btg pactual

Sector Policy: Power Generation - Oil

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1. Policy's Purpose

BTG Pactual drafted this Policy with several policies to identify the social, environmental and climate risks of its many operating segments, complying with the principles and grounds outlined in its Social, Environmental and Climate Responsibilities Policy.

To prepare each Sector Policy, a detailed analysis was carried out of the social and environmental issues involving BTG Pactual's many operating segments during all stages of its production processes, i.e., from opening new areas and obtaining raw materials, throughout the production, distribution and closing of all business activities. To this end, reports and documents were consulted from the sector's main players, such as IFC guidelines, international references for social and environmental risk analysis and technical knowledge of BTG Pactual's internal team.

The Oil Power Generation Policy establishes the 9 socio-environmental aspects relevant to the sector and classifies them according to their relevance in terms of risks and opportunities for this economic sector. This policy will be reviewed periodically over a period of no more than 3 (three) years.

2. Application Scope

This Policy must be applied by the ESG team, considering the relevance and proportionality principles, in all segments of BTG Pactual world wide that have entered or intend to enter into a relationship with legal entities and/or individuals in the fossil oil thermoelectric power generation sector, including, but not limited to, those carrying out construction, maintenance and generation activities.

3. Notes on the Sector

The fossil fuel oils used in thermal power plants are derived from petroleum. According to the National Agency of Petroleum, Natural Gas and Biofuels (ANP)[1], 96.7% of Brazilian approved oil reserves are in offshore reservoirs. Although significant in Brazil's energy matrix, oil is not relevant in the electricity matrix, accounting for only 3.7% of installed capacity according to the National Electricity Regulatory Agency (ANEEL). The most common derivatives used in electricity generation are diesel oil and fuel oil, the first of which is a lighter refined oil, while the second is a crude residual oil, less valued.

In thermoelectric power plants, oil is burned, converting chemical energy into thermal, then mechanical, and finally electrical energy. As these oils have contaminants in their composition, combustion tends to release more pollutants compared to natural gas. Furthermore, for their composition with larger carbon chains, there is more carbon dioxide (CO_2) released per unit of energy generated[2].

Unlike intermittent renewable sources, oil-fired power plants are independent of climatic variables, contributing to the stability of the Brazilian electrical system, consequently, the country's energy security. Another advantage is they can be installed near consumption centers, as they are small-size

[1] Painel dinâmico SDP – Recursos e Reservas. Available at: <https://app.powerbi.com/view?r=eyJrIjoiYmJhZGI4MTQtNDJhNS00NzYzLTg3YjktZGM3NGVjZjZiNmVkIiwidCI6IjQ0OTlmNGZmLTI0YTYtNGI0Mi1iN2VmLTEyNGFmY2FkYzkxMyJ9>
[2] The Palgrave Handbook of International Energy Economics, 2022.

units. This eliminates the need for transmission system construction and reduces the risk of energy loss during this process, as well as the possibility of selecting locations with lower socio-environmental sensitivity (examples: indigenous lands, quilombola communities, areas of high environmental conservation value) and/or land use conflicts. As they are less competitive than natural gas-fired power plants, they usually operate to regulate the load (flexible plants).

4. Social and Environmental Aspects

Below, we list the nine most relevant topics in this segment that BTG Pactual will analyze.

4.1. Productive Chain and Suppliers

As the source used to generate energy is oil, special attention must be paid to the environmental compliance of (i) the areas from where the oil is extracted, (ii) the refineries and (iii) transportation to the thermoelectric plant (normally by gas pipeline or highway).

Oil production generates impacts on fishing and tourism activities, as well as landscape alteration (if the activity is carried out close to the coast or on land) and changes in water quality, which may hinder maritime traffic, disorient fish schools, and even contaminate marine biota.

Specifically regarding the drilling of wells, special attention must be given to the isolation of formations and the risks of leaks during oil production, transfer and transportation operations, as well as the correct disposal of solid waste from drilling, considering its high potential for contamination.

Refineries emit greenhouse gases, atmospheric emissions and can alter water quality (resulting from accidents involving oil spills) if not operated properly, with mitigation and prevention programs, and within applicable standards.

