

NON-TECHNICAL SUMMARY

MODERNIZATION OF TAMEH CHP IN KRAKÓW



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WHAT IS TAMEH AND THE PROJECT?

TAMEH i.e. Tauron Arcelor Mittal Energy Holding is a joint venture company established in December 2014 by one of the largest Polish energy company Tauron SA and the leading steel manufacturer Arcelor Mittal. Both companies own 50% of shares of TAMEH.

TAMEH Holding has two daughter companies: TAMEH Poland and TAMEH CZ which operate the combined heat and power plants (CHP) at the Arcelor Mittal's steelworks in Poland (Dąbrowa Górnicza, Kraków and Kędzierzyn Koźle) and Czech Republic (Ostrava), which supply the steelworks with electricity and other media necessary for steel production.

This non-technical summary presents modernization of the CHP in Kraków planned by TAMEH in order to meet the environmental standards and improve energy efficiency at this plant. The project is expected to be finished by the end of 2017. Financing of the project is provided by the co-owners of the company and bank loans for which the company has recently applied. Very strong commitment of the company to follow the highest environmental and social standards and involvement of international financing institutions secure that the project will be developed in line with applicable national and EU regulations and the best industry practice.

WHY DO STEELWORKS NEED CHP?

Large integrated steelworks are complex industrial organisms which consume vast amounts energy to produce steel from coal and iron ore. The typical technological steps include:

- production of coke in coke plants; as a byproduct a vast amount of so called Coke Oven Gas (COG) is generated which after treatment in the chemical plant can be used as a source of energy; while treatment numerous byproducts are generated, such as tar, benzene or sulfuric acid are generated;
- production of sinter or pellets from coke, iron ore and other additives, as e.g. limestone;
- production of pig iron in blast furnaces, as a byproduct so called blast furnace gas (BFG) is generated;
- basic oxygen steelmaking and iron casting, as a byproduct of oxygen steelmaking so called converter gas (CG) is generated.

All these technological steps require a lot of electrical energy which is produced by on-site CHPs. Apart from electrical energy the CHPs produce also steam used at various places across the plants and compressed air for use by the blast furnaces.

As the COG has relatively large calorific value (the lowest calorific value is between 17.4 and 20 MJ/Nm³) it is commonly used as a fuel in the coke ovens and by other consumers of the steelworks, inclusive energy generation needs in CHPs.

BFG is generated in vast amounts by blast furnaces. It contains approximately 20-28% of carbon monoxide and energy content of BFG typically varies from 2.7 – 4.0 MJ/Nm³. In old steelworks the BFG was typically burned in flares while in the modern ones is co-incinerated with COG and sometimes with natural gas.

LEGISLATIVE CONTEXT OF THE PROJECT

The CHP in Kraków of an installed capacity of 898 MW is classified as a large combustion plant and as such may operate only based on Integrated Permit which regulates all aspects of environmental performance of the facility, inclusive of permitted air emissions, wastewater discharges, waste management, noise emission and others. Currently the facility operates based on the Integrated Permit of the Arcelor Mittal steelworks, however, application for the new, own Integrated Permit has already been prepared by the company and will be submitted shortly.

Integrated permits are issued by the competent authorities based predominantly on the Environmental Law of October 3, 2001 (with further amendments) which adopts, among others the Industrial Emissions Directive of November 24, 2010. Other national laws that implement respective EU directives are Waste Act of December 14, 2012, Water Act of July 18, 2001, Act on Nature Protection of April 16, 2004 and others. Specific issues are addressed by Executive Orders to the Acts, issued either by the Minister of Environment or the Council of Ministers.

As the large combustion plant the facility must meet the Best Available Techniques which are described in the reference document (BREF) referred to by the IED Directive.

The CHP is operating under an existing integrated environmental permit (in Polish, *Pozwolenie Zintegrowane*, document No. SR-II.7225.2.2.2015, issued on February 20th, 2015 by the President of Kraków City) and in line with Article 146a of Environmental Law of October 3, 2001 with further amendments (Journal of Law 2001 No. 62, item 627) it is currently under derogation from the IED for up to 17 500 hours (Environmental Law of October 3, 2001 with further amendments under isap.sejm.gov.pl/DetailsServlet?id=WDU20010620627). However the plant needs CAPEX in order to reach compliance with the IED before the end of this derogation period. After completion of the investment it will become compliant with the IED.

