Overview of the capex project
‘Flue Gas Treatment Unit at Zakłady Azotowe w Tarnowie-Mościcach S.A.’
The project is co-financed under the Norwegian Financial Mechanism Programme.

1. Project name:
   ‘Flue Gas Treatment Unit at Zakłady Azotowe w Tarnowie-Mościcach S.A.’

2. Project description
   The project is being implemented at the CHP plant of Grupa Azoty S.A. (former company name: Zakłady Azotowe w Tarnowie-Mościcach S.A.) and it consists of two tasks:
   1. Flue gas desulfurization,
   2. Flue gas denitrification.

   The project budget is PLN 90m, of which PLN 9.142m will be financed with the grant.

Flue gas desulfurization
   The flue gas desulfurization unit to be built at the EC II CHP plant will help reduce sulfur dioxide content in exhaust gases below 200 mg/Nm3, ensuring compliance with the sulfur emission standards set out in the IED Directive.

   Grupa Azoty S.A. selected the magnesium-based wet flue gas desulfurization method, in which SO\textsubscript{2} is absorbed in calcined magnesite suspension (85% MgO). The process by-products are magnesium sulfate heptahydrate and magnesium chloride hexahydrate.

   Magnesium sulfate heptahydrate is used in agriculture as a magnesium fertilizer meeting the quality requirements of the BN-79/6016/60 standard or as a component in compound fertilizers. Magnesium chloride hexahydrate can be used in agriculture as a magnesium foliar feed or as a component in compound fertilizers, and on roads to quickly remove black ice from the surface (an option that is least harmful to the environment).

   These by-products of the desulfurization process will enable the Company to leverage synergies between its power and fertilizer segments.

   The wet flue gas desulfurization method described above is the most efficient of any available desulfurization technique. It achieves high SO\textsubscript{2} and NOx absorption rates (95% and 15%, respectively) and a dust removal rate of 85%. This helps to ensure compliance with sulfur dioxide quality standards and at the same time contributes to reduced amounts of other emissions.

   The general contractor for the flue gas desulfurization project is Cenzin Sp. z o.o., the unit designer is Biprokwas Sp. z o.o., and the project technology was developed at the Faculty of Chemical and Process Engineering of the Warsaw University of Technology.

   The project is planned to be completed in August 2016.

Flue gas denitrification
   The purpose of the new flue gas denitrification unit is to improve air quality in Tarnów by reducing nitric oxide content in flue gases below 200 mg/Nm3. Flue gas denitrification will be a two-stage process. The first stage will aim to optimise the combustion process in dust burners, and the second stage will aim to reduce nitric oxides content in flue gases using the SCR (Selective Catalytic Reduction) technology. The method relies on a process where nitric oxides react with ammonia. In the SCR process ammonia is injected into the flue gas stream before the catalyst. The amount of injected ammonia depends on inlet nitric oxides concentration, flue gas volume and the required NOx reduction level. Only minor losses in
the form of unreacted ammonia are associated with the reduction process, which however do not impact
the properties of the fly ash. No by-products are produced in the unit.

The general contractor and designer of the flue gas denitrification unit is Polskie Konsorcjum Chemiczne
Sp. z o.o.
The project is expected to be completed in July 2016.

3. Project progress
The project’s implementation commenced in February 2015.

The following stages have been completed under the project for the construction of a flue gas
desulfurization unit at the CHP Plant of Zakłady Azotowe w Tarnowie-Mościcach S.A.:
1. Basic design has been developed;
2. Environmental decision specifying the conditions for the project implementation has been
   obtained;
3. Construction plans and specifications have been prepared;
4. Building permit has been obtained;
5. Detailed design is being developed;
6. The construction site is being prepared for the laying of foundations for the flue gas
desulfurization unit. As part of this task, the following works are under way:
   — relocation of industrial wastewater and stormwater interceptors (construction of new
     interceptors),
   — relocation of the drinking water pipeline (laying of a new pipeline),
   — relocation of part of the existing trestle bridge with pipelines (construction of a new trestle
     bridge and pipelines),
   — demolition of a closed switchgear building.

The following stages have been completed under the project for the construction of a flue gas
denitrification unit at the CHP Plant of Zakłady Azotowe w Tarnowie-Mościcach S.A.:
1. Survey of Boiler No. 5 has been performed and reference measurements have been taken;
2. Basic design has been developed;
3. Environmental decision specifying the conditions for the project implementation has been
   obtained;
4. Construction plans and specifications have been prepared;
5. Building permit has been obtained;
6. Detailed design is being developed.

4. Accomplishments
The project is progressing according to schedule.
Administrative permits have been obtained, and work has physically commenced on the construction site.

5. Outcome
Once the construction of the flue gas desulfurization and denitrification units is complete, Boiler K5 at
the EC II CHP plant will meet the emission requirements for nitrogen dioxide, sulfur dioxide, and dust
laid down in the IED Directive.

6. Contact details
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