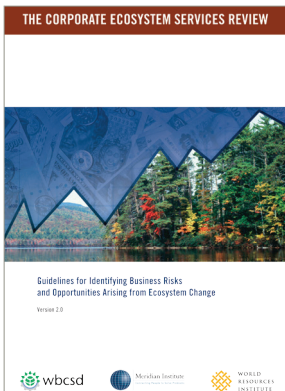




THE CORPORATE ECOSYSTEM SERVICES REVIEW CASE STUDY: ANGLO AMERICAN

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The Corporate Ecosystem Services Review (ESR) is a proven 5-step method to help managers identify business risks and opportunities arising from their dependence and impacts on ecosystem services. This case study describes one company's experience and results in applying the ESR.

This case is an accompaniment to The Corporate Ecosystem Services Review Version 2.0 (2012), which is available online at www.wri.org/ecosystems/esr. It was produced in association with CEBDS, GVCes, and USAID.

WHY ANGLO AMERICAN IS USING THE ESR

The Brazilian government plans to increase metal ore output by 30 percent by 2030, with an increase in extraction from the Amazon region. This is a significant business opportunity for mining companies, but balancing commercial and conservation efforts presents a challenge.

Anglo American, a large mining company, used the **Corporate Ecosystem Services Review (ESR)** to inform the design of a “greenfield” mining project—that is, a new project in an area unconstrained by existing infrastructure or prior work. The new Jacaré Project was located in the Brazilian Amazon Basin. Taking an extra step beyond conventional environmental impact assessment, the sustainability team applied some Anglo American sustainable development assessment tools—such as their environmental way and socioeconomic assessment toolbox— in combination with the ESR, and therefore was well-equipped to investigate strategies to cost-effectively advance corporate water and energy sustainability goals (Anglo American 2013a, Anglo American 2013b).

Spearheaded by the company's sustainable development department, the ESR team included environmental engineers and analysts, Jacaré site managers, as well as regulatory affairs and communications personnel. To get the most value out of their ESR pilot project, Anglo American joined a Brazilian business sustainability initiative called **Parceria Empresarial pelos Serviços Ecosistêmicos (PESE)**. PESE is a partnership among companies and civil society to demonstrate the business benefits of ecosystem services in Brazil. The eight companies participating in PESE executed their ESRs at the same time, leading to beneficial cross-sector learning and support throughout the process.

STEP 1. SELECT THE SCOPE

To keep the ESR process focused and manageable, the first step is to select a scope of assessment that is strategic, timely, and internally supported by the company.

Anglo American focused the ESR on a prospective green-field nickel mining project located in São Félix do Xingu, Pará, in the Amazon region. The project is undergoing a prefeasibility assessment.

While São Félix do Xingu used to be mostly contiguous rainforest, over recent decades the area has experienced widespread deforestation and now presents a mosaic of cattle pasture, settlements, and fragmented forests. The consequent loss of regional ecosystem services poses some challenges to Anglo American's operations, particularly in securing access to natural resources and building good relationships with local stakeholders. The ESR provides guidance on developing business strategies that respond to ecosystem change, and therefore is a good fit to inform the prefeasibility and impact assessment phases of this mine's development.

The ESR team focused on decisions about water and energy use for the mine. The Jacaré Project will use significant amounts of water and faces various options on how to manage water intake and use. The company is considering powering the mine with wood biomass fuel instead of coal. The opportunity is to reach 50 to 100 percent biomass fuel use in the future. The team used the ESR to better understand the financial, social, and environmental trade-offs among various technological options to inform design plans and an investment strategy.

STEP 2. IDENTIFY PRIORITY ECOSYSTEM SERVICES

To focus on the ecosystem services most relevant to business performance, the second step of the ESR is to prioritize a few key ecosystem services by evaluating the degree of the company's dependence and/or impact on more than 20 ecosystem services relevant to the scope of assessment.

Anglo American's team used the Anglo American assessment tools and the [ESR dependence and impact assessment tool](#) together to prioritize the ecosystem services most important to the mine. The team decided to focus on biomass fuel (wood), soil quality, and freshwater because of the operation's high dependence and potential impact on these services.

Freshwater Supply and Quality

The mine's ore refining processes will fully depend on water sourced from the nearby São Sebastião River. Using the best available water recycling technologies already employed at its current operations, the mine will be able to reuse 80–90 percent of its water, and will draw the remaining 10–20 percent from the river (Anglo American 2013c). The company plans to invest in rain harvest technologies that will minimize water intake from the São Sebastião River during rainy periods. These technologies can decrease the operation's impact on the river.

