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Poland: ANWIL S.A. case study

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Case study name:

[The greening of industries in the EU](#)

Country:

Poland

Organisation Size:

500+

Sectors:

Chemicals

In 2008, the chemical company ANWIL S.A. was the first in Poland to implement catalytic reduction of nitrous oxide (N₂O) by the installation of catalysts in its ammonia oxidation reactor, thus reducing the emissions of this powerful greenhouse gas by 90%. The investment did not interfere much with the previous system of nitric acid production, and therefore there were no changes to the employment structure and working conditions. Through systematic internal training of employees, a stable element of the HR policy within the constantly modernising ANWIL S.A. plant, it was possible to instruct current employees to handle the modified technological process. Also, the level of complexity of the process and high safety standards have remained unchanged.

Introduction

This report focuses on ongoing greening practices at ANWIL S.A, initiated in 2008. The specific action in question was the implementation of the catalytic reduction of nitrous oxide (N₂O) by the installation of catalysts in the ammonia oxidation reactor used in the process of nitric acid production. By the end of 2012 the reduction of nitrous oxide brought about by this measure will have amounted to 3.5 million tons in carbon dioxide equivalent. It was the first such endeavour in Poland. The process was carried out with minimal interference with the existing technological system and at a low cost.

ANWIL S.A., a chemical plant established in 1966 in central Poland, manufactures and sells synthetic chemicals: plastic (polyvinylchloride), *nitrogen fertilisers* and other parallel products of chemical synthesis. It also produces heat and electricity. In 2010 it employed 1,341 people. Its majority shareholder is Polski Koncern Naftowy ORLEN S.A.

ANWIL S.A. has been constantly modernising its technological processes since the beginning of economic transformation in Poland. Apart from the installation of the catalytic reduction of nitrous oxide, other investment has taken place in recent years, aiming to increase effectiveness as well as reduce emissions and energy consumption. The company has also implemented the PN-EN ISO 14001 Environmental Management System.

Drivers and motivations

What is important about the implementation of the catalytic reduction of N₂O is its proactive character, anticipating the amendments to the legal regulations. The investment was conducted in view of the impending introduction of charges for N₂O emission by the EU in 2013.

Simultaneously, the company is taking part in the European Emissions Trading Scheme (EETS). It was the income from the sale of emission reduction units (ERU) to other entities that influenced the decision to make the investment. It is expected that this advantage will be smaller after 2012, and avoiding emission charges will then become the main benefit.

Financing of the project became possible thanks to the joint implementation mechanism, provided by Article 6 of the Kyoto Protocol, through the transfer of ERU. An indispensable factor for the implementation of this project was the emergence of the N₂O catalytic reduction technology and the development of specific technological solutions by the British company Johnson Matthey (since 1998) and the Polish Fertiliser Research Institute in Puławy (technology patented in 2005).

Concern about company image was another motivating factor. The installation was launched at an event attended by the Minister of

Environment and the media. A model of the catalyst was presented during the Poznań Climate Change Conference in 2008.

The economic crisis had no impact on the selected green business practice.

Green business practices

The company found out about the impending introduction of charges for N₂O emission through its membership of industry organisations such as Fertiliser Europe, ECVN, Plastics Europe and EuroChlor. One of the reasons for membership in these bodies is to keep up to date with impending changes to the EU law with respect to environmental standards.

The investment was initially financed by a British investor, and when they withdrew, by a Liechtenstein-based one, in exchange for the transfer of ERU. The emission reduction effect was registered in the United Kingdom.

From the technical point of view the implementation of catalytic reduction of nitrous oxide (N₂O) required the installation of catalysts in the ammonia oxidation reactor used in production of the nitric acid on two lines in the fertiliser part of the plant.

