



**U.S. TRADE AND DEVELOPMENT
AGENCY**

EXECUTIVE SUMMARY

**Final Report Commercial and Technical Evaluation of the Application of Gas
Turbine Technology in Industrial Plants in Poland**

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Executive Summary

This final report summarizes five reports prepared for Polish Energy Partners by Wilton InterPower llc pursuant to a grant from the United States Trade Development Agency. The purposes of this study were to assess the feasibility of the application of small- to medium-scale gas-fired generation technology in Poland and to inform the relevant U.S. business community about such commercial opportunities in Poland.

The study summarizes a preliminary design for the application of gas-fired cogeneration technology in five locations in Poland. It describes a pro-forma economic analysis of relevant cost and operating assumptions and life-cycle costing estimates and summarizes a review of project sensitivity to major risk factors, including fuel price, price of power, foreign exchange, cost and tenor of debt financing and inflation. Based on meetings with PGNiG and its regional subsidiaries, the study concludes that a long-term gas supply is available at an economic cost for the next twenty years for each of the projects studied.

Recent experience demonstrates that the conclusions reported here are correct. Polish Energy Partners has already completed one cogeneration project, which has been operating since August 1999, and a second project will be completed in September 2000. Final negotiations with the host of the third project, which is described in this report, were completed in June 2000 and project construction will begin later this year.

Introduction

1.1 Project Background

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This study examines the technical, economic, and financial aspects of small to medium-scale combined heat and power plants where gas turbines, waste heat recovery steam generators and gas-fired boilers are used to supply energy to industrial and municipal organizations throughout Poland. Conversion to gas turbine-based combined heat and power promises to bring potential economic and environmental benefits to the industrial and municipal sectors.

Gas turbines suit Poland's needs technically, economically, and environmentally as an alternative to coal-fired applications. Gas-fired turbines run more cleanly and efficiently, with lower operating and maintenance costs, in comparison to existing coal-fired boiler houses now commonly found throughout the country. Significant reductions Of CO₂ emissions may result simply from conversion from coal to natural gas, even if production efficiencies are disregarded. Reductions in suspended particulate matter (SPM) and SO₂ emissions will also be realized as a result of the reduction in the use of coal

In the last several years, the government of Poland has taken numerous steps to promote natural gas as a fuel source. These actions include: signing an agreement with GazProm of Russia for the delivery via pipeline of natural gas, undertaking the expansion and upgrading of the gas distribution pipelines, removing subsidies for the mining and consumption of domestic coal, and establishing new electricity tariffs that reflect the actual cost of production and transmission. In addition, Poland's Public and Private thermal and power producers must meet new stringent environmental emissions standards to qualify Poland for entry as a member of the European Union

Recent experience has demonstrated that equity and commercial debt financing is available for gas-fired industrial cogeneration projects. The first such project to be developed in Poland, a 4.1 MW industrial cogen plant near Boleslawiec, Poland, was developed by PEP and financed with local banks providing the debt financing. This project has been operating commercially since August 1999. The second project, a 3.5 MW industrial cogen plant developed by PEP near Wroclaw, Poland, is under construction and is expected to begin operation in May 2000. Both projects utilize U.S.-made gas turbines. Final negotiations for the third project, a 20 MW industrial cogen plant in Kostrzyn, Poland, described in a previous Wilton report to TDA, are underway now. U.S. vendors have also stated their willingness to provide equity and debt financing to viable projects that procure their equipment. As these projects clearly demonstrate, there is substantial potential for U.S. exports, most likely pre-designed power plant packages that include gas turbines and related controls.

Participants

Polish Energy Partners (PEP) is a privately-owned Polish company established in 1997 to develop small-scale gas-fired cogeneration projects for Polish industrial and district heating companies in Poland. PEP was formed by combining the business and technical resources of an existing Polish power plant developer (Quo Vadis Polska) with the financial resources of the Polish Enterprise Fund, a highly regarded equity investment group based in Warsaw. Today, PEP has 21 full-time engineers and technical staff.

Wilton InterPower llc (Wilton) is an international cogeneration power plant owner/operator and developer with more than 20 years of management experience in the business of designing gas turbine power stations. Wilton InterPower was formed in 1995 with the specific mission of utilizing their industry experience for the development of small to mid sized power plants in countries that are re-vitalizing their energy infrastructure.

Projects

Wilton evaluated the commercial and technical feasibility of five proposed gas powered projects. These are summarized in Table 1. As noted, they range in size from 2 to 50 MW, and are located in all parts of Poland. Four of the projects are located at industrial hosts and would provide thermal and electric energy to the host; one would be located in an off-system gas field and would be configured to

provide only electric energy. Although originally intended to employ a gas turbine, this last project would be developed using a natural gas-fired reciprocating engine.

1.3 Recommendations

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The evaluation and analysis described in this report demonstrate that each of the potential projects is feasible and can be economically developed. Most of the projects would be constructed for a willing private host, with the active support of the gas company and, indirectly, the national grid, all of which greatly simplifies

The development process: In at least one case, there will also be a willing municipal host and a receptive electric utility. Many other industrial locations should also be highly attractive based on this analysis and could be developed using the documentation and models developed for this report.

At this time, Polish Energy Partners has executed an energy services agreement for the 16.9 MW Kostrzyn Project, and is actively pursuing the development of the 2.0 MW Molodycz Project, and the 50 MW Sanok Project. It is continuing to review the other two projects with the potential industrial hosts.