Provision of Biomass

Anglo American is considering replacing up to 10 percent of its coal use as fuel at the mine with wood biomass. This would represent a reduction of about 1.25 million metric tons of coal over the lifetime of the mine. Since both fuels have similar calorific content, Anglo American could source up to 38,000 metric tons of wood biomass per year, representing approximately 7,700 hectares of plantation forest (Sedjo 2013). The long-term opportunity is to reach 50 percent to 100 percent biomass fuel use.

STEP 3. ANALYZE TRENDS IN PRIORITY ECOSYSTEM SERVICES

Step 3 of the ESR guides an analysis of the conditions and trends in the ecosystem services prioritized in the previous step, as well as drivers of environmental change that significantly influence those trends.

Freshwater Supply and Quality

The São Sebastião River is located in the Xingu watershed and provides water for the 99,000 people in the city of São Félix do Xingu, several large-scale mining projects, and large cattle ranching areas that encompass Brazil's biggest cattle herd of 1.7 million animals (Anglo American 2013c). The river is located in a high-precipitation region, and has a distinct dry-wet seasonal pattern in water flow. Siltation and erosion from cattle ranching and deforestation at river banks by small-scale farmers and landless peasant migration have begun interfering with water flow, and increasing economic activity in the area is putting pressure on the watershed's supply (Anglo American 2013c). Water use permits are becoming increasingly difficult to secure from the local government. The government also has signaled its intention to develop a river basin committee, which may result in the imposition of fees for drawing water in the future. Such fees have already been implemented in other regions of the country.

Climate change and deforestation also are shifting regional precipitation and water flow patterns. Studies show that increasing deforestation in the Pará region of the Amazon will likely lead to lower levels of rainfall (Marengo et al. 2011). Furthermore, deforestation and climate change may lead to more frequent and severe droughts (Marengo et al. 2011). Water supply challenges may create problems not only for Anglo American's mining operation, but also for reforestation initiatives, as a compromised water supply may lead to lower soil quality and biomass growth rates.

São Félix do Xingu and other communities downstream from the mine lack water treatment and sanitation systems. In the future, growing water demand for other uses could potentially compete with Anglo American for water use. Other upstream users include mining companies and cattle ranches, which may also impact water quality through effluents and pollution from runoff carrying fertilizer and animal wastes.

Provision of Biomass

To understand the viability of local wood biomass supply as a reliable energy source, Anglo American's ESR team assessed how regional supply and demand for biomass is likely to change in coming years. The region is undergoing significant economic development and a consequent growing energy demand, traditionally met through biomass fuel. Anglo American itself would be contributing to the increase in demand if it invests in biomass-compatible energy systems, and could also use wood biomass as fuel from its own property, since it would be cleared for mining operations anyway.

According to the current scenario, switching 10 percent of energy supply from coal to burned biomass would save \$29.5 million over the 39 years of the mine's lifespan. This is a result of biomass prices being slightly lower than coal, which would have to be imported from South Africa or Colombia, even without taking into consideration potential incentives for clean energy. Local partners developing biomass production operations would supply the biomass.

Developing local reforestation projects to secure access to biomass fuel pose another set of important trends and conditions to be analyzed. There is significant uncertainty in the Brazilian Amazon regarding land tenure and ownership rights, driven by a history of land grabbing and erratic enforcement by government agencies. This creates challenges for Anglo American, as reforestation development would require additional land ownership. The government

recently started to enforce land cover legislation more vigorously and prioritize native species in reforestation projects. Moreover, potential third-party suppliers of biomass include small farmers and landowners in the region. These farmers and landowners are not trained in forest management, but have been working with international nongovernmental organizations in local projects to support entrepreneurship and capacity building.

STEPS 4 & 5. IDENTIFY BUSINESS RISKS & OPPORTUNITIES AND DEVELOP STRATEGIES

Step 4 of the ESR evaluates how trends in ecosystem services can impact the company, either positively or negatively. Step 5 of the ESR focuses on creating new business strategies that address the risks and opportunities identified in the previous step. Actions can be grouped under three categories: internal changes, external engagement with stakeholders or sector players, and public policy engagement.

Following ESR steps 1–3, Anglo American's ESR team identified risks and opportunities that would contribute directly to the strategy development for the mine's design, largely focused on the technology choices for the mine's energy and water use.