As for transportation, which can be carried by pipelines, trucks, trains or ships, the following recommendations are made: (i) identify risks for each mode of transportation; (ii) adoption of safety measures to prevent environmental accidents; and (iii) proof of the effectiveness of these measures.

All of these factors can represent operational risks to the plant (in case of accidents or shutdowns from the sanctions by environmental agencies) and/or reputational risks.

4.2. Use of Water Resources

Most oil-fired generators are turbines or internal combustion engines. Both require large amounts of water for steam generation and/or cooling. In the case of gas or steam turbines, water consumption can pose a risk to the water supply of the region if the power plant is installed in a water-scarce area, also generating an operational risk.

The risk related to the use of water resources can be minimized by adopting technologies with low water consumption or by utilizing reused water.

4.3. Impacts on Fauna and Flora

The implementation of an oil-fired thermoelectric plant, similar to the installation of any other project, can affect the flora by the suppression of vegetation (necessary for the implementation of access roads and the plant itself) and the introduction of waste without proper management into the ecosystem.

Furthermore, burning oil releases pollutants directly affecting the surrounding vegetation. According to experts[3], the pollutants emitted by plants of this nature can harm the growth of nearby vegetation, in addition to the whitening of the leaves of this vegetation in the event of any acid rain also caused by these pollutants. Periodic monitoring of vegetation is recommended to verify these negative impacts and, if necessary, adopt mitigating measures

With regard to fauna, the drafting and implementation of programs to drive away, rescue and manage fauna (with the presence of biologists to direct fauna to safe areas), generally required by environmental agencies, may mitigate these risks.

4.4. Atmospheric Emissions and Climate Change

During the construction of the plant, the main sources of atmospheric emissions are removal of vegetation cover, earthworks, movement of vehicles, civil works procedures and demobilization of the construction site. During the operational phase, the main emissions are related to the burning of fuel to generate energy and the transport of materials.

The combustion of oil in these power plants emits large amounts of nitrogen and sulfur oxides, mercury compounds, methane and carbon dioxide. Nitrogen oxide affect air quality, have negative effects on the health of the population and the acidification of rainwater. As to the nature of the fuel, these quantities are higher than those emitted by natural gas-fired power plants.

Despite usually operating only during peak hours, performing the important function of regulating supply and complementing the intermittency of renewable sources with rapid dispatch, oil-fired generating units has been replaced (or adapted) by natural gas units. In addition to the typically more competitive cost of natural gas, the equivalent emissions (per unit of energy generated) of greenhouse gases from these plants are higher than those from natural gas-fired plants. In this context, good practices in this sector include the creation of transition plans including the conversion of generating units; diversification of the controller's portfolio into less emission-intensive activities (such as renewable energy generation); and the use of biofuels.

The ESG team will verify whether the counterparty implements mitigating and preventive procedures such as: (i) monitoring emissions (especially carbon monoxide, nitrogen oxide and carbon dioxide); (ii) construction of appropriate chimneys for pollutant dispersion; (iii) implementation of green curtains to minimize the release of gases and dust outside the project; and (iv) selection of a location that favors atmospheric dispersion.

[3] According to Ugocione & Cardoso, nitrogen dioxide is a nutrient limiting plant growth in many ecosystems. For more information, visit: < https://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-40422002000300003&lng=en&nrm=iso >.

These measures can mitigate legal and operational risks (in case emissions limits are not met), in addition to reputational risk.

4.5. Noise

The main sources of noise during the construction phase of the gas thermoelectric plant correspond to vehicle traffic and the use of machines. During socio-environmental due diligence, verifications is made whether the counterparty carries out the following procedures: (i) maintenance of vehicles and equipment to control noise and vibration emissions; (ii) prioritization of equipment with low noise levels; and (iii) imposition of speed limits on internal roads.

For the operation phase, the main sources arise from the handling of machines and equipment, in addition to the transport of people and materials. Evaluation is made whether the counterparty monitors noise levels to verify if emissions are within the standards of applicable legislation.

4.6. Effluens and Solid Waste

The main sources of effluents in oil-fired thermoelectric plants are: residual oil, water generated in the process and sanitary sewage. Tanks and pipelines also pose risks of leakage and contamination. If the effluent is released without proper treatment, it may cause changes in the quality of the soil and watercourses, with interference in aquatic biota.