The company's investment partner was an advisory and investment firm, Vertis Environmental Finance. It was first contacted in 2005. Vertis Environmental Finance had had experience with similar projects since 2003. ANWIL S.A. chose them as its partner and middleman for the ERU trade, but not as supplier of catalytic reduction technology. This allowed the company to have a wider choice of contractors and negotiate better transaction terms. The focus was on diversifying the risk connected with the technical side of the project by acquiring technologies from two independent suppliers.

In the course of investment there were two catalysts installed on the nitric acid production lines, one from a British manufacturer, Johnson Matthey, and the other one developed and patented by the Fertiliser Research Institute in Puławy. The use of two different solutions was a way of reducing the main risk, which was insufficient reduction of N₂O emission connected with the fact that technology of catalytic reduction of N₂O is still in its development stage.

The devices allow radical reduction of N₂O emission by 90%. The products of the greenhouse gas reduction are nitrogen (N₂) and oxygen (O₂). The implemented solution is not intended per se to limit the use of resources or energy, but to considerably reduce the emission of a powerful greenhouse gas (whose impact on the climate is 310 times bigger than that of CO₂) through the catalytic reduction process. The installations were put in operation in May and July 2008 respectively. The reduced emission is comparable to the annual emission of CO₂ in a heat and power plant serving a large Polish city.

A project team was established by ANWIL S.A. for the purpose of this investment, to supervise all actions starting from the evaluation and choice of technology. ANWIL S.A. experts acquired the necessary knowledge on catalytic reduction from the sellers of the technology. The installation of the catalysts itself was conducted by the local company Remwil under supervision of the technology sellers.

Anticipation and management of the impact of green change on quantity and quality of jobs

Although this investment was massively important in terms of climate protection, it was possible to carry it out using existing human resources and with no significant changes in quantity or quality of jobs in the company. There are two reasons for this. Firstly, the implementation of the catalytic reduction of N₂O does not interfere much with the existing technological system and does not make it more labour intensive. The catalysts were added to the existing process of nitrate fertiliser production by placing them in the reactor. The employees were able to operate the modernised process after a normal course of training. The fact that this process did not become more labour intensive to the company after the modernisation and that selected green business practice interfered only slightly with the previous technological system organisation may seem surprising considering the size of the emission reduction achieved. This is because of the quality of the catalyst, which constitutes the only addition to the previous equipment.

Secondly, the utilisation of existing human resources was possible thanks to the general company policy of labour organisation and routine training. This policy is geared to the fact that ANWIL S.A. undergoes constant modernisation and the plant operates round the clock. The company operates the 5-crew system of work organisation. It allows for a better work-life balance than the traditional 4-crew system and enables one shift to be devoted to machine maintenance or staff training. The company also systematically widens and updates the workers' knowledge, by training senior and new employees. It conducts its own training without the help of public authorities or other entities with respect to acquiring unusual qualifications.

Impact on quantity of jobs

The technological process involving the catalytic reduction of N₂O is operated by 30 previously employed workers – no new employees were needed. This is because the green business practice is not more labour intensive, and there has been no significant increase in the number of procedures performed. The only change caused by the installation of the catalysts is a need for their maintenance, which is done during periodical repair stoppages and is outsourced. The role of company employees is to prepare the installation for repair and cooperate with repair crews, mostly to ensure safe working. They also supervise the monitoring system, which takes 8 hours a month, and prepare a monitoring report every 7 months, which takes 3 days. These tasks are facilitated by the 5-crew system of work organisation.

Impact on quality of jobs

From the point of view of the workers who operate the process there was minor modification of equipment, such as the replacement of control panel elements or the modified sequence of necessary actions. The interviewees described this as like being car driver. They said installing the innovation described in this report was like switching to a newer model of the same make of car. Driving it requires basically the same set of skills. The interviewees suggested that the increase of know-how following the installation of the catalysts was limited and concerned certain details of operating the technological process. The process changes that occurred were formally introduced (like all other change and modernisation) by updating technological instructions and mode of use. Employees are obliged to know the instructions, and this is verified during periodic training. The knowledge needed to operate the new devices was provided by licensors as part of the package and employees operating the modernised process were introduced to its updated specification in the course of routine training based on the earlier knowledge, lasting about 100 hours in total. The training was run by selected staff members as well as production supervision employees: managers, process engineers and masters.