Freshwater Supply and Quality

The ESR team weighed risks and opportunities associated with investing in water-saving and sanitizing technology that would reduce the mine's water use and address downstream communities' concerns about water quality.

Operational risk: Water scarcity caused by economic growth and climate change. Population growth in communities upstream and new projects such as hydropower plants, other mining operations, and cattle ranches may threaten the supply of water to the proposed Anglo American mine, risking halting mining operations in times of drought. Local climate change and the "drying of the Amazon" could also contribute to the risk of water scarcity (Marengo et al. 2011).

Operational opportunities: Corporate water conservation practices can reduce water footprint. The installation of rain capture and storage systems would allow Anglo American to decrease its operation's dependency on the local river's water supply and could reduce its operational expenses. New recirculation and evaporation optimization

techniques to reduce water losses during the ore refining processes could also reduce water use at the mine. In addition to investing in these technologies to improve the security of operational performance, Anglo American can inform stakeholders about such practices to protect its reputation.

Regulatory and reputational risk: Reductions in freshwater availability and quality can threaten the company's access to water usage permits. Downstream communities may blame Anglo American for water quality deterioration or reductions in supply, even if the mine is taking all necessary precautions according to law. Increasing pressure on the watershed's resources from economic growth could pose future challenges to securing water usage permits from government authorities, or could increase the cost of permitting.

Reputational opportunity: Water treatment of effluents and bringing sanitation facilities to downstream communities could reinforce relationships. In a regional context of deteriorating water quality and the lack of water and sanitation infrastructure in local communities, bringing sanitation facilities to the downstream communities would allow Anglo American to address perceived water quality impacts. By treating and sanitizing water flowing downstream as part of local development efforts, the company can burnish its public image and provide downstream communities with better water quality, while reducing water-related risks.

Provision of Biomass

The ESR team weighed risks and opportunities associated with the decision to invest in the biomass combustion technology needed to use biomass as an energy source, along with the respective biomass procurement/production strategy.

Operational and reputational opportunity: Biomass use reduces operating costs and the carbon footprint of the mine. Anglo American has already developed an economic case for sustainably procuring biomass fuel over coal. Biomass fuel aligns with the company's sustainability goals regarding carbon emissions, and reinforces a positive brand image (Anglo American 2012). There is also potential to recoup part of the upfront investment in a biomass-run operating system by generating and selling carbon credits in international voluntary markets.

Regulatory risk: uncertainty of biomass legality, and legal uncertainty of reforestation projects. The biggest barrier for Anglo American to switch from coal to biomass fuel is the question of how and where to access the raw materials over the lifetime of the project. The ESR team considered procuring

biomass from the open market, which poses challenges on verifying the sustainability and legality of biomass. The team also considered running corporate-owned reforestation projects, but there are legal uncertainties regarding land tenure and permitting for reforestation projects.

Reputational opportunity: Promote local reforestation and secure access to biomass in ways that reinforce Anglo American's relationships with local communities and NGOs. Anglo American can inspire local reforestation of degraded lands in São Félix do Xingu by being a guaranteed buyer of biomass from land owners that participate in native tree planting and sustainable forest management programs. Such a program would require technical assistance for farmers and cooperation with nongovernmental organizations in the area. Such a program could provide reputational benefits to the company by raising local income levels, restoring hydrological functioning of the region, and revitalizing biodiversity.

NEXT STEPS

The ESR process helped the team better understand how mining design can limit or enhance important ecosystem services in the proposed mining region. The ESR results will be presented and discussed during the Jacaré project's feasibility phase by managers and directors in order to inform the mine's design and development. The ESR team is planning continued engagement with the regional government, nongovernmental organizations, academic institutions, and companies in the area to further investigate the findings of the ESR and to develop best practices for managing the ecosystem services most relevant to Anglo American.

Anglo American's ESR team recommends incorporating ecosystem service dependence and impact assessment into every project plan developed by the company. The team plans to use this experience as a model for other Anglo American project development processes to follow, highlighting the following factors important for success:

- Understand the environmental and social characteristics of the site—especially the surrounding areas—and early in the process identify the stakeholders who should be engaged in the assessment.
- Hold frequent ESR team meetings, always involving the site team, to ensure the ESR is accurate, decision-relevant, and co-owned by decision makers.
- Consult internal and external experts whenever possible to speed the research process and bring external validity to the ESR results.

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