The socio-environmental team will verify whether the counterparty carries out proper treatment and disposal of its effluents and waste, by adopting continuous monitoring (of the effluents and the receiving body) within the limits imposed by legislation. The integrity management of tanks and pipelines will also be checked, as well as monitoring leaks in the plant area.

Failures in waste and effluent management processes can result in soil impacts and increase the risk of contamination. The costs associated with decontamination processes can be high, representing a credit risk (affecting the ability to repay debt).

4.7. Occupational Health and Safety

For this item, the social and environmental team must verify whether the counterparty performs the following procedures: (i) assessment of risks to employees and respective preventative measures; (ii) specific admission and periodical examinations for each of the position; and (iii) training on the subject, in addition to action plans to correct any irregularities identified. Below are the main identified risks and preventative measures.

	Aspect	Risk	Mitigators
1	Noise	-Turbines and engines. -Cooling towers.	- Acoustic isolation control rooms, identification areas with high noise, and require wearing PPE 100% of the time.
2	Confined Spaces	-Turbines, engines, condensers and cooling water towers	- Wearing Personal Protective Equipment
3	Dust	-Operation of vehicles and machines. -Installation and mobilization of construction site. -Landscaping.	-Wearing Personal Protective Equipment. -Maintenance of the vehicle fleet.

4.8. Human Rights

Regarding the construction phase of the oil-fired thermoelectric plant, operations may attract workers from other regions which may increase the demand for public services (health and infrastructure), to the point of overloading it, in addition to potentializing violence, traffic accidents, prostitution and child sexual exploitation, consumption of alcohol and other drugs, in addition to the employment of child and/or slave-like labor. These findings are translated into human rights violations.[4]

In general, recommendation is to assess the negative impacts of the project's installation and operation on human rights. On this subject, Brazilian Decree 9,571/2018 provides on the following mitigating measures to be adopted by companies:[5]

- Periodically validate conditions regarding human rights to identify, prevent, and mitigate the risk of human rights violations.
- Develop and constantly improve risk control and monitoring procedures.
- Maintain clear and transparent accountability for the operational risks regarding human rights and measures taken to prevent them.

4.9. Community

The greatest impacts on the community linked to this segment are related to the competition for the use of water resources in the region between human consumption and consumption by the thermoelectric plant, as well as the high rate of atmospheric emissions from the operation of this thermoelectric plant, which can bring changes in the quality of the air, negative effects on the health of the population and acidification of rainwater.

Besides creating programs to mitigate these impacts, recommendation is to create a communication channel between the community and entrepreneur on information actions on the plant and complaing and report channels. Communication channel is recommended to have as goal to compromise with solving complains and reports by the impartial, transparent and predefined process. By the analysis, determination, closing and return of each claim. In general, besides legal risks for any breach of laws, there may be risks to the company's image and reputation.

[4]Human rights are those mentioned in (i) UN Universal Declaration of Human Rights – United Nations; (ii) Declaration on Fundamental Principles and Rights at Work of the International Labour Organization; (iii) UN International Covenant on Economic, Social and Cultural Rights (iv) UN International Covenant on Civil and Political Rights.
[5]Brazilian Decree 9571/2018, which establishes the Brazilian Guidelines on Companies and Human Rights.

Annex: Sector Categorization Matrix - Social, Environmental and Climate Risk Document

Risks	Description	Category
Social Risk	Consolidated assessment	Medium
	Slave labor	Low
	Child labor	Irrelevant
	Occupational health and safety	Medium
	Damage to populations or communities	Medium
	Other factors	Low
Environmental Risk	Consolidated assessment	Medium
	Energy: use and conservation	Low
	Water: use and conservation	Medium
	Water: pollution	Medium
	Waste: management and disposal	Medium
	Air: pollution	Medium
	Biodiversity and natural resources: use and conservation	Low
	Hazardous materials: disasters	Low
	Soil: contamination	Medium
	Other factors	Medium
Physical Climate Risk	Consolidated assessment	Low
	Adverse weather conditions	Low
	Long-term changes	Irrelevant
	Other factors	Low
Climate Transition Risk	Consolidated assessment	High
	Public policies/Legislation	High
	Technology	High
	Markets/Consumers	High
	Other factors	High