



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

EXECUTIVE SUMMARY

Seival 500 MWe Coal-Fired Mine-Mouth Thermal Plant Project Feasibility Study

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I INTRODUCTION

Under the direction of Copelmi Mineragdo, Parsons Energy & Chemicals Group (Technical and Project Lead), Taylor-DeJongh (Financial) and Main Engenharia & Consultoria S.A. (in-country engineering company) have prepared a feasibility study, including necessary technical evaluation, plant siting, capital costing, environmental analysis, economic justification, and financial analysis, and are providing financial documents necessary to proceed with final development of a coal-fired thermal Power Plant.

This section presents the project objectives, and background on the Brazilian electric market and natural gas within Brazil.

1.1 PROJECT OBJECTIVES

The primary objective is to develop a report suitable for serious consideration by a developer/investor that includes:

- * Basis for the size and configuration of the coal-fired power plant;
- * Suitable site or sites;
- * Conceptual design, cost estimate and schedule; and
- * Financial basis, analysis, and plan.

The scope follows the primary objective. The detailed project scope is presented in Appendix A. An important objective for Copelmi is to clearly identify the next steps for the development of the power plant within the new Brazil electric model.

THE BRAZIL POWER INDUSTRY

The history of the electric power industry in Brazil has been documented in several key reports.'

The Brazilian power sector comprises two interconnected systems and a number of isolated systems. The interconnected systems are located in the North/Northeast and South/Southeast/Midwest regions of the country; at present they are not interconnected, although plans exist for a 500 kV interconnection in the near future. The isolated systems in the Amazon region to the north of the

The South, Southeast and Midwest regions are electrically interconnected with the transmission system interconnecting the main river basin generating complexes of the Paranaíba, Grande, Paraná and Iguaçu rivers. The system also includes the Itaipu transmission connections. The North and Northeast systems are interconnected through 500 kV transmission lines, linking the Paulo Afonso generating complex, on the São Francisco river in the northeast with the Tucuruí hydro installation on the Tocantins river in the north

Privatization is now well underway. The distribution companies are being privatized first, followed by the generating companies. Companies are being split into pieces, as felt necessary to provide reasonable company size and also fair

competition. The authority to analyze and forecast electricity purchases, and to write long term contracts is being given to the distribution companies. Competition is opening for projects such as VTP to compete with existing generation, and other new generation.

1.4 COAL IN BRAZIL

Coal provides two percent of Brazil's total energy needs. Historically, Brazil has produced as much as 25 million metric tons of coal (1985). However, domestic production has declined in recent years largely due to the deregulation of the coal industry that has allowed the import of foreign, primarily metallurgical, coal. Currently about 9 million metric tons of coal is produced in Brazil. Of this amount, approximately two-thirds is used by the generators of Brazil's approximately 1,400 MW electric generation capacity that uses coal (approximately 2.6% of Brazil's 59,000 MW total capacity). Exhibit 2 provides information on the existing coal-fired power plants in Brazil.

**Exhibit 2:
Existing Coal-Fired Power Plants in Brazil**

Operating Thermal-Plant	State	Capacity (MW)	Annual Coal Use (000 MT)
Pres. Medici	Rio Grande do Sul	446	1,742
Charqueadas	Rio Grande do Sul	72	286
Sdo Jeronimo	Rio Grande do Sul	20	30
Jorge Lacerda	Santa Catarina	482	1,468
Jorge Lacerda	Santa Catarina	350	1,000
Total		1,370	4,526

Source: International Energy Agency

Brazil's coal reserves are estimated to be 32 billion metric tons, 84% of which are located in the southern state of Rio Grande do Sul (RS). The Candiota region, located in southern RS within 50 km of Uruguay, has 14.0 billion tonnes of coal. This region has the most competitive coal within Brazil, with coal prices below US\$ 1.00/MMBtu.

Increased use of domestically mined coal is impeded by its very high ash (40-65%), high sulfur (2-5%) and low energy content. However, in its national coal strategy, Brazil recognizes the strategic importance of coal and the role that clean coal

The Southern States of Brazil seek to develop more local sources of energy to avoid brownouts and rationing which plagued Rio Grande do Sul in 1998-99. A ten-state blackout occurred in March 1999 as lines from Itaupu were dislocated during a windstorm. Southern Brazil currently imports more than two-thirds of its electricity.

Coal will be produced in low-income mining areas of Rio Grande do Sul and Santa Catarina where the mines generate critical economic activity. These two states have 15 million people combined.

Use of Brazilian coal will contribute to reducing Brazil's balance of payments deficit for imported oil and gas.

Reduction of dependence on hydropower, which leaves users very vulnerable to drought.

NATURAL GAS DEVELOPMENT STATUS WITHIN BRAZIL

To meet the expansion of power demand in the 5 southern states receiving Brazil-Bolivia pipeline gas, market studies indicate the need to increase installed capacity by a minimum of 9000 MW of thermoelectric production. To supply gas-fired generation of 9000 MW would require approximately 45 million m³/day of natural gas.

Historically, natural gas has played a small role in power production, however with the introduction of Bolivian and Argentinean gas, the fraction of electricity produced by gas is predicted to grow from 2% to 12% within 10 years. Over 90% of this gas will be imported and dollar based. Even with this tremendous growth, Brazil will need more thermal plants than can be supported by the Bolivian and Argentinean pipelines. Although hampered by initial problems of establishing prices, volume commitments, and bankable contracts, it is expected that many gas projects will be built, and will become an integral part of Brazil's energy mix.

Additional details regarding the natural gas development within Brazil are found in **Appendix K**.