The abovementioned features of the selected green business practice are also the reason that the process modernisation has not affected employees' work-life balance. It was also neutral to the safety of labour.

Skills development

Preliminary skills required to operate the process have not changed after implementing the selected green business practice: as before the modernisation, new employees are trained in the necessary areas by the company. However, when recruiting workers, the company does not require them to have a very narrow field of specialisation. Production departments employ people with technical middle school education, preferably in chemistry.

The main role during the modernisation was played by the specialists. They were included in the abovementioned project team at the installation stage of the N₂O catalytic reduction, and presently they play an important role supervising the technology of nitrogen oxides reduction in operation, as well as actively participating in verification of future project campaigns. The team was made up of chemical engineers, economists and lawyers. This category of employees require complex expertise in the area of company operations (for example, the issue of carbon footprint in the context of climate protection), as well as knowledge of law, current and expected legal regulations connected with climate protection. Technical supervisors were also involved. Their task was to implement the procedures connected to the Kyoto Protocol, which took about 2,000 hours in total (which is an equivalent of a year's work of one full-time employee).

There was no collaboration with local authorities and educational units in order to update skills in connection with the selected green business practice.

Collaboration during the implementation of the selected green business practice

As mentioned above, the company is a member of Europe's top industry organisations, which take part in the debate on the shape of EU environmental policies. This enables it to forecast important changes with respect to EU regulations and to forestall them – as was the case of the selected green business practice – by undertaking appropriate modernisation.

The trade union representatives were informed about the coming implementation of catalytic reduction of N₂O during routine meetings with the board. The investment was fully supported by the unions for three main reasons: 1) it was neutral in terms of employment and safety of labour; 2) there was an economic advantage resulting from the possibility of trading ERU and avoiding charges for N₂O emissions in the future; 3) the investment was a means to improve the image of the company resulting from the introduction of a green technology. The fact that the implementation of the N₂O catalytic reduction was neutral to the terms of employment was reiterated by a trade union representative at ANWIL S.A. He confirmed that the investment was supported by the unions due because of its positive effect on the competitive position of the company. However, the works' trade unions did not actively participate in the preparation stage of the investment, nor were they involved in the decision-making.

The implementation of the selected green business practice was communicated to the local community, which is usually interested in the safety of the area surrounding big chemical plants. However, the interest of local inhabitants in the catalytic reduction of N₂O proved more modest than expected. This could have been because of the lack of tangible effects of the investment – in the case of the N₂O catalyst installation it is impossible to see them, as the exhaust from the gas chimney cannot be seen with a naked eye.

Conclusions and recommendations

- The company is able to anticipate the future state of legal regulations pertaining to the chemical industry through its membership in European organisations and by monitoring legislative changes at the EU level, which later translate into amendments to the national laws. In this manner, the company can envisage modernisation – allowing it to avoid future costs and strengthen its competitive position, as with the green business practice discussed in this study.
- The managing board's openness to new investment financing solutions and cooperation with specialised consulting firms allows the company to use the opportunities to considerably strengthen its competitive advantage coming from current technological and legal change. The low cost of implementation of the selected green business practice was possible thanks to the innovative joint implementation mechanism.
- Proper human resources management, ensuring stability of employment and possibility of constantly updating one's qualifications through training incorporated into the shift work scheme, allows for easier introduction of technological process modification, to which the existing personnel can rapidly adapt.
- Consistent transparency policy and informing about the burden on the environment caused by the company and its reduction through modernisation should be part of the image-building for large plants operating in the chemical industry, and be a guarantee of trust from the local community and wider public opinion.
- Despite ANWIL S.A.'s self-sufficient head-hunting, local authorities should put more effort into shaping the educational offer of local schools by way of dialogue with the top local employers.

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