The modernization includes among others construction of new boilers. Due to the installed capacity of the plant environmental impact assessment is required prior obtaining the building permit. The EIA procedure in Poland is ruled by the Act on Environmental Information Disclosure and Environment Protection, Public Participation in Environment Protection and on Environmental Impact Assessments (EIA Act) of October 3, 2008 (with further amendments) which fully adopts EU directive on environmental impact assessment. Following requirements of the EIA Act, on request of the company an EIA report was prepared by an independent environmental consultant (SOZOPROJEKT Sp. z o.o.). The report fully meets legal requirements and addresses all environmental issues at the stage of construction, operation and dismantling of the plant. No adverse impacts have been identified. TAMEH has already applied to the competent authorities for environmental decision which will define environmental constraints to be included at the designing phase. The EIA procedure is open to public.

LOCATION OF THE PROJECT

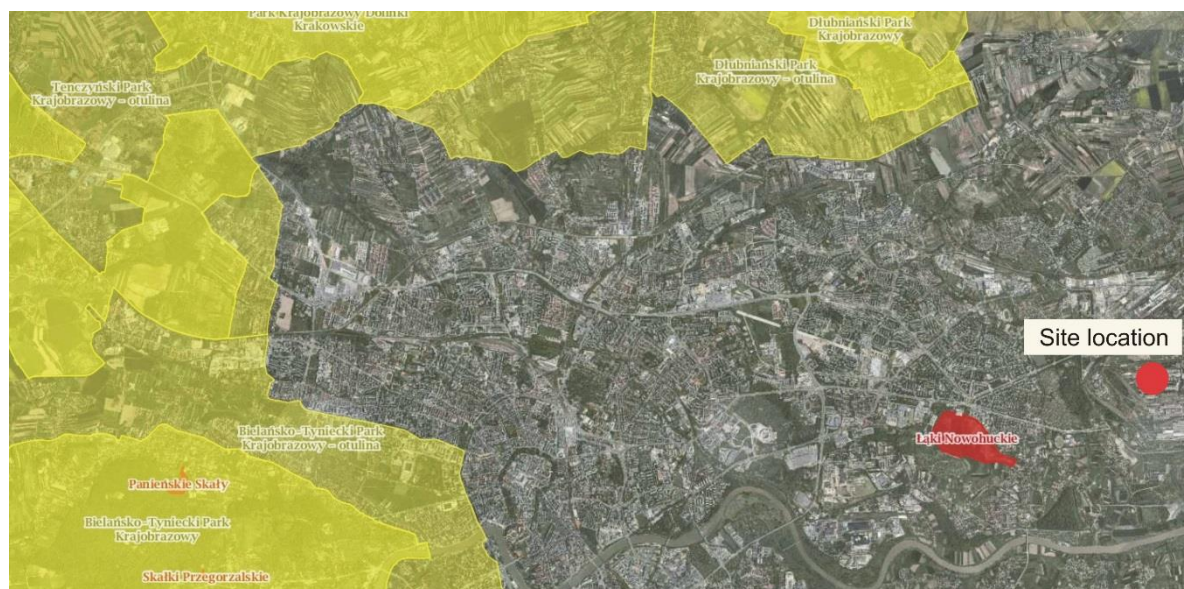
The Tameh CHP is situated in the central part of the Arcelor Mittal steelworks in Kraków. The steelworks are located in northeastern part of the city, in Nowa Huta district. The nearest residential areas are located to the west of the site by the Ujastek street and to the south by the Iglomska street. The entire surroundings of the steelworks comprise industrial areas, roads, railway lines, heaps and landfills.

The nearest protected areas are:

