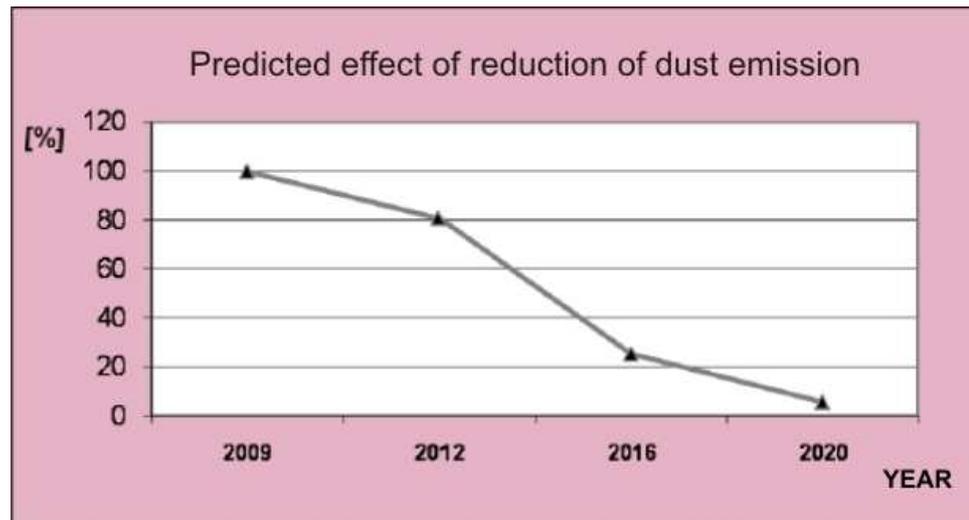


Fig. 10

7. Methods for reducing, limiting and preventing environmental impacts

7.1. Limitation of negative influence on the environment

Documentation necessary to start the Project is being developed now, the work are well under way. A significant part of documentation required by law has already been worked out. Some permits has also been obtained (see section 4.1). Preparatory work undertaken in order to obtain the remaining decisions and permits is in progress.

Governing the individual investment tasks is focused on performing all the work in compliance with legal requirements set down in relevant environmental permits, solving potential problems, monitoring and observing environmental procedures and the ones regarding communication with the society.

The investor will not only meet all the obligations set down in issued administrative decisions and permits but also undertake many other actions deemed to be environmentally friendly or favourable in people's opinions or from health and safety point of view. Such actions include:

- updating, implementing and systematic observing the Integrated Management System certified by Det Norske Veritas;
- systematic observance of the implemented obligation to present information on environmental monitoring findings to be updated every year and presented as a separate chapter constituting a part of annual company's report and in form of diagrams on the website as well as in an internal comprehensive coverage named *Environmental Report*;
- systematic observance of the communications procedure on making environmental information available;

- developing and implementing a procedure for biomass delivery logistics including control and settlements;
- developing and implementing a plan of cooperation with the interested parties (i.e. associates and subcontractors);
- supervising construction work by specialists in environment protection, health and safety and other fields (geology, hydrology, etc.) if necessary.

The implemented principles and certified systems observed in the ESW as well as new procedures resulting from the planned needs (e.g. replacement the fuel) cover not only the existing and presently operated installations but investment processes, too.

The actions listed are expected to significantly limit potential both environmental and social nuisance connected with the Project realisation.

7.2. Control and monitoring

Apart from detailed requirements to be met during the Project realisation decisions on environmental factors are also set down obligations regarding monitoring to be kept after the Project has been completed.

Monitoring is to include – among others – process parameters, properties of raw materials and media, emissions of pollutants into the air (continuous measurements of sulphur dioxide, nitrogen dioxide, dust, carbon monoxide, oxygen content in flue gas including the gas temperature and pressure), waste management (quantities, how they are utilised or disposed of), consumption of surface water used for cooling and process purposes, noise emission, electromagnetic field generation, etc.

Additionally, the stabilising checkdam to be built outside the ESW but in the “Natura 2000 – The Lower San Valley” area is to be monitored during its construction and for at least 5 years after it has been put into operation. The purpose of monitoring during construction is not to allow to exceed the long-lasting, maximum water turbidity limit downstream the checkdam. In turn, the purpose of monitoring after putting the checkdam into operation is – among others – to assess functionality of the fish pass as an element enabling run of migrating fish species. The monitoring will also include measurements of temperature, level and flow rate of water running through the fish pass and – first of all – assessment of ichthyofauna condition (i.e. determination of quantities and species of migrating fishes living in and travelling through the checkdam area. The said monitoring is to be based on two complementary methods enabling a precise appraisal of functional effectiveness of the facility enabling fish migration. Annual data obtained will be accompanied with an opinion of a specialist in ichthyology knowing needs and habits of migrating fishes.

Functioning of the checkdam and the fish pass as well as influence of after-cooling water is to be assessed and described in an as-built analysis discussing the Project’s impact on the environment. The said analysis will be carried out twice: after one and two years from putting the facility into operation and is to be presented to the authority issuing opinions and decisions on environmental factors conditioning the approval for the investment project realisation (Regional Chief Executive Officer for Environment Protection Agency in Rzeszow, President of the City of Stalowa Wola). The analysis will also enable to compare forecast impacts identified and described in the environmental impact assessment with actual impacts identified after the Project has been commissioned and put into operation.

Should findings presented in the as-built analysis prove the fish pass does not properly play its role, corrective actions aiming to restore and keep free run of migrating fish species shall immediately be taken.

8. Access to information

8.1 How can I get more information about the Project

If the information you need is rather simple and has not to be sought out, you can get it dialling the phone number given below; should you need other information please send a letter or an e-mail addressing it as shown below.

In order to ensure all notifications, questions and complaints – especially the ones coming from any persons representing the local community, to whom the Project can be a nuisance – are answered, a procedure defining how to respond to any comments of the stakeholders and communicate with them was developed.

Any information on the environment or its protection that bears no confidentiality features shall be given at a written request of the interested party without any unnecessary delay, but not later than within a month of receipt of such request. Should the request concern a complicated subject matter the said deadline may be extended by one month. In such a case the applicant shall be informed about the extension of the deadline.

Any information on the environment or its protection may be refused to give if the answer requires to make accessible any data being processed at this point of time or data transferred within the internal data circulation system or in case the application for the information is too vague or obviously impossible to be realised.

8.2. May I present my opinion about the Project now?

Yes, you may; any opinions about the Project may be presented during all the period it is realised.

8.3. Who should I contact to present my opinion or get more information?

Any comments and / or opinions should be addressed as follows:

Elektrownia Stalowa Wola S.A., ul. Energetyków 13, PL37450 Stalowa Wola;

phone: +48 158776514; e-mail: kontakt@esw.pl.

Please remember we can answer by phone only the questions regarding simple subject matters that do not require to seek out necessary information.

9. Summary

The assessment of the environmental impact of the design solutions applied shows that – compared to the presently existing condition – the Project do not causes any increase in environmental influence of the energy-generating fuel combustion installation coming from the area of the ESW's being a member of the Tauron Group. On the contrary, it leads to a distinct decrease in the plant's environmental impact and its nuisance do not exceed the allowable limits set down in the standards in force and is largely limited to the area of the Elektrownia Stalowa Wola.