- 1) Natura 2000 areas established pursuant to habitats directive:
 - a) No. PLH120069 Łąki Nowohuckie – located approximately 3.7 km to the southwest of the site;
 - b) No. PLH120008 Koło Grobli, - located approximately 13,3 km to the east of the site,
 - c) No. PLH120080 Torfowisko Wielkie Błoto - located approximately 13,7 km to the southeast of the site,
 - d) No. PLH120065 Dębnicko Tyniecki Obszar Łąkowy - located approximately 15 km to the southwest of the site,
 - e) No. PLH120004 Dolina Prądnika - located approximately 18,3 km to the northwest of the site,
 - f) No. PLH120010 Lipówka - located approximately 19,8 km to the east of the site,
 - g) No. PLH120079 Skawiński Obszar Łąkowy - located approximately 19,9 km to the southwest of the site,
 - h) No. PLH120005 Dolinki Jurajskie - located approximately 20,7 km to the northwest of the site
- 2) Natura 2000 areas established pursuant to birds directive:
 - a) No. PLB120002 Puszcza Niepołomicka - located approximately 11 km to the southeast of the site;
- 3) Landscape parks:
 - a) Dłubniański Park Krajobrazowy - located approximately 5,7 km to the northwest of the site,
 - b) Park Krajobrazowy Dolinki Krakowskie - located approximately 10,7 km to the northwest of the site,
 - c) Bielańsko – Tyniecki Park Krajobrazowy - located approximately 13 km to the southwest of the site,
 - d) Tenczyński Park Krajobrazowy - located approximately 15,5 km to the west of the site,
- 4) Nature reserves:
 - a) Rezerwat Bonarka - located approximately 11 km to the southwest of the site,
 - b) Rezerwat Groty Kryształowe - located approximately 11 km to the south of the site,
 - c) Rezerwat Koło - located approximately 14,9 km to the east of the site,
 - d) Rezerwat Panieńskie Skały - located approximately 16,5 km to the west of the site,
 - e) Rezerwat Skałki Przegorzalskie - located approximately 16,5 km to the southwest of the site,
 - f) Rezerwat Bielańskie Skałki - located approximately 18 km to the southwest of the site,
 - g) Rezerwat Wiślicko Kobyle - located approximately 18,6 km to the east of the site,
 - h) Rezerwat Gibiel - located approximately 19,4 km to the east of the site,
 - i) Rezerwat Skała Kmity - located approximately 19,5 km to the west of the site,
 - j) Rezerwat Skołczanka - located approximately 19,8 km to the southwest of the site na południowy zachód,
 - k) Rezerwat Lipówka - located approximately 19,8 km to the east of the site,

- l) Rezerwat Dolina Kluczywody - located approximately 20,7 km to the northwest of the site.

The nearest Natura 2000 areas are presented on the figure below (source of the basic map: <http://geoserwis.gdos.gov.pl/mapy/>)



CURRENT STATUS OF TAMEH CHP IN KRAKÓW

The TAMEH CHP in Arcelor Mittal's steelworks is an old facility constructed in 50's and 60's of the 20th century and extended in early 80's. Currently the facility operates 3 boilers type TP 230-2 (No. 1-3) of the capacity 180 MW each, one boiler type OPG-220 (No. 7) of the capacity 179 MW and one boiler type OP-230 (No. 8) of the capacity 179 MW, which produce steam which is provided to one steam collector and further to compressors producing air for use by a blast furnace and generators which produce electrical energy, heat and technological steam. Boilers No. 1-3 and 7 are fueled with coal, COG and BFG while the boiler No. 8 is fueled with coal and COG only. COG and BFG are generated at the Arcelor Mittal's steelworks. Flue gases from all of the boilers after particulate matter removal in the individual multi cyclones and electrostatic precipitators are discharged to the air via two stacks, 200 m tall.

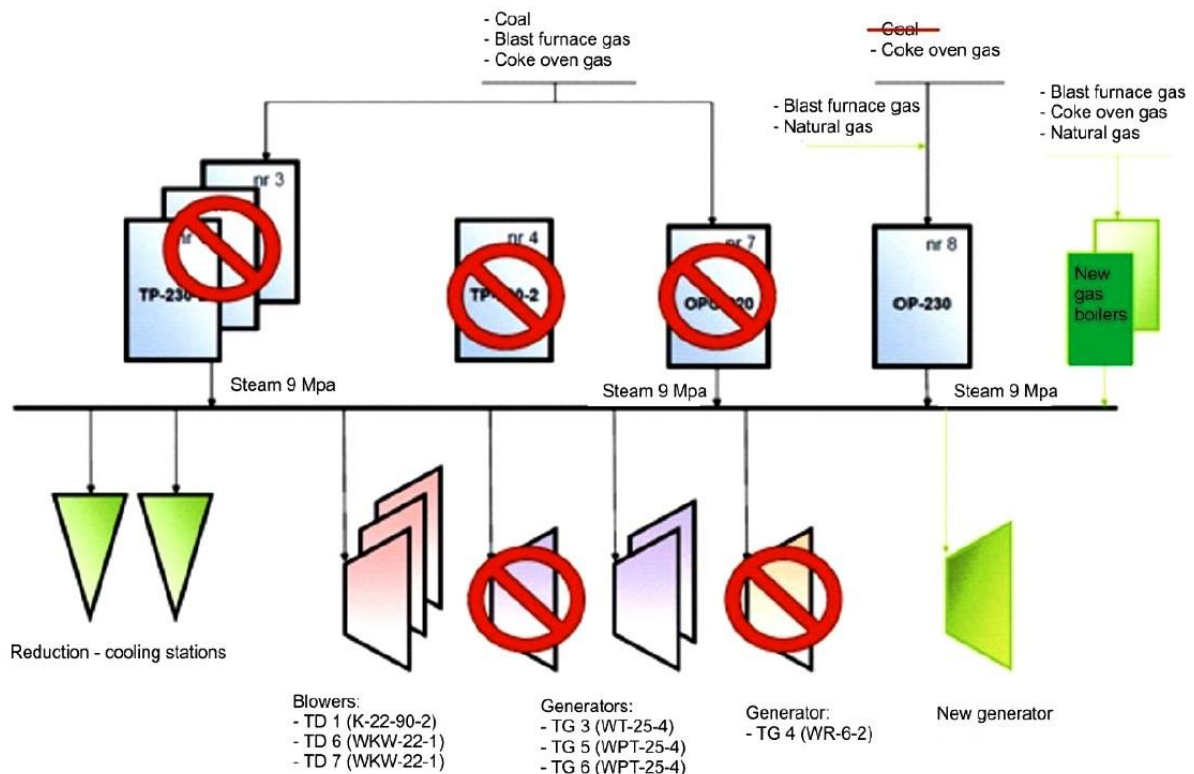
As the boilers are at least 30 years old their technical status is not satisfactory as for the current standards and the boilers require frequent maintenance and their efficiency is below the designed one. Taking this into account and given strict emission standards introduced by the Industrial Emissions Directive (IED) which are impossible without massive investment in emission controls for particulate matter, sulfur oxides and nitrogen oxides the company decided to benefit from the derogation mechanism offered by the IED directive. This derogation allowed the existing emission sources to have increased emission standards until December 31, 2023 under condition, that such emission source will not operate more than 17 500h. In case of the CHP in Kraków this maximum time of allowed operation will expire by the end of 2017. In order to secure undisturbed energy, steam and air blow supply to the steelworks TAMEH decided to totally modernize the CHP.

HOW THE CHP WILL BE MODERNIZED

The modernization of the CHP assumes entire conversion from coal to process gases (COG, BFG) and natural gas. The scope of necessary investment includes:

- construction of 2 boilers, 120 MW each, fueled with process gases and natural gas;
- reconstruction of the existing boiler No. 8, type OP-230 of the capacity 179 MW and its adaptation for use of process gases and natural gas only (coal will not be used anymore) and additional improvements:
- dismantling of 2 existing generators and construction of a new generator of at least 36 MW capacity (decision is currently in the course of arrangements)
- modernization of the cooling water system;
- modernization of the steam collectors.

The investment will be conducted in the existing buildings of the CHP. The core scope of the investment is presented on the drawing below (source: EIA report prepared by SOZOPROJEKT Sp. z o.o., in Polish: 'Raport oddziaływania na środowisko dla przedsięwzięcia budowy dwóch kotłów o mocy 120 MWt opalanych gazami procesowymi i przebudowy kotła OP-230 o mocy 179 MWt w celu możliwości spalania gazów procesowych w TAMEH POLSKA Sp. z o.o. Zakład Wytwarzania Kraków').



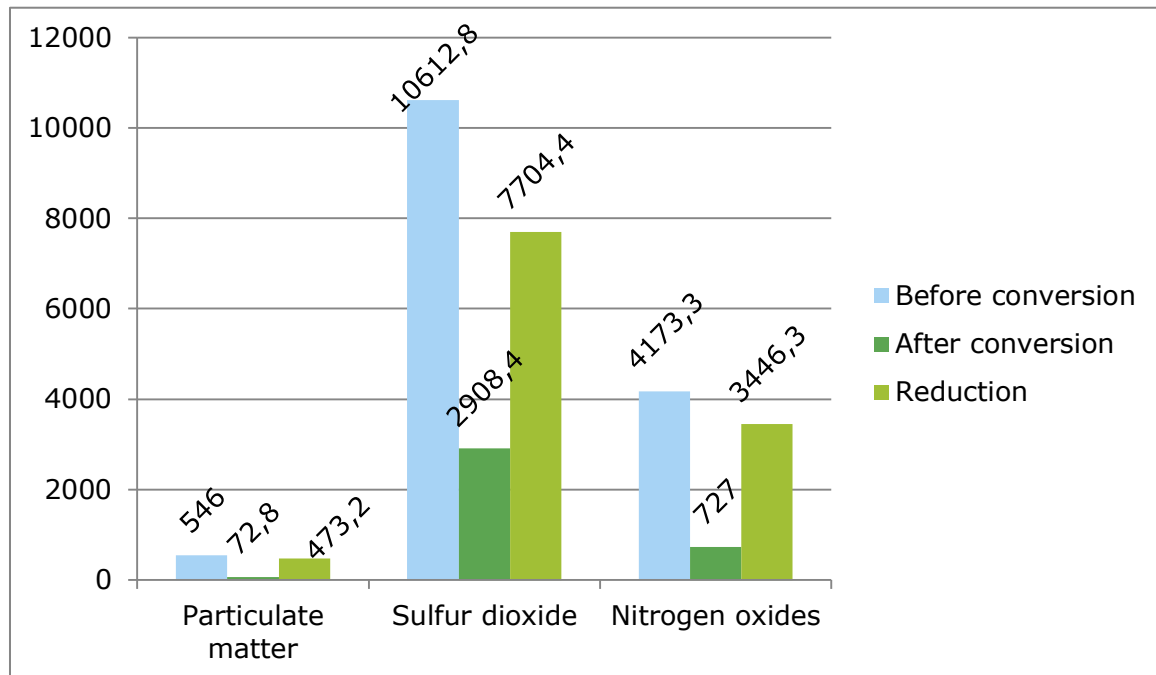
PROJECT CONSEQUENCES FOR THE ENVIRONMENT

Full conversion from coal to gas at the CHP will result with reduction of emissions of air emission pollutants, i.e. particulate matter, sulfur dioxide and nitrogen oxides, as the modernized CHP will have to meet strict emission standards applicable for gas fired plants, as presented in the table below.

Fuel	Particulate matter [mg/Nm ³]	Sulfur dioxide [mg/Nm ³]	Nitrogen dioxide [mg/Nm ³]	Carbon monoxide [mg/Nm ³]
BFG	10	200	100	100
COG	5	400	100	100
Natural gas	5	35	100	100

The emission standards are expressed in milligrams of pollutant per normal cubic meter of dry gases. In case of co-incineration of different gases the emission standards will be an average of individual standards weighted against the heat representative for specific gases.

Maximum annual emissions in metric tons of the emitted pollutants before and after conversion, calculated with use of applicable emission standards and time of operation, are presented on the chart below. As one can see, after conversion the plant will emit almost 11400 tons of pollutants annually than currently. As verified by means of air dispersion modeling, the emissions from the facility will not cause any breaches of the air quality standards. The modeling results indicated that maximum concentrations of pollutants at the ground level will not exceed 0,36 µg/m³, i.e. 0,13 % of the air quality standard for particulate matter, 28,7 µg/m³, i.e. 8,2 % of the standard for sulfur dioxide and 7,2 µg/m³ i.e. 3,6 % of the standard for nitrogen oxides. The air quality standards at the protected health resort areas of Swoszowice-Kraków and Rabka Zdrój will not be breached as well.



Up to now, the incineration of coal generates substantial amounts of fly and bottom ashes which are transported by water to a wet-type landfill. Implementation of the modernization will entirely eliminate this waste stream and moreover no water will be used for transport purposes.

Thanks to shutting down of four boilers the number of noise sources such as ventilators will be reduced and some noise sources, such as these related to loading/unloading of coal and its transport will be entirely eliminated. Although the CHP has limited contribution to the entire noise generated by the steelworks, the project will improve acoustic climate in the neighborhood.

FURTHER INFORMATION AND GRIEVANCES

TAMEH welcomes ongoing comments and suggestions on the project.

A full EIA is available for the project and copies can be found in the City Hall.

All requests for additional information related to the project should be addressed to the Press Officer of Arcelor Mittal in Kraków, or directly to the environmental department of Tameh in Kraków:

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